



# **Ethnobotanical Knowledge and Market Status of *Garcinia indica* from Uttara Kannada District, Karnataka, India**

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## **Authors' contributions**

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

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## **ABSTRACT**

The genus *Garcinia* comprises many species distributed in tropical regions, with *G. indica* being one of the most significant native trees found in the Western Ghats of India. This study tried to document the Ethnobotanical knowledge of *Garcinia indica* among the rural populations of Uttara Kannada district, India. The survey and interviews conducted with 120 families across different study area revealed substantial utilization of *Garcinia indica* for culinary, medicinal, and commercial purposes. The fruit rind, which contains hydroxycitric acid (HCA), serves as an ingredient in Indian cuisine and is purported to have anti-obesity effects. Its seed butter is utilized in cosmetics and medicine globally due to its therapeutic properties. There exists considerable economic potential for seed processing as a substrate in butter extraction; however, it is not scalable due to prohibitively labour intensive practices. Consequently, this study emphasizes the importance of developing an

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improved processing technique for these leaves, which could potentially add value and increase market price substantially. Such advancements would further generate revenue for conservation efforts, providing local communities with a sustainable source of income through the application of traditional knowledge.

**Keywords:** *Kokum, western-ghat; traditional knowledge; ethnobotany; medicinal properties; culinary acidulant; kokum ghee; sustainability and abdominal disorders treatment.*

## 1. INTRODUCTION

Over 200 species of the genus *Garcinia* (Family: Clusiaceae) found in tropical parts of Asia, Africa, and Polynesia; many of these species are valuable both medicinally and commercially Roberts (1984). *Garcinia indica* Choisy, sometimes referred to as kokum, is one of the most significant native species. It is mostly found in the Indian Western Ghats, which include Maharashtra, Goa, Karnataka, Kerala and portions of West Bengal, Assam and Gujarat (Subash Chandran, 2005). This plant has historically been collected from the wild, grown in home gardens and produced on a small scale in these areas for a variety of purposes, including as a culinary acidulant and for its medicinal properties (Krishnamurthy, 1984).

*Garcinia indica* holds a noticeable place in local cultures for its wide ranging medicinal applications. The fruit rind, seeds and butter are commonly used in traditional remedies to treat a variety of ailments, including piles, dysentery and heart conditions (Patil et al., 2009). Various parts of the tree, including the root, bark and fruit extracts are engaged in treating abdominal disorders and wounds (Jena et al., 2002). Kokum butter, extracted from seeds, is used in cosmetics and pharmaceuticals due to its astringent and emollient properties (Baliga, et al., 2011, Karthik et al., 2024).

Ethnobotanical studies highlight the deep rooted traditional knowledge associated with different *Garcinia* species. For example, the Malamalasar tribes of Kerala use the syrup from *Garcinia gummi-gutta* to treat bilious disorders (Yesodharan et al., 2007), while the fruit pulp of *Garcinia pedunculata* is employed by the Khampthi tribe in Arunachal Pradesh as a remedy for blood dysentery (Sen et al., 2008). Similarly, in Assam, *Garcinia morella* is used to produce a yellow dye for silk textiles (Kar, et al., 2008).

Traditional applications of *Garcinia indica* include the use of fruit rind decoctions to treat diabetes and the use of its butter as a moisturiser and wound healer (Padhye et al., 2009). Species like

*Garcinia dulcis* and *Garcinia mangostana* have been used in Southeast Asian traditional medicine to treat inflammatory and lymphatic ailments (Khamthong et al., 2017, Assemanian et al., 2019). The potential for modern therapeutic uses and the cultural and medical value of *Garcinia indica*, in particular, are continually highlighted by the plants participation in traditional knowledge systems.

## 2. METHODOLOGY

The study area falls under Central Western Ghats, Karnataka, India. The study included eight sites those are Kathgal (S1), Divage (S2), Devimane (S3), Ragihosalli (S4), Janmane (S5), Yeddalli (S6), Islur (S7) and Banavasi (S8) were chosen for the survey and a total of 120 families were surveyed (15 households per location) to record traditional knowledge and marketing information related to *Garcinia indica* in Uttara Kannada district. The data collection method engaged was semi-structured, open-ended interviewing, which allowed participants to reveal comprehensive information while maintaining flexibility. Special information of *Garcinia* species have been noted in separate section about medicinal and pesticide fiction. In order to optimise the gathering of traditional knowledge, contacts with the rural community. An attempt was made to interact with the community in a way that promoted the sharing of *Garcinia indica* culinary and therapeutic applications.

