Every post by Andrew Lea on Cider Works until 20.07.2021

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> Andrew, thank you for adding the note about the wind breaking limbs, as it is possibly relevant to my spot. What wind speed (and time of year) prompted your comment?

Several Pomona descriptions note its brittle wood. I'm not alone.

Here we often get autumn gales, defined as mean wind speed of 63 kph or as gusts of 80 kph, when the leaves and fruit are still on the tree (say October / November). I have certainly had leaders of Medaille d'Or snap under those conditions, side-branches fully laden with fruit. In fact it became such a regular autumn occurrence that as I said I now manage them differently to all my other cider trees and have abandoned the centre leader. With my other trees the fruit may blow off in a gale but the tree structure stays intact.

I can't really remember if I've had damage to MDO in high winds when the trees are dormant. I rather think I have. But those may have been exceptionally high winds. The situation is rather complicated because I used to have a willow windbreak when the trees were in their establishment phase but after they became mature I took it out because on a small site it was cramping them. Also, by bad luck, the MDO are on the extreme windward side of the plot so they get no shelter at all. I didn't know about this problem when I planted them.

Hope this helps?

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> I was reading this interesting discussion about keeving and I was wondering if the addition of CaCl2 or calcium lactate can be avoided acting on the apple tree itself instead of on the apple must. I mean, is it possible to control fruit calcium uptake (e.g. with calcium oxide)? Does the tree transfer enough calcium ions to the fruit in order to have a proper keeving?

The tree like other living things controls its major cations / electrolytes to certain limits with feedback loops, as long as there isn't too much or too little in the soil to cause deficiency or toxicity.

For apple fruit, the normal calcium range is 30 - 120 ppm (RSK data).

The high end of that is plenty to give you a good keeve quite naturally

(which is what used to happen until the end of the 19th century). If you consider that the normal quoted keeve addition is 400 ppm of CaCl2, you can work out that the calcium addition is about 150 ppm. It's all in the same ball park. The addition of calcium salts is a kind of insurance to ensure that enough is present to form a good gel.

> Another point is: adding calcium chloride to the apple must, we know that calcium cations bind pectin chains, but what about Cl- anions? Do they form soluble salts dissolved in the must or they will be eliminated with the cap?

I don't know for sure but I'd suspect that most of that chloride stays free in the juice. That would give you about 250 ppm extra. Normal chloride levels in apple juice are a maximum 50 ppm (RSK data).

In practice the use of calcium chloride at reasonable levels for keeving doesn't lead to problems. Calcium lactate sounds interesting though it's not as water soluble (max 8 g/L) as calcium chloride (80 g/L) so this could limit its possible application. But you could probably work around that.

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> 1. has anyone been testing juice to find the optimal pectin amount ? (in relation to tannin, ph, and sg).

That would not be easy to do without lab facilities. And even in a lab, getting an exact measure of pectin is hard work. A simple visual alcohol clot test is probably easiest.

> 2. would the addition of low methoxyl pectin post pressing be advantageous in assisting a keeve ?

Possibly, but I can't see the point. The apple itself, especially if the pulp is incubated to release pectin from cell walls, should provide all you need.

> 3. could another form of calcium be used at higher levels (would higher level be a good thing ?) such as calcium lactate(much better tasting than calcium chloride) and from what i understand as long as the cation is the same it should work, but ive been wrong before.

Yes the cation is all that matters really. Many different forms have been used in France in the past. Calcium chloride is the standard nowadays because it's cheap and easily available as 'food grade' and dissolves well. There is no advantage to adding more calcium than the maximum specified, if you do a 'back of envelope' calculation based on the amount of pectin present. Also, excess calcium doesn't taste nice.

> 4. Does the cap have to rise ? what does the act of rising actually?

The cap has to rise because it has to be physically separated from the juice. It takes away thiamin, asparagine (aspartic acid) and yeast into the gel. I don't think it would be as effective if it were just filtered out, because those elements would then remain in the juice. I think it is important to retain the gel structure (though I haven't seen any formal studies of this). Even large French factories still do this

AFAIK. They must have their reasons.

Have you seen the keeving page and other keeving links on my website? http://www.cider.org.uk/keeving.html

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> Does anyone know where i could find more information on production scale keeving ?

Depends what you mean by 'production scale'. Try Claude's book or http://www.ifpc.eu/kiosque.html#c4188

> Are there any home ways to test an approximate amount of nitrogen ?

Not easily. This has been discussed here before. See https://groups.google.com/forum/?hl=en#!searchin/cider-workshop/formol/cider-workshop/oVSy_tTWjZA/5gz9Lp2kEPMJ

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> refuses to come to life - it rotates slowly (I notice that sometimes this is the right direction and others the wrong direction) but never 'catches' into spinning hard... and yes, I have looked at it with the funnel off to see what is happening:-)

Is this a stand alone mill with its own motor or is it powered by belt drive off the press (like mine)? If the latter I would also suspect something in the belt or ratchet reverse mechanism.

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> I was quite surprised at the changes in color (colour) since all of the yeasts were pitched into the same batch of juice.

I am surprised too. In general, yeast fermentation lightens the colour of juice because it is a chemically 'reducing' environment. The coloured oxidised polyphenols, known as quinones, are reduced back to colourless polyphenols by yeast enzymes. I would have expected this ability to be the same across all Saccharomyces strains. But perhaps it isn't.

You don't say at what stage the pictures were taken? Have they all finished fermenting? Are they all at the same SG? Did you make any SO2 additions?

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> a) Force carbonated portion. The cider has a pH of 3.4 and has already had one Camden tablet per gallon at pressing and again at racking. Should I sulphite now before carbing in the keg? If so at what level would you recommend?

Ideally you need to measure the residual free SO2. Since you probably can't do that you must take an inspired guess. I would probably add

25-50 ppm SO2 but many wouldn't.

> b) Bottle conditioned portion. I gave the beer bottles half a teaspoon of caster sugar per bottle and the champagne ones one and a half. The hope being the beer bottles were lightly sparkling and the champagne ones more overtly fizzy. Have I got it about right?

If a teaspoon holds 5 g, a beer bottle 500 ml and a champagne bottle 750 ml, then you are about right according to me (page 85) and Claude (Table

15.3)

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> Thank you Andrew. I am not familiar in working with ppm, approximately how many tablets is that a rough equivalent of?

Pages 63 -64 of my book explain.

1 Campden tablet per Imperial gallon gives roughly 50 parts per million of SO2 in acid solution.

1 Campden tablet per US gallon gives roughly 60 parts per million of SO2 in acid solution.

If you want to know why, see here http://cider.org.uk/campden.html

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> Question: will keeping it chilled at -1degC be enough to stop any O2 + cider = vinegar kind of reactions? Or do I need to think about getting a CO2 blanket across it.

No it won't stop it, just slow it.

The old chemists' rule of thumb is that Q10 =2. That is, the chemical reaction rate halves for every 10C drop in temperature. So it will spoil at half the rate it would at 10C. Unfortunately the oxygen solubility will go up by about 30% as the temperature drops by 10C (gases are more soluble in cold liquids than warm). Swings and roundabouts.

Conversion to ethyl acetate / acetic acid really needs microbes to make it happen. They are inhibited in the cold too (though generally with a Q10

> 2). But conversion of ethanol to acetaldehyde and related

'oxidised' flavours doesn't need microbes if there are polyphenols present (covered last week). That is your biggest risk IMHO, rather than out and out acetification.

> It's not totally dry and at outdoor temps (10/12degC?) it's still blowing a bit of C02 itself, so may self-sort itself.

That may save you. If the liquid and headspace is still (super)saturated with CO2 and there is live yeast present, that will help to push out air physically and a small amount of oxygen ingress may well get mopped up.

I suppose ideally you should use CO2 to try to sweep out the air that gets in when you half empty the tank. At any rate I would add 50 ppm SO2 to give "30 ppm free" to scavenge any peroxide radicals that do get formed on handling. That's what I do when I send my cider off for contract bottling.

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I think you've got your wires crossed Jez. As fruit matures in store, the malic acid level drops so the pH does indeed rise.

Whether that is the explanation for the observations in the original post is open to question of course ;-)

Andrew

> Hmmm. Generally the acid drops in riper fruit so not sure it's that. Where are your apples from - have they been cold stored? The orchard that supplies me bulk dessert fruit has one of their stores that is never gassed or too chilled for juicing fruit which allows it to develop, but if it was chilled it won't have matured so could give you a higher than average PH. All the best Jez

Dear All,

For those who were missing it, imperfect and old-fashioned as it may be,

I'm pleased to say that my website has now been restored to a new host with greater bandwidth to cope with the high volume of seasonal traffic.

If you experience any problems with it (apart from its age and lack of glamour!), please let me know.

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> I found this article, which indicates that supercritical CO2 may have antimicrobial properties, specifically against Saccharomyces cerevisiae. http://www.ncbi.nlm.nih.gov/pubmed/11473595 The abstract doesn't state CO2 concentrations though.

Interesting. You can read the full article for free here http://onlinelibrary.wiley.com/doi/10.1046/j.1365-2672.2001.01386.x/pdf

If I'm reading it right, the CO2 conc values were from 15 - 30 volumes.

(For comparison it is popularly believed that the CO2 levels inside a champagne bottle (around 10 vol) are enough to inhibit growth of S cerevisiae though not to kill them.)

> What's interesting is the pressures required to yield supercritical CO2 are 4-10 MPa (600 to 1500 psi)- on the order of 1/100 the amount required for HPP, so a cider specific HPP unit could conceivably be quite a lot less money than a juice HPP unit.

Some at least of the lethal effect was claimed to be due to the explosive impact of CO2 rupturing cells on pressure release. I'm not sure how this could be made to work on an in-bottle basis at such high levels of dissolved CO2. And on a flow through basis you still have all the problems of maintaining downstream sterility on the filling line.

But it's an interesting thought ;-)

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> Wow. Could it work with cider? Sounds incredibly intrusive!!

Don't know if anyone has tried it on cider. If you you will find lots of references to experimental work in wine.

It's been used for food other than juices. Some shellfish, for instance, at least in the US and Japan.

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> a claim to increased health benefits (antioxidant is everyone's favourite buzz word!);

The "antioxidants are good for you" theory has been abandoned by mostknowledgeable scientists for the last 10 years or so now. Only marketingpeople and the Daily Mail still believe it.

Or, to be more specific, the polyphenols which have antioxidant properties are not good for you for that reason. Rather, if they have any beneficial impact at all, it's to do with up and down-regulating certain genes in the body. It is doubtful that polyphenol antioxidants per se have any useful function. Not least because the body cannot absorb most of them and their plasma concentrations are very low, far lower than those of other circulating antioxidants such as Vit C and uric acid.

There is a good downloadable review here, though you need to have some chemistry / biochemistry to follow it. Sections 7 and 8 are relevant.
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http://www.food4health.dk/filer/0910/sem2/natural_product_reports_2009_26_1001-1043.pdf

> will the application of pressure rather than heat actually help to retain more nutritional values in the juice?

Potentially it could. But modern HTST pasteurisation processes are verygentle. I would like to see the peer-reviewed data on which thesestatements are based ;-) [Also, the pilot work that I did on HPP apple juice showed that the oxidase enzymes were not inactivated so the polyphenols / antioxidants still continued to degrade]

It is arguable how good for you fruit juices actually are. We need todrill down and ask the question what do they contain that isnutritionally valuable? Their major ingredient is sugar! Otherwise it's just Vit C in most cases (natural in citrus and blackcurrant, added for apple because the native Vit C is destroyed during milling and pressing). Some juices contain carotenoids some of which have Vitamin A activity. That's about it really. You get far more out of eating whole fruits (with all their pectin and cell wall material), and from most epidemiological studies whole fruit consumption does seem to be good for people.

The fruit juice hype dates from the 1930's when Vitamin C had just been discovered. It could be time to move on.

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> And in particular, I bottled recently a cider which I had sulfited to 50 ppm prior to fermentation start. The test gave me less than 5 ppm free SO2 and 28 ppm total. I am a bit surprised by this last figure, I should have gotten at least 50 ppm total SO2 if that is the amount I added.

Not really. You could typically lose 20 ppm SO2 probably by oxidation to sulphate in the presence of polyphenols / polyphenoloxidase enzyme before fermentation begins. In fact that stacks up very well with figures that Burroughs obtained at Long Ashton in the 1970's. It's pretty much a fixed loss, independent of how much SO2 you add.

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> And this is one of the main objective of the SO2 testings I wish to do - to see which level of SO2 I can taste in a cider. At the moment I have no idea of the threshold that triggers the unpleasant taste - is it 20 ppm free? 50 ppm? I want to find out.

Claude, I would suggest you do not think of free or total SO2. I think this will confuse the issue. I suggest you think more in terms of

'molecular' SO2. The bound or ionic forms of SO2 are unlikely to have as much sensory impact as the undissociated molecular form which is almost certainly the primary odorant.

FWIW, as we have already discussed off-list, the (very sparse) literature values for SO2 sensory threshold in wines seem to range from

0.2 to 0.6 mg/L molecular SO2. But they are also matrix dependent as well as observer dependent (Blouin p 132).

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> Very interesting Andrew! Hence this effects decreases the amount of free SO2 even more. Has this been studied further since 1979? All the litterature I have seen, including your own article in Fermented Beverage Production, mention only the loss of free SO2 to binding - which wouldn't decrease the total amount...

There was no more work done on SO2 loss by oxidation after 1979 as far as I know (I have checked the Annual Reports up to the Cider Section closure in 1985).

You are right that oxidative loss isn't explicitly mentioned in my article in FBP. I suppose it falls into the category of "everyone knows that"! It is kind of axiomatic to a beverage chemist that sulphite can slowly oxidise to sulphate. And as we have discussed before, the primary use of sulphite at bottling is as an antioxidant and so you would expect the sulphite level to diminish somewhat on storage. Likewise during the early oxidative juice stages after sulphite addition and before fermentation begins.

But these oxidative losses are quite small and quite slow. Importantly, they don't really affect the antimicrobial function of SO2 or the necessity to allow for binding compounds and pH to get the correct molecular level.

Sorry if you feel you've been misled!

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> I thought I had this figured and now Andrew I am confused again. What is the difference between free SO2 and molecular SO2? Cheers Trevor

'Molecular' is only a very small part of 'free' and is the only biologically active part. Its relationship with 'free' is pH dependent.

Again, my SO2 page http://www.cider.org.uk/sulphite.html should make it clear (under the heading 'More information for tecchies' and the following schematic), and further if you go to the first workbook of the linked spreadsheet http://www.cider.org.uk/sulphite_binding.xls where the calculation of the pH equilibrium is shown.

Hope this helps.

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> I have looked through Liz Copas's book to find these - without success.

Liz's book doesn't do ornamental crab apples. It's a cider apple book.

I'd say "Golden Hornet". https://www.rhs.org.uk/plants/details?plantid=1261 and elsewhere via Google

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> I am new to cidermaking , and am looking for cider apple scionwood . I have several hundred varieties that I have planted for dessert and cooking and general use , and I am sure a good number of them are cider apples . I would like to trade scionwood I have , for scionwood of varieties I am looking for .

And you are in which country?

This is an international list and generally plant health regulations do not allow transfer of apple wood overseas, nor even across land frontiers in many cases.

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> I have obtained scions for Dabinett and Kingston Black and plan to graft them onto my mature ornamental crab tree. Will this work? My crab tree has never been pruned, so I am planning to do some corrective pruning, and then use a cleft graft to attach 2 scions at the end of 5 main branches. I know it's not a conventional approach, but, I'm eager to get some apples from an existing tree. My yard is too full to make into a proper orchard.

It should technically work but you will end up with what is known as a

'family tree'. That is, you will have three varieties on the same framework all competing with each other. Especially in the first couple of years you will have to be sure to rub out the unwanted crab shoots which will spring up from all over (though presumably you will leave one or two). It will take a lot of management to keep them all in balance but if it's your only option then go for it. The crab should help act as a pollinator.

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> Is champagne with a sweetened dosage pasteurized? If not, it seems it would have the same problem of the sugar in the dosage fermenting with residual yeasts.

No it isn't pasteurised. In food microbiology we have the very usefulconcept of 'hurdles' to microbial growth. In dosage-sweetened champagnethree 'hurdles' are much higher than in the ciders we've been discussing.

1. Virtually all yeasts are removed by disgorging and those that remainare mostly dead or crippled after such a long period (years) of autolysis at high CO2 pressure.

2. The alcohol level is about twice as high as in a cider. This inhibitsrenewed yeast growth.

3. The CO2 pressure is at least twice as high (6 bar) as it is in acarbonated cider. At this pressure yeast growth is prevented (eventhough any viable yeasts can remain viable, they can't grow).

For all those reasons sweetened champagne is typically stable if wellmade. However, as I think Jason from Ashridge pointed out a few months ago, the quality of the disgorging is a very critical factor in ensuring this and it can go wrong from time to time.

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> If you pasteurise your bottles without caps, yes for sure you will lose most of the carbonation... With heat, all dissolved CO2 will escape.

And the mess!! Foam everywhere!!

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> I'm not sure what Babycham is but I know perry is traditionally still in the UK.

Babycham is a carbonated sweetened and pasteurised perry product whose heyday was the 1960's. It was the forerunner to today's alcopops and fruit ciders and was targeted at female drinkers.

> had read that high pressure can promote the LAB conversion of citric acid to acetic acid. Have you ever heard of this happening?
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You have misunderstood. The reference you incorrectly cited (correct link is http://www.somersetmade.co.uk/oldscrump/makingperry.php) was written by Gillian Grafton about 20 years ago. She cribbed it from

Luckwill and Pollard without quite understanding it.

The relevant passage from Luckwill and Pollard reads:

"Naturally sparkling perry, made by the traditional champagne process in bottle, is rarely seen, for the problem of tannin deposition would interfere with the process of disgorging the yeast deposit. When such perries are made in bulk by fermentation in pressure tanks, this problem is avoided by the use of filtration before bottling. Unless the juice is flash-pasteurised or adequately sulphited it is also an advantage to select pear varieties low in citric acid, for lactic acid bacteria grow readily under high pressures of carbon dioxide. At the end of fermentation the perry is chilled to reduce the pressure before filtration and bottling: it helps, at the same time, to precipitate any unstable tannin that may be present."

What that says is that LAB grow readily in unsulphited naturally conditioned bulk sparkling perry (Charmat process) in the presence of

CO2. It does _not_ say and it does _not_ mean that a pressure of CO2 actually encourages their growth; merely that it doesn't discourage it.

The two are not the same.

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> I have occasionally seen damage to the foliage of apple trees caused by accidental exposure to glyphosate. It looks like severe mildew, without the powdery coating, for want of a better description.

Two quite interesting articles here from US orcharding academics / extension advisers.

http://msue.anr.msu.edu/news/glyphosate_damage_in_apple_and_cherry_orchards

This one has pictures demonstrating Con's observation.

http://www.nyshs.org/pdf/-NYFQ%202013.CMC/Send%20CMC%20NYFQ%20Winter%202013/Pages%2023-28%20from%20NYFQ%20Winter%2012-12-2013.cmc.pdf

The last one seems to demonstrate some inconsistent effects on fruit itself from simulated spray drift. It would have been interesting to see some data on glyphosate residues or its metabolites in the fruit.

The mammalian toxicity of glyphosate is of a low order so that might be some reassurance. I don't remember anyone querying the safety of fruit from glyphosate treated orchards, despite the well known tree damage reports. And it is fairly widely used.

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> Here's my predicament: I added sulfite to the first half of an IBC (50ppm, ph 3.2), before adding yeast. Then a few days later I filled up the rest of the IBC with a second pressing of juice, but forgot to add sulfite first. So now half the IBC (500 liters) needs 50ppm of sulfite, but I know it can't be added at this point because it will kill the yeast!

No that isn't true. You'd need a great deal more to kill the yeast - thousands of ppm. More to the point is that if the sulphite is added while the yeast is actively fermenting, it will be bound up by the acetaldehyde that the yeast produces, so it will be ineffective.

Your proposed solutions make no sense because they don't get around this issue. In any case, they are a drastic overthinking of what is a minor problem. (To that extent, although I'm a great believer in sulphite and all the good it does, I agree with Tim and Nick)

I suggest two possible options:

1. If there is no evidence that the yeast has yet started serious fermentation, you could possibly add the 50 ppm SO2 to the bulk now.

Some of it might be bound but some of it might do some good.

2. If the fermentation has already obviously started, do nothing. You will have 25 ppm of SO2 at pH 3.2 with presumably a full-dose yeast inoculum, so really the chances of anything going badly wrong under those conditions are quite minimal.

> Are there any other solutions that would be better? (i.e. just waiting until racking?).

In effect yes. But the SO2 you add before bottling (second racking) has a different function to when you add it to the juice before fermenting.

Don't get confused.

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> I am about to skip the salt. Do you agree?

I wouldn't. What I think you have done is form an acid pectate gel. As the pH falls the pectate becomes more protonated and hence less soluble.

That's not the same as a cross-linked calcium pectate gel which is found in keeving. I don't think the gel will be as robust as you need.

It's tricky to advise, to be honest. Could you do trials of both in parallel?

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> Ok, so would you suggest to ad the salt first and then decrease the pH?

It is really difficult to advise, since your apples seem to behave so differently to anything that I'm used to.

But I don't see how you could add acid after a gel has already formed?

How would you disperse it without breaking the gel?

It seems to me the options are

1. Add acid before adding the salt.

2. Delay adding acid until after the keeve is quite finished and you have racked away from the gel and you have a clear juice again.

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> Anyhow, I've been using a cheap nasty ph meter which is in hindsight a total waste of money, since it was giving a reading of 4.1 with the eater juice, which I suspect is way out.

Did you calibrate the meter with a standard buffer? No pH meter will read true without prior calibration.

From the description of the apples you give, we might assume a pH of

3.5 or so.

> having run out, I made a stock solution from 100g Sodium Metabsulphite in 1 litre water) and added 7.5ml of this (ie 1.5 campdens) per gallon, to a total of 3.5 campdens per gallon

That's 175 ppm. At pH 3.5 you only needed about 100 ppm. But that's not a stonking overdose.

> Left it 2 days before pitching the yeast and the fermentation did not start, even in a warm place. So I added the yeast from another finished batch, assuming it would kick start it - but still nothing.

How long are you waiting after adding the yeast? You might have to wait several days, especially if the SO2 was on the high side. What sort of yeast was it and was it hydrated properly and applied at the recommended dose?

> I suspect the ph meter was way out, and I've massivly over sulphited, and effectively killed the yeast off too :-(

I agree the pH measurement sounds wrong. But you haven't _massively_ oversulphited. Any good fermenting yeast should be able to overgrow that level of SO2.

> To rescue this batch, would it be OK to mix it with an equal volume of juice with no extra sulphite - effectively bringing down the campdens to 1.75 per gallon?

If you like. Or just give it more time!

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> Sorry to be thick but how did you get to 175ppm?

*Guy quoted 3.5 Campden Tablets per gallon. By definition 1 CT per gallon gives 50 ppm SO2. So 3.5*50 = 175 ppm.*

ppm stands for "parts per million" and more formally is expressed as mg/L (milligrams per litre).

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So following from the previous thread, I tried the experiment.

I bought some ethyl maltol (easy to get online cos the e-vapers use it) and just tried dosing it in some ciders.

I dosed at 100 and 200 pm in two dry ciders from different years and in a sugar-sweetened carbonated pasteurised cider (all my own). I also dosed it in plain tap water. I used undosed samples as controls.

In the tap water it had a barely discernible candy floss / cotton candy character at 200 ppm only (I did know what I was looking for but I think it was genuine!)
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In the dry ciders I don't think it did anything at all at any level.

In the sugar-sweetened cider it gave a marginal 'sweetness' enhancement at 200 ppm only but if anything made it seem less fresh and more cooked and caramelic, so not a character one would value. This became more obvious as the (light) carbonation was lost to the atmosphere.

It didn't enhance the fruitiness perception in any cider.

These results are much in line with the data from some published trials in grape and apple juice I'd say http://www.uark.edu/depts/ifse/grapeprog/articles/ajev44-3c.pdf

I am slightly surprised / disappointed because I've worked with maltol and ethyl maltol before in chocolate systems where AFAIR its effects were much more pronounced. But fatty systems are very different in their taste responses from aqueous ones.

I'd be interested to hear if anyone else tries it. Overall I'm left wondering how it got into the US wine regs and who ever seriously used it and why. There is data to show that maltol has some inhibitory effects on yeast and lactic acid bacteria so I wonder if that was the main reason for its inclusion - the citation does talk about it as a

'stabilizer' so maybe it was there more as an anti microbial (though probably not a very effective one) than as a flavour enhancer.

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> Thank you for looking into this. I will replicate your trial with some ciders here (southern Pennsylvania) when my e-cig ingredients come. I couldn't find maltol, but only ethyl maltol, so my trial will be similar to yours. Am I right in thinking that you would expect ethyl maltol and maltol to give about the same results?

I don't think maltol is used by the e-smokers. I have only seen ethyl maltol for sale. I presume that's because ethyl maltol is more volatile than straight maltol. It is also more potent on a mass basis by a factor of 2 - 3 times (because it's more lipophilic). I think both have been added to conventional tobacco products for maybe 50 years or so.

The sensory characters of maltol and ethy maltol are almost identical

(cf vanillin and ethyl vanillin). Only the threshold values differ.

> The other day I read on this forum that when doing trials with sweeteners it is important to wait 24 hours or more before tasting the results of the added sweetener. Would this apply to ethyl maltol too? Would waiting even longer be worthwhile?

It's a moot point. I think it's worth waiting 24 hours. I'm not sure it's worth waiting longer. (Don't ask me for the science! It's probably to do with the way molecular aggregates are formed in complex multicomponent solutions.) Sugar (sucrose) is a bit different because it actually hydrolyses in cider so some chemical equilibrium time is required.

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> I have done ten single gallon yeast test batches using the same juice, that are now just starting to finish fermenting. I am now trying to figure out what the way to keep these ciders safe from air. I haven't racked them off yet and they all headspace for fermentation.

Let each gallon finish to dryness under airlock and rack straight into glass bottles. You should get 5 good bottles out of a gallon, which is an advantage because then you can have several independent tasting sessions without fear of oxidation in part-filled bottles. I use the 70 cl bottles with screw threads / caps.

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> Couldn't one effectively stop the MLF by simply lowering the temperature?

Well no. Because as soon as it warms up the bacteria will start to workagain. Unless you plan to keep your cider chilled say Also, what is your opinion about maintaining a 15 C temp during the MLF phase? Is that warm enough? Or is it a simply a matter of experimenting?

You must consult your supplier's data sheet. I used Biostart Oenos SK1which quotes a minimum operating temperature of 17C. YMMV. I used it atambient temperature in an English summer and it took about 3 months todrop the acid from 0.8% - 0.5% (as malic). That was probably as far asit was going to go, it was about where I wanted it, and then I had the cider pasteurised.

ML organisms can run out of steam if they run out of nutrients.

Especially since in ciders, unlike wines, they have a _lot_ of work to do.

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> I think you will get better results if you stop it before it completely finishes.

How did you stop it? SO2? Lysozyme? Pasteurisation?

You are right that if it goes the whole way, MLF can effectively take out half the acid in a cider. That may be too much. That's why monitoring TA coupled with tasting helps to know where you are.

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> I would really appreciate it, if anyone could recommend a good cider making course in the UK.

http://www.cider-academy.co.uk/uk_scheduled_courses.shtml

http://www.warwickshire.ac.uk/courses/search_results/course_details.aspx?Id=12399

http://www.warwickshire.ac.uk/courses/search_results/course_details.aspx?Id=12634

> . If you have no objection to using O2

Whoops typo! SO2 of course.

~~~

All good stuff. But the weakest link is that for the most part we have no good idea of the PU's needed for any particular cider. We take a standard value, say 50 PU because it seems to have worked for generations of cidermakers, but with no way of knowing if that is right or not. So you can log all you want but the actual requirements are still based on guesswork! Or "custom and practice", if you prefer!

It's much the same as our approach to SO2 addition ....

Just reflecting .....

Andrew

> Someone a while back had programed a raspberry pi or some such device to count pu's and bleep when it had reached the required amount. Vince --Original Message-- From: cider-w...@googlegroups.com [mailto:cider-w...@googlegroups.com]

> My experience with the Vigo style 27 L 1.8 kW pasteurisers is that at any given point during heating the bottle or bag contents lag about 10C behind the bath temperature. However, once a set bath temp is reached, the heater of course continues to operate until the bottle or bag contents are in equilibrium with the set bath temp. This takes about 20 minutes to achieve in my experience. YMMV of course.

> I agree that a measurement of internal bottle or bag temp is the best thing. Not so easy if you have a pre filled and sealed totally immersed bag though. One way round that is to leave the bag open above bath level so that its internal temperature can be measured. But as soon as the bag is taken out it must be sealed with a tap and then inverted to sterilise the neck and tap area.

> Andrew

On 26 Jul 2014, at 21:00, Wes Cherry -Wes

> Just bought a new pasteuriser from vigo. Can anyone please tell me at what temperature to keep it at and for how long to pasteurise cider as opposed to apple juice? See http://www.vigopresses.co.uk/AdditionalDepartments/Header-Content/Ma ke-cider/Pasteurising-sweetened-cider/How-to-pasteurise-sweetened-ci der Although Vigo recommend the same temp 75C for cider as for apple juice, you probably don't need to go quite that high because of the hurdle effect of the alcohol. 68C is probably enough. But you won't come to any harm at 75C, just maybe it will become slightly more cooked. If you have no objection to using O2, I would personally add 50 ppm SO2 to the cider before pasteurising, which will go a long way to alleviating cooked flavours.>>>

> Also is it possible to pasteurise the cider directly in the vessel and then fill up a 20 litre bag in box via the tap? Not advisable, because (a) you will 'cook' the cider by heating it directly rather than in a 'bain marie' and (b) you will break the chain of sterility by putting sterile cider into a non-sterile bag.>>

> You might get away with it if you are lucky. But if any stray yeasts chance to get in, your BiB will become a balloon and eventually explode.>>

> Andrew -- near Oxford, UK Wittenham Hill Cider Portal www.cider.org.uk -- -- Visit our website: http://www.ciderworkshop.com You received this message because you are subscribed to the "Cider Workshop" Google Group.>>

%2%

~~~

> Just bought a new pasteuriser from vigo. Can anyone please tell me at what temperature to keep it at and for how long to pasteurise cider as opposed to apple juice?

%1%

See http://www.vigopresses.co.uk/AdditionalDepartments/Header-Content/Make-cider/Pasteurising-sweetened-cider/How-to-pasteurise-sweetened-cider

Although Vigo recommend the same temp 75C for cider as for apple juice, you probably don't need to go quite that high because of the hurdle effect of the alcohol. 68C is probably enough. But you won't come to any harm at 75C, just maybe it will become slightly more cooked. If you have no objection to using O2, I would personally add 50 ppm SO2 to the cider before pasteurising, which will go a long way to alleviating cooked flavours.

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(a) you will 'cook' the cider by heating it directly rather than in a

'bain marie' and

(b) you will break the chain of sterility by putting sterile cider into a non-sterile bag.

You might get away with it if you are lucky. But if any stray yeasts chance to get in, your BiB will become a balloon and eventually explode.

~~~

> While I was at a brew store the other day, the gentleman who was helping me.....

I would have asked him just how much cider he has ever made himself ;-)

~~~

> I would like to use Claude's spreadsheet but do not have the information for Newtown Pippin.

There is an old Long Ashton Report for 1931 where they brought in apples from British Columbia and made cider from them. Newtowns were amongst them and were reported to be in good cidermaking condition. Their acid level was recorded as 0.53%

For comparison, the acid levels of the other apples in the trial (all BC grown) were as follows in %:

Mackintosh 0.32

Rome Beauty 0.37

Grimes Golden 0.40

Winter Banana 0.38

Jonathan.. .. 0.46

Delicious.. .. 0.26

Staymen.. .. 0.49

Newtown.. ..0.53

Winesap.. ..0.51

This is just one measurement from over 80 years ago but maybe it gives some idea. Doubtless there is more modern data; it's just a question of finding it!

~~~

> You may already have seen this: http://en.wikipedia.org/wiki/Malus_sieversii

If you want a good read on this topic, look out for a copy of this book http://www.amazon.co.uk/Story-Apple-Barrie-Edward-Juniper/dp/0881927848

Barrie Juniper in Oxford was one of the people who did much of the original work on this and collected samples from Kazakhstan to verify his hypothesis through DNA analysis. He also suggests that large sweet apples were selected and propagated by bears, not humans. (That's from seed, obviously. We don't think bears do grafting!).

To us as cidermakers, this more recent paper is most interesting http://www.plosgenetics.org/article/info:doi/10.1371/journal.pgen.1002703

Amongst some interesting new information about the possibility of wild

European crab apple Malus sylvestris contributing to the genepool of

Malus domestica, it also says the following ...

"The Romans introduced sweet apples into Europe at a time at which the

Europeans were undoubtedly already making cider from the tannin-rich fruits of the native M. sylvestris [35], [72]. Cider is not typical of

Asia [35], but it was widespread in Europe by the time of Charlemagne

(9th century, [73]). Large numbers of apple trees were planted for cider production in France and Spain from the 10th century onwards [48], [52].

The very high degree of astringency of cider apples (often to the extent that they are inedible) led to the suggestion that cider cultivars arose from hybridization between M. sylvestris and sweet apples [35], [46],

[65]. We show here that the genetic structure within the cultivated apple genepool is very weak, with poor differentiation between cider and dessert apples. Cider cultivars thus appear to be no more closely genetically related to M. sylvestris than dessert cultivars. "

Which is not what a lot of romantics out there would like to have you believe!!

~~~

> When you mentioned 40c temperatures it sounded a bit worrying. I still don't think pasteurising would help.

Greg is right but I think we should unpick all this a bit.

There are two aspects to think about as regards 40C storage, microbiological and chemical.

The main microbiological threat to a dry cider is mostly due to lactic acid bacteria. If the cider has already undergone MLF, then the bacteria shouldn't proliferate any more. In that case pasteurisation is probably unnecessary. But if MLF hasn't happened, then I'd say that SO2 addition and pasteurisation are very valuable in preventing that happening in bottle.

The chemical threat to a dry cider held at 40C cannot easily be prevented. Remember that every 10C rise in temperature doubles the rate of chemical reaction. There are many reactions that go on, but one of the major

ones is probably the Maillard reaction in which sugar and amino acids react to give 'cooked' flavours. Even a dry cider will have enough unfermentable xylose and other sugar-like molecules for this to take place. SO2 has some benefit in inhibiting this pathway, but it won't affect other pathways eg ester hydrolysis.

You can't alter the fact that high temperature storage is damaging to nearly all alcoholic and non-alcoholic drinks with the odd exceptions like Madeira or maple syrup where thermal processes are an integral part of developing their flavour profile.

~~~

> Hi folks Any opinions on racking during MLF? The cider finished fermenting 3 weeks ago (residual sugar Well, sheep was proposed... But the trees are young and have tempting sheep-height leaves/branches... Still essentially a bush orchard. I reckon they'd get stripped.

Mow and strim all you can mechanically without damaging the trees. Then use glyphosate around the base of each tree; though you are probably coming to the end of the effective treatment season just now. Repeat annually or consider black mats around the base of each tree to keep the area bare in future seasons until the trees are big and ugly enough to look after themselves. M25 won't need much cosseting once it's established.

~~~

> consider black mats around the base of each tree to keep the area bare in future seasons

This is the type of thing I had in mind http://www.amenity.co.uk/woven-polypropylene-mulch-mats/woven-polypropylene-mulch-mat-50cm-x-50cm.html

~~~

> Andrew said "For those who are not aware of the long standing science..." Cheers for that Andrew,

Conversion of citrate to acetate by lactic acid bacteria wasfirst described by Muller-Thurgau (yes the same Muller-Thurgau after whom the grape is named) in 1913. So quite long-standing, yes!

> I obviously need to read up on perry making before this season... ;)

Unfortunately there are very very few places where you can read up on perry-making. Perhaps one day Tom Oliver will write the book ;-)

~~~

> I've just pressed a load of pears that weren't in the best of condition, mainly bruised/cut not really any manky rot. I'd prefer to sulphite it to cover myself. Do I follow the cider table?

See this thread

https://groups.google.com/forum/#!topicsearchin/cider-workshop/perry$20sulphite$20long$20ashton/cider-workshop/fSDX-9HXHwo

~~~

> For standard trees on M25 you should wait till they get to 2 m + and then do your first prune so that the buds break where you want them, at around 1.8 m.
~~~

Just to be clear. Grow them on unpruned this year, but rub out any side branches that appear during the growing season. Next winter make a pruning cut at around 2 m so that in the following year side branches will develop at 1.8 m.

~~~

> Does it make sense to prune some 10 cm or more off the tip of the baby trees now, to encourage lengthwise growth, or should I leave them to their own devices until they have reached, say, 2m and start training my three or four main branches and the central stem then? Or ... ?

If you prune now you will just get buds breaking lower down which you

don't want.

For standard trees on M25 you should wait till they get to 2 m + and then do your first prune so that the buds break where you want them, at around 1.8 m. In other words let them grow on this first year without any pruning until this time next year. If any side shoots appear during this year, rub them out.

As far as I know this is normal practice for standards.

~~~

I have heard this argument too about strengthening the stem (though can't remember where!). It maybe doesn't much matter which way you do it as regards side branches that develop on their own. I think the thing is though that you don't want to tip the leader until it gets over 2 m, if a standard is what you want. You don't want to specifically encourage lower side branching in a standard surely, even temporarily? [I had Liz

Copas check what I wrote in my book and she didn't pull me up on it.

Though she did add that a budded standard tree can be pruned into a centre leader form if you want to do that. But traditional standard trees seem to be grown with a more natural style of crown].

The amount of feathering or natural side branching and their angles

(horizontal good, vertical bad) will also be dependent on variety of course .....

Andrew

> I wouldn't call myself an expert on this either, and I welcome to be corrected! But I have a feeling there is an argument for leaving side-branches on the stem, as long as they are not directly competing with the leader. If they are no more than about 1 third the diameter of the main stem at their point of branching, and their angle is pretty wide, I think they are good. Any side-branches or feathers help to strengthen and thicken the main stem. They can be kept in check by shortening or removal as appropriate, and once the main 3 or 4 branches of the permanent crown, at 1.8m or 2m, have have made a season's growth, any lower side-branches can be removed. Somebody please correct me if I'm wrong about this! David Llewellyn Tel: + 353 87 2843879 www.llewellynsorchard.ie (previously 'fruitandvine.com') --Original Message-- From: cider-w...@googlegroups.com [mailto:cider-w...@googlegroups.com]

> For standard trees on M25 you should wait till they get to 2 m + and then do your first prune so that the buds break where you want them, at around 1.8 m. Just to be clear. Grow them on unpruned this year, but rub out any side branches that appear during the growing season. Next winter make a pruning cut at around 2 m so that in the following year side branches will develop at 1.8 m. Andrew

> As the ambient temp has dropped recently and with juice temps around 12c, I have had very slow starts with 350 yeast. A week in and no noticeable activity. The data sheet suggests it isn't suitable for ferments below 15c due to its tendency to flocculate at low temps. Should I switch to a more cold tolerant yeast for the rest of my cider this year?

I wish I had the answer! Experience from people currently using AWRI 350 is that you do need to be at 14 - 15C or so to get continued activity.

When I used it 40 (!) years ago at Long Ashton for small scale work we did our fermentations at 17C and it was just fine. Typically even at just 100 ppm YAN it would take around two weeks to dryness; at 50 ppm

YAN about a month, and at 25 ppm YAN it would be about 2 months. But I believe it was also used for our commercial ciders which would have been fermenting at UK ambient cellar temperature a good deal lower than 17C.

Unfortunately there is nobody left from that time whom I can now ask :-(

It certainly does flocculate nicely. The question really is, will it continue activity after low temperature flocculation and will it start working again when the temperature rises? It has only recently appeared on the market in ADY form so I don't think there's much experience of its current use at low temperatures. I hope to investigate this myself this season. Despite my preference for / happiness with my wild yeasts,

I do like the aroma profile of AWRI 350 plus there is the sentimental aspect of meeting up with a very old friend! That's why I want to look at it some more, despite having turned my back on cultured yeasts in general.

Sorry I can't give you an answer ;-)

~~~

> How does this group feel about adding yeast nutrient 4 days after initial pitch, I didn't have any on have at the time...I do now, would this be a waste our would the yeast still benefit from it?

It all depends...

- what sort of fruit are you using (high or low nutrient)?

- what does the yeast data sheet say about nutrient requirements?

- is the yeast prone to H2S formation?

- do you want a 2 week commercial fermentation or a 3 month craft one?

We cannot answer these questions for you. But you need to think them through. My view would be never to add nutrient unless or until the fermentation 'sticks'. Slower is better. But not everyone here agrees.

(If you do decide to use it, I don't think the 4 day delay is terribly relevant unless fermentation is already very fast and nearly finished - in which case you don't need it anyway!).

~~~

> I'm in the "make the yeast happy and they will make you happy camp". I just don't see the benefit of having malnourished, stressed yeast which produce hydrogen sulfide and volatile acidity.

That's a rather sweeping statement! Not all yeasts have the same nutrient requirements. Some might react like that, some won't. My favourite cider yeast AWRI 350 doesn't, for instance. That's why I say

"look at the data sheet".

Anyway, cultured yeasts aren't the only game in town. I haven't used cultured yeast in my own personal cider making for 20 years. I prefer a sulphite-directed wild yeast succession, and it doesn't gives me H2S or

VA. Just prize-winning ciders.

~~~

> Andrew Lea wrote: 2. Cider during and immediately after fermentation is not just saturated with CO2, it is markedly super-saturated. Andrew, do you have data/numbers on this? How much super-saturation can we get? Can it be 20%, or even more? And how long can this super-saturated state stay?

I don't have any specific cider data, but the UC Davis Wine Technology guru Roger Boulton says (in the UCD bible Principles and Practice of

Winemaking) "at the end of fermentation, young wines will hold considerable quantities of dissolved CO2, usually two or more times the saturation concentration, and this will be released during transfers and barrel storage in the following months". And the Canadian wine scientist

Ron Jackson says (in his book Wine Science) "During maturation, much of the supersaturated CO2 escapes, and its concentration falls to about 2 g/L (saturation) by bottling".

So you may be looking at supersaturation persisting for several months.

I would guess it depends on tank size, type of venting and many other factors.

~~~

> Need some help, my air locks have stopped bubbling already after only 1 week I have tested the SG and it reads 1.000 so I presume all the sugar has been converted What do I do now!!!!!!

http://www.cider.org.uk/part3.htm#conduct

~~~

> The cider after bottling looks and smells fantastic the first sip is excellent but has a truly awful aftertaste that invades the mouth like a bitter tannin but it is not like any bitter tannin I have tasted. Nor is it an astringent taste. The taste is not evident in the fruit before pressing or in the must pre-fermentation it appears post fermentation.

From what you would say about bitterness formed post-fermentation I would perhaps guess at the formation of acrolein by unwanted lactic acid bacteria. Tell us about the yeast you use, or is it wild, and what levels of SO2 you are using? What sort of vessels are you fermenting in? Could it be some sort of taint transfer from a plastic?

~~~

> I have a lot to learn and my assumption is that I am just doing it wrong :)

I wouldn't assume that. From the details you gave, you sound to be doing pretty much right. I'm less likely to think 'acrolein' now. The odd thing is that it doesn't occur in your other ciders and perries. Which would tend to indicate it's inherent in the fruit rather than a feature of the process.

Can I ask, with you being in New Zealand, are you familiar at all with bitter-sweet cider varieties? Are all your other ciders from dessert fruit? For instance, have you ever met a Tremlett's Bitter apple? Maybe what you have is a wilding with some of that character but you are just not used to it. The fact it appears post-fermentation could just be that the bitterness becomes more pronounced when all that sugar has gone.

> I will definitely give it one more go. Maybe I will learn something.

I would suggest trying a nice gentle wine yeast of known provenance from a primary yeast supplier but not of the champagne / bayanus type which tend to expose bitterness. Forget the so-called cider yeasts and any which are just re-badged 'own label' types of unknown provenance like the ones you've been using. Try Lalvin QA23 or 71B or KV-1116 perhaps? http://www.makewine.co.nz/categories/winemaking-ingredients-individual-items/winemaking-yeasts.

Or Mauri AWRI 350 if you can find it.

~~~

> If its been filtered and pasteurised etc etc i think they ve measured sugars not artificial another reason to drink real cider rather than sweet pops just thought the article would be of interest

Doesn't follow. My real keeved cider contains more sugar than the one quoted in The Telegraph article ;-)

~~~

> Looks OK to me, Andrew... I was a bit confused first as I had assumed ABW would have to be in grams per 100 grams of cider, but you seem to take it as grams per 100 mL of cider - but this would make only a slight difference for medium and sweet ciders where SG may be over 1.010.

Thanks for checking Claude! Yes I'm making the assumption that at normal drinking strengths mass per volume is pretty much the same as mass per mass, so it's not worth correcting for. It deviates markedly at higher

SG of course.

~~~

> I made a spreadsheet to calculate the amount of hidden sugar in several popular "6-pack" ciders, as well as the ciders I make. The amount of sugar added is truly astonishing. Almost 80 g/L for some. Angry Orchard "Dry" features 50 g/L of added sugar!

Sorry I don't understand what you have done there. Where are you getting your primary calorie data from? Is it 'on pack' in the US (I didn't think so?). And then are you trying to back-calculate the sugar content from that calorie content?

Can't you just measure the SG to get the sugar level? Isn't that simpler?

~~~

> However the effect of alcohol calories and glucose calories are different when metabolised in the body (as is glucose vs fructose by the way). Not all calories are created equal when it comes to animal metabolism.

Indeed. But the century old 'Atwater' conversions are what are still used for labelling purposes and as far as I can tell this is unlikely to change in the near future, since there seems to be no consensus on how to create a more metabolically relevant system.

~~~

> I wonder what the cal content of different types of cider is

You can calculate it quite easily from the sugar and alcohol content, using the 'Atwater' conversion factors which are over a century old but which are still the standard for calculating 'label' calories. The alcohol level is declared on the bottle; the sugar content isn't but you can measure it pretty much from the SG.

First measure the SG of the cider with a hydrometer and convert this to sugar content. Roughly speaking SG 1.010 is 2% sugar and pro-rata. The calorific value of sugar is 4 cals per gram, so if for example you had a cider at SG 1.010 it would give 8 cals per 100 ml from the sugar.

Next take the alcohol level as declared on the bottle; let's say it's 5%

ABV (alcohol by volume). This needs to be converted to alcohol by weight (ABW) so multiply by 0.8, to give 4% ABW. The calorific value of alcohol is 7 cals per gram so in our example this gives 28 cals per 100 ml from the alcohol.

Finally add the sugar and alcohol calories together. In our example this gives 8+28 = 36 calories per 100 ml. If you drank a pint of this cider

*(568 ml) you would therefore be consuming 36*5.68 = 204 calories.*

I think it is telling that far more calories are likely to come from the alcohol than from any added or residual sugar.

Andrew

PS Check my arithmetic, someone. I think it's OK but it's Sunday morning and the clocks here have changed so I'm not awake yet!

~~~

> This year I have bittersweet juice with a pH well over 4. I am sulphiting at 50% the recommended rate for wild fermentation which has started and have added malic acid at .5g/litre. I am struggling to get hold of sharp apples or juice. I don't really want to add any more malic acid as last time I did this at higher quantities it gave quite a crude acid taste to the cider . I have some cider from last year that has a Ph around 3.2 and was too acidic to drink. I am thinking of blending this into the current fermentation to reduce the Ph? Is this wise? What are the risks?

Re-working old cider into a fresh fermentation is not uncommon commercially. In fact it's even listed in C&E 162 as an 'ingredient'! I have also done it quite successfully on a hobby scale. You need to use sensible proportions though. You probably wouldn't want to add more than about 50% old cider into new juice.

The only caveat is to assess the old cider critically before you begin.

If it's just acid, that's fine. If it's a little bit oxidised / sherry- like or marginally acetic that's fine too. The new fermentation will take care of that by metabolising such things as acetaldehyde and ethyl acetate. But if it's obviously tainted eg mouldy or mousy or woody or seriously barnyardy, don't use it. Those taints won't ferment away and you'll just be left with a load more tainted cider.

~~~

> Thanks, Andrew. I guess I'll just wait and see what happens. Fingers crossed...

Well wild yeast fermentations are by definition a succession of different organisms, so perhaps something foamier was just having its*

15 minutes of fame ;-)

The likelihood is that everything will be OK. You are doing all the

'right' things - pH control, SO2, airlocks. It would be very bad luck if they let you down.

Andrew

* I think what I mean by that is some yeast which has the ability to make foamier proteins or perhaps to modify apple pectins in some unusual way. It's all about lowering of surface tension. The initial 'apiculate' phase is generally regarded as the foamiest as you know.

~~~

> Thanks for the reply, Andrew. Yes, one other aspect of this year's ferments is that the foam on some occasions has been very firm and almost 'set' - a bit like polyurethane expanding foam...? They have felt dry & 'crispy' to the touch.

Could be the action of natural apple PME (pectin methyl esterase) kicking in and forming a semi-keeved cap. More likely to happen at the higher pH and with a greater proportion of bittersweet fruit for you this year.

~~~

I've never come across this before &amp; doubt it is down to any climatic effect as it's been very cold &amp; frosty here of late. Maybe this is some kind of one-point-three-reoccuring fermentation.. ? ;-)Anyone else experienced similar or any thoughts as to what might be going on?Ray

~~~

> OK - No turbidity, just good fizzy ferment. No odd aromas, one tub has a bit of a sulphorous wiff but nothing unusual at this stage of the ferment. SG ranges from 1.025 - 1.045, all starting at 1.055 - 1.058. So nothing unusual apart from this burst of activity...

Hmm.. At the back of my mind was Zymomonas (Cider Sickness bacterium) which I have never knowingly encountered myself but which did affect high pH sweet ciders in store in the UK in past years when such things were common. A sudden violent and foaming fermentation is apparently characteristic of Zymomonas infection. But whether it might also affect a cider in active yeast fermentation I don't know. It has certainly been shown to be present in apple pulp.

~~~
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> Hello, is my picture not clear enough? This big white blob settled to the bottom of the carboy after the juice was left overnight with KM, then it slowly lifted up off the bottom and we were able to easily rack off from underneath. We are very curious if we are keeving without trying with our crabapple.

Well it is quite possibly some form of pectin / pectate gel. These things are not uncommon when working with apple juice. I would not call it a 'keeve' as such, because there appears to be no yeast activity associated with it, but it could show that you have a good level of natural PME activity in those apples. It would be interesting to see how much more it would develop if (a) you macerated the milled pulp overnight to liberate more pectin and (b) you added extra calcium as calcium chloride to form stronger cross links in the gel.

I'm presuming KM is potassium metabisulphite?

~~~

> Greg, the fruit fly thing is that just common fruit fly? I have noticed that in some of my boxes there have been a few fruit fly's. Just wondering if what you describe is the same thing here in the UK?

Greg's Queensland Fruit Fly is not the same as the animal which we call

Fruit Fly in Northern Europe. Ours is quite benign and not a pest.

Compare http://en.wikipedia.org/wiki/Bactrocera_tryoni and http://en.wikipedia.org/wiki/Drosophila_melanogaster

~~~

> With regards to singling out the bletted ones from the ones that are perhaps now mouldy & infectious is there a rule of thumb? I'm thinking along the lines of if my apples are a bit brown and squishy in places but still smell ok and no sign of mould spores that's ok? Anything else though I should consider?

I agree with Ray. The question to ask yourself is "Is this physiological or pathological?". That is the key distinction. Discard anything that appears to be pathologically infected. In your own words "a bit brown and squishy in places but still smell ok and no sign of mould" is OK. If the fruit skin is still intact and there is no sign of mould, but just uniformly brown inside, it should be good. But yes I'll admit it is a bit of a judgement call. The medlar picture here http://en.wikipedia.org/wiki/Bletting gives an idea of what is acceptable.

I'm not saying there is any advantage to using bletted cider apples nor am I advocating their specific use. Just that sometimes it happens and they _can_ be used if you need to.

> Last, am I still ok to go half or even quarter measure on SO2 dosage from the table in your book with bletted fruit? Is there increased risk of 'bad' bacteria and therefore increased of infection from a reduced dose? Naturally I want to keep it low to allow the keeve and wild ferment to succeed.

I don't have any measurements. All I can tell you is that last year with my 'pure' bletted HMJ trial I used my 'normal' half dose and a wild yeast fermentation and it worked just fine. The juice and cider was a little 'spicy' (not fruity) early on but at the end of fermentation it was just like any cider from normal fruit.

~~~

> I have a few russet apples stored that I was hoping to blend with Fair Maid of Devon, Slack ma Girdle and Fair Maid of Taunton. In terms of quantity I have roughly 10% of russets and 30% of each of the others.... Can
~~~

someone give me some advice on perhaps how best to blend this collection of apples? I am hoping to keeve them ... medium sweet cider

From Liz Copas book:

FMD is a full sharp

FMT is a mild bittersharp

SMG is a sweet

Russets will behave as medium sharps.

If you blend the 3 cider apples you'll have something approximating to amedium sharp juice. The 10% russets will probably maintain that balance.

If it were me, I'd lump everything together and see what happens.

If you plan to keeve, you'll need to add calcium chloride and PME forreliable results. The pH may be too low for a successful spontaneouskeeve with native PME.

BTW, FMD is recorded as a fast fermenter (i.e. it's a naturally highnitrogen variety). Watch out for this when you're racking after keevingif you want the cider to stay sweet. Though its impact may be diluted bythe other fruit. A lot will depend on how the trees were grown.

~~~

> Wow! It seems I've been throwing away a lot of usable apples. Up to now I've worked on the principal that if it doesn't look fit to eat is's not fit for making cider.

Not all apples blett. It's mostly traditional cider varieties with some tannin and more especially if they've been lying on the ground in cool damp conditions for a while. Last year my Harry Masters bletted before I was ready for them. As a trial, I made a batch of cider entirely from bletted fruit. It was absolutely fine and I blended it back into the bulk eventually.

But you do need to be sure they are just bletted, not mouldy. Bletting is a _physiological_ fruit breakdown due to pectin and polyphenol changes. Mould is a pathological breakdown where external organisms infect the fruit. Unfortunately once the apple has softened and browned due to bletting, the moulds can then get in quite readily and infection follows. So you need to be careful.

~~~

> I am currently trying to work out the amount of total SO2 in my cider. I am using the ripper titration method and in the instructions I have it says use 2 mol solution of Sodium Hydroxide however the solution I have in stock is 0.2mol. Do I just times the final result by 10 to get the total SO2. My results so far have been coming out far too low and I think this is the problem.I want to sell some cider this year so need to get it right, I know I could send away for tests and will do this at the end for confirmation but I would like to monitor it at key points of the process.

No you are misunderstanding the process. The Ripper titration is an iodimetric one, not an acid / base one. The sodium hydroxide is added only to liberate all the bound SO2. You then re-acidify and do the iodimetric titration quickly before it has a chance to combine again.

The instructions should make this plain.

I think 0.2 M sodium hydroxide will be too weak a strength to be effective at what it has to do (breaking the carbonyl - sulphite bonds).

That's probably why your figures are low. If you don't have the right strength stuff then you'll have to get some. Multiplying by 10 won't help at all.

~~~

> I speak from experience having used a serrated rubber roller grape crusher as a pseudo apple mill for several seasons in my early hobby days. This style? Hand crank? http://www.eckraus.com/wp/wp-content/uploads/2014/11/1ea331d112c64218909215d6e70d31e2.jpg

That style, but much wider and motor driven. Also had driven 'fingers' to help push the grapes towards the rollers. No help for apples ;-)

~~~

> I don't think the cast iron would be a problem since the contact time is probably under a second. I could be wrong though.

I don't understand how the contact time will be less than one second.

The cast iron will be constantly wet and bathed in apple juice as long as apples are going through the mill.

Generally cast iron is not nowadays recommended because stainless steel is the more modern alternative and does not leach significant iron. If you must use cast iron, the important thing is to rinse it well with water between each session of use and let it dry off. Cast iron has a certain corrosion resistance due to its oxide level ('passivation').

What you don't want is for it to sit in the presence of acid apple juice for hours and hours. This will dissolve the oxide and give you a nice dollop of soluble iron next time you use it.

~~~

> The only thing I'm unsure of is the size of the teeth on the rotor too large for a good size pomace?

It's not the size of the teeth that matter, it's their shape (and speed). You need them to tear and cut the fruit or hammer it with kinetic energy, or ideally a combination of all three.

A grape crusher is designed for a gentle squeeze just to break the fruit skin, nothing more. It won't be gutsy enough for apples.

I speak from experience having used a serrated rubber roller grape crusher as a pseudo apple mill for several seasons in my early hobby days. I had to pass the apples through at least 3 times to get anything near a pressable pulp. I bought the grape crusher cheap at an auction, from a local winery which was closing down. I wouldn't have gone that route otherwise and I soon as I could afford to do better, I did.

~~~

> Edu, do you know the scientific name of the service / spierling fruit?

http://en.wikipedia.org/wiki/Sorbus_domestica

~~~

> Andrew, I just read that Wikipedia link. Do you happen to know whether any of the trees in that 'population near Bristol' or any other specimens in England ripen their fruit regularly, or even occasionally? I suppose if they are propagating themselves naturally their fruits ripen sufficiently to have viable seeds, but I wonder do trees in the UK actually produce usable fruit as in Germany.

My understanding of the trees in the Avon Gorge / Horseshoe Bend is that they are just clinging to the limestone cliffs. The trees are small and stunted and although presumably they do fruit I think it might not be

'usable'. Also they are virtually inaccessible which is why they remained undetected I think for so long despite the fact that the Gorge has been 'botanised' and other Sorbus spp (eg Bristol Whitebeam) known there for hundreds of years. But if you plant it as a specimen tree here in good soil it does fine. Alan Mitchell's book records one of 22 x 3 m in Kensington Gardens in London. Can't tell you its fruiting propensity though. The related Sorbus torminalis (wild service) fruits very well here in the south of England, and S. aucuparia (rowan) and the S. aria group (whitebeams) fruit well even in Scotland.

~~~

> Yes I know this is an older thread but I believe it is a good thing to update errors posted on Oesco's website regarding their bladder presses.... ****

> Therefore, 80L/35.2L = 2.3 Bushels about half of what they post on their website...

Surely that's because when you mill a bushel of apples it only gives you half a bushel of pulp. The rest is the airspace between the apples, which disappears. They are quoting pulp volumes, not apple volumes.

One good reason for sticking to weight or mass, not volume, IMHO.

~~~

> They are quoting pulp volumes, not apple volumes.

Sorry I got that the wrong way round of course! They are quoting apple volumes and you are quoting pulp volumes.

~~~

> I have read that Barland perry was reputed to have health benefits for those suffering from kidney diseases. Does anybody know if it is still used for health reasons? Has there been any scientific inquiry into the makeup of the Barland Pear to determine why it might produce such an effect?

This seems to originate from a single mention by William Marshall in his

Rural Economy of Gloucestershire of 1796 which you can read online here http://books.google.co.uk/books/about/The_rural_economy_of_Gloucestershire.html?id=Hp1aAAAAYAAJ

Later authors merely repeated it verbatim.

I doubt that it is a current belief nor that it has been the subject of any scientific investigation. I just ran a Medline search on relevant keywords and turned up nothing.

~~~

> Not sure an underground swimming pool is in the card ;) Guess we will start collecting sheds.

If you are planning on commercial production in due course you will need to have something which is acceptable to your local EHO. With 2 cidermakers nearby then that will be something of a template, even if you don't like their cider. EHO's are not consistent country wide. In traditional cider-making areas they seem to be quite relaxed and even a simple open barn is acceptable. In other parts of the country they have been known to demand that cidermaking be done behind closed doors.

It may not be something you need to worry about now, but you will need to address it if you want to sell your cider.

~~~

> The EHO has never set foot through his door & he's now in his 3rd year of brewing & has expanded into the unit next door too. Hmmm.

I expect that's because he boils his wort. Boil your juice and all will be fine ;-)

Seriously, Ray, really pleased to hear of your renewed 5 star status!!

~~~

> We pressed a batch of Browns 2 weeks ago, a bit past their best but worth a go. SG 1.042 pH 3.1. At that pH I did not use SO2. The juice has fermented enthusiastically on wild, or our cider barn yeast and is now SG 1.004, but pH has risen to 3.5/3.6. I have tried to find reference to rising pH in Andrew's books, but cannot find it for these circumstances, although I am useless at finding things!

I don't think I mention it. Some yeasts generate acid during fermentation, some metabolise it. So pH can go down or up. In your case it seems like the latter. An alternative possibility in this mild weather is a co-occurring malo-lactic bacterial ferment but 2 weeks is a rather short time for that to have an effect.

Either way I wouldn't worry about it.

> I am inclined to add SO2 now, as fermentation is nearly complete.

SG 1.004 is too early. Wait until fermentation is fully complete and the yeast is settling. Otherwise the SO2 will be bound by excess acetaldehyde and it will just be wasted. SO2 should be added before or after fermentation. Never during.

~~~

> Will adding a stock solution of Sodium Metabisulphite kill and stop the yeast activity

No. Not reliably unless you go up to 1000 ppm. At realistic usage levels it may stun it for a while but that's all. You can use sorbate plus sulphite but again it's only a stunning exercise.

> or is there another way to do it ?

Repeated racking may help. Pasteurisation will work.

> After pressing we added a 5% stock solution to both barrels.

That's not relevant now. You are a bit casual about your usage here. The important thing is not the strength of the stock solution but the final concentration (0-200 ppm) in the juice or cider after it's been added.

~~~

> When using malic accid, would you strictly go with the L- version or it does not matter what enantiomer to use.

In terms of acidity, it is fine to use the mixed DL-racemate which is the normal commercial form. I think you will find the pure L-enantiomer is much more expensive.

It is generally believed that only the L-form is subjected to malo-lactic bacterial change to lactic acid. Therefore the DL racemate may only half convert, if you get MLF happening in your ciders.

If you want a really stable acid to add to your cider, you might consider adding lactic acid instead of malic. At least one large UK cidermaker does this. Some people talk of using tartaric acid but that can cause problems by precipitation of potassium tartrate, so is best avoided.

~~~

> Is Videne essentially the same as tincture of iodine for establishing whether fruit is ripe? Tincture of iodine seems hard to come by!

No it isn't the same thing and it has a much more complex formulation, though iodine is still the active ingredient. Whether it would work or not I don't know.

You could buy some and try it. Use a potato or some wheat flour as a positive control and a fully ripe table apple as a negative control.

~~~

> My Perry from last year, fall 2012 has turned out to be very inconsistent. Some bottles are perfect, most are not so perfect, some are horrible.

You haven't defined 'horrible' but from your previous posts it sounds as if you have acetification due to bacterial action. This could be somewhat sporadic and certainly dirty bottles or poor quality corks would not help.

If your perry is dry (no added sugar) there is no absolute requirement for pasteurisation or sterile filtration (SF is not for the amateur anyway).

I would definitely add SO2 at the 50 ppm level as you bottle. And store the bottles on their sides so the corks don't dry out.

In future years I would do a proper job by measuring the pH and adding the correct amount of SO2 prior to fermentation as well as 50 ppm at bottling. That should go a long way towards getting a nice clean product.

~~~

> I have purchased a 25 litre fermentation bin with airlock on but i wilk only be pressing around 10 litres, so a coupke of questions. Is this bin too big (lots of air will be left in.It has a screw cap so how will i add sugar and not introduce air. Should i just go buy a smaller bucket with a lid.

It is indeed a bit big but air is no problem in the early stages of fermentation. In any case all that headspace will be filled with CO2 not air while fermentation is proceeding, as long as it is protected with an airlock to prevent air getting back in. It's later on that you need to minimise headspace and the chances of air exchange. But you will need a second vessel to rack into anyway, so go out and buy yourself a smaller one too. When the initial fermentation has slowed down, rack into your smaller vessel. From then on keep headspace and air contact to a minimum.

I don't quite understand when and why you are planning to add sugar. Is your SG very low?

