

## Momordica cymbalaria: A superfood in disguise

***Momordica cymbalaria* is an underutilized cucurbit with remarkable nutritional and therapeutic potential, traditionally consumed by rural and tribal communities across India. The species is rich in protein, dietary fibre, minerals and vitamin C, along with diverse phytochemicals that contribute to its antioxidant, antidiabetic, hypolipidemic and hepatoprotective properties. Despite its resilience and medicinal value, the crop remains largely neglected due to poor seed germination, habitat loss and lack of organized cultivation. Emerging propagation techniques, including micropropagation, offer promising avenues for conservation and sustainable utilization. Promoting awareness, structured cultivation and value addition can elevate this species as a valuable functional food.**

**Keywords:** Conservation strategies, Functional food, Nutraceutical potential, Phytochemical composition, Traditional medicine,

**M**OMORDICA *cymbalaria* Hook F., is an underutilized and underexploited tuber forming vegetable crop, belonging to family Cucurbitaceae. It is known as *Kasarakayee* (Andhra Pradesh and Telangana), *Karchikai* (Karnataka), *Athalakkai* (Tamil Nadu), *Kadavanchi* (Maharashtra) and Little wild gourd (English). The generic name *Momordica* is derived from the Latin word 'Mordere' meaning "to bite." This refers to the characteristic appearance of the seeds in many *Momordica* species, which often look like they have been bitten or notched along the edges. The species name *cymbalaria* is likely inspired by the shape of the plant leaves, resembling small cymbals. This wild gourd species is native to India and is particularly important in the Central and Southern region. It plays a significant role as a wild food and traditional remedy for local communities and tribal groups, especially during the monsoon and post-monsoon seasons. *Momordica cymbalaria* is distributed across various Indian states, including Andhra Pradesh, Karnataka, Madhya Pradesh, Maharashtra, and Tamil Nadu, and has also been documented in parts of Chhattisgarh, Gujarat, and Jharkhand. Occasional or smaller populations are also reported from Kerala and adjoining areas. Beyond India, this species is found in neighbouring countries such as Pakistan and in regions of East Tropical Africa (Kenya and Tanzania).

### Botanical features

It is a slender perennial or annual climbing herb with a thin, branched, and striate stem that trails along the ground or climbs nearby supports using tendrils. The plant develops from tuberous, woody roots that are perennial and enable it to withstand adverse environmental



*M. cymbalaria* vine

conditions. The leaves are orbicular or kidney-shaped with a deeply heart-shaped base, typically lobed into five to seven segments. They are initially pubescent but become smooth on the upper surface as they mature. The species is monoecious with unisexual flowers: male flowers occur in racemes of 2–5 pale-yellow blossoms on slender peduncles measuring 5–30 mm in length, each bearing two stamens, while female flowers are solitary on longer peduncles of about 28 mm. Flowering predominantly occurs in October, followed by fruiting from November to January. The fruits are small, juicy, pear-shaped, and typically 2–2.5 cm long, deep green in colour, with eight prominent longitudinal ridges. Each fruit contains 4–10 smooth, glossy seeds, each slightly under half a centimetre long.

Despite its delicate appearance, this hardy plant thrives in challenging habitats such as dry deciduous

forests, rocky hillsides, and scrublands across semi-arid and monsoon-prone regions. Propagation is difficult due to slow and erratic seed germination, and the species relies largely on natural seeding, although vegetative propagation is occasionally possible. Its tuberous root system gives *M. cymbalaria* a survival advantage: even when the above-ground parts wither after the growing season, the underground tuber remains dormant and regenerates when favourable conditions return. This unique adaptation, annual foliage combined with a perennial root system, contributes significantly to its persistence despite increasing pressure on its natural habitats.

### Nutritional composition

The fruit of *Momordica cymbalaria* is highly nutritious and rich in dietary fibre, protein, and ascorbic acid (vitamin C). It is also an excellent source of key phytochemicals such as phenols and flavonoids. The dry fruit contains about 79–84% moisture, along with approximately 8.3 g/100 g of protein and 24 g/100 g of crude fibre. Total carbohydrates amount to around 13.5 g/100 g of dry fruit, comprising starch and soluble sugars such as glucose and fructose, with starch forming the major portion.

The mineral composition is particularly noteworthy, with high levels of potassium (~2400 mg/100 g), phosphorus (450 mg/100 g), calcium (350 mg/100 g), sodium (350 mg/100 g), zinc (3.37 mg/100 g), iron (35.46 mg/100 g), manganese (2.26 mg/100 g), and copper (1.64 mg/100 g). Fresh fruits provide approximately 73 kcal per 100 g. The vitamin C content is exceptionally high at about 290 mg/100 g fresh fruit—significantly higher than many commonly consumed fruits. Although beta-carotene levels are present, they are relatively low.

The fruit also contains appreciable amounts of organic acids, including citric, malic, fumaric, and gallic acids, which contribute to its nutritional and antioxidant potential. Compared to related species such as *Momordica charantia*, *M. cymbalaria* shows higher concentrations of



Fruits of *M. cymbalaria*

several minerals and antioxidants, enhancing its value as an underutilized superfood and a promising nutraceutical resource.