## 3. RESULTS AND DISCUSSION

The distribution of product usage across different sites shows a clear variation in preferences for home use, local marketing and wholesale distribution. At Site 1, 53.34% of respondents (8 families) reported using the product for home use, 33.33% (5 families) for local marketing and 13.33% (2 families) for wholesaling. Site 2 demonstrated a slightly higher preference for local marketing, with 53.33% (8 families), while 46.67% (7 families) used the product at home, and none of the families utilized it for wholesaling mentioned in Table 1 of Fig. 2.

## STUDY AREA

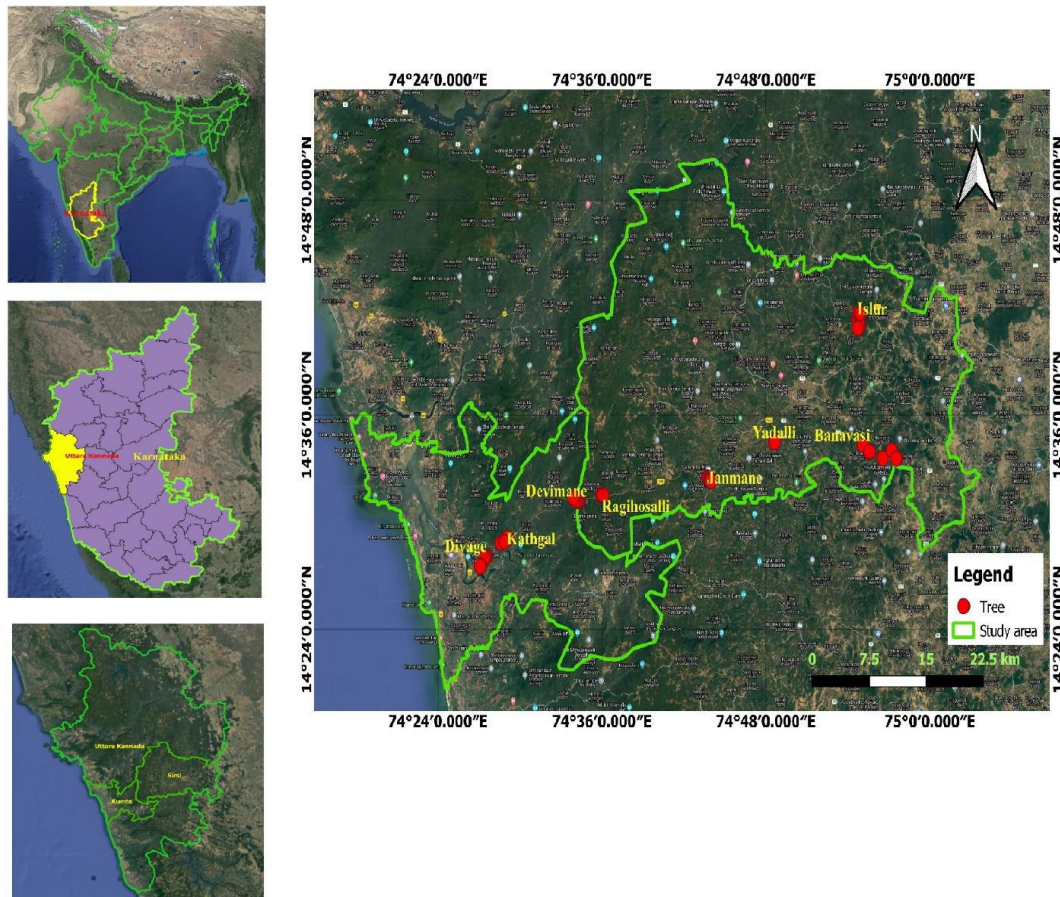


Fig. 1. Study area map

Table 1 of Fig. 2 depict Site 3 exhibited a unanimous preference for home use, with 100% (15 families) of the participants using the product domestically and no interest in local marketing or wholesaling. Site 4 presented a more balanced distribution, with 26.66% (4 families) using the product for home use, 46.67% (7 families) for local marketing and 26.67% (4 families) for wholesale purposes.

