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**Short Research Article**

# Ethno-botanical Survey of *Garcinia* Species of Assam

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## Abstract

An ethno-botanical study of *Garcinia species* of Assam viz., *Garcinia pedunculata* Roxb, *Garcinia cowa* Roxb, *Garcinia lanceaefolia* Roxb and *Garcinia xanthochymus* Hook. was conducted during the period of 2012−14. The five districts of Assam i.e. Dibrugarh, Sivsagar, Jorhat, Golaghat and Nagaon were selected purposively for ethno-botanical survey of the selected species and the data were collected personally through interview method in the residence of the respondents. The ethno-botanical study revealed that majority of people uses the fruits of all the four species for different purposes than the seed, leaf and bark. However, most of the people from the five districts used these *Garcinia* plant as a source of medicine and for some social customs like in Bohag bihu, *Garcinia pedunculata* is used for bathing purpose. The people of all five districts mentioned that infusion of dry pericarp of *Garcinia cowa* and *Garcinia pedunculata* is used for curing diarrheal, dysentery and flatulence. The fruits of *Garcina pedunculata* were effective to cure jaundice and the leaves of *Garcinia lanceaefolia* is used as vegetables and sometimes people are using the trunk and leaf of the fruit plants as wood and fodder respectively. The wood of *Garcinia xanthochymus* is used for making traditional rice mill 'Dheki'. All the four species were mostly grown in the backyard garden as semi-wild condition and all the respondents believed that these species are indigenous to Assam.

## 1. Introduction

North-Eastern Region is endowed with unique physiology and rich plant genetic diversity. Assam occupies a special place in North-eastern India located between 24°44´N to 27°45´N latitude and 89°41´ to 96°02´E longitude, covering 2.4% of geographical area of the country. Assam is a mined terrain of plains and hills intercepted by a number of rivers and streams. This region is blessed with nature's unique gift for flora and fauna and besides major fruits, flowers and vegetables crops a large number of tropical and sub-tropical and temperate minor fruits are still found in wild and semi-wild condition. In India the genus is represented by 35 species (Maheswari, 1964) and the *Garcinia* grow extensively in a semi wild condition in the states like Maharastra, Goa, coastal areas of Karnataka, Kerela, evergreen forest of Assam, Khasi, Jantia hills, West Bengal and Gujarat. Among these 15 species are included in NE India and 9 species are reported from undivided Assam (Kanjilal et al., 1934; Kar et al., 2008). In North-East region, the sundried slices of fruits are used for culinary purposes and folk medicine. *Garcinia pedunculata, Garcinia cowa, Garcinia lanceaefolia* are the most important species of North Eastern parts of India. A numbers of *Garcinia* species flourish well in evergreen forests but some thrive in areas with relatively low rainfall (Sharma et al., 1993). *Garcinia* L. commonly known as 'thekera' by Assamese people have rich traditional uses in this region like *Garcinia pedunculata* commonly known as borthekera is used for local consumption. The old dried fruits are good for dysentery, digestive and cooling (Baruah and Borthakur, 2012). Ripe fruit of *Garcinia xanthochymus* (Tepor-tenga) are eaten raw or cooked with other vegetables by the people of Dhubri district of Assam (Baishya et al., 2013). The local people from Kolhapur district, India used *Garcinia indica* as a good remedy against dysentery and mucus diarrheal (Jadhav et al., 2011).

## 2. Materials and Methods

### *2.1. Selection of district*

The state Assam comprises of 27 districts. Among the districts, Jorhat, Golaghat, Sibsagar, Dibrugarh and Nagaon districts are purposively selected for the ethnobotanical study. The study was conducted during the year 2012–14.

### 2.2. Tools and techniques of data collection

The main tool used for collecting data from the respondent was a schedule. The data were collected personally through interview method in the residence of the respondents. After establishing rapport, the basic aim and objectives of the study were explained to the respondent and data were collected with the help of the questions contained in the schedule by face to face interview method. Effort was made to clarify the respondents on the subject.

