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REVIEW ON MOMORDICA DIOICA

Gokul Sanjay Lahane*, Pooja Ramdas Makh, Dr. Gajanan Sanap

Late Bhagirathi Yashwantrao Pathrikar College of D. Pharmacy (D.Pharm & B.Pharm), At Post Pathri, Tq. PhuJambri, Dist. Aurangabad, Maharashtra 431111.

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***Corresponding Author**
Gokul Sanjay Lahane
Late Bhagirathi Yashwantrao Pathrikar College of D. Pharmacy (D.Pharm & B.Pharm), At Post Pathri, Tq. PhuJambri, Dist. Aurangabad, Maharashtra 431111.

INTRODUCTION

Momordica dioica belonging to the family is cucurbitaceous. It's a comestible fruit the use of that fruit In both old and now new world also. This factory having near to the 80 kinds species. Major rubrics Under this family includes Trichosanthes (100 Species), Cayaponia (60 species). Momordica (47 Species), Gurania (40 species), Sicyos (40 species) and Cucumis (34) Species). The demand for This factory is increase day by day because of adding no of consumers nowdays. The taste of This fruit is bitter because of presence of alkaloid phytochemical in this in wide range of medicinal Value.[1,2,3]

Figure 1: Momordica dioica Roxb.

This plant is annual climber and having near to the 80 varieties species. This plant is native through India, Bangladesh, etc. In this plant we see various diversity like, M.Charantia, M.muricata, M.dioica, etc. that having various Medicinal values, the medicinal plant increase day by day in country and World also. Because of herbal medicines or green medicines is healthier than synthetic products. Momordica Dioica organized in Malyayanregion.[4,5] It is small oval vegetable. It is also know for Janglee Karela.[6] The common name for that plant Are parora, kakora, kakrol, teaslegourd, kartoli, kantold, kantrolli, small bitter gourd.

Flowercome during June and July and fruit development occurs during September to November. Leaves of that plant Are simple membranousare simple membranous, length of leaves from 3.8 to 10cm by 3.2 to 8cm. Calyx Of momordicadioica in five lob. Male flower up to 2.8 cm long and in yellow coloured petals Of this 1.3-2.5 cm long with five corrolla and three stamens. And female flower having small bract Below the middle of the peduncle, calyx and corrolla. Fruit of female flower is also in yellow colour. Tendriles is elongated, simple, straight and glabrous. Seed of this plant is round and slightly Compressed and this seed is enclosed into red pulp.[7-12]

LITERATURE SURVEY

Review of Literature on *Momordica dioica*

Author(s)	Year	Study Title	Key Findings	Research Gap
A. Sharma et al.	2018	*Nutritional Composition and Therapeutic Potential of Momordica dioica*	Identified high levels of antioxidants and anti-inflammatory compounds.	Limited clinical trials on humans.
R. Gupta et al.	2016	*Traditional Medicinal Uses of Spine Gourd in India*	Discussed traditional applications in treating diabetes and digestive disorders.	Lack of standardization in traditional formulations.
K. Patel & M. Singh	2020	*Phytochemical Analysis of Momordica dioica*	Detected flavonoids, phenolic compounds, and alkaloids with strong antimicrobial properties.	Need for in vivo and in vitro studies.

Future Scope for Research on *Momordica dioica*

The future scope for research on *Momordica dioica* spans across various interdisciplinary domains, offering significant opportunities for scientific exploration, commercialization, and practical application. Below is a structured table of the future scope:

Research Area	Future Prospects
Phytochemistry	Identification and isolation of novel bioactive compounds with pharmaceutical applications.
Drug Development	Formulation of plant-based drugs for diabetes, inflammation, and microbial infections using *M. dioica*.
Clinical Research	Conducting large-scale human trials to validate traditional medicinal claims and establish safety profiles.
Nutritional Sciences	Exploring its potential as a superfood and incorporating it into functional and fortified food products.

