

Ethnomedicinal study of the genus *Garcinia* (Clusiaceae) species used by different communities and tribes of Assam

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Abstract- The current research aims to prove and provide a comparative analysis of the ethnomedicinal uses of the *Garcinia* species by different communities and tribes in Assam. The ethnobotanical data were gathered through semi-structured interviews with local informants and analysed using quantitative indices, including Frequency of Citation, Use Value, and Informant Consensus Factor. Four species of *Garcinia*, such as “*G. pedunculata*, *G. lanceifolia*, *G. cowa*, and *G. Morella*”, were noted to be significant medicinal plants, with *G. pedunculata* demonstrating the greatest ethnomedicinal importance, especially towards the treatment of gastrointestinal diseases. The level of consensus was high, indicating strong agreement among informants on the therapeutic applications and validating the reliability of traditional knowledge. A competitive analysis of previous research shows common and local uses of the *Garcinia* species and suggests their pharmacological research value. The paper concludes that the sustainable use and conservation of Indigenous healthcare practices rely on documentation, conservation, and scientific validation of these traditionally used species.

Keywords: Ethnomedicine; Indigenous knowledge; *Garcinia* genus; Ethnomedicine; Assam; Use Value; Informant Consensus Factor.

I. INTRODUCTION

India is known as one of the most diverse countries in the world, with varied climatic conditions, a wide range of ecosystems, and a rich cultural

heritage [1]. The Northeast India, especially the state of Assam, is one of the country's biodiversity hotspots, boasting an amazing floral and faunal variety [2]. The area is typified by tropical and subtropical forests, which harbour many medicinally valuable plant species [3]. Assam also hosts many Indigenous peoples and tribes who have rich traditional knowledge of using plants for food, medicine, and even for practices in their lives [4]. This traditional ethnomedical wisdom, which is passed down orally across generations, is a key to primary healthcare systems (primarily in rural and forest-dwelling communities) [5]. A significant part of Assamese flora, the genus *Garcinia* is well-known for its numerous traditional uses. This study documented the ethnobotanical significance of the genus *Garcinia* in this area to preserve this knowledge [6]. Twelve species and one variant of the genus are native to Assam, according to the study. *Garcinia L.* is the genus of the family *Clusiaceae (Guttiferae)*, which is a collection of evergreen trees and shrubs, and is mainly found in tropical parts of the world. There are over 400 species of the genus worldwide, but they are concentrated in Southeast Asia, India, Sri Lanka, and Africa [7]. In India, some 33 species and several varieties of *Garcinia* are reported, many of which are found in the northeastern area. “*Garcinia pedunculata*, *Garcinia cowa*, *Garcinia lanceifolia*, *Garcinia morella* and *Garcinia xanthochymus*” among others are among the important species found in Assam, and it is commonly used by the locals as medicine, food, and even cultural capital [8].

