

Flacourtia montana: An Underutilized Wild Fruit of Central Western Ghat of Karnataka

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OPEN ACCESS

Keywords

Wild Fruit. Ecology, Conservation

How to cite this article:

Rakshitha, V., Venkatesh, L., Salma. and Ali, S. 2026. *Flacourtia montana*: An Underutilized Wild Fruit of Central Western Ghat of Karnataka. *Vigyan Varta* 7 (05): 94-97.

ABSTRACT

Flacourtia montana J. Graham, commonly referred to as mountain sweet thorn, is an underutilized wild fruit species indigenous to the Western Ghats of India. Despite its rich nutritional profile, medicinal properties, and ecological importance, the species has not been fully explored for commercial utilization. Recent scientific studies highlight its potential in value addition, domestication, and sustainable livelihood enhancement. This article synthesizes existing literature on its taxonomy, distribution, morphology, phytochemistry, propagation, and broader socio-economic and ecological relevance, emphasizing the urgent need for conservation and mainstream integration.

INTRODUCTION

The Western Ghats of India are recognized globally as a biodiversity hotspot, characterized by high species richness, endemism, and ecological complexity. These forests support a wide range of wild edible plants that contribute significantly to local food systems and traditional healthcare practices (Bhat *et al.*,

2000). Among these, *Flacourtia montana* is an important yet underutilized species that has historically supported indigenous communities.

Wild edible fruits play a crucial role in supplementing nutrition, especially in rural and tribal regions where access to cultivated fruits may be limited. They serve as fallback

food resources during droughts and seasonal food shortages, thereby contributing to food security and resilience (Rasmi & Jose, 2025). However, despite these advantages, many such species remain neglected due to insufficient research, lack of awareness, and absence of structured market systems.

Taxonomy and Distribution

Flacourtia montana belongs to the family Salicaceae and is widely distributed in the evergreen and semi-evergreen forests of the Western Ghats. It thrives in humid tropical conditions, often forming part of the forest understory or secondary vegetation (Rasmi & Jose, 2025).

The species is commonly associated with diverse forest ecosystems that exhibit dynamic changes in species composition, biomass, and regeneration patterns over time (Bhat *et al.*, 2000). Its presence in such ecosystems indicates its adaptability to varying environmental conditions and its role in maintaining ecological balance. Furthermore, its distribution across different altitudinal gradients reflects its ecological plasticity and resilience.

Morphological Characteristics

Flacourtia montana is typically a bushy shrub or small tree with thorny stems and spreading branches. The plant exhibits dense foliage with dark green leaves, while the young leaves often display a coppery red coloration (Tripathi *et al.*, 2021). The presence of thorns, although a limitation for cultivation, provides natural protection against herbivory.

The fruits are small, dark red berries, generally 1–2 cm in diameter, with a sweet and slightly astringent taste. Considerable variability exists among different accessions in terms of plant height, fruit yield, fruit size, and biochemical composition (Tripathi *et al.*, 2021). Such variability highlights the genetic diversity of

the species, which can be exploited for selection and crop improvement programs.

Nutritional and Phytochemical Properties

The fruits of *F. montana* are nutritionally rich and contain significant amounts of sugars, vitamins, and essential minerals. They are particularly valued for their ascorbic acid, carotenoids, anthocyanins, and mineral content such as calcium and iron, which contribute to their antioxidant and health-promoting properties (Sebastian *et al.*, 2019).

In addition to their basic nutritional value, the fruits contain a diverse range of volatile compounds, including alcohols, esters, aldehydes, and ketones, which contribute to their characteristic fruity aroma and flavor (Mundaragi *et al.*, 2017). These phytochemical constituents not only enhance the sensory qualities of the fruit but also indicate potential applications in nutraceutical and functional food industries.

Medicinal and Ethnobotanical Importance

Flacourtia montana holds a significant place in traditional medicine systems practiced by indigenous communities of the Western Ghats. Various parts of the plant, including leaves, bark, and fruits, are used in treating ailments such as inflammation, diabetes, and microbial infections due to their pharmacological properties (Tripathi *et al.*, 2021).

Ethnobotanical studies emphasize that traditional knowledge of medicinal plants is deeply rooted in cultural practices and has been transmitted across generations through experiential learning (Savinaya *et al.*, 2016). Such knowledge systems are invaluable for identifying new bioactive compounds and promoting sustainable utilization of plant resources. Moreover, the reliance on herbal medicine in rural areas highlights the importance of conserving such species for future healthcare needs.

Post -Harvest Characteristics and Value Addition

One of the major limitations in the utilization of *F. montana* is its poor post-harvest shelf life. The fruits are highly perishable and prone to rapid browning due to phenolic oxidation, especially under tropical climatic conditions (Sebastian *et al.*, 2019). This restricts their storage, transportation, and marketability.

However, the fruit exhibits excellent potential for value addition. It can be processed into a variety of products such as juices, jams, jellies, preserves, and wine, which have shown good consumer acceptability (Sebastian *et al.*, 2019). Development of such value-added products can significantly enhance the economic value of the species and reduce post-harvest losses. Additionally, processing can help extend shelf life and facilitate wider market distribution.

Propagation and Domestic Potential

The domestication of *Flacourtia montana* is still in its early stages, primarily due to limited knowledge of propagation techniques. Studies have demonstrated that vegetative propagation using growth regulators such as indole-3-butyric acid (IBA) significantly improves rooting success, thereby offering a viable method for large-scale multiplication (Rasmi & Jose, 2025).

Seed-based propagation presents challenges due to the intermediate storage behaviour of seeds and their declining viability over time. However, appropriate pre-treatments and controlled storage conditions can enhance germination rates (Rasmi & Jose, 2025). These findings provide a scientific basis for developing effective propagation protocols, which are essential for commercialization and conservation efforts.

Socio-economic and Ecological Significance

Flacourtia montana possesses considerable socio-economic importance, particularly for rural and tribal communities residing in the Western Ghats. The fruits serve as a supplementary source of nutrition and income, especially during lean agricultural periods. By promoting its cultivation and value addition, the species can contribute to livelihood diversification and rural entrepreneurship (Rasmi & Jose, 2025).

From an ecological perspective, the species plays a vital role in maintaining forest structure and biodiversity. It contributes to ecosystem stability by participating in nutrient cycling, supporting wildlife through fruit production, and aiding in natural regeneration processes (Bhat *et al.*, 2000). Its adaptability to diverse environmental conditions also makes it suitable for integration into agroforestry systems, thereby promoting sustainable land-use practices.

Furthermore, the conservation and utilization of such underutilized species can help reduce pressure on major cultivated crops and enhance agricultural biodiversity. Integrating *F. montana* into farming systems can also contribute to climate resilience by diversifying production systems and improving ecosystem services.

CONCLUSION

Flacourtia montana is a promising underutilized fruit species with immense potential in terms of nutrition, medicine, and economic development. Its successful domestication and commercialization can contribute significantly to sustainable agriculture, biodiversity conservation, and rural livelihoods. Future research should focus on improving propagation techniques, developing efficient post-harvest technologies, and creating market linkages to unlock the full potential of this valuable species.

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