

Economic Importances and Production Technology of Drumstick

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Introduction:

The drumstick, also referred to as the "moringa" or "horseradish" tree, is an angiospermic plant. It is also known as the miracle tree, Ben oil tree, West Indian Ben, and Bahujan, among other names. It is one of the 13 species in the genus *Moringa*. The most extensively farmed of them is *Moringa oleifera*, which is indigenous to tropical and sub-tropical areas of the world. It is grown for its delicate pods, leaves, and even blooming buds because they can all be used in cooking. It is between 5 and 10 metres tall (Anwar *et al.*, 2007). It is considered a delicacy in South Indian households, where its peculiar, seductive fruit aromas are what make it so well-liked. It is especially prevalent in the southern Indian states of Kerala, Tamil Nadu, and Karnataka. The drumstick, also referred to as the "moringa" or "horseradish" tree, is an angiospermic plant. By another name, it is also known as Malaysia consumes its seeds, which are rich in proteins, vitamins, and minerals, as

nuts. The drumstick is often referred to as a horseradish tree because of the flavour of a condiment prepared from actual horseradish roots (*Armoracia rusticana*). It is regarded as one of the nutrient-densest crops in the world and a high-nutrient vegetable supplement. The immature green pods, which contain all essential amino acids, are the most valuable and widely used part of the tree. Malnutrition has been treated with drumstick, especially in nursing mothers and young children. Trees for Life, Church World Service, and Educational Concerns for Hunger Organisation are three non-governmental organisations that have promoted drumstick as "moringa" or "horseradish" tree. It is also known as natural tropical nutrition. According to Fahey (2005), leaves can be consumed raw, roasted, or dried and stored for many months without losing any of their nutritious content.

Composition and Uses

Composition

It is a nutrient-dense tree with leaves

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that are three times more nutritious than bananas in terms of vitamin A (four times more than a carrot), vitamin C (seven times more than an orange), protein (5–10%), calcium (four times more than milk), and potassium (Gandji *et al.*, 2018). About 40% of the mature *Moringa oleifera* seeds' oil is of good grade (73% of it is oleic acid). The oil has high levels of unsaturated fatty acids, particularly oleic acid up to 67.80%. Up to 6.81% of behenic acid is the predominant saturated acid followed by stearic acid up to 5.86%.

Uses

Due to its numerous nutritional benefits and ability to treat a wide range of ailments, moringa is commonly referred to as the "Miracle Tree." There are nutrients stored in every component of the plant. The leaves of the moringa tree are a great source of nutrients like calcium, potassium, zinc, magnesium, iron, and copper. Additionally, because the leaves have a low caloric content, they can be included in the diets of people who are obese. The leaves provide a great source of protein, minerals, and all nine necessary amino acids (Goldman and Ortiz, 2018). The drumstick is also widely used as a quality source of cattle fodder. When drumstick leaves extract is combined with ethanol at 0.04 to 0.08%, it has been observed that leguminous plants' nodulation and nitrogenase activity increase.

The Ben oil is a multipurpose drumstick seed oil that is used for cooking, watch lubrication, lighting, and other things like cooking oil in addition to the soap and fragrance industries. The seed cake can be used as manure after the oil has been extracted from it. Its seed oil can be utilised to make biofuels as well.

Drumstick seed powder, which has a coagulation efficiency comparable to alum, is used to purify the contaminated or cloudy drinking water. *M. peregrinas* starchy roots are eaten as food. Zeatin, a kind of cytokinin, as well as other advantageous phytochemicals including vanillin, beta-sitosterol, caffeoyl quinic acids, kaempferol, quercetin, and carotenes are all present in drumstick leaves (Kushwaha *et al.* 2012).

Health benefits

Anticonvulsant, antioxidant (for cardiovascular disorders), antidiabetic, antinephroticity, anti-gram-positive and gram-negative bacterial, anti-ulcer, antimutagenic, anti-tumor, anti-inflammation, anti-hypertensive, and anti-urilhiatic qualities are just a few of the numerous favourable health effects of moringa. It is referred to as a "miracle tree" since it provides huge amounts of nutrients from its leaves, roots, seeds, and pods. According to Ayurveda, drumstick tree leaves provide resistance against 300 ailments. Ascites, rheumatism, snakebites, and heart stimulation are all treated using different

moringa plant parts. It contains the alkaloids moringine and moringinine, which helps in fighting various health ailments in the human body. It is well known that the aqueous extract of roots and leaves has anti-malarial and anti-implantation effects. Since the leaf extract can prevent the mutagenicity brought on by nitrosodiethanolamine, it is also known to have anticarcinogenic properties (NDEA, a plant environment carcinogen). Nambiar *et al.* (2003) conducted a pilot study and found that integration of nutrition communication along with the introduction of unconventional dehydrated drumstick leaves, into the Integrated Child Development Scheme-supplementary food, was feasible and can be endeavoured for a longer duration in the existing national programmes.

Popular Varieties: KM1, PKM1, PKM2, GKVK1, GKVK2, GKVK3, Dhanraj, Bhagya (KDM1), Konkan Ruchira, Anupama, and Rohit 1 created by the public sector.

Temperature -25- 30 degree celcius but can tolerate up to 48 degree celsius in the shade

Soil – well drained sandy loam soil with soil pH -6.3 to 7.0

Seed rate – 500 grams/hac

Seedlings preparation – use 200 guage polythene bag-mix top soil and sand 3:1 ratio , mix little bit of super phosphate and compost , fill the bag

Seed treatment – soak the seeds overnight in water, remove outer seed coat, remove the kernal and plant it 1 cm deep in each polythene bag. Germination will be noticed in 5-12 days when seedlings are 60-90 cm height it is ready for transplanting in the main field

Planting in the main field – Depending on the soil type, dig a pit that is 1-2 feet deep. Combine top soil with 5 kg of compost or farmyard manure and a small amount of neem cake. Apply 20 grammes of phosphobacteria and azospirillum to each pit, if possible.

Spacing of plants – 3 meter between rows and 2 meter between plants

Direction of planting – East west direction ensure proper sun light and aeration

Plant population per acre – 666 plants

Pruning and cooicing – Pinch the tip 10 cm below the tip when the plant is 60 to 90 cm tall. A week after that, various side branches will begin to emerge and grow. Cut the side branch back to 30 cm in length when it reaches 60 cm once more. Repeat it once more in successive sprouting, and perform four pinchings within three months of the main field's planting.

Because doing so will result in abundant branching, and more branches will

produce more pods and fruits while also making the tree manageable in height.

Manure and Fertilizers: In irrigation areas, 26 kg of farm yard manure and 250 gm of fertiliser are provided in April, followed by doses of fertiliser in September and December, whereas 200 gm of fertiliser is given in rainfed areas in September and December. Depending on the needs of the crop, the fertiliser dose may be increased by 500 g per year.

Watering – any excess water will cause root rot disease. so only limited soil moisture for first two months till it establish is necessary and there after irrigate as and when necessary based on your soil type and prevailing climate

Weeding – For the first five months, the field should be weed-free. hence it's recommended to weed once a month. Apply 5-7 kg of farmyard manure and 250-300 grammes of ammonium sulphate per tree for a higher yield. Due to this, there will be more and larger pods.

Disease – root rot -avoid excess moisture

Pest – leaf eating caterpillar, termite, bud worm, aphid, leaf miner and fruit fly.

Yield – Minimum 250 -300 fruits will be born out of single tree.

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