

Chekkurmanis: Multi-mineral packed leafy vegetable

Chekkurmanis (*Sauropus androgynous* Meer) is an underutilised perennial green leafy vegetable and it belongs to the family Euphorbiaceae. It contains high amount of multivitamins and proteins. It is considered as 'multi-vitamin green' and 'multi mineral packed leafy vegetable' due to being rich in high quantities of macro and micro phyto-nutrients viz., proteins (6-8%), vitamin A, vitamin B and C, nicotinic acid, mineral, phosphorous and iron. It can help to alleviate malnutrition and is greatly contributing to nutritional food security. Climate change and population growth are hindering food and nutritional security efforts. As a result, the consumption of this green leafy vegetable should increase in our daily food habit.

CHEKKURMANIS (*Sauropus androgynous* Meer) is an indigenous monoecious perennial, small growing leafy shrub vegetable belonging to the family Euphorbiaceae. It is native to the Indo-Burma region. It has maximum concentration of diversity in South-East Asian countries and India. Kerala, Coastal Karnataka and North Eastern regions of India are predominant in its cultivation. Chekkurmanis was introduced into Kerala from Malaysia in 1953. It is generally grown as a live fence around the kitchen garden. The young shoots and tender leaves of this crop are consumed as raw in salads as well as cooked form and alternatively added to stir fry, rice and casseroles, egg dishes, soups and occasionally blanched to serve with chilli paste.

Nutritional composition

Its leaves contain high amount of nutrients (per 100 g of edible portion) viz., protein (6.8 g), carbohydrate (11.6 g), fat (3.2 g), fibre (1.4 g), carotene (5706 µg), vitamin C (247 mg), thiamine (0.48 mg), riboflavin (0.32 mg), niacin (2.6 mg), minerals (3.4 g), Ca (570 mg), P (200 mg) and Fe (28 mg). Underexploited vegetables such as chekkurmanis and other leafy vegetables contain high amount of various macro, micro and phyto-nutrients which can help in alleviating malnutrition and significantly contribute to nutritional food security.

Chekkurmanis leaves contain good amount of pipevarine compound (anti-nutritional factor) and sometimes it may cause problems like, dizziness, drowsiness, constipation and respiratory disorders due to excessive consumption of raw leaves.

Uses

Common uses: Tender leaves are having non-bitter acceptable taste, and do not require pre-cooking. Leaves are used in sandwiches, salads, curries, meat, rice & curry

dishes, scrambled eggs, omelettes, pickles, casseroles, stir-fries and as a garnish.

Medicinal uses: Chekkurmanis possesses great medicinal properties. It is very useful for women after childbirth to stimulate milk production and recovery of the womb. Its leaf contains considerable amounts of alkaloid papaverine (580 mg per 100 gm of fresh leaf). Papaverine is an alkaloid which has antispasmodic drug property. Polyphenols present in the leaves have protective effects on human carcinogenesis, cardiovascular and renal disorders, memory and cognitive function. Juice of chekkurmanis leaves pounded with roots of pomegranate and leaves of jasmine is used against eye diseases. Leaves have good antibacterial activity against *Klebsiella pneumoniae* and *Staphylococcus aureus*.

Botanical description

The commercially cultivated species is *Sauropus androgynous* Meer. However, genus *Sauropus* consists of several other species like *S. assimilis* Thw, *S. netroverus* Wight, *S. rigidus* Thw and *S. quadrangularis* Mwell which are distributed at different geographic regions. It is slow growing, erect, glabrous, perennial, monoecious shrub which can reach a height of 3.5 m. Its side branches terete and flaccid appearing to be pinnately divided with many small short-petioled leaves and persistent stipules. Leaves are sessile, biserrate, alternate and oblong in shape. The leaves are dark green on upper side and light green beneath the surface. The inflorescence of chekkurmanis is an unbranched axillary with small reddish monoecious flower. The fruit is globose, white or pinkish colour, 6-angular capsule about 1.5 cm in diameter and dehisces to release 3 black colour seeds. It is a high cross-pollinated crop due to protogynous and monoecism nature of the flower.



Chekkurmanis plant

Soil and Climate

The plant can be grown in all type of soil but well drained soil or semi laterite soils having rich amount of organic matter with pH 5.5 - 7.5 are ideal. Chekkurmanis should be grown during the warm season with ample source of water but it is relatively dormant in cooler environments. The shrubs are also reported in the Western Ghats areas of Kerala at altitudes of 600-1200 m.

