Research Article

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Ethno-botanical study of plants used by *Kodava* tribes in Kodagu district of Karnataka

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Abstract

The ethnic knowledge on medicinal value of major plants *viz. Justicia wynaadensis, Remusatia vivipara,* and *Bambusa bambos* consumed by *Kodava* tribes in Kodagu District of Karnataka, India was carried out to preserve the herbal/medicinal plant wealth and their proper usage, as there is a decline in human expertise to identify and recognize various medicinal plants. Data were documented using conventional ethnobotanical methods such as interviews and discussion with local populace of *Kodava* tribals (headmen, healers, and elderly persons) of the study area using a semi-structured questionnaire comprising information about plants and their local names, plant parts used, time of usage, method of sample collection and preparation of dishes, their nutritional and their use in traditional folk medicines, and any other specific comments. The study indicated that *J. wynaadensis,* locally known as *Maddh toppu* or *Kurinji Toppu* or *Aati soppu,* undergoes a mysterious transformation in terms of chemical constituents during wet and dark months of the monsoon, which is responsible for its medicinal values. During *Kakkada padinet*, *Kodava* people consume *Maddu Payassa* prepared from *J. wynaadensis* and believe that it generates heat and stabilizes the body temperature, and thus gives resistance against fever and cold during monsoon season. The *R. vivipara* is known as *Mara Kesa,* is used in folk medicine to cure inflammation, arthritis, to dispel worms and germs for disinfecting the genito-urinary tract. The consumption of newly emerged bamboo shoots (*B.bambos*) along with mushrooms is said to balance the body temperatures during heavy rainy days. In summary, the participants of the study underlined that these underutilized vegetables, major components in traditional dishes, offer enhanced nutritional and medicinal values when consumed especially during the monsoon season.

Key words: Ethnic knowledge, Folk medicine, Inflammation, Kodava tribes, Leafy vegetables, Medicinal value.

The interaction between human societies, particularly, tribals and aboriginals who are considered as primitive human societies with their surrounding flora was the core objective in ethnobotanical studies. As the Indian subcontinent is flourished with rich biodiversity (Zeven and de Wet, 1982; Arora, 1988) and vast heritage of about 705 diverse ethnic groups in different states of the country (Mamo, 2021), it is considered one of the major sites with ethnobotanical wealth in the world and attracts many researchers and environmentalists throughout the world. In the Indian subcontinent, about 5000 tribal-based villages are covering about 15% of the total geographical area. Ethnic communities residing in a particular region solely depend on natural resources available around them for their food, shelter, and traditional medicine.

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Of the endemic species, 1,600 are in the Western Ghats alone (Tripathi *et al*., 2018). Documentation of traditional knowledge is considered vital in order to preserve the herbal/medicinal plant wealth and their proper usage, as there is a decline in human expertise to identify and recognize various medicinal plants. The documentation of wild edible plants of Andaman and Nicobar islands by tribal population is essential for conservation and effective utilization of these plant genetic resources in future (Sharma *et al*., 2020).Though, literature is available on these crops pertaining to their medicinal values, ethnic knowledge on crops are scanty. To address this issue, study was carried out to collect the traditional knowledge of these herbs/plants which are consumed as a vegetable and have plenty of medical values.

Materials and Methods

Kodagu (Coorg) occupies a prominent position in humid tropical belt of Western Ghats and is situated to the South West in Karnataka on 12°26'

N latitude,75°47' E longitude covering an area of 4104 km^2 and altitude of 1525 MSL with an average rainfall of 2718 mm and the average temperature of 13 - 26 °C. Kodagu falls in high precipitation zone with picturesque topography. Major part of the year consists of rainy season starting in June till the end of September. Even in the post monsoon months of October and November, certain parts of the district receive a significant amount of rainfall. The district comprises three taluks, *viz.,* Madikeri, Somwarpet and Virajpet. The survey work was carried out to study the ethno-botany of three nutritionally rich medicinally important leafy vegetables (*Justicia wynaadensis, Remusatia vivipara* and *Bambusa bambos)* used by Kodavas in all three taluks, to ascertain the medicinal importance and other valuable information. Kodavas are the people from old civilization living in Kodagu with distict culture, heritage and life style of their own.

Data were collected from the local populace of *Kodava* tribals (headmen, healers, and elderly persons) and the persons having a thorough knowledge of different plants. A field survey was conducted in three Taluks (Madikeri, Somwarpet, and Virajpet) of Kodagu where the *Kodava* tribal community resides. For the collection and augmentation of data, conventional ethnobotanical methods endorsed by Botanical Survey of India were followed. The information about the three selected crops ((*Justicia wynaadensis, Remusatia vivipara* and *Bambusa bambos)* was collected through conducting interviews and discussion with knowledgeable elder people of the study area using semi-structured questionnaire comprising the information about plants and their local names, plant parts used, time of usage, method of sample collection and preparation of dishes, their nutritional and their use in traditional folk medicines, and any other specific comments. The specimens were collected and identified by referring to a standard flora (Murthy and Yoganarasimhan, 1990).

Results and Discussion

Justicia wynaadensis

The plant *Justicia wynaadensis* is locally known as *Maddh toppu* or *Kurinji Toppu* in *Kodava* parlance and as *Aati soppu* in Kannada. *J. wynaadensis* was reported as endemic to the rainforest region of the Western Ghats and Coorg. They are commonly found in wild throughout the district and some grow at home. It is highly believed that the wet, dark months of the monsoon bring about a mysterious transformation in terms of chemical constituents in the plant. These leaves are said to be replete with 18 types of medicinal values.

