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LITERATURE SURVEY OF PLANT MOMORDICA DIOICA ROXB. WILLD: AN UPDATE


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ABSTRACT

Momordica dioica climbing creeper plant is used both in the prevention and cure of various diseases and in the food of humans. It is necessary that we should have full knowledge regarding the therapeutical use and pharmacology activities for their proper utilization. In the present review, interest is focused on their folk uses, pharmacological, phytochemical and general study. We believe this study of *Momordica dioica* medicinal plant presented in this review will be useful to researchers, as well as practitioners. It has great potentiality both from the economic and botanical points of view. This paper reviews the work done so far in the Literature Survey of plant *Momordica dioica* Roxb.Willd.

Key Words: *Momordica dioica*, Literature Survey, Ethanomedical claim, Pharmacological Study.

INTRODUCTION

Momordica dioica Roxb. belongs to the family Cucurbitaceae[1] and under the genus *Momordica*, a genus of annual or perennial climbers that contains about 80 species.[2] *Momordica dioica* climber plant commonly known as Teasle Gourd, Kakrol, Kankro, Kartoli, Kantoli, Kantola, Kantroli, Ban karola or Small bitter-gourd is a relatively small oval to ovoid vegetable. It is also called as janglee karela.[3] This genus is essentially a native of tropical regions on Asia with extensive distribution in China, Japan, South East Asia, Polynesia besides tropical Africa and South America. As many of the species of this genus have been found to grow wildly in India, Bangladesh, Srilanka, Myanmar, Malay, etc.[4] it indicated that this region might be the origin of *Momordica dioica.* The plant is sometimes found growing wild and is common in hedges. It is often cultivated for its fruits, which are used as vegetable.[5] Teasle gourd is a cucurbitaceous popular summer vegetable. The fruits, young twigs and leaves of this crop are used as vegetable or cooked as a vegetables.[6]

It is available in the forest of dry and moist deciduous in feeding months August to February.[7] Teasle gourd is an important summer vegetable in Bangladesh and the Indian subcontinent. It has many advantages, like high market price, good nutritional value and keeps quality longer.[8] It has two different types of varieties male & female as well as fruited variety & fruitless variety. *Momordica dioica* Roxb. (chormosome number 28) dioecious and propagated vegetatively through tuberous root.[9] This study also shows that it is useful in the treatment of numerous diseases. The focus of literature survey is on how plants have been or are used, managed and perceived in human societies and includes plants used for food, medicine, divination etc. These new approaches enhance the use of plant in medicinal use as well as economical point of view. This literature survey of *Momordica dioica* medicinal plant shows uses in folk medicine in different parts of the world. In the present review, interest is focused on their folk uses, pharmacological, phytochemical and general study. We believe that the folk uses of *Momordica dioica* medicinal plant presented in this review will be useful to researchers, as well as practitioners. The aim of this review is to collate all available data on *Momordica dioica* plants with literature survey. In such a way, the present paper describes a rapid, simple and comparatively efficient Literature Survey of plant *Momordica dioica* Roxb. Willd - An Update

Brief History of *Momordica dioica*:

It has two different types of varieties male & female as well as fruited variety & fruitless variety.[10,11] Female plants tubers are larger than those of the male plants.[12] 120 genera in Cucurbitaceae.[13] In *Momordica* species total 60 species are reported world wide and out of them 7 are available in India. *Momordica dioica* (kartoli or spine gourd) is also found in cultivated or semi wild form. For cultivation require lowland for annual. It is dioecious, perennial in nature having tuberous roots. The green fruit is extensively used as vegetable by cooking or frying. Leaves 1.5-4 inches long, cordate, acute more or less 3-5 lobed; Flowers large, dioecious and yellow in colour; Fruit 1-3 inches long, shortly beaked, densely covered with soft spines.[14]

ETHNOMEDICAL CLAIM (Refer Table No.1).

Fig.1 Photograph of *Momordica dioica* Fruit

LITERATURE REVIEW

Phytochemical Study:

