



(REVIEW ARTICLE)



Momordica dioica: A medicinal plant, its benefits and pharmacological activity

Ankita P. Jatale ^{1,*}, Gayatri B. Jaiswal ², Payal G. Kabra ³, Chhaya V. Mahajan ⁴ and Swati P. Deshmukh ⁵

¹ Department of Pharmaceutics Shraddha Institute of Pharmacy Kondala Zamre, Washim-444505, India.

² Department of Pharmaceutics, Prakashchand Jain College of Pharmacy, Palaskhed, Jamner, India.

³ Department of Pharmacognosy, MUP'S College of Pharmacy Degaon, Risod, 444505, India.

⁴ Department of Pharmaceutics, late Shri P.C. Bhandarkar college of pharmacy & R.R. Kele College of Pharmacy, India.

⁵ Department of Pharmacology, Shraddha Institute of Pharmacy Kondala Zamre, Washim-444505, India.

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Abstract

Momordica dioica is a cucurbitaceous climbing creeper (commonly known as kakrol, spiny gourd or teasle gourd). It is native to Asia with widely distributed in India and Bangladesh also. It is used as preventive and curative agent for various diseases. It has also significant nutritional value as vegetable over thousands of years. This review aims to take an attempt to evaluate the pharmacological properties and benefits of *Momordica dioica* according to the view of traditional medicinal plant based on treatment including. *Momordica dioica* is considered as an underutilized vegetable, although having significant presence of certain compounds containing higher nutritional value than many frequently consumed vegetables. Different plant parts of *Momordica dioica* provide a numbers of phyto-constituents like alkaloids, glycosides, steroids, triterpenoids, flavonoids, ursolic acid, vitamins, minerals and rich in fibre. They have potential to cure asthma, excessive salivation and inflammation caused by lizards, snake bite, elephantiasis, fever, mental and digestive disorders. It is used to maintain skin health.

Keywords: *Momordica dioica*; Spiny gourd; Cucurbitaceae; Medicinal plant; Vegetable

1. Introduction

Momordica dioica is commonly known as spiny gourd or teasle gourd and also known as bristle balsam pear. It is a type of flowering plant belonging to the Cucurbitaceae/Gourdaceae family. This is a medium sized plants that grow abundantly in warmer regions of the world. It is widely used as a vegetable throughout India and some parts of South Asia. It is commercially important and exported and also used locally. They are well known for its bitter taste because of the presense of alkaloids. To mask its bitter taste the fruits are usually parboiled or soaked in salt water before cooking and eaten. Propagated by underground tubers. It has small leaves and small yellowish flowers with small dark green round or oval fruits. It is dioecious plant, that means the both male and female individuals are different of this plant. This medicinal plant is used to treat Type-I and Type-II diabetes. Cucurbitane triterpenoids, saponin glycosides and *Momordica* anti-HIV protein. These are the phytochemicals may be incorporated into food stuffs or food supplements and used as nutraceuticals. The green fruits and leaves of *Momordica* species plays a major role in improving human health by offering nutritional and nutraceutical components. The cultivated varieties of *Momordica* diocoa species such as *M. charantia*, *M. balsamina* (Linn), *M. dioica* (Roxb), *M. cochinchinensis* (Spreng), and *M. tuberosa* or *cymbalaria*. This study states the potential of *Momordica* species as its important source of both nutritional and bioactive compounds. In addition, this study also supports the inclusion of these wild species into the main food stream of the local population, improves their nutritional status. Flowering of *Momordica dioica* occurs during June to July and fruiting occurs during September to November. Leaves of plant are simple membranous, broadly ovate in outline, variable in length 3.8-10cm by 3.2-8 cm, cordate at the base, deeply lobed in 3-5 triangular lobes, punctated,

* Corresponding author: Ankita P. Jatale

entire but distantly denticulate, petiole 1.3-4.5 cm. long channelled above, pubescent and glandular. Male flower issolitary, up to 2.8 cm long and yellow coloured. Petals 1.3- 2.5 cm long, oblong lanceolate. Calyx five lobed, linear lanceolate. Corolla five partite, stamen three. Female flower is solitary, small bract below the middle of the peduncle, calyx and corolla as in male without staminode or of gland three united, ovary clothed with long soft papillae and many ovuled, ellipsoid.



Figure 1 *Momordica dioica* fruit

There are some health benefits of the fruit:

