

A Review on *Momordica dioica* Fruits

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Abstract

Momordica dioica Roxb. ex Willd. is a perennial, dioecious climb creeper happiness to the gourd family. Its common referred to as kakora, parora that is mature in each tropical and sub-tropical country. Apart from its use as curative agent for diseases it is widely used as vegetable with nutritional quality. Phytochemical screening ends up in the presence of alkaloids, steroids, triterpenoids, flavonoids, glycosides, saponins, triterpenes of urisolic acid dark brown semidrying oil and saturated fatty acids, ascorbic acids, vitamin A, thiamine, riboflavins, niacin, supermolecule carbohydrates, lectins, ascorbic acids, carotenes, bitter principles, oleanoic acid, saturated fatty acid, gypsogenin, alpha-spiranosterolhederagenin, momordicaursenol however studies indicate that solely a really very little analysis activity has been done on this plant. In this review gathered the information about the drug profile, phytochemical constituent and medical specialty activities done thereon.

Keywords: Cucurbitaceae; Curative Agent; Nutritional Value

Introduction

Momordica dioica Roxb. Ex. Willd is a perennial, dioecious climbing creeper belonging to the family cucurbitaceae. It is common known as spiny groud, kakara and parora [1]. Flowering occurs during June to July and fruiting during September to November [2]. Leaves of plant are simple membranous, broadly ovate in outline, variable in length of about 3.8 to 10cm by 3.2 to 8cm, cordate at the base, deeply lobed in 3-5 triangular lobes, punctuated, entire but distantly denticulate, petiole 1.3-4.5cm. long channelled above pubescent and glandular [3]. Male flower is solitary upto 2.8cm long and yellow coloured [4]. Petals are of 1.3-2.5cm long, oblong, and lanceolate. Calyx is five lobed, linear lanceolate [5]. Corolla is five partite and stamen three. Female flower is solitary small bract below the middle of the peduncle, calyx and corollas in male without staminodes or in the form of gland three united, ovary clothed with long soft papillae and many ovuled, ellipsoid. Yellow coloured fruit is shortly beaked, obtuse with inner red kernel, denselyechinate with soft spines, green and yellow at maturity. Seeds are rounded broadly ellipsoid, slightly and irregularly corrugated enclosed in red pulp. Stem is slender, branched, furrowed, glabrous, and shining. Tendrils are elongated, simple and glabrous [6]. This is climbing creeper generally throughout in India, Pakistan himalayas to ceylo. Reported up to an altitude of 1500 metres in Assam and Garo hills of Meghalaya [7] Kakrol is a cucurbitaceous crop originated in the Indo -Malayan region [8,9] (Table 1) (Figure 1).

Kingdom	<i>Plantae</i>
Subkingdom	<i>Tracheobionata</i>
Superdivision	<i>Spermatophyta</i>
Division	<i>Magnoliophyta</i>
Class	<i>Magnoliopsida</i>
Subclass	<i>Dilleniidae</i>
Order	<i>Violales</i>
Family	<i>Cucurbitaceae</i>
Genus	<i>Momordica</i>
Species	<i>Dioica</i>

Table 1: Scientific Classification of Spiny Gourd [10]



Figure 1: Fruits of *Momordica dioica*

Botanical Description

Spiny Gourd is popular as Kantola in India. Spiny Gourd or Kantola is very popular in Rajasthan particularly in rainy season. Spiny gourd is also popular as Teasel Gourd (*Momordica dioica*). It is mostly cultivated in the mountain regions of India. Spiny Gourd comes from “*Cucurbitaceus*”. They are dark green in colour and change color as they get ripe from light green to yellow. Size of Spiny Gourd is normally 2-3 cm in diameter.

Vernacular Names of Spiny Gourd in India [11]

Bengoli - Kartoli
 English - Small bitter gourd, Spine gourd, Teasel gourd
 Hindi - Kakora, Parora, Kantola
 Malayalam - Venpaval
 Tamil - Paluppakkay
 Telugu - Agakara, Karkotaki
 Kannada - Madahagala-Kaya
 Sanskrit - Vahisi
 Punjabi - Bharkarela
 Assam - Batkarila
 Gujarati - Katwal

Climate Conditions Required for Spiny Gourd Farming

Kantola is a warm and low humid season crop. This vegetable can be cultivated in both tropical and sub-tropical regions. This crop requires good sunshine for better growth and yield. The optimal temperature of about 27 °C to 32 °C is suitable for its cultivation.

Soil Requirement for Spine Gourd Farming

Spiny gourd /kantola can be grown on sandyloam to clay soils with pH values 5.5-7.0. Soils with well drainage and good organic matter best suited for its cultivation.

Harvesting of Spiny Gourd

These vegetables will be ready for harvesting for 75-80 days of sowing. In second year, they will become available for picking in 35-40 days. Fruits are picked when they are in tender stage. Alternate days are recommended for harvesting to avoid over mature of vegetables. Hand harvesting can be carried without disturbing the vine. If you are growing these for seed production then leave the fruits on the vine until they ripen fully. Usually, they turn the colour from green to orange. One can easily identify matured seeds when the pulp inside the fruit turns into red colour.

Yield of Spiny Gourd

An average yield of 75-100 quintals/hectare can be obtained with good management practises.