It contains Lectins, proteins, triterpenes and vitamins.[25] The fruit contains a high amount of vitamin C.[26] The fruit is rich in ascorbic acid and contain iodine.[27] The fruit also contain alkaloid, flavonoids, glycosides and amino acids.[28] *Momordica dioica* also contains an alkaloid, a fragrant extractive matter and ash 3 to 4 p.c. Ash contains a trace of manganese.[13] *Momordica dioica* as the average nutritional value per 100 g edible fruit was found to contain 84.1% moisture, 7.7 g carbohydrate, 3.1 g protein, 3.1 g fat, 3.0 g fiber and 1.1 g minerals. It also contained small quantities of essential vitamins like ascorbic acid, carotene, thiamin, riboflavin and niacin.[29] It also content protein in the leaves and dry weight of aerial plant parts remained higher in male as compared to female defruited, and monoecious plants.[30] From *Momordica dioica* fruit isolated 6-methyl

tritriacont-50on-28-of and 8-methyl hentracont-3-ene along with the known sterol pleuchiol. Momodicaursenol, an unknown pentacylic triterpene isolated from the seeds, had been identified as urs-12, 18(19)-dien-3 beta-ol on. Phytochemical investigations have revealed the presence of traces of alkaloids and ascorbic acid in fruits. Lectins, β-sitosterol, saponin glycosides, triterpenes of ursolic acid, hederagenin, oleanolic aciḍ, α-spiranosterol, stearic acid, gypsogenin, two novel aliphatic constituents.[31-34] From the dry root of *Momordica dioica* isolated three triterpenes and two steroidal compounds. These were alpha-spinasterol octadecanonate(I), alpha-spinasterol-3-O-beta-D-glucopyranoside(II), 3-O-beta-D-glucuronopyranosyl gypsogenin(III), 3-O-beta-D-glucopyranosyl gypsogenin(IV) and 3-O-beta-D-glucopyranosyl hederagenin(V). Constituent III was a new compound.[34]

Pharmacological Study:

Hepatoprotective, antioxidant and anti-inflammatory activities

Momordica dioica roots alcoholic extract significantly reduced CCl_4 induced hepatotoxicity in rats.[35] *Momordica dioica* Roxb. leaves ethanolic extract found more potent hepatoprotective activity against aqueous extracts was evaluated against carbon tetrachloride (CCl_4) induced hepatic damage in rats. Also in vivo antioxidant and free radical scavenging activities were also screened which were positive for both extracts due to the presence of flavonoids in the extracts.[36] *Momordica dioica* fruits ethanolic extract shows hepatoprotective activity against carbon tetrachloride(CCl_4) induced hepatic damage.[28] Fruit is reported for hepatoprotective activity.[37]

Hypoglycemic and hypolipidemic activities

Momordica dioica Roxb fruit pulp extracts shows the hypoglycemic and hypolipidemic activities on alloxan-induced diabetic rats.[38] *Momordica dioica* fruits shows the anithyperglycemic activity in alloxan-induced diabetic rats. In this study the ethyl acetate and ethanol showed significant antidiabetic activity with compare to chloroform.[39] This plant also possesses hypoglycemic.[40]

Analgesic and anti-inflammatory activity

Momordica dioica fruits pulp hexane extract and ethyl acetate extract significant exhibited analgesic and anti-inflammatory activities.[41] *Momordica dioica* root ethanolic extract exhibited significant analgesic activity. The aqueous extract was found paralysis of earth worms after 1hr. as 91.6 percent.[42]

Acute renal failure activity

Momordica dioica seeds ethanol extract possesses marked nephroprotective and curative activities without any toxicity due to its antioxidant activity and could offer a promising role in the treatment of acute renal injury caused by nephrotoxin-like gentamicin.[43]

Antiallergic activity

Momordica dioica roots shows antiallergic activity for alcoholic extract.[44]

Anticancer activity

The $CHCl_3$ extract of *Momordica dioica* roots and five isolated constituents showed anticancer activity in pharmacologic testing on cancer cell.[34]

Antifeeedant activity

Momordica dioica fruit pulp hexane extract and ethyl acetate soluble fraction of methanolic

extract exhibited moderate and concentration dependent antifeedant activity against Spodoptera litura.[45]

Antimalarial activity

Momordica dioica alcoholic extract screened in vivo & in vitro for antimalarial against NK 65 strain of Plasmodium bergheli, Jurinea macrocephala, Aegle marmelos, were found to posses schizontocidal activity.[46]

Antimicrobial, antibacterial and antifungal activity

Momordica dioica root powder chloroform extract used to isolated two steroidal glycosides and alkaloid by a separate method, Glycosides were screened revealed a moderate antibacterial and a poor antifungal activity.[32] *Momordica dioica* Roxb fruits methanolic extract showed more promising antimicrobial and antioxidant activity as compared to aqueous extract.[47]

Postcoital antifertility activity

Momordica dioica root aqueous and ethanol extracts were found to be most effective in causing significant postcoital antifertility activity.[48]

Insecticidal activity

Momordica dioica seed oil solvent extract were found to be satisfactory mortality of mustard aphid provided 100% mortality in 24 hrs. at 4% concentration due to presence of alkaloid momordicin in the oil.[49]