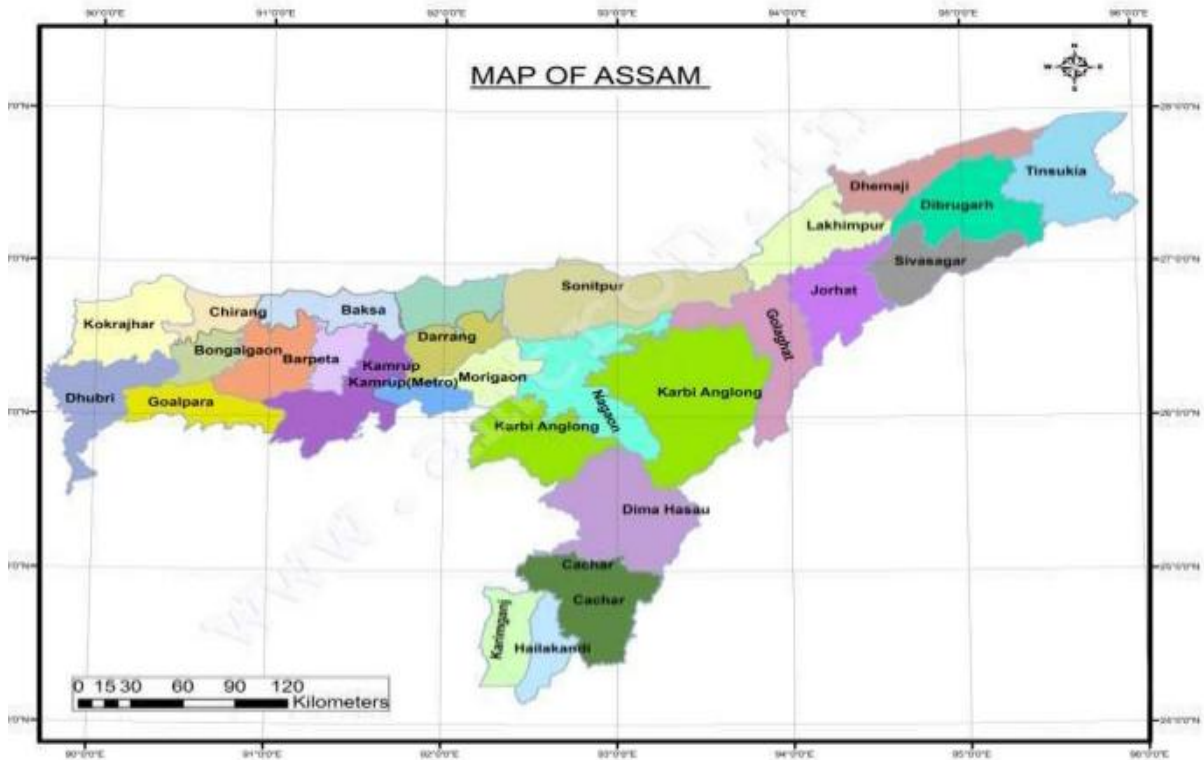


Fig.1: Map of Assam [6]

Historically, various components of genus *Garcinia*, the fruits, rinds and seeds, leaves, the bark, and the latex have been used widely in native medical practices [9]. These body parts serve in the management of other diseases, such as gastrointestinal diseases, dysentery, diarrhoea, stomach aches, fever, skin diseases, inflammations, and metabolic diseases [10]. Besides their

medicinal significance, the species of the genus *Garcinia* are appreciated for their nutritional or culinary value, especially for souring traditional Assamese cuisine [11]. The two-fold purpose of *Garcinia* as a medicinal and a food crop underscores its important role in maintaining the health and livelihood of the native people [12].



Fig.2: *Garcinia pedunculata* Roxb evergreen tree with fruiting stage [6]

Phytochemically, the species of genus *Garcinia* are believed to be good sources of biologically active compounds, including “xanthenes, flavonoids, benzophenones, organic acids, and hydroxycitric

acid (HCA)” [13]. These secondary metabolites have also drawn much scientific interest because of their various pharmacological effects, such as “antioxidant, antimicrobial, antiviral, antidiabetic,

antiobese” as well as anticancer effects [14]. Nonetheless, although there is increasing interest in the pharmacological prospects of *Garcinia*, much historical ethnomedicinal information on these species has not been well documented, especially at the community and village levels [15]. Ethnomedicinal research is an important connection between ancient knowledge and contemporary scientific investigations [16]. Recording of Indigenous practices not only aids in the preservation of valuable cultural heritage but also forms a basis of future pharmacological, phytochemical, and conservation-oriented research [17]. In Assam, the result of the speedy socio-economic transformations, deforestation, habitat degradation, and modernization is a great threat to both medicinal plant diversity and traditional knowledge systems. With the passing of the older healers and carriers of the knowledge, the chances of losing unrecorded ethnomedicinal information are higher [18].

Thus, a systematized ethnomedicinal investigation of the genus *Garcinia* used by various communities and tribes of Assam is necessary to document the traditional therapeutic applications, preparations used, parts of the plants used and usage patterns [19]. These records can help preserve the genetic resources of plants, certify traditional medicine,

and discover bioactive substances in the discovery of drugs [20]. This paper intends to show the ethnomedicinal significance of the *Garcinia* species in Assam and why there is a need to combine traditional knowledge with scientific studies to ensure sustainable use and conservation of these useful medicinal plants [21].

