



The Comprehensive Review on Momordica Dioica

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ABSTRACT:

Momordica dioica, a dioecious perennial cucurbitaceous climbing creeper, also known as kakrol, spiny gourd, or teasle gourd, is used as a food source and to prevent and treat a number of diseases. To properly utilize them, we must be well informed about their pharmacological and therapeutic uses. In addition to its role as a disease-curing agent, it is a popular and nutritious vegetable. Its traditional uses include astringent, febrifuge, antibacterial, anthelmintic, and spermicidal. Additionally used as a sedative, for urinary tract infections, and for bleeding piles. Research suggests that it has analgesic, hypoglycemic, hepatoprotective, antibacterial, anti-inflammatory, and anti-lipid peroxidative qualities. Despite having a better nutritional content than many commonly consumed vegetables and a notable presence of certain components, Momordica dioica is regarded as an underappreciated food. Furthermore, while being a traditional medicinal plant, it still has potential phytochemical components that raise the need for more thorough research to support its various therapeutic uses.

(Key words: *Momordica dioica*, *Cucurbitaceous*, *Hepatoprotective*, *Antibacterial*, *Anti-lipid peroxidative*)

Introduction:

Momordica dioica belongs to the cucurbitaceous family. This fruit is edible and has been used in both the ancient and modern worlds. Despite its various nutritional and disease-fighting qualities, this neglected plant needs more research to support its therapeutic uses. Secondary metabolites, including alkaloids, steroids, triterpenoids, saponins, phenolic chemicals, and flavonoids, have been identified in every part of the plant.[1], [2], [3] It is a dioecious climber that can be either annual or perennial and is usually referred to as spine gourd, little bitter gourd, or teasle gourd. With a wide distribution in Bangladesh, China, India, Japan, and Pakistan, it is indigenous to tropical regions of Africa, South America, and Asia. Anti-diabetic, antiviral, immunostimulant, anti-inflammatory, antipyretic, antiseptic, anti-ulcerative, antitoxic, antiperspirant, anti-hemorrhoidal, intestinal infection reduction, and skin-softening qualities have all been recorded for the roots. It is reported to be grown in the Meghalayan Garo hills and Assam at elevations of up to 1500 meters.[4] It is reported to be grown in the Meghalayan Garo hills and Assam at elevations of up to 1500 meters. The widespread perception that green medicine is healthier than synthetic products is primarily responsible for the resurgence of interest in natural medications that began last decade. This fruit's bitter flavor results from the presence of alkaloid phytochemicals, which have a variety of therapeutic uses.[5], [6], [7], [8]

Botanical Profile of Momordica Dioica:

Based on historical and contemporary studies, Momordica dioica is a dioecious climber that is perennial and has tuberous roots. The US Department of Agriculture approved Momordica dioica for the Cucurbitaceae family, Cucurbitaceae subfamily, and Cucurbitaceae family, respectively. M. Dioica's fruit appears to have been bitten. M. Dioica is often known as Kakora. From the Himalaya to the southern region, that plant is extensively distributed throughout the region. In Bangladesh, Myanmar, and Sri Lanka, for example, this plant is grown primarily for its fruit, which is then served as a vegetable. The plant produces oval-shaped fruits with tiny, soft spines. The aerial portion of the plant dies at the start of winter. This plant is grown via the vegetative propagation method. The kantola, or spiny gourd, is a popular vegetable in India and is primarily grown in mountainous areas.[9], [10], [11] When the fruits of Momordica dioica ripen, their dark green hue turns yellow instead of light green. The fruit has a diameter of 2 to 3 cm. This plant is monosexual, meaning that the male and female blooms are produced independently.[12] The weight of its fruit ranges from 2.9 to 5 grams. There are lengthy tendrils there. Because the ovules are distributed along the fruit's free central column and the seeds are encased in a hard, controlled endocarp, it exhibits tolerance to root knot nematodes, pumping caterpillars, and gall flies. Simple, widely oval leaves with deep lobes in outline typically measure between 3.8 and 10 cm in length.[9], [13]