Gastroprotective and ulcer healing activities

This plant also gives gastroprotective and ulcer healing activities.[50]

General Study:

Momordica dioica studied for the high frequency plant regeneration from cotyledon derived callus.[51] *Momordica dioica* studied for the adventitious shoot regeneration from immature embryo explant obtained from female and female.[52] *Momordica dioica* studied for the techniques for propagation and breeding from the seed and pollen.[53] *Momordica dioica* studied for the organogenesis of four types of explants viz. node, shoot tip, leaf and the cotyledon, the cotyledon showed the best performance.[54] Shoot regeneration only from specific cotyledonary parts.[55] *Momordica dioica* studied for the Genetic relatedness (diversity) and cultivar identification by randomly amplified polymorphic DNA (RAPD) markers.[7] *Momordica dioica* studied for the morphological and physiological variation collected from different agro-ecological zones of Bangkadesh, were evaluated for 29 morpho-physiological characters.[14] *Momordica dioica* studied for the tubers for perennating and prolonged tuber dormancy of 4–5 months.[56] The tetraploid and triploid forms in *Momordica dioica* reported collected from Khashi and Jayantia Hills of Assam, India.[57,58] Teasle gourd grows in warm and humid weather and tuberous roots are planted in pits. The vines are trained in bowers and 5–10% of male parents are provided for good fruit set. Plantation is done at beginning of the summer when monsoon starts, owering starts in April, and fruiting ends in October–November. The plants remain dormant in winter. The tubers are left in situ and they over winter.[59,60] Genetic diversity in teasle gourd based on morpho-physiological variation.[61,62] *Momordica dioica* evaluated as grain protectant against callosobruchus chinensis on the stored legume-pulse grains.[63] *Momordica dioica* studied for local & botanical names, description, chemical compositions, parts used & medicinal uses.[64] *Momordica dioica* studied disappearing medicinal plant of kottayam district of Kerala

state.[65] *Momordica dioica* studied for the folk medicinal claims of western Utter Pradesh, India.[66]

CONCLUSION

The traditional knowledge system in the world is fast disappearing. So there is an urgent need for inventorying, recording & to investigate all ethnobotanical information. In this paper work on Literature Survey of plant *Momordica dioica* Roxb. Wild uses of plant been documented for their ethanomedicinal, phytochemical, pharmacological and general study. This medicinal plant has dual significance; firstly for promising future food, secondly for future pharmacological activities due to its some active constituents. These literature survey data may provide a base to start the search related to phytochemistry, pharmacology, pharmacognosy and general investigations to researchers, as well as practitioners related to this plant. Therefore, attention should also be made on proper exploitation and utilization of this medicinal plant.

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Tables and Figures:

Table I: ETHNOMEDICAL CLAIM

Sr. No.	Fruits	Leaves	Roots
1	Cure vata, biliousness, asthma, leprosy, bronchitis, fever, tumors, tridosha, urinary discharges, excessive salivation, troubles of the heart, inflammation, errhine effect	Aphrodisiac, anthelmintic, cure tridosha, fever, consumption, asthma, bronchitis, hiccough, piles	Head troubles, urinary calculi & complaints, errhine in jaundice, bleeding (toasted), all kinds of poisoning like snake bite & scorpion- sting, inflammation of urine of house-lizard, ulcers, fever, sedative in high fever with delirium (as paste)[13]
2	Inflammation caused by urine of house-lizard, errhine effect	Headache relieves	Antiseptic, scorpion sting, ulcer by snake bites, bleeding piles, bowel affections, expectorant, powder to skin soft, supple and lessens perspiration.[11]
3	Errhine effect & provokes a copious discharge from the schneiderian mucous membrane	---	Piles bleeding, urinary complaints, sedative in high fever with delirum (as paste), snake-bite, scorpion-sting,

			antiseptic.[15]
4	---	---	Anti-allergic, bronchial asthma, antimalarial.[16]
5	---	---	Spermatorrhea, leucorrhoea.[17]
6	---	---	Contraceptive.[18]
7	---	---	Spermicidal activity and anthelmintic activity.[19]
	mental disorders.[19]		
8	In bilious affections, piles, jaundice, worms, leprosy, dysmenorrhoea & externally intractable ulcers, skin affections, burning in feet, night blindness, liver complaints of children, headache & inflammation caused by contact with the urine of the house-lizard.[20]		
9	For Diabetes and Hair lengthening.[21]		
10	Seed paste applied on the lower abdomen in dysuria and also to cure constipation.[22]		
11	To dandruff control tender paste applied on head 1 hour before bath.[23]		
12	Eye diseases, poisoning and fever.[24]		