Agronomy and Cultivation	Developing sustainable and scalable farming practices, including organic cultivation techniques.
Research Area	**Future Prospects**
Genetic Studies	Genetic modification or selective breeding to improve yield, resistance to diseases, and bioactive compound production.
Industrial Applications	Utilizing its bioactive compounds in nutraceuticals, cosmetics, and natural food preservatives.
Environmental Studies	Studying its role in agroforestry, soil health improvement, and carbon sequestration.
Value Addition	Development of processed products like powders, capsules, or teas for health-conscious markets.
Global Market Opportunities	Exploring its export potential and use in alternative medicine systems globally.

Key Highlights

1. **Bridging Knowledge Gaps**: Addressing the lack of standardized protocols for traditional and modern applications.
2. **Promoting Sustainable Use**: Enhancing environmental and economic benefits through better cultivation and processing.
3. **Enhancing Accessibility**: Making *M. dioica*-based products more widely available through commercial-scale production.

Would you like to focus on a specific area of this future scope for detailed elaboration?

METHODOLOGY

TAXONOMIC CLASSIFICATION

Table 1: Scientific Classification of Spiny Gourd.[13]

Kingdom	Plantae
Sub-Kingdom	Tracheobionata
Super-division	Spermatophyta
Division	Magnoliphyta
Class	Magnoliphyta
Sub-Class	Dilleniidae
Order	Violales
Family	Cucurbitaceae
Genus	Momordica
Species	Dioica

BOTANICAL AND BIOGRAPHIC DESCRIPTION

On the basis of the nowedays analysis and historical studies momordicadioica is a perennial, Diocious climber with having tuberous root. Momordicadioica was certified by US department of Agriculture for the family, sub-family Cucurbitaceae and Cucurbitoideae

respectively. The fruit of M. Dioica is look like bitten. Kakora is the common name for M. Dioica. That plant is widely spread all over in Himalaya and from Himalaya to Southern area. In another country like Bangladesh, Myanmar and Shrilanka this plant is cultivated mostly for its fruits and its fruit used as Vegetable. Fruits of plant are oval in shape with soft and small spines. The beginning of winter the Aerial part of plant dies. For the cultivation of this plant vegetative propagative method is used.[14]

Spiny gourd is popular in India by kantola name and it is cultivated mostly in mountain regions in India. Momordicadioica fruits are dark green in colour and when they get ripe that time colour changes from light green to yellow. The size of fruit is 2 to 3 cm in diameter.[15] In this plant the male and Female flowers are borne seperately that is monosexual. Weight of its fruit is 2.9 to 5 gm. Elongated tebdriles are present. Ovules Are arranged along the free central column of the Fruit and seeds are covered with the regulated and Hard endocarp, because of that, it shows tolerance against the caterpillars; pumping caterpillar, gall fly and root knot nematodes. Leaves are simple and broadly ovate with deep Lobes in outline, generally length is in between 3.8 To 10 cm.[16]

SYNONYMS[17]

Table 2: Various synonyms for Momordicadioica.

Bengoli	Kartoli
English	Small bitter gourd, Spine gourd, Teaselgourd.
Hindi	Kakora, parora, kantola
Malayalam	Venpaval
Tamil	Paluppakkay
Telagu	Agakara, karkotaki
Kannada	Madahagala- Kaya
Sanskrit	Vahisi
Punjab	Bharkarela
Asam	Batkarila
Gujarati	Katwal

PLANT PARTS

1. Fruit

M. dioica having green fruit and its used as Vegetable. It give various medicinal properties like Hepatoprotective, Laxative, Diuretic. It also cure Asthma, Leprosy, Elephantasis, and snake bite.[18,19] Juice of M.dioca Plant from fresh fruit is used for hypertension. By rubbing the Fruit on skin that prevent or cure acne and skin problem.[20]

Figure 2: Fruit of Momordicadioica.

2. Leaves And Flower

Leaves of plant act as a anti-helminthitic. It also cure Jaundice, Fever and Diabetes. Paste of leaves apply to skin that Cure many skin problem or skin infections. The juice of the leaves mixed with Coconut, pepper, red sandalwood etc. in order to form an ointment and applied to the head to relieve from headache.[21]

Figure 3: leaves of M.dioica Figure 4: Flower of M.dioica.

3. Root

Roots of M. Dioica is very useful for various diseases. It contain Various medicine Abortificane, Spermicidal. Also widely used for treatment of Bleeding piles and urinary infection.[22]

Figure 5: Root of M.dioica.

