

Mallero (*Elaeagnus latifolia* L.) : A potential minor fruit of Darjeeling and Kalimpong hills

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ABSTRACT

The Mallero fruit is a very good source of vitamins, minerals, fatty acids and other bioactive compounds. The fruit contains carbohydrate 74.06%, protein 7.80 %, crude fibre 9.3%, sugar 8.3 % and potassium 910 mg/ 100 g. It is consumed raw, and the fruit pulp is used to make jam, jelly, and hydrating beverages. Mallero plants are also used as the fencing due to its thorniness. The shrub has the ability to fix atmospheric nitrogen in the soil. The flowering season of the plant is from November to February and fruits become ready to harvest during April to May. The fruit has many bio-active compounds and has great application in the field of pharmacological and nutraceutical industries. The fruit is used for preparation of many processed products and has a great ceremonial values for the local people in the region.

Keywords: Darjeeling, *Elaeagnus*, Kalimpong, mallero, underutilized fruit

INTRODUCTION

The hills of Darjeeling and Kalimpong are endowed with a variety of biological niches that support a range of sub-tropical to temperate area flora and fauna. The region's land use practices for forestry, agroforestry, agriculture, horticulture, and animal husbandry are crucial to the region's ability to sustain its economy. The local natives are well-versed in the utilisation of a variety of plant resources according to their traditional knowledge (Chhetri *et al.*, 2022) and other plant parts in their folk and traditional medicines (Tripathi 2021). Some important and highly nutritious fruits consumed by the people in this region are *Baccaurea sapida* (Kusum), *Elaeagnus latifolia* (Mallero), *Machilus edulis* (Pumsi), *Eriolobus indica* and *Diploknema butyraceae* (Cheuri). Mallero (*Elaeagnus latifolia*), one of the major wild edible fruit consumed by the people of Darjeeling and Kalimpong and belong to genus *Elaeagnus* and family *Elaeagnaceae*. It is also nick named as Muslleri, Soh-hang and Basterdoleaster and native

to India and southwest Asia. It looks like a tiny plum tomato dusted with silver glitter. Fruit contains an elongated seed inside having an odd striped pattern. It has a slight tomato like taste and are rich in lycopene. The fruit contain vitamins, minerals and essential fatty acid. It is consumed raw, and the fruit pulp is used to make jam, jelly and hydrating beverages. It has the ability to reduce the prevalence of cancer and is a surprisingly good source of essential fatty acids. The crop has the ability to fix atmospheric nitrogen in the soil (Patel *et al.*, 2008). Despite having a huge potential for commercial, social, cultural, nutritional, medicinal, and environmental relevance in everyday life, the Mallero is still left as an underutilized fruit crop with little care. There is a vast scope for its utilization for income generation through value addition.

BOTANICAL DESCRIPTION

Mallero is a large evergreen, heavily branched woody shrub (Fig.1a) having rusty-shiny scales, thorny, spreading in nature and can grow up to the

height of 10 feet and spreading up to 3 feet more with support of nearby stuff. Leaves are alternate, ovate-oblong, glabrous, clothed beneath with shiny silvery or ferruginous scales (Fig.1b). The adaxial surface of leaves are dark green where abaxial surface is silvery white. The maximum leaf length is reported around 14 cm and breadth is 8.5 cm. The flowers are creamy white to light yellow colour, hermaphrodite in nature and pollinated by bees. They are scented, peduncled and very small covered with ferruginous scales. The flowering season of the plant is from November to February and fruits become ready to harvest during April to May. The Fruits are oblong to ovoid, ribbed, glittered with silver dust and turn orange to dark red when ripe. Fruits may only be kept for 3-5 days at room temperature and are often seasonal and very perishable due to their high moisture content (87.31%). The seeds are creamish, elongated with an odd striped pattern, white in colour and is weighing around 2 to 4 gram.