~~~

Dear Cider Forum,&nbsp;Question Up Front:&nbsp; Has anyone noticed different layers of alcohol in their carboys?&nbsp;I searched the forum and both cider bibles (Andrew's and

Claude's), and couldn't find anything on topic.&nbsp;I've noticed that some of my bottled cider appears to be stronger in alcohol than others from the same batch&nbsp;(I chaptalized the must to 1.080).&nbsp;&nbsp;I wonder if it could be from different layers of alcohol forming in the carboy or bottling bucket before I bottle the cider (with the strongest layer floating on top, and hence bottled in the last few bottles).&nbsp;Has anyone else either noticed this, or can debunk my "alcohol layer" theory with their better understanding of fluid dynamics?&nbsp;Happy Holidays!&nbsp;James

~~~

> Anyone? Apologies for pushing my own topic.

I don't think you'll get much response because most people here just have to make do with whatever nature provides. Very large cidermakers do run thermostatted fermentations at 20+C but mostly so they can get the quickest throughput without the danger of overheating. Time is money for them.

> If you were to define the optimum temperature profile for a wild yeast fermentation what would it look like?

I would suggest as low a temp as possible, maybe around 8 - 10C? That mimics UK winter conditions and will probably give you a 3 - 4 month fermentation. Temperature will probably have a large influence on a wild fermentation because it is a mixture of different organisms and so there will likely be a lot of 'natural selection' at different temperatures.

> Will I get any benefit from running cultured yeasts at temperatures other than what is specified on the pack?

Probably not. I would go for the lowest temp in the specified range just to conserve as many fermentation esters as possible. The volatile profile may vary with temperature in any case - AFAIR with most wine yeasts higher temperatures tend to generate more fusel alcohols.

I think you are also right to suggest that the nature of the original juice and especially its inherent nutrient level will have a very marked effect on fermentation behaviour.

~~~

> I have often read you describing how it is a succession of yeasts that provide an ideal wild fermentation. Do you have any thoughts on how these may be effected by temperature and what I might be able to do to swing the balance in my favour?

This paper which you can download for free may be of interest http://onlinelibrary.wiley.com/doi/10.1046/j.1472-765X.1997.00340.x/pdf

>

On another note, assuming I have successfully arrived at a stable cider with s.g 1010 do you foresee me having any difficulties in raising the temperature to promote some mlf? If not, what would be the ideal temperature for this to take place?

I am concerned that you are placing a lot of reliance on 'cold crashing' to stabilise a fermentation with residual sugar. As has often been discussed here, that is only likely to be successful in amateur hands if you start with low nutrient and / or keeved juice where the yeasts are already struggling.

It is true that the technique is used commercially in Australia on regular apples but 'cold crashing' is only a part of what needs to be done to ensure stability. After the cider has been chilled to inhibit fermentation and to part flocculate the yeast, it is then cross-flow ultrafiltered to remove virtually all yeast cells. The metastable sweet cider is then bottled and pasteurised, or is sterile filtered and bottled using DMDC (Velcorin) as a back-up to kill any stray yeasts.

This is done using a pressure tank (the Moscato process) if a naturally carbonated cider is required. This kind of technology is not available to the amateur.

The sort of thing you are talking about does take place in low nutrient keeved ciders which are bottled sweet and which undergo a slight continued yeast fermentation in bottle. Often a wild MLF will also take place in these ciders during the summer after bottling. But if your cider is not stable with respect to further yeast fermentation because the nutrients are too high, then you have far more to worry about than

MLF or not!

~~~

> With respect to the poliphenols, this link may be useful for you. http://www.ifpc.eu/fileadmin/users/ifpc/infos_techniques/Art_cidres_et_polyphenols_2012.pdf

Glad to see my old 1978 diagram getting an outing again! (Figure 4).

~~~

> But if VA is more than about 1g/l, is it not true that most of that is acetic acid, and clearly perceptable on the palate?

David, just to say briefly that lactic acid is also steam volatile. Off the top of my head I don't know the distillation efficiency but according to all the textbooks it can certainly contribute something to VA.

~~~

> Is there an actual verb for "making cider" in English/French/Spanish? As in, you brew beer, you distill whisky, Meadhing makes mead, and you vint wine. What do you "/blank/" cider.

In standard English, cider is simply "made". The person who makes it is a "cidermaker". Sorry but that's all there is to it. There is no special verb. (And surely nobody "vints" wine, except in pretentious lifestyle magazines?).

~~~

> I have 4 litres of pressed juice in 2x 2 litre bottles in my freezer just wondering how long they will keep?

For ever, pretty much. I never heard of a yeast that could ferment at

-18C. There might be some very very slow chemical changes to do with pectin or polyphenols but nothing significant.

~~~

> Hi. I have heard and read that "incipient fermentation" causes the chapeau brun to rise. Could it be, rather, a difference in density between the two materials (the brun and the unfermented juice)? This would have implications for choosing sulfite levels, fermentation temperatures, inoculation timing etc.

If you have ever looked at the progress of a real life keeve in a translucent vessel you will know it is the trapped gas that raises the gel. No question.

Of course at root this _is_ a density difference issue. That's why you need a high SG juice (

> 1.055) for a successful keeve, IMHO. (I know

Claude doesn't agree!)

~~~

> My question is, do I interrupt a wonderfully slow fermentation to deal with the film yeast or will the fermentation gradually overcome the film yeast infection without effecting the quality of the resulting cider? I presume 50 PPM SO2 is in order at next racking in any event?

I would use a spoon strainer eg http://www.oxo.com/p-390-scoop-colander-large.aspx to lift out as much as you can of the film yeast. Then proceed as normal with an airlock and of course keep the air out! Film yeasts only grow in the presence of air so that's how you can control them.

Don't add any SO2 now, it will be useless. Wait till racking.

~~~

> Hello Andrew, I was just looking for you book online; found one for over $4000 on abebooks.com!!!

I don't think it's that good! It is out of print till next year but there are still a few copies around much cheaper than that!! If you still cannot find one contact me off-list for workarounds.

> I have what I'm fairly certain are Bramleys and previous attempts at cider have been a little tart. Is there anything I can do, e.g., add tannin, to make a decent hard cider from these apples? Thank you!

I know some Bramleys have been grown as speciality fruit near Victoria but they're not usual in North America. Tartness has been addressed in this thread https://groups.google.com/d/msg/cider-workshop/P3qCtkkTiNg/OrHTAx57CTIJ

But no, tannin will not help you make a silk purse out of a sow's ear!

~~~

> Do Bramley apples make decent apple juice ?

Think about it. Do you personally find fresh Bramleys good to eat? Nice sugar / acid balance? Plenty of interesting flavour? Probably not. And making them into juice doesn't change their fundamental character.

As a pointer, most people find fresh Bramley juice far too acidic to enjoy. After Christmas, when the acid has dropped a bit by respiration, they do make a more balanced juice. By the following June, the acid has dropped even more but the juice tastes rather like potato peelings.

Your choice. Some people will like it; most won't. IMHO.

~~~

> Andrew I bought a bunch of your books a year or 2 ago, to sell to people as an easy way out when I get asked how to make cider! I'm sure I have a few left somewhere, looks like I might be sitting on a gold mine!

I'll just say that in the UK the old book is still available at a sensible price here http://www.vigopresses.co.uk/Catalogue/Books/Cider-Apple-Juice-and-Perry/Craft-Cider-Making-by-Andrew-Lea-99030

New edition won't be available till summer next year.

~~~

> PS - Andrew, would you sign my book please so I can sell it for a lot of money:-)

I don't think signing it will increase the price actually!

This entire nonsense is a consequence of the automated algorithmic pricing now being used in the book trade. No human beings are involved and there are no 'sanity checks'. There is quite a good article about it here http://www.aba.org.uk/news/633-algorithmic-book-pricing-and-its-implications

~~~

> maturing a batch of beer by a local brewery so I need to clean it out. Is there a "right way" to do this?

I don't use wooden barrels myself but this is the advice from Pollard and Beech "Cidermaking" in 1957

> I am taking delivery of my first new 1000l IBCs today and was wondering what recommendations you might have for cleaning prior to first usage.

There was a related thread just the other day https://groups.google.com/forum/?hl=en#!topic/cider-workshop/4kPnZqI0jOI

The archives are a valuable source of information.

~~~

Hi all,

I've a demijohn of cider that's been fermenting since last September, initially in a garage and then inside into a slightly warmer room in the spring, but not heated. It started fermenting quite wildly, then settled down, and actually stopped over winter. I posted here a few months ago as I was concerned it had stopped, but trying it it was still very sweet, so I added the airlock once more and sure enough it's continued to bubble away. Yesterday I noticed a funny thing hanging in the middle, and the bubbles are still happening, it's almost like a small jellyfish. I've videoed it in case anyone cares to give an opinion? It started with an SG of 1045, a mix of eaters/cookers and cider apples, all new trees. Any ideas? Should I be worried? Have I made vinegar, inadvertently? I let the video run so you could see the rate of bubbling.

Video can be viewed here:

https://youtu.be/gk-7POi_ni0

Cheers,

Duncan
~~~

~~~

> As far as I know, there are no pneumatic bladder presses

There are plenty used in the wine industry. Willmes to name but one. But

I don't think there are any available for small scale use. Probably because they require the extra cost of an air compressor system and mains water pressure is a more easily available alternative on a domestic scale.

~~~

> think about adding campden tablets but the whole additive discussion is a whole can of worms I won't go near I think.

SO2 is not a legal additive in apple juice sold for direct consumption

(except up to 50 ppm when bulk dispensed in catering establishments).

See http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:295:0001:0177:EN:PDF para 14.1.2

OK I realise you're not selling it, but for many reasons SO2 is best avoided in this context I think.

~~~

> Andrew, Will work it out, but it has been 10ml of a 1g/100ml solution in 20 litres...

Jez, in your first post you wrote 10 ounces!

That is not the same as 10 ml!

Which is it please?

Andrew

OK let's start again!

You have a 1% stock solution. That is 10,000 mg/L (ppm).

Now you are diluting that 10 ml to 20 litres or 2000 times.

So your 10,000 ppm stock becomes 5 ppm (mg/l) in the finished product.

Just as you said. That's much more realistic.

Actually looks like my 2010 table is way out of line for suggested levels. But your data is based on real life not desk studies so it's a better starting point!

Andrew
~~~

> Looking at my table, I have confused oz and ml (of the solution) - so that isn't going to help anyone!! Sorry!! Have I ever said that I am not the best scientist ever:-) All the best Jez >

~~~

Whoops typo! 'sucralose' of course, not 'sucrose'!

Getting late here....

Andrew

> I produced a little table back in 2010. You'll find it here https://groups.google.com/d/msg/cider-workshop/3ncXR7vSh3E/SgiTr8GThMEJ. You also need to be aware of the legal limits on sucrose addition to cider. That's why you _need_ to know your concentration in mg/l (ppm) Andrew

> Can you check those figures for us Jez? (And it would be _really_ helpful if you could work in metric throughout, instead of mixing metric and Imperial.). I calculate that your medium dry is at 142 ppm sucralose. Is it really that high? Andrew

I produced a little table back in 2010. You'll find it here https://groups.google.com/d/msg/cider-workshop/3ncXR7vSh3E/SgiTr8GThMEJ.

You also need to be aware of the legal limits on sucrose addition to cider. That's why you _need_ to know your concentration in mg/l (ppm)

Andrew

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I calculate that your medium dry is at 142 ppm sucralose. Is it really that high?

~~~

James Crowden and myself judged Classes 4-10 (which were about half the entries). Patrick Shave and Richard Toft judged Classes 1-3. Classes 11 and 12 were assessed by all judges.

To those who are disappointed not to have gained a place, I have to say that the standard of entries was generally high and it was very hard to choose just three winners per class. There were many many worthy entries, and very few with serious faults, in the classes that I helped to judge. So although the winners were excellent, many other entries came very close. But our 'first past the post' system doesn't give credit for near misses!

~~~

> Andrew, do you know if judge's scoresheets will be sent out to participants?
~~~

No I'm afraid it is not the British way to provide any feedback, and judges don't necessarily use any formal scoresheets (though some people might, just as an aide-memoire). Our way of doing things is very different from say the Americans or Australians where formal scores are recorded and integral to the whole procedure. I think this results from the fact that we are just looking for the top three entries in each class, which is most easily done by a process of progressive elimination and short-listing until just 3 remain. Also nowadays any formal scoring scheme would be hampered by the huge number of entries and the need to work to a very tight deadline. I have worked with scoring schemes and they take much longer to complete.

It could be argued that this is a weakness of the UK system, and maybe it is, but I don't see any move to change it.

~~~

> Since then I have purchased 1kg of Sodium Metabisulphite (Food Grade) , is it all the same strength ?

I suggest you read this http://www.cider.org.uk/sulphite.html to learn how to use sulphur dioxide, and the difference between using Campden tablets on the one hand and sodium metabisulphite as a stock solution on the other.

Campden tablets are 'cut' with a filler so they are not pure sodium metabisulphite.

~~~

>I do not have the experience to describe the flavor, Acetic ? Acidic? Astringent ?

Then you must train yourself. The following are reasonable flavour descriptor standards:

*Acetic - vinegar (taste and smell, various origins and at various dilutions). Often it is the volatile component (ethyl acetate) which is much more important in 'acetic flavour' than the acetic acid itself.**

Acidic - citric acid solution or lemon or lime juice (taste only)

Astringent - the mouth puckering and drying sensation of cold tea (taste)

**[Perries are very commonly subject to acetification due to their natural citric acid being attacked by lactic acid bacteria. Use of SO2 can help prevent this]*

~~~

> I know that I need to be scientific and from here on I have the tools to do that. But just trying to learn from what I have done in the past. If a "tart" bottle ages over time to a very mellow bottle, is that MLF ? If Acetification is the issue would an old bottle turn to vinegar, or mellow out ?

Once a perry is acetified, I think it tends to stay that way rather than

'mellow out'. But others may have more experience of aged perries than

I do. The lactic bacterial acetification in perries that I mentioned is

not the same as acetification due to acetic acid bacteria. For one thing, it happens in the absence of air exposure. It is a citrate to acetate conversion, not ethanol to acetate.
~~~

I think it might be worth taking a step back and asking what sort of fruit you are using? Are these dessert pears, perry pears or what? Are they named varieties? Do you have have any analytical data on them? Are they inherently high or low acid? And what country are you in?

~~~

> I guess I knew all that, but still there are these great monumental large oak vats at Westons and other big producers. Does no malolactic fermentation occur in them? Why have the vats? Are they just eye candy for tourists? Does the ageing and conditioning that happens in these vats not include a malolactic fermentation?

Well there are two things to consider.

1. The volume of the vats on display, the total throughput of the factory and the likely residence time of the cider. Just because they have wood on site doesn't mean everything goes through it or that it stays there very long. You'll see plenty of stainless at these places too! And blending ciders with different histories to obtain product consistency is very important in that sort of business.

2. The (wild) organisms we're mostly talking about, the ones trapped in the wood, are not Oenococcus oeni as used by winemakers. They're more likely Lactobacillus (specifically but not exclusively strains of L plantarum). These are bacteria with a very wide range of enzyme activities. They do far more than just convert malic to lactic, and they can utilise trace sugars as substrates too, so the malic may remain untouched even if the bacteria are active. It is perfectly possible to get a touch of mature farmyard (for instance) in such a situation while the malic acid remains unconverted.

You can be sure that the large makers are monitoring acid levels daily and know just where they are in the process and can stop it if unwanted acid loss (or increase) begins. They are also monitoring 'maturation flavour' both by sensory assessment and in at least one case by instrumental methods (GC-MS). This gives them a level of control which smaller manufacturers don't have.

Remember that these commercial ciders are 'built to a spec' in the same way that beers or soft drinks are. The brand has to be consistent from batch to batch. Most people on this list have quite different objectives from that.

~~~

> Can you please explain? How would letting the acid level drop be akin to throwing money away?

Mainstream commercial ciders in the UK are made from considerably less than full juice. 35 - 60% juice is typical. They are what we call

"glucose wines". Glucose syrup contains no acid. And our bittersweet apples (which are the major source of apple solids) are also very low in acid. You must remember that the UK cider industry unlike most others worldwide does not use many dessert apples. We are fortunate in having plenty of bittersweet high tannin but low acid apples. Hence the manufacturers often need to add acid to get the right balance for fermentation and for the final product. It would be crazy to spend money on adding malic acid and then have MLF destroy half of it. Often lactic acid is used as the acidulant because it cannot degrade any further.

~~~

> Every commercial cider I have ever tried has been through MLF as far as I can judge.
~~~

Certainly that isn't true here in the UK. Virtually no mainstream ciders are allowed to go through MLF. SO2 is used to ensure that. No manufacturer wants to throw money away by letting the acid level drop.

Here for the most part it's only the uncontrolled small makers who allow

MLF to take place. And by and large I think most of them don't recognise for what it is. They just think it terms of 'maturation', not understanding the microbiology that's going on.

> I think if conditions are favourable MLF is almost certain

> in cider.

Again, from the UK perspective I can't agree. If you use SO2 for fermentation, as I do, and SO2 at final racking, wild MLF is very uncommon.

"Different ships, different long-splices" as my nautical Dad used to say.

~~~

> Can you help me with the yeast / nutrient issue. Does that mean I should try a different yeast next time to see if it affects the problem?

I wouldn't personally use a champagne yeast like BC for cider anyway unless I were a large cider company making high alcohol glucose wines.

They are far too neutral in flavour. I don't know why they have got into the small cidermakers' psyche. My prejudice is to use a 'proper' wine yeast that brings something to the party. . But I digress....

You waited 4 months after fermentation was complete before you decided to bottle condition. Coupled with the repeated previous rackings, my hypothesis is that you had very few yeast cells available, maybe too little nutrient, and they have taken a while to get going and they are stressed. Your secondary fermentation is still proceeding, it ain't finished, that's why it's eggy. Give it more time and the H2S may age out (re-absorption by yeast). I know I dismissed this suggestion which you made originally but I didn't have all the background then.

My hypothesis is almost the polar opposite of Claude's, but there you go

.....!!

Question. Does the lack of egginess correlate with the increased carbonation?

~~~

> _Andrew_ - I think you may be right here - I think the increased carbonation may well have correlate with 'egginess'. I will be 'testing' some more tonight with friends so I'll see if that hypothesis stands.

Actually my suggestion was the other way round. That increased carbonation should correlation with lack of egginess because the fermentation is more complete then. Interim fermentations are often eggy.

> - can you recommend a 'proper' wine yeast - I am very happy to change to something that develops more flavour?

71B, V-1116, D47, DV10, QA23, AWRI 350 etc etc. Look in the archives of this list. This has been endlessly discussed.

> - although fermentation finished in January I have tried to be patient this year to get a better flavour and allow time for any malo-lactic fermentation in the Spring. In previous years I have bottled sooner but felt that was me being impatient. Is it advisable to bottle soon after fermentation has completed?

Yes, I would say so, if you are bottle conditioning using the existing yeast and not pasteurising. The act of bottle conditioning brings its own new flavour profile from the renewed yeast activity (as I think you are experiencing now). If it worked for you before, why did you change?

~~~

> Oh dear, just had the first set of feedback on this years cider from my sister and brother-in-law. I guess I did ask for honest feedback!

"Smelly" sounds pretty damning. It doesn't sound like something that will "go away", not by this time of year anyway. What sort of "smelly" is it? Eggy or sherry like?

> I have tried to produce and authentic, as natural as possible, cider but I'm guessing it may not fit with the palate of many?

Can you give us a run down of your process? Any pH control, yeast, SO2 etc? If you just run juice into a barrel and let it do its own thing then indeed "it may not fit with the palate of many".

~~~

> part A and part B,but do not give the full contents other than saying that the main ones are chitosan and silicic acid.My chemistry from school is very rusty,but I would be surprised if silicic acid was the same as kieselsol.

Yes one part is chitosan and the other is kieselsol. I can't remember now which is A and which is B. But it doesn't much matter.

As I said last week, I used the exact same product recently to clarify an intractable cider vinegar.

As I also said last week, kieselsol (German) is the same as silica sol

(English). That is, silica which has been micronised with water into a hydrated sol, also known as (poly)silicic acid (because it can be formally regarded as a polymer of H4SiO4 in chemical terms). A sol is a colloidal form which is stable because it consists of very tiny submicron particles dispersed in a liquid. This form of silica sol was developed for beverage use in Germany in the 1930's AFAIK. In those days it was principally used with gelatin as the co-fining agent (and often still is - that's what Claude used).

Chitosan is also known as de-acetylated chitin. It is prepared from chitin which derives from the exo-skeleton (shell) of insects and crustacea. Chemically, chitin is N-acetyl poly-glucosamine, a very insoluble polymer (useful if you happen to be a crab or a lobster, or even an earwig). Crushed crab shell waste is treated with alkali to remove the acetyl groups, leaving the parent poly-glucosamine which is water soluble and known as chitosan. Whereas gelatin has been around for a very long time prepared from animal bones and meat residue (e.g. calves foot jelly), chitosan has a much more recent history (I'd guess at no more than 50 years or so in commercial production).

Chitosan (a polysaccharide) and gelatin (a protein) are

'polyelectrolytes' and display a positive surface charge. The kiseselsol

/ silicic acid is also a polyelectrolyte with a negative surface charge.

The charges are neutralised when they come into contact and hence a large neutral polymer is formed which grows large enough to entrap other particles in suspension (both charged and uncharged), and eventually large enough to flocculate, hence clearing the beverage.

All fining procedures (even the single-part systems) pretty much work by

'charge neutralisation' in this way. The two-part finings are typically more complete in their action and with them it's less easy to 'overfine'

(i.e. to produce charge reversal and indefinite haze stabilisation) than it is with a single-part fining.

~~~

> Thanks,Andrew. Without your help with the chemistry background to these products,there is no way that I would know what I was adding to the perry.

Actually you would, cos it's all out there if you hunt via Google. You don't really need me. Though I'm more of a "one stop shop", I'll admit ;-)

> My wife,in

> particular,is very minded to use 'natural' products,and I now have some information from you to expain what I will be adding to the cloudy perry

Crabs are 'natural'. Sand is 'natural'. But they need some quite heavy chemical processing to become chitosan and kieselsol respectively. If this worries you, then you'll just have to put up with cloudy perry.

Have you tried it yet by the way? Does it show any signs of working?

~~~

> Also wondering if I should open them all up and doctor them or wait and see what happens next spring. I didn't take the SG after priming unfortunately so cannot tell if the added sugar has fermented out -

You could calculate it if you know how much dry sugar you added in grams per litre or whatever, and then convert that to SG. If you know you started at SG 1.002 and you can measure the SG now, then you should be able to say whether it fermented or not (i.e. whether the caps are leaky as you suggest).

~~~

No this is not normal. It looks to me like a film yeast with a regular but slow fermentation continuing under it - hence the bubbles.

Two possibilities:

1. With the low pH and 50 ppm SO2 and a low initial (wild) Saccharomyces yeast population, fermentation is only just beginning.

2. Fermentation has already taken place but you didn't notice it!

A hydrometer reading will decide between (1) and (2), so please get that data before doing anything else, and report back.
~~~

Either way there shouldn't really be a film yeast around but they do tend to be ubiquitous and develop whenever they get the chance.

Andrew

> With my early cider I am trying a small 5 gallon batch as my first attempt at a wild fermentation. The juice is mainly dessert apples with perhaps 10% tannic crabs, pressed two weeks ago with a SG of 1046. I sulphited 1 campden tablet per gallon (perhaps too much) and didn't test acidity but expect that this would be fairly high considering the apple composition. The cider is in an airlocked carboy in my basement at 17C. There are no obvious signs of fermentation yet although I have not tested with a hydrometer. Over the past few days a white film developed over the surface which now has lots of small (1mm ish) bubbles in it, which look suspiciously like a mould to me (see pic). Does this look normal to anyone and am I worrying about nothing, or if not any advice on how to proceed? Thanks, Dan

~~~

>There are a few yellow clumps too just under the white stuff, about 2 pence piece sized.

They are probably pectin.

> racking to a new vessel is probably the way I'll go and I can top it up with juice from this weekend's pressing. There is currently quite a large headspace over it as I was expecting a more dramatic fermentation, and that wouldn't be helping if it is a film yeast.

Sounds a sensible way to go.

~~~

> I was thinking I could either: 1) leave it be for a while and keep testing the gravity 2) move to somewhere a bit warmer in the hope of kick starting it 3) add some of my other vigorously fermenting cider (with commercial yeast) to save it rather than lose the lot and try a wild on a later batch, .

Any of those would do. Your choice.

> I was hoping to do a slow wild ferment so I'm not trying to rush it, but the white stuff on top is a bit worrying. It could be a film yeast but it looks a bit different to others I've seen.

The likely possibilities are true mould, film yeast, or perhaps pectin.

Difficult to decide from the picture. Moulds tend to produce blue or black spores. Pectin tends to form clumps. If you are still worried, could you rack away the cider from under the surface film in to a new container? Also I suggest you double check your airlock and especially the bung seal integrity in case air is getting back in. It is probably only a surface problem since you have already sulphited the bulk liquid.

Wild yeast fermentations are often slow to start since there are few yeast cells to begin with. And if you have sulphited that will leave even fewer. For my wild yeast ferments I always measure the pH and then add only half the 'official' sulphite level. Do you know what the pH was?

~~~

> I am concerned that the chemcials might damage the pump eventually.
~~~

I think we established that Star San is a solution of phosphoric acid.

Unless your pump is made of 316 stainless steel or is all synthetic polymer, I suspect it will have poor resistance to phosphoric acid.

Maybe worth checking your pump's chemical resistance directly with the manufacturer?

~~~

I've only just discovered it.

You can find the 1678 2nd edition here as an e-book

http://books.google.co.uk/books?id=ck1XAAAAcAAJ

If you go to the red tab that says "Read Ebook" you can get the option of downloading it as a PDF.

~~~

> Hi, I'm planning to bottle my cider but I'm not sure about the process involving sterilisation. Do I need to put the empty bottles in hot water to kill bacteria before filling

No. Just make sure they are visually clean and free from foreign bodies.

Bottles don't have to be sterilised separately because any adverse microbes will be inactivated during pasteurisation as you suggest.

~~~

> Hello Scott, You mention pasteurisation in your original post and answers that followed assumed that this is what you want to do, but I'm not entirely sure that you need to pasteurise the cider. Is this your intention? The next question is, if so, why?

If you Scott's sequential posts you will see he is sweetening with sugar or juice. Pasteurisation is mandatory to prevent re-fermentation. That has been the basis of my replies.

~~~

>

> Hi, I'm planning to bottle my cider but I'm not sure about the process involving sterilisation. Do I need to put the empty bottles in hot water to kill bacteria before filling No. Just make sure they are visually clean and free from foreign bodies. Bottles don't have to be sterilised separately because any adverse microbes will be inactivated during pasteurisation as you suggest.

Just an extra tip - take the capped bottles out of the pasteuriser hot, and lay them on their sides to cool naturally. This ensures that the neck and cap area of the bottles are also pasteurised by the hot cider.

~~~

> the trees ive sown are,30 dabinnette ,20 mitchlin,10 katja,10howgate wonder,10 sweet tate, 20 fairmaid of devon
~~~

Just to get the spelling right, it's "Dabinett" (Somerset not French) and "Michelin" (which is French). Both are bittersweets.

The Katja (Katy), Howgate Wonder and Fair Maid of Devon are all effectively sharps so they will balance your bittersweets which is good.

Never heard of "Sweet Tate". Can you tell us more about it?

~~~

> Upstate NY. Specifically I am looking for data for MacIntosh, RI Greening, Granny Smith, Cortland, Liberty, Red Delicious, Ida Red, Crispin, Gravenstein, Snow Apple.

You can assume that none of those have any significant tannin in cidermaking terms. So far as TA and Brix are concerned there is a reasonable dataset (1980's) from NYSAES here but you will have to pay for it http://link.springer.com/chapter/10.1007/978-1-4684-8225-6_14

It contains all the cultivars you want except Liberty, Crispin and Snow

Apple.

If you are within shouting distance of NYSAES at Geneva I suggest you contact their library.

~~~

> So, I am ideally set up to establish a collection of dwarf/semi-dwarf perry pear trees, provided my top-grafting idea onto my existing dessert pears will work, and provided I can get some nice scionwood of some suitable varieties for damp-cool-summer Ireland.

As far as I know the key people who might help you don't read this list or at least don't post. So you are shouting into thin air here. You need to get in touch with Jim Chapman who manages the UK collection of perry pears. http://gloucestershireorchardtrust.org.uk/varieties/collections/perry-pear-update/

And look at Charles Martell's book here http://www.gloucestershireorchardgroup.org.uk/perry_pears.pdf (quite a big download)

~~~

> And as I leave it overnight, do I keep the lid sealed, open (but protectet durt, flies etc.) or under airlock?

Just protect from flies etc. What i often do is to use an empty airlock

(not yet filled with water) until fermentation is well under way. Then I fill the airlock with liquid so it can do its job of keeping the air out while CO2 escapes.

[NERD NOTE: In theory a juice may benefit from exposure to air while the yeast is starting to grow. This helps the yeast to develop strong cell walls by synthesising sterols, for which oxygen is required. This may be more important for wild yeasts, or where yeast is re-used. Modern fresh dried cultured yeasts probably have enough pre-existing sterols to do without this. But it does no harm anyway.]

~~~

> The real question is can you convince yourself or whomever is growing your apples to accept the low yields that accompany this type of fruit growing? High density orchards are expensive to plant, and letting them go partly feral flies in the face of the economic models used to justify them.

Quite so. High density plantings are predicated on nutrient input. See this reference of mine http://cider.org.uk/tannin.htm#nutrient_table which shows how N2 levels affect apple yield as well as fruit nitrogen levels.

The 'old' (pre WW2) way of growing apples with virtually no nutrient input is almost entirely gone. That's why cider has changed in a couple of generations from something that could fairly easily be managed for slow fermentation and encouraged to stick for residual sweetness, to something that generally can't (unless the grower is prepared for much lower input and much lower yields).

~~~

> I'm having fun with my cider batches but I would like to add a caramel/maple flavor and do so naturally. Any suggestions for a good starting point? Thanks

Another forum perhaps? This one is about cider, not flavoured alcopops.

(Though the obvious answer is to add caramel or maple syrup. You can make caramel easily at home on a stove top or in a microwave oven. There is some overlap between caramel and maple syrup flavour since both are due to sugar breakdown via the Maillard reaction, but maple syrup is more subtle being based on a far more complex starting material)

~~~

> I dont usually get access to high acid apples due to the warmer climate here (ph 3.2 and above). However, could have sworn that the acidity does drop after a few months which I thought was due to wild MLF. I guess its probably just due to the banyus strain metabolising the malic acid then?

The factors that favour wild MLF are high temperature and high pH. In India you may have both (depending on your location). In colder temperate climates you won't. If the acidity drops over several months then it's almost certain you have a wild MLF. The effect of yeast fermentation at raising or lowering pH (both can occur) can only happen while the yeast itself is working. After fermentation is finished (SG Also, is there any benefit then of increasing the malic acid to a point where MLF can be done (besides obviously of reducing the acidity back again - which would be pointless)?

I really don't understand what you mean by that.

~~~

> When you say "factor of high temperature" - I assume that you mean temperatures warmer than 15 C.

Typically 17C is regarded as the lowest that a wild MLF will take place.

If you get up to 25C it will go quite fast.

> But when you say high ph I'm assuming you mean more acidic (apologies but not familiar with standard nomenclature)?

No. High pH means low acid, and vice versa. See here http://cider.org.uk/phandacid.htm
~~~

> What I meant with the second half of my post was that I always thought MLF is desirable (if the right organisams take hold) for adding complexity to the cider and not simply for reducing the acidity to a palatable level. Hence, do you think that (if you were to do it) adding malic acid to lower ph (numerically) and increasing temperature to encourage MLF; may result in a better cider?

Wild MLF is not always desirable. Firstly, you may get adverse flavour changes (too much barnyard, mouse, rope etc) and second if the pH is already high (low acid) then you probably don't want to raise it any more because a cider needs enough acid for proper taste balance. Low acid ciders are not nice to drink.

As with any food or drink, there is an optimum for an acceptable acid / pH level. Too high and too low are both bad. The levels depend on the product type.

Andrew

> Thanks again, dhruv.

>

> I dont usually get access to high acid apples due to the warmer climate

> here (ph 3.2 and above). However, could have sworn that the acidity does

> drop after a few months which I thought was due to wild MLF. I guess its

> probably just due to the banyus strain metabolising the malic acid then? The factors that favour wild MLF are high temperature and high pH. In India you may have both (depending on your location). In colder temperate climates you won't. If the acidity drops over several months then it's almost certain you have a wild MLF. The effect of yeast fermentation at raising or lowering pH (both can occur) can only happen while the yeast itself is working. After fermentation is finished (SG . For more options, visit https://groups.google.com/d/optout.

%2%

~~~

> Andrew's book says I could delay first racking for a month to encourage MLF.

%1%

Well yes it does. But that's for a UK type cider at a much higher pH. At pH 3.1, you could be waiting for a month of Sundays for a wild MLF to take hold. In practice, I'd say it will never happen.

If you want a MLF to reduce your acidity from where you are now, you need to buy a winemaker's culture to add when yeast fermentation is finished (SG Apples in Bristol: there's a lot of public apple trees in parks, squares and riverbanks across the city. There is a map at http://duo.irational.org/food_for_free/orchard_of_avon/ - though I found this year that many of my usual scrumping trees had poor or no crop. You could also try getting in touch with the city farms, e.g. Windmill Hill and St Werburghs, both of whom have apple trees and might be interested in your work with people with learning difficulties.

> The series of epicatechin oligomers n = 2-8 are called 'procyanidins'.

They are given that name because they yield the unstable red pigment cyanidin on strong acid hydrolysis as the carbon-carbon linkage between the units breaks up and the individual units become protonated into a coloured form due to electron delocalisation.

(Sorry if TMI! You don't really need all this to be a good cidermaker!)

~~~

> but I was wondering if anyone could comment on the effects on aroma, taste and mouthfeel contributed by each of the following:

> flavanols

These are the primary 'tannins' of apples, consisting largely of epicatechin (a flavan-3-ol) plus the epicatechin oligomers n = 2 to 8, which are known as procyanidins. These are responsible for bitterness and astringency in cider apples (also in grapes and cocoa). The lower members of the series are more bitter than astringent, the higher members vice-versa. They all contribute to cider mouthfeel. Present throughout the apple flesh at total levels up to 5000 ppm. Colourless when pure, but responsible for most cider colour formation via coupled oxidation (see chlorogenic acid)

> flavonols

In apples these are a range of quercetin glycosides, about 5 or 6 of them with different sugar substituents. Found only in the peel at single ppm levels and don't appear in the juice unless the pulp has been enzymed. Slight astringent mouthfeel at high enough levels.

> phloridzin

Four components, the parent phloretin along with phloridzin (a glucoside) and two xylo-glucosides. Phloridzin is bitter (its name means

"bitter root" and it was first isolated from apple roots where it is present in large (percentage) amounts). Presence in fruit and cider is small (tens of ppm).

On enzymic oxidation it gives a specific orange-coloured product which may be up to 25% of total cider colour.

> polycyanidin

No such thing.

> chlorogenic acid

The major 'non tannin' phenolic in most apples, present in flesh in the hundreds of ppm. Probably contributes slightly to mouthfeel. Is an important 'oxidation coupler' in apple browning - it is oxidised by the polyphenoloxidase enzyme to a quinone which then oxidises the procyanidins, but is itself thereby reduced back and later re-oxidised.

Can be broken down by lactic acid bacteria and Brettanomyces after fermentation to give ethyl catechol which is part of the characteristic spicy / phenolic / old horse flavour note.

> anthocyanin

One major component in apples, cyanidin 3-galactoside, which is responsible for the red colour of apple skin and the flesh of red-fleshed cultivars. Generally present at no more than tens of ppm and not at all in apples
~~~

which are not red. Rarely survives undegraded into cider. Minimal taste properties but anthocyanins tend to be slightly astringent when pure.

None of these entities have any aroma, since they are too large and too polar to be volatile.

~~~

> I guess we know about the characteristics of bitter sweets like Dabinett, Yarlington Mill, etc, because people fermented them as single varieties (rather than as a bitter sweet blend) to understand how they each perform and then people like you applied the science to those individual varieties. In this part of the world, we have very little science available on our 'native' apples so I was doing my best to connect it to what we were doing in the practical sense. I thought you of all people might have seen the worth of that.

So why don't you ferment each of your 4 varieties singly too, to understand what they contribute to the blend in sensory terms? That will tell you far more than a list of numbers by some arbitrary scheme of phenolics analysis, or at least may help you to correlate one with the other when taken together with what is already known about these things in the scientific literature. Cider flavour is far more than just phenolics anyway.

I don't understand your apparent preference for analysis over tasting.

I'm obviously misunderstanding something here :-)

~~~

>

> polycyanidin No such thing. Sorry, Andrew; I meant procyanidin. Please can you elaborate? Also, what did you mean by "The lower members of the series are more bitter than astringent, the higher members vice-versa." (what series?)?

Procyanidins are covered under Flavanols. The series of epicatechin oligomers n = 2-8 are called 'procyanidins'. Lower members would be roughly n = 2-5, higher members would be n=>5

If you want trivial names, the widespread procyanidin known as B2 is a dimer (n=2). B5 is also a dimer but with a different linkage. There is a trimer (n=3) called C1. But trivial names don't exist for most of them, and the systematic names are very long-winded.

BTW procyanidins of n=>8 do exist in apples but are not readily soluble and stay in cell walls.

~~~

> I'm sure you are right. However, I'm interested in all this for apple selection. I am looking at four culinary apple cultivars with high-ish polyphenols.

Well I am a bit gob-smacked to be honest! You have just four cultivars and you want to base your choice on a set of numbers which are just the tip of a huge analytical iceberg, and which you think will adequately represent their cidermaking potential?

I have to say I've worked in food biochemistry for 45 years and I would never dream of such a thing! Nor I think would any winemaker or brewer if they were trialling new grapes, barleys, hops. Surely the only valid test is to make cider from them (and more than once, to take account of seasonal variation). These food systems are far too complex to be summarised by a handful of numbers.
~~~

Now if you said you had 4000 cultivars and you wanted to weed them down to some sort of a short list quickly, well then some numbers might help.

Though not necessarily the ones you've chosen.

What drives you to take such a reductionist approach?

~~~

> I am looking at four culinary apple cultivars with high-ish polyphenols. All have similar counts of flavanols and flavonols.

What are the actual numbers? How are the analyses being carried out?

What methods are being used, and what standards? Is this by HPLC or simple colorimetry? What extraction systems are being used? I am suspicious of the methodology if anyone is finding significant flavonols in cider. What species are they finding? And what species of flavanols?

Can they enumerate the different procyanidins?

> One, though, has three to four times more phloridzin than the others. In the past, with less experience, it was rejected because of what we thought were poor tannin flavours. Should this continue be overlooked because of likely bitter characteristics (going by the numbers)?

Again, what are the numbers? It is very unlikely that you will have phloridzin in any cider at a sensorially significant level. Any bitterness most likely comes from the procyanidins.

> Another of the four has double the chlorogenic acid than the others. Should this be considered because of the colour factor (we wanted a darker cider) and because it could provide a spiciness that we are also after?

Again, what are the numbers? You have misunderstood the role of chlorogenic acid in colour formation. It is a redox shuttle which allows the procyanidins to oxidise and to generate colour - it does not generate significant colour in itself. The colour intensity depends on the procyanidin level and the amount of oxygen present and the PPO enzyme activity.

You need the correct bacteria to generate spiciness. This has been discussed here many times. There is always excess substrate present in apples. It remains a mystery why the conversion efficiency is so poor.

~~~

> I fear the acid will attack the zinc very quickly as it is usually a sacrificial coating. A good tough paint suitable for coating zinc may be the way forward...

Agree with Ray. Galvanised is a definite no-no for apples.

~~~

> My favourite nursery hereabouts (across the border in the Netherlands) now lists some cultivars as cider apples or mentions cider among their uses. Does someone have any input on any of them? I'm looking to replace some trees that the rabbits killed three winters ago. 1. I've never heard of these, got no google results either: - Dauws Moon - Fox Wilp - Red Sorcal - Rabauw(-appel) (FWIW, "rabauw" is a Dutch word meaning good-for-nothing)
~~~

I'd guess at Fox Wilp being a transcribed version of English Foxwhelp, which is an extremely acid but aromatic bittersharp. Can't make sense of the rest. Can you ask the nursery for the provenance of these apples?

Bramley is so not a cider apple. It's an acidic cooking apple which often crops very heavily so the surplus fruit is readily and cheaply available here in the UK. I doubt if it would be anybody's first choice here if they had anything better to use and were looking to make a cider of any quality.

As for the apples you list as 'north German', they are not what we in the UK would regard as 'true' cider apples (with low acid and high tannin). But that is not to dismiss them; they are dessert / culinary apples which can be used to make a sharp cider - what we in the UK call an Eastern Counties cider which is quite similar to the traditional

German style.

~~~

> This may seem like a silly question, but does a cider that has been pasteurized and left in bottle, mature the same as a cider that is left to mature in oak or other bulk storage container?

No. A pasteurised bottled cider cannot 'mature' in the sense of the microbiological changes such as MLF that often take place in bulk store.

It does undergo slow chemical changes but these are normally adverse, tending towards acquisition of cooked flavours through slow Maillard reactions and a loss of overall complexity and fruitiness. In the UK 2 years is a typical BB date for such ciders, assuming normal cool - ambient storage conditions. If bottled cider sits in a hot warehouse in the summer, it can change very quickly.

It is not easy to compare like with like though. At least in the UK, pasteurised bottled ciders would normally be sweetened and carbonated, whereas bulk stored ciders are dry and uncarbonated.

~~~

> If anyone can advise me on the above, including Andrew himself, I'd be very grateful as it's been very hard to get hold of Yarlingtons for me this year and I'm keen to see it turn in to an outstanding cider by any means necessary!

I don't understand the urgency. It's only 4th December. Fermentation takes as long as it takes. When it's cold, it takes longer. Sometimes when using a cultured yeast it will stop, and start again when the weather is warmer. Or maybe the Yarlingtons had less nutrient in them.

To know if the fermentation is truly stuck, you need to take a series of

SG measurements not just one, and plot them against time. I don't understand about 'adding enzyme'. What enzyme is that? You can add nutrients to a genuinely stuck fermentation, but if it were me I'd need a lot more evidence and SG data to think of doing that so early in the year.

I think you just need to relax a bit and let things take their course.

If it's still stuck at Easter, then yes you do have a problem ;-) But you don't have one now. IMHO.

~~~
~~~

There are two interesting articles on two well known UK cider and perry makers in the current CAMRA magazine. One is about Martin Harris and

Butford Organics and the other is about Tom Oliver.

You can read them here http://www.camraonline.org.uk/beerautumn2014/ pages 22 - 33

I don't think you have to be a CAMRA member to access them.

~~~

> However, one batch raises a question: we had one carboy that was fermented with Lallemand "belle saison" ale yeast, and it finished with a high gravity. It was in the region of 1.012, while all of the other fermenters went down to around 1.000, +/- a point or two. With all other factors being equal, am I correct for presuming that temperature was the only reason this one carboy still had so much un-fermented sugar? Is this yeast strain simply less tolerant of cold?

I have never used ale yeasts to make cider but I would suggest an alternative hypothesis, which is that maybe this yeast is especially

"glucophilic" i.e. it consumes glucose far more readily than fructose.

This is true of most fermenting yeasts but strains do vary widely in their behaviour. Since fructose is the major sugar in apples, this could slow the yeast down. (There is no fructose in beer wort, only glucose and its oligomers, so you would not notice the same effect there.

Although the "attenuation" of beer yeasts is related to how well they can metabolise the glucose oligomers, that is by a different mechanism).

Just a suggestion to throw in ;-)

~~~

> Gary mentioned that too much of calcium, makes the cider taste salty. I was wondering why last year bottles do have such salty after taste. I did double check all the ppm calculations, and think the amount of CaCl2 was right.

I am a bit worried by this. Can you tell us just how much calcium chloride you have been adding? It should work out at no more than 400 ppm (expressed as anhydrous CaCl2).

~~~

> If the gel is well formed and there is no start of fermentation, maybe just adding a pinch of yeast would help? And when I say a pinch, I mean it - I wouldn't add a full packet because it would start much too vigorously.

Maybe worth a try, but you do need only a tiny amount.

To try to set some numbers on it, active dried yeast contains about

*2*10^10 yeast cells per gram. To match the 'wild' situation, I'd say you don't want to exceed 2*10^5 yeast cells per ml of juice.*
~~~

Or in other words you need 1 gram of dried yeast per 100 litres of juice!

If you have less juice than that you need to scale down pro-rata. Unless you have a milligram balance at home (!) you will have to do that by slurrying in water and serial dilution.

~~~

> I think you need to give more information on what you are doing in order to be able to have a better idea of what is wrong. I assume you start the keeving process in November. What sort of apples do you use? Your pH are low, hence quite acidic apples. With such low pH, for sure I would not add any sulfite. I can't say for sure however that this is the cause of your failures. But certainly this is the first parameter I would change.

I agree with Claude. pH 3.3 is quite low to be trying keeving. I would leave out the sulphite and add it after keeving instead. You need to encourage those apiculate yeasts to get the cap to rise long before it breaks up. But would not be wise to add a commercial yeast which will be far too vigorous.

You should of course still add the enzyme, because that is essential to the pectin demethylation process. The fact you get such a dense gel may possibly indicate too much calcium, so you might cut back a bit on that.

Are you growing your apples on alkaline soil?

Demijohns are not ideal for keeving because of the narrowed necks and poor access. A straight sided vessel with a bottom tap is best.

Presumably you are not keeping any sort of positive pressure in the demijohns during keeving i.e. no airlocks?

~~~

> This year (one week after addition of CaCl2) it looks more like the second from the left on the second row, just that the clear juice layer is about 0.5cm high. The gel was formed after 24hours after addition of CaCl2. The layer of clear juice is slowly getting thicker. I did warm it up to 12C. Unfortunately mould spots are showing up.

If you had an open straight-sided vessel you could easily take the mould spots off. That is one advantage of it. Mould spots usually attach to small pieces of floating apple pulp.

The gel is now sinking, right? Is there any sign of fermentation at all?

(I think 12C is rather warm but if you are worried about trying to encourage fermentation I see why you would maybe do that).

> My apples are grown in the Czech Republic. Yes the pulp was macerated for about 18hrs.

So you have plenty of pectin. But I think we already know that!

We need to home in on the (lack of) fermentation. But you are only one week in, so there is time to go. Have you ever had fermentation in the past?

Where do your apples come from? Do you grow them yourself? How are they grown - young dwarf trees or big old trees? Is there any possibility that they have been treated in some way that inhibits fermentation? How are you sterilising your containers? Do you press the juice yourself? How?

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> Andrew, you were suggesting to reduce the amount of CaCl2. I am trying to get the idea how much is a bit. What I wanted to say is that the amount of the calcium used turns the must into jelly within 24hours (at room temperature). So what should be the result if I lower the amount of calcium?

I'm not sure from your questions that you really understand the mechanism of the keeving process. Have you looked at the keeving page on my website http://www.cider.org.uk/keeving.html and also the download link http://www.cider.org.uk/keeving.pdf that I give there? This shows how the PME demethylates the pectin to form polygalacturonic acid which then complexes and crosslinks with calcium to give a gel. The gel then further complexes nutrients and yeast, and gas production from the yeast then helps to lift the cap. When you remove the juice from the cap you should then have a slowly fermenting nutrient poor juice. That is what keeving is all about.

The strength of the gel depends upon the amount of cross linking and hence upon the amount of calcium present. Hence my _hypothesis_ is that if you get a very heavy set and immobile gel which totally fills your container within a day, you might do better with a looser gel and hence you need to add a bit less calcium. I can't tell you how much less, but as a start I'd say maybe 3/4 or 1/2 of what you normally add. I don't know this will work - it's just a suggestion. Are you sure you don't have the volume to run some small scale trials under different conditions?

Can I yet again paraphrase what I said a couple of days ago ... "Anyone trying the art of keeving should realise they are experimentalists and are pushing the boat out. It is not a recipe based operation (do this, do that and do the next thing and you will get a perfect result!). There are lots of uncontrolled variables and until you have built up some experience you won't know what works best for you. I say all this because I don't want people to be disappointed or to moan to me because

"it didn't do what it says on the tin"!"

~~~

> I am using a mixture of desert apples Jonagold and Idared. Unfortunately as the Apple Wine making tradition get lost in here before the second war, there are not any cider making apples available.

I don't have any experience of keeving such apples. I don't know if anyone does? The technique was developed for cider apples. So as I say you are being an experimentalist! I wonder if your fruit is very commercial and very clean it may have a very low wild yeast load - so that may be why the gel did not rise. Cider apples in the UK and France are picked up from the ground and kept for a while before use, hence the wild yeast populations can be quite high in those apples.

> What is confusing to me is that the gel formation is a chemical reaction. So how it should look like 24 hours after the calcium is added? Mine was gel in entire demijohn. I am attaching two pictures. Trial batch which is now one week old and kept for 4 days at 20C and a picture of demijohn, showing thin layer of clean juice.

It is difficult without seeing the gel itself, but it does look rather tight and rigid from the pictures. It has to be loose enough that the yeast action will make it float to the top and compress it as it does so.

Perhaps the pectin structure in those dessert apples is different to the pectin structure in cider apples? (That is a serious suggestion - there is evidence that pectin structures do differ across apple varieties).

Also maybe you do have too much pectin? Perhaps you should not be macerating dessert fruit pulp before pressing, but pressing it directly?

Again, you are an experimentalist....!

Any sign of progress in the last few days?

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> Sorry my dark under stair cupboard makes it hard to read the luggage labels tidy to my fermenter! My pH was 3.4 (read strip in daylight) and my total acidity was 3.29 g/l if my titration skills were good that day.

I find it hard to reconcile those two sets of figures for any apple juice, and they are outside the confidence interval on Claude's graph http://cjoliprsf.ca/Documents/Acidity-pH.pdf. I suspect one or other is incorrect.

Nevertheless I probably wouldn't do any acid adjustment now you're under way. Wait till you're ready to make your final blending decisions some time next year.

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> AndyinDevon wrote: The final blend tasted really very good indeed, probably the best apple juice I've tasted. This probably indicates your blend had a pretty high acidity if it was so good to drink. A perfect cider blend wouldn't be so good to drink fresh as it would seem somewhat bland and overly sugary!

I am so glad you made that point Claude! Beginners often imagine that the perfect juice will make the perfect cider. It won't, because once all that sugar has fermented away the flavour balance is totally different.

To Andy's point about the degradation of the alkali in the titration kit

.... yes this does happen and it is best to buy and use it fresh at least for each season. It is the acid CO2 in the air which gets into the alkali solution and part-neutralises it, thus changing its strength. [In the 'old days' in the lab we used soda-lime tubes on the alkali reservoirs to prevent this, but you never see them nowadays].

~~~

> Could anyone advise on the titration solution concentration so I can make my own, I have a lot of NaOH about for other reasons and it seems silly to buy solution when I can make it, I just need to know the qty to mix with distilled water and might the water need adjusting beforehand?

Because people keep asking about this I have set up a new web page here http://www.cider.org.uk/acid_titration.html

I hope it helps. It does also describe how to make up your own 0.1M

NaOH. And how to use it if you have it.

You are on your own about getting hold of the chemicals in the first place though. I see there is plenty of stuff on eBay but I'm certainly not going to recommend anywhere. Caveat emptor.

Andrerw

~~~

> I'll sulphite at racking. Would you suggest a particular ppm of sulphite for racking stage?

The normal addition of SO2 is a flat rate 50 ppm at final racking. I never add any at first racking since the yeast is still active then, so the SO2 will just get bound up with no microbiological effect. And the cider will be still be saturated with CO2 so the need for antioxidant protection is minimal at that stage. Keep your big guns for later when they're really needed.

> The acidity of the main must was found to be 3.4 g/l so perhaps outside the optimum acidity range? Might it be sensible to add some malic acid and raise the total acidity?

Do you really mean TA of 3.4 g/L? You quoted a pH of 3.4 before. Some confusion here? What was your apple blend?

~~~

> Could anyone advise on the titration solution concentration so I can make my own, I have a lot of NaOH about for other reasons and it seems silly to buy solution when I can make it, I just need to know the qty to mix with distilled water and might the water need adjusting beforehand?

How long is a piece of string? If you are trying to replace the alkali in a standard kit, it depends on the kit. Often it's 0.1M but not always. Does it say anywhere in the instructions? If you understand titration chemistry you should be able to back-calculate it.

~~~

> the cider in the normal plastic containers or in these new bag in boxes. Just wanted to see if people were Heading towards the newer products or still sticking to the containers.

Technically the bag-in-box is far superior. That's because it doesn't let any air in as the cider flows out. The old plastic barrels do. Air is the mortal enemy of cider. If you care about product quality, you will choose bag-in-box. IMHO.

~~~

> I have about 20 standard cider apple trees of different ages giving very good crops every other year.However,this year 90% of the trees (all except a couple of Dabinett which had a miniscule crop) had full crops,and I am concerned that next year there will essentially be nothing. Is there anything that can be done to alleviate this,or do I have to make cider from an 'on' year last two seasons?

I am in just the same situation and have been for several years. It's too late to do anything now for 2014. In the next 'bloom year' 2015 you could try to manually remove half the blossom which might help to break the biennialism, but this is practically very difficult to do. I considered that with mine and then I thought, what the heck, I'll just make cider in alternate years.

My biennialism is a consequence of a deliberately low input system and inadequate pruning after about year 10 when I took my eye off the ball for a while. Hence what started off as bush trees have effectively become standards due to neglect. I can't be bothered to try to pull them back now, and it will be hard to do. The cider is good after all.

It is a fact that most vintage UK cider varieties do tend to biennialism and need a lot of control to prevent it. With standards you may be on to a losing battle, and our odd UK weather patterns in the last 2 years will have exacerbated the cycle. My dessert trees are much better pruned and far less biennial - a combination both of nature and nurture I think.
~~~

I know this doesn't help ;-)

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> There are plenty of charts on the web about purines in food and beer etc but *none* about the level in good old real cider or perry. As cider is more like wine than beer is it lower in purines/uric acid?

If you read the writings of Charles Radcliffe Cooke, MP for Hereford in the late 19th century, he was always claiming that nobody in

Herefordshire or Normandy ever suffered from gout or gravel on account of their cider intake. John Evelyn claimed similar and I have seen some old French papers do likewise. But it's all what we would call anecdotal nowadays. Not evidence based.

I don't know any published measurements of purines in apples but they will be pretty low because they are a fruit not a grain or a meat.

Having said that it is known that fructose (the main sugar in apple juice) can increase the level of uric acid in humans by influencing the pathways of pre-existing purine breakdown. But there will be no fructose in a dry cider and probably even less purines than in the juice.

It's all quite complicated and the role of dietary purines rather like that of dietary cholesterol (as opposed to the endogenous stuff) is somewhat in doubt I believe. BTW do you know the cherry juice and gout story? That does appear to have some good evidence. Google it.

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> Following on the Apfelwein thread, I thought I would post a question about Sorbus domestica. I have read that Sorbus can be grafted onto several in the Rosaceae family, including pear. Is this something that is done by apfelwein producers? Does anyone have experience with grafting Sorbus onto any Rosaceae and could discuss successful practices?

About 20 years ago I visited the Klosterneuberg Research Institute near

Vienna. There they had been breeding new bitter-free varieties of S. aucuparia for food use and I was told that the best results were obtained by grafting onto Crataegus spp (hawthorn). This is referred to in a paper by Dr Eder who was one of the research team see http://www.lwf.bayern.de/veroeffentlichungen/lwf-wissen/17-vogelbeere/w17-12-vogelbeere-ein-obstbaum.pdf on pages 4 and 5.

I know this isn't directly relevant to S. domestica but maybe it helps?

As far as I know all the German Speierling fruit is collected from the wild and from seedling not grafted trees but I may be wrong.

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> Having read through this post I was wondering if there was cheaper method for measuring SO2 in conjunction with Vit C rather than having to purchase a condenser and suction pump.

Not sure which post you mean but determination of SO2 in the presence of
~~~

Vit C is difficult because they are both reducing agents and so they both respond the same to simple redox titrations. You can't alter their chemistry. Distillation is the obvious answer.

There are some reported workarounds, for instance, titrating in the presence and absence of glyoxal (which is an SO2 binder). I've seen this written up in an out of print Swiss textbook http://www.amazon.de/Getr%C3%A4nke-Analytik-Untersuchungsmethoden-f%C3%BCr-Labor-Betriebspraxis/dp/3980049817 but have no personal experience of whether it works.

~~~

> I have a few tanks with that sort of airlock, and have not been very pleased with their performance. This year I just replaced them S shaped ones and watched them bubble away.

My observation has been that they only get 'stuck' when the wind catches them or if a very vigorous fermentation is taking place or they are filled above the 'fullhohe' line. To cope with the former I put a plastic hat on each one, cut from an old polythene milk bottle. To cope with the latter I just knock them back into place from time to time.

Once the fermentation slows down I have not found a problem. I agree they are not well designed and I think the orange cover needs to be a bit heavier so it doesn't get stuck quite so readily on the internal moulding. It is not ideal that they should stick if the cider-maker is not around to knock them back down again ;-)

I must say I am quite happy to use them as airlock seals for finished cider. It is true that water can suck back on a cold night but it goes into the space between the spigot and the orange cover and in my experience does not suck back significantly into the cider. It returns to its proper position next day. As far as I have seen, the integrity of the seal is always maintained.

YMMV

~~~

> am waiting impatiently for Amazon to send Andrew's(4months...)

I am afraid my book will be out of print for a while. I suggest you try the other sellers listed on the Amazon.ca website or maybe Amazon.com who still seem to have copies. Failing that, contact me off list.

> Natural fermentation started a few days later. About 2 weeks in there was about 4-5 days of a sort of sulfur-ish smell. In January I bottled it, and I have to say the taste was not so good. Sort of a nice flavor underneath but covered by a strong acidic(?) taste. I know it needs to age, but I wonder if it went acetic.

First you need to distinguish between acidic (eg lemon juice taste) and acetic (eg vinegar taste and aroma). Those are your reference points.

Try to assign your perry to one or other of those. Clip your nose shut if you need to, to help you. (You cannot perceive aroma so readily with your nose clipped but you can still perceive taste)

It seems from what you say that you didn't check the pH of the juice or add any SO2. With a wild fermentation under those conditions you are at the mercy of whatever chooses to breeze in. Pears are typically very low in acid and also what acid there is contains a large proportion of citric acid. This means that unwanted lactic acid bacteria can get a hold and turn that citric into acetic - it is a very common problem with perries.

If that is the case, there isn't a lot you can do to it now, except mask it with sugar just before you drink it if it isn't too bad - you can't add sugar to the bulk or it will re-ferment. It is also possible to deliberately re-ferment it with added sugar and a wine yeast (in which case check the pH first to see that this is a sensible plan) which can help but not if it's gone too far.

Otherwise, it's a learning exercise. Once you've read the books you will know what to do for next season ;-)

~~~

> when sulfiting the must *prior to fermentation* the correct amount varies somewhat depending on pH. I guess it stands to reason that the same could be said sulfiting to intervene in a fermentation.

*Actually, no. Because when you use SO2 *after* fermentation you are doing it primarily to control oxidation which is independent of pH.*

The standard wine / cider industry recommendation is to maintain 30 ppm free SO2 in storage, irrespective of pH.

Andrew Lea

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> So I should be shooting for 30ppm rather than 50ppm! Thanks, Andrew.

No. The idea is that you add 50 ppm and after a few days you end up with

30 ppm (losses due to binding and oxidation). If you want to know exactly where you are you have to measure the free SO2 in storage and keep an eye on it all the time to maintain that level. That's what the professionals do.

~~~

> Question: if I were to

> mill more bittersweet fruit (which will turn out around 4.0) is there a calculation which will tell me how much to make to add to the 1000l to arrive at 3.8? Cheers. Lewis.

> I'm only in my 2nd year as a cidermaker, and I'm not a math whiz, but I would think it would just be a weighted average of the 2 batches of juice.

Sorry but it isn't like that. You cannot just average pH values, for two reasons.

1. pH is a log function not a linear one. It is defined as -log to base

10 of the hydrogen ion concentration. So at very least you would have to express the pH as the numerical result of [10 exp (-pH)] and then do your spreadsheet calculations on that. And then convert it back to a log form.

2. But even that wouldn't be accurate, because it takes no account of the buffering capacity of the system, which is what determines pH. And that will vary from juice to juice and is not practically calculable.
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In short you cannot accurately average or predict pH values when mixing apple juices. You can make a rough guess, of course, which may be adequate for the purpose (this is only cidermaking after all, not rocket science), but that's all.

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> One thing that still slightly puzzles me - now having reread the appropriate sections of your and Claude's books am I correct in thinking that a ph of 3.4 or maybe a little higher MIGHT result in a cider which is not sharp to the palate, but that one can only discover that information by measuring the t.a.?

Yes. You cannot judge the effect on the palate from the pH. A measure of

TA comes much closer to human perception for that. (Closer but by no means exact. The wine literature is full of weird and wonderful equations which attempt to describe human acid perception in analytically measurable terms!)

In addition, the perception of acidity in an actual cider is greatly affected by the presence of sugar, by non-fermentables such as glycerol and sorbitol and pectin residues, by alcohol, by tannin, even by volatile esters such as ethyl acetate. No matter what the TA is.

Different styles of cider demand different acidities. A full tannin dry west Country bittersweet would typically need less acidity than a more commercial sweetened style. And, right at the other extreme, Claude the other day quoted ice ciders with very high sugar levels and very high acidities too, which are needed to balance the sugar.

That is why for final cider blending, taste perception (and experience) must be the final arbiter.

~~~

> Could anyone advise the most effective way of achieving maximum yield from apples on a large scale 7500ltr +

So that's 10+ tons of fruit you want to handle.

> Hoping for a 75% yield or there about

IMHO you will only get that from a proper commercial pack press or maybe a belt press. Coupled with a good mill of course. Hydropresses don't give you much more than 65% tops by all accounts.

> as I will be making cider vinegar from the vast amount of bramleys that I have using Orleans method

I wonder do you have any experience of making vinegar on a large scale?

And do you have a market lined up?

~~~

> Could you suggest (best of your knowledge) best mill/scratter and pack press or maybe what to avoided Brands

The choice of "off the shelf" commercial brands in the UK is very limited. It's all imported anyway. Many people here use Voran mills and pack presses and are very happy with them. I'm one of the many. The official Voran
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distributor in the UK is Vigo who also offer excellent after-sales service. See http://www.vigoltd.com/Catalogue/Apple-pressing/Voran-Pressing-Equipment

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> Seems too good to be true... Maybe my 2.5 bushels per cheese is too high.

It is. Where did you get that figure from? What size of press bed did it relate to?

Where I come from, we don't use bushels any more, but one roughly bushel sized box of apples (ca 15 kg) gives a very well-filled cheese (too well-filled) on my Voran press which has racks 50 cm square. In fact, about 6 boxes give 9 cheeses (or layers, if you believe that the whole stack is the cheese. Opinions differ).

~~~

> from your 90kg, how many litres would you get?

70 - 75% yield.

> i assume you are using a fruit shark to scrat.

No. It is the integral mill on my press, as pictured in several placesin my book.

> what is the model number of your press as i am looking for something to press about a ton per year.

It's the Voran 100 P1 press with integral scratter; mine is 20 years old. Several small producers on this list have them. If you are only doing a ton a year I would suggest it makes no economic sense because of the capital cost, unless you get a very good secondhand deal. I don't exceed a ton a year, but then I'm lucky that I didn't pay for my Voran

(it came to me as a fully depreciated business asset, that's how). I would never have bought one otherwise.

~~~

> Training is vital and I have looked at Peter Mitchell but he is full to July which may be to late for me. Also note that Brewlab do a three day course but I think they are more ale oriented. Any one know of any other options available.

Pershore College do a course which should be good. They know their stuff pretty well. http://www.warwickshire.ac.uk/courses/search_results/course_details.aspx?Id=12399

There are also the Butford Organics Courses http://www.butfordorganics.co.uk/cidermakingcourses.html

Have you looked at some good books like mine or Claude's? I am always a bit worried when I hear of people wanting to launch into large scale cider making in their first year and with no previous experience. Have you thought about just 'learning' on a few hundred litres in your first year? Do you have a clear idea of what sort of product you plan to make and your target market? You are already worried about fruit supply, but at the other end have you thought about bottling and carbonation issues?

Or are you planning to sell just dry and draught?If you want a

'commercial' type product then the final stages are often done on contract in the UK nowadays eg through Pershore or Branded Drinks.
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> I'm a bit surprised at how low a lot of these vitamin C figures are! I thought apples were generally declared as having more than that. I wonder how much of it survives in the cider, especially in low-acid ciders.

No they are in line with the usually quoted figures. They are in mg/100g though. Multiply by 10 to get to ppm.

