



Athalakai (*Momordica cymbalaria* Hook. f.): Distribution, Nutritional Importance, Seed Extraction and Germination Challenges

*Janaranjani G

M.Sc. (Hort.) Vegetable Science, Department of Horticulture, Faculty of Agriculture, Annamalai University, Tamil Nadu, India

*Corresponding Author's email: janaga2003@gmail.com

Vegetables are indispensable components of the human diet, serving as primary sources of essential vitamins, minerals, dietary fibre, and a wide range of bioactive compounds necessary for maintaining health and preventing malnutrition. Despite India's remarkable progress in vegetable production, the benefits are primarily derived from a limited number of major commercial crops. A substantial proportion of edible plant diversity remains outside mainstream agriculture. These crops are commonly referred to as underutilized, neglected, minor, or orphan vegetables. Underutilized or neglected vegetable crops are plant species with a history of traditional use for food and medicine but that are inadequately researched, poorly commercialized, and weakly integrated into formal seed systems, markets, and policy frameworks. Although they are often locally or regionally important, their potential remains untapped mainly at the national and global levels. Tamil Nadu represents a notable hotspot of agro biodiversity in India, characterized by diverse agro climatic zones ranging from coastal plains and dry tracts to hill ecosystems. This diversity supports a wide array of indigenous and lesser-known vegetable crops, including leafy greens, tubers, legumes, gourds, and perennial vegetables that are deeply embedded in local food cultures and traditional knowledge systems.

One of these underutilized vegetable is Little Wild gourd (*Momordica cymbalaria* Hook F.). It is commonly known as karchikai (Kannada) or athalakkai (Tamil) or kasarakayee (Andhra Pradesh), Madhya Pradesh (Kadavanchi) and kakrol (Hindi). It is widely distributed in the tropical regions of Africa and India. It is distributed across several Indian states, including Tamil Nadu (Virudhunagar, Madurai, Theni, Dindigul, Tuticorin, Ramanathapuram), Karnataka (Belagavi district, Dakshina Kannada district, and Udupi district), Andhra Pradesh (Anantapur, Y.S.R. Kadapa, Kurnool, Bellari region), Maharashtra (Kolhapur (Radhanagari/Solankur), Aurangabad, Khandesh region, and selected black-soil tracts).

It is a perennial herbaceous climber belonging to the family Cucurbitaceae. It resembles bitter gourd in morphology. *Momordica cymbalaria* is valued for its edible fruits, which are used as vegetables, and its tubers, which are primarily utilized for medicinal purposes. The nutritional profile of Athalakai includes significant amounts of carbohydrates (3.72%), protein (3.26%), fat (1.61%), fibre (5.63%) and ash (1.25%) (Jeyadevi et al., 2012). A perennial herbaceous climber trails on the ground or climbs using tendrils/stems. After completion of a season the plants become dry and the tubers remain in the soil, when next monsoon hits the tubers again germinates and grow as a herbaceous climber.. Its stems are slender, herbaceous, and trailing. Leaves are alternate, simple, orbicular-reniform (round to kidney-shaped), and shallowly 5-to-7 lobed. Its fruits are pyriform small with a length of 20–25 mm length. Flowers are Small, unisexual (monoecious—bearing separate male and female flowers on the same plant), with a yellowish-white color.



The fruits are matured and burst in the plant itself to shed their seeds. Seeds are Smooth, shiny, ovoid to dark brown/black. We can also harvest the matured fruits and dried in sunlight to collect the seeds. The skin of the fruit become brown dried and then we can collect the seeds by removing their outer skin of the fruit. The seeds can also germinate to produce the new plant by in very low percentage. Because of seeds are either dormant or of low germination percentage.



It is well known that there are a number of factors affecting the germination. They include external factors, seed coat and internal rather physiological factors. In case of cucurbitaceous plants, two factors are prominent, that is seed coat and internal factors. Internal factors are either immaturity of embryo and presence of certain chemical is inhibiting germination. There is some physiological role of cucurbitacin-E and Saponins in germination of *Momordica cymbalaria*. The adverse effects of these chemicals may possibly be reduced by the temperature upto 55°C which is almost the summer temperature. (N. Mulik and S. V. Madhale 2009). Other experminent proved that mechanical scarification, use of Sand paper and nicking promotes seed germination. It indicates that seed coat is the major barrier for germination. Seed Coat is impervious to water and gases hence there is no germination. These seeds will not germinate until barrier is removed. (Rekha chittapur et al., 2015)

Understanding the factors responsible for seed dormancy and identifying suitable seed treatments are therefore essential for improving germination and establishing healthy seedlings. Further research on seed maturation, seed-coat characteristics and appropriate pre-sowing treatments could help develop reliable propagation techniques. In addition, the collection, characterization and conservation of germplasm from different agro climatic regions would support the identification of promising genotypes for future improvement. Understanding the factors responsible for seed dormancy and identifying suitable seed treatments are therefore essential for improving germination and establishing healthy seedlings. Further research on seed maturation, seed-coat characteristics and appropriate pre-sowing treatments could help develop reliable propagation techniques. In addition, the collection, characterization and conservation of germplasm from different agroclimatic regions would support the identification of promising genotypes for future improvement.

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