At Site 5, the product was used by 53.33% (8 families) at home, 40.00% (6 families) in local marketing and 6.67% (1 family) for wholesaling. Site 6 showed a higher tendency for home use at 66.67% (10 families), with 33.33% (5 families) opting for local marketing and none for wholesale. Site 7 displayed a similar balance, with 40.00% (6 families) favouring home use, 46.67% (7 families) for local marketing and 13.33% (2 families) for wholesaling. At last Site 8 had 80.00% (12 families) preferring

home use, 20.00% (3 families) for local marketing and none for wholesaling. In total, across all sites, 58.33% of the product usage was for home consumption by 70 families, 33.33% (40 families) for local marketing, and 8.33% (10 families) for wholesaling mentioned in Table 1.

A variety of customs were disclosed during these interviews, such as making kokum tambuli (sambar), juice and jam from the fruit pulp, as well as the use of fruit rind to make kokum huli (Kokum rind syrup) and pickles. Some families reported novel use, such as using the crushed liquid as a natural pesticide in their backyard vegetable gardens, while kokum seed butter, though less popular, was occasionally utilised in cooking as kokum ghee.

The present study revealed a wealth of traditional knowledge regarding the culinary, medicinal, and

marketing practices surrounding *Garcinia indica* in the Uttara Kannada district. It was found that different parts of the plant, such as the fruit pulp, rind, and seeds, were used in various applications. The culinary uses included making kokum tambuli (sambar), juice, jam, huli, and pickles, while kokum ghee, extracted from the seeds, was less commonly used. These findings align with the work of Rajeshwari and Manjunath (2015), who documented similar culinary practices.

Medicinally, *Garcinia indica* seed oil was reported as a traditional remedy for moisturizing dry skin, healing cracks, treating sunstroke, and managing ailments such as dehydration and amashanke (intestinal inflammation). These uses were consistent with findings from Mohammad et al., (2017), who documented the therapeutic benefits of kokum butter in treating skin ailments. Additionally, the fruit juice was recognized for its cooling properties, which echoes the observations of Murthy et al., (2017). Despite its

widespread traditional usage, the study found that the seeds, though valuable for butter extraction, were often discarded due to labour-intensive processing and limited market demand. This highlights the need for developing efficient seed decorticators to increase the utilization and value of *Garcinia indica* seeds, potentially boosting income for local residents (Bohra and Waman, 2019).

In terms of marketing, most families (58.33%) used the fruit for home consumption, while 33.33% sold it in local markets, and only 8.33% sold it to wholesalers. This suggests that while the fruit rind has a well-established market, the seeds and other by products remain underutilized. Developing value-added products and improving market access could provide economic benefits to rural communities, particularly by enhancing the use of the underutilized seeds for butter extraction, as recommended by Chate et al., (2019).

