

## Sohphie: A traditional fruit of Meghalaya

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### Abstract:-

*Myrica esculenta*, also known as 'Sohphie' by the Khasi tribe, is a multifunctional tree in Meghalaya. Its fruit, Sohphie, is high in Vitamin C, antioxidants, and minerals and is found in Punjab, Himachal Pradesh, and Uttarakhand. The fruit is more succulent than other species, known as Kaphal in Hindi, Nagatenga in Assamese, and Keifang in Mizo. Sohphie pickles have a distinct flavour, making them a natural tooth and mouth cleaner and refresher. The plant is widely used in folk medicine for treating ailments like asthma, cough, chronic bronchitis, ulcers, inflammation, anaemia, fever, diarrhoea, and ear, nose, and throat disorders. However, its increasing use and demand have led to illegal harvesting and habitat loss, putting it at risk of extinction.

### Introduction:

Sohphie, a local fruit from Meghalaya, grows wild in the Khasi hills of Meghalaya and is found in Punjab, Himachal Pradesh, and Uttarakhand. It has two types: large, juicy greenish-yellow sohphie (*Myrica esculenta*) and smaller, deeper red and sweeter (*Myrica nagi* or sohphie-nam). The tree produces edible fruits and byproducts, which can provide revenue for native communities in Meghalaya and the sub-Himalayan area.



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*M. esculenta* is a medium-sized evergreen tree with delicate yellow bark, 30-60 cm long leaves and white blooms. The fruit is a globose, succulent drupe with a firm endocarp and a diameter of 1.1-1.3 cm, weighing an average of 670 mg. The seeds are triangular and have an astringent flavour. Sohphie trees require 6-8 years to fruit after seeding, blossoming in October and lasting into December. Fruits ripen from April to June, with an active fruiting age of 8 to 10 years.

Following fruiting, the tree displays a downward tendency.

The plant has significant nutritional and medicinal value, with its fruits used to make syrups, jams, pickles, and beverages. Its bark, roots, and leaves were traditionally used to cure various illnesses and problems. The bark is also used to make paper and ropes. *M. esculenta* has been studied for its ethnomedicinal uses, including tannin extraction as a dyeing agent. The plant contains bioactive compounds such as alkaloids, flavonoids, glycosides, tannins, terpenoids, saponins, and volatile oils, which have been linked to its pharmacological effects. Myricetin, a compound with

antioxidant, anticancer, antidiabetic, and anti-inflammatory effects, is a key ingredient in many foods and beverages.



However, cultivation is restricted, and most traditional and commercial uses rely on collections from wild sources, which poses a threat to the species due to urbanization, overharvesting, and over-exploitation of forests and wastelands.

### Distribution

Box myrtle (Sohphie) is a subtropical evergreen tree found in the mid-Himalayas, ranging from 1,300 to 2,100 m altitude. It is found in various regions in India, including Khasi Hills, Assam, Arunachal Pradesh, Manipur, Mizoram, Nagaland, Himachal Pradesh, and Uttarakhand. The species also has diversity in the Chinese-Japanese region, the sub-Himalayan tract, Sylhet of Bangladesh, and southwards to Singapore and Malaysian islands. It is distributed in various agroecological zones.

### A bite of the Meghalaya's Sohphie

The initial bite of Sohphie flesh can generate unexpected shocks in the tongue and body, resulting in numbness and a taste of

sour, sweet, acidic, and punchy flavours. As the bites progress, the acid and flavours intensify, resulting in a mix of sour, sweet, tangy, and punchy flavours. This initial experience shows how many adore Sohphie and grow addicted. Khasis eat it with salt and chilli flakes, or they prepare a salad out of the pulp by scraping it off the stone and combining it with salt or sugar, chilli flakes, and mustard oil. The end product is a delightful and fulfilling experience.