Taxonomy of Momordica Dioica:[14]

| | |
|--------------------|----------------|
| Kingdom | Plantae |
| Sub-Kingdom | Tracheobionata |

| | |
|-----------------------|---------------|
| Super-division | Spermatophyta |
| Division | Magnoliophyta |
| Class | Magnoliophyta |
| Sub-Class | Dilleniidae |
| Order | Violales |
| Family | Cucurbitaceae |
| Genus | Momordica |
| Species | Dioica |

Vernacular Names of Momordica Dioica:[8], [15], [16], [17], [18]

1. Bengali: Kartoli
2. English: Small bitter gourd, Spine gourd, Teasel gourd
3. Hindi: kakora, Parora, Kantola
4. Malayalam: Venpaval
5. Tamil: Paluppakkay
6. Telugu: Agakara, Karl
7. Sanskrit: Vahisi
8. Punjabi: Bharkarela
9. Marathi: Kantoli
10. Gujrati: Katwal

Description of plant part:

i. Fruit:

M. dioica is used as a vegetable and has green fruit. It has a number of therapeutic benefits, including diuretic, laxative, and hepatoprotective effects. Additionally, it treats snake bites, leprosy, elephantiasis, and asthma. Fresh fruit juice from the M. dioica plant is used to treat hypertension. By applying the fruit to the skin, acne and other skin issues can be avoided or resolved. [19], [20], [21]



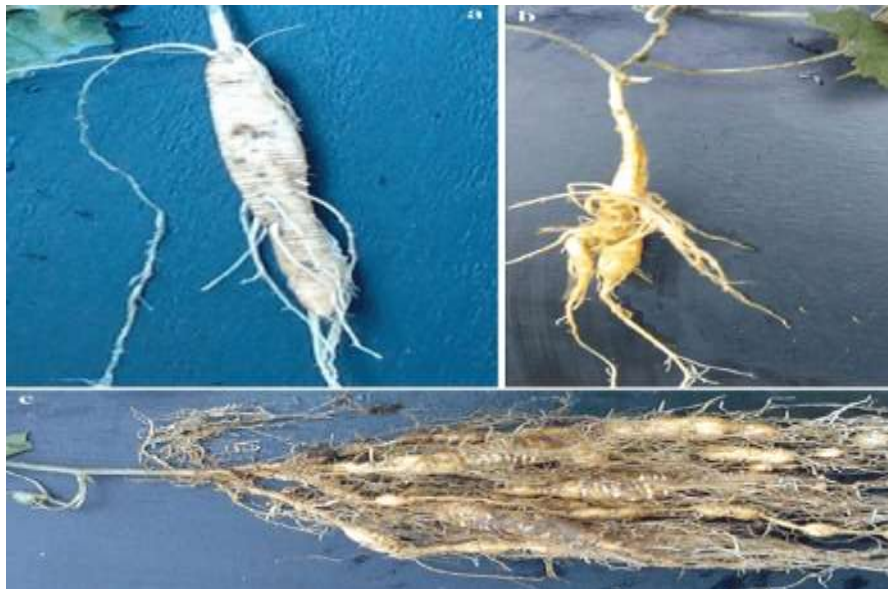
ii. Leaves and Flowers:

The plant's leaves have anti-helminthic properties. It also cures diabetes, fever, and jaundice.[22] Applying a leaf paste to the skin can cure a variety of skin conditions and infections. The leaves' juice is combined with coconut, pepper, red sandalwood, and other ingredients to create an ointment that is applied to the head to treat headaches. [5], [13], [23], [24]



iii. Roots:

M. Dioica roots are highly beneficial for a number of diseases. It comprises a variety of medications, including Spermicidal and Abortifacane. It is also frequently used to treat urinary tract infections and bleeding piles. [25], [26], [27]



Nutritional of Momordica Dioica:

