

# Ethnobotanical Utility of *Garcinia gummi-gutta*, A Versatile Tropical Fruit Tree of Central Western Ghats, India

H.N. Karthik<sup>\*1</sup>, P. Ramana<sup>2</sup> and B. Aravind Rathod<sup>3</sup>

Department of Forest Products and Utilization,  
College of Forestry (University of Agricultural Sciences, Dharwad),  
Sirsi 581 401, Karnataka, India

(Received 26 September, 2023; Accepted 16 November, 2023)

## ABSTRACT

*Garcinia gummi-gutta* is an abundant wild tree species found in Western Ghat of India with vast ethnobotanical potential. Being underutilized and little reports on its utility in the literatures, especially from the study area. An effort was made to document the ethnobotanical knowledge of this species. The study was conducted at Uttara Kannada district, Karnataka – a part of central Western Ghat, India. Traditional knowledge of twenty-one randomly selected rural respondents was collected using semi-structured open-ended questionnaire, the data obtained was analysed and visualized into charts and graphs. Study revealed the use of *G. gummi-gutta* fruit rind and seed butter for both culinary and medicinal purposes, Fruit rind is used in preparation of non-vegetarian curries (fish curries etc.) and preparation of pickles. Seed butter is used in frying of edibles, lighting oil in lanterns in some cases and also used as moisturizer, treating cracks, rashes, burn wounds, sunstroke, dehydration and amashanke etc. It is also observed that 71.42 per cent of people don't use rind for their household use. None of them found to produce the seed butter for the commercial purposes although 85.71 per cent people are aware of the process of butter extraction. The underutilized tree species (*G. gummi-gutta*) has many ethnobotanical benefits. Such uses can be commercialized, so that reliance on similar market alternatives can be minimized for example, the seed rich with seed oil can be used as potential feedstock in bio-diesel production and it in turn may help earn additional income for the rural communities and also help fight climate change by minimising the reliance on fossil fuels etc.

**Key words:** Ethnobotanical uses, *Garcinia gummi-gutta*, Central Western Ghat, Uttara Kannada, Karnataka.

## Introduction

The practical uses of the plants by a social group or of a particular culture, maybe in relation to their medicinal practices, food habits or any traditional rituals. This can vary according to availability, climate, region and extent of knowledge of local population. This type of knowledge helps us to understand the

typical interaction of people with nature (Kunwar and Bussmann, 2008), and its role in their well being simultaneously discovering new uses of existing plants that could benefit humanity.

The *Garcinia gummi gutta* is a source of food, spice, medicine, and diet ingredient in South and Southeast Asian countries including India.

*Garcinia gummi-gutta*, a tree species of the

(<sup>1</sup>Assistant Prof., <sup>2</sup>Prof. and Head

Clusiaceae family. It is also called as 'Malabar tamarind' and locally called as 'Uppage' in Kannada language (Karthik and Ramana, 2023). It's an evergreen tree of medium size. In India, flowering initiates between January and March, while fruit maturation commences during June and July and has been an integral part of traditional ethnobotanical practices in its native regions for hundreds of years. The fruit's various parts, specifically its rind and seeds, have been widely emphasized for their versatile applications in field of health and well-being. Its historical significance is rooted in the wisdom of local communities, who have relied on its medicinal properties to address a spectrum of ailments. It is naturally grown as stray spice tree in the forests and rural homesteads of coastal and mid-Ghats regions of Karnataka, Kerala, Maharashtra and Sri Lanka (Parthasarathy *et al.*, 2013; Shameer *et al.*, 2016).

From the past decade, the global aligned its interest towards natural remedies and health supplements, this has emphasized on *G. gummi-gutta* to the world of scientific research due to the presence of purported active compound, hydroxycitric acid (HCA) and it's potential to aid in weight management (Jayaprakash and Sakaraiah, 2000; Kim *et al.*, 2008; Amin *et al.*, 2011), leading to a proliferation of dietary supplements and wellness products. Apart from this, due to rich array of bioactive compounds, has shown potential antioxidant, anti-inflammatory, and antimicrobial properties.

Sour *G. gummi-gutta* fruit rinds are traditionally used as fish preservatives, smoke dried rinds in "Colombo curing" (Pickling in brine solution) of fish (Sreenivasan and Venkataraman, 1959; Lewis and Neelakantan, 1965), in fish curries as flavoring agent among local communities. Used as traditional remedy to digestive disorders and intestinal parasites, rheumatism and bowel complaints (Semwal *et al.*, 2015). The dried rind was used in gold and silver polishing, Acetic and formic acids substitute in rubber latex coagulation. Large number of small-scale industrial units are scattered in central Kerala, which process the fruits for its several value-added products (Hemesekhar *et al.*, 2011).