- It's a great source of phytonutrients, a substance set up in certain shops which are believed to be salutary to mortal health and help help colorful conditions. The vegetable is also low in calories as it contains roughly 17 calories per 100 gm. Kantola is also high in water content, so is salutary if you're trying to lose weight, adds nutritionist Seema Singh.
- It also reduces blood sugar situations in diabetic cases since it's rich in factory insulin. "Anything that's high in fibre and is loaded with water content is a great choice for a diabetic diet, and kantola ticks all the boxes, says Singh.
- Carotenoids, like Lutein, present in this vegetable help in forestallment of colorful eye conditions, cardiovascular conditions and indeed cancers. Being a source of vitamin C, a natural antioxidant, it removes poisonous free revolutionaries from the body reducing the chance of cancer.
- Prevents Hypertension and Supports Heart Health Fresh fruit juice of chine gourd is recommended to people with high blood pressure. It supports blood rotation and helps help atherosclerosis due to high antioxidant exertion. It consists of antilipid peroxidative parcels, thus protects and heals the roadway walls.
- Prevents Seasonal Infections Thunderstorm time is considered as an ideal time for common viral infections in the form of fever, cold and cough. Mother Nature has given enough power to spiny gourd to help similar infections. So do n't vacillate to eat it.
- Boosts Immune System Spine gourd possesses anti-allergic, antioxidant, antibacterial, analgesic, and anti-inflammatory parcels. It supports all functions of the vulnerable system similar as rustling the microbes, memory function of the vulnerable system, and also killer cells.
- Cures Eczema and Skin Problems Juice of the youthful fruits can be applied on the skin to cure pustules and acne. The Roasted seeds of *Momordica dioica* fruit are used for eczema and other skin problems.
- It has antilipid peroxidative parcels, therefore prevents oxidation of fats, hence precluding Adipose Liver in the first place. It's extremely voluntary to those suffering from Adipose Liver or Liver damage.
- Prevents and cures respiratory diseases chine gourd fruit greasepaint or infusion has errhine effect (induces mucus discharge) when introduced in the nostrils. It's used in Ayurveda to cure Asthma, Bronchitis, and to treat blocked sinuses.
- Brain Function Fruit of the factory possesses neuro-defensive parcels and supports the brain function via the CNS (Central Nervous System). In Ayurveda, it's used to treat internal diseases.
- Treats Cough Coughing is the common problem that's seen in the children and grown-ups due to instant change in climate or due to contagion and bacteria. However, also you can take 3 grams of pulverized Spiny Gourd thrice in a day with water to control thenon-stop coughing. If you're suffering due to coughing.
- Give relief in breathing problem Due to fog and air pollution, breathing problems are adding fleetly. One can consume spiny gourd to cure breathing problems. Mix 250- 500 mg of Spiny Gourd' s root greasepaint with 1tsp. of gusto juice and 1tbsp. of honey and take it to get instant relief of breathing problem.



Figure 2 *Momordica dioica* seeds

There are some traditional uses of *Momordica dioica*

- Fruit is also used to cure asthma, leprosy, inordinate expectoration, help the inflammation caused by lizard, snake bite, elephantiasis, fever, internal diseases, digestive diseases and troubles of heart and to treat discharge from mucous membrane.
- Fresh fruit juice is recommended for hypertension.
- Take a fruit and cooked it in a small quantum of oil painting and used for treating diabetes. Tender fruits are rubbed on skin for pustules and acne.
- Greasepaint or infusion of the dried fruits, when introduced into the nostrils produces a important errhine effect and aggravates a riotous discharge from the schneiderian mucous membrane.
- It's also used to cure fever, hostility, asthma, bronchitis, piles, hepatic damages, internal digestive diseases, bleeding piles bowel affection and urinary complaints. The ointment from the leaves applied to the head to relieve headache.
- Leaf paste applied externally to skin and orally two or three times daily for skin complaint.
- Greasepaint of root is applied to skin to make it soft and to reduce perspiration. Mucilaginous tubers of womanish shops are used in bleeding piles & bowel infections.
- Tuberous root is base in hot water and 50 ml of juice is taken orally formerly a day on empty stomach to beat diabetes. Heated root is used to stop bleeding from piles and also in bowel complaints.
- Roots of the factory are also recommended for scorpion sting. Root ground into a paste and smeared over the whole body is supposed to act as a opiate in high fever with distraction.
- In Ayurveda, it's used as a salutary measure to cure numerous conditions as urinary diseases, respiratory diseases, and vulnerable dysfunctions related to inflammation and complications. It should be consumed by new maters to help bellyache and puking in babies.



Figure 3 *Momordica dioica* leaf and flower

1.1. Nutritional values of *Momordica dioica*

The fruit of *Momordica dioica* contains ashes 9.1, crude protein 5.44, crude lipid 3.25, crude fiber 22.9, and carbohydrate 59.31. the fruit has high calaries (288.25 kcal/ 100 g) in dry weight. the minerals ranges from (mg/ 100 g dry weight,) and potassium has (4.63), sodium has (1.62), calcium has (7.37), iron(5.04), and zinc(3.83).