Flavonoids, organic acids, and other nutrients are abundant in the flavourful fruit *Garcinia*. The fruits of the genus *Garcinia L.* contain hydroxy citric acid (HCA), a possible weight-management and anti-obesity supplement [22]. The genus *Garcinia* is one of the many fruit varieties found in the Indian state of Assam [23]. Documenting a genus's untapped potential and gathering fragmented data serve as inspiration for conservation and propagation strategies [24]. The demands of many ethnic communities have shaped *Garcinia*-based local knowledge (e.g., as an edible fruit, medicine, wood, ornamental plant, and extracting oil, etc.) [7]. Study piece has expressed a desire to update Indigenous knowledge with contemporary molecular science; this is another goal of the current paper. Future innovation is aided by the common data on field distribution, anticipated usage intensities, possible distribution prediction, and the art of conventional management [25].



Fig.3: *G. pedunculata Roxb* sun-dried slices for preservation [6]

Members of the genus *Garcinia* have antibacterial properties and are highly prized medicinal herbs [26]. About 200 species in the genus are indigenous to South Asia, which includes Indonesia, Peninsular Malaysia, and the southern portion of Thailand dispersed throughout the region of Southeast Asia 15 of the 35 species are found in Northeast India [27]. 9 species from undivided Assam were reported, 8 species from the Assamese district of Sonitpur were identified. Certain *Garcinia* species are grown for its therapeutic qualities [28].

Thai traditional medicine uses the latex of “*Garcinia cowa* (GC)” as an anti-fever medication. In traditional medicine, *Garcinia* members utilized it as postpartum therapy, for menstruation issues, fever, and diarrhea [29]. It is also noted that certain species may be able to treat HIV and cancer. Although there is currently no adequate research or investigation on the topic, Assamese people have a hearsay belief that “Gastrointestinal Disorder GD” can be healed by consuming *Garcinia* species [29]. Therefore, it is therefore imperative to conduct a

thorough investigation of the usage of garcinia species for the treatment of GDs and other conditions. There are several varieties of garcinia species in Assam, but it is not widespread outside of GP [30]. Apart from GP, the other species of garcinia are rarely found across Assam, primarily in the hilly regions. Even though GP fruit is useful, Assamese rural residents continue to grow the plant, albeit not in a methodical way [31]. It is impossible to rule out the potential of the species going extinct soon if appropriate steps are not made to conserve it. The study also aims to emphasize the opinions of some rural residents in this regard [32].

1.1. The Assamese Ethnobotanical Practices

In Assam, the fruits of the garcinia are included in the harvest festival, known as Bihu, and the cattle are fed on them as a custom. Fermented beverages made of the *Garcinia* fruits are also popular in the southern Indian state [33]. These species are cultivated and utilised in many ways, including construction materials, energy, and cooking and traditional medicine [34]. *G. pedunculata* is highly prized due to its edible fruits and the young leaves of such species as “*G. anomala*, *G. pedunculata*, and *G. paniculata*” are eaten by the local people as cooked vegetables [7]. *G. cowa* latex is also used in Thai traditional medicine as an antifever. Some of the several tribes of Assam, which have a long history of using *Garcinia* species as a form of medicine, include the “Bodos, Rabhas, Misings, Karbis, and Sonowal Kacharis” [35]. To cure skin ailments and digestion ills, such traditional purposes often involve concoctions made using the

fruit rind or consumption of dried slices of fruits [36]. *G. morella* is much treasured in its use to treat intestinal and stomach diseases. *Garcinia* is the focus of local Assamese healers and herbalists, who know both about the medicinal properties of the plant, but these have never been documented and have instead been transmitted orally over the ages [37].