*G. gummi-gutta* can be found abundantly in the wild with vast repository of ethnobotanical knowledge among local people and it is sparsely recorded, so the study was conducted aiming at documenting the local traditional ethnobotanical practices from central western ghat regions of Karnataka, India.

## Materials and Methods

The study was done in the district of Uttara Kannada, which falls on the central western ghat regions of Karnataka, India. *Garcinia gummi-gutta* predominantly occurs in evergreen to semi-evergreen forest type. *Garcinia gummi-gutta* is naturally distributed in these locations abundantly and also found on farm lands as a cultivated tree, if not commercially.

The study area falls under tropical climate. The climate is primarily monsoonal and rains are caused by southwest monsoon during June-September. The region receives an annual rainfall of about 2500-4200 mm (KSNDMC, 2019). The relative humidity is highest exceeding 90 per cent during July-August and it is as low as 40 per cent in March-April. The mean annual temperature varies from 18 to 31 °C; generally, April and May are the hottest, while November and January are the coolest months.

The documentation of traditional knowledge and uses was done by Semi structured open-ended questionnaire from local rural families in the study area. The rural population majorly dependent on agriculture and horticulture practices as main source of income (Paddy and Areca nut cultivation) along with that they also relay on wide range of other Non-timber forest products for their day-to-day needs, *Garcinia gummi-gutta* is one of them. Interaction was done with rural people randomly. The age of respondents was ranged from 22 to 68 years respectively. The data was analysed and visualised using Microsoft excel software.

## Results and Discussion

The ancestral wisdom of traditional usage, passed down through generations from our forefathers, is pivotal in defining the value of specific commodities and serves as a foundation for future scientific research. With the rapid urbanization, digitalization, and increasing reliance on alternatives, there is a decline in the interest of the younger generation to acquire such knowledge, resulting in the suppression of traditional knowledge and impeding its transmission to the next generation. In light of these circumstances, it becomes imperative to meticulously document all traditional and ethnobotanical knowledge before it fades away from the annals of history.

Diverse traditional uses (Figure 1) were come to light during interaction. In culinary uses, fruit rind is used in non-vegetarian curries (fish curry) and preparation of pickles by putting them mixed with salt by some families. Seed oil butter is used in frying (edibles) purposes. Similar use of this fruit is reported by Rasha *et al.* (2015), it is an important culinary agent, used as acidulates by people of costal Karnataka, Goa and Maharashtra, especially with cartilaginous fishes and prawn curries. They also use in vegetable dishes in preparing chutneys and pickles. The fruit rind used as condiments in the preparation of food items (Murthy *et al.*, 2017).

Fruit juice of *G. gummi-gutta* is used in mild quantities as body coolant. Murthy *et al.* (2017) reported the use of *G. indica* fruit juice is as a coolant in summer. Two farmers reported that they use crushed juice of fruit as insecticide in vegetable garden of their backyard by spraying mixture of fruit juice with water onto the vegetable plants. This use hasn't been reported anywhere previously.

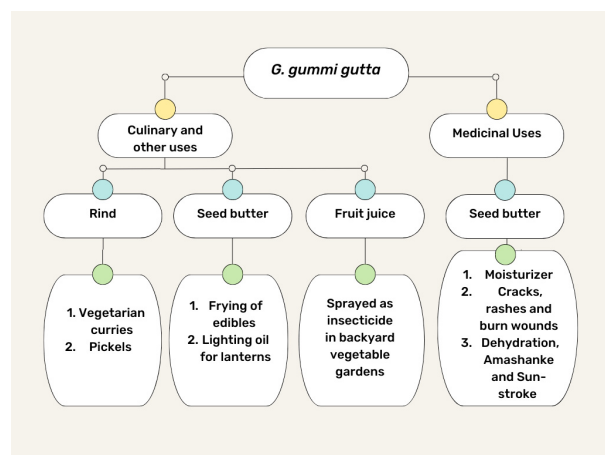


Fig. 1. Medicinal and culinary uses recorded during study

Even though the fruit rind is collected and marketed in large scale by local populations as substitute for tamarind in the preparation of various food items. Study indicated that, majority of them are not using it domestically. It is interesting to observe that 71.5 per cent (Figure 2-A) of respondents in the study area are not using it in the culinary purpose. Although respondents are using tamarind on regular basis, during special occasions they use dried *G. gummi-gutta* fruit rind for the preparation of special food items, especially for non-vegetarian dishes. It is found that there is a well-established market for the

fruit rind and many families collect the fruits, process and sell it for money, but the seeds are being discarded.