In another disquisition, its nutritive value of per 100 g comestible fruit is reported to contain 84.1 humidity, 7.7 g carbohydrate 3.1 g protein, 3.1 g fat, 3.0 g fiber and 1.1 g minerals and small amounts of essential vitamins like carotene, thiamin, riboflavin and niacin. Ali and Deokule estimated some of its micronutrient and secondary metabolites as follows calcium 0.5 mg/ g, sodiu 1.5 mg/ g, potassium 8.3 mg/ g, iron 0.14 mg/ g, zinc 1.34 mg/ g, protein 19.38, fat 4.7, total phenolic emulsion 3.7 mg/ g, phytic acid 2.8 mg/ g, and ash value 6.7. also, its fruit is recommended as nutritionally rich source of protein and good source of lipid, crude fiber, carbohydrate, iron, calcium, phosphorous. also, it's the loftiest quantum of carotene (162 mg/ 100 g of comestible portion) vessel amongst the cucurbitaceous vegetables (17 – 19). The ash content is reported as 3- 4 containing a trace of manganese. Tirmizi et al. screened it as a implicit source of chromium and zinc. Whereas, *Momordica dioica* (hulled) contained 0.27 mg/ kg of chromium and 4.91 mg/ kg of zinc, *Momordica dioica* (unpeeled) contained 0.26 mg/ kg of chromium and 11.0 mg/ kg of zinc. The protein content of leaves and dry weight of upstanding factory corridor remained advanced in manly as compared to womanish defruited and monoecious shops. The fruit contains advanced quantum of ascorbic acid and iodine. The presence of secondary metabolites of fruit including alkaloids, steroids, triterpenoids, and saponins was determined. Among them, four composites were insulated from ethyl acetate excerpt and five composites were insulated from methanol excerpt conforming of alkaloids and flavonoids with NH and C =O functional groups, independently. The alkaloids present in seed and root were called momordicin and *Momordica foetida*, independently. Phytochemical examinations summurized showed the presence of lectins, β - sitosterol, saponin glycosides, triterpenes of ursolic acid, hederagenin, oleanolic acid, α - spinasterol, stearic acid, gypsogenin, momodicaursenol, and three new composites named 3 β - o- benzoyl-11-oxo-ursolic acid, 3 β - o- benzoyl-6-oxo-ursolic acid, and 3- o- β - D- glucuronopyranosyl gypsogenin.

2. Pharmacological exertion

Antidiabetic exertion: Antidiabetic specifically oral hypoglycemic goods of *Momordica dioica* in rat model was screened it showed waterless, chloroform, ethyl acetate and ethanolic excerpt of fruit intermediated antidiabetic exertion in alloxan convinced experimental rats. also, Sharma and Arya reported ethyl acetate and ethanol excerpt containing steroids, triterpenoids had implicit part in alloxan induced diabetic rats and astronomically type 2- diabetes.

2.1. Antioxidant exertion

composites deduced from natural sources are able of furnishing protection against free revolutionaries. The alcoholic excerpt inhibited the conformation of oxygen deduced free revolutionaries (ODFR) in vitro with 4000 g/ mL ascorbic system. 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.

2.2. Antiallergic Conditioning

The antiallergic exertion of its excerpt in mice was observed. The alcoholic excerpt was estimated and its efficacy to inhibit unresistant cutaneous anaphylaxis was set up in mouse and rat.

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- spinasterol-3-o—D-gluco pyrano side was shown to be 50, at the cure of 4 g/ Ml. Analgesic exertion Ilango et al. and Vaidya and Shree dhara reported that both hexane excerpt and answerable portion of methanolic excerpt of *Momordica dioica* fruit pulp displayed analgesic exertion when compared to standard medicine. Petroleum ether, ethyl acetate, and methanol excerpts displayed significant analgesic exertion in acetic acid convinced writhing pattern when compared to the vehicle treated control group. But among them petroleum ether and methanol excerpt gave more significant analgesic exertion than ethyl acetate excerpt.

2.3. 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 dose dependent reduction of the onset and duration of a reduction in locomotor exertion.

Antimicrobial exertion: Shrinivas et al. studied methanolic excerpt and waterless excerpt of fruit and set up that methanolic excerpt had more promising antimicrobial exertion. Arekar et al. screened antibacterial conditioning of ethyl acetate excerpt. The attention of 200 g/ slice was more active against *E. coli* compared to *S. aureus*, *S. par typhi*, and *P. mirabilis* bacteria. Ethyl Acetate excerpt of in vitro shoot culture (yield 0.26) showed maximum inhibition zone against

S. paratyphi and *P. mirabilis* while ethyl acetate excerpt of in vitro callus culture (yield 21.5) showed maximum inhibition zone against *S. aureus*.

Anti-inflammatory exertion: The anti-inflammatory effect of the alcoholic excerpt of roots was estimated during CCl₄ convinced hepatotoxicity. Ilango et al. estimated both hexane excerpt and methanolic excerpt of fruit pulp intermediated anti-inflammatory conditioning.

2.4. 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 200mg/ kg, waterless excerpt showed 83 and ethanolic excerpt showed 100 abortifacient exertion. Kudaravalli estimated the ethanolic excerpt of fruit intermediated antifertility conditioning of womanish rats but set up no manly antifertility exertion at the cure of 250mg/ kg.

3. Conclusion

The main point of the given text is that *Momordica dioica*, also known as spiny gourd or teasle gourd, is a flowering plant that is widely used as a vegetable in India and South Asia. It is known for its bitter taste and is used to treat diabetes. The plant contains phytochemicals that can be incorporated into food and used as nutraceuticals, offering nutritional and bioactive compounds.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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