Momordica dioica contains vitamins, triterpenes, proteins, and lectins. Vitamin C is abundant in the fruit. Iodine and ascorbic acid are abundant in the fruit. The fruit also contains amino acids, glycosides, alkaloids, and flavonoids.[28] Additionally, Momordica dioica contains ash 3–4 p.c., an alkaloid, and fragments of extractive materials. Ash contains trace quantities of manganese. According to research, Momordica dioica has an average of 84.1% moisture, 7.7g carbohydrate, 3.1g protein, 3.1g fat, 3.0g fiber, and 1.1g minerals per 100g of edible fruit.[29] Additionally, it included trace amounts of vital vitamins such as niacin, riboflavin, carotene, thiamine, and ascorbic acid. In comparison to the monoecious and defruited females, the male Momordica dioica plants also displayed bigger dry weights of aerial plant parts and higher protein content in their leaves. Bioactive substances the dioecious climbing herb Momordica dioica is a member of the Cucurbitaceae family. Numerous phytoconstituents are present in it.[27], [30], [31] The phytoconstituents of the plant include traces of alkaloids, steroids, triterpenoid, flavonoids, glycosides, saponin, triterpenes of urisolic acid, dark brown semidrying oil, saturated fatty acids, ascorbic acids, vitamin A, thiamine, riboflavin, niacin, protein carbohydrates, lectins, ascorbic acids, carotenes, bitter principles, oleanoic acid, stearic acid, gypsogenin, α -spirosterol, hederagenin, and Momordica ursenol. Momordica foetida is an alkaloid found in roots and seeds, respectively. [3], [31], [32]

Momordica dioica's proximate and mineral composition:[5], [8], [33]

| SR.NO | PARAMETERS | COMPOSITION |
|-------|---------------|-------------|
| 1 | PH | 6.5 |
| 2 | Crude protein | 52.06g/100g |

| | | |
|---|-----------------|--------------------|
| 3 | Crude lipid | 4g/100g |
| 4 | Crude fibre | 15.36g/100g |
| 5 | Ash | 14g/100g |
| 6 | Carbohydrate | 14.58g/100g |
| 7 | Total solids | 12.9/100g |
| 8 | Calorific value | 302.56kcal/100Gdw* |
| 9 | Water | 87g/100g |

DW= Dry Weight

Proximate and mineral composition of *Momordica dioica*:[1], [5], [6], [7]

| COMPOSITION | M.DIOICA |
|--------------------|----------|
| Moisture /% | 84.1 |
| Ash /% | 6.7 |
| Lipids/% | 4.7 |
| Protein /% | 19.38 |
| Carbohydrate /% | 47.92 |
| Energy k cal /100g | 311.50 |
| Calcium mg/100g | 33 |
| Sodium mg/100g | 1.51 |
| Potassium mg/100g | 8.25 |
| Iron mg/100g | 4.6 |
| Phosphorus mg/100g | 42 |
| Fibre /% | 21.3 |

Vitamin composition of fruit of *Momordica dioica*:[2], [3]

| VITAMIN | M.DIOICA | RECOMMENDED DIETARY ALLOWANCE(MG/DAY) |
|---------------|----------|---------------------------------------|
| Vitamin A | 2.5 | . |
| Vitamin B1 | 1.8 | 1.7 |
| Vitamin B2 | 3.5 | 1.7 |
| Vitamin B3 | 1.9 | 18 |
| Vitamin B5 | 1.8 | . |
| Vitamin B6 | 4.3 | 2.0 |
| Vitamin B9 | 3.6 | 0.2 |
| Vitamin B12 | 4 | 0.001 |
| Vitamin C | . | 40 |
| Vitamin D2 &3 | 3 | . |
| Vitamin H | 6.5 | . |
| Vitamin K | 15 | . |

Fatty acid composition of fruits of *Momordica dioica*:[34], [35], [36]

| Fatty acid | Momordica dioica |
|-----------------------|------------------|
| Myristic acid(%) | 3.589 |
| Palmitic acid(%) | 12.157 |
| Stearic acid(%) | 3.547 |
| Oleic acid(%) | 56.253 |
| Linoleic acid(%) | 22.511 |
| Alpha-Linoleic aid(%) | 1.943 |

Uses of Momordica Dioica:

- Spiny gourds are inexpensive in calories and a great source of phytonutrients, weighing only 17 calories per 100g. In addition, it has minerals, dietary fibers, vitamins, and antioxidants.[37]
- Momordica dioica has anti-diabetic properties by lowering blood sugar levels, anti-cancer properties, anti-aging properties, anti-kidney stone removal, and eye health benefits. It has long been used as a sedative, astringent, antibacterial, antihelminthic, and spermicidal. It is also used to treat urinary tract infections and bleeding piles.[38], [39], [40], [41], [42], [43]