### 2.3. Analysis and interpretation

The collected data were properly tabulated and analyzed in light of the objectives of the present study. The frequency distribution and percentage were used in the study to analyse the data and draw conclusion.

### 2.4. Frequency distribution

It was a fraction expressed with 100 as its denomination. It was used to any set of data for comparison. A percentage is determined by dividing a part of a sum of frequencies by the sum of frequencies and multiplies by hundred (100) as shown below:

$$\text{Percentage (\%)} = \frac{X}{N} \times 100$$

Where, X=A part of sum of frequencies.

N=Sum of frequencies

## 3. Results and Discussion

The study revealed that the *Garcinia* species are perennial in nature and they are grown in all the surveyed area. However, plant population of *Garcinia xanthochymus* is minimum than other species. In all the district majority of people use fruits of *Garcinia pedunculata, Garcinia cowa, Garcinia lancofolia* and *Garcinia xanthochymus* than the seed, leaf and Bark (Table 1). However, 100% people from the entire district use only the fruit of *Garcinia lancefolia* and 100% people from Dibrugarh district use the fruit of *Garcinia xanthochymus* for preparation of soft drinks. Whereas 80% people from Sivasagar and Nagaon district used fruits of *Garcinia cowa* and 80% people from Nagaon district used fruits of *Garcinia xanthochymus*. It was observed that only 40% people from Jorhat district used fruits of *Garcinia pedunculata* and 30% people from Golaghat district used seeds of *Garcinia pedunculata* for medicinal purpose. It was also observed that 25% respondents from Jorhat, 20% people from Nagaon and Sivasagar and 15% respondents from Golaghat district used leaf of *Garcinia xanthochymus* as medicine and no respondents use leaf of *Garcinia lanceaefolia* as medicine. In the Sivasagar, Jorhat, Golaghat and Nagaon district 20% people use bark of *Garcinia pedunculata* mainly as a source of medicine.

The data revealed that the four species of *Garcinia* (*Garcinia pedunculata, Garcinia cowa, Garcinia lanceaefolia* and *Garcinia xanthochymus*) were generally used as medicine, wood and fodder by the people of the five selected district (Table 2). It was observed that about 55%, 75%, 100% and 85% people from Dibrugarh district and 50% and 60% people from Sivasagar and Golaghat district use these four species of *Garcinia* as a source of medicine to cure dysentery and diarrheal. The people of all five districts mentioned that infusion of dry pericarp of *Garcinia cowa* and *Garcinia pedunculata* is used for curing diarrheal, dysentery and flatulence. The fruits of *Garcina pedunculata* were effective to cure jaundice and the leaves of *Garcinia lanceaefolia* is used as vegetables and sometimes people are using the trunk and leaf of the fruit plants as wood and fodder respectively. It was recorded that the wood of *Garcinia xanthochymus* is used for making furniture and mostly for making traditional rice mill 'Dheki'. Few people are using the wood of *Garcinia pedunculata* for making bed, chairs and tables for their use and the latex of *Garcinia xanthochymus* is used as a lubricant

Table 1: Frequency percentage of respondents on account of the plant parts use

| Districts | Fruit (%) | | | | Seed (%) | | | | Leaf (%) | | | | Bark (%) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *G. pedunculata* | *G. cowa* | *G. lancefolia* | *G. xanthochymus* | *G. pedunculata* | *G. cowa* | *G. lancefolia* | *G. xanthochymus* | *G. pedunculata* | *G. cowa* | *G. lancefolia* | *G. xanthochymus* | *G. pedunculata* | *G. cowa* | *G. lancefolia* | *G. xanthochymus* |
| Dibrugarh | 75 | 65 | 100 | 100 | 25 | 10 | 0 | 0 | 0 | 15 | 0 | 0 | 0 | 25 | 0 | 0 |
| Sivsagar | 65 | 80 | 100 | 65 | 15 | 15 | 0 | 0 | 0 | 0 | 0 | 20 | 20 | 5 | 0 | 15 |
| Jorhat | 40 | 75 | 100 | 70 | 0 | 25 | 0 | 0 | 40 | 0 | 0 | 25 | 20 | 0 | 0 | 15 |
| Golaghat | 50 | 70 | 100 | 75 | 30 | 20 | 0 | 0 | 0 | 0 | 0 | 15 | 20 | 10 | 0 | 10 |
| Nagaon | 55 | 80 | 100 | 80 | 20 | 20 | 0 | 0 | 0 | 0 | 0 | 20 | 25 | 0 | 0 | 0 |