DISTRIBUTION

Mallero is extensively grown in subtropical and sub temperate zone, though it can be found at higher elevation in the tropics. It can be found up to a height of 1900 metres and is typically cultivated in semi-wild conditions. This species has a large geographic range that extends from Northern Asia to the Himalaya and Europe (Ahmadiani *et al.*, 2000). The primary centre of genus *Elaeagnus* is believed to be China. It is grown in China, from the Yangtze River Valley to the southern region, while it is also found in northwest China. It has been spread throughout Eastern Asia, reaching as far as South Asia and Queensland in northern Australia. Some species can also be found in southern Europe and North America. In India, it is quite prevalent in Sikkim, Assam, Nagaland, Khasi and Jaintia hills of Meghalaya up to an elevation of 1500 metres above mean sea level (Patel *et al.*, 2008).

USES

Fruits are often consumed raw form when it is fully ripe. In addition, the local people of the region has discovered several other processed product. They are making pulp based refreshing RTS (Ready to Serve) drinks, pickles, jam and jelly. The local

farmers are making an alternative source to earn by selling processed product from mallero. The dried wood can be used as a firewood. The fruit is considered an essential item for offering to the Gods during marriage ceremony rituals of Assamese and Manipuri communities.

MEDICINAL USES

Astringent properties can be found in the fruits and flowers. Leaves and fruits may be used in the food processing or pharmaceutical industries as a natural source of antioxidants (Dutta *et al.*, 2018). The fruit extract has potential use in the pharmaceutical and nutraceutical industries for the creation of functional products, as it demonstrates strong antioxidant and antibacterial action and includes bioactive chemicals and minerals (Dasila and Singh, 2022). The fruit may have the ability to reduce the occurrence of cancer as well as slow down or stop the growth of pre-existing tumours (Seal, 2012). The leaves should be a good aid in the production of silver nanoparticles. These nanoparticles have a great application in the field of pharmacological and electronical industries (Phanjom *et. al.*, 2012). The fruit is useful in constipation and as a health tonic. Local people consume the root extract of the fruit during pregnancy to prevent miscarriage.

NUTRITIONAL PROPERTIES

The fruit has high nutritional value and considered as a very rich source of minerals, vitamins, essential fatty acid and other bioactive compounds. Because of their abundance in ascorbic acid, phosphorus, potassium, manganese, calcium, sulphur, iron, zinc, boron, and copper, fruits may become more popular with consumers. Toxic elements such as Pb, As, Al, Ti, Ni, and Cr were also discovered to be safe for human consumption (Lepcha, *et. al.*, 2018).

Table 1 summarises nutritional characteristics and bioactive components of *Elaeagnus latifolia* L. It includes protein, carbohydrate, crude fibre, ash, crude fat, phosphorus, magnesium, and zinc, as well as their respective quantities. It also includes sugar, calorific value, vitamin C, calcium, iron, potassium, sodium, and copper levels.

Table 2 illustrates the physical and chemical features of *Elaeagnus latifolia* L. fruits grown at



Fig. 1: Plant (a) and leaf (b) of *Elaegnus latifolia* L.