Phytochemical study of Momordica Dioica:

Momordicadioica is a dioeciously climbing condiment that belongs to the Cucurbitaceae family. Steroids, tripenoids, urisolic acid, thiamine, riboflavins, and niacin are among the vibrant phytochemicals it contains. Momordicin is a phytochemical alkaloid found in seeds, and momordica foetida is found in roots. Triterpenes, proteins, vitamins, and lectins are among the phytochemicals found in that factory. M. dioica fruit has a high vitamin C content.[44] Alkaloids, flavonoids, glycosides, and amino acids are also present. 84 humidity, 7.7 g carbs, 3.1 g protein, 3.1 g fat, 3.0 g fiber, and 1.1 g minerals are all included in 0 grams of edible fruit. Additionally, it contains vibrant vitamins like as niacin, carotene, thiamine, riboflavin, and ascorbic acid.[1], [6] The study conducted by Jain and Singhai (2010) examined the nephroprotective effects of an extract from M. dioica fruits (200 mg/kg).[45] According to their research, the ethanolic extract exhibited the highest inhibition in DPPH free revolutionary scavenging exertion (84.2), followed by the waterless (74.8), ethyl acetate (69.4), and chloroform (59.7) extracts. However, because of the presence of phenolics, flavonoids, and amino acids, the ethanol extract exhibited 80.1 inhibition in total antioxidant exertion, followed by waterless (71.9), ethyl acetate (67.2), and chloroform (53.2) excerpts. Serum creatinine and blood urea were examined as biochemical indicators of nephrotoxicity. In order Apkins, reduced glutathione and the lipid peroxidation product were also tested.[46], [47], [48]

Pharmacology of Momordica Dioica:

i. Anti -Oxidant:

It is a chemical that inhibits oxidants, particularly those used to prevent food products from degrading.

ii. Anti-diabetic:

In Albino wister strain rats with alloxan-induced diabetes, Fernandopulle et al., Reddy et al., and Singh et al. investigated antidiabetic activity utilizing ethanol, water, chloroform, and ethyl acetate as solvents. Additionally, Sharma and Arya observed that ethanol extract and ethyl acetate contained steroids; triterpenoids may have a role in Type-2 diabetes in general and alloxan-induced diabetic rats in particular.

iii. Anti-Ulcer:

Momordicadioica extract was tested for its antiulcerogenic properties using a rat model of ethanol-induced ulcers by Fernandopulle et al. The amount of gastric juice, acid production, and H+K+ATPase all significantly decreased. While the levels of the antioxidant enzyme superoxide dismutases dropped, there was a significant rise in gastric wall mucus, pH, and catalase.

iv. Anti malaria:

In order to maintain schizontocidal efforts, Misra P. et al. evaluated an alcoholic extract both in vitro and in vivo for antimalarial activity against the NK65 strain of Plasmodium berghei, Jurinea Macrocephala, and Aeglemarmelos.[26], [49], [50]

Conclusion:

In traditional medicine, medicinal plants have long been utilized. Both ancient humans and our predecessors relied heavily on plants to help them recover from illnesses. However, it's annoying that people are now more likely to avoid natural sources of illness prevention than artificial ones. because there is a global health alert due to the ongoing reports of antibiotic resistance and synthetic medication side effects worldwide. Everyone is concerned about the increased prevalence of diabetes, cancer, obesity, hypertension, and neurological illnesses in the world. To determine the causes and solutions, extensive research is conducted. Therefore, the need of the hour is to find a better substitute for synthetic drugs. In order to combat these issues, medicinal plants could be a smart choice.[51], [52], [53] The pharmacological and phytotherapeutic potential of *Momordica dioica* Roxb has been the primary focus of the paper. Due to its high content of vitamins, antioxidants, secondary metabolites, and other vital components, it may help prevent diabetes, cancer, and neurological illnesses, among other illnesses.[6], [27], [54], [55]

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