The amount surviving in 'normal' cider is generally supposed to be very small. But it's quite a complex issue with a lot of factors involved including the exact nature of the analytical method - I'm sure we have done this topic to death here previously though, haven't we?

~~~

> Do we know for certain that cider did/does indeed alleviate scurvy?

Yes. It's in Lind's 1753 report. http://www.jameslindlibrary.org/illustrating/records/a-treatise-of-the-scurvy-in-three-parts-containing-an-inquiry/key_passages?page=2

See top of page 194 to 195. It was the only effective treatment other than lemon and orange juice (though not quite so effective as them). The sulphuric acid, vinegar, seawater, barley water which he also trialled had no effect.

Michael wrote:

> do softening apples keep their Vitamin C?

All fruit and veg lose Vit C during storage. The extent depends on storage conditions. There has been data on such loss in apples in the scientific literature since the 1930's but you may be most interested in these readings which were obtained recently by an amateur (using pretty much the standard DCIP titration method for ascorbic acid determination). http://www.suttonelms.org.uk/apple24.html

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> I shut them back up and waited till May before opening them back up and they were much much better. I did not keep opening them every so often to check either. just left them in the garage under a bench. When I tasted them in May they tasted like cider, very nice but not sweet

That sort of spring / summer softening is often due to the 'malo-lactic fermentation' where lactic acid bacteria degrade malic acid to lactic acid and half the total acidity is lost as a result. So the cider seems smoother.

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> FEW MORE QUESTIONS - I stirred in sugar, but the later bottles out of the barrel are more sugary. How do I prevent this?

Don't add dry sugar. Make the sugar up into a pre-dissolved 50% syrup with its own weight of cider and then just blend in the syrup and stir well.

> Does pasteurizing lower alcohol %? - I did 75c for 25 mins.

No not significantly unless you are boiling it in open bottles and the alcohol evaporates. But 75C for 25 mins is OTT. This is cider not juice. You only need to bring the cider to about 65C and then cap it. Or if you have pre-capped bottles, bring the bath to 65C and hold for 20 mins.

> Does it matter if air gets in when bottling if its going to be pasteurized anyway?

If the headspace is small (eg one inch) any oxidative effect for just 20 mins is correspondingly small. You can always pre-cap the bottles if this worries you. Or add 50 ppm SO2 which will mitigate both oxidative and cooked effects.

> & If you moved it after bottling, from bottle to bag in box, how much does that effect it shelf life roughly?

If you break the chain of sterility as you suggest you will be back to

Square One and the cider will no longer be sterile. So eventually it is likely to re-ferment. Nobody can tell you how long that is because it depends how many stray yeasts get in. Could be weeks or months.

~~~

> Hi I've got 30L of cider on the go. First time I've tired it. It tastes very acid, tart. I've been tasting it every so often to see if it would improve over the last couple of months, but it's got worst. Can it be rescued? Can one sweeten? How does one sweeten , whats the percentages of sugar to cider?

If you add sugar, it will almost certainly start to re-ferment due to residual stray yeast, unless you drink it within days or you pasteurise it. You would typically need about 2 -3% sugar (20 - 30 grams per litre) but you have to play around to get the level you like.

Otherwise try Splenda tablets at the rate of 1 or 2 per litre. That is an artificial sweetener which is not fermentable.

(Hope you have a good airlock or tight cap on your cider so it doesn't go vinegary /acetic. That is not the same as simple acid coming originally from the apple).

~~~

> Because they are in tablet form and not just powdered Potassium Metabisulphite i had assumed the " shell " of the pill casing was offering some protection over the loose form.

There is generally no shell. It's a simple compressed tablet. But the reduced surface area compared to powder will probably mean they have a longer shelf life than powder.

Metabisulphite salts are not stable long term and they degrade according to time, moisture, temperature and oxygen exposure. These factors are not predictable. If you really want to know the exact tablet strength you will have to make up an accurate solution and measure its SO2 concentration using a test kit. Anything else is just a guess.

But this is cidermaking, not 4-figure analytical chemistry. How accurate do you really need to be? How accurately known do you think the recommended amounts are in any case? I'm afraid that all these things are approximations anyway. Tis the nature of the beast.

~~~

> Could be gas bubbles on the hydrometer - did you spin it before reading to knock gas bubbles off? Try flattening the cider by stirring with a fork and then re-read
~~~

I agree. Could your 'white spots' just be clusters of bubbles on the surface? Maybe you have MLF starting now the weather is warmer?

It is not physically possible for the SG of a cider to rise spontaneously from 1.002 to 1.010.

~~~

I just saw in the UK Financial Times Weekend Magazine that our David

Llewellyn has been listed in Five of the Best Irish Food Producers for his apple juices and his "legendary balsamic cider vinegar"!

Well done David!

~~~

> So... what's wrong there? - the number of 100-150 million cells per mL is much too high for cider, and 20 to 50 million cells per mL would be more realistic.

I have no direct evidence but I suspect that's probably closer to the truth. I think the telling phrase is "Under favorable conditions". I suspect that figure is derived rather uncritically from lab culture wine fermentations. It's what 'could be done' rather than what normally happens. Even for most wine fermentations, 10^8 cells per ml seems pretty high (eg from various data given in Ribereau-Gayon's Handbook of

Enology).

> the yeast can get N from other sources (i.e. non-YAN) to build their biomass? But this seems unlikely.

Perhaps not so unlikely actually. Despite its name, YAN is not the only form of N available to the yeast. For instance yeast can take up proline and and also short chain peptides under certain conditions (see http://en.wikipedia.org/wiki/Yeast_assimilable_nitrogen) and these will be underestimated by the conventional YAN measurement. It's not as exact a correlation as you might think, especially since products like Go-Ferm and Fermaid O are actually made from hydrolysed yeast and hence will contain all sorts of weird and wonderful organic nitrogen compounds

(especially peptides) which may not show as YAN but may still be taken up as yeast biomass. For instance, a tripeptide will only appear as a single (terminal) amino acid by the YAN assay but will actually contain

3 amino acids.

The book sounds an interesting read. I'd guess it's not available to hobby producers outside North America and it doesn't seem to be downloadable ;-(

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> So the concept of YAN remains useful as it relates to quickly usable N, but a good part of the non-YAN N could be usable after a long process of breaking down the proteins. I could see this as an important beneficial effect of these nutrients, as they provide only a part of the N as rapidly assimilable YAN, and after that, some more N slowly becomes available as the proteins get broken down.

I'm afraid I am getting a bit lost by your argument here Claude ;-)

Nutrients like Go-Ferm and Fermaid are intended for speedy fermentations that take place over a few weeks. There won't be time for any large proteins in them to get broken down by autolysis. And, if you did allow the time, then the primary yeast crop would surely be the major source of autolysis products (rather than any nutrients you added).

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> Interesting... I have seen claims saying these nutrients (Fermaid O and Go-Ferm) were worth more than their DAP number. But I had thought this was because of other vitamins etc, that would make the yeast stronger,

It is. They contain growth factors such as vitamins, sterols and medium chain fatty acids, maybe some trace elements too.

> but I didn't think there could actually be some source of N outside of YAN...

There is some, but ....

> Since Fermaid-O is autolyzed yeast, would it make sense to assume it may contain about the same total quantity of N as dry yeast cells?

Yes

> Then part of this N would be as YAN and the rest as non-YAN, but still usable by the active yeast cells? This would be 4% as YAN and 6% as non-YAN N, for a total of 10% total N.

Only a fraction of that non-YAN will be usable in the sense of being directly metabolisable by yeast. Most protein will not be taken up.

Small peptides will be. Proline is also taken up under aerobic conditions (i.e. at the beginning of fermentation).

The problem is you cannot possibly know the N 'mass balance' in these fermentation aids. Maybe Lalvin will have the details but it will be proprietary and they're not going to tell anyone. You'd have to do some quite detailed chemical analysis to find out. And then you need to know quite a lot about the different nitrogen transport systems in the yeast to interpret that data.

> Assuming this, we could say that a dosage of 250 ppm of Fermaid-O provides 10 ppm of YAN plus 15 ppm of N under a non-YAN form, for a total of 25 ppm of N that may be taken-up for building-up the yeast biomass.

No, not all that 15 ppm non-YAN can be taken up by yeast. If it were, there would be no point in the concept of YAN in the first place!

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> One other big difference for me this year has been that I have also started using a hydraulic press in addition to my twin screw oak press (straw press) and the speed at which the juice is processed appears to make a huge difference. Even if the pulp is macerated prior to pressing their is no substitute for 5 days gentle juice development on a clean bed of straw !

Interesting observation. That could be because the pulp is incubating for a longer time in the older style of press and releasing more pectin and also more natural PME from the apple, if no additives are used. It would

be interesting to know if that is a consistent observation over several years on comparable fruit. 5 days is quite a long time to incubate, though, even for a very traditional pre-hydraulic process.

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> Thank you all for your comments. Andrew, I will measure SG, but given that the product is unpasteurized how could it be bottle conditioned to carbonation with residual sugar without endangering the integrity of the glass bottle?

Claude has satisfactorily answered this I think. It is obviously time that you learnt about 'keeving' ;-) This is widely used commercially in

France and to a very sophisticated degree (nitrogen gas flotation to raise the chapeau brun, refrigerated and centrifuged fermentations to keep everything very slow, YAN measurements, yeast counts and adjustment before bottling etc etc.). That's why French commercial ciders are as they are. There are some brief details in my book, and also on my website here http://www.cider.org.uk/keeving.html

~~~

> someone please provide some context for me as to how a 100% juice cider that is fully dry can be so low in alcohol?

I would query your description of "fully dry". Have you measured the SG?

It may have more unfermented sugar than you think. "Cidre Brut" can contain up to 28 g/L of residual sugar.

~~~

> Nick I suggest you search for David Llewellyns thread about his exploding pear juice from some years ago.

This is the link https://groups.google.com/forum/?hl=en#!searchin/cider-workshop/clostridium$20pear

The first thread is the one.

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> Hmm. option 4: freezing juice. I like that.

I'm with Dick. Freezing is the best option.

Pasteurisation is in theory possible but in practice difficult unless you have access to proper HTST flow-through kit and can pack the product into sterile containers. Sulphite is a non-starter at realistic levels.

It would work at 1000 ppm or so but then you have to remove all that sulphite before you ferment.

You can probably rent walk-in freezer space for a palletised IBC fairly readily (if you have the means of transporting it there). Failing that, you can rent a portable walk-in room or freezer to be located temporarily at your place.

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> This is incredibly helpful - thank you. I am all up for experimenting as much as possible - and this year is when I hope to do it. I have a colleague from Environmental Health who is studying an MSC (including brewing) so I am hoping we will be able to formally experiment approaches together.

If you have never made cider before (it's not clear from your postings)

I would earnestly recommend that you spend your first season learning the basics before you branch out into the much more complex world of keeving, arrested fermentations etc. Walk before you run. I also urge you to read around the whole topic extensively and maybe attend a cider training course.

> Do you know if YAN testing is often done in other brewing industries? There a number of vineyards here,

I suspect most UK vineyards unless they are big operations don't measure

YAN or if they do they would have it done on contract eg http://www.ukvine.com/qa-%E2%80%93-wine-analysis-with-custom-crush/

Nitrogen profile and management in brewing is not the same as in cider and wine making so would probably not be too helpful. Also you would be looking for very low YAN levels to do what you want (stuck fermentation), whereas winemakers are looking for much higher levels because they don't want stuck fermentations.

~~~

> I want a totally natural, semi-sweet cider with a petillant fizz in 500ml beer/cider bottles. Am I searching for a 'holy grail'?

Mark, I think you are in the UK. Look around the shops and ask yourself why are there no such products on the mass market? The answer is because it's very very difficult to do this reliably on a commercial scale. It

can be done but you have to know your fruit, be on top of your nutrient status, use wild yeasts, be prepared for keeving or repeat rackings, bottle 'au point' etc etc. These products died out in the UK commercially after WW1 because of all those difficulties. They are not well-suited to a modern fast moving commercial world where consistency and safety is expected and demanded. Exploding bottles in the store or the consumer's home are not regarded as acceptable any more ;-)

If you study Claude's book or my book carefully you will understand the challenges. So yes, your quest is for something akin to a 'holy grail'.

If it were simple, everybody would be doing it - and they aren't. It is done more commercially in France but the major producers of such ciders are actually quite 'high tech' about what they do. Claude mentioned yeast counts for instance but that's only a part of the control that they exercise.

You will find a few keeved ciders on the UK market which fit your specification, but they are normally presented in champagne bottles for safety reasons. Mostly they have restricted local sale. To think of two producers whom I know read this list, there is Rose Grant in Dorset and

Butford Organics in Herefordshire. They are not the only ones - just 2 examples which come to mind. But it is a specialist pursuit.

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> have been making cider for 3 years now and have learnt alot from my experimentations thus far. This year I am upscaling on quantities as I have access to far more trees and therefore have greater scope for experimentation.

Sounds as if you are just at the right place to start branching out!

Good luck

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> They do have support however, like in Brittany, they send cider samples to the Cidref in Quimper before bottling, for yeast count and nutrients analysis.

Claude, do you know what the nutrient analysis consists of? Is it just

YAN (Yeast Assimilable Nitrogen)? Do you know what threshold levels

Cidref recommend?

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> *1st question*: Does it make much difference what sugar you use? Some people here have used castor sugar. There's brown sugar and white sugar too. Does it affect carbonation levels? Is Dextrose a good choice?

Any refined cane or beet kitchen or table sugar (here in the UK sold as

'caster' or 'granulated') is just fine. They are 100% sucrose which is broken down ('inverted') by the acid of the cider to equal parts of glucose and fructose each of which is fully fermentable. You can use less refined 'brown' sugars but you may pick up caramelised flavours from them. Your choice.

Dextrose (often known as corn sugar in the US) is pure glucose. Some home brewers swear by it because it doesn't need 'inversion' as sucrose does, and at the high pH of beer that takes longer than at the low pH of cider. But the end result is just the same and most yeasts possess an

'invertase' enzyme which does the job anyway.

> *2nd question*: What amount should I use? Andrew recommends 10g per litre but I've seen different amounts used by others.

10 g/L sugar gives 5g/L CO2 which at 15C will give you 1.5 bar pressure which is a gentle petillance. (Depends somewhat on how much CO2 is left in solution from the primary yeast fermentation.). If you drink it from the fridge at 5C it will give you less than 1 bar pressure. http://www.cider.org.uk/carbonation_table.xls

> I don't have scales with high accuracy in such small amounts so I was planning on using 3/4 teaspoon of Dextrose per 500mL bottle rather than add larger amounts to the 20L batch and risk adding air by stirring.

So for 20L you need 200 grams of sugar. Make that up with some of the cider to a 500ml volume of syrup and blend that syrup gently into the bulk. That will minimise the stirring needed. It's very tedious to have to prime each bottle individually.

(I presume you are planning to use solid dextrose? If it's as a liquid, check the syrup strength and allow for the extra water.)

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> So from what I can gather, the amount to use is: 10g/L without adding yeast, or 6g/L with yeast. Would that be about right?

Vince has answered that. The level of sugar you add is to achieve the carbonation you want. Doesn't matter whether you add new yeast or not.

In either case it's yeast that does the work. Doesn't generally matter if it's carried over or newly added. Unless the cider is _very_ old, there will almost certainly be enough yeast left, it just may take a while to grow up again. Adding new yeast may make it happen a bit quicker, that's all.

> I'm looking for carbonation levels something similar to a commercial bottled cider.

Typical bottled ciders at least in the UK are carbonated to '3 vol' or 6 g/L CO2. The 10 g/L of sugar I quoted will give you 5 g/L CO2 as I said before. But that assumes there is no CO2 left from your primary fermentation (and indeed that the cider is already at SG By the way, would you be aware of a study on the rate of YAN use through the fermentation - we know most of it is used in the beginning to build the yeast population, but would all of it be used then, or would there be some left and used during the later stages of the fermentation. I wish I had a graph showing the yeast population, YAN amount, and sugar content plotted against the time for a typical slow cider fermentation...

Such a study was done by Challinor and Burroughs over 60 years ago and was reported in the Long Ashton Annual Report for 1948. It was also described in this review paper by Challinor in 1955 http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2672.1955.tb02079.x/abstract

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And the Hereford International Competition at the Cider Museum .....

> And Mid Somerset Show and Melplash Show..... -- *From:* JezH . For more options, visit https://groups.google.com/groups/opt_out.

%2%

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> I appreciate that they're not in season at the moment, but are there still places to purchase cider apples / apples that can be used for cider making during the spring/summer?

%1%

UK cider apples don't go through the cold / controlled atmosphere storage route that dessert apples do. So you won't get any cider apples now, but you can get some dessert apples and of course Bramley out of CA store into late spring / early summer.

The de-seasonalisation route for UK cider apples is via apple juice concentrate.

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> This is a very good question and I hope someone has an answer. I know that increasing levels of fruit thinning (removal of fruit from trees) increases fruit size, soluble solids, starch content, and titratable acidity of apples that remain on the tree and haven't been thinned. I don't know if this pattern also holds for polyphenols, but would love to find out. Anyone know?
~~~

You could start to find out here http://pubs.acs.org/doi/abs/10.1021/jf011018b

I'd just caution that this is one study on one dessert apple cultivar.

Here in the UK cider apples are never thinned and I don't know of any evidence that it has an impact on their polyphenol content. We typically harvest a vast multitude of quite small fruits. Issues like surface area to volume then come into play. It is also generally recognised that greater stress in fruit crops (eg grapes and apples) tends to increase their polyphenol content. So the equation may not be as simple as it seems.

~~~

> So they start high and then get 'diluted out' as the fruit increases in size. BTW, for this discussion, FLAVONOIDS = TANNINS. They are part of the greater group of POLYPHENOLS. Andrew That is interesting. Just to confirm, Andrew, diluted out with increase in size and not maturity (I realise size is usually a factor of maturity).

I'm not sure how you would measure 'maturity'. But yes, by and large independent of increasing fruit weight after the initial burst of biosynthesis, which seems to stop after cell multiplication ceases and cell growth begins.

In the authors' words:

"Polyphenol accumulation in the apple flesh occurred early during fruit life. For cider apples most of the fruit polyphenol content was present

50 days after flowering though there was still some increase between 40 and 60 days after full bloom for cv Kermerrien, and a low level of biosynthesis throughout fruit growth for cvs Kermerrien and Avrolles.

The evolution of concentrations during fruit growth and maturation was due essentially to dilution of an initially accumulated store. There was in particular no noticeable evolution close to maturity. The stage, around 50 days after full bloom corresponds, for cider apple, todefinitive transition between cell proliferation and cell expansion.

Similar results were obtained for table apples, in accordancewith literature results. Our results indicate an early stop, as suggested by the marked decrease of polyphenol concentration between 30 and 60 days, for cvs Elstar and Gala. After that point, polyphenol concentration would evolve mostly by dilution".

If you want know all the detail you'll need to buy and read the full paper http://www.sciencedirect.com/science/article/pii/S0031942207000957

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> The idea seems crazy to me because the quality of immature apples is poor -- low sugar content, high starch, low flavor development. Why would anyone want to make cider with them?

Speaking as one of the people cited in the paper, I think you are missing the point. These apples are not used on their own to make cider.

They are turned into a tannin concentrate which is then used as an ingredient to be blended with other dessert and cull concentrates, sugar syrups, acid etc to make a cider.

This is an idea for large scale commercial use, not for craft makers or hobbyists.

~~~

> Thanks Andrew. US$15 for a PDF download of the article was a good deal I thought. Will read it fully tonight.

US$15?? That _is_ a bargain. They charge us $35.95 here!

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> Excuse the potentially obvious question, but is it the case that immature dessert apples contain a higher concentration of tannins than fully mature fruit? Sugars build over time with ripening, but are tannins "there from the beginning" essentially regardless of maturity?

Yes. According to some recent quite detailed French work.....

"Concentrations of flavonoids (flavan-3-ols, dihydrochalcones and flavonols) in the fruit flesh decreased sharply between circa 35 and circa 100 days after flowering..... Most polyphenol synthesis had occurred at 40 days after full bloom"

So they start high and then get 'diluted out' as the fruit increases in size.

BTW, for this discussion, FLAVONOIDS = TANNINS. They are part of the greater group of POLYPHENOLS.

~~~

> This is an idea for large scale commercial use, not for craft makers or hobbyists. Why shouldn't craft makers or hobbyists use this technique?

1. Because in addition to the more standard milling, pressing and sub-micron filtration equipment, you need some sort of film evaporator to concentrate the extract to 70 Brix and then store it deep frozen to avoid deterioration. This sort of kit is costly and not normal or justifiable for craft operations.

2. Because all this does is to make an apple tannin extract from immature apples. There is much more to being a good cider apple than just having high tannin.

3. It is, as I said, the manufacture of an 'ingredient' which you can then manipulate in your product development lab until you get the result you want. This does not sit comfortably with the philosophy or outlook of most craft cidermakers. It is an industrial concept.

I have in my day job worked on projects for large companies using hot water and solvent extraction of apples and apple waste to do this sort of thing (raising tannin levels). But they are not the sort of thing I would do as a craft cidermaker.

~~~

> That's great, Andrew! Is there a similar paper out there with English varieties?

You could try "Cider Apple Data" on my website.

~~~

> I'm not finding a convenient comparison of French cider varieties..... I'm interested in knowing which have the most tannins.
~~~

http://www.ifpc.eu/fileadmin/users/ifpc/infos_techniques/Varietes_cidricoles.pdf

Nice diagram and analytical data on page 6

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Claude is quite right. This process is also used by some commercial producers in Australia to obtain a naturally sweet cider.

But sterile filtration (or pasteurisation) is an essential adjunct. Cold crashing may remove some yeast but it will not remove nutrient and the remaining yeast cells will start fermenting again as soon as they get the chance unless they are _totally_ removed. Sulphite and sorbate at realistic levels cannot reliably prevent this.

Cider is not beer. In cider and wine _all_ sugars (fructose and glucose) are totally fermentable as long as adequate nitrogenous nutrient is present. In beer wort, much of the sugar is not fermentable once the glucose has gone because it is in the form of higher maltose oligomers which yeasts can only assimilate very poorly. So what works for beer doesn't work for cider.

Andrew

> This cold crashing process is done on regular basis by some producers in Quebec. Actually, it is the main method for ice cider which has to be stabilized at a very high SG. However, it is followed by either sterile filtration (more often) or pasteurization. Then and by sorbate addition and SO2 for insuring stability. Cold crashing by itself is not sufficient... I am not sure you are right when you write: "cold crashing it will drop solids (including yeast & their nutrients) out of solution" - I'd say most of the yeast yes, but their nutrients, more doubtful... Some if it yes, i.e. the N that is in the yeast cell body, but any remaining N in solution in the cider would stay there.

%2%

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> And UV pasteurizing doesnt kill yeast, right?

%1%

Right.

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> Is there a better option than sucralose? 600x stronger than sugar so that will take some experimenting. ...not that I mind drinking mad quantities of cider, all in the name of research, of course.

Correct me if I'm wrong someone, but I didn't think that _any_ synthetic sweeteners are allowed in hard cider for sale in the US or Canada?

~~~

> will I be ok with the buckets or should I start shopping for glass carboys?

Ask yourself this simple question "are my bucket lids airtight and do they take a fermentation lock?".

If not, you must choose something else to do your fermentation in.

~~~

> I did as Andrew suggested and made up a 0.5% malic acid solution. I also went a step further and went out and bought a bunch of 1n NaOH so that I have complete control over that variable. I made up some 0.2n sodium hydroxide and tested my malic concentration using the method outlined in Claude's book: 0.5%, right on the nose.

Sounds just the ticket! There is also a procedure given on my website see http://www.cider.org.uk/acid_titration.html

BTW be sure you keep that 1N NaOH tightly closed and cool. Aerial CO2 can get in and eventually it can lose its strength; though obviously the weaker working solutions are more susceptible than the stronger stock ones.

~~~

> An easy solution (ha ha) would be to find a liquid that has a known acidity level, so that I would know exactly how much reagent should produce a color change. Could de-ionized water work for this purpose?

No - deionized water has no acid in it, by definition. The ions have been taken away.

The easiest thing is to make up a solution of malic acid in DI water at a known 0.5% (5 grams per litre). Then use the kits to measure that.

~~~

> I see my future in Spain doing British Cider as I love it,

> I would like also other books

If you are planning to make _British_ cider you might also look on my

(British) website or read my (British) book http://www.amazon.co.uk/Craft-Cider-Making-Andrew-G-H/dp/1904871984

But Claude's (Canadian) book also covers all that you need to know to get started. Though I think if you have never made cider before it would be unwise to do a first batch of 20,000 litres!

~~~

> What is the difference between the French and British Cider? The Cidre Brut is not so sweet as is the British for the same degrees of alcohol.

French ciders are typically made by 'arrested fermentation', so they have low alcohol levels and a significant amount of unfermented sugar remaining. British ciders are nearly always fermented to dryness and then back sweetened to whatever sugar level the producer requires.

Cidre Brut can contain up to 28 g/L of sugar. I would regard that as quite sweet.

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I guess I should have put in the links to the online versions so you can read them:

> Coxe 1817
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http://www.archive.org/details/viewofcultivatio00coxerich

> Buell 1869

http://books.google.co.uk/books/about/The_Cider_Makers_Manual.html?id=myJEAAAAYAAJ

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> I guess the evidence would be on the lines that E Coli and other pathogens are killed by the acidity alcohol concentration as outlined by Andrew below and the fermentation itself.

The papers that I always cite for this are here:

http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2672.1979.tb00851.x/abstract

(the abstract is incomplete because it doesn't mention the data in the paper that show Salmonella survival reducing as fermentation proceeds).

http://www.ingentaconnect.com/content/iafp/jfp/1996/00000059/00000012/art00001

http://aem.asm.org/content/65/3/1308.short

I don't know anything else in the public domain nor anything which points unequivocally to '56 days'. As Nick says, it's based on faecal disappearance and the probability of a living pathogen arriving at the cider mill being much reduced. After that the acid and alcohol take over.

~~~

> I am curious on why pasteurization is recommended with hard cider and why sterile filter is considered unsafe? I make sweet wine commercially and never pasteurize, only sterile filter (as is common practice among commercial wine makers). Why is hard cider treated differently?

Because it only has half the alcohol level of wine so the microbiological 'hurdle' is less. It is possible to sterile filter cider, and some people do, but the conditions and attention to detail have to be more stringent than for wine. Exploding bottles can and do happen!

For the amateur and small scale operator, in-bottle pasteurisation of sweetened cider is regarded as a safer option.

~~~

> Is there enough work to be done before bottling in a production setting to rid the dry cider of residual yeast to safely back-sweeten, carbonate and package without a pasteurization process? A dose of gelatin during cold crash in the fermenter, rack to brite tank where sweetener is waiting, carb and package? I suppose you could add a filter step in between the fermenter and brite tank. Is this process enough to ensure safely back-sweetening, carbing and packaging?

No. In-bottle pasteurisation is the only safe bet for the amateur.

*Cold sterile filling is *possible* but only in skilled hands with proper dedicated CIP equipment and in a near-sterile clean-room environment. It can be done - and is done by large commercial producers - but it is very costly and requires stringent microbiological control and monitoring at all times.*
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> Andrew how does the SO2 + carbonation + pasteurisation scenario compare with SO2 + bottle fermentation, from the point of view of loss of SO2 in bottle, and the progress of oxidation during long term storage. My own limited observation suggests there is a big difference in the lifespan of the cider, but it is only 'anecdotal', and I don't know the science behind it.

I don't know. It's going to be quite complicated isn't it? If you have a

'dead' (i.e. pasteurised) cider then the equilibria will be purely chemical to do with polyphenols, oxygen, peroxide radicals, early

Maillard products and SO2 all interacting. After a year or two maybe all the free SO2 is used up? Burrough's figures would tend to support that.

And I personally find that after 2 or 3 years my pasteurised force carbonated ciders begin to taste a bit tired, maybe even 'cooked' eventually. As a food chemist I say to myself "aha, I can detect the

Maillard reaction". But I would expect that, especially after a couple of summers when the bottles may get a bit warm for a month or two.

Whereas with a 'live' cider, maybe the yeast and bacteria are still able to metabolise slowly and to provide a reductive atmosphere. This would help to conserve the SO2, I'd guess.

On the other hand the microbial metabolism would produce sulphite-binding carbonyls, so this might work the other way. And once the yeast started to autolyse, more flavour changes would take place. My subjective impression is that my sulphited but naturally conditioned bottled cider does 'age' but not in the same way that pasteurised bottle cider does. I don't detect the Maillard reaction in those ciders. But I have never done a true like for like comparison.

What do you think?

~~~

> Claude favors multiple rackings of low-nutrient cider at cool temperatures, beginning right after the primary fermentation, and continuing with rackings so as to starve the yeast to the point where they are no longer active and the SG has reached 1.005-1.008. I might try this approach with my next batch. But, is it a widely accepted practice?

It is not widely done commercially worldwide except in conjunction with a keeving process. But it is the basis of much of what is done in

France. As you say, it requires low nutrient fruit, slow wild fermentations, and attention to detail. I will leave Claude to expound that detail!

It is not a 'turnkey' process but it certainly can work if you have the conditions right. You have to plan it from the beginning though, not least in terms of fruit origin and supply. If you are using bulk non-cider apples from a commercial grower it's less likely to work because of their high nutrient status.

Again, it reflects yet another aspect of beverage microbiology, in this case controlling the amount of nutrient available to the yeast. As you say it's about trying to starve it out so it can't grow very much. It is a very different approach to killing the yeast by heat or chemicals, or removing it physically by 'sterile' filtration.

~~~

> Andrew, would SO2 also maintain its antioxidant effect for long-term storage post-pasteurization? Assuming O2 in the headspace of the bottle and a good seal. Any research about SO2 losing its anti-oxidant effects with pasteurization?

There is a wee study by Len Burroughs in the Long Ashton rept for 1979.

In that he shows losses of total SO2 in sugar sweetened cider between 6 and 17 ppm attributable to bottling and batch pasteurising. Losses in bottle over the next 12 months in storage were between 14 - 39 ppm. No breakdown of free / bound SO2 is given.

These were our normal small scale experimental ciders bottled in glass with crown cap seals and a normal air headspace. These data agree with received wisdom. The act of pasteurisation doesn't take out much SO2.

More is lost on long term storage, probably as it scavenges peroxide radicals or aldehydes generated by the Maillard reaction.

~~~

> Besides pasteurization (which gives it a cooked taste, IMHO),

Pasteurisation of ciders sometimes gets a bad name because it is often poorly carried out by amateurs. Two precautions will go a long way to minimise the development of any cooked flavour:

1. Add 30 - 50 ppm S02 to the cider just before bottling.

2. Use the minimum temperature you need to do the job - bring the bottle contents to 66C, cap them, and let them cool on their sides to sterilise the inside of the caps.

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> So, Andrew, just for clarity and to nail this on the head, while we're on the subject: Do you think it is factually correct to state that the in-bottle fermentation mops up oxygen thereby prolonging the useful life of a cider Versus 1) still cider and 2) artificially carbonated cider?? Or is the phenomenon too much of a mystery or too complicated to be able to make that statement?

I don't think we have any actual data for ciders. There might be some from the champagne industry - I haven't looked. But it is certainly received wisdom in brewing for instance see this article from an authoritative source which mentions the O2 scavenging effect of yeast in bottle more than once https://www.ibd.org.uk/cms/file/308 So I think it is a very likely hypothesis to explain the observed differences.

I don't think this will have any effect on the Maillard reaction though.

I think that may be more due to lack of sugar in the sort of dry bottle conditioned ciders you are talking about. I have had long-stored keeved ciders (2+ years) with high residual sugar which are naturally conditioned and yet taste pretty cooked.

~~~

> I plan to follow this up with a 50 degree C. pasteurization of the bottles for 10 minutes with a cool bath to follow.

Sorry but 50C will not be sufficient to do the job. That's not high enough to reliably kill fermenting yeasts.

~~~

> But, I regularly read that some cider hobbyists use potassium sorbate and apple juice concentrate to back sweeten to take the edge off very dry cider and then bottle it as still cider. How does one do this without risking exploding bottles?

You can't. The risk is always present. Especially with apple juice conc, which is far from sterile and contains preservative resistant yeasts such as Zygosacharomyces bailii.

In-bottle pasteurisation is the only safe option on a domestic scale.

Don't listen to anyone who tells you otherwise.

~~~

> Is pasteurization out of the bottle a possible solution too?

Only if you 'hot-fill' (see the Cornell notes) and be sure not to break the chain of sterility as you fill. 'In bottle' is less vulnerable to adventitious contamination.

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> Maybe it's an incorrect assumption, but for whatever reason, I have often been surprised how good a bottle conditioned cider can be after 5, 6 and more years, whereaas any carbonated cider whether pasteurised or not (including my own) seems to taste old relatively sooner. Once again, caveat that this impression is not based on extensive tastings.

I think most of us would agree with you. It comes into the category of

'received wisdom' but is none the less true for all that!

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> I recently grafted cider apples onto my established/ mature crab tree. I'm curious if anyone can offer the steps I might expect to take during the next year. This season will I want to rub out any blossoms or prune at all?

Since (from your past posting) you have effectively 'topworked' to give a 'family tree' you will want to rub out all new buds which arise from the existing crab tree (unless you want to keep and manage just one or two) and you should remove any blossom that it puts out (though those buds should be rubbed out long before they blossom). Otherwise the competition will be just too great and the original tree will re-assert its dominance.

In my experience you will need to do this vigilantly for the next few years. You will find dormant crab buds breaking out from all over, even way down on the trunk where you didn't even know they existed. If you let them have their own way they could soon outpace the new scions, because they are still intimately connected to the growth system of the existing tree whereas your new scions aren't.

As I said when you first raised this, you have set yourself a bit of a challenge. It can be done, but keeping all the new scions in balance and holding back the original crab stock from taking over again is quite a challenge. Good luck!

~~~

> So, if I left whole branches as crab, the new grafts won't get enough of the tree's energy to do well?

There is the concept of 'sap drawers' which Claude has mentioned, where existing small branches below graft level are retained for a year or two

"to feed the roots and to retain life in the tree" (Garner)

I had thought that leaving whole existing branches in the tree would be too competitive (I've never done it) but Garner says "Experience has shown that where there are insufficient sap drawers, one or two large branches of the old variety should be left intact for the same purpose.

These may be removed entirely when growth from the new scions is abundant. The presence of large sap-drawers in no way diminishes scion growth but on the contrary increases it and encourages healing". So it doesn't seem to be the problem I'd feared, rather the reverse.

> Andrew, were you suggesting that I should rub out any crab buds that come up on the branch that I grafted onto? Would this help funnel the nutrients to the scionwood?

That is what I meant and is what I have always done for fear that the stock regrowth would overpower the new scion. However, (Garner again)

"topworking is followed by profuse and vigorous sucker growth from the stock. These may be thinned but not removed until the following winter or left for a further season if the scion growth is not strong". This is pretty much what Claude says.

On the other hand (Garner again re "frameworking") "as the season advances, sucker shoots will arise from the main branches of the old variety and should be rubbed out when the longest are less than 4 inches in length". That is what I have always done.

Ref RJ Garner "The Grafter's Handbook".

~~~

> How long does must last after pressing, presuming sulfites are added immediately?

That is impossible to answer. Do you know the nutrient status, yeast load and species count of your juice? No, of course you don't. And nor does anybody else. But those are the factors that determine longevity, in addition to temperature, pH vs sulphite level, sulphite binding capacity etc etc etc. In the absence of that data, the only answer is guesswork. So, the only answer anyone can give is "a few days to several weeks", unless we know a great deal more about your operation.

In the scenario you paint, why not consider just 'going with the flow' and treating it as a sulphited wild yeast fermentation? That _could_ have a lag phase of 3 weeks or so before gas production begins. All you'd need to ensure is that your juice containers are only loosely capped, not tightly sealed, so that CO2 can safely escape if fermentation begins before you've got it transferred to your final fermenting vessel.

> References (eg., Claude's, Proulx's) all seem just to suggest 'asap'.

I think it's a bit uncharitable to shoot the messenger just because you don't like the message ;-)

~~~

> I'm sure I found a great perry pear id page online, but b*ggered if I can find it now! Also gone back through the workshop archives and can't find any links. Any ideas?

I wonder if you are thinking about the Charles Martell book?

See link at http://gloucestershireorchardtrust.org.uk/varieties/pears/

Big download but has lots of pics.

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> but in the meantime, does anyone know about Moorcrofts?

From Ray Williams in Luckwill and Pollard "Perry Pears" 1963.

"Moorcroft

JUICE ANALYSIS: (19 samples) Sp. Gr. 1066: Acidity 0.50: Tannin 0.17.

VINTAGE QUALITY: (19 samples). A medium acid, medium tannin perry; astringent and frequently of good or excellent quality. Usually a high gravity juice.

A large tree with acute angled crotches and usually a small number of long, rather upright limbs, which break easily. Cropping light to medium.

A very widely grown variety and very popular for perry making. Believed to have originated on Moorcroft Farm in the parish of Colwall, Herefs.

The fruit is severely attacked by scab in some years. Not to be confused with the variety Newbridge (syn. White Moorcroft). In districts east of the Severn this variety is invariably known as Malvern Hills."

You can look in Martell's book yourself from the previous link I gave.

~~~

> S. Cerevisiae (the correct spelling if one were being nit-picky) is the family of yeast that are used in wine, ale, cider and baking.

You are still wrong as far as _wild_ wine and cider ferments go. The distinction is between strains of Saccharomyces cerevisiae and their subdivisons (eg uvarum, bayanus etc) on the one hand and 'apiculate' yeasts such as Kloeckera on the other. It is the apiculate yeasts which start a wild cider / wine fermentation and the Saccharomyces which finish. That is an ecological succession.

This is fundamental to understanding what happens. Please go away and read up on it. You couold start here http://www.fermentingyeasts.org/public/File/Function%20of%20yeast%20species%20and%20strains%20in %20wine%20flavour.pdf

Or look in my book or on my website for a simple description as it applies to cider.
~~~

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> there must be some core elements that are cornerstones everyone embrace.

No I don't believe that there are. The cultural and taste differences between native Spanish, French, German, UK and US ciders are vast. (By native I mean ciders that are pretty much 'traditional' and have not been chaptalised or ameliorated for mass market appeal. This inevitably leads to a bland convergence).

The first time I tasted ciders that were not from the English West

Country I was shocked that such things should even exist. Over time I have forced myself to appreciate them and to become far more international in my approach. So now I think I can understand and appreciate the diversity of ciders from many different cultures.

But I do not believe there are any common cultural norms in cider. About the only thing that links them is that they are made from apples.

(Just my six-penn'orth of course.)

~~~

> If the answer to this question in out there I can't find it. If I'm making a cider with a variety of apples that ripen at different times, is it best to preserve the early cider unfermented (frozen) and mix them all together before fermenting the whole or ferment each variety when available and mix it after fermentation?

It all depends. In my view, blending for pH balance should inform you of the best route in your particular case.

For instance if your early apples are acid and your later apples are bittersweets with pH

> 3.8, you may like to freeze the early juice so that you have it to blend with when you are fermenting the high pH fruit later.

On the other hand if you always have enough acid apples to blend even in late season, then you might as well ferment separately to get the job done and without the cost and hassle of freezing.

If you are using wild yeasts, and the interval between the early and later fruit is only a few weeks, you could as well start the fermentation early and then top it up with the later juice while it's still in progress. People in the UK often do that. But if you are using a cultured yeast and the weather is warm, fermentation may be done and dusted too quickly for that route to be realistic.

~~~

> My impression is that if Mac really gave off flavors, someone would have noticed...

But people have noticed and have documented it! In any case it isn't really an off-flavour is it? The 'Mac family character' (also prominent in Empires and Spartans) is a very estery note which maybe some people just don't like in their cider. Its level may also be very dependent on fruit growing conditions, or maybe on various issues around which exact clone is being grown. Mac has been around a long time, so I'd guess there are quite a few clonal selections out there.

Retention of native fruit esters in cider will also be dependent on fermentation conditions. Other things being equal, a cooler slower fermentation will conserve more native fruit esters than a warmer one.
~~~

>

> Any final thoughts on whether these esters age out, or on how to treat the juice to mask them?

If it really is just 'Mac character' that you've noticed, maybe you're over-reacting a bit trying to get rid of it. If that's what your fruit gives, that's what it gives. If you don't like it, choose some other fruit. You may find that if you add a malo-lactic bacterial culture then the estery notes will disappear. But you will also lose acid, and the overall flavour balance will change to something less obviously 'fruity'.

~~~

> the only additive to these batches has been tannin powder. However, a couple of months later, there remains this distinctly floral, almost sickly-sweet scent that invades the nose during tasting and makes for a somewhat unpleasant experience.

Tell us about the fruit you used for the cider. And tell us about the tannin powder.

Is the aroma rose-like? In which case it could be phenylethanol which can come both from yeast metabolism and also from natural precursors in the fruit.

Or is it so sickly floral that it verges on fecal? In that case it could be indole, formed by stressed yeast with inadequate nutrition.

> As an aside, I'd also like to know if there is ever any reason that the titrable acidity would /rise/ during ferment, other than an acetobacter invasion.

The simplest answer is CO2. Did you degas your cider before measuring the TA?

Otherwise, it is perfectly possible for fixed acid to rise during fermentation. Some yeasts synthesise malic acid, some metabolise it. So acid can go up or down during fermentation.

~~~

> The juice is a mongrel mix of Macintosh, cortland, royal gala, macoun and jonagold, so nothing very special there.

Hmm... McIntosh (and its derivative Macoun) rings some bells here.

According to Proulx and Nichols, a 1958 Summerland report found Mac cider to have "an unfortunate aromatic flavour resembling beeswax" and in his 1941 article Arengo-Jones said "Mcintosh is too strong and perfumed to use as a single variety cider and no more than 25% should be used in a bend".

Macs are certainly very estery and this seems to persist into the cider, both as native esters and possible liberation of bound forms. Their major esters have been reported as

Ethyl propionate

Ethyl 2-methylpropionate

Ethyl butyrate

Propyl propionate

Ethyl 2-methylbutyrate

Macs are not grown or used here in the UK, certainly not for cider

(though when I was a lad they were imported from Canada as table fruit) so I can't speak from personal experience. But they could be what you're picking up?

~~~

> I am wondering if this idea is good or not: I have hard cider that fermented to dryness and would like to add some fresh juice (apple or pear) from the grocery store, which already contains potassium sorbate. I agree none of this is very scientific as far as quantities are concerned, but I am naively thinking/hoping that it will not re-ferment in the bottle...

I'm afraid that is both naive and hopeful.

I think in the US and Canada, the maximum permitted level of sorbic acid in apple juice is 0.1% (1000 ppm). So even if you used the juice at a

20% dosage, you would only have 200 ppm sorbate in your cider. This amount will not reliably prevent re-fermentation by yeast. It may hold it off for a week or two, depending on yeast cell numbers and viability, but sooner or later the sorbate will be overgrown. Also, in the likely presence of malo-lactic bacteria it is metabolised to a 'geranium' off-flavour which will ruin your cider.

Not suitable for long term storage, in my experience. I have seen sorbated sweetened ciders explode. What a mess!

~~~

No need.

The physics is quite straightforward and has been covered here often.

For instance see here http://cider.org.uk/carbonation_table.xls

3 volumes of CO2 at STP is just under 2 bar at 15C.

Andrew

> I'd go back and ask them what bars / psi their rating is.

~~~

It is probably best to start off thinking of the saturation concentration of carbon dioxide at atmospheric pressure (1 bar absolute or 0 bar gauge) which in water at STP is 1.964 grams CO2 per litre. For ease and convention we normally call this 2 g/litre. This is also conventionally defined as '1 volume'. Both measurements are always referred back to STP. At this point the CO2 pressure in the bottle is in equilibrium with the ambient pressure of the atmosphere so there is no excess pressure, i.e. no obvious carbonation. The gauge pressure is zero.

By contrast a '3 volume' or 6 g/L carbonation gives a gauge pressure

(i.e. excess over atmospheric) of 0.883 bar at 0 C. Because gas pressure rises with temperature, this becomes 1.98 bar at 15C and 2.43 bar at 20C.
~~~

Now, let's look at where this gas might come from. Assuming you have a dry cider at SG 1.000 and you add priming sugar to SG 1.005 then you have added about 12 g/l of fermentable sugar. The conversion ratio of this to CO2 is just under 50% but for simplicity we will call the CO2 yield 6 g/L. However, if you are starting with a dry cider not long after it's finished fermentation, it will probably still be saturated with CO2 so we have to factor in an extra 2g/L to account for that. So in total we now have 8 g of dissolved CO2 per litre.

Referring back to the carbonation tables, 8g/L CO2 is '4 volumes' and at

15C gives just under 3 bar gauge pressure (or 45 psi old money). Proper heavyweight re-usable beer bottles (ca 500 g weight for 500 ml volume) are rated for this sort of usage.

It seems that you have bought lightweight '3 volume' bottles. In which case you should stick to the '3 volume' limit. That is, no more than 6 g/L of CO2. Assuming as before that you have 2 g/L already in solution at the end of fermentation, you have an allowance of 4 g/L of CO2, which you can acquire from the addition of 8 g/L of sugar, which is an SG increase for a fully dry cider of about 0.003 SG points. So if your cider was SG 1.000 when it was dry, you can go up to SG 1.003 with the added sugar. But bear in mind that some ciders will be below SG 1.000 at dryness. It is safer to add sugar by mass than to a target SG.

Andrew

> Thanks for the carbonation table Andrew. If you could explain it to me a little this would be helpful. I'm trying to figure out how you read the table to get a pressure rating in bars at both STP and 15 C. I see that the bar for O C and 273 K (STP) is 1.883 but the bar for 15C is 2.978. Can you explain this process a bit? Also, reading across the table from 20 C I see the bar is 3.43 which I understand translates to 3.385 atm and 49.75 psi. According to the rule of thumb that the safe range of pressure for a cider of SG 1.005 bottled in a beer bottle with crown cap is 3 atm and 45 psi, do I have to worry about a bottle with a 3 volumes of CO2 max exploding if temperatures reach 20 C? I feel like I'm missing something? cheers, jon

%2%

~~~

> I'm looking to source some French cider variety trees, mainly the bittersweets from Normandy region. Does anyone know if there's a nursery in the UK that have a selection or can link to a nursery in France?

%1%

I doubt you'll find any in the UK, but I just found loads of nurseries in France selling cider apple trees via Google.

It may not be good French but I just entered the search terms .

~~~

> I'd be interested in seeing how the French apples would grow here.

You might care to browse this site http://www.ifpc.eu/ for background information on French cider apples and for example this download http://www.ifpc.eu/fileadmin/users/ifpc/infos_techniques/Varietes_cidricoles.pdf and this one on response to climate http://www.ifpc.eu/fileadmin/users/ifpc/infos_techniques/Diapos_P_Guillermin.pdf

I don't think there is any problem with French cider apples growing here

- it's more a question of "what do they bring to our English cider-making party that we don't already have ?" Especially bearing in mind that the styles of cider on either side of the Channel are so very different.

~~~

> Many thanks Andrew....Time to dust off my translation books! I wonder if any of our native varieties are actually French types under a different name?

Generally no. The provenance of all ours is quite well known, as is the provenance of the French types in France. That is to say, their origins may not be known absolutely, but they have long native histories and they don't overlap.

A few French cultivars were deliberately imported by the Woolhope Club in the late 19th century, especially into Herefordshire. Michelin and

Medaille d'Or are probably the most well known of those. See Hogg and

Bull http://www.archive.org/details/applepearasvinta00bull pp 88-90. At that time it was established that some varieties known as 'Norman' in the UK did not correspond with anything then known in Normandy. Other well known imported varieties are Vilberie and Reine des Hatives.

The trade goes the other way too. I see that Dabinett appears on some of the French lists. Despite the fact that so many people want to spell it as Dabinette or Dabinet, it is thoroughly English. Dabinett is a South

Somerset family name.

~~~

The following message has been received by the Cider Workshop.

If you think you can help, please reply to Maria OFF LIST.

Vintage work

23/07/2015 03:10

Cider Workshop

Hi,

I am in Australia, but I do not mind to go to Spain, France or England.

I want to help to do cider, which I believe would be around September the busiest time.

Do you know any company that are looking for people?

Thanks,

Maria

> As far as I know there is no legislation on additives and their quantification in organic cider in EU.

See here (in Spanish) http://eur-lex.europa.eu/legal-content/ES/TXT/HTML/?uri=OJ:L:2008:250:FULL for the EU Organic regulations.

'Anexo VIII' is what you need. See E220/E224.

~~~

> I have heard of a recently scaled up producer who had to recall all of a batch of bottles because of off flavours, which were put down to the pasteurisation and was wondering what would have caused this.

Pasteurisation will not in itself be a cause of off-flavours unless it's terribly badly done. There is a possibility of 'cooked' flavours if it's overdone but this can be mitigated by use of SO2 before bottling. It's more likely there was some other problem and pasteurisation is getting the blame.

Many commercial ciders and beers are pasteurised and they don't suffer from off-flavours.

> And there is me having just given up my sulphur habit as I felt I had established a strong enough colony of yeast in my shed and that would be my only source of off flavours, as long as I was careful with oxygen exposure and very clean in the process.

Don't give up the sulphur habit Denis. If sensibly applied, it's a good habit, not a bad one! It reaches the parts of a cider that nothing else can reach.

~~~

> What country has this law on organic cider?

In the UK all 'Organic' Products have to be certified with a

Certification Authority which is registered with UKROFS (UK Register of

Organic Food Standards) under EU organic regulations. The biggest and most well known of these is the 'Soil Association'

The current Soil Association SO2 regulation states "For cider you may use E220 sulphur dioxide or E224 potassium metabisulphite. Total sulphur dioxide (SO2) levels in cider must not exceed 100 mg/l total SO2 and 30 mg/l free SO2."

See this document (which is a downloadable PDF) http://www.soilassociation.org/LinkClick.aspx?fileticket=4lKnBZAUtQs%3d&tabid=353

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> I think what Andrew says about cider from high tannin apples is right as tannins are a natural anti oxidant.

Well sort of. Or not. That's why my remarks were guarded. Tannins / polyphenols can act as antioxidants in wines and ciders but at the same time they can also act as pro-oxidants. That is because as they become oxidised, they can co-produce damaging pro-oxidants such as hydrogen peroxide. This can then oxidise the alcohol to acetaldehyde, which is bad news and a classic symptom of wine / cider oxidation. See http://ajevonline.org/content/25/2/119.abstract A lot of this is about redox balance, and about what else is in the system that might scavenge the peroxide. So it ain't simple.

That's why I always add SO2 to my stored ciders (and just before bottling). It pretty much stops all this happening by mopping up the peroxide and binding to any acetaldehyde produced.

~~~

> sulfite has its highest activity and is strongest just after adding it. So, to profit from this high strength period, you shouldn't mix it just after adding the sulfite, but let it work some time at this high strength.

There are two things going on here. One, as Claude says, is the binding to natural juice components (sugars and other carbonyls) which takes free sulphite out of the system. That happens at a different rate for different juice constituents. Some of the sulphite is bound within minutes while some takes many hours.

The second thing is the actual activity of free sulphite against unwanted microbes (which is why we use it after all). Again, that isn't immediate, because the sulphite has to be transported across cell walls and interfere with the internal metabolic machinery in order to disable the microbes. That may also take several hours.

All in all, that's why we recommend the waiting period after addition of fresh sulphite solution to a juice, before adding a cultured yeast. 12 -

24 hours is the rule of thumb. 'Overnight' nicely fits the bill. Add sulphite after pressing, and the yeast next day. And ideally, don't mix batches until the sulphite has done its work.

~~~

> I had three batches that were dry, and I added anywhere from 1.9 to 2.6 g/l of sugar right before bottling.

> perhaps foolishly bottled into standard wine bottles with a corker doing the work. I used new corks. Is this small amount of bottle conditioning too much for uncaged corks?

2.6 g/L sugar will give roughly 1.3 g/L CO2. Saturation solubility of

CO2 is around 2 g/L. So it rather depends on how much CO2 you already had in solution.

Let's say your original cider wasn't supersaturated, so you now have a total of 3.3 g/L CO2. From the carbonation tables this is I got nearly 12 pints of juice from a laundry bag of apples.

"Pints per laundry bag" must be the most creative set of units there ever was for expressing juice yield! Sure beats boring old "percent"!

> I was pleased with the result, but would be interested to know what anybody else thinks about using horticultural fleece for pressing.

Neat. But presumably this is a one-time use? My experience of horticultural fleece leads me to think it would be impossible to wash and re-use because it tears quite easily? So it could work out quite expensive in the long term? Or maybe with care it would survive a few pressings?

But certainly it's another one to add to the list. It seems to me we've come a long way since woven horsehair was recommended for press-cloths ;-)

~~~

> I was hoping to ferment and store in ibc this year, but now reading the tread I am nervous Can anyone recommend a tried and tested alternative product and supplier in the south of England, possibly 500ltr or 1000ltr

Really you can get a bit paranoid about this. Lots of people on this list ferment and store in food grade IBC's or in 'blue oak'. Yes of course you have to watch for air ingress but that's true of any fermentation vessel. Smiths are a well known supplier http://www.smithsofthedean.co.uk/index.html

If you want a pukka job you can use the purpose designed Speidel tanks from Vigo but they are more costly. Lovely jobs though and they will last you 20+ years. http://www.vigoltd.com/Catalogue/Tanks-vessels-accessories/Plastic-tanks-Speidel/Speidel-plastic-tanks

(That's what I use, and then I store in a stainless variable capacity tank).

~~~

> As I was racking a 220 litre barrel it was a good idea to invest in a pump, after attaching all the hoses and adapters the pumped cider was coming out white and foam was building up on the surface as it filled the new barrel.

This is quite normal with a fresh cider that is well supersaturated with

CO2. You may have up to 6 g/L present. Saturation is around 2 g/L. The excess CO2 outgasses under the mechanical agitation of the impeller.

> I think this was due to air being sucked into the connections somewhere and the force of the pump both adding to oxygenating the cider.

Possible but unlikely. I suggest you check your hoses and clips but at this stage air is less likely than native CO2.

~~~

> Couldn't resist buying this. Were you involved Andrew? Cheers trevor

No I wasn't involved in its production but I remember it well. May still have a copy kicking around...

The Home Food Science Section was a group that worked primarily with

WI's etc to get good scientific practice into 'domestic science'. They dealt with that side while Campden dealt with the commercial food industry. Pre-war they did a lot on canning and bottling, and post-war they were responsible for much of the advisory work on home freezing.

Disbanded in 1985 when the Cider Section (aka Food and Beverages

Division) closed. They were responsible for this lovely book

(http://www.amazon.co.uk/Preservation-Fruit-Vegetables-Fish-Agriculture/dp/0112428649)

1st edition 1929. The final 14th edition 1989 has been out of print for years but this looks like a modern reprint. Or maybe somebody just found a load of unsold stock?

~~~

> I usually use the Vigo cleaner/steriliser, but have read that chlorine based products can be corrosive to 304 grade SS.

What you say is technically true but it needs to be put in perspective.

Here for instance is a statement from the Nickel Institute on the subject...

"Bacterial control and management is often achieved by chlorine dosing.
~~~

Type 316 stainless steel performs well and the molybdenum additions in this alloy provide greater pitting and crevice corrosion resistance than its Type 304 counterpart. Data to evaluate acceptable free chlorine levels is limited but that available for raw waters suggest up to 2ppm for type 304 and 5ppm for type 316. However, stainless steel can tolerate considerably higher levels of chlorine for short periods of time, as would be the case during disinfection treatments".

You will only be using the chlorine sanitiser for a few minutes and rinsing with clean water afterwards, so in practice you shouldn't have a problem. If you left it for days or weeks that would be different.

But yes ideally 316 is preferred for cider or winery use over 304, especially for tanks where contact time may be many months. In that case it's the low pH and malic acid which are damaging to the SS.

~~~

> I just hope the yeast is ok. Any thoughts? it is going to get colder and I don't want a stuck fermentation!

Well of course EC-1118 isn't going to be too speedy at 7 - 10C. But it'll probably get lively again when the weather is warmer or if you can heat your IBC's a bit. Are you sure your locks are tightly fitting? With a slow ferment it's very easy for gas to escape round the side of the bung and you never see any bubbles.

I am slightly worried by your use of Star San in the airlocks. Have you calculated the concentration you'd get in the cider if they should suck back?

~~~

> I have no experience of StarSan but I thought it was actually peroxide based?

Should have googled before I posted ;-) No peroxide, just strong acid and a surfactant. I didn't realise it was available in the UK.

~~~

> Next year we will try to get hold of some Bittersharps to increase the acidity. Someone suggested Angelas. Has anyone had experience of Angelas?

Angela is one of the new deliberately early season-extending cider apples bred by Liz Copas and Ray Williams before Long Ashton closed and has recently become available commercially and in trial plantings. There isn't much experience yet, and probably none at the "craft" level. It is an early bittersharp and is ready in September / October, maybe a month before Dabinetts and Michelin. I have no idea how well it would store.

Quite apart from the currently limited supply of Angela, I would say you were probably better off with a traditional bittersharp like Kingston

Black or Stoke Red which is ready at the same time as Dabinett and

Michelin. But if you can get Angela easily, give it a try.

Otherwise, there's always Bramley if you just want acid ;-)

~~~

> If you think that I have calculated that worst case wrongly, or you think that that Starsan diluted solution really is inadvisable as a fermentation lock solution, _please_ do shout.

I think that amount of phosphoric acid is fine. It will just encourage the yeast! The surfactant will be microcidal to some extent of course. I have no experience of StarSan but I thought it was actually peroxide based?

Given the nature of your setup it doesn't sound as if you'd have a problem.

~~~

> Dabinetts and Michelins more or less 50:50 pH of 4.2 SG is 1046 What are others' experiences of this year's crop?

Just pressed some South Oxfordshire Dabinett at SG 1.050 and Kingston

Black at 1.046. Pretty typical I would say.

> at pH 3.8 we will need 184ppm of SO2. Seems rather a lot, and takes us nearly up to the 200ppm limit allowing no scope for later bacterial control. Any thoughts? Would we be better increasing the acidity to say 3.5? How far can we go with acidity before the balance goes awry?

You need to think forward a bit. If this is the only cider you've made then it needs to be made more acidic (at least down to pH 3.8) both for microbiological control and to make it nice to drink. If people will be drinking it as a dry still West Country cider then you need less acid than you do if it's a sweetened, carbonated and more commercial style.

Although pH is not a good measure of titratable or perceived acidity, I would say stay at pH 3.8 for the former and maybe drop to pH 3.6 for the latter. Though really those sorts of blending judgements should be done post fermentation and based on TA and taste, not pH.

If you have other more acid cider you will blend with later for your final product, then don't make this current one too acid.

At pH 3.8 you could think of adding 150 ppm SO2 for micro control now, leaving 50 ppm for addition at final store / bottling. But again it depends on what else you may be blending it with. You have more latitude if you will eventually blend with some more acid cider containing less SO2.

Remember the figures in the graphs and tables are only a guide based on a typical UK situation wrt naturally occurring sulphite binders and wild yeast sensitivities etc. They make reasonable assumptions but they are not set in tablets of stone.

> Finally, for clarification. I am working on the basis that the 200ppm SO2 limit applies to _all_ i.e. total SO2 additions, not just the free or molecular SO2. Correct?

Yes. The legal limit is on total SO2. And that basically means the sum of what you add. Relatively little (maybe only 10%?) is lost from the system irretrievably eg by oxidation.

Of course this only applies if you're selling it, and it only applies to the product as sold (not to whatever you do to it in the interim). But I assume you're not drinking 2000 litres yourself ;-)

~~~

> Does the sugar content stay the same year to year irrespective of the growing conditions

No not at all. See the attached gif which is data I collected many years ago in Herefordshire.

The CV for SG is about 10%, which means that the sugar content will vary about +/- 20% around the average value over successive years.

~~~

> planning to try a natural keeve cider later in the year when the temperature drops a bit hence we need to store some of our apples until then. We have two choices of apples separated out which we could use for this purpose, both are bittersweets. Does anyone have any advice which may be easiest to keeve. The choice of apples are 1) yarlington mill cider apple Or 2) harrymasters portwine cider apple.

Both should keeve OK, certainly if you use added PME and calcium. If by

'natural' you mean no additives at all, well it's anyone's guess really.

Probably HM would keeve better under those circumstances due to its higher pH.

Harry Masters is more tannic and lower acid than Yarlington Mill. In myorchard HM stores less well than YM and tends to 'blet' once offthe tree. However there could be other reasons for that (my HM probablyhas higher nitrogen because it grows where my chickens live) and thatmay not be a general observation. If you are set on making a singlevariety bittersweet cider and not blending with more acid fruit I'd choose YM over HM due to pH considerations. But what's to stop you using a 50/50 mix of both? The best ciders are always blends.

~~~

> Yes by natural keeve I mean I'm not going to add any chemicals to aid the keeve,mainly because I can't find anyone that sells the klercidre kit.

I have listed sources for keeving supplies at the bottom of this page http://www.cider.org.uk/keeving.html

http://www.vigoltd.com/Catalogue/Chemicals-additives/Keeving-Kit-94426 or www.cidersupply.com are probably the easiest places to go for mail order supplies.

~~~

I guess Jez's original puzzlement is why is NaMS solution denser than an equivalent strength of sugar solution. If you compare the common salt

(sodium chloride) and sugar density tables on the internet you will find the same thing. Salt solutions are twice as dense as sugar solutions at equivalent strengths. Those tables show Jez's solution as being about

12% NaMS.

As far as I know this is all to do with NaMS being ionic (just like common salt). The ions dissociate in water and can pack in the spaces between the water molecules more tightly (water has a 3D lattice like structure). Hence for the same volume of water you can pack in more mass of solid salt and the solution becomes quite dense. The sugar is not ionic and hence the sugar molecules just sit next to the water molecules and add to its volume, thus reducing the density.

I think that's it.

[I'm not sure that Claude's figure is correct by the way ....]
~~~

Andrew

> My stock solution of 10% NaMS (5% SO2) is coming out at SG 1.070. Never measured it before today. Andrew

> JezH wrote: Tonight, after I sulphited some juice, I poured the remaining So2 into the trial jar of the basic hydrometer. Don't ask me why - it was clean but does tend to live near the press. It then showed a reading of 1.090... which is odd seeing as it was simply water and sodium metabisulphite. It must have been a pretty strong solution... A 5% SO2 stock solution should have a SG of 1.0275. Could it have been somewhere like a 15% solution? Claude -- -- Visit our website: http://www.ciderworkshop.com You received this message because you are subscribed to the "Cider Workshop" Google Group. By joining and posting to the Cider Workshop, you have agreed to abide by our rules, and principles. Please see http://www.ciderworkshop.com/resources_principles.html To post to this group, send email to cider-w...@googlegroups.com . For more options, visit https://groups.google.com/groups/opt_out. -- -- Visit our website: http://www.ciderworkshop.com You received this message because you are subscribed to the "Cider Workshop" Google Group. By joining and posting to the Cider Workshop, you have agreed to abide by our rules, and principles. Please see http://www.ciderworkshop.com/resources_principles.html To post to this group, send email to cider-w...@googlegroups.com To unsubscribe from this group, send email to cider-w...@googlegroups.com For more options, visit http://groups.google.com/group/cider-workshop?hl=en -- You received this message because you are subscribed to the Google Groups "Cider Workshop" group. To unsubscribe from this group and stop receiving emails from it, send an email to cider-w...@googlegroups.com. For more options, visit https://groups.google.com/groups/opt_out.

~~~

This is a PISA question isn't it?

If a 5% SO2 solution (from NaMS) has an SG of 1.090 then what is the SG of a (maximum) 200 ppm solution of SO2?

> Once the fermentation has finished, will the SO2 added earlier affect the hydrometer readings? Wassail J.B.

%2%

~~~

> [I'm not sure that Claude's figure is correct by the way ....]

%1%

Just checked further. Claude's figure _is_ correct for SO2 gas dissolved straight into water. But not correct for the NaMS or KMS salt solutions which have a lot more inert 'stuff' in them and is what we commonly use.

So that explains that.

~~~

> Hi Matt. That's exactly what I bought! I thought both were the same thing, obviously so did the woman in the shop because I distinctly said I wanted to test the PH in my cider. She said they had papers too, but this would work....

You have been wrongly advised. See here http://cider.org.uk/phandacid.htm
~~~

What you have actually done is to buy a titratable acid kit and measured the titratable acid at 6.8 grams per litre (probably expressed as tartaric, does the kit say?). That is not the pH but is still a useful figure to have. It tells you that your cider will be quite acid when you taste it. You may like it like that, or you may want to add some artificial sweetener (you can't add sugar or it will re-ferment unless you pasteurise it). Anyway it hasn't even finished fermenting yet (SG

1.005) and in any case you should give it several weeks / months to settle down before assessing it critically.

Oh and do keep the air out at all times from now on. If you don't it will go vinegary.

~~~

> Does the Maillard reaction also happen at low temperatures but at a slower rate ?

Yes. The Maillard reaction can happen in minutes in your kitchen whenyou fry onions or potatoes, or it can happen over weeks or months atroom temperature. Think of a fresh home-made made jam or jelly. Thetaste when newly made is one thing. The taste after 2 or 3 years isquite another. That's room temperature MR for you. The oft-quotedclassic room temperature MR was the deterioration of dried egg powder in

US troop rations in WW2. That stimulated a lot of MR research in the 1950's.