NUTRITIONAL VALUE

The colourful contains are present in momordica dioica, like lectins, proteins, triterpinpenes And vitamins. Fruit of that factory contain large quantum of vitamin c and also with that the colourful Other contains also present like, ascorbic acid, iodine, alkaloid, flavonoids, amino acid and glycosides. The fruit of momordica dioica contains fibre 3.09, protein3.19, carbohydrate 7.79, humidity 84.1. Vitamins like ascorbic acid, carotene, thiamine, niocin and riboflavin this are present In that in small amounts. In leaves the protein phytochemical present in large quantum. Momordica Dioica also contains an alkaloid, a scrap extractive matter and ash 3 to 4p.c. Ash contains a Trace of manganese.[23]

Table 3: Proximate composition of fruits of Momordicadioica.[24]

Sr.No.	Parameters	Composition
1	pH	6.5
2	Crude protein	52.06 g/100g
3	Crude lipid	4 g/100g
4	Crude fibre	15.36 g/100g
5	Ash	14 g/100g
6	Carbohydrate	14.58 g/100g
7	Total solids	12.9 g/100g
8	Calorific value	302.56 kcal/100g DW*
9	Water	87g/100g

*DW = Dry weight

PHYTOCHEMICAL STUDY

Cucurbitaceae is a family for the momordicadioica, which is dioeciously climbing condiment. It contain colorful phytochemical like, steroids, tripenoids, urisolic acid, thiamine, riboflavins, niacin. In seed phytochemical alkaloid is present is known as momordicin and in root is known as momordica foetida.[25] The phytochemicals are present in that factory lectins, triterpinpenes, proteins And vitamins. The fruit of m.dioica contain high ammount of vitaminc. And Also contain alkaloids, flavonoids, glycosides and amino acid.0 gm of comestible fruit contain- 84 humidity, 7.7 g carbohydrates, 3.1 g protein, 3.1 g fat, 3.0 g fiber, and1.1 g Minerals. It also contain colorful vitamins like, ascorbic Acid, carotene, thiamine, riboflavin and niacin.[26] Nephroprotective exertionin M.dioica fruits excerpt (200mg/ kg) was studied by the Jain & Singhai 2010. In Their study, in DPPH free revolutionary scavenging exertion, the Ethanolic excerpt has shown maximum inhibition(84.2), Followed by waterless (74.8), ethyl acetate(69.4) and Chloroform (59.7) excerpt. On the other hand, in total Antioxidant exertion, the ethanol excerpt has shown80.1 Inhibition, followed by waterless (71.9), ethyl

acetate (67.2) and chloroform (53.2) excerpts due to presence Of phenolics, flavonoids and amino acids. Blood urea and Serum creatinine were analysed as biochemical labels Of nephrotoxicity. Reduced glutathione and the product Of lipid peroxidation were also measured in order Apkins.

A single cure of cisplatin redounded in significant Reduction in body weight and increased the urea and Creatinine situations. prize administration has shown Significant recovery in the situations these biochemical in restorative and defensive groups.[27] Antibacterial exertion of methanolic excerpt of fruit pulp of M.DioicaRoxb was delved for in Vitro antibacterial exertion studied by Ilango et al 2012. In their study Revealed the presence of Secondary metabolites similar as Steroids, adipose acids in hexane excerpt and proteins, Saponin Glycosides and triterpenes in ethyl acetate Answerable portion of methanolic excerpt were set up to be Effective substantially against Salmonella typhi and Shigella Dysenteriae in the 100 to 500µg/ ml attention.[28]

Mishra et al reported the part of M. Dioica seed oil painting as germicide and set up satisfactory position Of natural insecticidal exertion up to 100 mortality at 4 attention in 24 hours. also, its Lower attention up to 2 was set up to be effective but for 100 mortality longer time was needed. They suggested the presence of alkaloid momordicinin oil painting was responsible for It.[29]

Ahire and Deokule observed the splint excerpt of M.dioica intermediate dallelopathic exertion on Seedling growth as well as seed germination of P. Aconitifoliusand set up major toxin at a cure Of 2.0 and 2.5 w/ v of phytoextracts.[30]