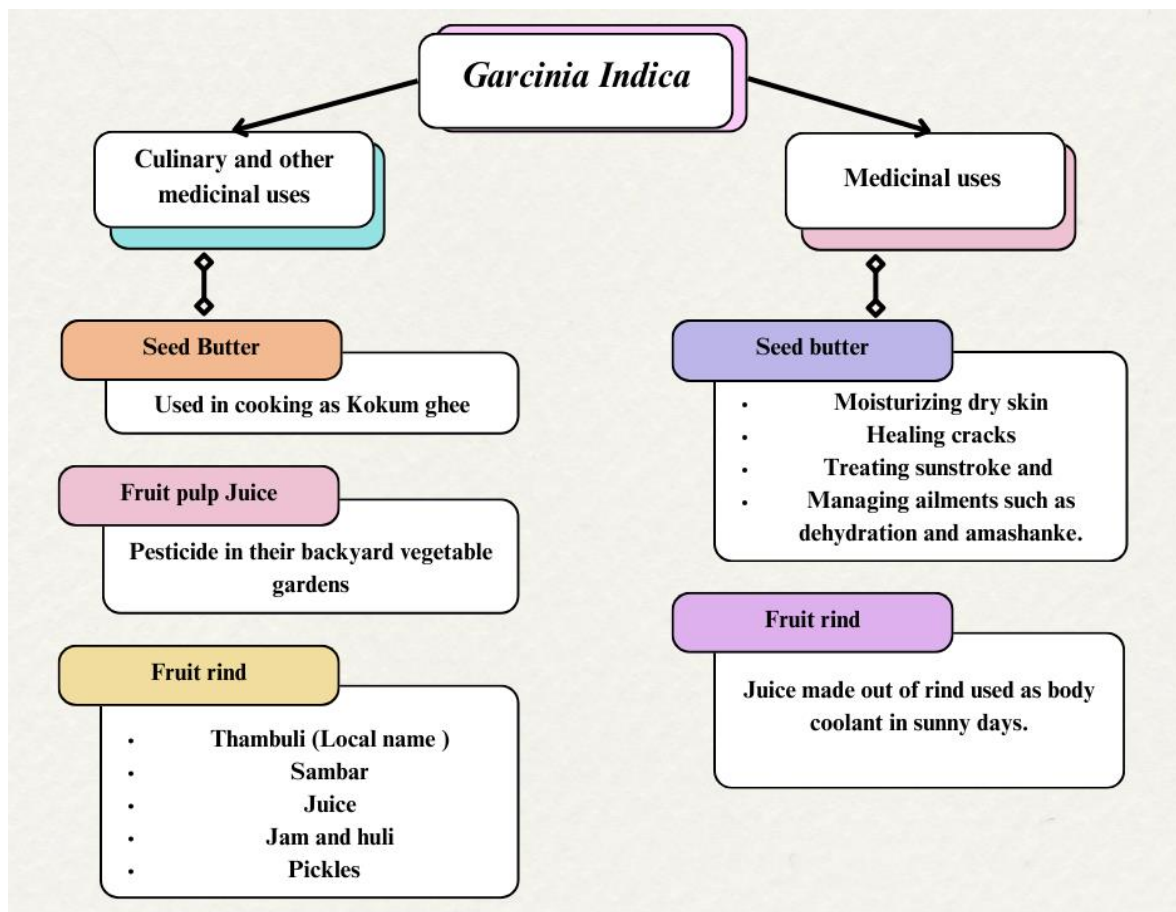


Fig. 2. Ethnobotanical uses of *Garcinia Indica*

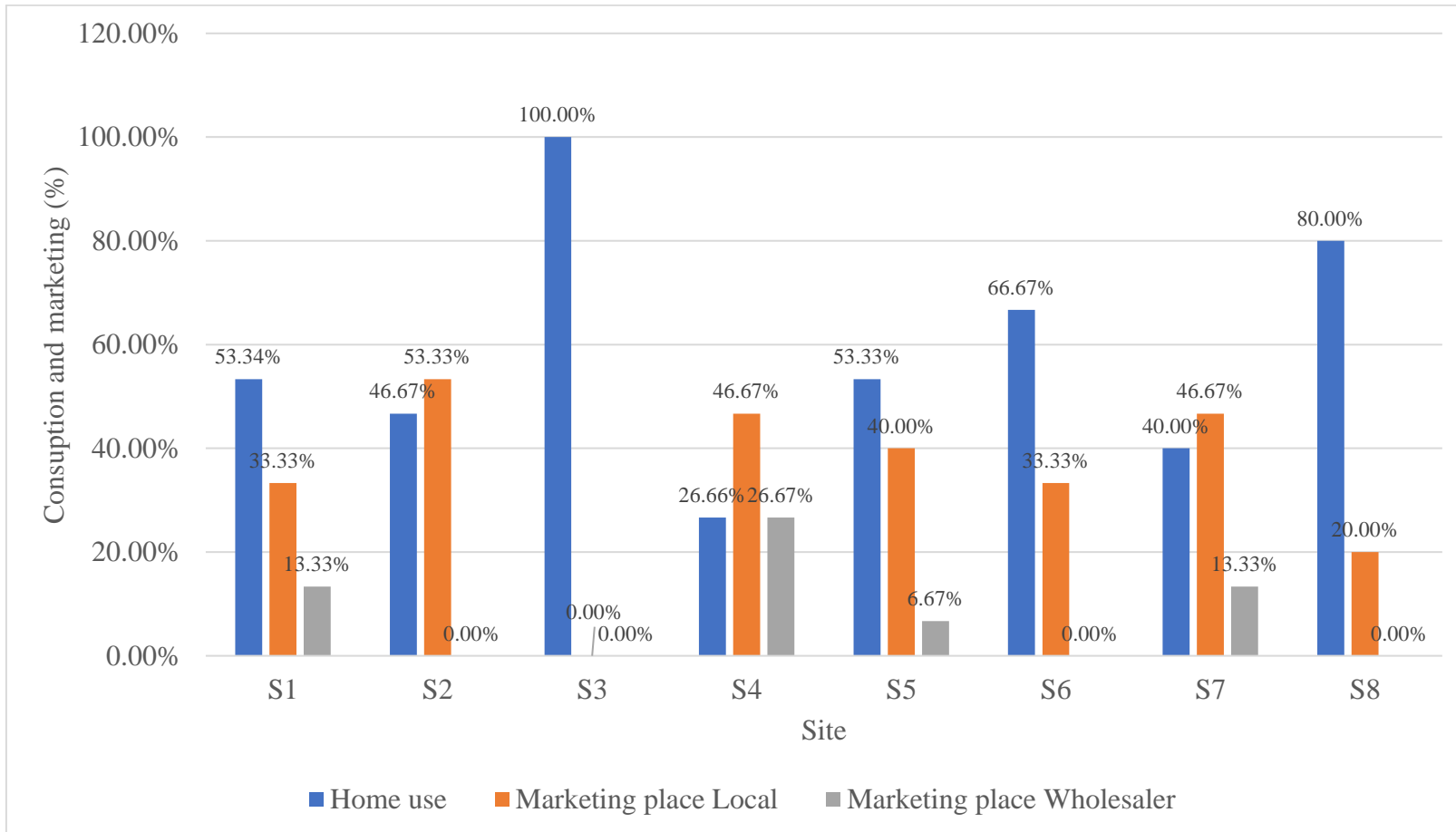
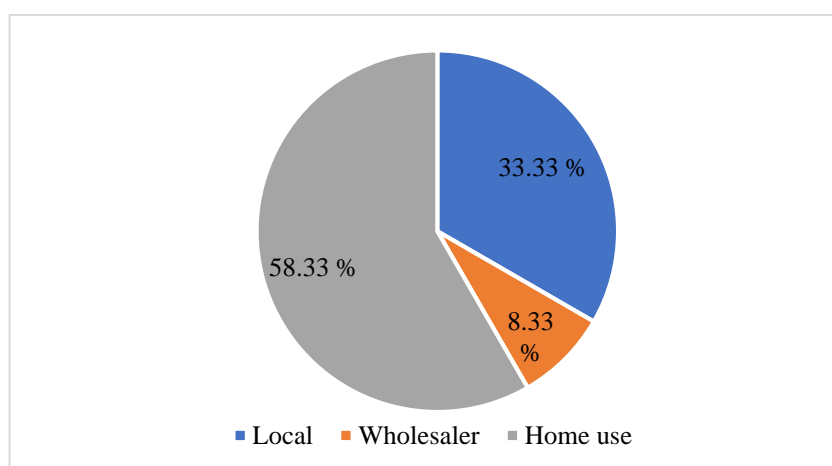