> Or is Maillard a broad type of reactions converting simple sugars and starches and proteins into more complex ones, and the particular reaction is temperature dependent? For example do some Maillard reactions happen at low temperatures while other require high temps depending on the chemicals proteins, sugars involved?

You need to be clear that the Maillard reaction is simply one betweenamino acids (maybe protein bound) and reducing sugars or other similarcarbonyls. It's not one of "converting simple sugars and starches andproteins into more complex ones". The end products are both simple e.g.hydroxy methyl furfural, maltol, furaneol which are potent flavours andalso complex and ill-characterised eg the coloured components.

The broad outline of the MR is independent of temperature, which mostlycontrols its speed. But pH and water content dictate the balance of theend products.

> Does it always lead to undesirable flavors in cider or can it sometimes be considered a good thing?

That's your call. A small amount of Maillard (eg from pasteurisingcider) might be considered to add complexity I suppose? You yourselfquote an example of cider sweetened with maple syrup. I wouldn't likethat, but you might.

> I have yet to make apple syrup, by concentrating apple juice over heat, but I intend to, mostly to use as a sweetening ingredient for cooking. I assume some Maillard reaction happens there, or maybe the acid inhibits it ?

Lots and lots of Maillard reaction happens if you make apple syrup orjelly. (The primary reactants there are fructose and asparagine). Theacid doesn't inhibit it in practical terms but the pH dictates the exactbalance of end products.

> I also assume that the taste of Rum benefits from the maillard reaction of the molasses used when making rum. The taste of fresh orange juice vs orange juice from concentrate, I am assuming some Maillard transformation there?

Yes and yes. Though much of the flavour deterioration in fruit juiceconcentrates comes not from the initial HTST vacuum evaporation step,but rather from continued storage at room temp. The cooler the conc iskept, the better the flavour will be.

> If there is a link to a resource where I could learn more please share the link.

These are OK:

http://en.wikipedia.org/wiki/Maillard_reaction

http://www.food-info.net/uk/colour/maillard.htm

http://mlaiskonis.com/2014/09/29/maillard-reactions/

~~~

> Interesting - this was a draught cider that I've drank a couple of times now, from two different BiBs in two different places over three months - and it still smells the same :-) I thought the first was a "one off" but after getting the same stomach-churning shock from it yesterday, I thought I'd ask...

The problem is that both indole and a range of sulphur compounds can give taints which might be described as stinky, drainy, faecal, cabbagey etc - although once you know them it's generally fairly easy to assign them to one category or the other. Though you could have both faults present simultaneously, of course!

Chemically the two are quite unrelated and come from two separate biochemical pathways. Indole is nitrogen-containing and has no sulphur in its structure. My recollection from when I worked on indole taints for a very large cider company many years ago, is that once formed it is pretty stable and doesn't disappear. Whereas sulphury taints are rather more fugitive and can sometimes be lost eg by oxidation or by re-absorption by yeast. Ciders that are "eggy" at the end of fermentation often lose it on maturation for instance.

~~~

> It could be the faecal aroma of indole.

Interesting i see that it's on the FlavorActiv cider list http://www.flavoractiv.com/products/gmp-indole-cider-flavour-standard/

They show a picture of a sow but it should be a boar really. They are also a bit wrong about how it originates in ciders. It's actually down to a vitamin deficiency.

~~~

> I'm wondering if there is any classification of odours from finished cider? Obviously I understand the acetic smell, "mouse" (though I have problems detecting it), farmyard, sulphurous, etc.

Does this help or is it not discriminating enough? http://www.cider.org.uk/flavour.htm

> However, I am currently sharing a third of cider (from Herefordshire, UK & a respected maker) that has a "bouquet" that we agree lies somewhere between an open drain or a sewer. It is a disgusting smell - but the cider tastes fine...
~~~

It could be the faecal aroma of indole. That is often perceived in the headspace aroma odour but not so much in the overall taste. It is also part of the 'boar taint' of pork. I detect it in pork pies sometimes. At low levels it can be almost floral, at high levels like dog mess. If you know the 'stinkhorn' fungus, that's it.

Could it be that?

~~~

> I'm wondering where to fit the its outlet tap? In the centre or at the side at the front? Is there any benefit to position of the hole right or centre?

I'd say it's purely a matter of personal preference and a lot of it depends on the size and shape of your juice container (if you use one) and how you prefer to handle it.

My original home-made press (the Geneva NYSAES design) had a centre spigot. The Voran I use now has a side / corner spigot. Personally I prefer the side spigot because I use 25 L plastic jerricans for juice collection and I find them easier to manipulate at the side of the press rather than face on (where they seem to get in the way of everything).

Also if you are running or pumping juice to a fixed holding tank, I'd guess a side spigot makes more sense. Also if your press is set on a slight slope (as mine is), it makes it easier to get perfect drainage from the tray if the outlet is in one corner or t'other. Dead centre makes it less easy.

I'd say take a few minutes doing some play-acting with your juice containers next to the press and pretend you are changing them over, lugging them in and out of position etc. Then decide which you prefer.

~~~

> Yesterday I pitched yeast into a barrel only half-full of juice. I won't be able to press more juice until sunday (i.e. 4 days later). I'm wondering if there is any problem with adding the juice I get on Sunday to the half-filled, already fermenting barrel, and pitching yet more yeast to accommodate the additional juice? Are there any issues with "staggered pitching" of this sort?

This is always being asked on here. It last came up not a fortnight ago see https://groups.google.com/forum/?hl=en#!topic/cider-workshop/ROLvL5z8soQ

There is no need to pitch additional yeast unless your fermentation is very nutrient deficient and you want everything to go really fast. There will be plenty of cells there to do the job if your first batch is already fermenting.

~~~

> I have made a batch of cider which is currently sitting in a cold barn. I have added the required amount of SO2 and added a yeast. However due to cold weather it will not start, it is contained in an IBC so I cannot move it anywhere warmer. I was pressed on 14th November and it still smells and tastes OK should I be worried as I am afraid that without fermentation it might go wrong or should it be alright until the weather warms it up. Greatly appreciate some advice.

You didn't say what yeast you added. Some cultured yeasts handle low temps better than others. Wild yeasts do best of all .
~~~

The SO2 should protect the juice until it takes off. However, it is understandable that you are concerned. For re-assurance, you could draw off a gallon or more of the yeasted juice and put in in a warmer place till it gets going. Then add that back to the bulk as an inoculum.

~~~

> I have a vigo pasteuriser and I'd like to use it to bottle some sweet still cider in 500ml crown caps, and have it safe. While experimenting it seems that the heat can force some cider out of the (unlidded) bottle, which is clearly undesirable both for hygiene and weights and measures. Has anybody used this machine to pasteurise capped bottles and is this a safe practice? Muchas gracias.

It's quite standard to batch pasteurise sealed bottles of cider. My book page 88 refers. There is a very small risk of burst bottles.

~~~

Nicely illustrated article here. The WPCS gets a mention as does Sally from Raglan!

https://www.rhs.org.uk/about-the-rhs/publications/magazines/The-Garden/2014-issues/october/reviving-the-fortunes-of-cider-apples

~~~

Yes Nick and Barry are right. I have posted this link before but here it is again www.cider.org.uk/pomace_usage.pdf Taken from Pollard and Beech

Cidermaking 1957. Over 50 years old but still good advice AFAIK. Silage is the tops if you have enough.

On a very small scale and if you have no cattle I find it is more sensible to just spread it back under the trees (if you make your cider in or near the orchard) and less hassle than trying to compost it (due to aeration problems). The birds pick it over and the worms take it down. It's all gone by spring.

Andrew

> Barry has hit the nail on the head. Ensile it if you have too much to feed fresh (limit the quantity to avoid bloating); once ensiled you acn be a bit more free with it. Pomace is a by-product and NOT a waste product. Best Nick --Original Message-- From: cider-w...@googlegroups.com [mailto:cider-w...@googlegroups.com]

%2%

~~~

> How come all these yeasts bad or good have not mutated over the last few 100 years into forms that are not killed by SO2/sulphur candles etc?

%1%

It partly depends on their internal biochemistry and whether they possess any mechanisms that will allow them to withstand (moderate) levels of SO2 or not. If they do, those mechanisms can indeed be enhanced by selection pressure. It so happens that many Saccharomyces yeasts do have such mechanisms and those with enhanced SO2 resistance and (and also alcohol tolerance) are the ones we call 'wine yeasts'.

Other Saccharomyces strains, such as those used in brewing or baking, are much less SO2 resistant than the ones we use for wines.

If you are using a wild yeast fermentation, the selection pressure occurs 'on the hoof'. Nearly all the yeasts in a wild yeast fermentation are susceptible to SO2. The majority are killed outright or are severely inhibited. They have no chance to adapt, any more than you would if I fed you arsenic. Those few that survive, mostly*

Saccharomyces, are the ones that quickly multiply to dominate the fermentation.

**The reason I chose arsenic for my example is because it is possible for individual humans to build up tolerance to arsenic poisoning over time.*

But if you haven't built this up, you can be killed outright by a dose which an habituated person might survive. (It's not the best analogy though, because that's about individual tolerance rather than population selection pressure. Maybe someone can come up with a better one?)

~~~

> Is there an accepted time limit on how long its safe to leave a high ph juice fermenting before dropping it back to 3,.8 or so? I realise there's unlikely to be a definitive answer, ... If it was a week for example that would be wonderful as I could do 200l of bittersweets a day and blend with the sharps in an IBC - ah, livin' the dream!

You are right there is no definitive answer. Even if there were any studies to answer your question (which AFAIK there aren't) each batch of fruit will be different in terms of its microbial load and its sulphite binding capacity. The recommendations as regards 'best practice' are of necessity generalised.

I think one quite important point to bear in mind is that in general yeasts are much more sulphite resistant than bacteria. Yet, by and large, it is probably unwanted bacteria (acetics, lactics) which are going to give more trouble to your cider downstream (often after the yeast fermentation is finished) than the wild yeasts. As you may know I typically do wild yeast fermentations with only half the recommended sulphite level added before fermentation and I rarely if ever have bacterial problems.

Now, all the LARS recommendations for sulphite levels vs pH are based on the levels needed for virtually total wild yeast kill which is more than enough to knock out the worst bacteria too because they are the more susceptible. The same is probably true of pH even in the absence of sulphite, in the sense that the activity of yeasts is almost pH-independent under any normal cidermaking conditions, whereas the activity of most spoilage bacteria is probably quite pH sensitive (the lower the pH, the harder they find it to grow).

All of which is a roundabout way of saying that (a) probably any amount of SO2 is a lot better than none at all and (b) the sooner you can get the fermenting bulk down to pH 3.8 or below the better off you will be.

But, in practical terms, if your fermentation is going to take say a month or two all in, then waiting a week before you can drop the pH by blending probably isn't going to have too much of an adverse effect.

That's my two penn'orth.

~~~

> You need to paint the internal parts. There is no cure.

Greg is right that there is no real cure. Use a proper fruit mill made of stainless steel, not a garden shredder. Mild steel dissolves in fruit acid.

However, addition of citric acid or bran as iron chelators may provide some sort of respite if you are lucky. See http://www.cider.org.uk/cider_darkening_Pollard_Beech_1957.pdf

~~~

Yes but how? Who are the publishers?

~~~

Somebody just pointed out to me that they had the first edition of my book (original black cover, not the current red) and it had no index.

Which is sad but true :-(

On the other hand it did have more colour pictures!

I did announce this at the time, but you can download a 1st edition index and a list of text amendments from 1st to 2nd edition here http://cider.org.uk/book.html.

You can stick the index in the back of the book!

~~~

There is a good chance that I'll be able to update my book to a 3rd edition at its next reprint later this year.

So I'm just wondering, what sorts of things do people think I might include if I had the chance? What's currently absent that you'd like to see?

(But don't ask for cider recipes or 2-week turbo cider please! Cos you won't get them.)

Answers off-list please.

~~~

> Do tannins affect fermentation speed?

Generally no. We have cider apples here in the UK with tannin levels around 0.5% and they have no trouble fermenting nor are they noticeably slower AFAIK than lower tannin juices.

> Maybe it's not the tannins but the difference in the amount of sugar?

I have to say I'm amazed at the sugar levels you are quoting. They are quite outside most people's experience I would think. But anyway, the concentration of sugar won't really affect fermentation speed. More likely issues are the inherent amount of nitrogenous nutrients which means in effect the levels of free amino acids and thiamine (assuming you are not adding nutrients).

~~~

> Wondering if anyone has any values as percentages as to the typical final sugar content of a fully fermented fully dry natural real cider...?

If you really mean absolutely dry and totally and fully fermented ...

Sucrose nil

Glucose nil to trace However, a claim has been made that even fully fermented dry cider has residual sugars - a claim I dispute; so wondered if there were any figures out there, scientifically proved / tested if you like that would support my assumption of 0% RS.

Here is an example of some 'modern' figures - see Figure 1. http://onlinelibrary.wiley.com/doi/10.1002/j.2050-0416.2004.tb00630.x/pdf

But it's a matter of long received wisdom (and truth) that there is no sensible sugar in dry cider. But as we know, many ciders maybe sold as

'dry' aren't ;-)

~~~

> Yes - if you plot your data on a semi-log graph, you get a beautiful straight line, of which Excel will give the equation without fuss...

Years ago I was taught to do semi-log plots if you wanted to give your data a neat straight line relationship. Or, if that didn't work, a log-log plot would nearly always do the trick!!

Was also taught the Winsorising technique for removing outliers from data sets to make the stats look better!

~~~

> Are these formulae derived from empiric measurements or from chemical modelling? If the latter, that in turn must probably be based on presumptions about the chemical composition of the juice?

The formula for ionic SO2 vs molecular is based on ionisation equilibrium theory and is standard for any similar weak acid system.

It's maths rather than chemistry. But the pK has to be empirically determined.

The binding formulae are empirical. However, in my spreadsheet they are modelled based on the likely concentration of binding factors in apple juice and their empirically determined equilibrium constants. Again, the binding equilibria come from standard theory (Law of Mass Action), but the equilibrium constants for each solute have to be empirically determined (and have been, by many people many times).

Fortunately my model agrees with the empirical data which were obtained originally at Long Ashton in the 1960's and 1970's and with their later modelling.

The molecular SO2 required for various yeast kills is totally empirical and again has been the subject of much study in many research institutes worldwide. I chose 1 ppm molecular to keep it easy. Many wine people choose 0.8 ppm as their target value.

The reference by Wurdig which I gave is in a German wine textbook and covers most of this.

Failing that there is a new French textbook http://www.dunod.com/sciences-techniques/sciences-techniques-industrielles/agroalimentaireoenologie/ouvrages-professionnels/le-so2-en-oenolog which spends 304 pages on the topic.

~~~

The results of last Friday's judging were announced a couple of days ago and are here

http://www.thethreecountiesciderandperryassociation.co.uk/assets/Competition-results-june2015.pdf

Several familiar names (and lurkers!) from this list are there. Well done to them!

~~~

> The juice was pressed 1 month ago and yes the trees are big and quite old so perhaps low in nutrient. The temp is 11 degrees at the moment. I'll raise the temp. Should I skim off/decant off the yeast film or leave it be? Appreciate your replies.

I'm surprised that an unsulphited wild yeast fermentation at 11C isn't going a bit faster than that. Maybe the nutrients are very low? What sort of fruit was it? If you want to continue with the wild yeast scenario, it might be worth getting hold of some thiamine and DAP to hold in reserve. If you search the archives here you will find this discussed several times in the context of stuck fermentation. As a last resort you could change course and try the cultured yeast route as you normally do.

You could rack off the juice from the film yeast if you like and put it in a new container. While doing that I would take the opportunity to splash and aerate the juice as you go. The idea of that is that fermenting yeast does need some air (oxygen) to help its growth. But then be sure to top up the container (probably with clean water) to the neck to minimise the exposed surface area. Your pictures show rather a large surface area / headspace. Film yeasts can only grow at the liquid

/ air interface. Minimise that and you minimise your problem. [I realise what I have written sounds a bit paradoxical but there is a difference between air exposure at the surface where film yeasts grow and dissolved air in the bulk where fermenting yeasts grow].

One thing I would not do just now is add any SO2. Your wild yeast fermentation is obviously struggling and at this stage it would do it no favours.

Good luck

~~~

> Thanks for your response Andrew. Apologies, I should have included this info. I don't know the pH (no meter), starting SG was 1.048, it's only got to 1.040. Airlock has been fitted all of the time and it tastes OK at the moment.

Has it been like this for months? Is it very cold? Were the trees big and old / low nutrient?

You need to get it fermenting faster. I suggest your choices in order are:

1. Raise temperature

2. Add thiamin (vitamin B1)

3. Add yeast nutrient (DAP)

4. Add a cultured yeast.
~~~

~~~

> Hi all I'm hoping someone can identify my white surface growth. See pictures below.

Incipient film yeast. See http://www.cider.org.uk/part5.htm -

Fermentation and Storage Problems.

What is your pH? What was the starting SG and what is it now? Have you got an airlock fitted? Does the juice / cider taste OK?

~~~

> Brilliant. Thanks very much for reply. Cheered me up! If did decide to add more sugar, would it be too late too if I've already racked the cider from the lees? Would I need to add more yeast? Thanks again.

There will probably be enough yeast still in suspension to start fermentation again if new sugar is added. If nothing happens after a week, you could add more yeast. I suspect you won't need to.

~~~

> There will probably be enough yeast still in suspension to start fermentation again if new sugar is added. If nothing happens after a week, you could add more yeast. I suspect you won't need to.

Should have also said, don't just bung it in as dry sugar. Make it into syrup first with a little of your cider or some water and then stir the syrup into the bulk.

~~~

> BUT! - I've over-looked the fact that the original SG was only approx 1.035 before I added the yeast and started the fermenting. Is my juice/Cider ruined? Is there anything I can know to safe it? Any advice much appreciated.

Don't panic. You can live with a low alcohol cider, but it may be more prone to film yeast and other spoilage organisms so it may not store as long as one at a slightly higher alcohol. It certainly isn't ruined nor is it unsafe to drink.

If you want to get back to where you would have been with a nominal starting SG of 1.045, all you have to do is to add the difference in sugar, which corresponds to 10 SG points. That's about 20 grams of sugar per litre, or 600 grams in 30 litres. Even if your cider has finished fermenting, there will be enough yeast in suspension now that the fermentation will start again after you add the sugar. Then you just take it on to dryness as normal.

~~~

>I wonder what Andrew's thoughts on this (outlandish to some!) method of sterilisation

Barry, I am familiar with the company in Swindon that you mention.

AFAIK they are the only licensed food irradiation business in the UK.
~~~

When I was in the food analysis / authenticity business we also tested certain products (notably herbs and dietary supplements) to determine if they had been illegally irradiated to reduce their microbial load

(before importation into the UK).

Irradiation is very different from UV treatment because it is much more energetic 'ionising radiation'. It is not much used in Europe and in the

UK herbs and spices are the only foods for which a license exists. It is much more widely used in the US and the Far East. There has only been limited work on its application to wine so far as I know, some of it with a view to inducing faster maturation. Google .

There is a good and up to date IFST position statement on food irradiation here https://www.ifst.org/documents/misc/Irradiation2013.pdf

~~~

> ....the bugs might have gone but the toxins created by the bugs hadn't,I digress.

Yes this is not the place for a full discussion of food irradiation but

I am aware of the incident you mention, and indeed persistence of pre-existing toxins is one of its potential drawbacks.

>

On the cider front thinking about it,if you say had a pallet of 20 litre boxes of freshly filled cider sweetened etc would this effectively sterilize it like pasteurisation? Barry

I really don't know.

On the basis of a quick scan of what's been done on wine, I suspect you might get flavour changes if you get the radiation level high enough to zap all the yeasts and bacteria.

Anyway it's totally hypothetical. Irradiation of ciders and wines etc is not permitted under EU and UK food law, could only be done in a licensed facility (there is only one in the UK), and even if it were the product would have to be clearly labelled as such. A non-starter I'm afraid.

~~~

> Hello Andrew I am interested that you say that UV will have no effective role against yeast, can you expand on that a little for me please.

There is a lot of experience in the US now using UV 'pasteurisation' of apple juice to inactivate E. coli successfully. But it has very little effect on fermenting yeast, maybe a lag of a week or two before fermentation kicks in. The yeast cells are not killed and keep on growing quite happily. Data in this paper from Geneva NY / Cornell

(although the abstract does not say so) show it quite clearly http://onlinelibrary.wiley.com/doi/10.1111/j.1745-4549.2003.tb00498.x/abstract

Of course it will depend upon yeast load, hurdles and the intensity of

UV light that is used. But generally fermenting yeasts are not regarded as susceptible to 'normal' treatment with UV light. I can't put my finger on it, but I'm sure I saw some work on wine where yeast inhibition was achieved but the flavour was compromised at the high UV doses necessary.

I think if it were a viable technique, all the winemakers in this world would be using it as an alternative to aseptic sterile filtration. And they're not!

~~~

>

> 138psi? Mine says 350 bar http://media2.turbosport.co.uk/2008/6/20081203164763060049a0009.jpg So does mine. But that's the pressure _in _the_hydraulic_system_. Not the actual pressure on the cheese (which is the force divided by the surface area over which it acts).

*Rated max hydraulic pressure from Voran spec sheet is 380 bar or 5700 psi pretty much. This acts in a system whose piston is 3.5 inches (9 cm) diameter - hence surface area from pi*r^2 is 3*(3.5/2)^2 which is pretty much 9 square inches. The cheese size is 19 inches square (I said*

18 inches before but that's wrong cos it's actually half a metric yard aka 50 cm). 19 inches square is 361 square inches. So 5700 psi acting on

*9 square inches reduces to 5700 * 9/361 = 142 psi when acting on 361 square inches. Not so far off my original figure of 138 psi.*

Discrepancies are due to rounding errors and metric to Imperial conversions.

[Thanks to an anonymous friend who asked me off list to explain it more fully!].

~~~

> Anyone any idea how strong a bottle jack (or maybe even a trolley jack) I would need to match the pressure produced byt the Voran pump, or to at least give enough pressure for an adequate juice yield??

I agree that the piston oil seal is easy enough to replace. I have done it myself though I did have the Vigo engineer talk me through it on the phone which was a help. Nick's right, the piston plus plate is very very heavy! It needed two of us to lift it out. Not sure about the actual hydraulic pump if that's your problem. Silly question perhaps, but have you checked the oil level in the hydraulic reservoir?

*The pressure on a Voran 100 P1 is 138 psi. This acts over 18 inches square or 324 square inches. By my calculation (324 * 138 / 2240) this requires a 20 ton jack. You would probably do OK with a 10 ton jack. As*

Nick says it may be tricky to brace it up to the cross beam if it sits on the top, but you could perhaps have it acting from below sitting on the piston plate. However, the juice tray is not strong and you will need something firm and unyielding to support it as a substitute for the piston plate if you do this.

~~~

> By my calculation (324 * 138 / 2240) this requires a 20 ton jack.

Well I was nearly right! The Voran brochure says that the pressing force is 24.7 tonnes.
~~~

http://www.voran.at/uploads/tx_product/100_P1_-_100_P2_-_Packing_Presses_with_shift_press_cage_01.pdf

~~~

> Thanks for your replies folks. It is actually the hydraulic pump, the little stainless steel gadget inside the oil box (photo attached); I should have explained more clearly earlier.

I think this is what you need (from the Voran website) http://www.voran.at/typo3temp/pics/voran_hydrPressen_allg_110062005_15_b2338f5151.jpg

~~~

> 138psi? Mine says 350 bar http://media2.turbosport.co.uk/2008/6/20081203164763060 49a0009.jpg

So does mine. But that's the pressure _in _the_hydraulic_system_. Not the actual pressure on the cheese (which is the force divided by the surface area over which it acts).

~~~

> Is there a handy dandy calculator for how much Sulphite solution to add to my juice. At say 50 PPM?

http://www.cider.org.uk/sulphite.html

Ray,

I think this is a confusion between English English and American

English. Confusingly they call taps spigots. We call spigots spigots and taps taps. One wonders what they call actual spigots?

Andrew

> I did wonder... Ray

%2%

~~~

> "Taps" is a musical piece sounded at dusk, and at funerals, also a die use to cut threads. Hope this clears the subject up:)

%1%

So that made _my_ evening, Rich! (OK so I know it's barely lunchtime for you ...)

~~~

[Slightly off-topic now ...]

Those of us of a Certain Age will remember the American humorist Tom

Lehrer, and in particular his song "Bright College Days" which contains the lines
~~~

"Turn on the spigot,

Pour the beer and swig it"

which is where I first learnt the American meaning of the word as distinct from the British.

~~~

> I seem to be unable to stop the recurrence of flower sickness in several secondary fermentation vessels. They are all in the neck of the bottle, so its a very small amount of flower sickness. If I let it be do I risk the batch going off?

Do you know, this exact same question was asked just last week. See here https://groups.google.com/forum/?hl=en#!topic/cider-workshop/Vv-WolUYPBw

> Also, in my last post I was lamenting a TA reading that suggested I was much too low in the acid department. Several suggested my calculations were right, and the TA kit was likely faulty. I've since purchased some pH strips, and they seem to confirm the TA reading. According to them I'm off the charts at 4+ pH. Should I get some malic acid in there ASAP?

You had a TA reading of 0.2% which Claude and I then doubted given the nature of your fruit. But if you have a pH >4 then I'm afraid it does tend to confirm your original acid reading. Yes I would get the malic in there PDQ. Get below pH 4, preferably to pH 3.8 if you can. This is (a) to prevent infection in store and (b) to provide enough acid for flavour balance.

This may also have a bearing on your film yeast problem, because SO2 will be ineffective at a high pH.

~~~

> Hi, I'm trying to improvise something with a mill, the only thing I can find was a foliage machine (vegetation) mill

Scott, this has been discussed so many times on here already. I suggest you search the list archives for 'garden shredder' which is the usual UK term. There are indeed potential corrosion issues, as also the risk of electric shock or motor failure from inadequate waterproofing. But some people do use them and have got around the issues.

~~~

> It then says to test the addition of calcium chloride in litre samples every three hours and look for flocculation of the tannins. I did this straight away and then at three hourly intervals until nine hours and still did not see any flocculation. I had to leave at this point and so just added the required amount of calcium chloride to the bulk.

I've never done all this testing myself. I work on the theory that it doesn't matter when you add the calcium ions. After all, if it were a spontaneous keeve they would be there already from the fruit. Maybe somebody has tested it to show its more efficient this way, but I'm not aware of it. (BTW it's flocculation of pectin not tannins; and it isn't really flocculation, it's gel formation, which isn't easy to see. You might have missed it if you were looking for a deposit. They do use the word tapioca.)

What is the pH of your juice BTW? Is it very acid? The enzyme is less active at low pH.
~~~

> Andrew's book that one should never add the PME and calcium chloride at the same time and I wondering why.

All that means is that you shouldn't mix the calcium chloride and enzyme in the same container, because the strong CaCl2 will inactivate the enzyme. You can add them sequentially, with stirring in between, as long as the concentrated solutions do not meet.

> I am now worried that

> because I did not wait for the flocculation in the test sample I have added the calcium chloride too early and it will not produce the chapeau brun.

I don't think you need worry. I have often done it like you did, and it's worked for me.

~~~

> I have wondered about this myself, if maybe the CaCl2 acted as an inhibitor for the enzyme.

I don't think so. The use of calcium salts to help induce keeving goes back around 100 years, long before pure PME preparations were available.

In those days just the native apple enzyme did the work. I think if there had been inhibition it would be known.

> the cap never lifted from the bottom of the tank (even at SG 1050), if I had not observed the granulation in the test I would not have known that the enzymic action had occured. ...... as I believe the lack of N, along side the cold temperature, was what kept the cap on the bottom.

Need to distinguish two things here.

1. Formation of the gel by enzymic demethylation followed by calcium complexation. This can occur quite quickly, maybe even in hours.

2. Incipient wild yeast fermentation creating enough CO2 to lift the cap to the top. This can take days even weeks.

Your problem was lack of yeast activity not lack of gel formation. That could indeed be due to lack of N.

> In the instructions for the keeving kit read days for hours, I have never had a keeve occur in the timescale proposed by the instructions.

I tend to agree with you. It has taken up to 4 weeks for me to get a keeve in cool weather.

Two other points which tend to get overlooked.

1. You need plenty of pectin in the system to start with. Overnight maceration of the pulp before pressing is helpful, even obligatory, to liberate lots of soluble pectin from cell walls.

2. SG difference. The old French leaflet "Comment faire du bon cidre" say a minimum of SG 1.055. In my experience if you have an SG less than that the cap will be reluctant to rise and will be loose and floppy. (I know Claude disagrees!)

And a note about sulphite. Although I am a known sulphite freak, here is a case to be made for no addition at all before keeving. This is to encourage the apiculate yeasts to get going quickly to raise the cap.

You can then add a half dose of sulphite after the juice is removed from the cap.
~~~

Finally, there is no certainty about the keeving process (certainly not in the hands of Anglophones!). Anyone trying it should realise they are experimentalists and are pushing the boat out. It is not a recipe based operation (do this, do that and do the next thing and you will get a perfect result! No). There are lots of uncontrolled variables and until you have built up some experience you won't know what works for you. I say this because I don't want people to be disappointed or to moan to me because it didn't do what it says on the tin!

~~~

> ... that may add some visual information to keeving. I have listed the known variables under each keeve photo at http://cidersupply.com/Page%20-%20Good-Bad-Ugly.html

Brilliant, Chris! Best 'rogues gallery' of keeves that I ever saw!!

Thanks for the link.

~~~

> The CAMRA motion indicates that addition of herbs/fruits/spices can be traced -back- to 1676.

Yes but I doubt the proposers have read or understood what Worlidge actually wrote. You can get it online here http://books.google.co.uk/books?id=ck1XAAAAcAAJ and if you click the red

E-book tab you can read it directly or download it as a PDF.

The bit to focus on is on p 157. Worlidge is quite clear there that

"There is not any liquor that hath less need of mixtures than cider, being of itself so excellent that any addition whatsoever maketh it less pleasant".

And in the following section he is quite clear that the addition of other fruits and spices is for medicinal purposes, not because it makes the cider itself more enjoyable. It is about transferring what Worlidge calls the "vertues" of these medicinal additives and "conveyed into our bodies by the most pleasant vehicle that can be obtained".

Perhaps the proposers are unaware that any medicinal claim for cider nowadays would contravene our Medicines Act ;-)

~~~

> 10gallons of cider, some wild yeast some not, all starting with a sg of 1.04 and now 1.00. Started bottling but now read if the sg starts low. Eg. 1.04 or less it won't keep.

Assuming you mean somewhere between SG 1.040 and 1.050, yes it will keep fine. It's just that low alcohol ciders are more prone to infection eg from film yeasts. But it's a continuum, not a sharp divide.

> Tasted it and it is acid and dry.

That's what happens when all the sugar ferments away. That doesn't mean you're in trouble.

> if I add sugar to the ones I have bottled will it start to ferment.

Yes.
~~~

> Second question. I have a 2 gallon brew still bubbling away, can I stop the fermentation to leave it sweet and not to alcoholic.

No. Not easily at home.

If you want a sweet commercial style cider you must either add sugar and pasteurise to prevent re-fermentation, or use an artificial non-fermentable sweetener like Splenda (sucralose).

~~~

> My Cider hasn't even started :-(((Pressed around the 12th Oct, I thought I sulphited it with a half measure but may have made a mistake and over sulphiting it ? (though I thought I did as instructed) So far to get it going, I've added champange yeast, sugar, apple juice, stirring in some warm water, putting into new tubs (just in case old ones were leaking air) and praying, but nothing has worked.

That is odd. Mine didn't get pressed till mid November but are all working happily now (wild yeasts). Can you get anyone to test your SO2 level for you to check you didn't overdose?

Have you tried taking a portion out and keeping it warm till it starts, then adding it back in as a starter?

Failing that I would suggest vigorous aeration and thiamine (vitamin

B1). Wait 2 weeks and then if no joy add nutrient (DAP). But that is normally for stuck ciders, not those that don't start at all.

~~~

> My only comment is that I feel you hit it too hard with So2 for a wild ferment... 13-14 tablets would have been sufficient. However, you say it started, though looks like the drop is slow(ish) With cold temperatures expect fermentation to slow right down. Can you see anything happening? It can take months, but I am not sure I would do anything to it. Nutrient would perhaps help the yeast along, though if it is too cold I don't think it would make much difference. However, essentially it is still juice so I would bow to Andrew on this...

I'm going to repeat what I already said once today to someone else.

Draw off some of the juice, keep it warm for a couple of weeks and see what happens. If /when it ferments, this will give you some reassurance and you can add the ferment back to the bulk which will maybe get things moving.

I have 3 wild yeast ferments chugging along just now outdoors in South

Oxfordshire started at various points in November. Daytime temps about

8, night-time about 1. So it's all quite do-able but I didn't add nearly as much SO2 as you have (for the pH).

~~~

> I've just had my lazy cider tested for SO2 levels and the results are..... 257 ppm - total So2 141ppm - free SO2 apparently double what it should be :-(

I'm pleased that you now have a clear explanation of why fermentation is slow to start.
~~~

> So, I've now, added apple juice and water to dilute the cider. pitched in yeast (correct amount I hope) added a couple of tsp's of Marmite (first I've ever heard of this) given it a good stir plus I'm part heating the garage where it's stored to keep the temp up.

The Marmite is just a cheap and cheerful source of B vitamins and free amino acids to help the yeast along.

~~~

> Failing that I guess I can buy thiamine (vitamin B1) from a brewing shop ?

Thiamine aka Vitamin B1 http://www.homebrewcentre.co.uk/product.asp?pID=293&cID=137. You need about 0.2 mg per litre and the tablets are 3 mg each so each one does about 15 litres. It may tell you to add more on the pack but I wouldn't.

Leave that a couple of weeks and see what happens. If nothing starts up in that time, then the next step is to add yeast nutrient aka ammonium phosphate / sulphate http://www.homebrewcentre.co.uk/product.asp?pID=294&cID=137 The dose is about 300 mg per litre. Again the pack will tell you to add more but I wouldn't.

But again I would comment that these additions are normally for when fermentation is stuck, not when it hasn't begun at all. I would definitely get that SO2 checked.

~~~

>

Who on earth told you to add 2.5 teaspoons of 'Campden Powder' to 25 litres??!! If we assume that's sodium metabisulphite, and they were flat teaspoons then you have added around 12 g of NaMS to 25 litres. Or 6 g of SO2 to 25 litres. That works out at around 250 mg/l (ppm). In the worst case that you added heaped teaspoons you now have 500ppm SO2. No wonder it ain't fermenting!! Depending on your pH (did you measure it?) it may never ferment. You might have to try the peroxide trick that someone posted earlier.

~~~

> Having checked my cider after 10 days I find the SG to be the same .048 and this after adding 2 sachets of cider yeast (I thought I may have killed off the first lot by with too much heat) The juice tastes the same as it did 10 days ago,,,,,,,,,very nice, but I don't want juice - I want cider. The juice is in a new fermentation bucket with an airlock inside my honey warming cabinet. The cabinet has not been over 23 degrees and probably closer to 15. Any ideas please?

Odd. Did you add any sulphite and if so, how much? What type of apples are you using? Can you tell us a bit more about what you did to make the juice? How did you rehydrate the yeast?

~~~

> They didn't mention how many decibels they need to make the apple fall,

Claude, you are our resident mechanical engineer! Can't you calculate for us the acoustic power needed to make a ripe apple fall?

It seems to me that to set up a resonance for the most efficient transfer of energy, you'd need to know the natural frequency of vibration of an apple hanging on a stalk, and tune the acoustic input accordingly. Doubtless the marketing chaps at Batlow have already done that!

~~~

> It seems to me that to set up a resonance for the most efficient transfer of energy, you'd need to know the natural frequency of vibration of an apple hanging on a stalk, and tune the acoustic input accordingly.

It seems that the mathematics has already been done at Cornell for regular mechanical harvesters http://www.math.cornell.edu/~rand/randpdf/vibfrut1.pdf

They're suggesting optimum shaking frequencies for apples at between 200 and 350 cycles per minute. Which is only around 3 - 6 Hz, a very low frequency indeed in acoustic terms. I imagine that higher frequencies would not transfer the energy to the apple efficiently, no matter how loud.

So can we conclude that the Batlow ad is pure marketing hype with no basis in reality?

What a shame ;-)

~~~

> What is the expert opinion on the prospects for reproducing the tannin profile in traditional UK/France ciders without actually having access to high-tannin apples? Could it ever be viable to extract the right compounds in the right proportion and add them to inferior juice before fermentation? Or is this a pipe-dream?

Total pipe-dream. Why? Here are just a few reasons ....

1. There is not just one compound of interest (procyanidin B2, which despite your belief is actually quite widespread in plants). There is a whole spectrum of oligomeric procyanidins in apples which are soluble up to n=7. The lower members of the series tend to be bitter (hard), the higher tend to be astringent (soft). Even in UK cider apples this distinction based on different molecular weight distribution patterns is well recognised. You would need the whole range available if you were to

'play' with them.

2. There are other phenolics apart from procyanidins which are important, specially the phenolic acids which give rise to the 'old horse' flavours by bacterial breakdown. All apples have these components, but their level varies considerably by cultivar.

3. Cider apples are not only distinguished by tannin per se. There are issues like pulp pressability and other volatile flavour pathways which confer distinction and cideriness. Some heritage American apples probably have these already.

4. Unlike the acids and sugars, the polyphenols take part in immediate and important enzymic reactions as soon as the fruit is milled. These patterns are complex and involved coupled oxidations. Adding exogenous polyphenols would not be the same thing as having them in the fruit from the beginning.

5. Where would you get them from? The commonest and cheapest source of procyanidins / polyphenols is grape or apple pomace (which is probably where the hair restorers get theirs). Such 'tannins' are already available on the market. You can try them and see just how far off the mark they are.

My message to people in other countries who are obsessed with English and French cider apples is to grow them by all means and see how they work out. If they do, all well and good. If they don't, look for other local varieties / seedlings which bring a distinction of their own to your cider. The world of cider is much much bigger than just the UK and

France. Stop being obsessed by what we do.

Andrew

I'm afraid you write like a brewer who thinks that cider is some form of beer. All this talk of lagering, beer yeasts, lack of sulphite etc. No mention of pH control or the actual apples you used. Cider is a wine.

You should be doing all your fermentation to dryness in just one tank.

Then racking and maturation for several months in another tank. All this pumping from one place to another and holding at 21C sounds like far too much handling to me. You are right to be wary of oxidation. You need to get your infrastructure right first.

You definitely need an SG reading to check the progress of fermentation.

At 9C I think it's most unlikely it will have fermented to dryness in just a few days.

Andrew

> Hi! I'm feeling a bit unsecure, so I thought somebody can comment on my plan for cider making. Last week (monday) I put around 940l of applejuice (brix/sg - 10.9/1.0438) with 11kg of sugar into a IBC. Using Safcider

~~~

The Cider Workshop does not normally allow postings from commercial advertisers.

However, because it is relevant to the topic under discussion here

(titration kits), I am allowing the post below which has been received into the moderation queue, on a one-time basis only. If anyone wishes to discuss it with Lisa at Accuvin, please do so off-list.

24/04/2015 23:53

Here is a test kit that might work for you:http://www.accuvin.com/cgi-bin/miva?Merchant2/merchant.mv+Screen=PROD&Store_Code=ACCUVIN&Product_Code=530-20&Category_Code=02

Here is a video on how to run the test:https://www.youtube.com/watch?v=yin4KgHfhSM

Lisa

Andrew (acting as a moderator)

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> Andrew, you have said before that there isn't much yeast on the apple skin and most of the yeast come from the cellar and pressing equipment. I'm pretty sure the yeast population of my cellar has changed over the years of using cultured yeast and bacteria. If your mill/press/cellar can supply enough inoculum, even frozen apples should ferment without added yeast. If frozen apples don't ferment well, that implies that the apples are the major source of yeast for spontaneous fermentation.

Good point. But there are two sources of yeast for wild fermentation, which is an ecological succession and not a monoculture.

One source is the fruit itself (mostly inside it) which is where the apiculate yeasts like Kloeckera come from. They are the ones which kick off a wild fermentation. The second source is the mill / press / cellar environment, where the Saccharomyces live dessicated all year round.

They grow slowly and only take over the fermentation once the apiculates begin to die out (at 2 - 4% alcohol). So yes I'd agree, if you have plenty of Saccharomyces on your equipment from previous seasons then the frozen apples will eventually start to ferment from that source alone.

But it might take quite a while depending on the inoculum level. That why I suggested a cultured yeast was a safer bet to be certain.

In the case of frozen juice, the Saccharomyces introduced by milling and pressing will be subject to loss by freezing. So addition of a cultured yeast is even more relevant then.

A.

~~~

At the moment I am experiencing a really strange phenomonen. I froze two IBC's of juice, each of about 800 litres (freezer -15 deg C). One froze to a solid block as per normal. The other has not frozen to a solid block, and is oozing sticky sweet (and definitely slightly fermented) juice out of the cap on top.

[Andrew

Lea Fwd: [Cider Workshop]

Feasibility of storing unfermented juice

Based on my laboratory experience of deep frozen juice, I'd say you

couldn't rely on any significant proportion of wild yeasts or bacteria being

viable after a freeze / thaw cycle. Most of the cells will be destroyed by

internal growth of ice crystals and membrane disruption. Some may survive but

they'll take a while to build up and they won't be representative of the

original microflora.

I'd say forget wild yeasts if you're working with deep frozen juice.

Sulphite after thawing and pitch a cultured yeast.

Andrew

>

wrote:

If the unfermented juice is frozen, will the wild yeast revive

and be healthy enough to ferment the juice when it thaws? I'm considering

freezing ibcs in a local cold storage facility to spread out the workload a

bit and to have the option to sell juice to other cideries.On

Thursday, June 5, 2014 2:40:03 AM UTC-4, Andrew Lea wrote:

On

05/06/2014 03:46, Morgan Murphy wrote: > Hmm. option 4: freezing

juice. I like that. I'm with Dick. Freezing is the best

option. Pasteurisation is in theory possible but in practice

difficult unless you have access to proper HTST flow-through kit and

can pack the product into sterile containers. Sulphite is a

non-starter at realistic levels. It would work at 1000 ppm or so but

then you have to remove all that sulphite before you ferment.

You can probably rent walk-in freezer space for a palletised IBC

fairly readily (if you have the means of transporting it there).

Failing that, you can rent a portable walk-in room or freezer to be

located temporarily at your place. Andrew -- near

Oxford, UK Wittenham Hill Cider Portal www.cider.org.uk

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> Andrew would the same rules apply to frozen apples? I have a chest freezer full of apples that I intend to thaw out and press sometime soon and was intending to do a sulphite/wild yeast fermentation depending on the acidity, otherwise I'll use 71B...

I'll second what Claude said. The freeze / thaw cycle will not do the wild yeasts any favours and their survival will be poor. I'd use a cultured yeast.

~~~

Some more background from Erbsloeh here http://www.fruit-processing.com/docs/FP_2_2008_p.82-86.pdf

Google is your friend ;-)

> RTFM http://www.erbsloeh.com/product_datasheets/en/PMB_FructozymP_GB_001.pdf

> Thanks Andrew - so 15ml per 1000l of juice? The 5-80ml is on the bottle label, but it doesn't specify type of fruit juice.

RTFM http://www.erbsloeh.com/product_datasheets/en/PMB_FructozymP_GB_001.pdf

> Thanks Andrew - so 15ml per 1000l of juice? The 5-80ml is on the bottle label, but it doesn't specify type of fruit juice.

%2%

~~~

> It says 5-80ml / 1000 litres juice.

%1%

Where are you getting that from? The Erbsloeh data sheet says 5 - 15 ml per 1000 L for apple juice of 10 - 15 Brix. The higher levels are for currants. If you are working at room temperature I'd go for the higher dose level.

~~~

> I was using the SO2 wizard from the ciderworkshop website and I noticed that the total quantity needed at pH 3.4 is smaller than at pH 3.3. So for cultured fermentation type the quantities are as follows: pH 3.2 - 60 ppm pH 3.3 - 72 ppm pH 3.4 - 65 ppm pH 3.5 - 103 ppm Are the numbers swaped, or the amount at 3.4 should be somewhere between 72 and 103 ppm?

I don't anything about the Wizard you refer to, but from my equations and chart I can tell you that the figures are:

pH 3.2 60 ppmpH 3.3 72 ppmpH 3.4 85 ppmpH 3.5 103 ppm

Looks like someone has taken my figures and transcribed wrongly.

You can find all my calculations and chart on this 44kB download http://www.cider.org.uk/sulphite_binding.xls

~~~

> does anyone have an approved HACCP plan that I may use to modify for my cider mill

See here for some ideas http://www.ciderworkshop.com/commercial_HACCP.html

Note that this is based on British practice. In other countries it may be different. For instance, here in the UK it is normal practice to harvest all cider fruit after shaking and falling on to the ground, where it may lie for days or even weeks before collection. In other jurisdictions this may be forbidden.

~~~

> I am in the process of building a small commercial cidery in Iowa. I am interested in the Voran presses, but I can't seem to locate a distributor in the US to get pricing, etc. Anyone able to help? Thanks

See http://www.voran.at/en/machinery/contact/partners/

They don't list a US agent. You need to contact them directly in Austria http://www.voran.at/en/machinery/contact/

~~~

> I've been reading some old recipe books lately and came across this one for Sweet Cider. /Procure a cask, pitched inside (like a beer-cask); .... manner, viz.: 1st. Burn 1/2 ounce of brimstone in the cask (as described in recipe No. 84).

> Do you think this treatment would be sufficient to keep the juice from fermenting at all? The process for burning the brimstone (i.e.. sulphur) is to hang a vessel in the cask through the bunghole, I guess until the sulphur has fully combusted.

Does it quote the size of the cask at all? Then we could calculate theamount of SO2 being added. Let's say it's a 36 gallon 160 litre cask.

Then burning 3 X 1/2 oz of sulphur (38 grams) will give 75 grams of SO2under ideal conditions. 75 grams of SO2 per 160 L is around 450 ppm SO2.

Wow!! That would hold off fermentation for a good while, many monthsmost likely. But the SO2 might be rather obvious to the drinker!

Not recommended here in the 21st century ;-)

~~~

> After dinner I went out to our garage to pour the cider into bottles - and there was a field mouse floating in one of our stainless steel pails.

Funny how different people's perception of 'risk' is.

I would be far more worried by your dangerous practice of bottling fresh apple juice in glass and allowing it to ferment in closed containers, than I would be by one stray mouse.

Perhaps when you've had a forgotten bottle explode and injure somebody with flying shards of glass, you'll take a different view.

~~~

> I'm not sure why you made the assumption I was fermenting in closed containers . . . . I actually don't.

I beg your pardon if I misunderstood. But the assumption amongst wine and cider makers when talking of in-bottle fermentation to gain a sparkling product is that the bottles will be sealed to keep the gas in.

~~~

> Do any producers use these bottles and can you provide the benefits of them plus recommended manufacturers or wholesalers?

I would talk to Bottle Company South http://www.bottlecompanysouth.co.uk/index.aspx

In the past they used to do clear PET bottles with 28 mm screw caps though I don't see them listed now. The large companies typically blow them on site from solid blanks as required, to save on storage space.

However, I would caution against their use except for very short term storage (weeks). Regular PET bottles are gas permeable. O2 gets in and

CO2 gets out. I know the large companies use them but they only have a very short BBE date. They expect you to to drink the product almost as soon as you get it home!

However, there are some (brown) PET bottles on the market which incorporate an 'oxygen barrier' and which may give you slightly longer shelf life. http://www.the-home-brew-shop.co.uk/acatalog/Coopers_Pet_Bottles_24_x_500ml.html#.VPlhFi61_b4

~~~

> I have 10 tonne of bitter sweets arriving next week, and I need to add a little acidity in the form of bramleys. Problem is bramleys were delivered 3 days ago!! my question is if I press the bramleys now will the juice still be alright for blending next Saturday 18th

I'm presuming for some reason you can't press them all next weekend?

If you press now, the juice itself may not keep a week and may begin to spontaneously ferment. That's not a problem if you are using wild yeasts. But if not, why don't you just press the Bramleys now, sulphite for the pH, add your yeast (if that's what you plan to do) and then let the fermentation begin.

Next weekend you can press your bittersweets, check the pH, sulphite, wait 24 hours, and then add them to the probably already fermenting Bramley.

That's one way of doing it.

~~~

I was down at Reading yesterday to help with the judging.

These were the results:

National Championship Perry

1st Olivers

2nd Kent Cider Co

3rd Raglan Cider Mill
~~~

National Championship Cider

1st Sheppys

2nd Dove Syke Cider

3rd Wilces Cider

South of England Perry Champion

Tutts Clump

South of England Cider Champion

1st Salthill

2nd Tutts Clump

3rd Marshwood Vale

(all three are members of this list. Well done!)

[Disclaimer: I have no connection with the organisation of the competition. I'm just passing on the news I was given.]

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> In the Whiting document, does his figures for acetic acid cover Eastern styles of cider, which would generally be sharper than cider made with cider apples? I note that he mentions cider apples and perry pears at one point...

I think you can assume since this came from Long Ashton in the 1970's, where to be blunt with you the Eastern style as such was not really recognised, the figures unless otherwise stated will relate to West

Country ciders.

But note that although it is true that Eastern ciders are sharper than their West Country counterparts, this is to do with 'fixed acids' not acetic. If anything the lower pH of Eastern styles (pH with a juice of low pH to give a blend of pH 3-5, at which acetic acid formation by this means is negligible.

Sorry typo (actually an OCR misread). That should be pH 3.5 of course.

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In connection with the current discussion of acetification in ciders and perries I have been prompted to re-read the review by Geoff Whiting at

Long Ashton which you can download for free here:

ACETIFICATION IN CIDERS AND PERRIEShttp://onlinelibrary.wiley.com/doi/10.1002/j.2050-0416.1973.tb03527.x/pdf

Although it is now 40 years old, probably very little has changed in that time so far as the craft / artisan / heritage cider or perry maker has concerned. Well worth a read if you can cope with the biochemistry and want to gain a detailed overview of the multiple facets of this topic.

Two other excellent reviews from around the same time are by Fred Beech:

CIDER MAKING AND CIDER RESEARCH: A REVIEWhttp://onlinelibrary.wiley.com/doi/10.1002/j.2050-0416.1972.tb03485.x/pdf

and by Tony Williams:

FLAVOUR RESEARCH AND THE CIDER INDUSTRYhttp://onlinelibrary.wiley.com/doi/10.1002/j.2050-0416.1974.tb06795.x/pdf

Yes there have been some changes, some new understandings and some unfulfilled expectations over the intervening 40 years, but these papers are still well worth a read by any serious cidermaker with a technical interest. We are fortunate that they are now available for free.

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Now we're getting into the Northern Hemisphere busy season, I'll just make an admin point to people thinking of posting for the first time.

When you make your first post to this group, no matter how long you may have been a member, it does not appear immediately. It has to be moderated by a human being (one of the admin team) first, just to be sure you're not spam and that your post is valid and on topic.

This may take several hours because we are multinational and it depends who's awake and who's checking their mails at the time. Please bear with us. Repeat posting won't achieve anything I'm afraid.

Andrew (on behalf of admin team)

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> Does an attenuation percentage not apply when using a yeast in cider?

NO.

Because all apple sugars (sucrose, fructose and glucose) are fully fermentable. Unlike beer wort where around half the sugars can be virtually non-fermentable. 'Attenuation' refers to the ability of a yeast to ferment complex sugars such as maltotriose and maltotetraose.

These do not occur in fruit juices. You cannot achieve residual sweetness in ciders in the same way you can in beers.

This is a fundamental difference between wine / cider making and brewing. If you are to be a cidermaker you need to think like a winemaker not a brewer.

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> Thank you for explaining that. Honestly, since this is my first time fermenting anything at all with yeast, I doubt I think like anything at this point. :)

Oh apologies! It sounded as if you had a brewing background. But since you don't, you have the chance to pick up all the right cidermaking habits from the start. There are plenty of people here to help you on to the right path ;-)

Your expectation of fermentation beginning in only 15 hours was more than a tad unrealistic. Yeasts are living things. The population you inoculate has to grow and multiply in the juice by around one hundred times before it reaches the stage where it can saturate the juice with carbon dioxide gas. Until that stage is reached, although the yeast is growing, you will not see any visible sign of fermentation (bubbles).

That will take several days, even with a strong inoculum like yours. If you used a wild yeast fermentation with low cell numbers as many of us do, you might be waiting 3 weeks before you see anything happen.

You might also like to think about your fermentation temperature. 75F or

25C is quite hot for a craft cider fermentation. Most people here would recommend closer to 60F or 15C, even lower, and would more likely think to use a wine yeast, not a beer yeast.

Hope these pointers help.

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> I based the time for fermentation start off of the bottle the yeast came in, but thinking about it now, that was of course for beer (which the yeast is intended for).

You have also added SO2, which brewers never (or very rarely) do.

Brewing yeasts are not 'trained' to resist SO2 as wine yeasts are and may have a longer lag phase for this reason.

> I choose the yeast because I read in some other forum (don't remember which) that zymurgy magazine had recommended it for cider because it gave results similar to a commercial brand that my wife favors.

Just be aware that the format and flavour of most commercial ciders is determined only in part by the yeast. A lot of it is do with post fermentation processing eg carbonation and sugar levels let alone acid balance from the apples or amelioration with other ingredients such as fermentable glucose syrup.

> With the sulfited must, in a sanitized and air-locked plastic-bucket fermenter, the must should be safe for a bit before I need to worry about nasties, or oxidation correct?

In the early stages you don't need to worry too much about oxidation.

After fermentation you must be vigilant to keep air out.

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> I have pressed about 1.5 tons of Dabinetts this season and they gave a juice yield of around 56% (i.e.. 56l per 100kg fruit) using my Vigo rack and cloth hydraulic press. In comparison I got about 75+% yield from some Cox's earlier in the season. can anyone tell me if the Dabinett yield is in the expected range or am I way below expectation?

That is a very low yield. Were the Dabs ripe? When did you press them?

Did you do a starch test first? Did the fruit hold the imprint of a thumb if you pressed into it? That's the old cidermaker's way of judging ripeness!

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> I wonder if Dr Terra Vermicelli was also involved in the spaghetti tree growing in Switzerland?

I think she is actually the daughter of the well-known Swiss spaghetti breeder. Leading edge plant science seems to be a family tradition for them ;-)

Andrew

This one caught my eye this morning....

"The Institute of Applied Earthworm Technology announces the world's first Self-Planting Apple Tree.

Anyone who's planted an apple tree by hand knows how tedious it is.

First the hole has to be dug, then the tree located in the hole, and finally it must be back-filled and firmed with soil. Wouldn't it be wonderful if all this could be done automatically? Large growers do have mechanical planting systems but there's nothing affordable out there for small growers except the old-fashioned spade. Now all that has changed thanks to the scientists at IAET.

Dr Terra Vermicelli, Science Director of IAET, said "We have copied the burrowing gene from an earthworm and genetically engineered it into an apple rootstock. The apple tree now just has to be placed in position upright on the ground and the roots automatically dig themselves into the soil in minutes. A small amount of surface preparation may be necessary by removing tough and matted grass but otherwise the genetically engineered roots do just what a worm would do".

To prevent trees self-planting in store, they are kept moist and in the dark. Under these conditions the action of the burrowing gene is suppressed in the same way that it is in earthworms on a wet night. But as soon as the roots are exposed to daylight and dry conditions, they will pull themselves into the soil just like a worm would, taking the tree with them. A cleverly constructed 'stop codon' prevents the process going too far. The tree automatically finds its own level, needs no back-filling and can take up soil nutrients right away because of its genetically engineered 'active roots' (patent applied for).

IAET's Marketing Manager Avril Fish added "We are so excited about our

'Lumbricus' range of self-planting rootstocks. We think they have the capacity to revolutionise apple tree planting on a small scale where the mechanical tree-planting technologies used by large companies are just too expensive. We hope to trial our new system from late 2014 with UK craft cider growers because of their forward thinking attitudes and their known enthusiasm for new scientific advances"".

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> It is the bore of the cylinder, which is the same as the area of the piston, and normally also the same as the shank. If it is 2 inches diameter, the area would be 2 multiplied by PI, or 6.3 square inches.

*What am I missing? The area of a circle is pi*r[squared] surely? So isn't that Pi * 1 *1 = 3.14 sq in?*

It's already cider time here in the UK, so perhaps I've got it wrong?

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> Nothing aside from purchasing apples from a different orchard. Same strips. Given how last year's cider cleared up after a malic acid dose, I don't think they are defective.

The pH strips are not ideal but better than nothing. A calibrated pH meter is best.

> I've stumbled upon this: http://www.cider.org.uk/appledat.htm The second chart is of data from Geneva NY, 100km south of Lake Ontario. The Golden Russet is not listed there as a UK varietal and the pH comes up as 3.75. The reliability of that data is questionable but it's at least one other instance of someone getting similar numbers in my general region.

That is actually the pH of the cider after a natural fermentation, not of the juice. It could have risen due to MLF. Valois and Merwin (Journal of the American Pomological Society 60(3):113-128 2006) give data for

Golden Russet juice grown in upstate NY (Finger Lakes) as:

pH 3.65 TA 0.54% in 2002pH 3.61 TA 0.46% in 2003

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> Last year I was having issues with Russets not giving enough errors: https://groups.google.com/d/topic/cider-workshop/fhtA8p8bzYk/discussion Readings were so low people assumed there were instrument errors. This year I've tested my russet juice again, and the pH is an unsatisfying 3.8. That a smaller vessel of juice that I'm fermenting partially wild (only 75ppm S02) has got some flower sickness seems to corroborate the insufficient acidity.

Can we just double check how you are measuring pH please? From your previous thread it didn't seem that you had actually ever measured it.

You had only measured titratable acid and there seemed to be something badly wrong with your procedure for that.

What are you doing different this year? Are you using a calibrated pH meter?

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> im looking to plant 2 cider apple trees - all the space i got - to suppliment my apple pickings

Assuming you're in the UK I'd say one Dabinett and one Yarlington Mill.

As medium bittersweets they'll balance your more acid desserts and cookers and they'll also give you the tannin that you currently lack.

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> thanks for the replies are these two trees self pollenating or do they polenate of each other or will i need another tree?

They are diploids in adjacent pollinator groups (see http://www.johnworle.co.uk/jw-varieties-apple-trees-2014.html) so should cross-pollinate. In any case unless you are very isolated or on a new estate there will probably be other dessert and crab apples within a few hundred yards of you which will do the job too.

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> I'm pretty certain I'm in the clear, but I'm hesitant to risk sharing it with others until I'm sure its safe.

I would refer you to this reassuring review www.drpflug.com/PDFs/Odlaug_Pflug_1978.pdf

He says "If the pH of the substrate is below 4.6 then there will be no botulism hazard". I can't believe any apples get up to pH 4.6.

As Trevor says, E. coli (especially the 0157H type) is more likely to be a hazard, because it will grow at apple juice pH. But all the data shows that this is destroyed by fermentation e.g. http://www.ingentaconnect.com/content/iafp/jfp/1996/00000059/00000012/art00001

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> Do I need to pasturize the juice from the windfalls? Or will using sulfites be enough to get rid of any harmful bacteria? Thanks!

Don't pasteurise the juice. That is never a good idea for wine, cider or perry. It will adversely affect the flavour and can cause problems with clarification later. Sulphites are the normal route to control unwanted microbes in fruit juices before fermentation. Ideally you should measure the pH and tailor the sulphite addition to that, see http://www.cider.org.uk/sulphite.html

Otherwise, use the old '1 Campden tablet per gallon' rule. That's an

Imperial gallon by the way. Not a US one ;-) http://www.cider.org.uk/campden.html

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> It did settle out to the bottom after letting it sit for 3-4 hours. It almost looks cloudy and leaves a chalky taste in your mouth?

Sounds a lot more like starch granules to me than a pectin gel. How ripe are your apples?

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> We also picked and pressed the next day and we normally sweat them for one to two weeks, could that of been it?

Highly likely. Starch in unripe apples is converted to sugar off the tree as the apples mature. That one to two weeks storage could be quite critical.

> Is there a way of testing for starch or to much pectin prior to picking?

Qualitative starch test on apple slices is shown here http://cider.org.uk/iodine_test.html as I posted a few days ago. This is a simple test for cider makers who need zero starch. If you Google it you can find more sophisticated versions designed for professional apple growers who need to put slightly underripe apples into CA store.

All apples / juice contain pectin and unlike starch the soluble pectin tends to increase on storage not reduce (because it is leached out from the spaces between the cell walls as they break down). You can do a qualitative test for soluble pectin by adding 3 parts alcohol to 1 part juice and watching for clot formation. Not sure that will help you here.

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> Just out of curiosity, Andrew - what effect would the addition of starch have on a cider?

I don't understand why anyone would want to add starch deliberately? Is that what you are suggesting?

Starch is a normal and characteristic component of unripe apples. As the fruit ripens the starch is naturally broken down into sugars. If you ferment apple juice with unconverted native starch in it, you get a lower alcohol yield because there is less sugar and also lower flavour because the rest of the fruit isn't ripe yet. The starch itself is in the form of granules about 25 microns in size which is why it has a chalky taste. If you leave such juice overnight you will see the granules separate out, or you can find them as a layer under the yeast after fermentation. Starch is not broken down by yeast.

Large cider makers often do not wait for all the starch to convert naturally (time is money!) and they treat it with amylase enzymes instead to get the maximum realisable sugar and hence maximum alcohol.

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See here http://www.thethreecountiesciderandperryassociation.co.uk/assets/Competition-results-june2014.pdf

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> Any thoughts on what size I should be looking at? I am brand new to cider making an no absolutely nothing about making cider (you can groan now... :)).

Not groaning but just clarifying ;-)

I'll guess you are in the US and you may not realise that this a

UK-based list where 'cider' means the fermented product. That's what you probably call 'hard' cider. What you probably mean is what we call unfiltered apple juice.

However, the production of juice from apples is the first step anyway, and there are many US contributors to this list, so there will be people here who can answer your question in terms of the equipment you could buy to suit you. Here is a first suggestion http://www.oescoinc.com/orchard-nursery/lancman-water-presses.html but you will probably get lots of others. Basically you will need both a grinder and a press. You must also think how you plan to bulk store your juice before you use it. I presume that the juice you currently buy in is preserved or pasteurised? Or maybe just refrigerated? It won't last very long if not.

Andrew Lea

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> Actually we would be using it as it comes out of the press...The standing time would be virtually zero. The only thing we would be storing would be crates of apples waiting to be pressed.

Silly question perhaps, but the food scientist in me needs to ask if you are actually using single strength apple juice (ca 12 Brix) in your process at the moment? Most people using apple juice as a sweetener for other foodstuffs will be using apple juice concentrate at around 70

Brix. I wonder how you get rid of the excess water? Is there an evaporation step in the granola production process?

~~~

> I've been pasteurising my Cider in a water bath ....I've been getting bubbles leaking from the caps, around 10%,

That is not right. What sorts of bottles and caps are you using?

> on top of this it takes a long time for the temperature to rise when a new load of bottles are placed inside, so the process is very laborious.

It takes as long as it takes. Anything worth doing does.

> I have another option that I've read previous posts on and that's using a filter to remove the yeast, I believe 1.2 microns removes the yeast, so would this be stable in a bottle with the added sugar to sweeten?

This question is always being asked here and the answer is always thesame. No.

You not only have to remove the yeast, everything downstream has to besterile and you have to bottle aseptically to avoid any backcontamination. That sort of stringent microbiological control is notwithin the scope of the amateur. Commercial bottling operations canmanage it by fastidious attention to detail but pasteurisation is theonly option that can be safely recommended for the small producer.

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> Re Index Andrew. I note the 1st ed of yours didn't have one either. Is the publishers choice?

Yes you are right my 1st edn had no index. The publishers said they would do one before it went to press, but they didn't. Later I compiled one myself and put it on my website, and I made sure that the 2nd edn did have an index by doing it myself.

Back in the day (30 odd years), when I first started to get involved with academic books, it was clearly the publisher's responsibility to do the index. It was seen as too tedious and time consuming for authors and there was a feeling that they wouldn't do it objectively, being too close to their own work. The publishers even employed people who were professional indexers!

But now the publishers seem to shift all the burden onto the authors.

The major multinational publisher of a multi-authored academic book with which I have recently been involved demanded that the contributors / editors of the book compile their own index. This can be quite challenging. One problem is that it can't be done until the proofs are set and the page numbers are known, by which stage production and printing deadlines are very tight so there is a very short window in which it must be done. For multi-authored books, someone also has to collate all the separate chapter indexes into one seamless whole that treats the book as a unit. The same keywords may appear in different chapters for example but their 'weight' may be different.