Varieties

It is an underutilised crop. Previously, no attention was paid to this crop, and no germplasm of this crop had been conserved. However, breeding effort is currently underway, and no of distinct variety is available at this time. Chekkurmanis is two types—dashbroad-leaved and narrow-leaved.

Seed rate

The seed rate depends on various factors such as soil fertility, germination percentage, irrigation facility, and climate suitability. Around 1 lakh cuttings are required for 1 ha area of chekkurmanis planting under the normal conditions.

Propagation method and planting

It is propagated by seed and stems cutting, primarily semi hardwood cuttings. The seeds have low germination percentage and viable for 3-4 months. The

amount of rainfall and irrigation facilities available at a given location are usually considered for sowing and planting season. The cutting should be taken from 6-12-month-old pencil thickness shoots having 5-6 nodes with 20 to 30 cm length. The cutting is planted directly in the field or planted in polybags containing rooting media for proper root initiation. The rooting should be treated with IBA/IAA solution before planting in poly bags for proper root emergence. The cuttings are normally planted in shallow furrow at least 15 days before the arrival of monsoon, i.e., April-May or May-June at 30-40 cm × 30-40 cm distance for proper growth and development of the crop. Transplanting of seedlings to the main field is done at 25 to 30 days after planting of cutting.

Micro-propagation

The single nodal explant cultured in Murashige and Skoog (MS) media supplemented with varied quantities of cytokinins such as benzyl adenine (BA), and kinetin are used in a micropropagation of chekkurmanis. After 25 days, more shoots induction is seen in 1.0 mg/L BA and 0.1 mg/L Kn. Shoots are grown in MS medium supplemented with different amounts of indole 3-butyric acid (IBA) and naphthalene acetic acid to stimulate rooting (NAA). After 25 days, all of the shoots are rooted in 0.5 mg/L IBA and 0.2 mg/L NAA. Rooted plants are successfully transplanted to soil and acclimatised.

Manure and fertilizer management

The application of FYM should be done at the rate of 5 kg per plant per year and NPK (7:10:5) mixture at the rate of 30 g per plant. The spray of urea should be done at the rate of 1% after each leaf plucking to improve the leaf yield.

Irrigation

It is a drought resilient crops, the application of water in summer season is beneficial to emergence of new shoots and increase the number of cutting.

Training and Pruning

The tender stems are trained over hedge and trellises. Regular pruning can be done in the cooler climate when the plant suffers from the dormant condition for promoting new growth of leaves and tender shoots. The stem should be cut nearly close to the ground at 10-15 cm of plant height. The new growth of shoots will start during the spring session from these pruned plants.

Application of plant growth regulators

Growth hormones are mostly applied in chekkurmanis to stimulate rooting in cuttings. Rooting in cuttings is promoted by dipping the bottom end of cuttings in a 50 ppm solution of IAA or IBA.

Harvesting, yield and marketing

The first plucking of leaves and tender shoots is done at 3-4 months after planting when plant height of 60-90 cm is attained. Subsequent plucking of tender shoots and leaves should be done at one month interval throughout the year. The annual average productivity is 30-50 t/ha with 1-3 kg tender leaves per plant per year. The tender leaves and shoots are primarily used for culinary purposes. After harvesting, the leaves and tender shoots are bundled

in small bunches for sale.

Disease and pests

It is free from various pests and diseases but sometimes occasionally has more incidence of scale insect and aphids which can be managed by the spray of any contact insecticide @1-2ml/lit. Precaution should be taken at the time of plucking of leaves and tender shoots. The plucking of leaves should be avoided just after chemical spraying.

Future prospects

1. The efforts on collection and conservation of indigenous germplasm need to be explored by developing *ex-situ* conservation block.
2. Selective habitat enrichment for identified indigenous germplasm and their promotion in further research activities.
3. Development/identification of high yielding, disease and pest resistant varieties.
4. Develop a platform to exchange and conserve information and materials, identify key task and relevant lead centres for networking of research and development activities to address research gaps and resource needs for nutritional security, climate change associated stresses, heat tolerance, flooding and salinity.
5. Experiments for establishing the role of chekkurmanis in national security.

For further interaction, please write to:

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