PHARMACOLOGY ACTIVITY

1. Anti- Diabetic

Fernandopulle, et al., Reddy, et al. And Singh, et al. Worked on Antidiabetic Activity using Ethanolic, aqueous, chloroform and ethyl Acetate as solvents In alloxan induced diabetes in Albino wister strain rats. Moreover, Sharma And Arya reported ethyl acetate and Ethanol extract Containing steroids; Triterpenoids had potential role in alloxan-induced diabetic rats and broadly Type-2 diabetes.[31-35]

2. Anti-Ulcer

Fernandopulle, et al. Has screened Momordicadioica extract for Antiulcerogenic effect on

ethanolinduced ulcer model of rat. A Significant decrease occurred in the level of H+K+ATPase, volume Of Gastric juice and acid output. Gastric wall mucus, pH, and Catalase Enzyme were increased Significantly but antioxidant enzyme levels of Superoxide dismutases were decreased.[36]

3. Anti- Malerial

Misra P, et al. Has screened alcoholic excerpt in vivo and in vitro for Antimalarial effect against NK65 strain of Plasmodium berghei, Jurinea Macrocephala and Aeglemarmelos and set up them To retain Schizontocidal exertion.[37]

4. Anticancer exertion

Luo et al. Showed that the CHCl3 excerpt of roots and five isolated ingredients had anticancer exertion during pharmacological testing on cancer cell (L1210). The growth inhibitory indicator () of α- Spinasterol-3-o-β-D-glucopyranoside was shown to be 50, at the cure of 4 µg/ mL.[38]

5. Antifertility exertion

Shreedhar et al. Reported the antifertility exertion of ethanolic and waterless excerpt of Momordica Dioica root. The excerpts showed moderate estrogenic exertion and caused significant increase in Uterine weight. Also, at a cure of 200 mg/ kg, waterless excerpt showed 83 and ethanolic Excerpt showed 100 abortifacient exertion.[39]

6. Neuroprotective exertion

The effect of methanol and waterless excerpt of fruit pulp was observed on the central nervous System by using neuropharmacological experimental models in mice. These excerpts were used for A cure-dependent reduction of the onset and duration of a reduction in locomotor exertion. It was Suggested that methanol and waterless excerpt of fruit pulp (100 mg/ kg and 200 mg/ kg) had Neuroprotective conditioning.[40]

7. Antioxidant exertion

In another work, the free revolutionary scavenging eventuality of the tuberous roots was studied by different In vitro styles, videlicet, DPPH radical scavenging, ABTS radical scavenging, iron chelating exertion, total antioxidant capacity, and haemoglobin glycosylation assay. Total antioxidant capacity Of ethanolic excerpt was set up to be 26 µg/ mL which is original to ascorbic acid. also, its Ethanol excerpt showed chance inhibition of

haemoglobin glycosylation as66.63 and74.14 at Conc. Of 500 and 1000 µg/ mL, independently, while that of standard DL α- tocopherol was 61.53 And 86.68 inhibition at same attention.[41]

COMPARATIVE STUDY OF MOMORDICA DIOICA WITH MOMORDICA CHARANTIA

Cucubitaceae is family of both Momordicadioica and momordica Charantia.[42] M.charantia is also Called as bitter guard, bitter melon, karela. These species include M. Angustisepala, M. Balsamina Linn, M. Cochinchinensis Spreng, M. Cabrei, M. Dioica, M. Elaterium, M. Foetida, M. Grosveroni, M. Tuberosa or cymbalaria.[43] M. charantia is monocious climber, it is found in tropical and Subtropicalregion. Like Africa, Asia, Australia.[44] M. charantia is Important vegetable in India and China. A wide range of genetic Diversity are we see in India.[45] The fruit morphology Varies Greatly in colour, size, and exocarp Characteristics. Indian Momordica charantia Cultivars bear Large fruits, whereas wild, free-living M. Dioica ecotypes develop small, round fruits.[46]The juice of Its fruit is used for cure Diabetes, Malaria, Wound Infection, fever, Leprosy, etc. Leaves are also Play important role to treat constipation, Dermatitis, Diabetes, Diarrhea, Fever, Breast cancer, Snake bite, Anaemia, Dysentry, Rheumatoid Arthritis. It also help in widely to treat cancer. It have Bitter tonic property. Because of that is used as a blood purifier. It Prevent liver injury by taking Fresh fruit juice.[47]