There are of course 'automated' index routines in things like Microsoft

Word, but they are not human and so they can't discern the context in which keywords are important or not. In the case I mention, we were expressly warned against using them. It is still a largely manual process.

So I am fully aware of all the issues ;-)

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I'm a bit surprised that nobody's yet mentioned Bill Bradshaw's new book which has been out for a couple of months now. See http://iamcider.blogspot.co.uk/p/haynes-cider-enthusiasts-manual.html So in the lull before the autumn onslaught I'll say a few words.

When I first heard about this book I thought it might be a bit glib and superficial, but far from it! Actually it is firmly in the tradition of the original Haynes car workshop manuals, with enough step by step detail to allow the beginner to start making cider (and to plant a cider orchard) with confidence, but without being bogged down by myth and magic. It's helped by some superb pictures, of course, what with Bill being a photographer by trade as well as a cider enthusiast by inclination.

As Bill himself says, it probably doesn't tell you anything that you can't already get from other printed and online sources, but it's nicely and logically put together between one set of covers and if a UK hobbyist beginner had to choose just one volume as an introduction to the topic, this could well be it. Of course it could be helpful for people in other countries too, but I'd say it has a pretty British (even

West Country) focus in terms of fruit and processes. Bill claims that he's no cider making expert but that's a tad disingenuous I feel. Bill has mixed with a lot of cider makers in the last few years, so let's just say on the basis of this book that he's a good learner!

Plus points about this book are a good smattering of cider history and background, construction details for a mill and a press (attributed to

Nigel Cox and Mark Evens respectively), and some useful tables eg of UK cider apple varieties and of juice properties at different acid levels.

It's also a plus point to me at any rate that Bill doesn't shy away from the science where it's important, while still acknowledging the history of our UK cider tradition - there's a lovely photo sequence of pressing through straw, for instance.

On the downside I felt it doesn't go into as much detail about different styles of finished cider as it might and assumes that all cider ends up in bottles rather than on draught. I only found one passing reference to 'bag in box' packaging, for instance, which I thought was curious given the enormous benefit that process has brought to small UK cidermakers in recent years.

It's nicely written in a conversational style though there are just a few too many typos for me and it sadly lacks an index. Probably due to its excellent presentation and large number of pictures it is a wee bit on the expensive side. But it would make a lovely present for someone who's contemplating hobby or community cider making but hasn't got into it yet and needs to get a good first grasp of the essentials to do a

"proper job" as they say in the West Country.

All in all, a recommended read for the novice cidermaker. Doesn't replace my book or Claude's, but then it comes at the topic from a different angle.

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> Well, I was quite wrong about the acidity, I checked and triple checked but my TA on the freshly pressed juice is just 0.3 (the juice off my neighbours tree comes in at 0.7)

That is a bit of a surprise. Which hemisphere do these apples come from?

How long have they been in cold store? Apples can lose half their acid by respiration in store over say 6 months and that is probably what happened here. I wonder what they taste like? It'll be interesting to hear about the quality of the final cider. I believe that Grannies were widely used for 'cider' in South Africa, certainly in the 1970's. Don't know about today. And I think they would have been generally fresh, not out of long storage.

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> Just opened my 56 gallon barrel to find there's a quite a heavy white mould on top of the cider.

Much more likely to be a film yeast than a mould. Air is obviously getting in. The longer you leave it the worse it will become. Ideally you should rack the cider away and store it in an airtight vessel or glass bottles before it deteriorates any more. You can add 50 - 100 ppm

SO2 for further protection as well.

The archives of this list are full of discussions about film yeast. You started a thread about film yeast on vinegar yourself not so long ago.

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> made 15L of Y.M . After an initial sulphiting an EC1118 was pitched and away it went. After two weeks it was fermented to dryness. The ph is still 4, which I know is not ideal, TA 4.5. Should I now rack and sulphite for storage, or do I need to try to adjust the ph to at least 3.8?

Just to recap, there are two reasons for adjusting acidity.

One is to gain better microbial control before fermentation, especially if using SO2. You've rather blown that one now. (I wonder how much SO2 did you add for pH 4?).

The second is for organoleptic flavour balance. A YM cider at pH 4 (TA

4.5 g/L) will be a bit insipid in my view, but you might like it, especially as a fully dry cider that you don't sweeten. People here in the UK do make such stuff. It will also be more prone to wild bacterial spoilage and development of funky flavours in store which most people in the New World don't like. Adding acid and dropping the pH will maybe help prevent this, especially if you decide to use some SO2 for storage as well.

Your choice.

~~~

> My question is whether the addition of Potassium Sorbate and SO2 can lead to cloudiness in bottled cider.

No. Not in itself. But you may like to read this thread.

https://groups.google.com/forum/?hl=en#!searchin/cider-workshop/campden$20tablets$20haze/cider-workshop/wB4GNIiWdMY/voUtrXTHLiIJ

Other possibilities are:

1. Excess pectin (or less likely tannin) precipitated on cider storage.

2. Inadequate time for settling of chitosan /kieselsol before racking.
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3. Don't know what 'one step' cleaner is but if not rinsed away it might be reacting with other components of the cider.

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> Methylated spirits is more of a British term for what we would call "denatured alcohol" in the US

Agreed.

> As to the test for pectin, I'll hope Andrew will get back soon with the relative effectiveness of methanol (don't do that!), ethanol, isopropanol, and denatured ethanol. IIRC the test can be done with "EverClear" type ethanol, which isn't methylated but is the ethanol-water azeotrope so around 95% ethanol.

Yes you do need ethanol at around 95% to do the test. Vodka will not do.

I don't have any actual data but on purely chemical grounds I'd think the effectiveness in the pectin test goes isopropanol

> ethanol = denatured ethanol

> methanol. Certainly isopropanol (IPA) was once used to precipitate pectin from aqueous solution in the commercial pectin plants. But part of the reason for that may be that IPA was regarded as a 'food safe' solvent due to its relatively low toxicity, and not subject to the high level of duty that ethanol attracts.

~~~

> over the years, lots of gaps I'd like to plan to replant some trees over time,

I hope you are aware of what is known as 'Specific Apple Replant

Disease' when filling in the gaps from an old orchard. You will find a lot about this online. Here is a start written for the amateur gardener http://apps.rhs.org.uk/advicesearch/profile.aspx?pid=572 but there is lots of advice for larger scale growers out there too.

If the rootstocks or original trees are still growing in some shape or form, top-working rather than replanting may be an attractive idea.

They'll crop quicker too.

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> clarify--I'm just amazed at how much difference in clarity there is between cider made with cultured vs. wild yeast (or at least in this, my initial foray into cidermaking using wild yeast).

In my personal experience this is not necessarily the case. My wild yeast fermentations clear perfectly. I think the fruit may have quite a lot to do with it. Mine is high tannin cider fruit which probably helps.

Flocculation involves some quite complicated surface / colloid chemistry and electrical charge interactions, so that the composition of the cider itself also plays a role in addition to the physical chemistry of the yeast.

I think the operative word is "wild" and it's worth taking a minute or two to think about this and how it differs from "cultured" or
~~~

"selected". Good flocculation is one of the first properties that a wine yeast is selected for. And a selected yeast is by definition a monoculture so all cells behave the same way. A "wild" yeast isn't and doesn't. It's a succession and mixture of different organisms with complex behaviours and it may just be the case that you have been unlucky with your mix of wild yeasts compared to mine. Their native flocculating ability, when interacting with the natural cider colloids, may just be very poor.

Having said that, I'm surprised that fining with chitosan / kieselsol did not help. There is always a danger of 'overfining' and stabilising a haze for ever, but generally using paired finings reduces that. Did you do trials at different levels of each component or did you just use a fixed dose?

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> However, someone in California came-up with these apples (see picture attached) that in my opinion do look strangely like real Foxwhelp... These trees were obtained from Trees of Antiquity nursery in the US. From this picture, is it possible to confirm this is really Foxwhelp? And (I know I'm pushing a bit there) is it possible to know which sub-variety (e.g. Bulmer's / Broxwood...).

It is _possible_ of course. Here attached is a picture of some of mine.

But I really don't think a photograph in itself is enough ;-) Lots of red stripy apples look much the same in a picture.

What about the fruit characteristics? Is it very acid, very distinctively aromatic in a rich kind of way (I mean not estery like Red

Delicious or Macs, much 'deeper' than that), does it have greasy skin etc etc. When does it crop relative to other UK cider apples? (Mine is a good month earlier than say Dabinett would be).

This is what Liz says about the Foxwhelp group:

"The fruits of this group of apples are easily distinguished by their extreme acidity and markedly striped, bright red flush and long stem.

Their shape is often irregularly cylindrical, their eye basin virtually non-existent and usually beaded.

Skin smooth, waxy, occasionally some russet in the stem cavity,perhaps spreading slightly. Lenticels sometimes small brown dots.

Colour, pale butter yellow, always almost completely covered with a bright red 'Worcester' flush, strongly flecked and striped darker red.

Flesh usually mildly bittersharp with some astringency and a pleasant clean flavour juicy; chewy, yellowish, often reddened under the skin."

Do they fit with that?

I agree with Vince that the stems in your pic look a bit short. Here is another pic of some of mine here http://www.cider.org.uk/applepics.html where you can see the stems are typically quite long.

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> I also am in CA and also got Foxwhelp from TofA. So far they seem like a great cider apple, whether or not they are the very same as in the UK. To me the fruit looks flatter and generally larger.

The picture that Claude posted is not the same as on the TofA website.

The latter is very definitely not the same as true Foxwhelp (also cropping is described as late whereas in the UK it is early). Claude's picture seems to be much closer to what we have in the UK.

There are some things not quite stacking up here ....

Also, I'll just throw in the fact that we know that UK varieties grown in CA (or many other places in the US come to that) just don't behave the same as they do here. In the warmer climate they tend to be much less acid and have more sugar, and less tannin. I would rather see a comparison where the apples are grown on the Pacific North West coastal strip (eg Rich Anderson). There, they seem to behave much as in Europe, for reasons that are obvious.

~~~

> Thanks Andrew, sorry - some clarification in No3: by "safe" I really meant "how long will they keep before going off (taste, etc)?" (ie safe to drink).

Cider doesn't 'go off' in the sense of becoming pathogenic or dangerous to health. It's a low pH alcoholic product, not milk or a meat pie.

The flavour may change / deteriorate with time (exposure to air being a prime cause) and you may not like it, but that won't make it unsafe to drink.

Unpasteurised dry cider in a sealed bottle lasts effectively for ever, though its flavour may change for the worse over time.

I think you may be getting confused with other food products where pasteurisation is done to prevent or retard the growth of pathogens.

Doesn't apply to wines or ciders or beers which are effectively non-pathogenic.

~~~

> So the questions I have are: 1. Does this proposal seem sound?

Sound and unexceptional.

> 2. If cider was pasteurised in bottles, would it continue to mature?

Microbiological changes would cease. Chemical ones would continue. In my view straight dry ciders do not 'mature' by long keeping after their first season. Bottle conditioned is a different thing, and they do.

Be sure your bottle closures are appropriate and will keep air out. You appear to be re-using old bottles. Only crown cap or 28 mm screw thread pattern or maybe 'Grolsch' type are re-usable really. But in any event you need new caps / seals.

> 3. How long would it be safe to keep unpasteurised bottles?

If by 'safe' you mean 'will they explode', the answer is that if they are fully fermented they never will. If they are dry ciders there is no more sugar to ferment. I don't understand your desire to pasteurise such product.

> 4. How long would it be safe to leave the cider in the Spiedel tanks (given I don't yet have enough bottles)?

See (3). But in an LDPE tank you will get slow continued oxidation through the tank walls and lid. Keep everything else well closed and sulphited with minimum headspace and you're probably good for 6 months or so. A thin film yeast may develop but that's likely the worst of it.

> I gather MLF can be hit or miss and I've no experience of it

At pH 3.4 - 3.6 and 50 ppm SO2 at bottling, as you plan, you will minimise your chances of wild MLF developing. I'd guess it won't.

~~~

> In New Zealand I'm allowed 400 mg/L although the regulations are a little unclear if that's as sorbate of sorbic acid. However, I would rather not go to the higher rate if I can avoid it or people feel it adds any other detrimental organoleptic effects.

Here in the EU we are only allowed 200 ppm as sorbic acid which certainly isn't enough. Proof of that is that nobody here actually dares use it because it can't do the job reliably enough to hold cider in trade.

I have talked to quite a few US cidermakers who, like you, are allowed to go up to 400 ppm. They usually combine it with 50 ppm SO2. If everything else in their filling chain is good and clean, then I understand they can expect a few months storage life. If the kegs are likely to be turned around fairly quickly, then you may get away with it.

Maybe some of them on this list could comment?

I think some people can pick up high levels of sorbate as an off-flavour in its own right (irrespective of the geranium taint), but I think most people don't.

~~~

> To be clear, it's not actually "geranium" (geraniol); rather it's a compound which is -more- unpleasant, but which evokes a character such that if you say "geranium", people know what you mean...and it is a very-not-nice flavor note.

Just to amplify that, as Dick says it's not the terpene-like aroma

(geraniol / citral) of the leaves of the rose or lemon scented geranium

Pelargonium graveolens or crispum - which most people find quite pleasant in context (i.e. not in cider!). http://cdn.c.photoshelter.com/img-get/I00005LYxLVEV6_4/s/750/750/Pelargoniu-Lady-Plymouth-27774.jpg

Instead it's the very-not-nice aroma of the crushed leaves of the zonal pelargonium type of geranium Pelargonium x hortorum. The actual compound is called 2-ethoxy-3,5-hexadiene. http://leslieland.com/wp-content/uploads/2010/02/zonal-geranium.jpg

~~~

> I'm rather curious as to why 50 mg/L rather than >0.8 mg/L molecular? Or is that just to provide a rule of thumb?

Well yes "50 ppm" is a rule of thumb. But a very widely used one in the wine and cider industry. "Add 50 ppm free SO2 at bottling to maintain 30 ppm at equilibrium".
~~~

"0.8 ppm molecular" is no less a rule of thumb, based on the SO2 susceptibility of some species of wild yeasts. It applies to SO2 addition before fermentation. Doesn't really apply to SO2 addition after fermentation where other considerations are more important, such as antioxidant and and anti-LAB activity.

~~~

> One of the barrel heads looks.frothy with a fizzing sound but the other is has a solid.mass building above the surface of.at least 2 inches in places but it is not hardened, should we wait and see or do we write 2014 off as down to experience.

Without seeing it, it's impossible to say, but it sounds to me as if the

barrel that's frothy and fizzing is already lost and the keeve hasn't worked. While the other one with the 2 inch cap is truly keeving (there is no reason it should 'harden'). Check it twice daily and rack it as soon as the cap looks like breaking up or the fizz breaking though.

Unfortunately our current very warm UK weather isn't giving ideal conditions for keeving just now.

~~~

> But aside from that issue is there anything problematic about 1) adding malic acid after SO2 has been added, but before fermentation,

It depends on the time delay. If it's only minutes, that's fine. If it's hours, that's not so fine, because the unwanted microbes will still get a chance to multiply at high pH and at an inadequate molecular SO2 level to stop them. Shut the stable door too late and the horse will have already bolted.

or 2) adding acid after SO2, and

during fermentation?

Useless. For the reasons given above; and also that once fermentation has started, any added SO2 will be bound up by acetaldehyde produced by the yeast and rendered ineffective. SO2 should only be used before fermentation, and (quite a while) after. Never during.

~~~

> I have two buckets, the second one is bubbling along and both buckets seem to be air tight.

I would check the seal around the airlock itself then! Sometimes the gas gently creeps past.

~~~

What does your hydrometer say? That's the only good measure of where you are.

If you are only in a bucket with a lid the gas seal may not be very tight. Probably time to get it into a proper fermenter before the air gets at it.

Andrew

> Hello Everyone, I have a bucket of cider that has gone through its turbulent phase and who's airlock is now showing no activity. As this is my first batch, I have no idea if this normal or okay. By no activity I mean that the water in the airlock is still, no little bubbles at all. Could this just be signaling a very slow fermentation?

Thank you for your insights, Diana -- -- Visit our website: http://www.ciderworkshop.com You received this message because you are subscribed to the "Cider Workshop" Google Group. By joining and posting to the Cider Workshop, you have agreed to abide by our rules, and principles. Please see http://www.ciderworkshop.com/resources_principles.html To post to this group, send email to cider-w...@googlegroups.com To unsubscribe from this group, send email to cider-w...@googlegroups.com For more options, visit http://groups.google.com/group/cider-workshop?hl=en -- You received this message because you are subscribed to the Google Groups "Cider Workshop" group. To unsubscribe from this group and stop receiving emails from it, send an email to cider-w...@googlegroups.com . For more options, visit https://groups.google.com/d/optout.

%2%

~~~

> Yes, it can be frustrating. Well, my name is Edwin and I am in the USA! Thanks for your response. Anyone else know IF there are any ciders available commercially that have gone through malolactic fermentation so I can taste the results?

%1%

I cannot speak for the US. Dick already suggested that no large scale commercial US ciders go through MLF. Greg (although he's in Australia) already correctly mentioned that some smaller UK and French commercial ciders may typically go through a wild MLF. I also mentioned that this may not actually involve any malic acid loss if for example the bacteria utilise a pentose degradation pathway in preference to malic. So you may get barnyard aroma but no change in acid. AFAIK no commercial cidermaker anywhere uses a controlled and inoculated Oenococcus oeni MLF simply to achieve acid loss; but I may be wrong. As I said before, large commercial operations don't generally allow MLF and smaller operations probably don't have it under control. So for them it may or may not happen. It isn't easy to tell just by simple tasting, especially where blending of base ciders is involved for a final product, some of which may have gone through MLF and some not. This has already all been said.

I really don't know what more you want out of people here. Cidermakers are not generally as sophisticated as winemakers whose back labels often tell you whether or not the wine has been through MLF.

This article http://www.pomona.dk/Artikel.pdf although now 14 years old makes a point of mentioning whether or not the ciders in question typically undergo MLF or not.

~~~

>

> One reason Andrew doesn't mention for wanting MLF is microbial stability. I don't follow at all. How does reducing acidity / increasing pH improve stability?

Greg's reply covers this. I'll also say that, paradoxically, it isn't the increase in pH which contributes to greater stability, but more the fact that the ML bacteria (whatever species) are believed to take out of the system all manner of micro-nutrients which would support the further growth of spoilage bacteria. So the idea is that once the MLF is done, the wine / cider is as microbiologically stable as it ever will be.

Another feature of MLF is that it reduces the concentration of some SO2 binders such as pyruvate, so that after MLF you need to add less SO2 to the cider for long term storage.

~~~

> Ah, thank you Andrew! Now I can do some tests!

Here's some TLC I did on my own cider many years ago. http://cider.org.uk/tlctext.htm Hope you can see the spots.

I'd used a culture of Lallemand / Erbsloeh Biostart Oenos to get the MLF to take off.

~~~

> Andrew in that TLC plate you showed. Just to try to understand this properly, if your cider (on the left) had partially completed a MLF, would we also see a pale yellow spot at the same level as that on the right (Weston's, presumably?!!), i.e. would we see two spots for your cider, one high up and one half way up?

Yes. You do see two spots half way through. That's how you know things on their way.

The attached graph shows the corresponding total titratable acidity vs the date, in summer 2002. The cider was bottled once it had dropped to about 0.45% from the original 0.80%. At that point I couldn't see any more malic by TLC. There should have been a trace remaining but the spots are not the easiest to pick out visually. (There is a very weak spot on the left hand track running further ahead than lactic. That's probably succinic acid, a microbial metabolite).

~~~

> Wishes:

> A commercially available culture of Lactobacillus cultures (perhaps probiotic capsules of L. Casei?) that one could experiment with!

If you just want to reduce acidity by MLF and to smooth your cider a bit, then you can buy winemakers' cultures of Oenoccous oeni very easily. Sometimes they go by the old name of Leuconostoc oenos.

Lallemand now sell a Lactobacillus plantarum culture for winemakers which they call V22 see http://www.newworldwinemaker.com/2012/05/lactobacillus-the-good-the-bad-and-the-ugly/

Not sure if anyone on this list has tried it for cider. Probiotic capsules or cheese starters would take you way off in the wrong direction I think. But even "L. plantarum" covers a wide range of enzyme activities. A pure culture will probably be very different from a mixed wild culture of nominally the same species.

~~~

> Cidermakers are not generally as sophisticated as winemakers whose back labels often tell you whether or not the wine has been through MLF.

I'll just toss one more concept in here, in case it isn't obvious to people. That is, in a white wine the malic acid is typically only 10-20% of the total acid, the rest being tartaric. So a MLF in white wine doesn't usually lower the total acid catastrophically, because there is always a good deal of tartaric acid left.

But in cider, malic acid is >90% of the total acid (the balance being quinic). So a complete MLF, if all the malic converts to lactic, sends half your acid up the spout as CO2. That's why large commercial cidermakers,

certainly in the UK, are so wary in general of allowing MLF to happen. As I said before, losing acid is like losing money!

~~~

> Andrew also had some of Murdo's cider; his taste-memory might be better than mine.

I did have some of Murdo's cider back in 2003. My recollection was that he claimed it was made from Napa-grown Kingston Black, rather than Nehou

;-) It was very smooth, very low in acid, not very tannic. I'd agree it had all the hallmarks of having been through MLF (perhaps Oenococcus rather than Lactobacillus?). I don't remember any leatheriness or old horse, just an overriding sensation of smoothness. It was high in alcohol, up around 9%. Quite unlike any KB from the UK.

~~~

> If there were a test one could do on a finished cider to determine whether MLF has taken place (possibly an assay of malic acids and lactic acid to determine the ratio between the two, paper chromatography?)

That is quite do-able by paper or thin layer chromatography. It's a standard winery technique which can be applied to cider too. Kits are widely available. See for instance http://www.vigoltd.com/Catalogue/Testing-analysis/MLF-testing/Malolactic-fermentation-chromatography-kit-94271

Fine on your own cider whose history you know. But you would have to be a little bit careful interpreting the results on a commercial cider for instance if it had been deliberately acidified with lactic acid. You wouldn't necessarily be able to tell if that lactic were from MLF or a bottle. Though the complete absence of malic would be a reasonable sign that MLF had taken place.

~~~

Dear All,

Can I just explain that all first-time posters to this group are moderated, for obvious reasons (yes we do get some occasional weirdos here!).

So you have to wait for your first post to be approved by one of the admins. And we aren't on duty 24/7. We have our own lives to lead as well.

So just be patient please.

~~~

> The only thing that sticks out to me is the allowance of artificial sweeteners. They doesn't seem craft or heritage to me. I know saccharin has been in use there for quite some time. Any insight as to why it was included?

Yes, it is a pragmatic response to an essentially British situation which doesn't really apply in other countries. That is, the dispense of still 'farmhouse' cider direct from cask or nowadays from bag-in-box.

Many customers prefer a slightly sweetened 'farmhouse' cider and as we all know, if sugar or juice is used to achieve that, then pasteurisation or sterile filtration is the only way to prevent re-fermentation

(keeving excepted). Those technologies are not easy for small producers to implement successfully and so, as you point out, saccharin has been used here to sweeten cider since the 1890's. Sucralose is a modern and improved substitute.

Many of us with a 'purist' outlook don't really want to see the use of artificial sweeteners at all, but to exclude them would be unnecessarily restrictive and unfair to a section of our high juice craft cider industry which has been using them for over a century. Hence it was a pragmatic and realistic response to an existing traditional production scenario. If we were designing 'from the ground up' the decision might have been rather different, but to an extent we have to take cognisance of the world as it is rather than as we would wish it to be.

That's my take on it.

~~~

> I was going to say something similar. Most drinkers in the UK want to drink cider in pints like they do with beer and they don't want to get too drunk. So there is a demand for lower strength ciders.

I think it is very important for people outside the UK to understand this. The UK is by far the largest cider producing and consuming country, and for at least the last 50 years or so cider here has been deliberately made and marketed as a "session drink" to compete directly with beer / lager which have moderate alcohol levels around 4% ABV.

Nobody wants to drink pints of a 7.5% ABV cider all evening. (Well nobody with any sense anyway!).

Although cider is technically a fruit wine, it does not hold the cultural position of wine in the UK and probably hasn't done so for at least a century, if it ever did. In other countries consumption patterns and opportunities can be very different because drinking cultures vary so much. It is so important to remember these differences rather than make sweeping statements of what cider is or should be when seen from just one national perspective.

~~~

> Andrew, I had a sample of a different batch tested for malic and it came out at 120mg/L. Very low indeed. I did not test for lactic acid. This was a blend of batches that basically started out with a pH around 3.2, fermented at temps from 67 down to 60F, and is now at pH 3.9! I must surmise that I have a pretty strong native LAB presence in my apples and cidery.

Thanks. With such a low malic acid, I think we can reasonably assume that must mostly be the result of LAB activity and that the balance of acid is now lactic. It would be interesting to know if the causative organisms are Lactobacilli or Oenococcus ...

~~~

> Hello, all, I have a question about malolactic fermentation and how it relates to change in pH of the cider. More specifically, if MLF can start when the cider still has a significant gravity such as 1.025 or so?

Yes it can if the temperature is high enough. I believe this is quite normal in traditional Spanish cider making for instance, where yeast and malo-lactic fermentations can occur at the same time. For obvious reasons this is unknown in the UK!
~~~

This is the simplest explanation for what you are seeing. But it could be the effect of yeast metabolising malic acid; some yeasts metabolise malic acid and some synthesise it. Can you have a malic / lactic profile done for you by a wine lab at reasonable cost? Ideally you need that and a titratable acid figure. pH rise on its own is not really enough to figure out what's going on.

~~~

> From what I've read and what I understand about historical cider making, if it freezes, it should still be fine in spring when it thaws again.

I think the key word there is 'historical', because historical ciders were made using wild yeast fermentations. This means there was a large diversity of yeasts in the mix and doubtless a small proportion were much more cold tolerant than others, even tolerant of being frozen while wet.

I do all my fermentations with wild yeast outdoors and a few years ago all my fermentations froze solid for several weeks during a particularly cold UK winter. They did indeed start up again after thawing, but it took quite a while and I believe that the viable yeast population was much diminished by being frozen. Quite probably most of the yeasts actually died and the ones that survived were different from the ones I had started out with. But yes this is typical of 'historical' experience and where people are quite happy to have long slow fermentations (6+ months) anyway.

*The situation may be very different with a monoculture yeast as you are planning. All individuals will be genetically identical, not selected for viability after *slow wet deep freezing, and you could be in a situation where dead means dead. Anything that survives may be some stray contaminant yeast and not the one you inoculated with.*

Andrew

* [the reason I qualify "slow wet deep freezing" is that it is possible to quick-freeze and to freeze-dry yeasts to preserve their viability under controlled laboratory conditions, often in the presence of a cryoprotectant. But this is not what would happen in the situation you describe]

~~~

> Hey, thanks for your reply! I see that Andrew's answer to your question about why people filter indicates that filtering can create "sparkling brightness."

Brightness is due to lack of particulates, especially at the sub micron level. This might happen due to filtration or by the natural flocculation known as 'dropping bright'.

What I couldn't understand about your original post was your claim that a cider might not be clear and yet could be bright. Yet clarity and brightness are virtual synonyms, or are certainly points on a continuum.

Clarity is lack of cloudiness; brightness is one stage further along than that in particle size terms. I find it hard to envisage a bright cider which isn't also clear.

~~~

> Would we have to worry about the damp of the cave and its mould/mildew?
~~~

Serious red flag IMHO, if you are fermenting / storing in the cave in porous plastic like IBC's. You could easily get vapour-phase transfer of geosmin, TCA and similar mould metabolites into a cider. You would be safer if only glass or stainless steel is involved.

~~~

> The thick red clays of the Gloucestershire/Herefordshire border have long supported the growing of cider apples and perry pears. The Dymock/Newent/Ledbury/Much Marcle area has a great heritage. Also, the northern part of the Forest of Dean, around May Hill and Longhope. The Vale of Berkeley, right next to the Severn once great grew many many acres also.

All true, but there is also the interaction between variety and terroir to consider. Thus, in the Three Counties area specifically, and to quote from Hogg and Bull https://archive.org/details/applepearasvinta00bull

"Mr. Thomas Andrew Knight says "the excellence of the Cider formerly made from the Redstreak, Golden Pippin, and Stire applesin light soils seems to evince that some fruits receive benefit fromthose qualities in the soil by which others are injured." Marshallgives the instance of the once celebrated Stire, which in the lime-stone lands of the Forest of Dean yielded an incomparably rich andhighly flavoured Cider, but when grown in the deep, rich soil of thevale of Gloucester, afforded a liquor only useful for its strength androughness. The Hagloe Crab again, another celebrated apple in its day, required the calcareous rock called "Dunstone" to give fullflavour and richness to its liquor. The Foxwhelp on the otherhand, yields the Cider, so remarkable for its strength, and thatpeculiar flavour, for which it is so highly esteemed, from deep clay

Sandstone loam, and if the trees are grown on light or too sandy asoil, its Cider is then thin and inferior in flavour. The same maybe said of several other varieties."

This is a theme repeated frequently in older cider-making literature. I believe it to be broadly true even today with all our oh-so-clever science. That's why many of us here so frequently suggest that people planting cider orchards need to 'do the experiment', rather than just taking some sort of all-purpose turnkey solution to what are the 'best' cider varieties. It's hard enough to get it right even in a small area like the UK. When you think internationally, it's nigh on impossible.

People must be prepared to try things out for themselves, and not just trust the ramblings of random blokes they find on the internet.

~~~

> Nicely done ... but,

You may find the attached scan of value. It's taken from "Cider and

Juice Apples - Growing and Processing" ed by Ray Williams in 1988 (?).

(The Cider Museum in Hereford may still have copies for sale).

~~~

> So can anyone give me the names of the more 'famous' cider areas in the Three Counties? Are there any?

If you look at the PDF I posted yesterday, I think the second and third paras of Section 3.2 address your query.

~~~

> Is there any similar distinction in EU materials and labeling?

Yes. In EU Food Law there is a distinction between an "additive" and a

"process aid". So that an artificial sweetener would be an additive but an enzyme or fining agent would be a process aid. (This is also reflected in our HMRC Notice 162 which controls cider making practices).

Process aids don't need labelling per se but additives do. In the EU,

SO2 is regarded as an additive but also needs additional labelling as an allergen.

On the other hand, isinglass as a fining agent is a process aid but also needs labelling as an allergen since traces might remain in the finished product. Although alcoholic beverages are still currently exempt from ingredient declaration in the EU, allergens and some classes of additives (eg artificial sweeteners) must be labelled nonetheless.

It ain't simple ;-)

Andrew.

~~~

> Interestingly my TSO do not require "contains ascorbic acid" for the apple juice because "anything that is used in the processing of a food product but is not present in the finished product should not be listed" (ascorbic acid is denatured by the pasteurisation process).

Sorry but your TSO is plain wrong. Ascorbate is an ingredient not a process aid. It is not fully denatured by pasteurisation unless you add only the tiniest and most ineffective amount.

~~~

> allergen.

On the other hand, isinglass as a fining agent is a process aid but also needs labelling as an allergen since traces might remain in the finished product.

Correction. Mea culpa. This is no longer the case under the new 2014 legislation. AFAIR the drinks industry provided data to show that even if isinglass and similar fish proteins were used as fining agents, no allergenic residue remained in the product. This data has been accepted by EFSA so that labelling of such process aids as allergens is no longer required.

~~~

> One other thing to perhaps ponder on between now and your blossom time. Assuming that you have two trees of some varieties an option is to use a blossom thinning chemical on one of those two.

That was the way it used to be done here. AFAIK no blossom thinning chemicals are now permitted for use on fruit trees in the EU, because of the collaterial damage they do to bees. So it's pruning or hand thinning or not at all!

Perhaps one of our orchardists could confirm.

~~~

Dick did it overnight Tim. We shouldn't see any more auto-responds now.

Andrew

> Could admin remove this account please. Tim --Original Message-- From: cider-w...@googlegroups.com [mailto:cider-w...@googlegroups.com]

%2%

~~~

> It is possible that the acetaldehyde formed during fermentation will form a dioxolane with the benzaldehyde which will have a greener aroma and be less offensive.

%1%

Correction - any chemists present will know that I'm talking through my hat there! (My first post of the day and I hadn't fully woken up!)

What I meant to say is that the (benz)aldehyde might form a dioxalane with a dihydric alcohol such as octane diol which can be present in apples and cider. That route in cider is quite well-known for a range of aldehydes. So what I'm suggesting overall is the the benzaldehyde might

'age out'; but there again, it might not ;-)

~~~

> A batch of cider I dealt with recently (from 2013 pressing) had an eggy/sulphurous smell and so I have been reading around that. Various sources mention an issue with a lack of nutrients for the yeast and it being 'stressed'. I have come across Yeast Nutrient on sale, but I confess I'm a bit unclear as to its role. I thought the yeast lived off the sugar in the must? Can anyone explain in layman's terms the role of nutrients and a) how I can tell at the must stage whether sufficient are present, b) increase these if necessary?

The yeast cannot live off sugar alone any more than you and I can. Italso needs nitrogenous nutrients and vitamins to support its growth andbuild its biomass just as we do.

There is no easy way to tell at home whether you have 'enough' nutrientsnaturally present in the juice or not, although speed of fermentation issomething of a guide. 'Enough' also depends on what your cidermakingobjective is. Many people like to add yeast nutrients as an 'insurancepolicy' so they can be sure they get a fast and efficient fermentationto dryness in just a few days. Other people, like me, prefer a longstressed fermentation believing it makes for a better cider. You caneven work to remove nutrients e.g. by keeving or repeated racking in thehope that the cider will 'stick' with residual unfermented sugar due tolack of yeast nutrient. These issues are discussed in my book and in

Claude's. Claude in particular covers the topic in a good deal of detail.

The relationship between yeast nutrient and stinky / sulphur / eggy /

H2S flavours is not a simple one. If yeasts are desperate to findnitrogenous nutrients they will break down proteins in the juice. Ifthese proteins are sulphur-containing then they may leave someobjectionable volatile sulphur compounds behind. These have very lowaroma thresholds so that even a few parts per billion can be noticeable.

However, they are often absorbed again by the yeast later in itsmetabolism as fermentation comes to an end. In my wild yeastfermentations this is what happens. The initial egginess disappears inthe early stages of maturation as the yeast absorbs it. However thiscannot be guaranteed for everyone ;-)

The idea of adding nutrients is to stop the yeast breaking downsulphur-containing proteins to get its nitrogen. There is a belief insome quarters that the split addition of nutrients to wine or ciderfermentations can be valuable - that is, before fermentation and againhalf way through. if you look in the archives of this list you will findthis has been discussed a fair bit.

It is also the case that H2S production is very yeast strain dependentdue to the presence or absence of various enzyme pathways. Someoneposted here recently about yeasts which have been bred to circumventthis. Some strains such as AWY 350 are naturally very low H2S producerswhereas the Montrachet strain Davis 522 is a notorious H2S producer.

Most reputable wine yeast suppliers already list the H2S productionpotential of their yeasts on their data sheets.

If you want to add nutrients you'll find them for sale at any homewinemaking shop as you have discovered. You can buy simple inorganicnutrients like diammonium phosphate (DAP) or more complex yeast basedones. If you follow the directions given your fermentations willprobably take off like a rocket! They can't be guaranteed to prevent H2Sproduction but they may do.

~~~

> In the orchard I help maintain I have seen some blemishes on the young fruit and have not been able to positively identify the problem from online resources. When the fruitlets were smaller than marbles I saw a circular chunk of flesh bored out of the hard fruit. Since then, they have scarred over, and the fruit is growing larger, but slightly mishapen. Can anyone tell me what pest causes this? I will take photos of the fruit next time I am at the orchard and add them here.

Try apple sawfly https://www.rhs.org.uk/advice/profile?pid=644

~~~

> How much longer before we can kill off this thread as entirely OT? Whether people know the answers or are merely guessing, the discussion doesn't belong here.

I'm not sure that I'd be quite as harsh as Dick! Whether we like it or not, we know that a lot of New World cidermakers do use other fruits in cider as adjuncts, and surely better to use fresh local cherries than someone else's cherry concentrate? So I think the question is a valid one. (As I already said, and Yann agreed, I have been told that bladder presses cannot be used for this without prior de-stoning.)

A lot of stone fruit pulp and juice is made in Europe, much of it for the 'nectar' trade, and also the trade in sour cherry juice concentrate.

Here's a link to the purpose-built Voran kit which is used for the purpose - effectively it's a large sieve with rotating blades inside.

There is also a video to show it in operation http://www.voran.at/en/machinery/machine-database/menu/obstverarbeitung/category/entsteinanlagen/product/entsteinanlage-ep1000/

~~~

> that if I had been forced to use just bittersweets and sweets that my juice would have been insipid, quite apart from the microbiological hazards.

I agree.

> I am though trying to produce a Breton style cider so am erring on the side of a high pH, so far this year 3.8-4.

I have been up to pH 3.9 in such a case, but I personally found thekeeved cider too low in acid to enjoy. It also developed a very heavy

'old horse' note on maturation, rather too much for me! That's a microproblem of course. Could be lactics, could be Brett.

> If one was to make a single variety eg Dabinett would you really have to add some malic acid to make the cider acceptable?

In my opinion yes. Not everyone would agree with me.

> Do producers of single variety ciders routinely add malic acid to a bittersweet juice?

If they are mainstream commercial guys, yes. They don't tell you thatthough! That's what misleads people in thinking they are drinking an SVwhen they're not.

> Also how high a pH would Breton ciders typically start with?

Don't know for sure, but probably up around 4.

> From what you say it is possible to add malic acid after the fermentation is complete, could this be done at any time during the maturation process?

Yes but the later you leave it the less microbiological control youhave. Shutting the stable door after the horse has bolted. Better doneearlier IMHO.

~~~

> I forgot to ask is this unusual?

Keeving is an art at the best of times. You did not add any PME, only calcium chloride, so you are entirely dependent on whatever natural PME there is in the apples. You say that all the containers were filled at one time but was the juice really exactly the same? For instance, if you filled them sequentially you would have containers of early, mid and late run juice. The PME is likely associated with cell walls so just maybe there will be more PME in the late run juice than the free run.

That is just one of many possible explanations. There may also be differential extraction of PME inhibitors. When you are dealing with complex natural systems this is the sort of thing you have to expect.

Quite separately I would worry that your pH is so high at 4.3. Are you trying to make a pure Dabinett cider? It will be microbially vulnerable and sensorially unbalanced. If it were me, I'd lower the juice pH with added malic acid once the keeve has been successful.

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> If I was to add malic acid could I simply progressively add to a sample and measure pH or would you really have to do a titration? I am pretty low tech and have only pH papers 2.8-4.6.

The normal thing is to add acid in steps of 0.1% (1 gram per litre) and test after each addition. TA is probably best if you are thinking of flavour balance in the finished cider and pH if you are thinking of microbial stability during fermentation. The pH papers are not very discriminating nor very accurate but if your objective is to drop at least 0.2 pH units they will probably do the job.

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> I am new to the group. I have started craft cider making in South Wales (UK). I have some Speidel plastic tanks - 300l and 500l sizes - with contents that need to be racked after primary fermentation. I have used a pipe inserted from the top and a small pump.

It's so much easier to pump from below. Vigo will sell you a custom adaptor to fit the Speidel bottom outlet to 15 mm or 19 mm tubing (not in their catalogue, you have to ask). Of course you need to fit it before the tank is filled ;-) But it's one to remember for next year.

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> My question is, must I buy proper stuff to calibrate it in the future, or can I use distilled water, eg as sold for topping up batteries??

You need a proper calibration buffer which you will have to buy. The pH of distilled water is not fixed as a buffer is, so cannot be used for calibration.

People imagine the pH of distilled water is 7. It isn't. It is typically closer to pH 5.5 because it picks up CO2 from the air and this makes it more acidic than pure water. It is very unbuffered (very low dissolved electrolytes) so its actual pH fluctuates a lot and it's very difficult to measure accurately.

Buy the proper calibration buffer as Ray and Rich have said.

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> Andrew. Continuing my e book journey through the Royal Society I note that Beale's aphorism 21 you quoted from the appendix to Evelyn's Sylva above was read to the Royal Society 2 years earlier on Dec 10th 1662 by Mr Oldenburg for Mr Beale. At the same meeting there was present Mr Christopher Merret of champagne fame as per Tom Stevenson, and Sir Robert Moray who describes the use of air pipes and bellows in a furnace to increase the temperature (needed to make verre anglais the strong glass needed to contain the pressure of champagne or bottle fermented cider. Oh and a certain Mr Boyle demonstrated how to make a vacuum. Quite a meeting!

Oh to have been there! You should read James Crowden's "Ciderland" pp

23-33 which also refers to those Royal Society meetings in 1662 in the context of bottle fermented cider and gives a short biography of Beale.

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> I would start maybe by working out what is needed to reduce the acetic level by 0.5 g/L and see what happens. And if you do manage to reduce the acetic back to an acceptable level, you will almost certainly

have to add some fixed acid to get the overall acid balance back, because the whole caboodle may be far too low in acid by then.

Sorry I think I am talking nonsense. If you add more fixed acid all it will do is to neutralise the pot carb you have just added and liberate the acetic again. Try it but on refection I don't think it will work.

One 'traditional' way of removing acetic (since it is a 'metabolic' acid) is by mixing with fresh pomace, repressing and re-fermenting. At least this used to be done with slightly acetic ciders. Don't know if it would work with perry. Second time around you would need to pay close attention to pH and SO2 control to prevent the same problem reoccurring.

Like I said, not easy.

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> That's what I feared. Is there an easy calculation to determine how much potassium carbonate to add?

Well no, because you are not wanting to bring down total acid, you are wanting to bring down acetic specifically. But the pot carb will not be selective. So you can only do it by trial and error. I would start maybe by working out what is needed to reduce the acetic level by 0.5 g/L and see what happens. And if you do manage to reduce the acetic back to an acceptable level, you will almost certainly have to add some fixed acid to get the overall acid balance back, because the whole caboodle may be far too low in acid by then. Obviously citric is not a good idea, lactic is the next obvious, or perhaps tartaric. You could use malic but if lactobacilli are still present then they will likely attack the malic too. If you are selling this you would also need to choose an acid which is acceptable for perries in your jurisdiction.

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> Jonathan may have been trialed at Long Ashton and said to produce a good cider if my memory serves me.

Yes. BC-grown Jonathan was trialled at LARS in 1931 and reported to give

"Very fair cider with pleasant brisk flavour".

Also if you look in the archives of this list a number of people have commented very favourably on its descendant 'Jonagold' for cider making, even here in the UK.

And Dick Dunn asked:

> PS: Why "Nottingham" yeast?

I would be interested to know that too. Why do so many North American hobbyists use "Nottingham", a top-fermenting ale yeast, for ciders? Here in the UK it is never (?) used for cider. Wine yeasts are the norm.

I am genuinely interested because I still have time to include it in my book if someone can provide me with a sensible answer ;-)

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> Couple of questions; Did this happen because I changed to the plastic caps and they are not airtight like the rubber stoppers with the airlocks?
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It could be because the plastic caps are oxygen-permeable. Most plastics are, especially if they are just thin dust-caps. Or it could just be from the dose of air that got in when you did the switch-over.

> How should I proceed. My intention is to keg them both and force carb them now. Is any treatment necessary first? I looked up some old posts here on the subject and the advice seemed to be intervention was not needed if you intend to bottle or keg straight away. Have I understood this right?

Film yeasts on cider are an occupational hazard but not a big deal unless they are allowed to get out of hand. They are a warning sign but not an immediate disaster. They tend to be self-limiting because they need air. The immediate neck area where the film is may smell solvent-like but the bulk of the cider is probably OK. If you have no bottom tap, use a turkey baster to find out (and top up with clean water to minimise headspace afterwards).

You will probably be fine without treatment if it's just a thin dusting and you plan to keg and carb them now. They won't develop further in a

CO2 rich and airtight environment. If you are leaving longer you might want to spray SO2 around the inside of the carboy neck or even add 50 ppm SO2 to the bulk.

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> Q1) For bittersweet cider, what are the two? (more than 2?) best apple varieties which will make a nice cider?(sparkling not flat).

Welcome to the list.

First you need to understand that the apple varieties will not have any bearing on whether the cider is sparkling or flat. That is a matter of the technology you use to make and finish your cider.

The matter of a 'nice' cider is totally subjective. Again, the technology you use will have a large bearing on that as well. The best ciders are nearly always blends and not made from single varieties. The normal UK craft cider recommendation is a 50/50 mix of bittersweets and

(bitter)sharps. If you have plenty of decent dessert apples they can substitute for the (bitter)sharps though with some loss of quality. For bittersweets, good well-behaved mid season choices would be Dabinett and

Yarlington Mill for instance.

If you know nothing about cider making or the sorts of trees to choose,

I would respectfully suggest you look at my Science of Cidermaking articles first of all. Part 2 is here http://www.cider.org.uk/part2.htm and is linked to the other parts at the bottom of the page. You can buy my book if you want to go further.

For tree supplies, I would go straight to a specialist cider nurseryman like John Worle, who is not too far from you http://www.johnworle.co.uk/index.html Don't bother with local nurseries unless they have existing skills and understanding of cider varieties.

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I've been making cider off/on for 10 years, and have always added a crushedcampden tablet per gallon, 24/48 hours prior to fermenting, in order to usea controlled yeast.

OK

In discussions with my friend from Barton Cider, he definitely does NOTadvocate campden (his cider is 100% organic),

That's what some prefer, but not a hard/fast rule.since campden kills off anymicrobes that will set up malolactic fermentaion, after the yeast has doneit's job, in spring, when temperature warms up again.

Not certain this is strictly correct - as empirically (see later) you seem to have had a possible MLF...

A lot of the apples that go into my cider are Bramley, so high in acid, butafter a good winter and spring, and possibly through to the next autumn, mycider matures beautifully, losing a lot of the excess sharp edge.

Sounds like malic turning to lactic to me. But it could just be 'maturation' - cider fermentation is a complex biological process...

Is thisjust maturation, or is it specifically malolactic fermentation? This year,i'm also using Lalvin 71B yeast which judging by the first batch, is rathergood at lowering acidity.

Think Andrew/Claude mmay have discussed that previously.

According to some, 1 campden per gallon may not be enough for a fullsterilising - especially with high acid apples present,

You're wrong there. Increase sulphite as acidity DECREASES (ie pH increases). I don't use any sulphite in low pH/high acidity culinary fruit.but sufficient toget rid of most of the nasties - so maybe the malolactic bacteria survive?

See earlier comment....

Not being made of proper cider apples (basically whatever I can get myhands on) is it safer to ignore malolactic, and rely on simple maturation,

It's not 'simple' and you prob do have MLF.

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> As the subject suggests, it tends to go immediately opaque in a blend. Anyone have any idea what is going on?

This is not uncommon when blending. It's to do with the destabilisation of the polymeric tannins (probably from the pear, in this case) by other juice constituents. It is always recommended to blend several weeks or months before you bottle to allow the haze to settle out. An alternative is fining or filtration.

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> Andrew Is there a failsafe way to avoid "stable and stubborn" hazes in blended perry by an appropriate treatment/fining, either before fermentation, before blending, before bottling, or some other critical time????

I'm not a perry expert and have little personal experience, so I'm not the best person to ask. I don't think anything is "failsafe"! Received wisdom has it that high tannin perry pulp is best macerated before pressing to reduce the most troublesome tannins by binding them to the pulp. Fining cloudy perries with gelatin or chitosan should in theory help although the risk of 'overfining' and indefinite haze stabilisation is a real one. Combination finings are probably safest.

Another possibly useful tool is insoluble PVPP eg Polyclar or Divergan to pull out troublesome tannins in the finished perry before they form a haze? PVPP is not a fining agent but more of a preventive. I have used it successfully in the past on cider vinegar problems.

One of the problems is that the tannin provides the astringency which is desired, so the more you fine it out the more insipid the product may become. Perhaps some of the perry makers on this list could contribute from their experiences?

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> Greg, i think it's also like a chemistry taste / smell, for example, acetone, nail polish

Sounds like classic ethyl acetate to me. See for instance http://cider.org.uk/part5.htm

> is it mean, that i should more carefully monitor the integrity of the equipment?

No it means you should monitor the integrity of the operator. The equipment is dumb, and only as good / bad as the person who uses it. You have already admitted to running with an empty airlock and using no SO2.

This is your reward.

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> how seriously absence of SO2 increases the risk of cider's sickness?

SO2 inhibits wild yeasts, film yeasts, acetobacter and lactic acid bacteria, and chemical oxidative processes. All these may generate unwanted high levels of ethyl acetate. So, lack of SO2 is a definite risk factor for ethyl acetate production.

It is impossible to quantify this. But ask yourself, why is it that 99% of the world's winemakers use SO2?

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The following link has been brought to our attention which may be of interest to US readers

https://cydermarket.com/Cider_Producer_Survey_2014.html

> The secondary is much gentler and longer. It might only be the malo fermentation or it might be the scavenger yeast on the lees using the very last of fermentable sugars.

Oh yes I am aware that the malo-lactic fermentation is sometimes called a 'secondary fermentation' by wine makers (though I think this usage is now discouraged by all the wine schools). I am also aware that the first few days of a cider fermentation can be quite turbulent especially if wild yeasts and no sulphite is used; later
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on, things get quieter. To that extent one might distinguish two phases (sometimes called aerobic and anaerobic as Ray suggests).

But the type of thing I'm talking about is where people are arbitrarily drawing a line after say 4 or 5 days of cider fermentation which they call 'primary' and racking it into what they call 'secondary' simply because that's what brewers do, without understanding that wine / cider is different from beer.

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> There isn't a concept of secondary fermentation in cider.

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Too right. It really is time we knocked this one on the head. Did you ever hear of winemakers talk of Primary and Secondary fermentation? Of course not. Only brewers do. And cider is a fruit wine. It isn't a beer.

This is I'm afraid yet another example of the uncritical adoption of

Brewspeak by cidermakers. It is a valid concept in brewing, where the distinction between Primary and Secondary fermentation has a real biochemical meaning - that is, the point at which the easily assimilable sugars (glucose and maltose) have been consumed by the yeast and the hard-to-ferment sugars (maltotriose, maltotetrose) are all that's left.

At that point the yeast has to switch gear and slow right down because the only sugars then available to it are much harder to ferment. (From this incidentally we also get the concept of high and low attenuation which again has no place in wine or cider, unless you are using glucose syrups as fermentation adjuncts)

In wine and cider, all the fruit sugars - fructose and glucose, and sucrose after inversion - are fully fermentable, hence the discontinuity found in brewing beer does not arise. Hence to echo Matt again, there is no concept of primary and secondary fermentation in cider. Let's stop speaking as if there is.

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> I'd guess it was primarily used on the old V. labrusca 'foxy' wines of upstate NY and elsewhere which needed a lot of sweetening to make them palatable.

The current link http://www.ecfr.gov/cgi-bin/text-idx?rgn=div5&node=27:1.0.1.1.19#27:1.0.1.1.19.15.349.6 says "Use authorized at a maximum level of 250 mg/L in all standard wine except natural wine produced from Vitis vinifera grapes. FDA advisory opinion dated 12/1/86."

(There is a similar wording for ethyl maltol too, but a lower limit of

100 ppm. That's because ethyl maltol is 'pokier' than maltol, as we say in the flavour business).

I'm not familiar with the exact US terminology here (standard vs natural wine) but does that confirm what I suspected?

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> Maltol is still permitted, apparently. Here is the GPO reference: http://www.ecfr.gov/cgi-bin/text-idx?rgn=div5&node=27:1.0.1.1.19#27:1.0.1.1.19.15.349.6 "To stabilize wine," according to the language of the regulations. Why would it be used? Would it ever be used in cider? Anyone know what maltol is for?

Maltol (3-hydroxy-2-methyl-4H-pyran-4-one aka the trade name Veltol) is a naturally occurring Maillard compound that is formed when sugar is heated. So it's a major natural flavour component of things like sugar syrups, caramels, confectionery products, baked desserts, toasted barrel oak, baked potatoes etc.

It is sweet and caramelic in its own right but it also has the useful property of acting as a sweetness enhancer or synergiser for pretty much anything with sugar in it. So in its synthetic form is widely used across the food industry and also in animal feed to increase the perception of sweetness.

I have no idea how it crept into the US Wine Regs, or when, but it did.

According to Amerine's "Wine Technology" (rather old now) its use is as "stabilizing and smoothing agent" at a maximum level of 250 ppm. Ref

21 CFR 121.1164 (no longer valid)

I'd guess it was primarily used on the old V. labrusca 'foxy' wines of upstate NY and elsewhere which needed a lot of sweetening to make them palatable.

Never tried it in cider (not permitted for that purpose in the EU, though widely used in other foods.). Might be interesting though.

~~~

> Thanks for your response Claude. My next pressing I think I will try 24 hours in the press before pressure. I will talk to him again but I think he was suggesting several rackings, do you think this is common practice?

Ian, I don't know whether you or he have read this leaflet but it might be worth a look. http://www.cider.org.uk/comment_faire_du_bon_cidre.pdf

It's from 1977 and describes 'best practice' artisan French cider making in the days before commercial PME enzymes. They recommend at least one racking.

This more recent paper suggests on the basis of experimental work that the most efficient time for a second racking is as soon as the SG has dropped by 10 points http://onlinelibrary.wiley.com/doi/10.1002/j.2050-0416.2008.tb00313.x/pdf.

Otherwise it's rather "by the seat of your pants". If you rack too often you can run the risk of it sticking at a higher SG than you wish. Too little and it can go to dryness. I have ended up in both places! So much depends on the nutrient status of the original juice, and knowledge of how your apples perform. Claude's book says a good bit about all this.

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> So my first batch of cider has aged for a bit, and was ready for a bit of sampling but the result has left me wanting. The alcohol content is high, but the taste is rather... thin is really the only way I can explain it. Almost like it's been watered down. Any suggestions for further batches? What could I be doing wrong?

I was looking back at your previous posts and I see that you have been using standard PNW table apples (fresh juice from a market) and that you have fortified the juice quite heavily with sugar before fermenting.

That would explain both your observations. In future years you need to be cannier with your choice of fruit, and I really don't see why you need to increase the alcohol level, which just throws everything off balance.

Michael has made 2 good extra points. First of all, it's only mid-November. Forget your cider till spring and taste it again. Some complexity may be gained on maturation. Second, if you need body, add fresh juice or sugar and pasteurise.

I suspect you were expecting to end up with a commercial style cider but without the commercial resources or technology. I'm afraid this sort of disappointment is not uncommon, because beginners don't realise how much manipulation goes into the standard commercial ciders they are used to.

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> This raises the question: is there a period of time such that, if a haze does not develop in that period of time, it is unlikely to develop at all? Or is it possible for one's beverage (composed largely of cider, and partly of juice extracted from berries) to appear clear for an indefite amount of time, and then develop a haze?

Very difficult to predict. As far as pectin is concerned, an alcohol precipitable haze as a result of blending would probably occur pretty quickly, with hours or days. But a tannin / protein haze, quite likely to occur due to interactions between the various fruit components, could take months to appear and could be shocked out by cold winter storage of bottles for instance. Since this appears to be your first time doing this, I suggest you treat the whole exercise as a learning experience.

As a matter of interest, what species of berries are you using? Are they wild or feral or cultivated?

Just one more observation. When you pasteurise, the red colour may be almost lost. But most of it should return on cooling; this is due to the various thermal equilibrium forms of anthocyanins, some of which are colourless and favoured by high temperatures. If you bottle the product in clear glass, I'd always advise storage in the dark. Free anthocyanins are light sensitive and will degrade irrevocably in sunlight. They will degrade anyway over time, but there's no point in hastening the process.

Good luck with your 'formulation'!

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> Also UV light absolutely can kill yeast. At a sufficiently powerful level it causes too types of damage capable of killing a colony.

OK I should have qualified my remarks. Mea culpa.

At "a sufficiently powerful level" to kill fermenting yeasts it also causes UV-induced deleterious flavour changes in the wine or cider.

That's why it's not used in practice. The regular UV pasteurisers used for water or apple juice won't touch fermenting yeasts, because they don't provide enough energy. It's all in the research literature.

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> Hi I have been asked to make a cloudy carbonated cider,however my samples have very quickly settled in the bottle and left a dirty looking ring of sediment. Any ideas welcome on how to stop it settling and remaining cloudy ?

Four suggestions:

1. Use a non-flocculant yeast (not easy to find thesedays but maybe a wheat beer yeast?)

2. Add a small amount of (pasteurised and cloud-set?) cloudy apple juice back into the cider and allow to re-ferment (maybe with a non-flocculant yeast?)

3. Use a commercial drinks emulsifier / clouding agent (not permitted by

C&E 162)

4. Prepare your own cloud using tank bottoms and a sub-micron homogeniser mill (probably permitted by C&E 162?).

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> Andrew, there is a reference in the Vigo document to agitate the must for 10 - 20 after adding the CaCl2. Is that strictly necessary? I gave it a very good stir with a large spoon.

Reality check please. You are working on a 30L scale AFAIR. "Agitation in a closed circuit for 10 to 20 minutes depending on the quantities involved" is for a large commercial operation where thousands of litres are being keeved. The end requirement is simply good homogeneous mixing of the concentrated CaCl2 solution into the bulk.

> Also, bearing in mind I know I need to be patient, how often should I check for the chapeau brun? Will it be obvious through the sides of the Spiedel fermenter? I'm wary of constantly opening the lid and peering in?

You can open it all you want. Keeving is traditionally done in open straight-sided tanks. But yes if you have a translucent fermenter you should be able to see most of what's going on through the sides. There are lots of pictures on the WWW to show you what happens. Google and click on . Simples.

You may initially see a pectin gel form in the body of the liquid below the surface. This will gradually rise as it becomes impregnated with gas from the yeasts trapped within it. May take a week or two to get there.

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> there was a light gas release noise as the lid was unscrewed.

You shouldn't be keeping the keeve tank under any sort of top pressure.

No airlocks etc.

> Previous to the above the juice had dropped bright and clear apart from small flecks of brown hovering mid surface and no froth or obvious bubbles that I could see.

Any sign of a large pectin clot or gel in the body of the liquid? If you shine a light from the side or behind?

> I appreciate the above isn't good or ideal for the keeve. Given that Sunday evening and Monday onwards the temperatures are set to drop by a good margin, with overnight lows of possibly 1C, and forecast to on average around the 7C, am I best to just keep my nerve and hang on?

Can't do much else can you?

Good luck.

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> I milled and pressed my apples allowing a delay of 12 hours between operations. The first thing I noticed when I popped the lid of the barrels open was a fizzing sound. Is that fermentation?

Very unlikely in such a short space of time. If so, your juice will be obviously fizzing already and you might as well give up all ideas of keeving right now ;-)

> The next action will be to add the salts. I finished pressing 11pm yesterday 16th Nov. When is the optimum time to add this?

No need to delay in my opinion. Do it now. Some people go through a trial to check that the PME has worked see

http://www.vigoltd.com/files/ca7fefe1-6bbf-41cb-b214-a3a100a90165/94424%20CPME%20Instructions%20SEP2014.pdf

http://www.vigoltd.com/files/d67d6c66-c16f-47c3-8813-a3dc011207ec/94426%20Vigo%20Keeving%20Kit%20-%20Supplementary%20Instructions%20-%20SEP12014.pdf

You can do this too if you like, but I never have.

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>

> yes my friend used to let it in container for a long time may be 6 to 7 months for racking just after comleting his fermentation and then for 48 hours chilling to temperature 3 to 4 degree celcius and then he used to leave his wine at room temp for 5 to 6 months i hope in this period his wine got acetification by the way my problem and my question is this if there is acetification has been started of wine how can i prevent it and how can i sterilize my container and what precautions should i consider in future????

So, as far as we can tell, the wine became acetified by storage at high summer temperatures. This is almost certainly by microbial action. It could be by acetobacter if air got in, or it could be by lactic acid bacteria in the absence of air. The standard ways to prevent this are

1. Keep the air out (and maybe blanket with CO2 or N2)

2. Keep the wine cool (in hot climates like California or Australia wines are stored in refrigerated jacketed tanks).

3. Keep the SO2 levels up. Typically aim to keep 50 ppm free in bulk store at all times.

I hope you are doing proper pH control and SO2 management before fermentation too.

You cannot reverse acetification once it's happened. It may be possible to 're-ferment' the wine after blending it with new juice but that's about all you can do. Once you have acetic acid and ethyl acetate present in offensive amounts there really isn't much you can do.

"Prevention is better than cure".

To sterilise containers you just do the normal standard procedures with chlorine or active oxygen based sanitisers sold for winery use. Or maybe steam.

Is this a hobby or are you doing it commercially? I find it odd that you are a trained food technologist and yet you are coming here to ask these basic questions. Perhaps you need to go on a 'winery conversion course'.

Or read some professional winemaking books.

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> I am afraid you don't give us enough details for us to be able to tell you anything... And by the way, what is TSS?

TSS is Total Soluble Solids as measured by Brix refractometry. I have told this poster before that he cannot use refractometry to measure TSS in fermentation (due to the refractive index of alcohol) and that he should make SG measurements with a hydrometer. But he doesn't listen....

Presumably the fermentation has long finished and air has got in. He is in India which may be hot, and so acetobacter may be working quite happily in his 'wine'.

And of course we can't help him unless he gives lots more detail about his process. The causes of acetification in wine and ciders are well known (failure to keep air out, for the most part) and have been rehearsed here endlessly as an archive search will show. He could also look in my website as another source of free information.

If people want us to help them here, they must also be prepared to help themselves a little. We are not nursemaids.

~~~

> My 8 gallons of Jersey cider has just finished fermenting after 2 weeks. I have my bottles which have been sterilized. Is there anything i need to do to the cider before i bottle it ?

Don't know what you mean by 'Jersey' - New Jersey, Old Jersey, Chisel

Jersey ....?

Anyway I'd respectfully suggest you look at the Science of Cidermaking

(parts 3 and 4) to get an overview http://www.cider.org.uk/part3.htm

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> This is the first batch i've made so i'm very new to this. According to what i've read i need to wait for the fermentation to stop (which it has) and then bottle. Just tasted it and it does need sweetening up a bit

Please read the links I supplied. They will give you the options. Be aware that if you add sugar to sweeten the cider it will referment. So your options are to do that and pasteurise the bottles (not as difficult as it sounds actually) or to use an artificial sweetener such as Splenda.

If your cider has only just finished fermenting it will be very harsh.
~~~

Best to store in bulk and not think about bottling until after Christmas perhaps.

Hope you have read Le Couteur's treatise on Jersey Cider Making. It is here (starts on page 331) https://archive.org/details/ageneralviewagr00coutgoog

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>

> Not so. In the EU / UK it is forbidden to USE any pesticide which has not been through formal approval. This includes Neem, Soft Soap, Coffee Grounds, Rhubarb Leaves, Quassia, etc.

> I knew of the others, but coffee grounds ?

To deter slugs. It was all over the UK press a couple of years ago if you Google for it. The RHS advised that their use was illegal as follows

"All pesticides must be approved, and it is illegal to use unapproved materials even if these are household materials such as washing up liquid, coffee, vinegar or baking powder."

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> Great! But is it illegal to put coffee ground in your garden as organic matter? - it makes an excellent compost! And then if it deters slug, this is a side effect...

As a mulch it is indeed legal. But if you _intend_ it to deter slugs, it is not! Just goes to show how ridiculous the whole thing is.

Unfortunately this is the sort of nonsense which gives the EU a very bad name, and is very frustrating for those of us who are fundamentally supportive.

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> My understanding is rather that they didn't go through the the approval/registering process (which costs a LOT of money) which would permit them to market it as an insecticide. It's use in not forbidden - it is the marketing as an insecticide that is forbidden.

Not so. In the EU / UK it is forbidden to USE any pesticide which has not been through formal approval. This includes Neem, Soft Soap, Coffee

Grounds, Rhubarb Leaves, Quassia, etc. These simple remedies have not been approved because it would be far too costly for the manufacturers to get the data and submit the dossier. Also it would be very difficult to standardise their potency. It's crazy and bad law, because it's unenforceable, and lots of people do use these things 'illegally', but that's the daft world we live in.

It's the equivalent of no longer being permitted to sanitise wine and cider barrels with sulphite. Whatever happening to that one in the end,

I wonder?

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> Thanks, Andrew. I use the active-oxygen based and the Vigo Chlorine-based ones now. The only benefit these others appear to have is cost...

One of the potential drawbacks to the Quats is that due to their chemical structures they are very 'sticky' at the molecular level in terms of adhering to surfaces. Now that's brilliant if you are working in a butcher's shop where you need long acting anti-microbials on all contact surfaces. Not so good for the inside of a fermentor where they might stay around to inhibit the 'good' fermentation yeast and bacteria, despite rinsing. I would be very wary of using them on plastic polymers such as HDPE or LDPE for instance where their adhesion would be much more tenacious than on metal surfaces. Also they don't tackle 'biofilms' which tend to build up over time. And as I said they don't tackle all microbes by any means.