Fig. 3. Marketing and usage of *Garcinia indica*

**Table 1. Marketing place and home use from family**

Site	Home use	Marketing place	
		Local	Wholesaler
S <sub>1</sub>	53.34 % (8)	33.33 % (5)	13.33 % (2)
S <sub>2</sub>	46.67 % (7)	53.33 % (8)	0.00 % (0)
S <sub>3</sub>	100.00 % (15)	0.00 % (0)	0.00 % (0)
S <sub>4</sub>	26.66 % (4)	46.67 % (7)	26.67 % (4)
S <sub>5</sub>	53.33 % (8)	40.00 % (6)	6.67 % (1)
S <sub>6</sub>	66.67 % (10)	33.33 % (5)	0.00 % (0)
S <sub>7</sub>	40.00 % (6)	46.67 % (7)	13.33 % (2)
S <sub>8</sub>	80.00 % (12)	20.00 % (3)	0.00 % (0)
<b>Total</b>	<b>58.33 % (70)</b>	<b>33.33 % (40)</b>	<b>8.33 % (10)</b>

Note: Brackate values are the number of family respondent



**Fig. 4. Marketing of *Garcinia indica* by rural population of Uttara Kannada district**

#### 4. CONCLUSIONS

The study recorded both culinary and medicinal uses of *Garcinia indica*. The fruit rind was used in preparation of non-vegetarian curries (fish curries etc.) body coolant, insecticide and preparation of juice. Seed butter was also used as frying of edibles, moisturizer, treating cracks, rashes, burn wounds, sunstroke, dehydration and amashanke (intestinal inflammation) etc. The fruit contain HCA content which have high medicinal value as body coolant and reduction of stomach infection. findings reflect the cultural and economic significance of the plant in local communities and emphasize the need to preserve and promote this traditional knowledge. The development of value-added goods and more effective technologies for seed processing, such as seed decorticators, may uncover new options for revenue production and sustainable usage of *Garcinia indica*. Rural families might profit monetarily from improved plant usage and marketing outlets, while also maintaining significant traditional practices for future generations.

#### DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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