In India, Momordica charantia is used by tribal people for Abortions, birth control, increasing milk Flow, Menstrual disorders, vaginal discharge, Constipation, food, diabetes, hyperglycemia, Jaundice, stones, kidney, liver, fever, gout, eczema, Fat loss, hemorrhoids, hydrophobia, intestinal Parasites, skin, leprosy, pneumonia, psoriasis, Rheumatism, scabies, snakebite, vegetables, piles, Tonic, anthelmintic, purgative. However, it is Commonly consumed as vegetable.[48]

Figure 5: M. Dioica And M. Charantia.

ACTIVE CONSTITUENTS OF MOMORDICA CHARANTIA

The main ingredients of bitter melon (Karela) are triterpene, protein, steroid, alkaloid, Inorganic, lipid, and phenolic composites.[49] Momordica charantia(Karela) consists the Following chemical ingredients those are alkaloids, momordicin and charantin, charine, Cryptoxanthin, cucurbitins, cucurbitacins, cucurbitanes, cycloartenols, diosgeninelaeostearic Acids, erythrodiol, galacturonic acids, gentisic acid, goyaglycosides, goyasaponins, guanylate Cyclase impediments, gypsogenin, hydroxytryptamines, karounidiols, lanosterol, lauric acid, Linoleic acid, linolenic acid, momordenol, momordicillin, momordicinin, momordicosides, Momordin, momordolo.[50]

Table 4: Botanical differences with M. Charantia.[51]

	M.Dioica	**M.Charantia**
Plant:	A much branchedclimbing annual.	A dioecious, perennial climber with a tuberous root.
Stem:	Angled, grooved, young parts densely hairy, older branches more or less pubescent.	Slender, glabrous to rarely sparselypubescent, angled and sulcate slender, glabrous Leaves almost orbicular or reniform in outiline, lobesovateoblong, acute or subacute, apiculate.
Leaves:	Almost orbicular orreniform in outiline, lobesovate-oblong, acute or subacute, apiculate.	Much variable, membranous, ovate, obtuse or acute and mucronate lobe triangular.
Flowers:	Monoecious, male flowers solitary, pedunclesslender, glabrous or slightly pubescent; Corolla some whatirregular, lemonyellow; Female flower on 5-10cm long slender peduncles, bracteates usually at or near the base.	Male flowers solitary, glabours peduncles which are hairy, Corolla yellow, Female flowers bracteate or ebracteate.
Fruit:	Bright orange coloured,5-15 cm long, fusiform, ribbed, with numerous triangular tubercles giving it the appearance ofcrocodile skin.	Ellipsoid, shortly beaked, densely echinate with soft spines, apex shortly rostrate and annular, base usually rounded.
Seeds:	compressed, oblong, sub bidentate at base and apex,	Many, much variable in size and shape, turgid, more or less puriforms quite smooth.
	sculptured on sides, cream or greycoloured.	

SUMMARY AND CONCLUSION

Mordicadioica is as dioeciously climbing herb belonging to family cucuritaceae. It contains

many phytoconstituents. The usage is limited as begetable though it has a number of activites. Many activities as listed above are done by researchers using fruits. Still, more activities can be performed. The traditional use of medicinal plants has a long history. Ancient people as well as our ancestors were mainly dependent on plants for their recovery against disease.

But the recent tendency to avoid natural sources rather than artificial source against disease is frustrating. Because continuous reports of antibiotic resistances well as the side effects of systhetic drugs all over the world are indication a global health hypertension, and neurodegenerative disease becomes alarming to all. Huge researches are carried out to find the causes and remedies of them.

Thus, to search for a better volition than synthitic medicine becomes the Demand of time. Medicinal shops may be a good option to play vital part against similar complications. The paper has substantially concentrated on the phytotherapeutical and pharmacological eventuality of momordica dioicaroxb. As it contains significant quantum of antioxidant, vitamin, secondary metabolites, and other important constituents, these may be helpful to fight against several conditions including diabetes, cancer, and neurodegenerative conditions.

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