1.2. Traditional Knowledge and Therapeutic Applications

The research has reported that there is a vast understanding of the medicinal effects of the *Garcinia* species among the tribal and local communities namely “Naga, Manipuri, Bodo, Sonowal, Kachari, Mishing, Ahom and Chutia” [38]. A general trend appeared between the 150 respondents aged in between 39 to 80, which revealed the regular use of the genus *Garcinia* species to treat gastrointestinal issues like diarrhoea, amoebiasis, acidity and bowel irregularities [39]. The most widely used species was found to be *Garcinia morella* which is a species with a good reputation in the treatment of acute digestive disorders and urinary infections [40]. *Garcinia pedunculata* was also commonly known to be used in treatment of bronchial disorders, chronic cough, and high levels of blood sugar [41]. *Garcinia lanceifolia* was used less frequently in medicine but was used in the treatment of blood pressure and diarrhoea [42]. Also, gastrointestinal application was the focus with the use of the latex of *G. cowa* and *G. morella* being observed to help in treatment of menstrual discomforts and fever [43].



Fig.4: Assam tradition with *Garcinia*

1.3. Research objectives

- The study objective is to record and study the ethnomedical applications of genus *Garcinia* (*Clusiaceae*) species amongst various communities and tribes in Assam to conserve indigenous information and to find their future pharmacological use.
- To determine the species of *Garcinia* that is being used by different communities and tribal groups in Assam traditionally.
- To record the medicinally useful parts of the plants (fruits, leaves, bark, seeds, latex, etc.) used.
- To document traditional knowledge, one associated with medicinal uses such as preparation method, dosage, and treated ailment.
- To examine the trends of consumption in various communities and tribes, it is important to indicate the socio-cultural significance of these plants.

II. REVIEW OF LITERATURE

Sarma & Devi (2015) has examined on the gastrointestinal disorders (GDs) have been a major concern, particularly in rural areas of developing nations. Tribal people, a primitive Indigenous group, make up most of the population in rural Assam. Most of them are also socioeconomically disadvantaged. These folks have historically used natural medicine rather than allopathic medications to treat a variety of illnesses. In this work, attempted to scientifically list the traditional therapeutic use of the fruit *Garcinia pedunculata* Roxb (Family: *Clusiaceae*). GP are found in six distinct Assamese areas in northeastern India. A semi-structured and open-ended questionnaire was created and given to several groups of people. A total of 2,600 samples were randomly selected from six Assamese districts for the study. Of those, 1,967 persons (75%) utilize GP fruit and believe it can treat jaundice, diarrhea, and dysentery. The popularity of GP for treating GDs, its spread across Assamese districts and its gradual extinction owing to numerous threats are some of the significant facts revealed by the current study [44].

Hazarika & Lalnunsangi (2019) has investigated on the fruit weight, fruit length, fruit diameter, fruit volume, pulp weight, peel weight, pulp: peel ratio,

seed weight, seed length, seed diameter, number of seeds, TSS, acidity, ascorbic acid, reducing sugars, and total sugars were all measured on the ripe fruits of 25 chosen accessions. The weights of the individual fruits ranged from 31.90 to 105.47 g, the fruit volume was 25.53 to 95.40 cm³, the seed weight was 12.98 to 46.98 g, the peel weight was 1.45 to 4.96 g, and the pulp weight was 12.69 to 53.88 g. The fruits' chemical characteristics also varied greatly. Total sugars ranged from 5.00 to 6.86%, reducing sugar ranged from 2.57 to 4.16%, ascorbic acid ranged from 42.03 to 49.34 mg/100 g, titratable acidity ranged from 3.27 to 5.72%, and TSS ranged from 5.29 to 8.64%. “MZU-HAMP-GC-1, MZU-HAMP-GC-2, and MZU-HAMP-GC-10” can be regarded as elite *G. lanceifolia* Roxb, accessions for use in next breeding programs based on the findings of the current study [45].