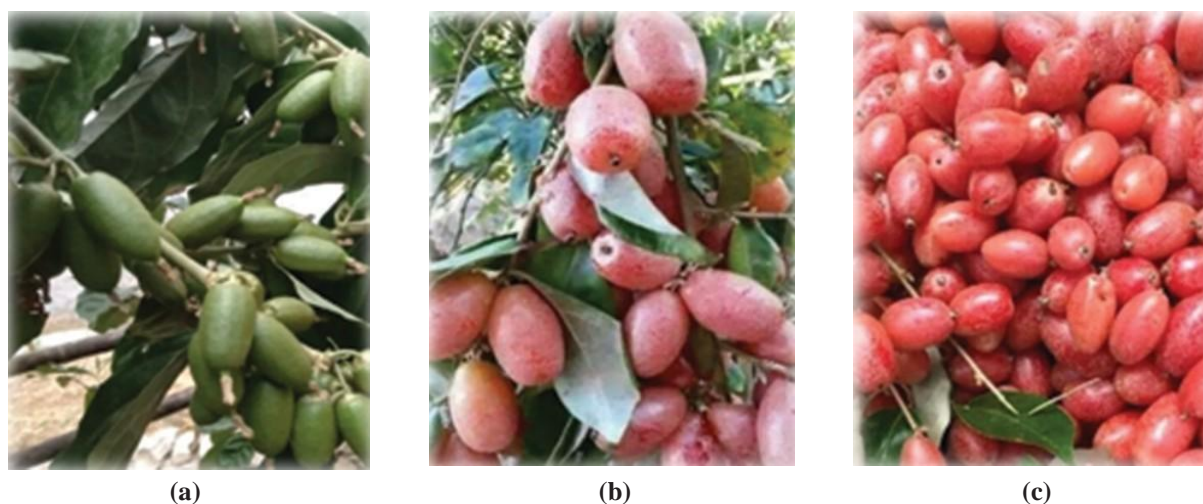


Fig. 2: Immature fruits (a), mature fruits (b) and harvested fruits (c) of *Elaegnus latifolia* L.

Meghalaya. It includes parameters like fruit weight, fruit length, fruit diameter, pulp recovery, seed weight, seed length, and seed diameter, as well as their values. TSS ($^{\circ}$ Brix), acidity, pH, porosity, TSS: acid ratio, pulp/seed ratio, and moisture content are among the chemical parameters.

PROPAGATION

Seed: Seed should be collected from ripe fruit of healthy mother plants. Cold frame is the best propagation structure to sown seed. Seed germination can be observed after 3 to 4 weeks though it may take 16 to 18 months to transplant

Table 1: Nutritional Properties & Bioactive compound of *Elaeagnus latifolia* L.

Ingredients	Amount	Ingredients	Amount
Protein	7.80%	Sugar	8.3%
Carbohydrate	74.06%	Calorific Value	332.10Kcal/100 g
Crude fibre	9.3%	Vitamin C	12 mg/100 g
Ash	3.6%	Calcium	46.67 mg/100 g
Crude Fat	0.52%	Iron	180 mg/100 g
Phosphorus	228.99 mg/ 100 g	Potassium	910 mg/100 g
Magnesium	42.82 mg/100 g	Sodium	5.58 mg/100 g
Zinc	0.25 mg/100 g	Copper	2.59 mg/100 g

(Source: Kumar and Said, 2018)

Table 2: Physical and chemical fruit properties of *Elaeagnus latifolia* L. grown at Meghalaya

Physical parameters	Value	Chemical parameters	Value
Fruit weight (g)	13.80	TSS (°Brix)	9.31
Fruit Length (cm)	3.10	Acidity (%)	3.46
Fruit diameter (cm)	2.45	pH	3.29
Pulp recovery (%)	70.19	Porosity	37.38
Seed weight/fruit (g)	3.16	TSS: acid ratio	3.29
Seed length (cm)	2.87	Pulp / seed ratio	4.73
Seed diameter (cm)	1.24	Moisture content (%)	87.31

(Souce: Patel *et al.*, 2008)

due to slow germination process. Seedling are poked vertically into individual for easy handling and when they are at least 15 cm tall, they are transplanted on the field.

Cutting: Hard wood cuttings are procured from current season growth having pencil thickness with 4-6 nodes of about 8 to 12 cm long are recommended and planted in a polybag. Cutting takes two to three weeks to sprout and ready for transplanting after 2-3 months in a field.

