

CHAPTER 7

Food, ethnomedicinal, pharmacological, ecological and economic aspects of *Limonia acidissima* L. (Rutaceae): a medicinal tree of India

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Abstract

Limonia acidissima is a wild tree of India and popularly known as Elephant Wood Apple. Fruits are preferred food of Asian elephants. Fruits are used to make relish, and plant parts have medicinal uses. It has also economic values. Keeping the above importance, its botany and significances are discussed in this chapter. Photographs are provided for identification and academic purposes.

Keywords: Tribal food, relish, fodder plants, elephant

Introduction

Wild edible plants play an important role in providing food in tribal and rural areas. They have medicinal significance. They are also the source of livelihood. As they are local plants, they have ecological services. Due to urbanization, they are going to extinct, and sustainable food practices are going to vanish. Climate change and modern food systems are also major causes. The increasing population of the world needs the availability of adequate food, which is available in our traditional practices and is suitable for health (Kumar et al., 2012). In this scenario, the documentation of such plants is important (Kumar et al., 2021). Therefore, an attempt has been made to document the food, medicinal, ecological, and economic values of *Limonia acidissima* (Figure 1). It belongs to the family Rutaceae. It is a tree, usually observed in forests, near rivers, and around rural and tribal areas.



Figure 1: Canopy of *Limonia acidissima* (Photo Credit: Dr. Sanjeet Kumar)

Morphology

It is a tree with axillary spines having dark grey or black rough bark. Leaves are fascicled. Rachis and petiole are narrowly winged. Leaflets are 5-7, opposite, subsessile, elliptic or obovate, entire, obtuse often notched at apex and glabrous. Flowers are in short racemes on short lateral branches. Pedicels are glabrous, and articulate on the pubescent peduncle. Sepals are minute. Petals are green or reddish. Stamens are usually 10. Anthers are red. Fruits are many-seeded. They often flower from February-April and the fruiting period is from November to January (Saxena and Brahmam, 1994; Nayak and Kumar, 2023; Figures 2-4).



Figure 2: Leaves of *Limonia acidissima* (Photo Credit: Dr. Sanjeet Kumar)



Figure 3: Flowers of *Limonia acidissima* (Photo Credit: Dr. Sanjeet Kumar)

Food values

During different floristic works in India, it was noticed that ripen fruits are used to make relish. Relish is consumed with meal. Ripen fruits are also used to make country beverage (Present study).

Medicinal values

The Juice of fruit is given to treat cough and cold. Paste of the root is applied over the wounds and ripen fruit juice is consumed to improve the body strength (Nayak and Kumar, 2023). The plant parts of *L. acidissima* are traditionally used in the treatment of various health problems. The most common ailments treated by this plant are constipation, skin diseases, diarrhea, jaundice, dysentery, asthma, diabetes, and dyspepsia and it also act as hepato-protectant, cardiotonic, cardiac stimulant, and diuretic agents (Mohanty and Pattnaik, 2024).



Figure 4: Fruit of *Limonia acidissima* (Photo Credit: Dr. Sanjeet Kumar)

Pharmacological values

It has antidiabetic, antibacterial, anti-diarrheal, antiulcer, wound healing, neuroprotective, antioxidant, hepatoprotective, antifungal, analgesic, larvicidal, antihistaminic, diuretic, anti-inflammatory, anti-spermatogenic, antihyperlipidemic, anticancer, and adsorbent activities (Mohanty and Pattnaik, 2024; Sharma et al., 2024).

Bioactive compounds

Different parts of *L. acidissima* have some bioactive compounds like quinones, coumarins, phenolic acids, triterpenoids, lignans, flavonoids, alkaloids, sterols, and some volatile oils (Murthy and Dalawai, 2020). Phytosterol γ -sitosterol, ergosterol, lanosterol, lupeol, stigmasterol and stigmasteryl are reported from the fruits of *L. acidissima*. The seeds have been reported to have alkaloids, flavonoids, phenols, tannins, terpenoids, fats, sterols, saponins and glycosides (Yusnaini et al., 2023). It

also consists β -carotene along with tyramine derivatives (Sharma et al., 2024; Figure 5).

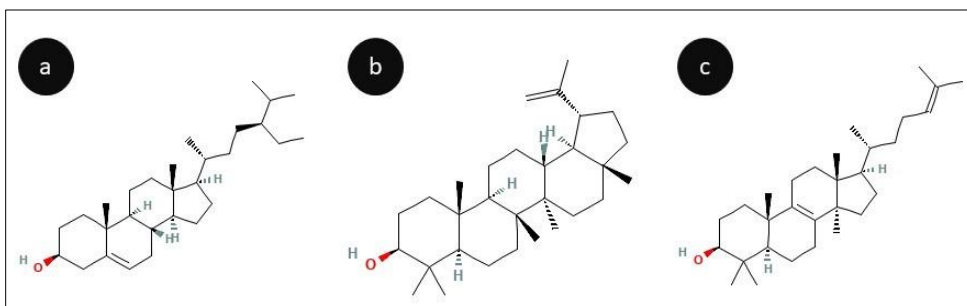


Figure 5: Common bioactive compounds of *L. acidissima*, a) γ -Sitosterol; b) Lupeol; c) Lanosterol (Source: PubChem)



Figure 6: Economic values of *Limonia acidissima* (Photo Credit: Dr. Sanjeet Kumar)

Ecological values

The fruits come under the preferred food of Asian Elephants. Ripen fruits are also consumed by the Indian Giant Squirrel (Present study).

Economic values

The price range of one ripen fruit is Rs. 5 to Rs. 17 as per availability and locations (Figure 6).

Conclusion

The study concludes that fruits have food values and are consumed as relish and beverages. Therefore, value addition on fruits can be carried out at regional levels to enhance the livelihood of local people. The plant parts have medicinal uses and can be the source of novel pharmaceuticals. Fruits are consumed by Asian elephants and other wildlife, so they can be planted in their habitat for the restoration of the wildlife population and to reduce man-wildlife conflicts.

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