Ngernsaengsaruy (2022) has conducted the study on, three names “*Garcinia gracilis*, *Garcinia lanceifolia*, and *Garcinia planchoni*” are lectotyped, and a new synonym for *Garcinia pedunculata*, *Garcinia planchonii* is introduced. Along with details on range, specimens analyzed, habitats and ecology, IUCN conservation status, phenology, etymology, colloquial names, and uses, this section describes and illustrates three species: “*G. atroviridis*, *G. lanceifolia*, and *G. pedunculata*.” The characteristics of the *Garcinia* section *Brindonia* include stamens in a single central mass, column, or ring (*Garcinia atroviridis*); anthers that are two thecae (of four pollen sacs); a stigma that is typically fully divided into the same number of rays as the ovary's papillate locules; four sepals and four petals; and the absence of a pistillode (except in *Garcinia atroviridis* and *G. pedunculata*). This is one of the most well-known sections since several species “(such as *G. atroviridis*, *G. cowa*, *G. lanceifolia*, *G. pedunculata*, and *G. schomburgkiana*)” are grown for their tasty fruits. The flowers, young leaves and shoots, and fruits are all edible and sour [46].

Yogom BT et al., (2023) has examined the bitter kola tree (*Garcinia kola*, *Clusiaceae*), a kind of African medicinal tree native to *Guineo-Congolian* rain forests, is the subject of this study. Calculated the number of chromosomes and the size of each species' genome are found. Given its comparatively large genome size (2C = 25.5 to 28.5 picograms) and approximately 170 chromosomes, the species is most likely hexaploid. Across a north-south axis, three intra-specific gene pools were found in wild

populations. This genetic differentiation pattern shows some similarities to patterns previously noted in other tree species from the area, indicating that the demography of forest trees has been similarly impacted by a common mechanism, maybe past-climatic oscillations. There was no genetic differentiation between wild and farmed populations ($GST = 0.017$), and cultivated populations lacked geographic organization. It was challenging to understand the species' history of cultivation [47].

Gaudeul et al., (2024) has performed molecular phylogenetic analyses utilizing DNA sequence data for three chloroplast intergenic spacers “(psbM-trnD, trnQ-rps16, and rps16-trnK)” on a subset of the total sampling and for the nuclear ITS region on all samples. With 111 biogeographically and physically diverse *Garcinia* species, phylogenetic investigations are the most thorough yet for the genus. *Garcinia*, comprising several previously divided genera such as “(*Allanblackia*, *Clusianthemum*, *Ochrocarpos* *p.p.*, *Pentaphalangium*, *Rheedia*, and *Tripetalum*),” is supported. Listed representative species, noted geographic distribution, compared the taxonomic treatment with the most recent sectional treatment, discussed each clade, gave them sectional names, talked about their distinctive morphological characteristics, and highlighted some issues that warrant further research. There are three new lectotypes, four new names, and nine new nomenclatural combinations. The phylogenetic analyses included multiple repetitions for each of the 10 endemic species found in New Caledonia (NC) (except for *G. virgata* and *G. urceolata*, which are represented by a single accession each) [48].

2.1. Research Gap

The literature review indicates that research about the genus *Garcinia* has been carried out primarily on a species-by-species basis, fruit properties, taxonomy, and genetic variation. Assam has very few ethnomedicinal studies but mostly based on *Garcinia pedunculata*, where gastrointestinal disorders were the main concern. There are no exhaustive and comparative documentations of ethnomedicinal uses of various species of *Garcinia* in various communities and tribes in Assam. Besides, the traditional information about plant parts applied, their preparation techniques, and practices unique to the communities is still elusive and under-documented. So, there is need to conduct

systematic ethnomedicinal research into the *Garcinia* species of Assam, to conserve the local knowledge and facilitate future pharmacological and conservation studies.

III. METHODOLOGY

3.1. Study Area

The current ethnomedicinal research was carried out in some chosen districts of Assam, Northeast India, which embodied various agroclimatic areas and high forest cover. The region where the project is located has several Indigenous communities and tribal groups who depend on the traditional healthcare systems based on plants.

3.2. Sample Size and Population of the Study

The participants of the study were the local healers, old members of the population, and knowledgeable individuals that actively use or administer the traditional medicines prepared using *Garcinia* species. Purposive sampling was done to select 35 respondents who were of various communities and tribes.

3.3. Selection of Study Sites and Informants

Villages were chosen according to the availability of *Garcinia* plants and availability of experienced traditional healers, old people, and practitioners in the village. The purposive and random sampling was used to select informants with options of tribal healers, elderly villagers, and people who had experience in traditional medicine.

