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Drumstick Value Addition for Nutritional Security

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Moringa oleifera, sometimes known as drumstick, is a versatile, fast-growing, and extremely nutritious tree that is commonly grown in India's tropical and subtropical regions. It has become more important in guaranteeing nutritional security, especially among vulnerable groups, because of its rich content of proteins, vitamins, minerals, antioxidants, and bioactive substances. Nearly every part of the plant is edible and has therapeutic use, including the leaves, pods, seeds, and flowers. The main value-added products made from drumsticks, including leaf powder, soup mix, health drink mix, ben oil, dehydrated pod pieces, and herbal tea, are highlighted in this article along with their botanical characteristics, nutritional value, and health advantages. Value addition not only enhances shelf life and marketability but also improves nutrient intake and consumer acceptability. Thus, drumstick-based value-added products offer a sustainable, affordable, and natural solution to combat malnutrition and promote overall health.

Keywords: *Moringa oleifera*, drumstick, value-added product, nutritive values, Health benefits

Introduction

Drumstick (*Moringa oleifera)*, also known as miracle tree, is a very nutritious and versatile tree extensively grown in the tropical and subtropical areas of India. One of the promising plants that may help improve the consumption of vital minerals and phytochemicals that promote health is the moringa plant. Moringa plants have incredible nutritional and medicinal advantages. Most of the plant's fruit, pods, seeds, and leaves are used in many countries, especially traditional civilisations, as nourishment or for medicinal purposes. Because of the chemical composition it contains, Moringa oleifera is utilised in impoverished countries to cure and prevent malnutrition, particularly in infants and nursing mothers, in place of imported nutritional supplements.

The plant's long, thin, stick-like pods, which are frequently consumed as vegetables, have earned it the local name "Drumstick tree" in India. For its therapeutic and nutritional qualities, it is highly prized. There are several more names for this crop in various Indian languages, such as Murungai/Murungai Maram (Tamil), Shevga/Shevaga (Marathi), Sahjan/Sujna (Hindi), Shigru (Sanskrit), Saragavo (Gujarati), Mulakkada (Telugu), Nuggekai (Kannada), and Sajina (Bengali).

It is an essential medicinal plant and a nutrient-rich ingredient in many dishes that promote good health. Recent scientific studies have also evaluated the usage of drumstick leaf and pod powder in value-added products such as soups, biscuits, beverages, and frozen delights that mimic ice cream. These studies showed that the addition of drumstick significantly improved the products' physicochemical properties, nutritional composition, antioxidant activity, and sensory acceptability, suggesting its potential in the manufacturing of functional meals.

Scientific classification

Kingdom : Plantae
Order : Brassicales
Family : Moringaceae
Genus : Moringa
Species : *Moringa oleifera La*

Fig 1. Drumstick

Botanical description

Appearance: It is a perennial, fast-growing, soft-wooded tree that can grow up to 6 – 10 meters.
Root: It is a deep tap root system with many lateral roots.
Stem: soft, brittle, whitish-grey, corky bark.
Leaves: tripinnate, light green with small oval-shaped leaflets.
Flowers: bisexual, cream to pale white in colour, borne in panicles.
Pod: long, slender, three-sided green pod and edible when tender.
Seeds: round, dark brown with papery wings

Value-Added Drumstick Products

These are a few of Drumstick's value-added products:

1. Leaf powder
2. Dehydrated Leaves
3. Soup mix
4. Chutney powder
5. Pickle
6. Health drink mix
7. Paste
8. Ben oil
9. Dehydrated pod pieces
10. Herbal tea
11. Capsules/tablets

Nutritive value

The nutritional content of drumsticks per 100 grams is shown in the table below.

Table 1: Nutritive value of drumstick per 100 g

Nutrient	Pods Per 100g	Fresh leaves Per 100g	Dried leaves Per 100g
Moisture	86.%	75%	7.5%
Calories	26	92	205
protein	2.5g	6.7g	27.1g
Fat	0.1g	1.7gg	2.30
carbohydrates	3.7g	13.4g	38.2g
Fiber	4.8g	0.9g	19.2g
Minerals	2g	2.3g	-
calcium	30mg	440mg	2003mg
Magnesium	24mg	24mg	368mg
phosphorous	110mg	70mg	204mg
Potassium	24mg	24mg	1324mg
Copper	3.1mg	1.1mg	0.6mg
Iron	5.3mg	0.7mg	28.2mg
Oxalic acid	10mg	101mg	-
Sulfur	137mg	137mg	870mg

Health benefits

When consumed in value-added forms, such as leaf powder, soup mix, health drinks, capsules, and enriched meals, drumstick (Moringa oleifera) is one of the most beneficial natural foods for improving nutrition and health. Regular use of these products has the following important health benefits:

Digestive health: Because they are high in fibre, drumsticks help with digestion and help avoid constipation. Eating regularly may improve gut health and alleviate digestive problems.

skin and hair health: By preventing damage from free radicals and encouraging cell renewal, the vitamin E in drumsticks supports healthy skin and hair.

Increases immunity: Drumsticks, rich in antioxidants and vitamin C, boost immunity and help guard against illnesses and infections.

Blood sugar levels: Drumsticks are helpful for people who have diabetes or are at risk of getting the disease since they have been demonstrated to help control blood sugar levels.

Bone health: Drumsticks are a good source of calcium, which is necessary for strong, healthy bones. Including drumsticks in your diet will help avoid problems associated with osteoporosis.

Conclusion

Drumstick (*Moringa oleifera*) is rightly regarded as a "miracle tree" due to its exceptional nutritional and medicinal properties. Developing value-added products from its leaves, pods, and seeds is essential to improving nutritional security, particularly in areas with limited resources. Products that offer concentrated quantities of essential nutrients and antioxidants in handy formats include leaf powder, health drink mixes, soups, capsules, and ben oil. By including these products in regular meals, micronutrient deficiencies can be overcome, immunity can be increased, digestion can be improved, and bone and general health can be supported. Additionally, value addition boosts the income of farmers, generates job possibilities, and supports agro-based businesses. Thus, promoting drumstick value-added goods on a large scale can be a useful tactic for enhancing public health and guaranteeing long-term nutritional security.

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