People in the study area are familiar with the concept of butter extraction from the *Garcinia*, but only few families are involved in the seed butter extraction that too for domestic consumption during festivals and food preparation. Local population are aware of medicinal importance of seed butter from *G. gummi-gutta* but majority of them are not practising it on large scale. 85.70 per cent of respondents are fully aware (Figure 2-B) about the method of production of seed butter but none of them are employed themselves in commercial scale. The fresh seed material will be blended with ash and dried in open conditions for 1-2 months and stored for the extraction of seed butter. However, majority of them are disposing the seed after de-pulping as a waste. The lack of interest and involvement in the butter extraction process is mainly due to laborious nature of seed processing, especially decortication and lack of market for extracted butter.

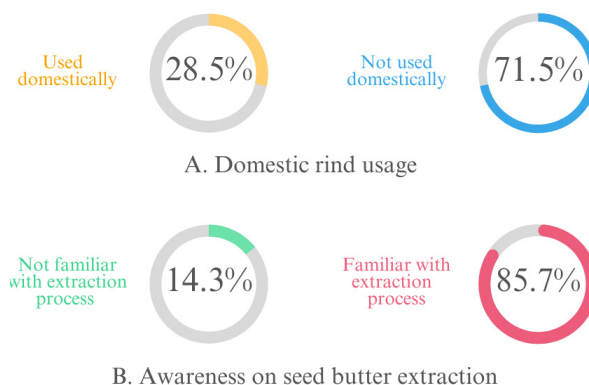


Fig. 2. Percent domestic rind usage and familiarity with seed butter extraction

In medicinal uses seed butter is extensively used as moisturiser in winter by applying it to lip and face. Used in cracks, rashes and sometimes in treating burn wounds. It is also used in treating sunstroke by spraying oil droplets into the nostrils, treating dehydration and amashanke (bloody diarrhoea) by consuming seed oil mixed juice. Mohammed *et al.* (2017) reported similar uses (treatment of cracked heels, dry skin conditions and other skin ailments) but with the *G. indica* (Vrukshamla) seed butter by folklore Vaidyas (Doctors) of Western Ghats of India. Whereas, seed butter is rarely used in frying edibles and also sometimes used as light-

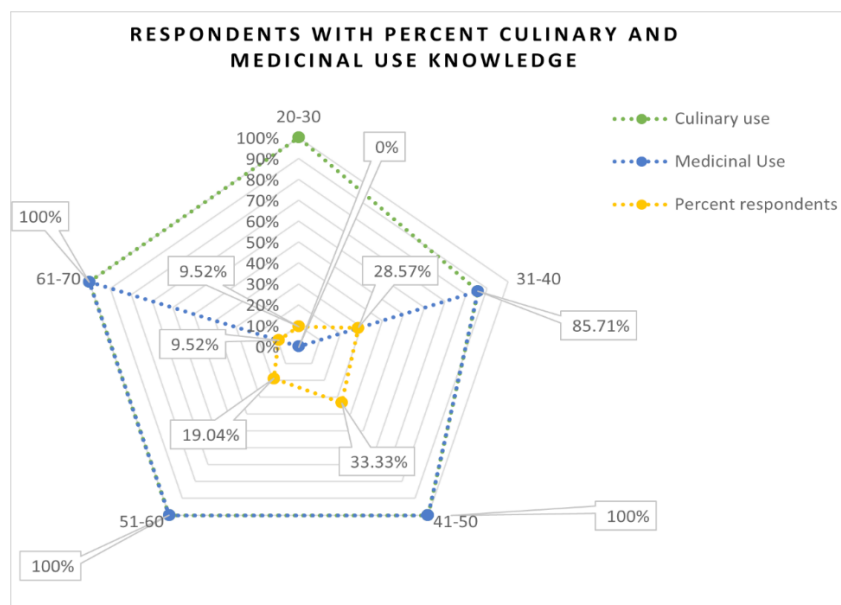


Fig. 3. Respondents of different age group with knowledge of culinary and medicinal usage (in percent)

ing oil in lanterns.

Rural respondents of five age groups ranging from 22 to 68 years were interacted. It is concerning to found that the younger age group of 20-30 years of age has no knowledge of any kind of medicinal use. Whereas age group of 31-40 years has significant knowledge (85.71 %), however, respondents of remaining age group were fully familiar with both culinary and medicinal uses (Figure 3). Which implies that knowledge sharing from older to newer generation is declining. So, documentation of these important knowledge is urgent need.

The present apathy towards the seed processing for its value addition may be addressed by developing suitable seed decorticators. This will facilitate in the easy processing of seed material for butter extraction coupled with searching for new marketing channels to market the butter by developing several value-added products, for example seeds known have 35 to 45 percent of oil (Parthasarathy *et al.*, 2013) which can be used as feed stock in bio diesel production (Subramani *et al.*, 2018). This will not only help in effective utilization of underutilised seed and also provides additional income, generates employment from seed processing which intern helps in promotion of cottage industries among local community.