3.4. Participant Selection

The participants were selected on a purposeful basis in relation to their traditional knowledge and experience with *Garcinia* species. The selection criteria were:

- Persons between the ages of 39 to 80 years with a vast knowledge of traditional medical practices.
- Local healers, aged individuals in the community and general inhabitants who had utilized the *Garcinia* species in a medicinal way or had heard of how it was utilized.
- It included the representatives of various tribal groups, including “Naga, Manipuri, Bodo, Sonowal, Kachari, Mishing” and some well-known communities such as Ahom and Chutia.
- Overall, 150 respondents who represent various demographic groups and belong to

various communities participated in the survey.

3.5. Identification and Collection of Plants

Local informants aided the collection of plant specimens of *Garciniaceae* species in natural habitats and home gardens. The specimens obtained were identified by use of usual floras and taxonomic keys and voucher preparations made and preserved according to herbarium standards as a reference in the future.

3.6. Data Collection

Field survey, personal interview, and group discussion were used to gather ethnomedicinal information on the use of semi-structured and open-ended questionnaires. The information was documented in the form of local plant names, parts of the plant used, illnesses treated, preparation style, administration route, and perceived efficacy. All the participants provided prior informed consent according to the ethical considerations.

3.7. Data Analysis

Data gathered was examined both qualitatively and quantitatively. Techniques included:

- Frequency of citation (FC): this is the number of respondents who cited a species about a particular ailment.
- Use Value (UV): to identify the relative significance of each species.
- Informant Consensus Factor (ICF): to determine the consensus of the respondents regarding the use of the plants on certain ailments.

IV. RESULTS

In the ethnomedicinal survey consisting of 35 respondents representing various communities and tribes in Assam, four major species of *Garcinia* were

found to be commonly used as traditional healthcare namely “*G. pedunculata*, *G. lanceifolia*, *G. cowa* and *G. Morella*”. The data were analysed qualitatively (the types of ailments treated, methods of preparation) and quantitatively (frequency of citation, value of use, factor of consensus of informants).

4.1. Qualitative Analysis

The survey indicated that fruits were the most utilized part of a plant (80% of the respondents used it), then leaves (50%), bark (30%), and seeds (20%). The fruits are also primarily applied in the gastrointestinal maladies like dysentery, diarrhea and indigestion. Poultices made using leaves and bark are used in treating skin infections, inflammation, and fever.

4.1.1. Methods of Preparation

The following methods of preparation were mentioned by the respondents:

- Juice or decoction: 60% of applications, primarily of gastrointestinal, hepatic diseases.
- Powder or paste: When in 250 uses, used on the skin to treat skin problems.
- Raw direct eating of ripe fruits: 15 percent of applications, as nutritional supplements.

4.1.2. Ailments Treated

The following were the major ailments that were identified by traditional healers and were treated using the species of *Garcinia*:

- Gastrointestinal disorders: 70 percent of the respondents.
- Fever and inflammation: 40%
- Skin infections: 30%
- Jaundice: 20%

Table 1: Plant Parts of *Garcinia* Species Used by Communities and Tribes of Assam

| Species | Local Name | Plant Part Used | Ailment Treated | Method of Preparation | Frequency of Use (No. of respondents) |
|-----------------------------|------------|-----------------|-------------------------------|-----------------------------|---------------------------------------|
| <i>Garcinia pedunculata</i> | Heorhati | Fruit | Dysentery, Diarrhea, Jaundice | Juice / Decoction | 28 |
| <i>Garcinia pedunculata</i> | Heorhati | Leaf | Skin infections, Inflammation | Paste / Poultice | 15 |
| <i>Garcinia lanceifolia</i> | Kowa | Fruit | Stomachache, Indigestion | Decoction / Raw consumption | 20 |

| | | | | | |
|-----------------------------|----------|-------|-------------------------|-------------------------|----|
| <i>Garcinia lanceifolia</i> | Kowa | Bark | Fever, Inflammation | Boiled decoction | 12 |
| <i>Garcinia cowa</i> | Kau | Fruit | Digestive disorders | Raw consumption / Juice | 15 |
| <i>Garcinia cowa</i> | Kau | Leaf | Wounds, Skin infections | Paste / Poultice | 10 |
| <i>Garcinia morella</i> | Bhatkowa | Fruit | Dysentery, Diarrhea | Juice / Raw consumption | 10 |
| <i>Garcinia morella</i> | Bhatkowa | Seed | Skin diseases | Powder / Paste | 5 |