Now all these may be rather theoretical considerations, I don't know.

There doesn't seem to be much good data out there for wineries and ciderhouses. But there is lots of positive experience with the active oxygen and active chlorine types which work on a totally different principle, and which have been standard in the fruit beverage industry for many years, and a good deal less experience of the Quats.

I suppose if it were me I would restrict them to general ciderhouse cleaning / sanitation and wiping down of work surfaces, but I wouldn't use them for the inside of fermentors or tanks or pipework or anything like that.

Wish I could find some hard evidence. Perhaps somebody will chip in and say they've been using them for years with no problems.

~~~

> As I'm getting low I have just read through them and wondered if any one had any thoughts about the suitability / experience of the following two that seem useful: C020 Selgiene Food Grade Cleaner Steriliser http://tinyurl.com/kbsrktj TRIO 100 Hard Surface Sanitiser/Cleaner http://tinyurl.com/nts98vq

These are fundamentally quaternary ammonium formulations for sanitising surfaces (killing pathogens) in general food preparation use. In wineries they are typically used on surfaces which are not rinsed off eg walls and the outsides of tanks. They are long acting but also slow to work and not broad spectrum. Their application in wineries is the subject of this briefing http://wineserver.ucdavis.edu/industry/enology/methods_and_techniques/reagents/ammonium.html and also here http://locale.mannlib.cornell.edu/gsdl/collect/wiwp/index/assoc/HASH01f8.dir/200418.doc

I would take note of their potential tainting properties if not well rinsed. Though the same could be said of active chlorine I suppose.

Personally I still think active chlorine or active oxygen is the way to go for cider tank and equipment sanitising. Just my prejudice I suppose.

~~~

> That's a big SG drop in a short period isn't it, and does it mean I started with lower sugar so bottling could happen earlier then usual?

No, it means you had fruit with a high nutrient status and at a highish temperature so it fermented faster. It's too soon to bottle. Leave it for a month or two under airlock or tightly sealed to mature in bulk.

Then bottle.

> The cider from the primary tasted good... not very appley, but still tasty.

Why did you expect it would be appley? Is beer malty? Or wine grapey?

~~~

> I am a beginner to cider making. In bottling 18 litres I am considering adding a litre of store-bought pasteurized cider to my own home pressed cider on bottling. Does that sound like a reasonable proportion without measuring the sg?

You can calculate it like this. Commercial apple juice has an SG around

1.045. If you dilute this 18 times with cider that gives SG around

1.003. Once that sugar has re-fermented you should have a gentle effervescence. (Just make sure from the label that the juice you buy is only pasteurised and has not had any preservatives added).

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> He is only fermenting S.V. as he wants to blend once fermented, and he does blend not too long after fermentation has stopped and the green flavour has subsided.

Further thought ..... if he is blending after fermentation, and his SG is down to 1.000 or below, it's maybe not worth worrying about hazes just now. Blending is an inherently destabilising operation wrt haze so that even clear ciders when blended can throw a new haze. I'd suggest maybe he does his blending first, then worries about the haze. And although fining is a useful tool to keep in reserve if things stay intractable, I'd keep that to use just on the final blend not on individual components.

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> Really I was citing his case as an example to illustrate my conclusion: correct pH does seem to aid the ability of ciders to clear naturally, in my opinion.

I'm not sure about that. The wine and beer literature doesn't generally support the idea. Yeast flocculation is pretty much independent of pH over a normal beverage range. For instance see Figure 3 in this paper http://femsle.oxfordjournals.org/content/136/1/13 (click on the PDF symbol for a free download) All the yeast strains studied flocculated fully at pH values between 3 and 5.

But there is much more to clarification than just yeast flocculation, as

Dick has pointed out. Bacterial growth is one possibility. Pectin is another (which you have discounted; though this far on, the alcohol test may not be too reliable if there's only a small amount of pectin present). For HMJ at high pH, I'd also think that phenolics or 'tannin' could be a major player. Does your friend use SO2 at any point, especially if the cider's been racked 3 times? Oxidation can play into this. And pH can affect the formation of tannin / protein hazes so that a pH around 4 can produce more haze than at a lower pH. See the abstract here http://pubs.acs.org/doi/pdf/10.1021/jf950716r

My guess is that your issue is around 'tannin', but it's almost impossible to call this without detailed and costly chemical analysis.

My advice is to wait another month or two. If there's still no clarification by then, fining could be the order of the day. I'd recommend the two-part kieselsol / chitosan or kiesesol / gelatin finings.
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> I'll have another snifter this evening to make sure, but I'm fairly confident its vinegar not just excess sharpness.

To be defined as vinegar it must be at a minimum 5% acetic acid, and all the alcohol must have been converted. To achieve this you will have need to have had an obvious vinegar mother working on top of the cider, full access to air, and a temperature of around 20C for several weeks or months. Did you fulfil these criteria?

If not, but it still smells 'vinegary' (which is predominantly the aroma of ethyl acetate, not acetic acid) it is more likely a cider which has become slightly acetified (high volatile acidity) due to bacterial action in the presence of air, faulty air lock, lack of SO2 etc. The amount of acetic acid required for we call 'high volatile acidity' is around 0.2%. Please contrast that with the 5% required for real vinegar.

It is also possible (though less likely) for some lactic acid bacteria to produce high volatile acidity even in the absence of air but conditions need to be quite warm for this.

Another possibility is that with the predominance of dessert and culinary fruit in your blend it is simply 'acidic' i.e. a natural high concentration of malic acid from the apples. If you are not used to this it can be quite stark the first time you meet it. You could be up at 0.8

- 1.0 % malic acid, and in the absence of sugar this comes over as very tart indeed.

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> There's certainly no evidence of a mother of vinegar floating on top. I might well top it up with some CO2 and dose it with some malolactic bugs. Are the ones available for wine from homebrew shops applicable or should I look for specialist cider cultures?

What are you trying to achieve here? First of all you need to have a proper diagnosis of the problem. Specifically, is it a problem of volatile acid or fixed acid, or maybe of both? Did you read what Claude wrote?

If it has high VA, there is little you can do now. No amount of adding

CO2 will help you cure that. The best advice probably is to referment the cider, maybe with fresh juice next year, or maybe with added sugar and a wine yeast now.

If it has high fixed acid, then a ML culture may help you. But before that, do as Claude suggests and measure the titratable acid so you have some data to help you now and as ML proceeds. If you then decide you want a ML culture to lower the acid, then buy one suitable for wines.

There are none on the market which are specific for cider. Bear in mind the temperature must be at least 17C and it will take several months to work.

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> Balancing acidity at the time of pressing and also making a decision with regard to SO2 can really help you get where you want to be next time.

Couldn't agree more. Forward planning on pH control / acid balance and judicious use of SO2 are the most important things that any cidermaker needs to learn. It's not enough just to bung a load of apples together and hope for the best!
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> Thanks, can you recommend a titration kit?

Go to a homebrew shop. They are easy to find. This is typical http://www.homebrewcentre.co.uk/product.asp?pID=475&cID=127

You are in the UK I think, Claude is in Canada.

~~~

> He advised us to Clear the juice (with bentonite) wright after the pressing, before fermentation ? Now this is nowhere mentiond in any of the cider making books I bought. They always talk about fining at the end ?

It is I think pretty standard practice to add bentonite to white grape juice, but not to apple juice, before fermentation. The purpose of the bentonite is to remove soluble protein which will precipitate as the alcohol level rises and can form hazes which are difficult to clear later. This can be a problem with grapes but not with apples, since apples contain only about one-tenth the soluble protein of grapes. Hence bentonite before cider fermentation is not generally needed.

The only people I know who might add bentonite to apple juice before cider making are people using re-diluted clarified apple juice concentrate. In this case the bentonite is added to provide solid surfaces on which the yeast cells can rest and liberate their alcohol and CO2. Otherwise there is a danger of yeast 'auto-toxicity' and sticking fermentations. But this has nothing to do with protein removal.

~~~

> I wonder how long before we have competition from a company making "cider" with these "apples" _http://timesofindia.indiatimes.com/India/Cashew-juice-apple-of-Pepsis-eye/articleshow/39980110.cms_

It's already being done. See for example http://nopr.niscair.res.in/bitstream/123456789/5996/1/NPR%208(4)%20374-379.pdf

and http://www.sciencedirect.com/science/article/pii/S0023643805000320

I've seen several such papers from Asia, Africa and South America.

Though I'm not clear if it's yet being sold anywhere on a commercial basis.

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> also reluctant to clear, but after a few fining tests, I was successful with the combination of 0.6 g/L of gelatin, followed next day by 3 ml/L of Bevasil.

Bevasil is a colloidal silica sol (another trade name is Baykisol).

These are also known generically as 'kieselsols' in deference to their original German origins. Fining is largely about 'charge neutralisation'. The concept of such 2 part 'combination fining' is that gelatin is positively charged and kielsol is negatively charged. When dispersed in a beverage they act to form a flocculant gel by charge neutralisation, entraining other charged (and non-charged) haze-forming entities with them. That's how it works.

Gelatin / kieselsol is a good combination. As (arguably better) is chitosan / kieselsol. Michael is in the UK so he can easily buy the 2 part finings by mail order. http://www.homebrewcentre.co.uk/product.asp?pID=1654&cID=112 is chitosan

/ kieselsol and http://www.homebrewcentre.co.uk/product.asp?pID=263&cID=112 is gelatin / kieselsol.

I recently used chitosan / kieselsol on some intractable cider vinegar which had not cleared after standing for years. It took a few weeks to work but it's clear as a bell now.

Tests are important - don't commit to treating a complete batch without small scale trials. And follow the instructions. As Claude says, you need to add the two parts separately with a time interval between them.

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> Another Q: if I have some 'spare' fermenting cider when racking into bulk container that I would want to use to minimise air gap in future rackings, what's the best method of storing - unadulterated in fridge, plus SO2 in fridge, pasteurising, etc?

That's a good idea. But it doesn't need any special treatment. Ferment it on its own in a smaller container under airlock and use it to top up when you need it.

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> I'm a real ale bitter drinker and occasionally have bottled ciders (Thatchers, Aspalls, Sheppeys) that are enjoyable in that they don't appear _too_ sharp.

That's because they are sweetened with sugar and pasteurised or sterile filtered to prevent refermentation. The sugar offsets the acid taste.

> I have 2 options that I'd like advice on if possible: (1) I could let it continue until a natural end. (2) Stop it now. If I go for (1) Any suggestions as to what the FG is likely to be?

Depends on your fruit but could be 0.996 or so.

> If I go for (2) is it still likely to be sharp tasting (as in 1) or should I have stopped it earlier to have a slightly sweeter cider?

It won't taste so sharp but how do you propose to stop it?

Pasteurisation is the only reliable way.

> I could, I suppose, put in additives to adjust taste when 'mature' and ready to drink but would appreciate some early advice; esp as I'll be pressing in another week or so for another 30l.

The normal additive used by amateurs in this case is a non-fermentable non-sugar sweetener. Saccharin has been used since the 1890's but has a nasty long aftertaste. Sucralose (Splenda) has a better taste profile.

Best of all (but more work) is sugar + pasteurisation. See http://www.cider.org.uk/part4.htm#sweet

BTW it is better to avoid the word 'brew' when talking of cidermaking.

Brewing is the making of beer ;-)

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> this year I will be buying in my apples (bittersweets) from a reputable supplier. I was hoping to ferment using the wild yeast in the apples, all my equipment will be brand new and I will be fermenting/storing in 1000ltr ibs. Is it advisable to go down the route of wild yeast for a first use of equipment? Could anyone recommend a tried and tested amount of Camden tablets to use each 1000ltr drum if going down wild yeast route?

Three tips:

1. Don't ferment bittersweets on their own, the pH is too high and your cider will be too prone to infection. Blend apples for pH /acid balance before fermenting.

2. To hit the 'correct' level of SO2 (full or half dose), you need to measure your pH and then check the tables here http://www.cider.org.uk/sulphite.html

3. Using Campden tablets on 1000 litre batches will be tedious to say the least. Make up a stock solution of SO2 from metabisulphite and use that.

The choice of wild or cultured yeast for a first time fermentation is entirely up to you. But it may take 2 or 3 weeks to get a sulphited wild yeast fermentation going, depending on the native yeast load. Your equipment will have next to no Saccharomyces on it in its first season, so you will be entirely dependent on the yeasts associated with the apples and whatever drops in. If you can't live with that level of worry, and won't be able to sleep at night, use a cultured yeast which should take off reassuringly in 2 or 3 days. I generally recommend that route for a beginner.

~~~

> Andrew, I am wondering if you would provide more perspective than you've done so in the past few years about the practical differences between your lightly-sulfited wild fermentations and a non-sulfited wild fermentation.

Oh dear. That's a bit difficult. You see I have never ever in my life done a fermentation without using sulphite. Even my Foxwhelp juice at pH PS - Also welcome suggested carbonation values for cider. I was going to shoot for approx 1.5-2.0 vols of CO2.

That's a good place to be IMHO. Just a tiny bit 'spritzig', nothing more. 2 vols CO2 at 15C gives about 1 bar pressure (15 psi). When I take my cider for professional carbonation at Pershore College, that's what I get.

~~~

> I have just done a batch of 600 bottles of bottle conditioned cider 5 days ago. Today I transferred them all to a warmer room to promote in-bottle fermentation it was while I was doing this that I noticed the liquid inside had an oily look about it when I tipped them up,

Not sure how you can really tell it's oily from outside a bottle ;-)

But one major cause of 'oiliness' is growth of unwanted lactic acid bacteria. These can produce polysaccharide gels just like yoghurt does, but a good deal thinner in cider. When the cider is poured, it trickles out like light oil. Here is a picture of oily cider scanned from Pollard and Beech's Cidermaking book of 1957. However, 5 days is rather short for that sort of growth.

Have you used SO2 at any point in your process? This will tend to minimise unwanted LAB activity. And what is your pH? High pH ciders are more susceptible.

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> I'm experimenting with different methods of back sweetening this season. Has anyone here tried stevia? If you, what can you tell me about it? My assumption is that it is non-fermentable. I'm just looking to balance the acidity of my culinary fruit since my bittersweets/bittersharps are still too young to produce.

Yes it is non-fermentable. This is what I wrote here when this came up acouple of years back:

"I have worked with Stevia in drinks though not in cider. IMHO itoverpromises and underperforms, really because like many high intensitysweeteners (whether synthetic or natural) it has a long lingeringprofile and an accompanying bitterness rather like saccharin. It isn't

'clean'. The best of the extracts are those high in Rebaudioside A,which are less bitter but still clinging in their sweetness. These arethe most likely to come to market once approved. The hype about Steviais really because it's 'natural', not because it's any good. I don'tthink there's any technical reason why it wouldn't work in cider, butfrankly if you are going for a high-intensity sweetener you're betteroff with sucralose, in my view."

I suggest you just have to try it to see if it works for you ;-)

~~~

> The cider taste clean and fresh if not exactly bursting with flavour. I'll leave till june to mature (develop flavour hopefully) then I'll probably sweeten half of it using apple juice or a sugar solution. I then pasteurize and bag in a box it. Does that sound like a good plan ?

Pretty good I'd say. Just make sure to keep the air out. You could add

50 ppm SO2 as an antioxidant and antimicrobial, though if you are hoping for a wild malo-lactic ferment then you wouldn't do that.

(You have to pasteurise it after it's in the bag, by the way, not before you bag it. Otherwise you break the chain of sterility).

~~~

> I'm happy with a slight fizz, The brown plastic barrels have a tiny vent (as far as I can see) but do you mean that I should loosen the top off from time to time to let the air escape ?

Well it won't be air, it'll be CO2. I don't know the detailed construction of your 'barrels' or what they are intended for. But some that I've seen have no vent. The point about venting is to stop them exploding of course. Even exploding plastic can make an awful mess. You will have to check and see. If they are intended to be self-venting to relieve excess pressure, that will be OK. For instance the brown cider

'barrels' on this page are self venting http://www.smithsofthedean.co.uk/buckets-and-small-containers/buckets-and-small-containers.html

~~~

> Checked my cider today and SG is down to 1010 and 1020. Can I get away with transfering it into barrels (typical brown plastic 5 gallons)

If you want a dry cider it's too early to rack it now. It will just throw down more yeast in your 'barrel' and you will need to constantly vent it. Wait till it's below 1.005.

If you hope to retain some natural sweetness for a while and drink it in that semi-finished state from the barrel, then perhaps yes. It will still need venting.

> I over Sulphated it

Sulphite I hope. Sulphate does nothing.

> Or should I give it another stir and see what happens ?

Depends on your goals. If you want a dry cider, stir it and add some thiamin and nutrient. If you want a sweet cider, rack it and then manage it with care.

> wot u reckon ? (I kinda lost patience with it !)

No cider will reward you if you don't respect it ;-)

~~~

> Would fully immersing a bottle of cider in a bath pasteurizer accomplish the purpose of killing microbes in the neck and cap instead of turning the bottle on its side to cool?

Yes, that is often done and is how it would work say in a tunnel pasteuriser. But sometimes on a domestic scale people prefer not to cap before pasteurisation to minimise possible breakage issues. Also it is easier to take the bottles out of the bath if they are not fully immersed (and if you are not using a liftable bottle cage). In that case the 'lying on its side while cooling' technique is used.

The fundamental principle is that all parts of the bottle and cap must get sufficiently hot to do the job of killing the yeasts and bacteria inside.

~~~

> I had about 200ml cider left over after racking my demijohns, I left it in one of them uncovered for about 1.5 months. I smelled it today and it smelled like vinegar (so far so good) I tasted it, it tastes like vinegar.

Yes but until you have measured the titratable acidity you have no real idea. Cider can smell 'vinegary' but be nowhere near true vinegar

(minimum 5% acetic acid). Lots of threads here on this in the archives.

> 1. Although everything seems to have worked out fine result wise, there was no substantial "mother" or in fact, much of anything at all. (there was some *very *minor film on the top) Is this normal?

No. If you are to get substantial acetic acid from a static process, you almost certainly need a 'mother'.

> 2. In order to extend this do I just add more of my completed cider and wait again? (I have limited volume of cider this year)

If you have a 'mother', yes. Minimum temperature of 20C. 30C is better.

> 3. Can I add apple juice to this to extend it? (I read that it's possible but it seemed weird to me).

No. The juice has to be fully converted to cider first. Acetobacter won't generally work on sugars.

~~~

> Unless I see some gel rising and the cap begin to compact in the next day or so, I was planning to knock the ferment back with S02 to give the juice more time to keeve. A good idea?

Interesting idea. Never tried it myself.

> If so, how best to incorporate the So2 without making a mess of the existing cap and thick layer of sediment- or is that to some extent unavoidable? (I was thinking of carefully poking in a lees-stirring device (attached to a variable speed drill) and VERY slowly mixing the so2 solution once added (tho this might still make a mess). I hope I'm not again acting prematurely, but it sure looks like i've got a ferment coming before the cap and gel have had a chance to do their thing.

Strikes me you may break up the cap that way. Can you gently inject the

SO2 solution into the juice via a thin hose creeping down past the side of the cap? I think any mechanical stirring might be a step too far. It seems to me the SO2 should go just under the cap because that maybe is where most yeast activity is?

~~~

> Our wine supplier sells "Stabilized Iodine/Iodate 0.0156N. Also known as Vinodine." Can't find any reference online to 'Vinodine' so have taken their word that its the same as iodine.

It should be referred to as "iodide / iodate". The chemistry is rathercomplex but essentially it is a stable form of iodine which liberates it

'in situ' in the presence of acid. However, if you use it the quantitiesand calculations are different from using regular iodine solution (seebelow).

> Using 25% sulfuric acid, not the 10% I was shown how to use, so tried adjusting it @ 40% (ie. 2ml rather than 5ml). Likewise, the vinodine is 0.0156N and not the 0.01N, so tried adjusting it using a chemistry calculator online.

You are getting in an awful muddle here. I suggest you follow the stepsbelow...

50 ml of cider

Add 5 ml of 25% sulphuric acid (anything weaker will not do)

5 - 10 drops of starch solution indicator (freshly made from 2.5 gsoluble starch in 100 ml boiling water and allowed to cool)

Rapidly titrate with the standard 0.0156N 'Vinodine' solution to a blueendpoint that remains stable for 20 seconds.

Multiply the titre value by 10 to get the Free SO2 in ppm.

To get the Total SO2, pre-treat the 50 ml cider sample with 25 ml of 1Nsodium hydroxide and leave to stand for 10 minutes to dissociate thebound forms. Then add 10 ml (not 5) of the 25% sulphuric acid, thestarch indicator, and immediately titrate as before (so the bound formsdon't have time to recombine).

Multiply the titre value by 10 to get Total SO2 in ppm.

I suspect you were not adding enough acid in what you were doingoriginally. Also bear in mind that after fermentation the amount offree SO2 will be very low. The detection limit of the method is regardedas around 10 ppm i.e. 1 ml of titre, so you can't really measure muchlower than that.

Hope this helps.

~~~

> In particular Bath and West seems to have two main strands of classes for cider, the open and farmhouse classes? I can't find a definition of these anywhere? Just not looking in the rights place I'm sure. What is the difference between a cider in the respective open and farmhouse class.

The definitions are here http://www.bathandwest.com/files.php?id=553

That is all that there is. I think that if you are outside the UK then a still "farmhouse cider" category presented in gallon jars is irrelevant.

It derives from our long rural cider history and doesn't apply elsewhere in the world.

> In NZ most ciders are made from cull apples and are made from diluted apple wines. There are a few of us making pure juice ciders from tree ripened fruit and personally I have escewed competitions because I can't see how you can judge a 35% industrial juice cider against a pure juice "craft" cider? How are these issues dealt with in the UK context.

In practice these issues don't arise. The large cider companies don't generally enter their low juice branded products into agricultural show competitions like Bath and West, because they are unlikely to get placed

(remember that in the British system only 3 prizes are normally awarded per class no matter how many entries there are). If they do, they make high juice ciders specially for competition.

Having judged ciders in the UK, Australia and the US, I would advise new cider competitions elsewhere not to follow the UK example. I suggest you'd be better off looking at what happens at GLINTCAP or the new

Australian cider guidelines. For instance see http://www.bjcp.org/docs/2015_Guidelines_Cider.pdf I think these will serve your purpose better than the way that we in the UK do things.

~~~

Have you made the same blend with predominantly Sweet Alford before?

Sweet Alford has a high pH and so its polyphenol oxidase (PPO) will be very active. Did you notice the juice being especially brown when you milled and pressed it? Were they milled and pressed together or separately? The crab apples might be very tannic and so the combination of the active PPO and the tannin might be the cause. But this would all happen at milling and pressing not during fermentation.

When you say crabs do you mean wildings (of M domestica) or species crabs (not M domestica)?

Otherwise I would be tempted to think possible metal contamination but surely you would be on top of this!!

Andrew

> This year one batch of my cider has developed a very rich dark gold colour. It is a blend of mostly sweet alford with some crab apples for tannin and flavour. None of the apples had much colour in the skin or flesh,

the apples were milled then pressed straight after picking, fermentation about 2 weeks, abv about 8%, cultured yeast and mlf culture. I haven't done anything different to normal but the colour is quite unusual, quite attractive really. I surmise it must be one of the crab apple seedlings I used causing a reaction involving tannins, or maybe just some oxidation effect, but I really have no idea how it happened. I will try those crabapple cultivars again next year to see if one of them caused the colour change. Any idea how this might happen? Greg -- -- Visit our website: http://www.ciderworkshop.com You received this message because you are subscribed to the "Cider Workshop" Google Group. By joining and posting to the Cider Workshop, you have agreed to abide by our rules, and principles. Please see http://www.ciderworkshop.com/resources_principles.html To post to this group, send email to cider-w...@googlegroups.com To unsubscribe from this group, send email to cider-w...@googlegroups.com For more options, visit http://groups.google.com/group/cider-workshop?hl=en -- You received this message because you are subscribed to the Google Groups "Cider Workshop" group. To unsubscribe from this group and stop receiving emails from it, send an email to cider-w...@googlegroups.com . For more options, visit https://groups.google.com/d/optout.

%2%

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> John I use a lot of crabs which I grew from seed, mainly John Downie seedlings (malus domestica with unknown pollen parent).

%1%

Greg, in that case I'm inclined to go with your original hypothesis. The seedlings will be variable, and maybe you've grown one with a slightly different phenolic pattern from all the rest. I don't want to get into too much technical detail but Malus species other than domestica can and do have a distinct phenolic composition which is unlike domestica. In the presence of Sweet Alford and its active PPO, maybe you are seeing a biochemical interaction which doesn't normally take place, with substrates which aren't normally there. The complexity of colour formation in apple pulp through oxidation is somewhat overwhelming in biochemical terms and although it's easy to describe in outline the devil is very much in the detail!

~~~

> However, batch 1 is *still* plodding on with a very slow ferment.

What is its SG now?

Was the fruit from old low nutrient trees? In which case the fermentation may be nutrient poor and you may need to add some if you want to ferment to dryness.

If the cider from such trees is sweet and the SG remains stable over several weeks, you may be able to rack and maintain it as a naturally sweet cider.

~~~

> I did many-a t-budding late last summer and am now wondering when exactly I should cut the stock above the bud. Does one cut when the stock is showing first signs of growth? OR does one wait until the bud shows signs of waking up? Would someone with successful experience at bud-grafting please answer.

I have absolutely no such experience, but on such matters I always defer to RJ Garner's "Grafter's Handbook".

Garner says "stocks containing buds which have remained dormant until the winter are usually cut down to the bud soon after midwinter (January

/ February). If the stock is cut some three to four inches above the bud, this snag will serve as a stake to which the new growth is tied to keep it upright". The snag is removed towards the end of the summer.

Does this help? Sounds to me as if you are overdue and should cut now.

~~~

If you think about it in terms of plant physiology, you surely need to remove the 'apical dominance' of the remaining stock early on before growth resumes to allow the inserted bud to break. Otherwise it will tend to be suppressed by the downward flow of auxins from the stock?

Andrew (who is not a plant physiologist)

>

> I did many-a t-budding late last summer and am now wondering when exactly I should cut the stock above the bud. Does one cut when the stock is showing first signs of growth? OR does one wait until the bud shows signs of waking up? Would someone with successful experience at bud-grafting please answer. I have absolutely no such experience, but on such matters I always defer to RJ Garner's "Grafter's Handbook". Garner says "stocks containing buds which have remained dormant until the winter are usually cut down to the bud soon after midwinter (January / February). If the stock is cut some three to four inches above the bud, this snag will serve as a stake to which the new growth is tied to keep it upright". The snag is removed towards the end of the summer. Does this help? Sounds to me as if you are overdue and should cut now. Andrew

> Never done it myself but have considered using iodophor to conduct a iodine starch test. Hope this is helpful.

I'm not sure if iodophor would work, because the iodine is already complexed. It might.

This is the way it is normally done using 'tincture of iodine'

>

> Andrew - For information purposes only and don't read any further if you really don't wish to know about "turbo yeasts" ...

I may be wrong but it seems to me these are just the very high alcohol yeast strains which are used to make industrial bio-ethanol primarily for fuel. Presumably home-brew companies just buy them in and repackage and rename them for their niche "wanna get legless" market.

~~~

>

Doubtless, but if you think about it the home-brew market is surely tiny compared to the agricultural alcohol and bio-ethanol sectors. That alcohol is indeed made by fermenting a 'wash' and then distilling it.

On a vast scale. I think that's why these yeasts have been developed. I don't believe that mainstream brewers and cidermakers nor home-distillers (where legal!) are the target market.

Our friends at Lallemand have a special business unit which covers this sector http://www.ethanoltech.com/

~~~

> I suppose I can track down a smaller carboy but that will take time, I was looking for a now solution.

Have you thought of the SO2 spraygun solution that Ray recommends? https://groups.google.com/d/msg/cider-workshop/3GYWJZ-4skU/8ldWiL96-g0J

Ray might like to confirm the strength he uses (10% isn't the same as

100 ppm so must be a typo somewhere there)

~~~

> I placed a heater next to the carboy and added some turbo yeast if this doesn't get it going then I think I'm going to add a little more yeast,

If I read you right, the key differences between your batches is that for the good one you used a proper wine yeast D47 and for the one that is stuck you used an ale yeast SO4. This suggests to me that SO4 maybe isn't "fit for purpose" in a cider context. Maybe it has high nutrient requirements in apple juice, so you could think of thiamin or DAP to kick it a bit.

I have no idea what a "turbo yeast" is and probably don't wish to know

(since I am a self confessed cider snob and purist!), but if it were me adding more yeast I would add D47 since it worked for you before. Can you just take some of your 'good' fermentation and add it as a starter culture to the one that is stuck?

~~~

> Andrew - For information purposes only and don't read any further if you really don't wish to know about "turbo yeasts" ...

Thanks Ray. I feared as much. Makes me even prouder to be a Cider Snob and Purist then ;-)

~~~

> Also have heard much talk about adding a centrifuge step (to cold fermenting juice).

Centrifugation of French cider during fermentation, but after keeving, is mentioned here http://onlinelibrary.wiley.com/doi/10.1002/j.2050-0416.2008.tb00313.x/pdf

and also here http://www.pomona.dk/Artikel.pdf

I believe because of its cost it is only actually done by the larger manufacturers, in conjunction with refrigeration, to control fermentation speed.

> Another quick question - maybe a silly one. In Michigan we make pink applesauce by keeping the skins on the apples...has there been any trials or research regarding apple skins in fermenting?? Much like red wine?

I know of two published papers around this topic, although neither are really about fermenting on the skins:

http://www.sciencedirect.com/science/article/pii/S0315546380734004

Yoshida D., Shoji T., Tanabe M., and Kanda T. 2006. Red cider and method for producing the same. Japanese Patent Application JP 2006197845.

Unfortunately the full paper is in Japanese. The abstract reads "PROBLEM

TO BE SOLVED: To provide a red cider which is not a rose type pale pink cider, but a red to deep red type cider and to provide a method for producing the red cider. ;SOLUTION: The method for producing the red cider comprises adding an antioxidant before or after crushing to a crushed material of a red variety apple, adding juice of apple which is a variety other than the red variety apple thereto and adding an antioxidant before or after the addition thereto and then leaving the apple mixture standing and fermenting the apple material mixture. The red cider is obtained by the above method"

Andrew Lea

~~~

> I have trees, some of which were sold as Kingston Black and some of which were sold as Broxwood Foxwhelp. These KBs look the same as other KBs ... but so do the BFs!!! The BFs have much the same size, shape, cavity, basin, background, flush, stripe, lenticels, flesh colour, etc as the KBs. They taste slightly sharper and are slightly crisper but that could be because they are a couple of weeks behind the KBs. Otherwise I see no difference and am concerned I have been duped.

Here are some pictures of my Broxwood Foxwhelp and Kingston Black https://picasaweb.google.com/HarpHill/KingstonBlackAndFoxwhelp?authuser=0&authkey=Gv1sRgCLLMgfWa1bejzQE&feat=directlink

Here in the UK the BFs are early croppers, a good month before the KB.

BF is striped but KB isn't. BF is much more acidic than KB. Also BF has a very distinctive 'deep estery' aroma almost like old-fashioned furniture polish whereas KB is a much lighter and fruitier estery note.

Of course in the NZ climate things may be totally different. I do know that KB grown in Victoria (Australia) and in the Napa Valley (US) are a good bit different from what they are here.

Attached is what Liz Copas has to say, from her book 'Cider Apples'.

~~~

> I'm in Surrey. I started grafting to get a collection of old varieties to keep in the garden then got interested in cider apples so made some of them instead. I hope to get 15 of them on M27's down on the allotment!

I don't quite understand what you are asking. Are you just keeping these cider varieties as collectibles? Or do you plan to make cider from them?

In the latter case, I'd say your list is too heavily biased towards bittersweets with not enough acid to make a good cider (only the

Foxwhelp on your list is acid).

~~~

> So is there a suggestion that I dont have enough acid? I would have thought the foxwhelps with their absurd acid content would do.....

Have you done any calculations based on published acid data? eg from http://cider.org.uk/appledat.htm I reckon you might come in at around

0.5% total from your mix. But you are relying entirely on those

Foxwhelps delivering the goods.....

~~~

> Andrew, I recently had some backsweetened cider not get completely pasteurized. I think it was sufficient to kill saccharomyces but apparently not for some lactobacillus. The indicator was that it went cloudy. The resulting fermentation produced fizz, but I doubt that it was a sacc fermentation due to the impressive amount of souring that occurred. Does that sound correct? Do lacto bugs need more PUs than sacc?

I think the PU requirements are much of a muchness for most yeast and

LAB really. Can't find any data to say otherwise and I never heard of

'differential survival' as being a known problem either in wine or cider pasteurisation (unless there are spore formers involved which confers much greater heat resistance in both cases).

You have to have a really heavy infection to see a bacterial haze as compared to a yeast haze with the same cell count, because bacterial cells are so small. That's why MLF, even with fizz, can take place in an apparently clear wine or cider.

When you say 'souring' do you mean a true and significant TA change or just an adverse flavour change (eg ethyl acetate) as a wild or non-Saccharomyces yeast might give?

I think it's impossible to 'call' your problem with such limited evidence really. The only real way would have been to have some investigative lab microbiology done at the time.

Sorry I don't have an answer myself. Perhaps someone else does.

~~~

> Hi all - just had a phone call from someone who's had a bottle of my cider that's been kept in an office (so 21+degC) for some time and it's started to go cloudy. Any ideas for what might be causing the cloudiness? Cider has been fully fermented to dry @ 6.3%

If it's fully dry it's not likely to be microbiological. If it were pectin it would probably have manifested at an earlier stage. My money's on tannin (polyphenols). Is it the only bottle in the batch which you know to be affected? If you have a retained sample from the same batch you could subject it to a forcing test - e.g. repeated cycling from say

25C down to 4C and back again, holding for a day or two at each condition. If it goes cloudy after a few turns of that, you could infer an incipient polyphenol (chill)-haze. Was it sulphited at bottling? Any chance of a poor cap seal that might have let air in? That could encourage haze formation.

Just my thoughts ....

~~~

> The problem is that the juice has not dropped clear and is a pale opaque yellow. I am wondering if the bottled cider will clear eventually, and if so, with the in bottle conditioning will there be a gross layer of sediment? I guess the safest thing would be to leave it to ferment out and hope that it drops clear in time, then prime at bottling.

No advice but I think your analysis is correct. You choose! Swings and roundabouts really ;-)

~~~

> Odd thing, when I tested the juice this morning it was 3.83, I re-calibrated and checked again, same 3.83

Actually Chris, I'm going to correct what I said earlier. Although it's true that the H+ equilibrium is established very quickly, I'd forgotten that lactic acid specifically forms a dimeric 'lactide' in strong solution. It may be that this takes some time to dissociate once you get it in the juice, hence your observed pH drop overnight. But I think 0.07 units is within the 'repeatability' of the pH meter anyway, isn't it? So it could just be experimental variation.

-

> time available, I shall collect some cookers today and press them next week, storing in a fresh container. After sulphiting I can then add in stages to bring the main batch down to around 3.60 - does this sound okay? I will have pitched my yeast by then but I think it is okay to do it this way?

That sounds a good plan. Your Dabinett is already protected by the lactic acid and you can sulphite that today if you haven't already done so. Then you can treat your possible Grannies in a more relaxed fashion.

Might be worth doing a starch test on them to see if they have more sugar yet to be released since you are now allowing yourself more time.

~~~

> Well, I say Grannie Smiths but only because the owner says that 's what they are, and she is a very accomplished chef and I trust she has it right. As long as they are cookers I expect they should be reasonably acidic.

GS is an Australian seedling which needs far more warmth than we get in the UK to ripen properly. It's only ever grown as a curiosity I think, though some reports say it makes a reasonable cooker but never ripens to eating quality. I would quiz the owner as to its provenance! I should be interested to know its Brix /SG values and its pH or acidity when you press the juice.

> When I added the Lactic acid I stirred it in and waited around 30 minutes before testing, is that long enough? Does it act on contact?

Oh yes. The effect of adding acid is immediate. No chemistry has to take place - just physical dissociation of the molecule to release hydrogen ions. And those kinetics are fast.

~~~

Entry form now downloadable from here

http://www.thethreecountiesciderandperryassociation.co.uk/assets/competition-entry-form2014.pdf

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> Apparently fast freezing produces larger crystals which destroys structure more, therefore maybe a slow freeze may be ok?

No, that's the wrong way round. It's slow freezing which produces large crystals and fast freezing that produces small ones. As Clarence

Birdseye discovered ;-)

If you dig into the literature a little, you find that this whole freezing damage thing in apple wood is enormously complicated. As somebody already said, it's in part varietally dependent. Plant cells contain natural 'antifreezes' the levels of which are under genetic control. Moreover they are 'inducible' which means that they are increased in response to environmental factors. As winter sets in, the tree prepares for the possibility of freezing conditions. As far as I can read, some apple scions can survive deep freezing but it depends on their previous history. Scions cut in autumn or mid winter survive deep freezing better than those taken in late winter; plus the varietal overlay. But if scions taken in early spring at 5C are suddenly deep frozen to -20C, I don't think the survival rate will be very high.

Frankly, given all the unknowns, isn't it just easier to use the fridge which we know works and is safe?

~~~

> some scion wood. I am aware that the top working would be timely if carried out soon, but is it too late to gather the scion wood? I was wondering about putting it in the freezer for a few days to simulate the winter we have not had...

I don't think scion wood has a requirement for chilling per se does it?

We keep it cool and slightly damp just to extend its shelf life.

The freezer would NOT be a good idea - ice crystals will kill the cells!

Just in poly bags in the bottom of the fridge should be fine. Maybe each bundle wrapped in dampened paper tissue to stop them drying out. But don't let them swim ;-)

~~~

> I wonder how do people protect their systems. I know the Voran has a height limit and a red line at 380 bar but are there any safety cut outs or is everything done manually?

The Voran does have a red line on the pressure gauge at 380 bar (which is the internal hydraulic pressure by the way, not the pressure at the cheese) but it has an internal relief valve in the hydraulic line which opens automatically before you get there. So you cannot exceed that pressure.

The height limit is a different issue. This is to stop you pushing the ram too far up and out of its seal. There is no automatic stop on this.
~~~

Someone posted here a few weeks ago (but with no follow up) where he had done this. First of all you get a big oil leak and then eventually I guess the piston falls out. That has to be controlled manually. I use dummy blocks of wood or faced MDF to pack the empty space in the cheese if I'm getting close.

~~~

> I bought a two head Vigo carbonator, the set up I have is set to 50 psi o just under 4 bar for the cider which is at 16 degrees, this seems to carbonate at a good saturation.

Do you mean this one? http://www.vigoltd.com/Catalogue/Carbonation/In-bottle-carbonators/In-bottle-carbonators

4 bar at 15C means 5 vols of carbonation. I don't think the simple

Vigo carbonator can deliver anything like that much into the finished product. It only gives 'petillant' which is more like 2 vol. Also, carbonation at 16C is very inefficient. You should really be down below

4C to get greater gas solubility.

> My dilemma is with pasteurisation, I'm not sure whether to do it before or after. My two options are:- 1. Pasteurise with the caps off in a bath of 66 degrees hold for a minute, allow to cool to room temp. with a potassium meta soaked cloth draped over the bottle tops to keep them sterile then use a solution of potassium meta in a bottle to sterilise the carbonator prior to use, followed by carbonation and capping with caps immersed in a solution of potassium meta. before capping. In my mind this process is totally sterile but I could be overlooking something, Or 2. Bottle, carbonate, cap and then pasteurise risking caps coming off and bottle bombs or doing a lower carbonation.

Holding a bottle at 66C for one minute? Am I misunderstanding you? The entire bottle contents have to reach 66C. That will likely take about 20 minutes in a bath at the set temperature because you have to warm the bottles and the contents to get sufficient PUs.

Re 'sterility' I'm afraid your understanding of beverage microbiology is a bit off beam. Major spoilage yeasts in cider like Z. baillii and S. ludwigii are totally sulphite resistant and they will be all around your workplace. Draping a sulphited cloth over the bottles will not help at all, and you will soon build up a sulphite-resistant inoculum in your carbonator. You may be lucky the first few times with what you propose but it isn't 'sterile' and sooner or later you will have bursting bottles and a real mess to clean up, let alone flying glass shards etc..

You really must pasteurise after carbonating and capping, not before.

For the amateur or small scale producer that is the only reliable way.

Many people here pasteurise closed bottles after carbonation and do it quite successfully. It is standard practice and it works.

BTW unless you are sweetening the cider with sugar or juice or at a residual SG

> 1.000 you don't need to pasteurise anyway.

~~~

> and yes, I'm not really understanding which type of bacteria can cause problems

It's yeasts which are likely to cause the biggest problems in sweetened cider in terms of exploding bottles and customer safety, not bacteria.

Bacteria are more likely to cause flavour changes.

~~~

> That's good to hear Andrew. I've made my first ever cider this year and just bottled it. There's only a small amount and I hadn't pasteurised it, and I was beginning to get worried that I should have. Do you know if there's a time scale within which you should drink it, before any malolactic fermentation might happen?

There is nothing inherently bad about wild MLF. It typically happens in early summer as the cider gets warmer. But it may or may not. If your cider pH is

> 3.5 it is more likely. If you add 50 ppm SO_2 at bottling it probably won't happen at all.

See http://cider.org.uk/part3.htm Maturation and Bottling.

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> "Can you tell me if you are lying the bottles on there sides after pasteurising? It is easy for just a few bottles done in the kitchen , but would be a lot of work when doing hundreds of bottles in a day." I manage it at a fair throughput. Put the bottles in milk crates and rest the bottles on a piece of timber so the crate does not quite go horizontal.

Indeed. The objective is to ensure that the inside of the neck and cap are efficiently sterilised. Another way with a large pasteuriser is to completely immerse the capped bottles in the water bath, standing up or lying down (easier with a basket system, of course). When I was at Long

Ashton for instance we laid them horizontally in the pasteuriser AFAIR.

Many ways to do it.

~~~

> I confess if I'd taken the trouble to price out a CO_2 tester, I might have stopped fretting. I guess there's an issue about accuracy on the low cost models, but this can be easily resolved with some bench marking against lab tests.

I really don't get this bit about 'lab tests' and 'bench marking'. You don't need a chemical measure of CO_2. You just need to know the pressure and temperature in the closed system as Claude explained. Then you can calculate your CO_2 level from the tables. He also importantly explained just how you need to 'snift' the air away before you make the pressure measurement too. That's been the standard technique for years, and is probably why you didn't get an answer to your question originally.

Your question about the _kinetics_ of dissolution isn't capable of answer by calculation or on a mailing list. It's empirical. The finer the bubbles, the greater the contact area at a microscopic level, the colder the liquid, the composition of the liquid, all will have a role to play in the time it takes equilibrium to be reached. In professional carbonators, this aspect is taken very seriously; for instance the chilled liquid is often sprayed as a fine aerosol into a large volume of
~~~

CO2 gas under pressure. Under those conditions saturation is reached in seconds. If you just sit CO2 in contact with the surface of a liquid with no agitation and only a slight overpressure, saturation to equilibrium conditions will likely take many days, even weeks.

But at any rate, you can monitor it doing just as Claude suggests.

~~~

John,

I've been re-reading your original post and I'm no longer clear exactly what you're trying to do.

I'd assumed, with everyone else, that you were carbonating a cider in keg or bottles so it would have bubbles. But now i look again at your original post I'm no longer so sure. It seems that maybe you're just trying to saturate a large bulk of cider (you now talk of 1 or 2 thousand litres) with CO2 at room temperature and pressure? So that there are no bubbles and there is no overpressure?

Can you explain in a bit more detail what your objective is please?

~~~

> Hi Andrew, I have been told by someone at Vigo that you recommend Maurivin AWRI for perry making. I'm about to make a batch of around 5000 litres of Blakeney Reds in IBCs for the first time, which number AWRI do you recommend?

First of all, you are posting to the whole Cider Workshop not just me!

Other people may have a view on this.

Second, you have been slightly misinformed. All I have ever said is that back at Long Ashton in the 1970's, AWY 350 was used for our 'commercial' cider and perry and for much of our experimental work too. The reason is because it is a very low H2S producer, does not need added nutrients, and flocculates well. It can also confer a pleasant floral bouquet. The downside is that it needs a temperature

> 12C or it tends to stop working.

Yes it is a nice yeast and I have recently started to use it again myself for some of my own ciders. But I'm not _recommending_ it for perry one way or the other. And there is a lot more to making good perry than yeast selection. Some of our best perry makers use wild yeasts for instance. I also believe that SO2 management is important (but then I would think that). Acetification is an ever-present threat to perries

(more so than to ciders for various technical reasons).

~~~

All,

Google Groups has taken it into its tiny little head to regard a number of recent postings as spam when they're plainly not, but even worse not to notify any of the admin team. So I'm afraid some messages have been stuck for hours, even days, before they get noticed and released.

We'll try to keep on top of it as best we can.

~~~

> I have a big bag of dry yeast stored in the freezer. Should it be kept at room temperature instead?

My understanding is that dried yeast should be stored in the fridge at

4C but not in the freezer. The yeast pack should be tightly sealed to keep air out too. Freezing can damage cells. But check with the yeast supplier's data sheet. Modern yeast technology is a world away from what it was 20 years ago.

~~~

> At 150ppm and a pH of 3.7 you have about 1.86 mg/l of Molecular SO2.

Actually 150 ppm at pH 3.7 only gives 1 ppm molecular when you take the binding into account, using a Long Ashton style model. See http://cider.org.uk/sulphite_binding.xls But the binding data have only ever been established for UK ground harvested stored cider fruit not for

North American dessert fruit. How I _wish_ somebody would get that data!

I agree that Mike's problem might be improper rehydration, especially if his yeast was frozen. But he's only been waiting 2 days. That's a tad impatient. A few more days might show something ;-)

~~~

I note that the Orchards and Cider Daily Event programme is now shown here http://www.bathandwest.com/orchards-cider/270/

~~~

> but wondered if it would be commercially feasible to produce from the acidic Foxwelp apple,

> any ideas Andrew on the keeping qualities of Verjus and would it have to be pasteurised?

Well if it was juice from ripe apples it would have to be pasteurised to keep any length of time. Or it will just ferment and become cider. My pure Foxwhelp juice at pH Time for a bit of peroxide maybe to get rid of the excess so2.

I wouldn't go quite that far. By my back of envelope calculation he's only at around 100 ppm SO2.

However, I would query the use of an Ale Yeast. Why?! I'll bet Peter

Mitchell didn't suggest that! They are not sulphite tolerant. Use a regular wine yeast for cider. They are trained for sulphite. In any case cider is a wine, not some form of beer.

~~~

> As time goes on, I am coming to the realization that the kind of cider (ale yeasts, dessert fruit) and the speed we are making it (4 weeks apple to bottle) means we should be adding nutrient.

In that case, probably yes. I think it is very easy in this Forum to think in terms of "one size fits all" or "what I do is what everybody else does". But there are so many approaches to the making of cider, hence if there are problems they may well demand a variety of solutions.
~~~

You may well want to follow wine making practice and look at split nutrient additions. I think Linda Bisson's lectures cover the impact of this on H2S production at least. Also, as others have said, straight DAP is not necessarily the best source of nutrient.

~~~

> Does anyone know what M25 apples look like, their season and characteristics? Alternatively what varieties are commonly used for stem builders that might have produced these apples? Pictures of the dunkertons crop and the stray apples attached.

Where you are, Bulmers Norman is a very frequent stembuilder for cider trees. The fruits you showed _could_ be that. Check it out some more.

Alternatively it could just be a bud sport of the Dunkertons?

I'm sure I've seen some data on rootstock fruits somewhere but I can't locate it right now and I can't find it on Google.

~~~

> Andrew a sport would be interesting but it is so different from the Dunkerton's I think stem builder is most likely - but which variety was used? You suggest it might be Bulmers Norman but it does not look like any of the cider apples in Copas!

I agree and I am no great expert on BN but I think Liz's pic is an uncharacteristically green example. Most of the other pics I have seen of this variety are much yellower.

> I have also looked in Clark (Apples a field guide) and Sanders (Apple book) and the variety list of the supplier (Cider apple trees of North cadbury). From the illustration in Sanders there are two varieties that look candidates, Keswick Codlin and Golden Noble but the former is the wrong season and is not on the stock list. ..... At the moment I am leaning towards Golden Noble.

I saw Keswick Codlin in Scotland last week and I don't believe it's that. I grow Golden Noble myself and it is dropping now. The fruit is very yellow, very smooth and very globular. Not so much like your picture. I can send you a fruit if you contact me off list.

> I shall have to cut one open to see the core structure and taste it at the same time - sometime in the next couple of days when I am preparing apples for pressing as the apples will get added to the mix whatever they are.

Tasting will tell you immediately if it's BN or GN!!

~~~

> I don't have any problem reading mine, but as Dick was saying I think it all depends on the light source - plus of course setting up the focus correctly. That said though, I mainly use mine out in the orchard to do spot checks on apples - which is where it really shines as such a small juice sample is needed.

I use mine in much the same way and have never had a problem reading the scale, so long as the prism is fully covered with liquid and it points towards the light (and it's focussed). Mine is a hand-held refractometer of this type http://www.bs-ltd.com/ltd/elineatc.html although not that exact model.
~~~

David, I wonder what sort of kit you were using? You talk about calibration - but the hand-held types are fixed and cannot be recalibrated AFAIK. Can you point us to a web link?

~~~

>

> David, I wonder what sort of kit you were using? You talk about calibration - but the hand-held types are fixed and cannot be recalibrated AFAIK. Can you point us to a web link? Andrew - Please double-check your refractometer on this. The one that I have is substantially the same as the photo of the one you mentioned at http://www.bs-ltd.com/ltd/elineatc.html , and it -can- be recalibrated.

Fair point. I was obviously wrong. Looking around, it seems that many of them can be recalibrated. Mine can't. It has some sort of automatic temp compensation built in but it is over 25 years since I bought it and the instructions are now lost ;-)

~~~

> Your pictures show a light growth of film yeast Thank you for the solid answer! What would you recommend to me to get it under control? Given that I would like to have MLF by inoculated oenococcus oeni bacteria (Biostart Vitale SK11). I have 30ppm total SO2, and recommend limits are 50-60 mg/l Total, 15mg/l free. Should I try to sulfur 15ppm and afterwards inoculate MLB, or just go for MLF right now when free SO2 is practically 0?

I really don't know. But it's a very light growth of film yeast such as we often see on ciders. I think if it were me I would inoculate the MLB without adding more SO2 (they need all the help they can get) and try to keep the air right out. The MLB should saturate the cider with CO2 anyway which will help. Are you able to meet the temperature requirement for the MLB just now? They do like to be warm!

~~~

> Are you able to meet the temperature requirement for the MLB just now? They do like to be warm! Yes I thinks so. Room temperature is around 16c, could be a bit more. Not too warm, but I hope enough for MLF to start.

According to the datasheet for Biostart Vitale SK11, 16C is the absolute minimum. You maybe need to try to get above that to get those bacteria to multiply in a reasonable time. MLB really do shut down if it's too cold.

~~~

> So can you please help me to identify the problem? Few pictures below to help you.

Your pictures show a light growth of film yeast.

["Film yeast" and "flower" are the same thing]

~~~

> The use of pears in cider is still quite important in France. Most calvados also include some pears.

I think it would have been very natural to do this in the UK West
~~~

Midlands (Three Counties) where perry pear trees and cider trees grow next to each other. Doubtless that's why it became part of our

'permitted practice' in cidermaking (and the reverse in perry making).

Interestingly the juice of high tannin perry pears (Scheidmost) was also used in parts of Central Europe notably Switzerland to provide some tannin to dessert apple ciders and to help clarify them. I have no idea if this is still done.

~~~

> Whether the juice is from apples out of your backgarden, an orchard miles away, out of a can or some other form of concentrate, adding adjuncts means it is no longer "cider". It's an apple-based flavoured wine. I don't consider myself a purist on this, just someone who believes that the term "cider" as a definition, a concept and a drink needs protecting. A line drawn in the sand if you like.

I'm with you Ray. 110%. Cider is all about "the best an apple can be"

(which is the strapline of the Possmann cider company in Frankfurt). End of story.

It does not include recipe based formulations with other fruits and other flavours. They may have their place somewhere but they are not cider. People are welcome to make and drink them but they need to find another name and not to hijack a term which has been associated with apples in English (and French and Spanish) for the best part of a millennium.

"Alcopop" is a good name I think. For let's be clear, that's what they are and that's the market that they're aimed at. So that's what they should be called.

Like you I don't understand why (in the UK) Trading Standards don't act on nomenclature since these products clearly do not conform to the HMRC definition of 'cider'.

~~~

> I agree with Matt. Putting the amount of juice content on the label would stop much of the confusion and at the very least let everyone know what they were getting even if it was called 'cider'.

Yes but let's not confuse the two issues:

1. Making 'chaptalised' cider and declaring juice content.

2. Making 'ciders' with a nominal apple base but using other fruits and flavours in the formulation yet still calling them 'cider' on the bottle and in advertising (even if they pay 'made wine' duty, the punters will not understand that).

The two issues are quite distinct.

Andrew

> I feel firmly put in my place over this post and will never again associate the word Cider with anything not made from anything but "Proper" apple juice.

Don't worry - it isn't personal ;-)

But for some of us in the UK the idea that 'cider' can be made, advertised and sold like alcopops to incorporate fruits and flavours other than apple is like a red rag to a bull. That change has happened here very quickly and pretty unexpectedly over about the last 5 years, and is a triumph of deliberate construction by some clever people who spotted a gap in the market and led the way through. Then everyone else piled in and followed. Obviously it is in many commercial interests that the distinction between those products and true ciders (even diluted ones) becomes as blurred as possible. You only have to look at the trade press and the advertising to see that. Even some of our self-styled

'craft' cider makers are getting in on the act now with flavoured offerings. And who can blame them, if that's where the money is?

That is what has hit us just when the craft cider revival was getting under way, and it threatens to derail the whole project by re-defining the meaning of the word 'cider' to embrace a virtually unlimited range of alcoholic drinks which are only nominally apple based. The rot has even set in at some of our cider competitions, which now offer classes for these bastard creations.

That is why some of us get so very angry about it, because it seems to be making the job of safeguarding true cider in the UK even more difficult just when it seemed we might be making some headway.

Irrational maybe - I expect there was the same outcry when the word

'custard' stopped meaning eggs and milk and started to mean cornflour and colouring! I personally believe the juggernaut is now unstoppable and that the 'newspeak' will soon take over. I think in 10 years time the idea that cider should be made from apples, sugar and water alone will seem very quaint and old-fashioned, just as it is today if you take the trouble to make custard from eggs and not from cornflour.

I rarely comment on 'political' issues around cidermaking, preferring to stick to the technical, but on this one I will get off the fence, because it annoys me so much.

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> Browsing the Hartlib papers (free on line searches) I came across this. Written by Beale in March 1657 it looks like the early exponents had a broad church for the definition of cider. I guess that whilst apple ansd pear were the main sources of fruit anything suutable groweing in England that could be fermented wouls also qualify as "cider" too.

I'll grant that Beale may have been a bit loose with terminology in writing to Hartlib, but when he puts it all down for Evelyn ('Aphorisms' in Pomona 1664) he makes a clear distinction between 'cider' from apples, 'perry' from pears, and 'cherry wine', 'plum wine' etc. (Beale paragraph 54 on page 29 of Pomona https://archive.org/details/sylvaordiscourse00eveluoft)

And Worlidge in Vinetum Brittanicum (1691) - sadly not online - is quite clear on the distinction between cider and perry made from apples or pears, and those ciders (which he calls 'mixtures') which have been deliberately flavoured either for medicinal purposes or to conceal production faults, and those 'wines' made from other fruits such as grapes, gooseberries, cherry, plum, redcurrant etc, . He has separate and clearly defined chapters for all these entities. He does not lump them all together as cider. He says "Besides cider, there are many other curious drinks that may be prepared out of British fruits". The book itself is sub-titled "A Treatise of Cider and Other Wines and Drinks extracted from fruits growing in this Kingdom". No confusion there.

The last word goes to Worlidge ...."There is not any liquor that hath less need of mixtures than cider, being of itself so excellent that any addition whatsoever maketh it less pleasant"

~~~

> Our Code of Practice requires any blending or addition to cider other than apple (or pear) to be declared as 'cider with X' or 'cider and X'.

So, to put you on the spot, when an NACM member sells a 'cider' with the front label clearly saying 'cider' without qualification, but it's actually citrus flavoured and includes a picture of a lemon, this would be in breach of the COP? Am I right?

> This was agreed some 6 years ago with LACOTS (now LACORS, I believe) but as far as I am aware we have yet to see any cases brought by any TS dept. I would add that NACM has no 'clout' with Trading Standards - which is anyway organised locally and not nationally. The law is the law and TS depts. interpret and test it by bringing cases.

But who would initiate that? Hasn't NACM 'triggered' such prosecutions in the past by having a quiet word with the right people? That's the way we do things isn't it? And the COP is taken to be a de facto statement of what cider is, because LACORS defer to recognised trade bodies for their definitions. It seems to me that a test case here is long overdue.

Otherwise it begins to make the COP look very silly because the way I see it it's being breached every day. Isn't it? And if it's a COP matter, can't the NACM internally police its own members?

~~~

> OK, personally I'm down with cider being fermented apple juice full stop. That's what I do. BUT I'm having trouble splitting some of the hairs.

A lot of this, and why it rattles Ray and myself, is very UK specific.

It doesn't have the same resonance in other jurisdictions, so I don't think you need be worried about splitting the hairs. It's for us to fret about, not you :-)

In essence, the perpetrators and purveyors of these flavoured ciders are paying duty on them as 'made wines' but marketing them as 'ciders'. This is at best anomalous and at worst is deceitful. It surreptitiously blurs and broadens the UK definition of cider which has been accepted as for the last 50 years AFAIK as "apples only" - OK with some sugar, some water and some pear if you like - but fundamentally apples with no other flavourings.

The problem for us is that it is rapidly changing the whole public perception of cider, especially amongst young people. The target market for these concoctions is "new drinkers", exactly the same people who used to put a shot of blackcurrant syrup in their Blackthorn as earlier described. But by offering them as pre-prepared products masquerading as

'cider', the whole definition of the word is being forcibly changed to reflect the new norm. It is not 'cider and blackcurrant', two entities where the boundaries are clear and which you choose to mix, it is just

'blackcurrant cider' with the boundaries deliberately blurred. We used to call them 'alcopops', you called them 'coolers'. Now they are back but calling themselves 'ciders'.

They squeeze out the small makers (in particular those under our 70 hL limit who are duty exempt and so cannot make or sell these products even if they wished to) but in a much more general and insidious way they

are changing people's expectations of what cider in the UK should be by manipulating the very definition of the word. A whole generation is now growing up believing that this stuff is 'cider'. They know no better.

Yes it's a marketing dream and a product developer's paradise, but in the long term I think it does the cause of true apple based cider no good at all.

~~~

> I think we need to be even more vigilant in reclaiming the word Perry because the widesperead use of "Pear Cider" can only damage the case for cider. HMRC allow 25% apple juice in Perry and 25% pear juice in Cider but these do not make the resulting drinks Apple Perry or Pear Cider! If we do not stop the use of "Pear Cider" it could make it very difficult to stop the spread to "other fruit" fermentations being called cider.

I think the NACM has accepted the synonym "Pear Cider" for "Perry" already. So that battle may be lost. But I don't know what the official

NACM line is on eg lemon, blackcurrant and cherry ciders.

Back in the 70's or 80's there was an almighty ding-dong when the first cherry cider from Belgium appeared in the UK. The NACM soon drove it out

- and rightly. But I suspect they may have a different view now. And presumably NACM views prevail with Trading Standards, since they are the recognised trade body. Nick, what is current NACM thinking on this?

~~~

> And does secondary fermentation in the bottle constitute 'sparkling'?.

Section 5.4 of HMRC Notice 162 defines the meaning of 'sparkling'.

~~~

> I have a total of 13 gallons, I'll let 10 gallons ferment till next spring but I'll like to bottle 3 gallons now to be consumed around Christmas.

Think this through please, for your own safety. If the SG of your cider is above SG 1.005, and you bottle it now while it's still actively fermenting, the likelihood is that those bottles will explode before

Christmas. This is cider, not beer. Unlike wort, all apple sugars are fully fermentable.

What is your current SG? Is it even safe to contemplate bottling?

~~~

> I was at my local brew shop today and asked if there was anything I could use to clear up my hard cider after the primary fermentation They recommended polyclar/ Divergan F the directions read : apply 2 tsp to 1 pint of cider then add that to my 5 gallon batch. My cider had been brewing for 16 days now and fermentation has slowed way down to about 1 bubble every 90 seconds.

I think you are missing the whole point of (craft) cider making. Itisn't brewing and it all takes time. 16 days is nothing. You are beingfar too hasty. Think months not days.

For a regular straight dry cider, you should wait until your SG is bottle around 8 gallons now, I was considering this clearing agent but wasn't sure about it.

I repeat that Polyclar / Divergan is _not_ a clearing or fining agent.

It is an adsorbent resin like nylon. It is meant to protect against post-bottling haze, not to remove yeast or particulates.

If you really must try to clarify your cider before the fermentation is finished and the yeast flocculates by itself (will it will almost certainly do in its own time), then use the two-part chitosan / kieselsol wine finings that I suggested. They are much more efficient than the old single component finings, so long as you follow the addition instructions closely. Not sure which country you are in but they are available from home brew shops in North America and the UK.

~~~

> Can I titrate for Total Acid using a .1M solution of KOH?

YES

> My assumption is,since you need 1.4 times the amount of KOH as NaOH, the equation would go from this: TA(g/L, malic)= ml NaOH* (N.01) * 67/ml sample to TA(g/L, malic)= (ml KOH/.71)* (N.01) * 67/ml sample

NO. You have misunderstood the nature of molarity. 0.1M KOH and NaOH have the same molarity (but different concentrations). The equation is therefore the same for both.

You are also confusing 'molarity' (M) and 'normality' (N). (In the case of simple alkalis M and N are identical, but in many more complex titrations they are not.)

See the acid titration details on my website http://cider.org.uk/acid_titration.html

Especially note that stored 0.1M alkalis can lose strength over time due to adsorption of aerial CO2. This will give you erroneously high acid readings.

~~~

> I have 4 batches of cider that I have pressed over the last 4 weeks. The first 3 batches are fermenting nicely (not yet ready for first racking) and have PHs of 3.3, 3.4 and 3.5. I pressed one final batch of different apples yesterday and the PH is 4.0! I obviously need to increase the acidity and I would prefer to do that by blending rather than adding Malic Acid. My question is can I blend immediately, considering this latest batch can't 'protect' itself from infection very well?

Yes. I think this is the third or fourth time this question has been asked in the last month. See here https://groups.google.com/forum/?hl=en#!topic/cider-workshop/7Vg3MWCvGB4

> will I still be able to calculate the alcohol content?

Yes. Take note of the starting SG and volume of each batch and what goes where and how much, and then it's just primary school arithmetic after that.

Andre

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> Another elementary question - I am using 300 litre fermenters (Speidel) and will blend by pumping the juice between containers. Are there any clever ways of measuring the volumes? I know these fermenters are nearer 350 litres than 300 and if I do 'half-an'half' the volumes will still be approximate.

The Speidel PE tanks are pretty uniform and straight up to the shoulder.

If you have an empty tank you can calibrate it with known volumes of water and mark it off; or by running a rule up the side. Or say you have a tank half-full of juice, then add say an exact 20 L of juice measured with a calibrated plastic jug and use the rule to measure the increase in level. Then extrapolate from that. The bigger the measured aliquot you add, the more accurate this will be. There will be errors once you get above the shoulder and the tank width narrows of course. Yes the tanks do have some overage over the stated capacity so if you reckon a brim full tank is 350 L then a half full tank is around 175 L.

But how accurately do you really need to know your ABV? The difference between 350 and 300 is one part in 6 or 7 depending how you look at it.

That's about 15%. 15% of 5% ABV is 0.75% ABV. Trading standards allow a tolerance of 1% ABV on labelling don't they? And if you're not selling it, that sort of variation really isn't very important is it?

~~~

> It has been in the fridge at 40F for two weeks now after adding PME and CaCl2 and I have seen no sign of any gel forming. I am using the PME and CaCl2 from cidersupply.com.

I am concerned that you have seen no gel.

On the other hand 40F is only

4C and that's a low temp for enzyme activity. Can you raise the temp of a portion of it to say 10C and see what happens?

But, no gel could mean no pectin. That could be down to the apples themselves or maybe the pectin structure has been destroyed by freezing

/ thawing. Have you done an alcohol test on the juice to see if it has plenty of pectin present?

~~~

> What is the average/normal carbonation range in bar or psi for cider using a carbonation machine? Am I right in saying 4 bar or 60-70 psi?