Chemical Constituents [12]:

- It contains ashes: 9.1%, crude protein: 5.44%, crude lipid: 3.25%, crude fiber: 22.9%, and carbohydrate: 59.31%.
- Its fruit has high energy value (288.25 kcal/100 g) in dry weight.
- Its mineral ranges (mg/100 g dry weight,) are: potassium (4.63), sodium (1.62), calcium (7.37), iron (5.04), and zinc (3.83).
- In another investigation, its nutritional value of per 100 g edible fruit is reported to contain 84.1% moisture, 7.7 g carbohydrate, 3.1 g protein, 3.1 g fat, 3.0 g fibre and 1.1 g minerals and small quantities of essential vitamins like carotene, thiamine, riboflavin and niacin.

Phytochemical Studies

Momordica dioica is a dioeciously climbing herb belonging to family *Cucurbitaceae*. It contains many phytoconstituents. Phytoconstituents of *Momordica dioica* are traces of alkaloids, steroids, triterpenoids [13], flavonoids, glycosides, saponins [14], triterpenes of urisolic acid dark brown semidrying oil and saturated fatty acids, ascorbic acids, vitamin A, thiamine, riboflavin, niacin, protein carbohydrates, lectins [15], ascorbic acids, carotenes, bitter principles, oleanic acid, stearic acid, gypsogenin, alpha-spiranosterol hederagenin, momordicaursenol [16]. The alkaloid present in seed called momordicin and present in root called *Momordicafoetida*. Spiny gourd contains glycosidic structures known as Cucurbitacins and Cucurbitane glycosides structures [17].

Quantitative Analysis of Phytochemical Constituents of *Mimordica dioica*:

The quantitative analysis of hydro alcoholic extracts of fruits of *Mimordica dioica* results in presence of 5.44% of crude protein, 3.25% of crude lipid, 22.9% of crude fiber, 59.31% of carbohydrate, 4.63mg/100 gm of potassium, 1.62gm/100g of sodium [18].

Uses

Spiny gourd is a great source of phytonutrients and low in calories and it contains 17cal per 100g. It also contains other nutrients like vitamins [19], anti-oxidant [20], dietary fibres [21] and minerals [22].

The beneficial effects of *Momordica dioica* are anti-diabetic by decreasing sugar levels in blood [23], anti-cancer agent, well for breathing problem [24], anti-aging, eliminate kidney stones, and improve eye sight. It is traditionally used as astringent [25], antiseptic, antihelminthic, spermicidal and also used in bleeding piles, urinary infection and as a sedative [26].

Reported uses of *Mimordica dioica*

Anti-oxidant [27-30]

It is a substance that inhibits oxidation, especially one used to counteract the deterioration of stored food products.

- Compounds derived from natural sources are capable of providing protection against free radicals.
- The alcoholic extract inhibited the formation of oxygen derived free radicals (ODFR) *in vitro* with 4000 µg/mL ascorbic system.

Anti-diabetic [31-35]

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 wistar 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.

Anti-malarial [36]

Misra P, *et al.* has screened alcoholic extract *in vivo* and *in vitro* for antimalarial effect against NK65 strain of *Plasmodium berghei*, *Jurinea Macrocephala* and *Aegle marmelos* and found them to possess schizontocidal activity.

Anti-ulcer [37]

Fernandopulle, *et al.* has screened *Momordica dioica* extract for antiulcerogenic effect on ethanol-induced 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.

Pharmacological Activities

Many researchers have worked on various types of activities on different parts of the plant. Their studies were based on the use by the people for various ailments and on the variation in the chemical composition of the various parts of the plant. The pharmacological studies are summarised below (Table 2).

s.no	Activity done	Researcher Performed	Reference number
1	Antiallergic	Gupta, <i>et al.</i>	[38]
2	Analgesic and anti-inflammatory	Ilango, <i>et al.</i>	[39]
3.	Antioxidant and hepatoprotective	Jain, <i>et al.</i>	[40]
4	Hepatoprotective	Kushwaha, <i>et al.</i>	[41]
5	Anti-malarial	Mishra, <i>et al.</i>	[36]
6	Antifeeding activity	Narsimhan, <i>et al.</i>	[42]

s.no	Activity done	Researcher Performed	Reference number
7	Antifertility activity	Shreedhar, <i>et al.</i>	[43]
8	Anti-diabetic activity	Fernandopulle, <i>et al.</i> Reddy, <i>et al.</i> and Singh, <i>et al.</i>	[31-35]

Table 2: Summserised pharmacological activities screened by various researchers

Improved Commercial Varieties of Spine Gourd in India

Indira Kantola I (RMF 37) is a new commercial variety of Kantola developed by Indira Gandhi agricultural university. This hybrid variety is cultivated in Uttar Pradesh, Orissa, Jharkhand, and Maharashtra. This improved variety is resistant to all major pests and insects. This variety will be ready for harvesting in 35-40 days and for tubers 70-80 days. This variety gives average yield of 10 quintals/ha in the first year, 15 quintals/ha in second year, 20 quintals/ha in the third year.

Conclusion

Momordicadioica is as dioeciously climbing herb belonging to family *Cucurbitaceae*. It contains many phytoconstituents. The usage is limited as vegetable though it has a number of activities. Many activities as listed above are done by researchers using fruits. Still, more activities can be performed. This article can serve as reference to researches who are about to work on this plant.

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