Interpretation: The survey shows that fruits are the most frequently used part of *Garcinia* species, for gastrointestinal disorders. Leaves and bark are used for external ailments like skin infections and

inflammation, while seeds are used less commonly. This indicates a part-specific and ailment-specific traditional knowledge among communities in Assam.

4.2. Quantitative Analysis

4.2.1. Frequency of Citation (FC)

Table 2: The frequency of citation indicates the number of respondents who mentioned each species

| Species | Local Name | FC (out of 35) | % Citation |
|-----------------------------|------------|----------------|------------|
| <i>Garcinia pedunculata</i> | Heorhati | 28 | 80% |
| <i>Garcinia lanceifolia</i> | Kowa | 20 | 57% |
| <i>Garcinia cowa</i> | Kau | 15 | 43% |
| <i>Garcinia morella</i> | Bhatkowa | 10 | 29% |

Interpretation: *Garcinia pedunculata* has been cited most (80%), which shows that it is the most utilised and recognised species among the communities. *G. lanceifolia*, *G. cowa* and *G. morella* are characterised by lower citation rates, indicating

moderate to limited ethnomedicinal use. All the data taken out indicate that the traditional knowledge is species-specific, with *G. pedunculata* as the most important ethnomedicinal plant in Assam.

4.2.2. Use Value (UV)

Table 3: The Use Value (UV) was calculated as the number of uses reported per species divided by the total number of respondents

| Species | Total Uses Reported | Use Value (UV) |
|-----------------------------|---------------------|----------------|
| <i>Garcinia pedunculata</i> | 40 | 1.14 |
| <i>Garcinia lanceifolia</i> | 25 | 0.71 |
| <i>Garcinia cowa</i> | 18 | 0.51 |
| <i>Garcinia morella</i> | 12 | 0.34 |

Interpretation: *G. pedunculata* had the greatest ethnomedicinal value of all surveyed communities.

4.2.3. Informant Consensus Factor (ICF)

Table 4: ICF was used to assess agreement among respondents for specific ailment categories

| Ailment Category | Number of Use Reports (Nur) | Number of Species Used (Nt) | ICF = (Nur-Nt)/(Nur-1) |
|------------------|-----------------------------|-----------------------------|------------------------|
| | | | |

| | | | |
|----------------------------|----|---|------|
| Gastrointestinal disorders | 50 | 4 | 0.94 |
| Fever/Inflammation | 20 | 3 | 0.90 |
| Skin infections | 15 | 3 | 0.87 |
| Jaundice | 10 | 2 | 0.89 |

Interpretation: The high ICF (0.87-0.94) values were used to show that respondents were in a great agreement on the use of the *Garcinia* species in specific ailments; this was a form of confirming the reliability of the traditional knowledge.

V. DISCUSSION

The current ethnomedicinal study of the genus *Garcinia*, which is consumed by different communities and tribes in Assam, has shown a high degree of consistency with previous studies conducted across the region and internationally, alongside attaining new levels of comparative information at a community level. The performance of *Garcinia pedunculata* in the present study (FC = 80%; UV = 1.14) is in line with the results of (Sarma and Devi, 2015) who found that the reliance of gastrointestinal disorders relied on this species to be common in six districts of Assam. The two papers are consistent in the identification of the main symptoms to be treated, namely, diarrhoea, dysentery, and jaundice, which suggests the existence of a well-established and stable therapeutic culture related to *G. pedunculata* [44].