The pressure setting on a "carbonation machine" is often not a direct guide to the final carbonation level of the drink itself. In any case, it is better to think in terms of carbonation volumes or grams per litre of CO2, because those are independent of temperature and therefore meaningful. Simple pressure isn't a useful control parameter unless it is always related to a specific temperature of measurement.

In terms of final carbonation level, 2.5 to 3 volumes of CO2 is generally plenty for cider. That is around 5 - 6 grams of CO2 per litre.

There are lots of tables around which relate those figures to the pressure developed at different temperatures. Or use my spreadsheet http://www.cider.org.uk/carbonation_table.xls 4 bar pressure in bottle at 15C implies a 5 volume carbonation which is pretty high for a cider.

~~~

> My other question concerns secondary fermentation. I plan to pump the cider from one IBC into another.

It sounds as if you plan to rack your cider halfway through the fermentation. I wonder why you'd do that? In most cases it is quite satisfactory to set up the cider fermentation in one vessel and not rack it again until it gets to SG

> Hi Checked on of my barrels today as there was no airlock activity, when I looked there were three lumps of white mould (see photo). They were about the size of a 2p piece. The juice smelt fine - but I did not taste it. I lifted out the mould and added some juice from a container where fermentation was in full vigour. Once I refitted the airlock, it showed the first signs of fermentation. The juice was pressed on 29th Sept. It was a blend of Ashton Bittter / Morgan Sweet / Brown's Snout with a PH of 3.4 and SG 1.060. The barrel is 60 litres and I added 12 Campden tablets at pressing - no yeast was added. A second barrel from that pressing with the same apples etc. is fermenting fine. Is it likely to be a major problem? I am tempted to just progress as normal - anything else I could do? Cheers John -- -- Visit our website: http://www.ciderworkshop.com You received this message because you are subscribed to the "Cider Workshop" Google Group. By joining and posting to the Cider Workshop, you have agreed to abide by our rules, and principles. Please see http://www.ciderworkshop.com/resources_principles.html To post to this group, send email to cider-w...@googlegroups.com To unsubscribe from this group, send email to cider-w...@googlegroups.com For more options, visit http://groups.google.com/group/cider-workshop?hl=en -- You received this message because you are subscribed to the Google Groups "Cider Workshop" group. To unsubscribe from this group and stop receiving emails from it, send an email to cider-w...@googlegroups.com . For more options, visit https://groups.google.com/d/optout.

%2%

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> Hi Checked on of my barrels today as there was no airlock activity, when I looked there were three lumps of white mould (see photo). They were about the size of a 2p piece. The juice smelt fine - but I did not taste it. I lifted out the mould and added some juice from a container where fermentation was in full vigour. Once I refitted the airlock, it showed the first signs of fermentation. The juice was pressed on 29th Sept. It was a blend of Ashton Bittter / Morgan Sweet / Brown's Snout with a PH of 3.4 and SG 1.060. The barrel is 60 litres and I added 12 Campden tablets at pressing - no yeast was added. A second barrel from that pressing with the same apples etc. is fermenting fine. Is it likely to be a major problem? I am tempted to just progress as normal - anything else I could do? Cheers John -- -- Visit our website: http://www.ciderworkshop.com You received this message because you are subscribed to the "Cider Workshop" Google Group. By joining and posting to the Cider Workshop, you have agreed to abide by our rules, and principles. Please see http://www.ciderworkshop.com/resources_principles.html To post to this group, send email to cider-w...@googlegroups.com To unsubscribe from this group, send email to cider-w...@googlegroups.com For more options, visit http://groups.google.com/group/cider-workshop?hl=en -- You received this message because you are subscribed to the Google Groups "Cider Workshop" group. To unsubscribe from this group and stop receiving emails from it, send an email to cider-w...@googlegroups.com . For more options, visit https://groups.google.com/d/optout.

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> acidity and sugar content are easy enough to calculate, but what's the best way to go about measuring the tannin for new cultivars, to see if they size up to any of the British "vintage" cider apples?

The standard methods are here http://www.cider.org.uk/tanmeths.htm

Easy enough for anyone working in a food analysis lab, but not the sort of thing a person could do in their own kitchen. Unless they were really geeky ;-)

~~~

> I've seen the lists and references of various Sweets recommended for cider making but I was wondering if people here have particular favourites and why. Some I have to hand and am keen to try are Sweet Alford, Sunset, Kidds Orange Red, Northwood and Orleans Reinette.

From the UK perspective, only Sweet Alford and and Northwood (aka

Woodbine) on that list are true cider 'sweets'. The rest are dessert varieties which are effectively 'sharps'. (In warmer climates where acid levels are low that may not be the case).

For my part, although there are some true traditional 'sweets' available in the UK, I'm not sure why anyone needs to grow them nowadays. In the

'old days' they probably helped to balance out high tannin from big standard low nitrogen trees but I wonder how many people really have that problem today.

I do have Sweet Coppin and Le Bret (false Sweet Alford) but frankly they seem rather underwhelming in terms of contribution to the cider.

Starting again I would focus just on bittersweets and (bitter)sharps.

Leave the sweets in a museum perhaps. Not everything from the old days is worth perpetuating.

Just my personal prejudice of course ;-)

~~~

> Looking at things from a different perspective, having true sweets to hand allows the cidermaker to take advantage of the ready availability of low cost dessert fruit. Here in the eastern counties that's a useful tool.

Good point Mike. I missed that by thinking solely of diluting the tannin. But you would be better off with bittersweets surely, which not only have the low acid you seek but also some tannin bite?

~~~

> Dear Andrew Thank you for your response. It raises further points to consider: First, in terms of those flavoursome, old eating apples, does the flavour simply not translate through to cider? Or are you saying that the acidity becomes more dominant as the sugars are fermented out?

Absolutely! That is the biggest problem around using dessert apples for cider, the high acidity after fermentation which is too dominant and unbalanced for most people. Hence the subsequent need for back sweetening etc.
~~~

And no, I don't believe that the flavour of flavoursome old varieties of eating apples translates directly through to cider for the most part.

Fermentation pulls everything apart and puts it all back together again, but generally in a different way from the way it was in the original fruit.

~~~

> Reading your comments again, Andrew, do you now make more use of mild bittersweets in place of true sweets?

I'm only a hobbyist with a dozen or so trees, so I "make use of" what

I've got! My planting plan was always intended to produce a balancedcider if everything was blended and fermented together. I was brought upat Long Ashton not to believe in single varietal ciders and nothing inmy own experience has subsequently changed my mind.

I only have two sweets, Le Bret and Sweet Coppin. Le Bret is a poorcropper with me and although the fruit gets tipped into the blend, it'sprobably no more than 5% of the volume. The fruit seems bland anduninteresting to me. Sweet Coppin is out of phase for me bienially, soin some years that's all I have. As a result I have fermented ittogether with cull Bramley to produce a balanced blend. The result wasdrinkable but undistinguished. I didn't expect Bramley to bring anythingto the party, but obviously Sweet Coppin didn't either.

I have never tried Northwood / Woodbine. It is more highly regarded thanthe two that I have, and is described in Liz Copas's notes as "an aromasimilar to honeysuckle when stored, cider fruity and good quality, oftenwith an interesting woody aroma". I would of course suspect the lattermay be due to infection from fermenting on its own at a high pH, but Ican't confirm that! Looking at an old thread on here I see that Denis

France has used this variety. Maybe he will comment.

~~~

> I plan to make a good amount of traditional cider, allowing 9-12 months for malolactic fermentation and aging. I would however, like to formulate some recipes or learn tips to produce ciders that can be turned quicker. These ciders will be my initial offerings while waiting for the others to complete.

Don't you fear that this will irreparably damage the reputation you wish to build? If you start by offering 'cheap and cheerful' and then move on to a better and more mature product, your existing customers may not move with you and new customers won't buy into your revised proposition because you will be tarred by the brush you started with.

Generally in the food industry it is hugely difficult for a brand to move upmarket once it has established itself at the low end. Skoda did it with motor cars but it's not a common progression.

Just my six penn'orth from a UK perspective ;-)

~~~

> This year, I tried to do a MLF with malolactic bacteria after completion of alcoholic fermentation. Quite promising results. Now I have read somewhere that some wine makers these days inoculate with MLB at the start of AF.
~~~

There is so much on this topic if you Google it. Co-inoculation of MLB in winemaking is not uncommon these days. [Disclaimer, I am not a winemaker myself].

However, there are some caveats and potential drawbacks. One of these is that the MLB and yeast can adversely interact with each other's function

- this is strain specific. Another is that some people report an increase in acetic acid production when you co-inoculate, due to metabolism of free sugars by the MLB. There is also a tendency for side reactions such as malo-succinate to take place, and loss of lactic acid maybe by oxidation.These effects may be much significant in ciders than in wine, since malic is the major acid in cider whereas it's minor in wine.

From the wealth of literature available, here are two that might be especially helpful:

Spanish work on co-inoculation in ciders. http://onlinelibrary.wiley.com/doi/10.1002/j.2050-0416.1999.tb00023.x/pdf

Linda Bisson's lecture series from UC Davis. See especially the section in lecture 13 which is called 'Management of MLF' and covers the timing of inoculation http://lfbisson.ucdavis.edu/PDF/VEN124%20Section%204.pdf

~~~

> I believe that the data point to ML having an ability to metabolize glucose/fructose in the absense of malic acid, although I have never read so in the literature.

It's in the literature I cited.

~~~

> My question: does skipping the sulfite actually reduce risk of H2S faults?

No. All the wine literature indicates that H2S is primarily formed by by the breakdown of sulphur-containing amino acids in the yeast's search for assimilable nitrogen. That's why addition of yeast nutrients is often recommended, to prevent the yeast doing this. SO2 does not play a role in this mechanism and cannot normally be reduced by yeast to H2S.

> (It occurs to me this topic has likely been discussed here in the past. My apologies if I'm going over familiar territory.)

Yes it crops up regularly. Sulphur metabolism in fermenting yeasts is a much researched but still complex area. A lot of it is genetic - that is, some yeasts are much more prone to H2S formation than others. So choosing the right yeast helps. Additionally, H2S and related compounds have very low odour thresholds so that even parts per billion or less can be a sensory problem. Often it is transient as you have noted. It comes, and once fermentation is over it usually goes. If you have really persistent egginess, you can treat it with copper or copper-impregnated bentonite.

~~~

Melanie Wilson wrote:

> I've heard there is a program (pc) for apple IDs but never found it.

I think this is what you mean. It runs on MS Access.

http://www.nat-orchard-forum.org.uk/ApplekeyPreamble.html

Andrew

> To answer your question in the subject line: yes! I find your TA results very low (and improbable) for a blend of Golden Russet with Cortland and Idared - all of which normally have relatively high acidity. I would suspect something is wrong either with your TA kit or with your manipulation. Hence cross checking with pH would certainly be a good idea.

I have to agree with Claude. Your calculations seem correct so there must be some other procedural error. I can also tell you that typical titratable acid levels in blended commercial apple juices sold on the

North American market are in the range 3 - 4 g/L (they are normally higher in Europe where we prefer a tarter juice). If you are finding lower values then there is something wrong with your analysis. If you are using phenolphthalein as indicator, are you going far enough for the pink colour to persist for around 30 seconds?

Irrespective of all that, if you want to control film yeast then a dose of 50 ppm SO2 and rigorous exclusion of air should help, without knowing anything of TA or pH.

~~~

> WHEEE!!...Andrew as cider Rock-Star! Wait...I think I know now...he'd be the Charlie Watts type (but younger): slightly back on the stage, providing a solid reference and cadence for the rest of the band, calm but with an expression a mixture of amusement and slight bemusement at the goings-on around him. How's that, Andrew?

Pretty close! I'm quite happy to provide a solid reference while everyone out front gets on with the histrionics. Though no-one ever compared me to Charlie Watts before ;-)

~~~

*Anybody ever use a Rover Pompe, their stainless steel pumps look good vale for money or are they just rubbish? Regards Tim in Dorset *

~~~

> The issue seems to be that that with such a large mass of tightly pressed pomace, the juice in the middle struggles to leak out to the sides. I remember reading somewhere that in traditional methods, the pomace would be layered with hay to allow drainage.

This has often been discussed here see for instance this most recent thread https://groups.google.com/forum/?hl=en#!topic/cider-workshop/WanSJ73r-ok

I don't use a basket press myself but I have seen wood, HDPE, coir and even synthetic roofing felt cut to size and being used to create layers and hence to improve the drainage when used on apple mash.

~~~

> Hello Andrew, I have seen elsewhere on the forum that you have mentioned rice hulls or wood pulp as a means that some cider makers create porous pathways in their pomace to allow for runoff. I can see rice hulls

being effective, but wonder about the effect wood pulp would have on the taste of the juice. Do you have any knowledge of this?

I have no personal experience of using press aids. It is rarely if ever done in Europe, where pectolytic mash enzymes have been the norm to get around this problem certainly since the 1970's. At one time it was widely done in North America and yes some taint issues from wood pulp have been reported. See the attached page from Don Downing's "Processed

Apple Products". http://www.springer.com/food+science/book/978-1-4684-8227-0

I suspect it is much less common amongst large commercial producers in

NA now, since the advent of Bucher-Guyer piston presses and mash enzyming. It was very much associated with pack, screw and belt presses.

~~~

Test

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> Ray, I drink most of my cider myself,but if I were selling it,I would probably mix the final cider batches,so that the product was more uniform.Having said that the outcomes are not that different

Can you define more closely the differences that you perceive in the flavour?

~~~

> Thanks Mark! Good info! S02 resistant! Geez. :)

Yes but Saccharomycodes ludwigii is only one of many potential spoilage yeasts that might produce diacetyl. It is also a very slow grower.

I think the chances are that SO2 may control your problem. In any case

SO2 will bind to the diacetyl to an extent as described, irrespective of whether you have 'lud' or not.

~~~

> If I were to send those bottles to the keg and treat with S02, is it likely to go away?

Probably, for the reasons I gave. I am surprised that you are getting detectable diacetyl shortly after yeast fermentation. This is not commonly described in ciders or wines, but more so in beers due to the breakdown of wort amino acids. What sort of yeast are you using? Any odd nutrients? Are you using any SO2 prior to fermentation? Could you have a spoilage yeast or bacterium involved? Are you very sensitive to diacetyl? Do other people pick it up too?

~~~

> I have noticed that if I bottle cider from my keg system and then store the bottles in the refridgerator (at 40 F), a few months later they may have a diacetyl or buttery aroma.
~~~

Trouble is that diacetyl can have more than one source. For instance it can be set up by yeast as acetolactate (odourless) which is then later oxidatively converted to diacetyl. This last step is chemical, not microbiological. It may be that when bottling you are introducing oxygen which is doing this. Are you using a beer yeast by any chance? I think they maybe do this more than wine yeasts? Or could there be a spoilage yeast in your bottles doing this if you are not using SO2? Is your keg system for forced or natural carbonation?

Another route is conversion of pyruvate or citrate to diacetyl by LAB, but as you say this would normally be expected at higher temps.

> I'm guessing 30-50ppm S02 at bottling would help stabilize it. So far, I haven't been using S02, but will if I can solve this problem.

Diacetyl is an SO2 binder so it should stop the diacetyl from being detectable, even though still present. It will also inhibit spoilage yeasts and LAB.

[Incidentally, sensory perception of diacetyl varies widely. Personally

I am diacetyl-blind and cannot detect it, neither in wines nor cider nor spoiled milk. Pure diacetyl just smells vaguely chemical to me and not at all buttery. But I can pick up 'mouse' at a thousand paces ;-)]

~~~

> We are looking to buy boxes for wine and champagne bottles, boxes that carry six bottles with partitions. Can anyone recommend a supplier in the UK?

Not being commercial, I have rarely needed to do this, but I found the regular cartons and the moulded postal boxes from Kite Packaging quite satisfactory and easy to buy in small quantities online. http://www.kitepackaging.co.uk/mcp/boxes-for-bottles/

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> The pH paper strips was purchased from a home brew shop 2011 the last time I make some cider but they have been kept seal and dry in a cool place, they cover the 2.8-4.2 range. We are not adding any yeast we are hoping for a wild yeast fermentation. Could it be an in accurate reading from the paper strips?

Well as Ray pointed out the other day, and as the article on my website shows, the pH strips are not as accurate as we would like them to be.

They are only coloured dyes after all, and their pH-sensitivity varies according to the matrix they are used in. Storage may be part of the issue - they should certainly be kept cool, dry and in the dark to protect the dye - but my study showed that even fresh strips are not always reliable. The best that can be said is that they are better than nothing at all.

If you are using wild yeast then at pH 3 I would not exceed 25 ppm SO2 and remember you will have to wait a week or maybe even two before the wild yeast has multiplied sufficiently to be obviously working (though the current warm UK weather is being quite a help!). A cultured yeast will give you more reassurance more quickly. That's your choice.

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> I ordered a digital pH meter and it should arrive tomorrow and I will re check todays 100 litres and then add the suggested number of campden lablets in the Craft Cider Making Book.

Hope you have bought a pH4 calibration buffer too :-)

> Would it be too late to add more campden tablets to the batch of 180 litres from last Friday if the new digital meter shows the paper strips where well out

As long as the juice is not in active fermentation, this may still be worth doing. But once the yeast is seriously busy, you are wasting your time, because the acetaldehyde produced by the yeast will bind up all the sulphite.

I am surprised you are still using Campden Tablets when working on such a relatively large scale. I find a stock metabisulphite solution is much easier to use.

~~~

> However, for me, I found it a real bugger racking it. Normally I could tolerate a little bit of any film yeast to slip through the bottom tap as it got broken up. But allow any olive oil through and then it's in your bucket/demijohn/bottle whatever. And then you have to clean that. To not have the oil come through you have to rack a lot less.

Point taken Matt, but an IBC has a bottom tap and is translucent so you can see the oil / cider interface and stop just before you get there.

If you 'chock' the tank toward the tap you don't lose so much.

The oil does float of course, though if you disturb it overmuch it tends to emulsify a bit and takes a few hours to separate again. Yes it does reduce the total recovery and it is awkward to clean the oil out afterwards. Your flexible bag option is much better. But mine is a cheap and workable solution which costs only a few quid and is easy to implement. There is a trade-off of course!

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> John Dalton died in 1844, this stuff isn't exactly new.

I think there is a confusion in this discussion between

1. Positive swept physical displacement of air by CO2, which can be total if it's properly managed afterwards. Though its tricky because CO2 is soluble in cider. N2 is in some ways better because it's less soluble. In wineries a mix of N2 and CO2 is often used to control the solubility issue.

2. Partial pressure solubilities of CO2 and O2 in air, which as Greg says can co-exist at equilibrium levels (which is where Dalton's Law comes in).

I think you're both talking about different situations.

~~~

> I did say co2 can be used to flush air out, which is I think what you are saying. My point is that having the headspace full of co2 doesn't stop o2 getting in, which is a common misconception.

If it's sealed after it's flushed, no more air can get in. The problem is that CO2 dissolves in cider hence creating a partial vacuum in the headspace which then tends to suck more air in unless the seal is very good. In practice
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small cidermakers here do find that CO2 flushing of part-filled vessels does work well in practice as long as the ingress of new air is restricted as far as is possible.

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> Been following this with interest. Does the dissolved CO2 add to the acidity (perceived or otherwise) in the cider or is it so minimal as to be undetectable in cider? Just thinking of the comparisons with beer served under a CO2 blanket (at atmospheric pressure or greater) where some commentators are adamant that the dissolved CO2 alters the flavour.

Dissolved CO2 in cider definitely adds to both the perceived and actual measurable (titratable) acidity. Not minimal at all. That's why you have to boil it off before measuring 'fixed' acid. It also has a flavour altering effect on the whole beverage. That's why Greg said earlier that

CO2 acidity in wine is undesirable (arguable) but in cider is desirable.

Saturation solubility is 2g/L. Many white wine makers target around 1 g/L quite deliberately to get the flavour balance they want. In many ways one needs to regards CO2 as an 'ingredient'. It does a lot more than just add bubbles.

A cask beer if properly conditioned will surely be saturated / supersaturated with CO2 anyway? Isn't that the whole point?

~~~

> Can someone who has or has knows the workings of a variable capacity tank could offer some advice. In short, How do they work?

I have one which is a Speidel circular tank in stainless steel. It has a circular stainless steel lid which fits neatly inside. The gap between the edge of the lid and the inside surface of the tank is filled with an inflatable silicone rubber tyre which you pump up with a device similar to a bicycle pump. The lid has a threaded sealable vent built in and also an eye so you can attach a rope and control the height of the lid in the tank before you fully inflate the tyre to hold it firmly in place. The lid is normally placed just above / touching the surface of the liquid to minimise headspace. After that you close the vent, and then pump up the tyre. It works fine and I have held finished cider in it for over a year prior to bottling. Just need to check the tyre pressure every so often.

> The reason I ask is I am wondering if an IBC could be given a 'swimming pool cover' that floats on the surface, cut from bubble wrap or an actual pool cover (food grade is available) and would this make any real difference?

It would have to be totally air impermeable and sealed to be truly effective. That means all the way round the edges as well as being impermeable to gas diffusion. I don't think bubble wrap or pool liner meet those criteria very well.

Matt's suggestion is good, but alternatively and very cheaply you can just use olive oil in an IBC and it will float on top as a seal (very old idea - the Romans used to do it). I found you need about 3 litres of oil for about a 3 mm cover depth in a 600L IBC. It's easy enough to calculate once you've measured the surface area. That will hold the cider about 6 months I'd say. (Remember the IBC itself is also air permeable through the walls). It works like a plastic film but its advantage is it gets right to the edges to give a total seal.

~~~

> The apple industry is growing in China.

China produces more apples and more apple juice concentrate than any other country in the world. It really isn't true that cider is a complete unknown in China. Several research institutes out there are working on it with government funding, some in conjunction with institutes in other countries. A quick search of Google Scholar will show you that.

> You don't need "cider apples" to make cider or "cider Yeast"

For instance, according to this paper http://onlinelibrary.wiley.com/doi/10.1002/j.2050-0416.2006.tb00721.x/pdf cider in China is made from Fuji, Starking and Gala. Not so very different from Australia, actually. And a yeast strain from the Chinese culture collection was used for fermentation.

Obviously production, and the market, is very small at present. But there is a lot of technical and business interest. At least three UK cider companies have dabbled in China in recent years.

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> In my case, I'm planning to add the same variety of apple to the fermented juice, so there's no problem with the blend. And I'm planning to add sulphite to the new juice, leave it 24 hours,

Good plan.

> then commercial yeast and nutrient to the new juice as I pump it in to the fermented juice.

Why would you feel the need to do that? There will be oodles of acclimatised yeast present already. Seems a bit of overkill to me. Or are you aiming for 'fast and furious'? Will it be the same yeast as the one you already used?

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> I should add, I want to add more juice in order to ferment it, not to sweeten the cider. But I've run out out of fermenting space to do it separately and have some space in the tank of fermented juice.

If you are happy with the potential blend you'll get, just do it. There are some theoretical reasons why it isn't 'best practice' but in real life I don't think it makes two ha'p'orth of difference for the average rustic cidermaker.

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I think they are intended primarily for moving solids and viscous liquids. That's probably why there is always this grumbling issue about how gas tight the seal is if you use them for fermentation; because it wasn't designed for that. Nonetheless they are popular because they are cheaper than the purpose-designed alternatives eg from Graf and Speidel.

The blue (hydrophobic) pigment is a worldwide standard and locks itself into the HDPE so it can't ever leach out (years ago I knew its chemical name but I've forgotten it now!).

Andrew.

> Fantastic Andrew. Not sure how I missed that! I buy quite a lot from Stowers. They have a depot close to me! Durrrr. Trevor FitzJohn Chairman : Pacific Radiology Ltd 99 Rintoul Street : Newtown : Wellington 6021 PO Box 7168 : Wellington 6242 : New Zealand Cell + 64 21 483 959 Fax + 64 4 978 5571 (work) Fax +64 4 385 8037 (home) Email trevor....@prg.co.nz

%2%

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> Is there a formal name for these blue barrels.? I would like to use them but cannot find in NZ where to buy them. Cheers Trevor

%1%

They are known as "UN approved open top food grade barrels". They come in various sizes but the 220L seems to be most popular with cidermakers.

They are used and available worldwide (though I suspect they are all made in the same factory in China?).

Here is an NZ supplier http://www.plastic.co.nz/plastic-products/4308.html

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> Are CB corks significantly different from the "beer" corks supplied by Vigo? http://www.vigoltd.com/Catalogue/Bottle-closures-decoration/Corks-stoppers/Corks/Agglomerate-corks-for-bottle-conditioned-beercider-45mm-high-x-26mm- Giles

My understanding is that 'Cidre Bouche' corks for use in champagne bottles are 38mm by 25mm. I also understand that the 1 mm diameter undersize is deliberate to allow gas to blow past the cork in case there should be excessive fermentation.

But I have never used them myself. I'm merely reporting what others have told me.

~~~

> Andrew, I have after pressing my juice added 1 level spoonful of sodium metabisulphite to 24 litres prior to fermentation which I left 24 hrs before adding yeast, (Fermentation is now under way) but I have since been told it is double the amount required, please could you advise the problems this may cause and any corrective measures needed if any?

Relax. You don't have a problem. Say one level teaspoon is 5 grams of metabisulphite. The yield of SO2 is roughly 50% so that's about 2.5g

SO2. In 24 L that's around 100ppm. Depending on the pH of your juice, that's a typical addition level for many juices. See http://www.cider.org.uk/sulphite.html

The fact that the cider is already fermenting shows you have nothing to worry about.

~~~

> Right - just tried it with another hydrometer, and this one's saying 1.020,

A 25 point drop from September - that's much more realistic. But your two hydrometers should really agree within a point or two.

> it indoors to a room that never gets really hot, about 16-18 degrees, to see if anything kicks off.

I would imagine the higher temperature may get things going again.

> Could the wild yeasts have just exhausted themselves?

They might have exhausted the nutrient supply but apples from young trees tend to be high in nutrients. I would give them time at a higher temp. You can always add nutrients later if that doesn't work.

> impressed that the juice tastes so nice after all this time, I thought it would have gone off? Perplexed.

No reason it should 'go off' if it's well protected by an airlock and undergoing a slow fermentation. And it's half cider now.

~~~

> Thank for your reply Jahil Is there a way to find out (measure) tannin in apples?

http://cider.org.uk/tanmeths.htm

Also some typical tannin data for different apples is given in the tables here

http://www.cider.org.uk/appledat.htm

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> I pulled it out today, to test the SG, and it's still around the 1.040 mark -

I find that hard to believe if you started at 1.045 in September andyou've had lots of apparent fermentation activity. Are you sure you areusing the hydrometer correctly? You need to spin or jiggle it a gooddeal to get the bubbles off or it will give false high readings. Also it mustn't catch the side of the demijohn. The hydrometer must be free to move.

> There's about 3/4 to an inch of sediment at the bottom - two colours - the lower layer is a white/cream colour and is about 2/8" thick, the second layer is the thicker, about 1/2" thick, and a medium orange brown.

Bottom layer probably starch, top layer probably yeast.

~~~

> Would temperature of the cider make any difference? It's quite chilly after coming out of the garage.

Yes it would make a small difference. But only by a point or two. My suspicion is that you are seriously over-estimating the SG and that fermentation has actually finished, or very nearly so. Far more than a 5 point drop, at any rate. The UK weather until December was really quite warm so there was 3 months for the wild yeast to do its stuff.

On the other hand, was the fruit very low nutrient, from big old trees?

This could certainly cause the fermentation to stick.
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> Hi, I have inadvertantly obtained Potassium metabisulfite, K2S2O5, also known as potassium pyrosulfite, is a white crystalline powder with a pungent sulfur odour. rather than Sodium metabisufite, even worse I have added 3 grams to 25 litres of juice in the normal way (24 hours wait time) and the added commercial yeast it appears to be fermenting albeit slowly I pressed on Saturday and added yeast on Monday. My question is although the function is obviosly similar, does the difference warrant me renewing my search for Sodium Metabisulfite or not, obviously it is not on regular sale here or I wouldnt be asking, Thanks very much for any advice, David

There is no effective difference in activity between KMS and NaMS except that in theory KMS yields slightly less SO2 in acid solution because potassium is heavier than sodium. In practice you have added around 60 ppm of SO2 from the figures you give us. That is a very standard level and is unlikely to slow up a cultured fermenting yeast appreciably unless the juice was very acidic indeed. What was its pH?

~~~

> I am a little confused. Are you saying that the free SO2 is what is causing the issue during distillation or the the total SO2.

I thought that was what I was saying, but I have gone back to the textbooks to check and I think I was wrong. There is no doubt that all the _free_ SO2 will come across by distillation. The question is how much of the _bound_ SO2 will come over. I think the answer is some, maybe not all, but I'm not sure what percentage. Certainly if the cider were strongly acidified and then distilled it would all come over

(because this is how you do total SO2 analytically). But in the absence of strong acid and a current of gas - how much?

I think it would be safest to assume that all the SO2 will come over - worst case scenario. Then you just have to learn (empirically?) how much in the distillate will give you a sensory problem. It is not an easy one to calculate from first principles because a brandy distillate is divided into three fractions and the acetaldehyde comes over in the in the heads. I suspect the SO2 mostly does too, and then they recombine, but I don't know that for a fact. You need to talk to someone skilled in fruit brandy distillation in Central Europe and not some random bloke on the internet ;-)

Actually, I think some of the Americans on here are allowed to and do distil their ciders. Maybe they have a feel for SO2 levels and can advise?

~~~

> Is it possible for the cider to contain a certain level of SO2 before you distill or does the cider have to be sulphite free.

French law for Calvados allows a max of 40 ppm total SO2 in the cider before distillation. (Moinet 2009). For Cognac and Armagnac I believe it's zero. Your local law may have something specific to say about regulations for fruit brandies.

The precise amount of SO2 that distils over will depend on how much is bound and the pH of the cider so it's a variable thing.

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> Thanks Andrew. I will check the PH and make a decision on whether or not to use SO2. Would it be worth considering using malic acid to lower the PH to bring down the quantity of SO2 required pre fermentation or to potentially use none at all.

I really wouldn't like to comment, not being in any way a distiller. Yes dropping the pH will mean you use less SO2 but that's because more of it will be in the molecular form so I think that the same amount will actually distil over due to the laws of physics and dissociation equilibria. Remember most French cider fermentations will have relatively high pH (probably around 4 or so) so their SO2 will be less volatile (i.e. more in the ionic form). That does not apply to the bound

SO2 of course. The acetaldehyde-sulphite adduct doesn't dissociate till you get down to pH 1 or so, AFAIR. That is the basis of the distinction in the methods when you measure free and bound SO2 by distillation eg

Monier-Williams

I think you need to make proper measurements of free and bound SO2 in your cider if this is an issue to you. It may be safer not to use it.

There is something in the back of my mind which says that the very few

UK cider brandy makers use very little SO2 or none at all. I do know that they don't allow any MLF to take place before distillation which they like to do early in the year before the weather warms up. That is to do with minimising acrolein formation which gives an adverse flavour to the spirit.

Are there other fruit brandy distillers where you are that you can chat to for advice? This problem will be common to them all, won't it?

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> I've just frozen a bunch of pomace in plastic bags while waiting for my press to be built. Gravensteins, wasn't ready for them. Is there any risk of a loss of quality? It will be in the freezer for about 2 or 3 weeks. (I read the post here about freezing juice, which seems not to be a problem. What about pomace?)

The freeze / thaw cycle will break down a lot of the apple cell structure so the pulp will probably be very wet and sloppy. It will probably need only the slightest pressure to liberate the juice. You may also find it browns rather more quickly than normal pulp. Freeze / thaw does seem to have some impact on various apple enzyme systems (eg pectinases and polyphenoloxidases). It's not so much the time it stays deep frozen as what happens while it freezes and while it thaws.

~~~

> That sounds reasonable. However, I have difficulty to understand what you mean by a "dusty" flavor. Do you have the feeling it could ruin your ice cider?

I'm going to toss in a couple of ideas here.

1. In the past, I used to work a lot in apple juice factories and with concentrated aroma essences from apple juice. In the air and in the essences there would be fruity / estery aromas (from some types of apples) but there would also be what I used to call 'dusty aldehydic' aromas (which were not the same as the fresh cut grass 'leaf aldehyde' aromas). I never pinned down the 'dusty aldehydes' in chemical terms but

I think they were associated with higher concentrations of aroma. When it was diluted out to single strength they disappeared (and in any case aldehydes will be metabolised during fermentation). So maybe with the cold and the concentration this is what you have. Quite likely it's not a problem.

2. BUT, some mould taints could also be described as 'dusty'. They would likely be a problem downstream and might persist into the cider. Is there any sign of any sort of mould growth i.e. on the top of the juice or on the inside top surface of the containers?

If this is your first year it's all a bit of a learning curve isn't it?

You might just have to take it through the process to learn what happens.

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> Any advice on this or about making vinegar generally would be appreciated.

http://www.cider.org.uk/part6.htm

First you need to make cider. Then you make vinegar. You cannot do it all in one operation.

Please don't post 25 redundant messages back to all of us next time. And choose a relevant topic for your subject line.

~~~

> Maybe I should start selling it then ;)

*I think so Tim. In dinky little bottles with gingham tops. A real piece of rural Dorset for the 4*4 weekender brigade ;-(*

~~~

> Many shops &/or makers will sell you a bottle of cider vinegar with some 'mother' in the bottom. Shop around.

If it's at the bottom it might be dead though :-(Mother should be at the top really. The bacteria make the 'mother' as a raft to keep themselves afloat and next to the air.

I acquired my 'mother' about 30 years ago in just the way Ray describes, from a commercial bottle of vinegar where the cap seal had failed. The neck had a lovely column of discs in it where the 'mother' had continuously grown, sunk and reformed. The company in question were having pasteurisation / filtration problems so some live bacteria got through. Generally in the mainstream brands that would be very unusual today. Go for a smaller niche brand. But beware that general cloudy crud and sediment in vinegar is not necessarily 'mother' and may not have any live bacteria associated with it.

My website vinegar link gives some other ideas for acquiring 'mother'.

Brouwland sell a starter see http://brouwland.com/setframes/?l=&to=http%3A//brouwland.com/shop/product.asp%3Fcfid%3D28%26id%3D1758%26xin%3D1%26src%3Dvinegar%26dt%3D24&shwlnk=0

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> I hope that this will go some way at least to reassure cider makers that NACM and its members will be working hard to ensure that the status quo, or something like it, can continue.

There are some supportive public statements both from the Treasury and the NACM in the FT here http://www.ft.com/cms/s/0/1fb7c4be-bdc5-11e4-9d09-00144feab7de.html?siteedition=uk#axzz3T8PpX75v

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> Now 10 days since I am back from French Ciderland...

Thanks for that travelogue Claude. Very interesting to read.

Here in the UK you will also find many craft producers planting HT trees as well as BT.

Re malo notes in French ciders, my impression is that these are in balance in the first year, but can develop more (sometimes adversely) on longer ageing. Whether this be MLF or Brett is an open question. Perhaps both.

Interesting observation on lack of bitterness. Maybe that's a deliberate change to using less bitter varieties to suit modern palates. Here our most popular bittersweets even in the craft community might be seen as

Dabinett and Yarlington Mill, both quite softly astringent but not in-your-face bitter.

Thanks again for your observations.

~~~

Most of the cider apples grown on dwarf rootstocks in the UK by modern efficient growers are going straight into bulk commercial cider houses where there is little segregation of the fruit. So detailed information on tree juvenility vs cider flavour quality is lacking. However, there is some sort of anecdotal 'feel' I think amongst the artisan grower / cidermakers that there is a juvenile period of 5 years or so after first cropping during which the fruit quality improves. In so far as there are any measurements, this is not to do with SG, dry matter etc. There was some evidence from unpublished Long Ashton work that juvenile cider trees on dwarf rootstocks contain high juice nitrogen levels (though it's not totally clear why this should be), but that those levels drop over time even if normal levels of NPK are being applied. Other things being equal, high juice N would lead to fast fermentation rates and poor cider quality.

In my own little orchard I would say that the fruit quality subjectively improved over the first 5 years or so. This may be due to the fact that each tree was carefully planted with a good supply of nutrients including nitrogen to aid establishment. My later management has deliberately kept N levels very low and so my observations could reflect management practices rather than any inherent disposition of the trees.

~~~

> (I hesitate to use the word 'juvenile' which properly applies to the period of tree development prior to fruiting).

Woops - yes of course! "My Bad" (as I think people say now?)

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> Another compiled resource from Long Ashton and Geneva regarding acid and tannin assessment

Seemingly taken from my web site. But with the caveats and explanatory stuff missing. The original is here http://cider.org.uk/appledat.htm

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BBC iPlayer radio shows only last for a month.

> Yes, I think it's on the website for 29 or 30 days. I hadn't realized that the other night. Ann Marie Thornton James Creek Orchards

> I can't seem to get this to work, is it time sensitive?

> If I knew how I'd post one of those sad face icons. The "play list" below the info sounded right up my street.

Actually you can get it as an edited but indefinite downloadable podcast if you hunt for it. Try this http://downloads.bbc.co.uk/podcasts/radio3/earlymusic/earlymusic_20141228-1400a.mp3

:-)

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> I'm not sure I agree, Andrew. Yes, tannins in cider range from bitter to astringent, but also from green to stalky to powdery, and from gripping to fine. It is another lot of dimensions I look for in ciders and one we assess our ciders on. My question about aging tannins in the apple is to help with decision-making. Acidity rounds and takes on new flavours as the apple ages. For example, Ballarat provides good acidity. Picked ripe, is yields a strong malic hit. Picked late, it takes on grapefruit notes, which parallel what the acid does in the bottle. Does tannin develop in quality as the apple ages?

All I can say is that you must be a very sensitive lot out there in the

Antipodes. I don't recognise any of the things you talk about and I'd be surprised if any UK cidermaker did. How can malic aciddevelop grapefruit notes for instance? That makes no sense inbiochemical terms, and I don't ever recall a cider with grapefruit-likearoma in this country. Except those that are added for the fruit cider / alcopop type of drink, of course.

The apples you talk about (Ballarat, Red Delicious and NZ Rose) are verylow in tannin AFAIK compared to cider apples or to red wine grapes so itseems odd to me to make so much of their tannin character when theysimply don't have any.

> cider made from local Red Delicious have a definite 'stalkiness' - a green/woody taste like that when chewing on an apple stalk.

Green stalkiness is most likely ascribed to unsaturated aldehydes which are the product of lipoxygenase oxidation of fatty acids when the cells are disrupted. Nothing to do with tannins.

> Maybe I am confusing

> taste profiles with textural perceptions but the two often seem to go hand in hand.

I honestly do think you are picking up normal flavour notes perceived by the retronasal route and ascribing them to tannins (and acids).

> Sugar and flavour aside, is there an optimum time to pick and

> mill when tannin quantity and quality are maximised?

Nobody here in the UK thinks a jot about that AFAIK. Tannin 'quality' is very secondary to other more important considerations like overall off-tree maturation for sugar and ester development at the climacteric.

Here we would anticipate all the best cider to be made not from fresh-picked fruit but from fruit which has had some maturation lying on the ground or in barn store.

The tannin does not sensibly change over that period as far as I am aware. There are certainly differences in procyanidin amount and chain length but they are varietally determined and are characteristic of the apple itself. So Tremlett's Bitter is always harder and more bitter than

Dabinett for instance, which is softer and astringent. That's one reason that good cidermakers blend their fruit, to balance the tannins amongst many other things.

I think we are not just on opposite sides of the world but we are also looking at cider in totally different ways ;-)

~~~

> I suspect the answer to your question lies in the last sentence of your post!! ..... Any kind of cider or wine, even if acidic, or extremely dry, or oxidised, or tainted with acetic, was surely a treat!

David has a good point I think. In previous generations there was probably a higher tolerance of oxidised flavours than there is today.

Even so, the adverse effect of air exposure was recognised from way back and good cidermakers did their best to minimise it. Thus Ralph Austen in

1657 wrote "In drawing the cider, take heed of giving it too much aire; if much aire get in, it will very much deaden the liquor and makes it flat and heartless and the cause (by many) is not perceived."

In practice a lot probably depends on when the cider was drawn off too.

Up till around midsummer, a traditional large vat of cider was probably still supersaturated with CO2 from the fermentation which was also renewed from the malo-lactic fermentation. They didn't do 10-day turnarounds in those days - with low nutrient fruit, fermentation took the best part of six months and it was still continuing slowly at the time that most of the cider was drunk. Again, though, from the mid 17th century it was well recognised that cider deteriorated after midsummer and it was best to put it into bottles for long storage. Hence Austen again ... "cider may be kept perfect a good many years if it be drawn out into bottles and well stopt with corks and hard wax melted thereon".

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For our UK readers who want to try their hand at keeving, I just heard that Vigo now have their keeving kit in stock see http://www.vigoltd.com/Catalogue/Chemicals-additives/Keeving-Kit-94426

Although the kit is sufficient for 1000 litres, the calcium chloride keeps indefinitely and the PME enzyme for several years in a fridge, so you certainly don't have to use it all in one season.

Happy experimenting!

~~~

> One wonders why each of these things has a name then. I think of it as an advertising term. But then I prefer precise terms over vagueries.

Yes that's all very well but it isn't always possible to explain in exact scientific terms why one craft cider differs from another which is made elsewhere.

Obviously the more industrial your cider or wine making becomes, then the less important the concept of 'terroir'. But to distinguish craft-made ciders or wines from particular areas, then I think it's valuable. And it does involve differences in fruit type, soils, climate and microclimate, perhaps even wild yeast and bacteria. And the interactions between them.

And it certainly isn't just an advertising term. It may have been hijacked by the marketroids in recent years, but it goes back years for

European wines and even in UK cidermaking the concept (if not the actual word) has been well established for many years eg in the traditional differences between say Devon and Somerset ciders.

However, to go back to where we came in, I doubt very much that you can reproduce the terroir of one area elsewhere just by simple manipulation of soil additions. I agree with Claude that it's a lot more complex than that.

~~~

> One of the magic ingredients of cider seems to be the mysterious terroir. So I was wondering... Would throwing in some granite dust/gravel, for example, when planting the trees help on a micro-terroir level ;)

But a blanket approach like that would be inconsistent with the idea of terroir surely. It seems to me that you would need to find out the origin of each of the tree types you plant and then match it for each type in terms of soil structure and pH. A near impossible task.

I grow a variety of trees which originated mostly in the deep West

Country loam soils, here on thin South Oxfordshire chalk. The terroir doesn't match at all. Yes the ciders might be richer if it did, but I don't have a choice. They are still pretty good and have won prizes at respected shows.

Quality of and understanding of the cidermaking process is at least as important as terroir, I think. There could be lots of reasons why the ciders from neighbouring orchards are 'uninteresting'. Is the fruit they grow the same as you've chosen for instance? A good cider variety, even on the wrong 'terroir', is likely to outperform an indifferent dessert variety when it comes to cidermaking.

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> */ Maths is not my strongest subject I do admit. But 10 grams and 100 ml of water is surly 10% not 5%.....Or am I missing something?

Yes. You are missing the 50 - 60% yield factor. So to obtain a ~5% SO2 solution you need to make a ~10% metabisulphite salt solution.

> Attention perry pear detectives!

David, don't you think you are barking up the wrong tree trying to map this onto a perry pear? Isn't this a bit unlikely?

Have you checked out the ornamental cultivars of Pyrus communis frequently used in landscaping schemes? For instance, Pyrus 'Beech Hill' looks pretty close to me.

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> Have you checked out the ornamental cultivars of Pyrus communis frequently used in landscaping schemes? For instance, Pyrus 'Beech Hill' looks pretty close to me.

You can buy it as a landscaping tree in Ireland http://www.treecentre.ie/index.php?option=com_content&view=article&id=355:pyrus-communis-beech-hill&catid=92:tree-catalogue&Itemid=639

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My last word on this subject for now, taken from from Gabriel Hemery's recent book "New Sylva" http://newsylva.com/

"A number of pears are popular as ornamental trees .... 'Beech Hill' is a variety of common pear with an upright branching habit when young, although in autumn it becomes weighed down by the great volume of inedible fruit that it produces'.

If you Google it you will find mention of its unsuitability as a street tree for just this reason. Now of course, that inedible fruit might be just fine for perry. Please make a batch and report back!!

~~~

Nick has stated the 'official' viewpoint. That is, each new tranche of juice is treated with sulphite individually to 'sterilise' it and only afterwards are they combined. That way all the microbes are kept in check. Thomas has also given a variation on this route.

If you do it the Alex way, you effectively contaminate all the clean sulphited juice from Day 1 with the new dirty juice from Day 2. So you have negated all your Day 1 sulphite addition. What you would have to do to compensate is to treat Day 1 + Day 2 as if it were _all_ new dirty juice. So you'd measure the _total_ volume, measure the pH, and compute the sulphite required accordingly. Likewise on Day 3. If you can measure the free SO2 that's already present, you can of course subtract that from the total that needs to be added because it's already available in the system. But by doing it this way you will be adding a great deal more SO2 overall than if you do it in two or three three isolated tranches. And this may cause you legislative problems downstream.

That's my take on it anyway.

Of course it all rather depends on how fastidious you feel you have to be about following the 'official' sulphite prescriptions. Lots of people cut corners and probably get away with it. Depends on pH and how far you want to gamble. Not everyone's a sulphite freak like me ;-)

Andrew

> Is the newly pressed juice going straight into the partially-filled tank, such that un-sulfited juice is being mixed with previously sulfited juice? If so, I seem to remember a previous thread where one of our experts (perhaps it was Andrew?) recommended hat the new juice could be held in an intermediary tank, where pH could be measured and sulfite added, and then, after 24 hours it could be blended in with the larger batch of

previously-sulfited juice. That might be an inelegant work-around, and if your objective is to get your main fermenter topped-off as quickly as possible, in order to eliminate head-space and get ready for yeast pitching, it would add an extra step and slow things down. But it would allow you to dose the sulfite appropriately for each "installment" of juice going into the bigger fermenter.

On day one the amount of KMS I add is easy (as per the book).

On day two it retake a ph measurement, work out required addition as if nothing had been added, subtract addition already made and add accordingly. The issue is that I know that much of the day 1 addition has been bound up (and I can measure free SO2 so know that it is relatively low prior to day two's addition - say 8ppm free). Is my second (and third) addition logical (Captain). Is there a better approach? Alex -- -- Visit our website: http://www.ciderworkshop.com You received this message because you are subscribed to the "Cider Workshop" Google Group. By joining and posting to the Cider Workshop, you have agreed to abide by our rules, and principles. Please see http://www.ciderworkshop.com/resources_principles.html To post to this group, send email to cider-w...@googlegroups.com To unsubscribe from this group, send email to cider-w...@googlegroups.com For more options, visit http://groups.google.com/group/cider-workshop?hl=en -- You received this message because you are subscribed to the Google Groups "Cider Workshop" group. To unsubscribe from this group and stop receiving emails from it, send an email to cider-w...@googlegroups.com . For more options, visit https://groups.google.com/d/optout.

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> remove solids and won't impact the taste or color. I know many commercial cider houses filter yet Andrew Lea and Simon McKie have both written against it.

I haven't written against it as far as I recall. I have my own

'commercial style' bottled ciders cross-flow filtered prior to carbonation and pasteurisation (both on contract). But for 'farmhouse' style ciders, I have said that I do think it's generally unnecessary.

I've just had some bag-in-box still farmhouse cider made up without any filtering. Horses for courses. Where you live (I'm presuming US) you don't have the farmhouse style that we do in the UK.

> For UV, I was thinking of using a standard potable water inline filter, like you might use for your tab water. Thought was to run it though at bottling. All SS and glass. 260nm. Has anyone tried that?

Forget it. UV "pasteurisation" doesn't work against fermenting yeasts.

It's only good against pathogens, which are not an issue for fermented cider. Search the archives for previous discussions of that.

~~~

> I have two 30 litre barrels of pure Morgan Sweet juice, that I hope to have ready to drink for Christmas. Both are fermenting happily, but having taken delivery of a nice new pH meter today I checked the acidity and it's 3.9/4.0. Only to be expected, I suppose, but will it be ok to leave it, given that it might not have to be stored for long? Or should I get some malic acid chucked in? I could blend it with some more acid juice, but I'd rather keep it single variety, really, and I would like it to be ready in time if possible. The initial SG was 1050.

Given its short life and prompt consumption, you're probably OK microbiologically as you are. Are you sure of that pH? Have you calibrated the meter?

The main problem is that it might be a bit insipid in flavour due to low acid. I have a keeved bottled cider I made a couple of years ago at pH

3.9 (because I had no more acidic fruit to hand) and every time I taste it I kick myself that I didn't just add malic acid from a bag. It's too bland and just needs a touch of acid to liven it.

~~~

> Not wanting to hijack a thread - but it is directly related? - do you need pH4 *&* pH7 solutions to calibrate a pH meter...? (I've finally splashed out & ordered one) Or will pH4 solution alone be OK due to the narrow range most likely to be experienced (ie pH2.8 to pH.0-ish)?

Well, when I were a young lad in the lab it was the norm to do dual point calibrations on pH meters to fix both the set points and the

'slope' between them. And this was done daily. But the electronics have moved on hugely in 40 odd years. My current cidermaking dipstick pH meter (a medium quality Hanna) even suggests in its manual that single point calibration is quite OK (though dual point is better). I only ever calibrate now, at home, at pH 4. The range of interest for cider is about pH 2.8 - 4.4 so i think for all practical purposes a single calibration at pH 4.0 is all that's required.

I know, standards are slipping, but that's our world now. Quick fixes, instant gratification, 5 day fermentations, single point pH calibrations. It's the slippery slope ;-)

~~~

> It could still work. The trick is to keep everything as cold as you can (not easy in the UK just now unless you have a large fridge). If yeast growth starts before the keeving kicks in, you can kiss the idea goodbye for this year. The gel has to be formed before the yeast lifts it.

Forgot to mention that a little judicious SO2 addition could also help to delay things. Use half or quarter of the regular dose for the pH. But add it ASAP before too much yeast growth begins (which it will have already done, just that you can't see it).

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> one large old tree in the garden which you might describe as bittersweet. If left till late enough they become palatable enough to eat, just. Although my sister spat it out when I suggested she try! Although perhaps acidic I now know there is reasonable sweetness because this year I took an OG after pressing and it was 1054.

That doesn't stack up. If it's acidic it isn't bittersweet. Bittersweets are tannic and drying, not acidic. If acidic AND tannic it could be a bittersharp.

> Current position: I have 5 gallons in a single fermentation barrel that was pressed over a weekend (2wks ago) that was 1054 at pressing. Cider yeast was added and fermentation got under way in my dining room. After a week it reached 1024 and I racked it and topped it up with fresh juice (as I had some left over from a second pressing). Reading was then 1028 and I placed it straight in the garage where it has been for the past few days. This is the cider that I want to try and cold rack.
~~~

No chance, IMHO. It's already dropped 30 SG points in a week? You'll never stabilise that by (cold) racking. And in any case the addition of a cultured yeast has knocked it on the head too. Double whammy I'm afraid. Could only work if you have a refrigerated tank down to 2C plus an ultrafilter - commercial winery technology. Cut your losses and take it to dryness, then backsweeten with sugar and pasteurise.

> Secondly, from the second pressing (a week later than the above first pressing), I tried to start a Keeve. ... O.G. was 1054, as with first pressing. I put a pressure release cork in it and put it straight in the garage. It had been there 4days now. There are a few bubbles on top of the liquid but nothing else. Questions I have here are, after reading about the use of Calcium and PME on Andrew's site today, is it too late to order some from Vigo and try to ensure I get a Keeve?

It could still work. The trick is to keep everything as cold as you can

(not easy in the UK just now unless you have a large fridge). If yeast growth starts before the keeving kicks in, you can kiss the idea goodbye for this year. The gel has to be formed before the yeast lifts it.

Good luck though.

~~~

> I do not mind ascorbic acid as it also has some preservative qualities.

Ascorbic acid reactions with anthocyanins are very complex. Too little and it can degrade, forming peroxide and hence reducing anthocyanin colour. Too much and it can complex directly with the anthocyanins also bleaching them. If you use it you must also keep the oxygen right out.

The Food Science literature is full of examples of its multiple behaviours. It is not the simple friendly antioxidant that everyone imagines. But if you get the right level it can help you. You may need a tiny bit of SO2 along with it. You may need trials at various levels to check what is right for you. And try to check out those references to see what they tell you. I no longer have copies of them.

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> This morning we pressed 7 - 19 Bushel bins of Red/Pink-Fleshed Apples (Too many varieties to list) I want to keep the deep red color through fermentation and into bottles. Anybody in group have suggestions beyond keeping the fermented product away from Oxygen to keep the red I was given?

Mike,

It's really not easy. But see if you can get your MI extension people get you this paper "Simard, Re; Beaulieu, F., 1980: Production of a stable rose cider. Journal Canadian Institute of Food Science and

Technology 13(4): 178-183". It's in French.

Also this Japanese patent may help "Yoshida D., Shoji T., Tanabe M. and

Kanda T. (2006). Red cider and method for producing the same. Japanese

Patent Application JP 2006197845" http://ip.com/patfam/en/36956375 It's in Japanese.

Both methods involve the use of some sort of antioxidant (ascorbic acid

AFAIR) to reduce anthocyanin degradation.

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> Yes, but it could be one reason why this misuse of the word is so widespread... French cider making and scientists have had an important influence on worldwide cider making.

They have, but most of what the French have done is quite unknown to the hobbyists in the UK and North America who are most guilty of the mis-use of the word 'brewing' in a cidermaking context. I think the explanation is much simpler. Beer has many times the volume sales of cider, and in most of the English speaking world cider is or has been positioned in the market-place as a direct competitor to beer. Its true origins as a wine are forgotten or not understood by most consumers.

So I think it's a natural mistake for naive people to make when they start to think about cider making, because they make an erroneous connection between beer and cider rather than the true connection between wine and cider.

My objection to the term 'brewing' is that it implies the processes that

Dick spoke of (mashing, infusing etc), and further that it implies that ciders are made to a 'recipe' as beers are. How many times I've been asked "well I've boiled my apple juice, now what do I do?" or I've had complaints that my book and website is short on cidermaking "recipes"!

~~~

> Indeed draught cider is required by UK law still to be served in pubs in pints, 1/2 pints or 1/3 pints - just like beer! Not many people know that.

Gosh Nick you do dig 'em up! I'm quite tickled now by the idea of persuading some unsuspecting publican serve me cider in a wine glass and then having "his collar felt"!

Andrew

(I think quarts in pubs went out in WW1 but correct me if I'm wrong!)

~~~

> If you are going to state specific gravity (SG), **especially** if you are asking for help, please use conventional notation. That is 3 digits past the decimal point.

I agree with Dick. I also have two extra niggles of my own.

One is with people who cannot be bothered to spell "sulphite" correctly

(or the alternative "sulfite"). The second vowel is an "i". If you write sulphate / sulfate (with an "a"), it is simply wrong, and in fact refers to a totally different type of chemical compound with very different properties. Getting the correct vowel does matter.

The other is with people who talk of cider as being "brewed". It isn't.

Beer is brewed, for sure. Wine and cider are simply "made". Using the word "brewed" implies a very different recipe-based kind of process which doesn't apply to wine or cider.

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> Thanks Andrew, it measures in sulphuric so the acidity is 0.7%.

Did you boil off the CO2 before you did the titration? If not, it will read high.

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> I'm gonna probably ask the very obvious here, but I've just tested a batch of my cider and got a reading of 5.0 ppt. Looking back through earlier posts I can see that the desired level is between 0.5% & 0.8%. Can someone confirm that by math calcs 5.0 ppt = 0.5% and that there is no other complicated formulas for getting to the % figure.

% = parts per cent (i.e. per hundred). ppt = parts per thousand.

1000/100 = 10.

You might like to check though what _acid_ these figures are expressed as. Conventionally for cider, acid figures are expressed 'as malic'. If your test gives results 'as tartaric', multiply by 0.89 to convert to

'as malic'. If your test gives results 'as sulphuric', multiply by 1.4 to convert to 'as malic'.

> Also my cultured yeast cider batches have now finished its fermentation in my purpose built insulated box which was heated to a temp of about 15degrees by my greenhouse frost heater. Is it best to turn my fan heater off and store it in a temp of about 5-8degrees to allow it to start to clear or is it best to store at the higher temp??

Colder is better IMHO.

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> Yes, I had to add a little water and boiled it in the test tube. The test kit asked for distilled water but I used tap water not sure what difference that makes

Well tap water will have neutralised and lowered the acid level to some extent. Depends how acid your water supply is and how much you added.

Distilled water or rain water would be better. Plenty of rain around to collect just now ;-)

You can also use commercial bottled water from a granitic or non-calcareous source. Check the back label and choose the one with the lowest pH and the lowest calcium and magnesium levels. Stretton Hills is the lowest I've found - I think it comes straight off the Long Mynd pre-Cambrian granite. But not Buxton or Evian which come from limestone strata.

~~~

> I am new to the cider making world, but have been toying with the idea of buying an orchard. Is there some definitive "complete guide to making cider"? I need all the info I can get.

David,

It depends what continent you're in. Although cider making is much the same the world over, the available fruit differs quite markedly from place to place which will have an impact on the final product.

So if you're in the UK or Ireland, my book
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(http://www.amazon.co.uk/Craft-Cider-Making-Andrew-G-H/dp/1904871984) or website is good for that. If you're in North America, Claude's book

(http://www.chelseagreen.com/bookstore/item/the_new_cider_makers_handbook:hardcover,%20plc) is better because it has specific cider orcharding information. If you're in Australia / NZ you could go either way!

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> Working with a large batch of Brett fermented cider

?? Is that accidental spoilage? Or something you did deliberately? What does it taste like??

> is sitting on the lees, and has a pH of about 3.2. Should I be concerned about spontaneous MLF?

Discussed many times here, even in the last few days. Lees autolysis can encourage wild MLF.

On the other hand low pH counts against it. But if you want to be certain of inhibiting wild MLF, add 50 ppm SO2. I wonder what your TA is at pH 3.2? Couldn't you stand some acid loss for improved drinkability?

> Also, does MLF give off a substantial amount of C02? If spontaneous MLF begins in the bottle is there a risk of blowing caps?

Discussed many times. See for example https://groups.google.com/d/msg/cider-workshop/uZyWei7vPog/to5a5EJKO70J where the figures are worked through.

~~~

> LA Standard dose which many of us adhere to, under what circumstances might one decide to use less, how much less might one use, and given that one can use less and many people don't like SO2 why did LA settle on that amount?

You might find some answers on my sulphite page http://www.cider.org.uk/sulphite.html From that page ....

"All the dosage information is derived from long-standing work at the

Long Ashton Research Station and other wine research institutes, which started in the 1950's and culminated in the late 1970's. It is based on the empirical fact that the level of molecular SO2 required to kill adverse yeasts and bacteria but to allow beneficial ones to flourish is around 1 part per million. To get this level of molecular SO2 you actually need a lot more free SO2 because there is a pH related equilibrium which keeps most of the SO2 in the inactive bisulphite ion form. Hence, in the table and chart above, the amount of SO2 you need to add depends on the pH.

Unfortunately, that's not all the story. When you add SO2 to juice or cider, some of it becomes bound to juice components like glucose, galacturonic acid, pyruvate etc. Hence the total SO2 you need to add must also take account of this binding. It is the total SO2 which is given in the table and chart above. This is not an exact science because it needs to make certain assumptions about the levels of the binding components, which will differ depending on the nature of the fruit, how many rotten apples got in etc etc! So the figures given in the table and chart are necessarily approximate. In the table, the column for total yeast kill is based on a target value of 1 ppm molecular SO2 and for partial yeast kill is based on 0.5 ppm."

Although 1 ppm molecular SO2 is needed to inactivate most yeast, many spoilage bacteria are susceptible to a lot less SO2, maybe as little as

0.2 ppm. That is the principal of using 'sub-optimal' SO2 as I do. It allows a wilder population of yeast and bacteria to flourish while hopefully knocking out the nastiest. But I still use some, because I don't want all the microbes in the juice to have potentially free-rein.

If your juice is very acid (say What I've come across which is confusing me (maybe from Andrew though I can't now find the post on which it featured) is the notion of using a 50% sulphite dose and "saving" some sulphite for later.

No you don't "save it for later". You just use less than the "Long

Ashton standard dose" before fermentation. You don't make up the shortfall afterwards.

You may or may not choose to add SO2 at final racking / bottling

(primarily as an antioxidant rather than an antimicrobial) but that is a totally separate thing, not directly connected with the level you decide to use before fermentation.

What may have confused you is that if the cider is to be sold, a TOTAL

SO2 of 200 ppm must not be exceeded when all additions are summed together, no matter when or for what purpose you added them. Hence it is worth keeping a balance sheet. There was a discussion recently where someone was concerned about exceeding 200 ppm overall, so he decided I think to add a bit less before fermentation so he could still add some at bottling and still keep within the legal limit. Perhaps that's what muddled you?

~~~

> I just need to know if the pectin enzyme used with wine is the same as cider

For most practical purposes, yes. There are indeed some individually tailored pectic enzyme preparations for apple, grape and pear, but in your case I'd just go with what you can easily get locally.

If you have a real problem with haze formation in your cider, you can think again in future years. But for now I would keep it simple.

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> I keeved a 100l batch of cider last season. As far as I am aware the keeve was successful and I certainly ended up with a stable sweet cider at 1022. I bottled this in champagne bottles at the beginning of July. The cider was completely bright at bottling but has unfortunately developed what I am certain is a pectin haze - small jelly like string in each bottle (it is not a yeast deposit).

Hmm ... I'm doubtful that it's pectin in this case. More likely a lactic rope which is quite often seen in French keeved ciders. Did you use SO2 at any point? Do you know the pH of the original juice or cider?

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> I found a guy on amazon selling food safe polyester cloth on Amazon. For $65 I can get enough cloth to make 10 36x36 cloths. The only problem is that the largest size he sells is 100 microns

It's not suitable.
~~~

For one thing it claims to be polyester 'felt' and only designed for single use i.e. not cleanable. For another that mesh size is far too small (search the archives of this group). My Voran polyester cloths for instance are about 1 mm x 3 mm. 100 microns is at least ten times too small.

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> Is potassium carbonate advisable for cider and for this situation? The page referenced above states a 1g/l reduction per 1 g/l of pot carbonate. Does that general rule of thumb hold true for cider? This passage is troubling: "Because both carbonates reduce only the tartrates, it is quite possible to notice that there may be little drop in TA if the malic acid is predominant despite the increase in pH." Which leads me to believe that pot carbonate won't work.

It will work after a fashion, but certainly not to the huge reduction (7 g/L) that you require.

The reference you cited is quite comprehensive. It describes the different effects of potassium on tartrate (wine) and malate (cider and wine). In effect the potassium salts of tartrate are pretty insoluble, so by adding potassium carbonate to wine you can _precipitate_ potassium tartrate which can be racked off to remove tartaric acid totally from the system. But the salts of malate are soluble, so all that you will do by adding potassium carbonate to cider is to increase the pH and to neutralise some of the malate anion and its taste sensation, but the acid itself will still stay in solution.

Hence addition of potassium carbonate will reduce the perceived acidity up to a point but there is only so far you can go with it, not least because you will also be adding potassium ions which will have an effect on flavour (and may also have labelling implications?). I would say

(following Pollard and Beech 1957) that about 3g/L is probably the maximum amount of potassium carbonate you'd want to add.

It's impossible to predict just how it will turn out. All you can do is to try the experiment on a small scale and see what you think.

(Just six penn'orth from one of Her Majesty's subjects.)

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> Cider apples can cover a wide range of cider / tannin types

Sorry typo. I meant 'acid / tannin' types.

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> What is the best mix of apples in cider? Does it have to be cider apples all the way or is there a good split between eaters and cider apples.

I think this topic is fairly well covered in the books by Claude and myself, isn't it?

There are two important things to consider in my view.