#### **What's amazing about the Sohphie tree**

Sohphie is a wild tree species that is **actinorhizal**, meaning it may replenish the soil by fixing nitrogen from the air. They have nitrogen-fixing bacteria called **Frankia** in their root nodules, which creates a symbiotic interaction between the bacteria and the plants. Planting actinorhizal trees is an efficient soil reclamation approach in agroforestry because they flourish in impoverished soils and help recover soils affected by activities such as mining and forest fires. Furthermore, these trees stabilise dunes and limit erosion, making them a viable soil reclamation option.

#### **Nutritional security**

The edible part of the box myrtle is the pulp, which accounts for 75.4% of the fruit and contains 80.6% moisture. The fruits are sweetish sour, with 5.7 to 6.2°Brix total soluble solids (TSS), 0.83 to 3.57% reducing sugars, and 2.18 to 7.68% total sugars. The

biochemical properties of the fruit include titratable acidity, ascorbic acid, tannins, pectin, and fat. The pulp includes carbohydrates, crude fibre, protein, ash, caloric value, sodium, potassium, calcium, manganese, copper, iron, and zinc. The fruits have high antioxidant activity because they include phenolic chemicals, flavonoids, and flavonol. The ascorbic acid equivalent reducing power is 1.53 mg/g, whereas the free radical scavenging capability is 0.19 mg.

#### **Role of livelihood and ecological security**

Fruits in Khasi hills are used for making 'Um Soh-Phi', a refreshing drink, pickle, fruit beverages, and jelly due to their high TSS and pectin content. Sohphie trees provide timber, fuel, fodder, tanning, and yellow dye. They are actinorhizal and can replenish nitrogen-depleted soils. Wider canopy trees can be used for agroforestry systems to protect the environment from degradation.

#### **Soil and climatic conditions**

This plant thrives in various soil types, from shallow to deep, loamy brown forest podzolic soil in Meghalaya to medium to deep, loamy to clayey red lateritic soils in northeastern India. It thrives in pH ranges of 5.5 to 6.5, requires 25 to 35°C during summer and 2 to 12°C in winter, and requires 500 to 1500 mm annual rainfall.

#### **Propagation possibilities**

The regeneration of *M. esculenta* in natural forest stands is hindered by high anthropogenic activity, with indigenous communities collecting fruits for sale, resulting in low seedling availability and conversion rates. Assisted regeneration is a viable option to replenish natural stocks through habitat enrichment. Seed propagation is generally unreliable due to impermeable seed coats, and collecting seeds when fruit color changes from green to dark red are recommended. Treatment with hot water and sowing in forest soil and sand (2:1) is recommended for improved germination and growth. Vegetative propagation through cuttings and auxin concentrations has shown little success, with the highest rooting in spring season and air layering in summer. Micropropagation may be a viable method for the mass multiplication of desirable trees.

### Harvesting and post-harvest handling

Trees can produce 30-40 kg of fruits annually, which are highly perishable and harvested early in the morning to maintain freshness. Fruits have staggered maturity, so harvesting is done regularly. They are collected in bamboo baskets or cloth bags and transported to local markets due to their low shelf life (2-3 days).

### Processing possibilities

Locals like the sweet and tangy flavour of box myrtle fruits, which have sparkling

crimson juice. They are used to make pickles, jam, and jelly, and have the potential for widespread promotion among rural people. Bark and leaves contain therapeutic characteristics and are employed in a variety of preparations, with prospective applications in the pharmaceutical industry.

### Market availability, product category, and marketing prospects for the future

Fruits harvested from forests or homesteads are sold in local markets for Rs. 30 to 50 per kilogramme, giving a valuable source of income. Although fresh fruits are offered, processed versions are also available at local stores. Fruit processing into nutraceutical drinks, frozen/glazed items, and flavoured ice creams might increase market potential and generate higher profits for collectors/growers.

### Limitations in Popularisation

*M. esculenta* trees, particularly seedlings, have been neglected due to their sluggish growth and lengthy gestation time, which result in little commercial value. The fruit species needs repeated pickings and a protracted harvesting time. Lack of information about economic benefits, inefficient vegetative propagation procedures, availability of high-quality planting material, dioecious nature, limited marketing networks, and technological hurdles for postharvest handling and processing are major barriers to its widespread adoption.