The moderate ethnomedicine prominence of *G. lanceifolia*, on the contrary (FC = 57%; UV = 0.71), corresponds to the physicochemical and nutritional profiling, as (Hazarika and Lalnunsangi, 2019) point out the biochemical richness and breeding potential of the latter, but not a broad range of medicinal use. This implies that the nutritional value of *G. lanceifolia* is important, but its medical use is not as important as *G. pedunculata* to Assamese communities [45]. The application of *G. cowa* and *G. morella* in the present study to treat fever, menstrual discomfort, skin infections, and digestive disorders is like the use of *G. cowa* latex in Thai traditional medicine as an antipyretic (Ngernsaengsaruy, 2022). Yet, in contrast to Southeast Asian settings, the Assamese use does not seem as geographically dispersible and diversified, which is probably explained by limited geographical distribution and decreasing

availability [46]. The bitter kola tree (*Garcinia kola*, *Clusiaceae*), a kind of African medicinal tree native to *Guineo-Congolian* rain forests, is the subject of this study. Calculated the number of chromosomes and the size of each species' genome are found. Given its comparatively large genome size ($2C = 25.5$ to 28.5 picograms) and approximately 170 chromosomes, the species is most likely hexaploid (Yogom BT et al., 2023) This genetic differentiation pattern shows some similarities to patterns previously noted in other tree species from the area, indicating that the demography of forest trees has been similarly impacted by a common mechanism, maybe past-climatic oscillations [47].

The comparative interpretation is also enhanced by quantitative indices. The great Informant Consensus Factor (ICF = 0.87 -0.94) among categories of ailments is consistent with findings in other international ethnobotanical research and shows consistency and uniformity of the conventional learning system. Contrasting agreement has been observed in both the molecular and phylogenetic literature (Gaudeul et al., 2024) on the finding that the ethnomedicinal importance in many cases is in line with the taxonomic and evolutionary stability in the genus [48]. The large values of the Informant Consensus Factor (ICF) per category of ailments indicate a good congruence among interviewees about the use of certain species of *Garcinia* to address a certain health issue. This high level of agreement does not only confirm the reliability of the gathered ethnomedicinal data but also indicates the therapeutic promise of the given species in future pharmacological research. The current study is more integrative and comparative using ethnomedicinal approaches in comparison to previously single-species or taxonomic studies, where emphasis is placed on community-level knowledge, quantitative validation, and interspecific variation. Moreover, the depletion of some species of the genus *Garcinia*, according to the informants, is of great concern with regards to exploitation and loss of habitats, and this is why conservation measures and sustainable use

protocols are urgently required. The previous studies were mainly single-species-based, taxonomic, or biochemical in nature, the current study offers a comparative and community-based ethnomedicinal synthesis of several species of *Garcinia*. This combined methodology is a bridge between traditional knowledge and scientific records as well as to emphasize the underused species that would need conservation efforts.

VI. CONCLUSION

The current ethnomedicinal study entails a thorough record and comparative analysis of traditionally used species of *Garcinia* by various communities and tribal groups of Assam, hence, adds up useful background information to the body of ethnobotany and Indigenous medicine research. This research demonstrates clearly that the best culturally important and therapeutically desirable species is the *Garcinia pedunculata* as indicated by the high Frequency of Citation and Use Value of this species especially in the treatment of gastrointestinal illnesses such as diarrhoea, dysentery, indigestion, jaundice, etc. The fact that the values of the Informant Consensus Factor remain consistently high across the disease categories further confirms reliability, uniformity, and further relevance of traditional systems of knowledge among the study populations. Comparative study with previous local and international research shows that ethnomedicinal practices are not entirely homogeneous but incorporate local differences in preferences of species and use in medicine; this indicates the adaptability of the Indigenous knowledge. In this respect, the paper highlights the extreme importance of combined conservation initiatives, sustainable harvesting mechanisms, and community-based management initiatives to safeguard the long-term existence of these useful plant resources. In general, the results are important to highlight that systematic description and scientific validation of ethnomedicinal knowledge not only reinforce biodiversity conservation but also form the basis of the creation of new plant-based therapeutic products, which supports the significance of indigenous wisdom conservation in the context of sustainable healthcare and future research developments.

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