Table 2: Frequency percentage of respondents on account of method of use and frequency of use of plants

| Districts | Plant use | | | | | | | | | | | | Frequency of use of the plant | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Medicine | | | | Wood | | | | Fodder | | | | Daily | | | | Weekly | | | | Occasionally | | | |
| | *Garcinia pedunculata* | *Garcinia cowa* | *Garcinia lanceaefolia* | *Garcinia xanthochymus* | *Garcinia pedunculata* | *Garcinia cowa* | *Garcinia lanceaefolia* | *Garcinia xanthochymus* | *Garcinia pedunculata* | *Garcinia cowa* | *Garcinia lanceaefolia* | *Garcinia xanthochymus* | *Garcinia pedunculata* | *Garcinia cowa* | *Garcinia lanceaefolia* | *Garcinia xanthochymus* | *Garcinia pedunculata* | *Garcinia cowa* | *Garcinia lanceaefolia* | *Garcinia xanthochymus* | *Garcinia pedunculata* | *Garcinia cowa* | *Garcinia lanceaefolia* | *Garcinia xanthochymus* |
| Dibrugarh | 55 | 75 | 100 | 85 | 15 | 10 | 0 | 0 | 25 | 15 | 0 | 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | 100 | 100 |
| Sivsagar | 50 | 80 | 85 | 80 | 10 | 20 | 15 | 10 | 25 | 0 | 0 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 100 | 100 | 100 |
| Jorhat | 55 | 80 | 80 | 75 | 25 | 10 | 10 | 20 | 20 | 10 | 10 | 10 | 0 | 0 | 0 | 0 | 30 | 25 | 10 | 0 | 70 | 75 | 90 | 100 |
| Golaghat | 60 | 90 | 100 | 75 | 25 | 10 | 0 | 25 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 30 | 30 | 10 | 5 | 70 | 70 | 90 | 95 |
| Nagaon | 55 | 85 | 80 | 85 | 25 | 26 | 10 | 10 | 20 | 0 | 10 | 5 | 0 | 0 | 0 | 0 | 35 | 30 | 20 | 25 | 65 | 70 | 80 | 75 |

during weaving. Table 2 revealed that the *Garcinia* plants and plant parts occasionally used by the people. However 100% people from Dibrugarh and Sivasagar district used the *Garcinia* species occasionally. While, only 10% respondents from Jorhat and Golaghat district use *Garcinia lanceaefolia* weekly. The study also revealed that there was variation between the species regarding the method of use of fruit plant (Table 3). Majority of respondents from all the districts kept *Garcinia pedunculata* and *Garcinia cowa* fruits in preserved from. About 100 and 65% respondent from Jorhat, 90 and 60% respondents from Nagaon and 80 and 75% respondents from Sivasagar district use *Garcinia pedunculata* and *Garcinia cowa* as preserved form respectively. Generally the ripe fruits are sliced in to small pieces and sun dried and then preserved alone or mixed with mustard oil. Whereas fruits of *Garcinia lanceaefolia* and *Garcinia xanthochymus* were mostly used as processed food for preparation of pickles jam, squash and jelly.