1. The acid level of your final blend. You will probably be aiming at a final acid level in the cider of 0.4% - 0.7%, depending on the style of cider you wish to make. So this will dictate the balance between dessert apples (generally high acid) and cider apples (which may be low acid if bittersweet, but high acid if sharp or
~~~

bittersharp). Ideally you should also be aiming for a pH of 3.8 or below for fermentation, for good microbiological control.

2. The indefinable aspect of 'vintage quality'. Cider apples can cover a wide range of cider / tannin types (there are 4 classic classes) but they will generally have much more character to them after fermentation than dessert apples. That's how they come to be 'cider apples'.

If you want a rule of thumb, and you are in the UK, I'd say you could aim at a 50/50 split between bittersweet and sharp / bittersharp cider apples. If you don't have the sharp / bittersharp apples, then you could substitute dessert apples but with some loss of overall character. (And not all dessert apples are the same. Russets are going to beat Gala, for instance.

On the other hand, Jonagold and Katy can be surprisingly successful.)

But depending on where you live and in which country this may not be possible. You may not have access to bittersweet apples or they may not grow well in your climate or on your soil. In any case, you can make good light ciders purely from dessert apples, as long as you are aware of and on top of the acidity problem and you choose your varieties intelligently.

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> So if you both had a blank canvas 5 acres + with a choice of any tree/variety/type available on the market and you were to produce 1 Cider and 1 Perry which had to be organic what would you do?

I note from your previous mails that you are in Surrey. I can't comment on the perry, but so far as the cider goes I would personally forget dessert varieties and would go for a 50/50 bittersweet / bittersharp mix as I suggested before. So you might typically have Dabinett, Harry

Masters, Yarlington Mill as bittersweets, and Kingston Black, Stoke Red and Browns as sharps. They are all mid - late season so can store for a while but more importantly will give you a balanced blend both before and after fermentation. These should all work fine if you want to be organic. If you wanted to spread the cropping period you could try some of the new Liz Copas 'girls' varieties which are early season.

You can't be sure which of the cider varieties will do best on your site so you will have to be prepared to experiment and if some of them don't do well then topwork them over to something else.

I would not plant any dessert varieties deliberately if cider is all you really want.

On the other hand if you want to go to the trouble of growing organic dessert varieties to acceptable market standard, while diverting the outgrades to juice as well as cider, then I would tend to go for the older 'Victorian' dessert varieties eg Blenheim Orange,

Egremont Russet, Laxton Superb, Ribston Pippin, D'Arcy Spice, Ashmeads

Kernel etc etc which are better flavoured and barn store better than more modern dessert varieties and can command a premium if you get the marketing right.

I also note from a previous post that you were planning to make large amounts of vinegar. It seems a shame to make top class cider only to downgrade it to vinegar. You don't need good cider apples to make vinegar - Bramley cider would probably do fine - and there are some practical drawbacks with making vinegar from bittersweet ciders because the tannins tend to go on forming hazes in finished product indefinitely

(unless you add SO2) which can be a problem for the consumer who generally expects vinegar to be clear.
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But as I said before these are all decisions you must make for yourself after adequate research.

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> Like I said I'm new to this, sorry for any offence. What should I be calling it then?

"Foam" sounds good enough to me. I don't know why some home-brewers feel the need to lapse into Milwaukee German. It always seems highly pretentious to me. Anyway, the term Krausen is not used in UK cidermaking. Nor is Trub (the English for which is Lees).

> I only ever really drink cider from Bridge Farm, at the Dorset Steam Fair, as the commercial stuff doesnt quite do it for me. Nigel's stuff just seems like how it should be?

Agreed. If you can match Nigel you'll be doing OK!

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> This morning however the two slower ones have kicked right off. There was Krausen all over the place and i've had to put 'blow off' tubes in place after a quick read up before coming in to work. Will this settle down? Is this to be expected? Have I ruined it all by being impatient with the natural yeasts?

"Krausen" is a brewing term not used in cider making. Cider is a fruit wine, not a beer. You will not earn many friends here by using brewing terminology ;-)

I don't know where you got your 'instructions', but it is quite normal to have a delay of a couple of weeks after sulphiting while the wild yeasts get going. Just think how those few cells have to multiply, maybe by ten thousand times, until they can saturate the liquid with CO2 and you can see all those bubbles. It takes time.

It will indeed all settle down. You haven't ruined anything by being impatient. Clean it all off, replace the airlock and relax. See here for more 'instructions' http://www.cider.org.uk/part3.htm

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FWIW, Morden Russet is listed on page 24 here https://archive.org/details/indexoffruitcult19899davi

It says it's a seedling of Anisim selected at Morden in 1935. Anisim seems to be a hardy apple of Russian origin.

~~~

The Hereford Competition details have been announced and are downloadable from here http://www.cidermuseum.co.uk/assets/International-Cider-Perry-Comp-2014.doc

Notably for the first time in any UK competition as far as I know, there are two new classes for ciders made from 'culinary' fruit. I take that to include 'dessert' fruit. Anyway, it provides a slot which never existed before and is surely to be welcomed.

Andrew

Dear Cidermakers

I have pleasure attaching the details and entry form for the

International Cider & Perry Competition 2014 taking place on Wednesday

14^th May 2014 and are pleased to introduce some new categories.

If you require any further information please do not hesitate to contactus and we look forward to receiving your entries.

Best wishes

Margaret Thompson

Museum Director

Cider Museum, Hereford

01432 354207

> but my main point is that a good cider is a good cider regardless of what Apple it is made from

But it can only shine if it is judged amongst its peers. For instance, if you're judging a range of predominantly low acid bittersweet ciders and a high acid low tannin sample suddenly crops up in the set, it will inevitably get marked down no matter how good it is in absolute terms. I have had that experience at Bath and West more than once and I remember one time was when judging with Nick Bradstock and we both observed the same thing and both somewhat lamented the situation we were in. It was a good cider but there was no way we could let it through.

We don't have 'cider style guides' here as they do in the US (well done

Dick and others!) but that helps to put them into the right category.

The default UK position for the last 100+ years is that West Country cider is the norm and anything different from that is inevitably marked down. That's a consequence of our cider history but the landscape is changing and I think it is far-sighted of the Museum Competition to recognise that.

~~~

Just to clarify about "culinary fruit", Margaret says it is "a section for cider made by fruit other than cider fruit".

So now you know.

> The Hereford Competition details have been announced and are downloadable from here http://www.cidermuseum.co.uk/assets/International-Cider-Perry-Comp-2014.doc Notably for the first time in any UK competition as far as I know, there are two new classes for ciders made from 'culinary' fruit. I take that to include 'dessert' fruit. Anyway, it provides a slot which never existed before and is surely to be welcomed. Andrew -- Original Message -- Subject: International Cider & Perry Competition 2014 Date: Tue, 11 Mar 2014 12:10:56 -0000 Dear Cidermakers I have pleasure attaching the details and entry form for the International Cider & Perry Competition 2014 taking place on Wednesday 14^th May 2014 and are pleased to introduce some new categories. If you require any further information please do not hesitate to contact us and we look forward to receiving your entries. Best wishes Margaret Thompson Museum Director Cider Museum, Hereford 01432 354207

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I think if it were up to me I would have called the new class "Eastern
~~~

Counties style" or some such. Because that's what it's all about really.

I welcome the new class, because hitherto such ciders have always been at a disadvantage when judged against their typically more tannic and lower acid West Country cousins.

Andrew

> I'd imagine they are sensible enough to have a cut-off point for ciders which use "culinary fruit" as sharps - and those made entirely with culinary fruit ie: some Kentish style or "eastern counties" ciders. I'd hardly call it a nonsense when it potentially opening up new areas of taste & flavour - and above all encouraging makers across the UK. Ray

>

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> Andrew

>

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> Margaret Thompson

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> Museum Director

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> Cider Museum, Hereford

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> 01432 354207

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> Visit our website: http://www.ciderworkshop.com

>

> You received this message because you are subscribed to the "Cider Workshop" Google Group.

>

> To post to this group, send email to cider-w...@googlegroups.com . For more options, visit https://groups.google.com/d/optout.

%2%

~~~

> a traditional cider which includes some of the more flavoursome desserts as part of the blend is often at an advantage as it stands out from the crowd

%1%

Well it may be, but that's not what we're talking about here. We're talking about ciders made from dessert / culinary fruit alone. No

'benefit' of tannins etc. I have judged such ciders and no matter how good I have been forced to disregard them because they are too distinct from the West Country style which is regarded as 'the norm' for UK cider. In this new class they can more easily be judged on their own merits.

~~~

> Hi, I'm off to Australia fairly soon and would love to know if there are any ciders I should be looking out for as I'd love to try some of the local stuff while I'm there.

The winners of the recent Australian Cider Competition are here http://www.cideroz.com/2013/10/18/it-finally-happens/

Tread carefully, obviously many of them are imports, but it will give you some good local names to look out for, though I'm not sure how wide a distribution they would necessarily have.

You must realise from the UK perspective that most of them are made from pack-house table fruit, many of them by the 'Moscato' process, so the majority of them are a lot different from what we have at home.

One not on that list (surprisingly?) is Henry of Harcourt, some of whose ciders are made from UK and French varieties of cider apple. Likewise

Small Acres and Red Sails also use European fruit varieties. But there are not many such producers.

~~~

> by which time it was very ripe and many were badly bruised, but into the cider they went. So I wonder whether it was that apple that has contributed to these flavours. .....

I think that is a very important observation. The flavours you seek are due to bacterial action (lactobacilli) on non-volatile phenolics such as chlorogenic acid which (as has been said before) are present in considerable excess even in dessert apples. Yet it is very rare for dessert apple ciders show these flavours.

I am coming round to the hypothesis that it's maybe the way in which the apples are handled that makes the difference, not their chemistry. Cider apples in the UK and France are collected off the ground after some weeks, often kept for a few weeks longer, and are very mature. They do get banged around a bit. Some may be bletted or bruised. There may even be a few rots creep through. Dessert apples by contrast are typically picked straight off the tee, maybe a tad under-ripe, and probably used directly, rarely when they are over-mature. In some parts of the world, they are taken from controlled atmosphere cold store where their maturity has been deliberately curtailed.

Now, there is data from Long Ashton to show that the total acid tolerant bacterial population associated with cider apples rises considerably (40 fold) over 3 weeks storage even if hand-harvested, and a _further_ 100 fold if bruised and bumped during mechanical harvesting before 3 weeks storage (Beech and Carr review 1977). So my hypothesis is that it's the way the apples are harvested and stored before use which allows a much higher population of lactobacilli to develop in the fruit before pressing, and that may be an important determinant of whether these flavours develop or not, rather than whether they are 'dessert' or

'cider' apples. Dan's observation would seem to bear that out. Of course we know there are other factors which favour lactobacillus growth too, such as a lack of SO2 and a highish pH, but I suspect that fruit history and handling could also be important.

~~~

> But I can't give you a recipe along the lines of "do this and you will get it". I don't think anyone can.

Just an afterthought ..... Here in the UK a particularly prominent spicy

/ phenolic note is often associated with Yarlington Mill apples - to the extent that it is almost regarded by some as a 'varietal character'.

There _may_ be good chemical reasons for this because its non-volatile phenolic composition is distinctive and different to other cider apples.

So it may just be more pronounced with YM when it occurs.

So if you can secure enough Yarlington Mill to make a single variety test batch (maybe with a little acid fruit to keep the pH down a tad) and you use a lightly sulphited wild yeast fermentation and you don't add any SO2 at storage, maybe you will achieve this elusive character.

The reason I suggest a lightly sulphited wild yeast fermentation is not because the yeast in itself is responsible for the character, but because it may give a greater chance for the wild Lactobacilli to persist through from the fruit than if you hammer everything at the start with full SO2 and a cultured yeast.

(I realise that you are already observing MLF in your ciders but, to echo Dick, that may be by the action of wild Oenococcus oeni - formerly known as Leuconostoc oenos if you read older textbooks - and not of

Lactobacilli. Both will metabolise malic to lactic and make bubbles.)

~~~

> I haven't used such barrels myself but I thought I'd just pass on a cautionary tale about someone who used fresh whiskey barrels and left the cider in them long enough for the residual whiskey to leach out into the to such an extent that they were "done" by trading standards because the alcohol content was above the 8.5% threshold.

Also worth mentioning that in the UK HMRC will expect you to pay 'made wine' duty on any cider that is aged in spirit barrels and thereby acquires the flavour of the spirit. Cider is only allowed to taste of cider (with due allowance for genuine maturation in wood of course).

This has been covered here quite a lot in the past.

~~~

> I've heard that Andrew Lea is editing a new book on cider making this year? Is it coming out soon?

It is not a new book. It is a 3rd edition of the existing book. The existing book is still available here http://www.vigopresses.co.uk/Catalogue/Books/Cider-Apple-Juice-and-Perry/Craft-Cider-Making-by-Andrew-Lea-99030

~~~

> Hi Andrew, Does your book cover making cider using wild yeasts?

Yes. I give pretty much equal weight to the use of cultured wine yeasts and wild yeasts. Nearly all my own cidermaking for the past 20 years has been with wild yeasts.

~~~

Well that's a lot of chat about my book ;-) From the horse's mouth, soto speak, I can tell you the following....

The third edition is in production with my new publishers now. It willbe completely redesigned and reformatted, with colour pictures, but theunderlying approach and structure of the book will remain as it is now.

It is scheduled for publication in September 2015.

The text has been updated slightly where appropriate, with some minoradditions and corrections, but it remains as a 45,000 word practicalintroduction to the subject. In my mind, if in nobody else's, it is a

21st century version of the 1957 "Cidermaking" by Pollard and Beech,trying to bring science-based 'best practice' to the amateur and smallscale maker. There is some science in it, but only as much as is neededto do the job. There are no 'recipes'.

If you didn't like the previous versions, the third edition won't changeyour mind. I do not plan to write a bigger book. There are articles onmy website that go into stuff more fully than the book does, and I hopeto revamp the website this year.

If you want an alternative approach to mine, check out Claude's bookhttp://www.chelseagreen.com/bookstore/item/the_new_cider_makers_handbook/ or

Bill Bradshaw'shttp://www.amazon.co.uk/Cider-Manual-Practical-Growing-Manuals/dp/085733283X

If you want to look at some of the serious science, I suggest you readmy new article on Cidermaking in "Oxford Handbook of Food Fermentations"edited by Charlie Bamforth.http://ukcatalogue.oup.com/product/9780199742707.do

~~~

All,

There are over 1500 registered members on this forum, and probably many more casual readers. Our list is for _public_ discussion of cider matters. We don't all want to read people's private arrangements and conversations even if they are cider related.

Please keep such stuff off-list.

~~~

> I'm not at home right now, so cannot provide a pic - yes still under airlock. Looks and smells just like bread mold - bluish in color - not well defined in shape - floating atop the cider. No apparent gas or other signs of fermentation.

That _does_ seem like mould (Aspergillus or Penicillium). Did you add any yeast originally to get it going? We need an SG value really. Have you tasted the liquid? Either way I'll agree it doesn't sound too good.

~~~

> Re the mold. Yes tasted it. Scary moldy and I've dumped it. This is my first year, and I had many gallons of spectacular cider that was like champage, wonderful; thus, while I'm disappointed, I'm still glad for the batches that were good. So I'm not heartbroken, just wanting to learn from the experience. Sorry if this is a repeat of my question, but it's how I learn best, do you think that the cold temps kept fermentation from getting established properly? This was a wild fermented batch.

It does sound a bit odd, if the other batches behaved quite normally.

Were they all wild fermentations or did you add yeast to the others? It is quite unusual for juice to go straight to mould and stay there - usually the yeasts get going at some point. But if there was a very low level of wild yeast and it was cold, perhaps this could happen.

~~~

> Is there any way to salvage cider that has gotten a mold growth on the top of it?

Well I'll repeat what I just said. What makes you so sure it's a mould?

What is the SG of your cider now? Has it finished fermenting? Is it still under an airlock?

Moulds are only likely at the very beginning of a (slow) fermentation.

Otherwise the more probable possibilities are a pectin gel or a film yeast. Does it have coloured spores? Can we see a picture or a full verbal description please.

~~~

A new group member just tried to post the following link in the subject line but with no accompanying text:

http://www.ebay.co.uk/itm/Voran-Cider-Press-and-Mill-/181352882305?

This may be of interest to some.

Andrew (with admin hat on)

We've been here before, a couple of years ago. See this thread https://groups.google.com/d/topic/cider-workshop/rJjxsXSzLl0/discussion

I even posted a graph showing cumulative (Excel calculated) PU's (for an apple juice, not a cider) to take account of heating and cooling profiles.

And Wes chipped in some useful stuff about his data logger too.

This thread is almost a re-run!

~~~

Seems it's OK to mention it http://www.thewestonmercury.co.uk/news/business/a_century_of_cider_making_expertise_at_village_company_1_1679262

> That will explain why, when they were on telly the other week, Ribena-branded polo-shirts were being worn!

> a well-known Somerset cidermaker (not sure if I'm allowed to mention them) presses and concentrates all the blackcurrants for Ribena.

> Very quickly .... invented at Long Ashton in the 1930's by Vernon Charley*

*Sorry, meant to say by * that Vernon Charley was the chap who translated*

Warcollier's book into English as "Principles and Practice of Cider Making".

~~~

>

> The story is not widely known, so I have written it up and you can find it here http://cider.org.uk/campden.html if you are interested.

> Fascinating ! Doesn't it tend to each the colour out of the fruit? I ask because I once asked my father, who worked for a jam maker, why colouring was listed for an ingredient in strawberry jam, to be told that when the barrels of strawberries arrived at the factory, the sulphur dioxide had taken the colour out and so needed adding back in.

Yes 1000 ppm does bleach the colour considerably. But with colour rich fruits like dark plums, the binding is reversible and most of the anthocyanin colour returns when the SO2 is boiled off. Strawberries are tricky because their anthocyanin pigment (pelargonidin 3-glucoside) is at quite a low level and very labile anyway. That's why much commercial strawberry jam is / has been artificially coloured.

I'm not sure how much sulphited fruit is used in the jam industry now.

My understanding is that nearly all of it is IQF (individually quick frozen) at source and imported deep frozen, and the old sulphite process is virtually obsolete.

~~~

A good friend of mine recently asked me about the definition and history of the Campden tablet, which was not invented for home winemaking as many suppose.

The story is not widely known, so I have written it up and you can find it here http://cider.org.uk/campden.html if you are interested.

~~~

> Fascinating - now about the Ribena?

Very quickly .... invented at Long Ashton in the 1930's by Vernon

Charley who was then head of the Fruit and Cider section.*

Commercialised and named in 1936 by HW Carters of Bristol working closely with Long Ashton. Taken over by the Ministry of Food during WW2 as a naturally high Vit C syrup. Postwar, Carters expanded production and built a new factory at Coleford in the Forest of Dean. Charley left

Long Ashton (1948?) to become the first director at Coleford.

Carters were taken over by Beechams, Beechams by SmithKline, SmithKline by Glaxo (GSK). This year the Ribena brand was sold for the first time and is now owned by Suntory of Japan. To complete the cider circle, a well-known Somerset cidermaker (not sure if I'm allowed to mention them) presses and concentrates all the blackcurrants for Ribena.

~~~

> As a culinary / cooker they are of course Sharps. So will give good acidity to balance a blend of Bittwersweets. Don't fall into the misguided belief that if it isn't a "cider apple" it can't be used for making cider! :-) I would guess a number of folk on here use Bramleys etc as Sharps to adjust acidity in their blends to get a good pH for a clean ferment. It's better than adding Malic Acid powder isn't it?

I'm with Ray. I grow Golden Noble as a great cooker. I've never needed to use it for cider but as a sharp it should blend just fine with bittersweets. Don't know how it would press. I suspect the pulp might be a tad sloppy especially as the fruit ages.

To the taste, it's not as acid as say Bramley or Foxwhelp. (I've never measured it). So do your own measurements of pH and TA to help you judge what blend level to use.

~~~

> It seems to be Italian in design .....

This is the manufacturer's website for the WineLab version http://www.cdrfoodlab.com/food-analyzers/winelab/ There are other versions for general food analysis, edible oils etc..

QCL are the UK agents and one imagines that the CiderLab is a variant model of WineLab which they have helped to develop.

~~~

> surprised that it's a bitter lemon taste, so my question is are there different types of citric acid and have I got the right one to use as a steriliser?

There is only one 'citric acid', which has an intensely sour taste, but is not bitter. I suppose there might be some formulations on the market which have lemon flavour or oil added but I never heard of that. The ingredients list should tell you what's in the pack? Should just be 100% citric acid.

~~~

> The thing is, Andrew, there should be plenty of academic research into the effects of coolstorage for eating apples.

There is. Some of it is summarised in this review which I just picked at random http://www.tandfonline.com/doi/abs/10.1080/01140671.2000.9514136#.VJckzv8APA

But the original query wasn't about that. It was about making cider with

CA stored apples which is quite a different thing and on which there is virtually no published work for the reasons I suggested.

~~~

> Thanks Greg and Doug. Amazing what a paucity of information there seems to be on this?

Well not really. The majority of the world's ciders are made either from fresh fruit or from juice concentrate with aroma addback. As far as I know it's only in Australia and New Zealand (and maybe a little in the

US) that CA stored pack house rejects are used. So there won't be much data on this topic.

Also, companies going this route may well have studied it but they aren't going to put their findings into the public domain. The way the cider and the whole food industry is now, a lot of research work never appears in published academic literature. If it has any immediate commercial potential, companies prefer to keep it in house as a 'trade secret'.

~~~

> there are well established traditions of fruit wine made with apples plus another ingredient. The experimental part is to call them cider.

Nail hit squarely on head!!

~~~

~~~

> I know from the brewery world, acceptable levels in packaged product are 50-100 ppb. I have also read that for wine, dissolved oxygen levels up to 1 ppm are fine because the added SO2 prevents a host of nasty oxidized flavors. Where does cider fall on this incredibly broad spectrum?

(Commercial) cider falls in pretty much with (white) wine. That is because of their similar polyphenol content and the fact that SO2 is nearly always added to maintain 30 ppm free. So any adverse effect of oxygen is mitigated by the SO2. SO2 does not react with the oxygen directly but with primary oxidation products of wine / cider (aldehydes and oxygen radicals), hence blocking their further transformation.

However, canned ciders often do not contain free SO2 because of potential corrosion of the can and the lacquer. An industry friend has told me that a target DO value for them is Looks to be an older version of the Voran100P2, (http://www.voran.at/en/machinery/product-range/menu/obstverarbeitung/category/packpressen-mit-schiebebiet/product/packpresse-100p2/) though I'm not sure why the voltage and ampage info has been over-stamped. Seller says it has an aluminium catchment tray. I would have thought Voran used SS, or was this not always the case?

~~~

> Hmmm it is still absolutely inactive. The true cyser going great guns however. Should I add some nutrient?

I would add thiamin first, see what happens. If that doesn't work in a week or two, add nutrient. This was discussed here in December. This is what I wrote:

"Thiamine aka Vitamin B1http://www.homebrewcentre.co.uk/product.asp?pID=293&cID=137. You needabout 0.2 mg per litre and the tablets are 3 mg each so each one doesabout 15 litres. It may tell you to add more on the pack but I wouldn't.

Leave that a couple of weeks and see what happens. If nothing starts upin that time, then the next step is to add yeast nutrient aka ammoniumphosphate / sulphatehttp://www.homebrewcentre.co.uk/product.asp?pID=294&cID=137 The dose isabout 300 mg per litre. Again the pack will tell you to add more but Iwouldn't."

> The yeast granules are still totally distinct.

Didn't you hydrate them properly? What sort of yeast are you using?

Remember you are already doing this on a fermented cider. You may have to help it with some aeration too.

~~~

> 1) Both of the DJs with honey have taken off like a rocket. The air lock glugging and the contents murky and swirling - great. The DJ with golden suryp is totally inactive - the grains of yeast just floating there, still clear and airlock inactive. Why would this be?

I can think of two possible reasons:

1. The honey will probably be higher in yeast nutrients and assimilable nitrogen than the golden syrup which is probably quite devoid of anything nitrogenous.

2. In the process of making golden syrup, yeast inhibitors like HMF

(hydroxymethylfurfural) are generated from sugar degradation. These will slow down yeast growth.

~~~

> Andrew's book says NACM allows up to 7 ppm of Iron. So do I read this correctly that: a. that level does not spoil the cider b. that translates to 7g / 1000 L c. if I knew the ppm of the Iron in my well water, I could calculate the volume of that water that would have to gotten into my juice to get 7g

Yes. But the 7 ppm isn't some magic threshold value. It's just that above that you run greater risks and Also high levels of manganese. These tend to be associated with the sulphur smell.

The manganese thing is interesting. It is known from the Australian wine industry that manganese sulphide can form at Mn hotspots in stainless steel tanks which have contained normally sulphited wine and which are then caustic washed. The manganese sulphide then later breaks down to give H2S in the next charge of wine. This is one of the very rare occasions when SO2 can give rise to H2S. It is due to the chemistry of manganese which can exist in a large number of different redox states.

It is one reason why a caustic wash of an SS tank should be followed by an acid wash.

~~~

> Esteemed group - I just finished pressing into an IBC that I had washed and rinsed extensively with well water discolored presumably by iron. After running sanitizer through as a final step, I left behind maybe a gallon or three of the water in the bottom. Five hours later, after having added 50ppm sulfite, the juice looks very very dark in the tank.

A couple of questions I think.

- Have you had the well water analysed? Do you _know_ it is iron rich or are you just guessing? Here in the UK, especially in upland areas, many well and surface waters are brown but that is due to humic acids from peaty soil, not necessarily iron.

- What sort of sanitiser did you use? Was it made up with and rinsed away with said water? Is it three gallons of sanitiser solution in the
~~~

IBC? If you use a chlorine or peroxy based sanitiser without rinsing, the residue could oxidise the apple polyphenols to make them brown.

(Though the peroxy based sanitisers like peracetic and percarbonate can be blown or dried away in a current of air AFAIR, obviating the need to rinse but they must be dried.)

You raised the question of the type of iron (metallic / ferrous / ferric) but I think this is a bit of a red herring. Metallic iron would soon dissolve in the acid of apple juice to give an ionic form. Normally in the presence of air this would be the ferric form, but in the reducing conditions of fermentation this would go back to the ferrous form. As soon as air is admitted, it will re-oxidise to ferric which will complex with the polyphenols to give the brown / black colour.

~~~

> The reason why we thought of the make-shift method is because a farmer we know in South East England produces vinegar successfully this way which I have personally saw and sampled. He does not have any biochemical background.

Well of course you might strike it lucky first time by being purely empirical ;-) But for the volumes you are contemplating, it seems a huge gamble if you have never made any cider or vinegar before.

> For 60,000 litres of vinegar production, what is the capacity of the submerged acetator that you would recommend? Any low-budget ones that you may point out to us to buy? It's primarily going to be used seasonally.

No good asking me! I'm not a vinegar technologist. Talk to specialists like Frings http://www.frings.com/ACETATORS-Fermenters.52+M52087573ab0.0.html http://www.frings.com/fileadmin/assets/Download_Essig/FRINGS_VINEGAR_2009.pdf or Cetotec http://www.cetotec.com or Labu http://www.labu.at/en/direct-marketing/fruit-processing/vinegar-production/

> Are there any specialised courses that any one offers for vinegar production? Or a consultation service you may know?

Nothing in the UK AFAIK. You could try these people in Austria, though I know nothing about them http://www.essig.at/en/consulting/

~~~

> 1. Since the ultimate aim is to produce natural vinegar, should we ferment directly into vinegar as in, not wait till we ferment all sugar into alcohol then transfer alcohol into acidity? Can both fermentations happen simultaneously if we introduce air?

No. It is a two step process. Anaerobic (yeast) followed by aerobic

(acetobacter). You can't mix them. They have to be sequential.

> 2. Please note we do not plan to add any yeast. At which stage should we add the vinegar mother? Right from the start or once alcohol fermentation is say half way through?

Once the yeast fermentation is entirely finished. You should then rackthe cider off the yeast before trying to acetify it.

> 2. We plan to inject air into the IBCs to speed-up the process using an aerator (the types used for fish ponds or waste industry like side channel blowers or regenerative blowers). At which stage is it recommended to do so? Right from the start or once we get full alcohol fermentation?

Once the yeast fermentation is entirely finished.

Be aware that once youstart to pump / sparge air into the bulk, the mother (Acetobacterxylinum) will mutate into a single cell form (Acetobacter aceti). Itwill become entirely dependent on the forced air supply and willprobably die if it doesn't get it. Acetobacter are obligate aerobes. The

'mother' is a mat they make to keep them in contact with air. Theprecise technology of forced aeration in submerged vinegar acetators iscritical to success. You cannot really mix the static Orleans surfaceprocess with a forced aeration (submerged) process.

Acetification is also exothermic and in a large forced aerator with notemperature control the bacteria can also overheat and die.

> 3. Current juice sugar is about %11. Is it realistic to expect a vinegar acidity of %6 by the end of it? And if so how can we dilute it to the recommended %5, bearing in mind the juice is certified organic, and we wish to maintain that accreditation for the vinegar?

Presumably you must use organic certified water ;-)

> 4. Do you recommend any books or specialist resources on the subject? Any courses that you may recommend?

http://link.springer.com/chapter/10.1007/978-1-4684-8225-6_13

http://link.springer.com/chapter/10.1007/978-1-4613-0309-1_1

> 5. Would you recommend the use of industrial vinegar making machines to the method described above? Some machines produce vinegar within a day with the addition of lab-made bacteria and forced aeration.

For 50,000 litres, yes. The bacteria are not 'lab-made'. They aresimply selected from wild Acetobacter strains.

> 6. Lastly, once vinegar is made, it is said to leave it to age for at least 5 months. Is that necessary? And why?

Improved flavour. Sedimentation of polyphenol hazes. Those are two reasons.

~~~

> Fascinating topic. I too have been making CV ... I'm not sure what to do next. Should I simply draw it off and bottle it?

Have you analysed the acid level? It needs to be a minimum of 5% to be called vinegar.

> Will the mother automatically regrow in the bottle if I don't actually take bits off it? Does anybody filter theirs?

Mother will regrow in bottle if (a) there is unconverted alcohol and / or (b) access to air eg through a faulty cap. You can stop this by pasteurising or using SO2. Filtration of cider vinegar is not easy on a small scale and you might like to fine it first. The two-part finings work well.
~~~

Cider vinegar sometimes goes hazy in the bottle even if filtered, due to tannin polymerisation. SO2 will stop this. If you are only using it yourself, it hardly matters. If you are selling it, some people get around that by putting a label on the bottle drawing attention to its

'natural' qualities and turning a drawback into a strength!

~~~

> Thanks Andrew. Would you test the acidity using a TA kit as you do in cider?

See http://cider.org.uk/acid_titration.html

You have to dilute the vinegar because it's round about 10x more acid than cider.

~~~

If you want to 'go it alone' you might like to follow up the patents cited below to understand what sort of technology has been used:

"Vinegar production is an important fermentation process in which vinegar is produced from dilute aqueous alcoholic solutions such as charging wort. Vinegar is made by a variety of processes and the most widely used modern apparatus for the production of vinegar is the

Fring's generator (British Pat. No. 731,804 and No. 1,101,560) which is a semi-continuously operated, vortex-stirred tank giving volumetric efficiencies of up to 0.5 (the volumetric efficiency is the ratio between the volume produced daily and the effective volume of the fermentation vessel) with 96 to 98% conversion of ethanol into acetic acid, thus permitting performances of up to 0.48 to 0.49 (the performance is obtained by multiplying the volumetric efficiency and the percentage of conversion divided by a factor 100). This system has still not entirely replaced the much older and far less efficient, so-called

"Quick" process (cf. British Pat. No. 781,584), involving the continuous recirculation and sparging over birch twigs and other fillings in large wooden vats.

A recent development in the production of vinegar is that of

Greenshields (cf. British Pat. No. 1,263,059), using an elongated vessel similar to that of the Fring's generator, but using an upwardly moving fermentation medium, whereas the Fring's process uses a downward stream.

According to the Greenshields process, volumetric efficiencies of up to about 1.0 are achieved, with up to 88% conversion, thus permitting a performance of about 0.88.

In the vinegar process special kinds of bacteria are used, generally

Acetobacter species, and for a high efficiency it is advantageous that the bacteria are well suspended in the culture medium.

On the other hand, it is preferable that the bacteria settle quickly to achieve high volumetric efficiencies without the risk that the bacteria, or a substantial part thereof, are taken along with the final product, in which they remain suspended. Therefore, it is important to use elongated vessels, as indicated in British Pat. No. 1,263,059. Loss of bacteria can also be reduced by including a separate sedimentation vessel having a larger cross-section than the fermentation vessel to achieve sedimentation of the bacteria. Thus, an important

limitation of the volumetric efficiency of known processes is the limited capability of the bacteria to settle out before removal of the final product."

~~~

> i know the basics that it need more aeration and temperature should be about 25-30 degree. but i dont know how to make a generator?

Google is your friend. See here http://naldc.nal.usda.gov/download/ORC00000397/PDF (12 MB download). Fig

4 shows a classic beechwood 'generator'. Fig 3 shows a 'rolling generator' which is much simpler. Modern 'acetators' use forced aeration with no solid supports for the bacteria but that is another big step of complexity and cost.

These are also described in the references i cited before

http://link.springer.com/chapter/10.1007/978-1-4684-8225-6_13

http://link.springer.com/chapter/10.1007/978-1-4613-0309-1_1

In your present case I wonder if you might need extra nutrients if the acetic fermentation has 'stuck'? Maybe you should try 120 ppm of ammonium phosphate. I presume the air supply is unimpeded? And you must keep the temperature up as you say. Otherwise you may be suffering from a phage as I said before.

~~~

> Dear Andrew,

>

[Acetator] It's primarily going to be used seasonally.

Why? Have you thought that through? If you have a generator or an acetator and it's thermostatted, you can make vinegar all the year round on a short cycle in smaller volumes from bulk stored cider. That's the way it's normally done, and cuts down on capital costs.

~~~

> I still however have the following queries: 1. Is getting the PH level right necessary for vinegar production? Should we bother or is it luxury?

One the one hand I doubt that it matters much about pH control of the alcoholic fermentation if it's to be turned into vinegar.

On the other hand if it's too high (say

> 3.8) it may encourage the growth of unwanted lactic acid bacteria? So maybe stick to normal recommendations

(i.e. pH 2. I plan to leave my apple juice to ferment naturally in IBCs for 3 weeks without adding any yeast.

3 weeks may not be long enough with wild yeast. Monitor the SG and let it take as long as it takes.
~~~

> tube to go to the bottom of the IBC) and introduce slow forced aeration into the IBCs (using an aerator used for fish ponds or the likes) to speed up the acetification without the need to add bacteria..... What are the pros and cons of the plan above as opposed to using the industrial submerged acetification machines?

Unless you are a proper (bio)chemical engineer and can do all the right calculations about gas exchange, O2 demand, heat production etc, then you are 'flying by the seat of your pants'. The design and perfection of the Frings and Greenshields acetators was not by accident (though I think the latter is no longer in production). There was a lot of planning, a lot of calculation and a lot of empirical tweaking to get them to a commercially working stage. I doubt that anyone here can help you with that. In any case it is proprietary knowledge and something of a "trade secret".

> 3. If we are to thermostat-control it, what is the ideal temperature for both fermentations (cider and then vinegar) the wild slow way, i.e. If we are to leave Mother Nature to do its work with minimal intervention on our part, hoping for the best?! (If we are not to introduce forced aeration).

You could probably thermostat the alcoholic fermentation as high as 20C.

The vinegar conversion could / should be warmer up to 30C? But don't let it overheat ;-)

> 4. Is adding nutrients at all necessary for vinegar production if we start with a %100 apple juice, organic at that?

Not needed for the slow Orleans process, or for a beechwood 'generator'.

Probably necessary for the submerged culture acetators because the biochemical demand is so stressful and fast conversion is the goal.

> 5. Why should the cider be allowed to age for one month before being used as a feedstock for vinegar?

To be sure the yeast has totally stopped working and to change from a

'reducing' environment to an 'oxidising' one.

> 6. Is A. Xylinum and polyphenol not good for health?!

No comment. You can believe whatever you want to.

~~~

> The problem is, the second time today I only managed to press around 150l before running out of apples so I have c 150l in my 200l speidel tank, and it is not close to the top. I decided to use campden tablets so I'm waiting the 24 hours before introducing the yeast, I just hope I'm ok doing this in the larger tank ,or do I have tor rush out and buy some smaller tanks tomorrow to minimise the headroom?! I can't really find anything definitive on this.

No you don't have to worry about headspace at this stage, so long as you use an efficient airlock. The fermentation generates its own CO2 blanket which is heavier than air. It's only after the first racking, once CO2 production ceases, that you need to be concerned about keeping air out.

> Also, does anyone have any advice on using the speidel airlocks? I assume just fill with water? To what mark?
~~~

They have a mark moulded into them, about 1/3 the way up. Mine do anyway. Fit them and fill them to the mark, then drop in the orange centre bit.

> The juice has come out of the box with a ph of 3.2 and SG of 1045, but I've adjusted it to 3.5 (leaving the sugar where it is) and may tweak it a bit more with some more precipitated chalk. I've also added pectolase and tannins, which I intend to add more of the latter tomorrow morning when I stock up. I understand I may need to increase the tannins by c 4/5 times due to the Bramleys having a very low tannin content - ?

I would be wary of adding any extra chalk. I'd think you've added plenty. Pectic enzyme is wise. But forget the added tannins - unless of very high quality they just give a woody taste. You cannot make a "silk purse out of a sow's ear". Bramley cider is what it is. You will not convert it into something magical by adding tannin. Learn to love it on its own terms.

> Outside of that I'm just using Vigo yeast and a wineworks nutrient, I'm trying to get the room temp up to about 20 deg c for fermentation, but then I intend on dropping it back to c 10-15 degs. Does anyone have any recommendation for how long to keep it at 20 deg c for before considering lowering it once fermentaion starts?

You are fussing too much. No need to go up to 20C at all. 10 - 15C is fine for a cultured yeast. Slower and cooler is better.

~~~

> Ray Thanks for this info, it's a great help. I did add sulphite at the beginning if fermentation at the rate of 50ppm Once again thankyou also for the fast response

As usual, Ray speaks sense. If you want to delve into sulphite in cider more deeply now you have the spelling sorted, see here http://www.cider.org.uk/sulphite.html

>

>

> Making up a stock 5% sulphite solution is better / easier than messing with Campden tablets. .....Keeping the solution in a tightly stoppered glass bottle means the solution will keep for a good while. Maybe Andrew could expand on the 'shelf-life' of such a solution.

It isn't easy to give figures on shelf life. It will depend on how often you open the bottle, how much headspace is left, the pH of the water, presence of trace metals etc etc. I typically make up a fresh stock every 3-4 months or so if it's not already used up by then.

The other thing to bear in mind is that the solid metabisulphite powder also loses its activity over time, and especially if it gets wet. Keep it somewhere dry and tightly closed. Some people say get new powder every year - I'd probably say every 2 or 3 years if you're looking after it well.

In larger cider and winery operations they routinely measure the strength of their stock solutions, so the actual level of addition can be compensated. This is done by an iodine titration (just like the

Ripper titration for measuring free SO2 in cider, except you need to dilute the stock quite considerably in water of course and then do a compensatory calculation).

~~~

> Just occurred to me, the kind of folks who tend to make their own cider are probably largely the same kind of folks familiar with gardening and general outdoorsy stuff, and might already be very familiar with the word sulphate, re: sulphate of ammonia, sulphate of iron, copper sulphate, sulphate of potash etc.

Perhaps. Personally I think they are home brewers who are familiar with the use of genuine sulphate salts for 'Burtonisation'. Either that, or they're just sloppy and inattentive people. Take your pick.

~~~

> Did our first pressing last night of mixed varieties of apples and got approximately 30-35 gallons of juice. I did a test of the pH with pH paper strips and the juice is in the 2.8-3.1 area. I am unsure of the number of Campden tablets to add even after reading Andrews Craft Cider Maker a number of times but I was thinking 30 tablets?

I thought the table in the book was fairly clear. 1 CT per gallon (or 30 tablets per 30 gallons) gives you 50 ppm SO2.

It is true that if the juice is very acid (pH very low) then you may not need much - or any at all. The table also shows that. What sort of apples are you using that they're so acid? Straight Bramley?

To be honest I am such a sulphite-freak that I find it hard to add none at all! So I often go down to just 25 ppm (i.e. half a tablet per gallon) with my very acid fruit (eg Foxwhelp at pH around 3). So you too could add 15 tablets to your 30 gallons. You are supposed to crush the tablets and dissolve them in a little juice before adding them to the bulk.

Are you hoping for a wild yeast fermentation or will you add a yeast?

~~~

> Hi, I'm 16, a friend and I aspire to start and run a cider business, orchard to shelf. Do you have any advice that we might find helpful? Thank you.

It sounds as if you have never made cider before. So I would say read asmuch as you can about it (proper books are better than the internet) andhave a go at making your own this coming season. Then you will get somefeel for what you are trying to do, at least on the production side.

Also taste as many different ciders as you can, to get an understandingof the huge diversity out there. Most of the ciders on the supermarketshelf will be a good bit different from the sort of stuff that people onthis list make, and need a lot of technology to make them 'customerfriendly'. Cider doesn't come that way naturally.

My observation regarding new entrants to the cider business over thelast 10 years or so is that they fall into two distinct camps.

On theone hand there are people who are 'quality driven' and who are led bywanting to make the best cider they possibly can along more-or-lesstraditional lines. I think that covers most of the people who post here.

On the other hand there are people who think of cider making as just abusiness opportunity because they are aware of a market which still hassome slack for commercial exploitation. For them cider is just anothercommodity, just another drink. Of course it has to sell at the end ofthe day or there would be no business, but quality and provenance arenot so important to them as clever marketing.

You have to decide which camp you belong in ;-)

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> Dorset, but considering Somerset.

That's good because you are plumb in a cider making area so you should be able to get lots of first hand experience of how such businesses run, how they make their cider and how they market their products. That's even better than books. If you are lucky you may even be able to help out as seasonal or weekend labour so you can see how things work from the inside.

~~~

> The gravity didn't seem to change for three weeks and I was worried that I'd added too many tablets. But in the last week it's dropped to 1040. Is this normal to have such a big drop in one week with no cultured yeast?

Totally normal. Yeast is yeast. The lag phase was long because the the yeasts have to grow from just a few wild cells. But once the population is high enough, it behaves like any other fermentation. (Even cultured yeasts were wild once. They are not made in a factory. They are selected from wild populations.)

> I was expecting it to drop by 1 point every week.

That will only happen if you have a very low nutrient juice and/or are doing repeated rackings.

~~~

> Leaving aside sterile filteration and aseptic bottling (which is beyond my scale and budget). Why do most small scale commercial producers filter?

They don't necessarily, at least not here in the UK. But if they do, it's probably because they believe a sparkling bright product is more appealing to the consumer.

> Do only people who force carbonate filter or is there some benefit to filtering even if bottle conditioning?

It would make no sense to filter and then to bottle condition IMHO, because the yeast will make it cloudy again so the benefit would be lost.

> My dry cider is to be force carbonated and bottle pasteurised. Should I filter before filling my bottles and if yes then what should the specification of the filter be?

The filter is typically 0.2 or 0.5 micron. That is for reasons both of optical clarity and also because that will help to remove most yeast and bacteria. People either use (depth filter) sheets alone, sheets followed by membranes, or (increasingly) tangential cross-flow membrane filters.

Sheets are cheapest. You can't really use straight membranes without some form of depth pre-filtration because they blind up too quickly.

What you do depends on your scale because of costs.

~~~

> style cider - the Westcountry one has little malic and very nice citric.

Wow! How did you achieve that? Have you had it checked by HPLC to show that it's citric? Or was that a mis-type?

~~~

> Do you think you could have in Asturias a naturally occuring LAB flora that is more cold tolerant?

See this paper Claude http://onlinelibrary.wiley.com/doi/10.1002/j.2050-0416.1996.tb00901.x/pdf

Amongst much else, it deals with a strain of Oenococcus oeni (formerly known as Leuconostoc oenos) isolated from Asturian cider which is certainly able to metabolise malic to lactic acid in a mixed culture fermentation at 12C. But as the authors point out and the data shows, things happen much faster at 18C!

~~~

> Not many other things that could be wrong apart from the open/close valve and the pump mechanism

Possibly an airlock? I agree with Nick about oil level. Is there enough hydraulic oil in the chamber? Did you lose much when you changed the seal? Check the dipstick.

According to the Voran manual, this is how you replace the seal

(collar). Note step 8 to get the air out. I seem to remember that's what

I did because that's what the Vigo engineer told me.

1.) Move out the piston (1) over the collar (2)

2.) Pull out the piston (lifting table)

3.) Scoop out oil until the collar is free

4.) Remove old collar

5.) Insert new collar with the groove downwards

6.) Place piston back again

7.) Lower piston

8.) Ventilate (move out piston until oil comes out)

Also, they say "Functional faults are mostly the result of air in the hydraulic system. The pump must then be ventilatedwith the motor running (the lower screw on the distributor head internal hexagonal SK8 must beloosened and tightened again if knocking sounds are heard)"

I've never had to do that.

~~~

> I didn't know that Andrew, every day is a school day.

The trouble is that the word 'demijohn', which is believed to be a corruption of a French word 'dame jeanne', refers in origin to the vessel shape (narrow neck, thick body, possibly with small handles, sometimes encased in wicker) and not to its volume. Occasionally in the
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UK you will even find half-gallon or smaller sizes of 'demijohn'. But by convention here it is normally taken to be a gallon in volume. In other countries it is something different.

~~~

> Yes, that is exactly what I am trying to do. Is there anything I can do to speed it up - just for test purposes? Otherwise I guess I just rely on my calculations and time - which often seems to be the best approach with cider of course! :-)

I don't understand the concept of 'premature ageing'. I think you are looking for a 'forcing test'. My book and website refer to this one from

Pollard and Beech 1957:

Testing for Safety

-Put a test amount of (SG 1.010) bulk ciderin a champagne bottle and wire down top

- Lay down in closed box at 75F / 25C for

21 days

- Uncork carefully (goggles?) and assesscarbonation level

- If acceptable - proceed with bulk bottling

- If cork strains against wire and carbonation isexcessive - repeat test every two weeks

Does that help?

If you have already bottled the cider, then hopefully you have not exceeded SG 1.010 for a champagne bottle nor 1.005 for a crown cap beer bottle.

~~~

> Thanks Andrew - I must have missed that in your book!

It's in the section of Naturally Sweet Ciders.

> I've not bottled yet, waiting for the Spring. The Pollard and Beech test seems to be exactly what I was thinking of.

To be fair, it really applies to long slow natural fermentations, or after keeving, to test the likely fermentation activity in bottle. I'm not sure if that is what you're doing. But even if you are just naturally conditioning a dry cider with added sugar, by forcing the secondary fermentation at a high temperature for a month you should get some feel for what is likely to happen in the longer term under cooler conditions.

~~~

> I am about to start on designing a label for my cider, but thought I'd post on the forum first to see what great designs are out there first. So here's your opportunity post your labels here and let's see your great designs! :-). Thanks.
~~~

At the "label class" this year at the Hereford cider competition, thethree winners were designs that were modern and interesting. You may ormay not like them, and they are all very different from each other, butthey stand out on the shelf and are a good bit different from

'conventional' cider labels. They were:

Skyborry Cider, Powys UK

Reverend Nat's Hard Cider, Portland, USA

Cockagee Cider, Ireland

Interestingly all three are members of this list. You can google to find examples of their labels.

~~~

We had access to a lot of Foxwhelp this year. The first harvest was windfalls, not in prime condition so not unexpectedly they rotted quite quickly and we had considerable wastage. The second harvest was shaken from the trees, stored in the open in bags (ton sacks) and pressed within a few days. Despite these initially being in good condition rot quickly set in with these too. Are Foxwhelp known for their poor keping qualities? If not, has anyone any ideas on what we may have done wrong? Chris

~~~

> From previous years the sugar has been pretty good (1060) and this year I have picked them and will let them sweat for a couple of weeks which might even see that improve. PH was 3.6 or 3.7 a few years back I think.

I wonder if you really have what you think? Here in the UK J de M are hard as bullets when they come off the tree and with very little sugar and no flavour at picking time. You would never want to eat them like that. They only develop after a couple of months off tree in cold storage. A typical winter pear.

Perhaps they grow differently with you.

~~~

Can i suggest you search the archives of this list? You'll find this topic has been covered here many many times. In fact it last came up just 2 weeks ago.

Andrew

> Hello, what is the consensus of using windfall apples for cider that may be contaminated with animal feces? There are plenty of deer in my area and they are often in the orchard, so there is definitely a risk of e coli. Will the acidity/ alcohol of the cider take care of that? Or should I be doing more to clean the apples than just wash them in water? Or should I just avoid them altogether? Any feedback much appreciated! Cheers, Mike -- -- Visit our website: http://www.ciderworkshop.com You received this message because you are subscribed to the "Cider Workshop" Google Group. By joining and posting to the Cider Workshop, you have agreed to abide by our rules, and principles. Please see http://www.ciderworkshop.com/resources_principles.html To post to this group, send email to cider-w...@googlegroups.com . For more options, visit https://groups.google.com/d/optout.

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Andrew

Michael Vasilev wrote:

Hello, what is the consensus of using windfall

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There are plenty of deer in my area and they are often in the

orchard, so there is definitely a risk of e coli. Will the

acidity/ alcohol of the cider take care of that? Or should I

be doing more to clean the apples than just wash them in

water? Or should I just avoid them altogether?

Any feedback much appreciated!

Cheers,

Mike

~~~

> I'm adding enough sugar soln to and bottling @ 1,003 or 1.004 They usually drop to 0,998. Had a read of your book with the carbonation table there... 1,005 -

> 8g/litre (so 6g/litre over the 2g/litre saturation). Was that assuming fermentation to 1,000 - so a drop of 5 degrees? In which case, I'm getting about the same - so total CO2 around 8g/litre.

Yes that was the assumption.

> Although this may well be academic, as the non-saturated CO2 is not "in" the cider, but in the bottle. Only the 2g/litre is "in" the cider - so should it just be that that goes on the label? Or am I tying myself in as many knots as Jez does with his "98% juice - with 2% water allowed for heavy dew, but drying each apple with a hairdryer" :)

But the supersaturated CO2 _is_ dissolved in the cider. Where else would it be? The headspace volume is relatively very small and it ain't in there.

However, I never saw anyone who tried to do a QUID on CO2 levels - it's never done on soft drinks for instance even when juice percentages are stated. I think you are making a whole lot of work for yourself trying to give numbers for CO2. Surely there are limits to how 'transparent' you want to be?

~~~

> Am I right in thinking that typical amounts of CO2 in bottle conditioned cider are (in brewery terms) around 2-2.5 Vols? By my reckoning & googling, to convert this to grams/litre you use a factor of 0.194 - so 2Vols = 2 x 0.192 = 0.388g/litre.

Don't know what you've been googling .... ;-)

"1 vol" is near as dammit 2 g/L of CO2. That's saturation level.

Anything above that is fizz. The amount of fizz depends how much sugar was added / converted.

Carbonation table link here http://cider.org.uk/carbonation_table.xls

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> It is quite true, that if you do not disgorge cleanly, and leave some yeast behind, the pesky wee things can start all over again, and you end up with a "tertiary" fermentation and all the hassle that comes from that, i.e. sediment in the bottle, that is supposed to be crystal clear.

Thank you Jason, that is what I had heard. I wonder now if that is why we've had some rather lively and cloudy ciders submitted to the Bath and

West 'Bottle Fermented' class sometimes? Yours excepted, of course!!

I wonder have you tried any of the encapsulated yeasts which are supposed to get around this problem? Also I believe some people add alginate or bentonite to get a cleaner disgorgement?

> In my experience, the clarity of the cider at disgorging time is important, as this will leave very little potential yeast cells to get going again. I think in wine circles, the degree of clarity is generally higher than in ciders. With ciders, there is more stuff to clear, and that is why I find hand riddling, over a longer period than the giro-pallets normally are set up for, does a better job. They do it too quickly.

Very interesting observations, thank you.

Just to explain, it's not that I intend to do any of this myself! Simply that I was explaining the (theoretical) details to somebody else recently and I realised that I didn't have 'chapter and verse' on current practice. Now I do!

~~~

Thanks Barry,

I should have checked the archives first myself shouldn't I? I can see we discussed this about 4 years ago now ;-)

Andrew

> Andrew, I was always worked from advice given to me by James Lane at Gospel Green,he always made up a dosage syrup by dissolving cane icing sugar in the first few bottles of disgorged cider ,the ratio was 1 kg to 1litre of cider,this was then used as a base syrup which he added with a dosing gun bought for that purpose,(it's one of the sheep worming guns which you can adjust the dose on),from memory he added 1.5 units and then topped up with more cider to the correct bottle level. Possibly you recall the post about added sugar leaving a residue in the bottle when held up to the light James showed me this on some freshly disgorged cider telling me it generally takes 3/4weeks to fully dissolve in the bottle. Barry

This is a question directed at those few people who make sparkling cider by the 'champagne' method i.e. by in-bottle fermentation and disgorging of the yeast after 'remuage'.

When this is done for grape wines, it is often the practice to add a little more sugar syrup to top up the volume lost when disgorging and also for sweetening purposes. This is known as the 'dosage' (from

French). The added sugar doesn't re-ferment because (a) there are very few viable yeast cells left and (b) the combination of high alcohol and

6 bar CO2 pressure inhibits further yeast growth.

However, I'm not clear if a 'dosage' is added when doing this for cider.

I had always been under the impression that it wasn't because the lower alcohol concentration made it untrustworthy - in other words, re-fermentation might occur.

Can anyone who makes this style of cider tell me what their experience is, and indeed what is general practice? Is a sugar syrup 'dosage' used or not?

~~~

> What I want to know is if we test the in-bottle pressure at 15 degrees C and it is 1.5 bar, what will it be at 70 degrees C? The bottles we use are rated to cope with 4.5 bar, so working backwards, we can only carbonate at a level which will generate 4.5 bar or less, at 70 degrees C.

This is my Henry's Law spreadsheet http://www.cider.org.uk/carbonation_table.xls

If you enter 2.5 vol in the box at the bottom of the page you see that

1.5 bar at 15C equates to 8.44 bar at 70C. 2.5 vol carbonation is pretty much an industry standard, in fact on the low side if anything.

However, although your bottles are presumably rated for 4.5 bar continuous use, it is probable that they will withstand higher pressures for short periods, especially if they are not subject to external shocks and bumps while so pressurised. In practice, this must be the case or no carbonated drinks could be batch pasteurised in real life. I would double check the situation with your bottle supplier.

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> My impression was that the pectins were transformed by the freezing process, hence couldn't form a gel anymore.

Degradation of pectin and its functionality in fruits after a freeze-thaw cycle is well known. Ask anyone who makes jams or jellies.

The scientific literature is a little unclear on the mechanism, but it is certain that the ice crystals formed during freezing rupture the plant cell walls where the pectin is located. It may that this physically damages the pectin chains, but it seems equally likely that pectin and pectin degrading enzymes are brought into unrestrained contact rather than being spatially separated and under biosynthetic control as before. Hence when the fruit is thawed all enzymic hell breaks loose and the structural integrity of the pectins is rapidly lost. There is no way to put the genie back into the bottle after that.

I agree with Claude that keeving of freeze-thawed fruit is a total non-starter.

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> Andrew, Looking at this table in your web site, the polyphenols units are GAE/L. I assume these are gallic acid equivalents, but in which units? Would this be in mg/L of GAE?

So sorry Claude. I had forgotten the units! I have corrected the table heading now. Yes it is mg/L as GAE.

~~~

> Hi Andrew, My last batch of cider was very pale and clear (like white wine) I added sweetness by adding sugared water, this kept it the same colour, this time I want to make the cider 100% apples, therefore using pressed apple juice but I want to keep the lovely clear colour as much as possible, I thought the pectolase cleared the cider as well as breaking down the gloopiness, I'm not keen on adding anything that isn't necessary, so what would you recommend? Using the vit c or having a slightly darker cider? I take it I don't add pectolase if I do one of the options above. Thanks in advance

You still seem confused by the difference between 'clarity' i.e. lack of turbidity, and depth of colour. "A lovely clear colour" makes no technical sense.

If you want clarity, use a pectic enzyme on your juice. If you can treat it at 55C, you can it done in a couple of hours. If you do it at room temperature or cooler, it may take a couple of days. Then you will need to rack off the clear juice before use

If you want a pale coloured juice, you can use ascorbic acid (500 - 1000 ppm) added at or immediately after pressing. But be aware that the ascorbic acid is constantly degrading due to enzymic action and so you will only have a limited window to hold before pasteurising until it starts browning again. Or, choose to make the juice from apples with a very low polyphenol (tannin) content, so use dessert apples not cider apples. They will naturally brown much less.

If you want both clarity and a pale colour you will have to find a way to combine both strategies. For my money I don't think cider should be as pale as a typical white wine. HMRC 162 defines cider colour as

"straw/gold/golden brown". Of course that is pretty subjective but I think it's generally what we expect in the UK.

~~~

> Hi, I want to back sweeten with pressed apple juice, do I have to use pectolase to clear the juice so that it won't darken the cider? I'm going to pasteurise afterwards

You seem a bit confused. Pectolytic enzymes do not control darkening, only turbidity. If you add fresh pressed juice to fermented cider, and then pasteurise, you will almost certainly get a (somewhat) cloudy cider which may remain that way indefinitely. If you want it to be clear, then you should clarify the juice with a pectolytic enzyme first. (Even then, some cloud may possibly develop after pasteurisation due to polyphenol changes).

Darkening is mostly determined by the polyphenol oxidise activity of the fresh juice. You can inhibit that by adding ascorbic acid (Vitamin C) immediately after pressing if you really feel you need to.

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> Then you will need to rack off the clear juice before use Is there a danger that you lose flavour - in leaving all the sediment behind - by racking at this early stage? When I've added a pectic enzyme to freshly pressed juice I've not racked it until it's almost fully fermented.

But Scott is using the juice for sweetening. He doesn't want it to ferment.

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> If you want a pale coloured juice, you can use ascorbic acid (500 - 1000 ppm) added at or immediately after pressing. But be aware that the ascorbic acid is constantly degrading due to enzymic action and so you will only have a limited window to hold before pasteurising until it starts browning again. Or, choose to make the juice from apples with a very low polyphenol (tannin) content, so use dessert apples not cider apples. They will naturally brown much less.

Another thought .....

Given that you are only using this juice for sweetening cider, not straight drinking, you could consider using SO2 to lighten the colour instead of ascorbic acid. Say you allow yourself a typical 50 ppm SO2 addition to the cider / juice blend before pasteurising, and say for the sake of argument that you sweeten by adding 10% juice. Then you could add as much as 500 ppm SO2 to the juice after you press it, assuming it is to be blended at 10% into your cider. That will hold off the darkening better than ascorbate because SO2 is both a reducing agent and a PPO inhibitor. Also it will help with microbial stability if you want to hold for a couple of days with pectinase. The high level of SO2

might interfere somewhat with the action of pectinase, so maybe it would be worth doubling the enzyme dose?

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> So I took a vinometer to test alcohol content and I was a 5%.

Don't trust a vinometer, ever. They don't work.

Measure the SG again and this time get rid of all the adhering bubbles on the hydrometer which will buoy it up and give you the wrong reading.

You may have to spin or jiggle it to get an accurate reading; or de-gas the cider sample by pouring it from one container to another several times.

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> I would just really like to know if there is any correlation between soil acidity and the pH of the cider fruit (see my post below)

If you mean does the acid in the fruit come directly from the soil, the answer is no. Acid in fruits comes from photosynthesis.

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> Distillation is the best way to go.

For those who want to play with the glyoxal version of the Ripper titration, and can read German, it's described on page 3 here. http://partners.metrohm.com/GetDocument?action=get_dms_document&docid=693006.

The idea is that the addition of glyoxal binds up the free SO2 (but not ascorbate). So if you do a Ripper titration with and without glyoxal, you can calculate the SO2 in the presence of ascorbic acid by difference. No guarantees - I've never tried it. The theory looks sound but I only ever saw it referred to in Tanner and Brunner's "Getraenke

Analytik" and nowhere else in the last 35 years. So I don't know if there are problems with it, or just that no other authors of wine analysis textbooks felt the need.

The normal workaround is the distillation method because that is the standard technique for SO2 determination anyway. The direct Ripper titration has only ever been regarded as 'quick and dirty' although masses of people do use it. Its limitation is that it's not selective and all sorts of other reducing agents interfere with it. As here.

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> Hello Andrew I do use ascorbic acid at 1gm per litre mainly to prevent discolouration (see www.skidbrookecyder.com for a picture of the juice) but I understand that it is entirely denatured by the heat of the pasteurisation

That is a very surprising statement. If you are adding 1000 ppm as you are I would expect a good half of it to remain after normal handling and bottling unless you leave the juice around for several days before pasteurising. Did the person who told you that actually do any measurements of residual AA in your product to show you that it's true?

If it were all destroyed as you suggest, it would actually make your juice go browner more quickly than without it. (The breakdown products of ascorbic acid actually act as pro-oxidants. Strange but true).

> The mould is intensely annoying when it appears but too rare to be a threat to the business.

The incidence you quote is quite low and more indicative of the odd faulty bottle / cap seal rather than a systemic process failure on your part.

> One of the "big name" producers did a study on the mould and established that it was not a threat to health but obviously unsightly but they were getting it in tetra packs where somebody could have drunk a good amount before coming across the mould...Yuk!

It is true that these sorts of moulds are not regarded as pathogenic.

But I would caution drawing too much parallel between TetraPak and what you do. TP is flash pasteurised and (cold) filled into chemically sterilised blanks which is a bit different from your conventional low temperature in-bottle treatment. So the conditions for mould growth are not the same.

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> Mould has been our biggest production hurdle.

Guy,

I'm sorry to hear about your mould problems. Do you use ascorbic acid in your juice process? Other things being equal, that should reduce the O2 levels and prevent the growth of in-bottle moulds (which are aerobic organisms). Does it?

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> What I want to know though is whether it is optimum to let the cider ferment to dryness and rest until spring say, and mature a bit, before pasturising and bottling?

Yes. The maturation is important for flavour development.

> Alternatively, is it just as acceptable to wait for the relevant gravity to be reached and then sweeten, pasturise and bottle?

No. IMHO.

> Lastly, if I also wanted to force carbonate my pasturised my cider would be be acceptable to pasturise the cider in a large container within the boiler. Then rack to a sterilised pressure barrel until cool, force carbonate and transfer to my 450ml bottles and crown cap?

No. Unless you have proper professional purpose built equipment, you will almost certainly break the chain of sterility by doing that. You must carbonate first, then pasteurise the filled carbonated bottles. But beware of pressure issues. This has been discussed here in detail before. Search the archives.

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> How well do these papers keep, does anyone know?

I don't have any exact data, but even freshly purchased Vinoferm strips are pretty poor. See http://cider.org.uk/pH_measurement_comparisons.html

On your scale of operation I'd go for a pH meter every time. If you were just a low volume hobbyist it might be different.

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> I have just bottled 5 gallons of the best cider I have made so far! There was about a litre and a bit of lees in the bottom. Is there any mileage in using this as a starter for an unfermented batch of apple juice?

How old is the cider you just bottled? If it's from this season

(2013/14) and only just finished fermenting, you could do I suppose. If it's from 2012/13 I'd forget it. But if you are using a regular cultured yeast then you'd surely be better off just using fresh yeast which is nice and clean? If it is a wild yeast fermentation there could be more mileage in it.

> I pressed some very late at the end of january and it hasn't really got started yet as it has been outside under seal. I know it is the same apple as I have just bottled only a different year so was hoping I might mimic what I now have by using the residual yeast in the lees.

I think that is not necessarily guaranteed. Yeast is a major contributor to cider flavour but it's not the whole story. Also, dead and dying yeast harvested from lees at the very end of a fermentation may be very different
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in its behaviour from young vigorous cells multiplying during active fermentation . Brewers sometimes harvest the lees for re-use but their fermentations are much shorter and they acid wash the yeast to remove unwanted bacteria.

I'm not saying you shouldn't try it, but I wouldn't expect it to duplicate exactly your previous batch. Life is a wee bit more complicated than that ;-)

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> I will take this opportunity to ask a question that has been on mind for awhile..Would Cider Marmite be viable / possible from Lees? "Cidermite" - perhaps there is such a thing already?

I think it would be quite simple. This tells you how http://en.wikipedia.org/wiki/Yeast_extract But it's not the sort of thing you could easily do at home. It's a factory process.

I doubt there is enough cider lees around to make it a paying proposition though when all the costs are factored in. And although these products were originally made from spent brewing yeast (hence

Marmite's origins in Burton) I'd imagine the yeast is mostly grown up specially for the purpose now except where they are making 'limited editions' from a named beer or wine (I note there has been a Champagne

Marmite). It would be difficult to keep it consistent otherwise I'd think. If there is one thing food manufacturers generally hate it's variability in their raw materials. A concept which impacts directly on craft cidermaking where the variability is more likely to be celebrated.

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> I'm pretty sure I've added more bentonite than necessary to a batch of champagne method cider. I followed the dosage on the label - a teaspoon per gallon of juice - but with the benefit of hindsight that seems far too much now.

Use of bentonite for clarification of juice is quite a different game from using it during maturation and remuage of secondary fermented wine.

For instance this data sheet suggests 3 - 5 g (less than a teaspoon) per hectolitre (100L).

On that basis you've added far too much.

http://www.laffort.com/images/stories/telechargement/fiches%20commerciales/2%20-%20FC%20-%20ANGLAIS/FC_ANG_cleanspark.pdf

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