Suggestive action plan for the preservation, reproduction, extension, usage, and promotion of Mallero.

i. Reproduction and propagation: Efficient methods for reproduction and propagation need to be developed to ensure a sustainable and consistent supply of planting materials. This involves optimizing the propagation techniques as well as enhancing the cultivation processes to boost its yield.

ii. Extension and cultivation: Extending the cultivation, particularly in regions beyond its current prevalent areas, could diversify its

availability. Research and initiatives aimed at introducing and cultivating in newer geographical locations should be explored to expand its reach.

iii. Utilization and commercialization: Leveraging the diverse utilization, including its nutritional, medicinal, and commercial potential, requires increased awareness and promotion. Educating local communities, farmers, and industries about its value and encouraging its use in various products could enhance its commercial viability.

iv. Promotion and public awareness: Raising public awareness about the significance of the fruit in various aspects of daily life is crucial. Educating farmers, consumers, and industries about its nutritional richness, health benefits, and versatile applications can amplify its demand and utility.

v. Collaborative efforts and research: Collaborative efforts among governmental bodies, research institutions, agricultural organizations, and local communities are pivotal. Investing in research, development, and technological innovations related to mallero can improve its production, processing, and market reach.

CONCLUSION

Nutritional richness, versatile applications, and potential health benefits underscore its significance as an underutilized fruit deserving of further exploration and utilization. Its capacity to enhance living standards and contribute to long-term growth makes it a valuable asset that warrants increased attention and commercialization for the betterment of local communities and the industry at large.

REFERENCES :

- Ahmadiani, A., Hosseiny, J., Semnianian, S., Javan, M., Saeedi, F., Kamalinejad, M. and Saremi, S. 2000. Antinociceptive and anti-inflammatory effects of *Elaeagnus angustifolia* fruit extract. *J. Ethnopharmacol.*, **72**: 287-292.
- Chhetri, S., Tamang, A., Kundu, S., Tamang, T. and Subba, S. 2022. Cheuri (*Diploknema butyracea* (Roxb.) H. J. Lam): An Under-Utilized fruit of Sikkim and Darjeeling Hills Need Domestication. *Indian J. Nat. Sci.*, **13**: 43874-43878.
- Dasila, K. and Singh, M 2022. Bioactive compounds and biological activities of *Elaeagnus latifolia* L. An underutilized fruit of North-East Himalaya, India. *S. Afr. J. Bot.*, **145** (3): 1-9.
- Dutta, I., Gogoi, B., Sharma, R. and Sharma, H. K. 2018. In vitro Evaluation of Leaves and Fruits of *Elaeagnus latifolia* L. for antioxidant and antimicrobial activities. *Asian Journal of Chemistry*, **30** (11): 2433-2436.
- Kumar, V. and Said, P. P. 2018. Physico-Chemical Characterization *Elaeagnus latifolia* from Sikkim Himalayas. *Int. J. Pure Appl. Biosci.*, **6** (5): 361-366.
- Lepcha, R., Upadhyay, S., Muddarsu, V. R., Manivannan, S. and Bhutia, R. W. 2018. Study on value addition and products diversification of Mallero (*Elaeagnus latifolia*). *J. Pharm. Innov.*, **7** (11): 532-535.
- Patel, R. K., Singh, A. and Deka, B. C. 2008. Soh-Shang (*Elaeagnus latifolia*): An Under-Utilized fruit of North East region needs domestication. *ENVIS Bulletin: Himal. Ecol.*, **16** (2): 8-13.
- Phanjom, P., Sultana, A., Sarma, H., Ramchiary, J., Goswami, K. and Baishya, P. 2012. Plant-mediated synthesis of silver nanoparticles using *Elaeagnus latifolia* leaf extract. *Dig. J. Nanomater. Biostructures*. **7**(3): 1117 – 1123.
- Seal, T. 2012. Antioxidant activity of some wild edible plants of Meghalaya state of India: A comparison using two solvent extraction systems. *Int. J. Nutr. Metab.*, **4** (3): 51-56
- Tripathi, P. C. 2021. Medicinal and therapeutic properties of minor fruits - A Review. *Int. J. Minor Fruits, Med. Arom. Pl.*, **7** (2): 01- 28.