### Culinary and nutritional use

*Momordica cymbalaria* has long been a part of traditional diets in rural and tribal communities, although it is not commonly found in mainstream markets. The fruit and leaves are often cooked as vegetables or added to traditional curries, imparting a distinct, mildly bitter flavour to the dishes. In dried or powdered form, the fruit is consumed as a nutritional supplement and is sometimes incorporated into herbal formulations. The tuberous roots, though rarely used in modern culinary practices, hold considerable value in indigenous medicine and are traditionally consumed to treat digestive and reproductive ailments.

## MEDICINAL IMPORTANCE OF MOMORDICA CYMBALARIA

### Traditional uses in folk medicine

*Momordica cymbalaria* has held a significant place in traditional medicine systems across India for centuries. Various parts of the plant, including the fruit, leaves, and roots, have been used as stimulants, tonics, and laxatives. Local and tribal communities rely on this species to manage a wide range of health conditions such as diabetes, gout, rheumatism, and disorders of the liver and spleen. It is also used as an emmenagogue to stimulate menstrual flow and as a remedy for malarial fevers, wounds, infections, and digestive ailments. Fresh juice extracted from the root or fruit is traditionally administered to expel intestinal worms and relieve gastric discomfort, highlighting the plant's therapeutic importance.

### Modern research highlights

Modern studies have validated many of these traditional claims, establishing *Momordica cymbalaria* as a potent medicinal plant. Notably, it exhibits strong antidiabetic activity, effectively lowering blood glucose levels and aiding in the management of type 2 diabetes mellitus. The plant also functions as a hypolipidemic agent, reducing LDL cholesterol and triglycerides, which is crucial for cardiovascular health. Rich in antioxidants, *M. cymbalaria* helps neutralize free radicals and mitigate oxidative stress. It further demonstrates hepatoprotective and nephroprotective properties, safeguarding liver and kidney tissues from toxic damage. Additionally, the plant shows anti-inflammatory, analgesic, anti-ulcer, and anticancer properties, contributing to wound healing, pain reduction, and potential inhibition of cancer cell proliferation. Traditionally, it has also been used in infertility treatments and is reported to possess abortifacient and aphrodisiac effects. Toxicity studies in rats indicate a high safety margin, with no significant adverse effects even at elevated doses, supporting its potential as a functional food and herbal supplement.

### Conservation and cultivation challenges

Despite its impressive medicinal and nutritional

properties, *Momordica cymbalaria* is quietly edging toward extinction. This decline is primarily attributed to habitat destruction, overharvesting from the wild, and naturally low seed viability. Unlike major crops, *M. cymbalaria* has not yet been domesticated on a large scale, placing additional pressure on wild populations. To address this, researchers are exploring modern propagation techniques such as tissue culture and micropropagation to improve multiplication efficiency. These methods could enable large-scale cultivation, reducing dependence on wild collections and aiding conservation. The optimal sowing period is early June, at the onset of the monsoon. Although the vine thrives in rocky, well-drained soils and is notably hardy, its slow and erratic seed germination remains a major constraint, limiting its adoption in mainstream agriculture.

### Future prospects

Describing *Momordica cymbalaria* as a “superfood in disguise” is no overstatement. With its diverse range of nutrients, bioactive phytochemicals, and proven medicinal benefits, it stands out as one of the most underappreciated plants in both the culinary and healthcare sectors. To unlock its full potential, there is a pressing need to increase public awareness of its health-promoting properties, promote conservation through structured cultivation practices, and develop value-added, post-harvest, and food-processing techniques to minimize waste and enhance its market appeal.

In a world increasingly turning to natural solutions for chronic lifestyle-related diseases and wellness, *Momordica cymbalaria* emerges as a cost-effective, sustainable, and health-enhancing option waiting to be rediscovered and valued.

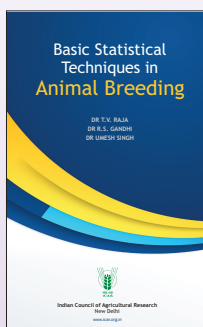
### SUMMARY

*Momordica cymbalaria* Hook F., commonly known as “*Karchika*” in Karnataka, is an underutilized vegetable crop belonging to the family Cucurbitaceae, predominantly found in the Western and Eastern Ghats of India. Despite its remarkable nutritional and medicinal properties, this wild vine remains largely underexploited, with its value unrecognized outside select regions of Southern and Central India. This article highlights the untapped potential of *Momordica cymbalaria* and emphasizes why it deserves recognition as a significant superfood.

For further information, please write to:

<sup>1</sup>Department of Vegetable Science, College of Horticulture, Bengaluru, University of Horticultural Sciences, Bagalkot, Karnataka 560 065; <sup>2</sup>Department of Vegetable Science, Kittur Rani Channamma College of Horticulture, Arbhavi, University of Horticultural Sciences, Bagalkot, Karnataka 591 218; <sup>3</sup>Department of Fruit Science, Navsari Agricultural University, Navsari, Gujarat 396 450; <sup>4</sup>Division of Flower and Medicinal Crops, ICAR-IIHR, Bengaluru 560 089; \*Corresponding email: jogindersinghsiddhu@gmail.com

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