About 100% respondents from all the districts believed to grow these *Garcinia* species in the backyard garden as semi-wild plant (Table 3). So far as the propagation techniques is concerned 100% respondent from Dibrugarh, Sivasagar, Jorhat and Golaghat district and 70% respondents from Nagaon district propagate this plants from seeds only and very few people know about the vegetative method of propagation like cutting and air layering of these plants (Table 4 ). From the study it was observed that 100% respondents from all the districts also believed that these four species of *Garcinia* is indigenous to Assam (Table 4). The method and purpose of

Table 3: Frequency percentage of respondents on account of method of use and status of the plant

| Districts | Method of use | | | | | | | | | | | | Status of the plant | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Table purpose | | | | Preserved | | | | Processed | | | | Backyard | | | | Small holding | | | |
| | *Garcinia pedunculata* | *Garcinia cowa* | *Garcinia lanceaefolia* | *Garcinia xanthochymus* | *Garcinia pedunculata* | *Garcinia cowa* | *Garcinia lanceaefolia* | *Garcinia xanthochymus* | *Garcinia pedunculata* | *Garcinia cowa* | *Garcinia lanceaefolia* | *Garcinia xanthochymus* | *Garcinia pedunculata* | *Garcinia cowa* | *Garcinia lanceaefolia* | *Garcinia xanthochymus* | *Garcinia pedunculata* | *Garcinia cowa* | *Garcinia lanceaefolia* | *Garcinia xanthochymus* |
| Dibrugarh | 20 | 0 | 25 | 30 | 55 | 70 | 25 | 20 | 35 | 30 | 50 | 50 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| Sivsagar | 0 | 0 | 30 | 35 | 75 | 80 | 0 | 0 | 25 | 20 | 70 | 65 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| Jorhat | 0 | 0 | 25 | 25 | 65 | 100 | 30 | 10 | 35 | 0 | 45 | 65 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| Golaghat | 0 | 0 | 35 | 15 | 65 | 85 | 40 | 20 | 5 | 15 | 25 | 65 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| Nagaon | 0 | 0 | 30 | 20 | 60 | 90 | 40 | 30 | 40 | 10 | 40 | 50 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |

Table 4: Frequency percentage of respondents on account of propagation method and history of plant

| Districts | Propagation method | | | | | | | | History of the plant | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Seed | | | | Vegetative method | | | | Indigenous | | | | Introduced | | | |
| | *Garcinia pedunculata* | *Garcinia cowa* | *Garcinia lanceaefolia* | *Garcinia xanthochymus* | *Garcinia pedunculata* | *Garcinia cowa* | *Garcinia lanceaefolia* | *Garcinia xanthochymus* | *Garcinia pedunculata* | *Garcinia cowa* | *Garcinia lanceaefolia* | *Garcinia xanthochymus* | *Garcinia pedunculata* | *Garcinia cowa* | *Garcinia lanceaefolia* | *Garcinia xanthochymus* |
| Dibrugarh | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| Sivsagar | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| Jorhat | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| Golaghat | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| Nagaon | 70 | 100 | 100 | 100 | 30 | 0 | 0 | 0 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |

use and propagation techniques etc. are became a tradition since last past of 19th century which claims that these *Garcinia* species seems to indigenous to Assam.

The ethno-botanical survey indicated that local people or people of Assam had knowledge about *Garcinia* species (*G. pedunculata, G. cowa, G. lanceaefolia* and *G. xanthochymus*) and they were known for their edible fruits and medicinal properties. It is commonly known as 'Thekera' in Assamese and Assamese people have rich traditional uses of these fruits as medicine and in some social customs. The fruits of all four species of *Garcinia* (i.e. *G. pedunculata, G. lanceaefolia, G. cowa* and *G. xanthochymus*) have digestive and anti-dysenteric properties (Barukial and Sarmah, 2011). They are also effective for diarrheal and jaundice (Buragohain, 2011).

## 4. Conclusion

Fruits of *Garcinia* species are mostly used as a source of medicine by the local people of Assam. Though the fruits are known by the people but awareness of *Garcinia* as a fruit and good chemical content is limited. As the fruits are sour in taste, they are mostly consumed as preserved and processed form. Therefore from the study, it can be concluded that these *Garcinia* species could be used to enrich diet formulations and nutraceuticals.

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