### Acknowledgement

The authors would like to thank the 'College of For-

estry, Sirsi' for its help in conducting the study.

### Conflict of Interest

The authors declare no conflict of Interest.

### References

- Amin, K.A., Kamel, H.H. and Abd Eltawab, M.A. 2011. Protective effect of *Garcinia* against renal oxidative stress and biomarkers induced by high fat and sucrose diet. *Lipids Health Dis.* 10(1): 1-13.
- Hemesekhar, M., Sunitha, K., Santhosh, M.S., Devaraja, S., Kempararaju, K., Viswanath, B.S., Niranjana, S.R. and Girish, K.S. 2011. An overview of genus *Garcinia*: phytochemical and therapeutical aspects. *Phytochem. Rev.* 10(3): 325-351.
- Jayaprakash, G.K. and Sakaraiah, K.K. 2000. Determination of (") Hydroxycitric acid in commercial samples of *Garcinia cambogia* extract by liquid chromatography with ultraviolet detection. *J. Liquid Chromatogr. Tech.* 23(6): 915-923.
- Karnataka state Natural Disaster Monitoring Centre (KSNDMC). 2019. <https://www.ksndmc.org/default.aspx/Reports/Annual>.
- Karthik, H.N. and Ramana, P. 2023. Organic acid profile of *Garcinia gummi-gutta* (L) Rob. from central Western Ghats of India. *Pharm. Innovation.* 12(5): 1762-1765.
- Kim, K.Y., Lee, H.N., Kim, Y.J. and Park, T. 2008. *Garcinia cambogia* extract ameliorates visceral adiposity in C57BL/6J mice fed on a high-fat diet. *Biosci. Biotech. Biochem.* 72(7): 1772-80.

- Kunwar, R.M. and Bussmann, R.W. 2008. Ethnobotany in the Nepal Himalaya. *J. Ethnobiology Ethnomedicine*. 4:24.
- Lewis, Y.S. and Neelakantan, S. 1965. (-)-Hydroxycitric acids: The principal acid in the fruits of *Garcinia cambogia*. *Phytochem*. 4: 619-625.
- Mohammed, F., Joshi, S.V., Patgiri, B., Bairy, S.T. and Narayana, S.K. 2017. Analytical standards of Vrukshamla (*Garcinia indica* Choisy) beeja taila - Kokum butter. *J. Ayu. Med. Sci*. 2(3): 247-250.
- Murthy, H.N., Joseph, K.S., Payamalle, S., Betageri, S., Gudodagi, R., Mesta, S. and Kodli, S. 2017. *Garcinia gummi-gutta* (L.) Robs.: A promising feedstock for biodiesel production. *Int. J. Green Energy*. 14(14): 1178-1181.
- Parthasarathy, U., Nirmalbabu, K., Kumar, S.R., Ashis, G.R., Mohan, S. and Parthasarathy, V.A., 2013, Diversity of Indian *Garcinia* - A medicinally important spice crop in India. *Acta Horticulturae*. 979: 467-476.
- Rasha, H.M., Salha, A., Thanai, A. and Zahar, A. 2015. The biological importance of *Garcinia cambogia*: A review. *J. Nutr. Food Sci*. 5(4): 1-5.
- Semwal, R.B., Semwal, D.K., Vermaak, I. and Viljoen, A. 2015. A comprehensive scientific overview of *Garcinia cambogia*. *Fitoterapia*. 102: 134-148.
- Shameer, P.S., Rameshkumar, K.B., Sabu, T. and Mohanan, N. 2016. Diversity of Malabar Tamarind (*Garcinia gummi-gutta*(L.) N. Robson) in the Western Ghats- Morphological and Phytochemical evaluation, p. 132-141. In Rameshkumar, K. B. (Edited) *Diversity of Garcinia species in the Western Ghats: Phytochemical Perspective*. Jawaharlal Nehru Tropical Botanic Garden and Research Institute, Palode, Thiruvananthapuram, Kerala, India.
- Sreenivasan, A. and Venkataraman, R. 1959. Chromatographic detection of the organic constituents of Gorikapuli (*Garcinia cambogia* Desr.) used in pickling sh. *Curr. Sci*. 28:151-152.
- Subramani, L., Parthasarathy, M., Balasubramanian, D. and Ramalingam, K.M. 2018. Novel *Garcinia gummi-gutta* methyl ester (GGE) as a potential alternative feedstock for existing unmodified DI diesel engine. *Renew. Energy*. 125: 568-577.