Justica is a small climbing herb, with a slender stem 2-3 m long with distant nodes (Fig. 1a). Leaves are 5-10 cm long, elliptic-lance in shape, long-pointed, base narrow, with 6-8 pairs of veins and oppositely arranged. Leaf petiole is 1-2 cm long. Flowers are borne in pairs on drooping spikes 5-10 cm long (Fig. 1b). Bracts are ovate, 3-5 mm long. Sepals are linear, stamens are 2 with dilated filaments. Style is thread-like, with two-parted stigma. The plant flowers during December-February.

Fresh leaves (Fig. 1c) with stem collected during 17th day of the *kakkada* month (first week of August every year)

The leaves are plucked and soaked (some boil it) in

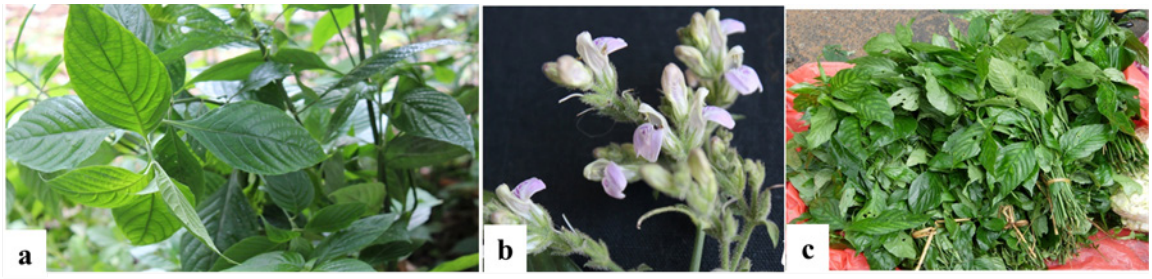

Fig. 1: (a) *Justicia wayanadensis* in Kodagu, Karnataka, India; (b) crop in flowering;(c) bundle of leaves sold in market of Madikeri, Kodagu, Karnataka

water overnight to extract the aromatic juice, which is thick and dark pinkish- violet in colour. Women make cakes or sweet porridge out of the mix, called "*Maddu Payasa,*" in households on the 18th day of the *Kakkada* month.

Collection of stem and leaves on the 17th day of kakkada month

(first week of August every year)

↓

Fill ¾th of a large vessel with the maddu thoppu (plucked stems and leaves) and soak with fresh water and cook on a very gentle heat for about 1 ½ to 2 hours

↓

the stem and leaves should be immersed in water at all times.

Keep the extract in the vessel overnight

↓

Strain and reserve the aromatic juice (extract), which is thick and dark pinkish- violet in colour and discard the stems and leaves

↓

The extract is used to prepare various dishes

("*Maddukuul*", which is simply rice cooked in to the extract,

"*Maddupayasa*", sweetened jaggery rice cooked into the extract,

"*Madduputtu*", an unsweetened rice cake prepared out of the extract

that is eaten with ghee and honey.)

Flow chart of preparation of delicious *Maddu Payasa*

In traditional functions of *Kakkada padinet*, local people mainly consume *Maddu Payassa* (Fig. 2.) prepared from *Maddh toppu*.

During the 18th Day of *Aati masa* (First week of August), Kodava people celebrate *Aati Padinema* (Dakshina Kannda) or *Kakkada Padinet* (Kodagu), which is the beginning of agricultural activities. On this particular day, people prepare a sweet and delicious

Fig. 2: Maddu payasa prepared from *aadi soppu (maddu soppu)*

dish from the leaves of *J. wynaadensis* and consume it.

A typical juice can be produced from all the parts of the plant *i.e* leaves, stems and twigs of *J. wynaadensis*. It generates heat and stabilizes the body temperature. This extract has the medicinal value, which gives resistance against fever and cold. Overnight preparation is given to the children at 5 o'clock in the early morning and it acts as deworming agent. *Aati soppu* has a great medicinal value in purifying blood as well. Person who is suffering from urinary tract infection is advised to consume one glass of the aati soppu juice, which helps in subsiding the infections. It is said that drinking *aati soppu* soup keeps urinary track clean *Kodavas* believe it as a herbal or ayurvedic tonic (Table 1). This traditional practice is believed to keep the people healthy throughout the year. Phyto-components presents in *J. wynaadensis* lend credence to its use by the local community as a plant with 'medicinal properties' and hold promise for the production of novel pharmaceuticals as well as a nutraceutical.

Remusatia vivipara

Remusatia vivipara (Roxb) Schott is an epiphytic species belongs to the family Araceae. It is one of the unexploited vegetable plants, used for its edible corms, stems and leaves. In India, it is distributed in the Himalayan region and the Western Ghats of central South India and Maharashtra region. In South India, it is commonly found in states of Kerala and Karnataka. In vernacular language it is known as *Mara Kesa*. The leaves and tubers are extensively used in folk medicine. This plant grows luxuriantly in the crevices and on tree tops (Fig. 3a,b) during monsoon season (June to September) .

Plants are small tuberous herbs, tuber up to 1 cm across, leaf solitary, 6-10 cm across, orbicular, peltate, membranous, rounded at apex, shallowly cordate at

Table 1. Traditional medicinal benefits of *Justicia wynaadensis* as described by *Kodavas*

Plant/herb	Habitat	Plant parts	Medicinal benefits
Justicia wynaadensis	Bushy shrub, shade loving	Leaves, stems and twigs Most effective on 18th day of *kakkada* month	• generates heat and stabilizes the body temperature • effective in treating cold, fever and headache • deworming agent • cleansing of the urinary track • blood purifier • restricted use for people suffering from gastric problem

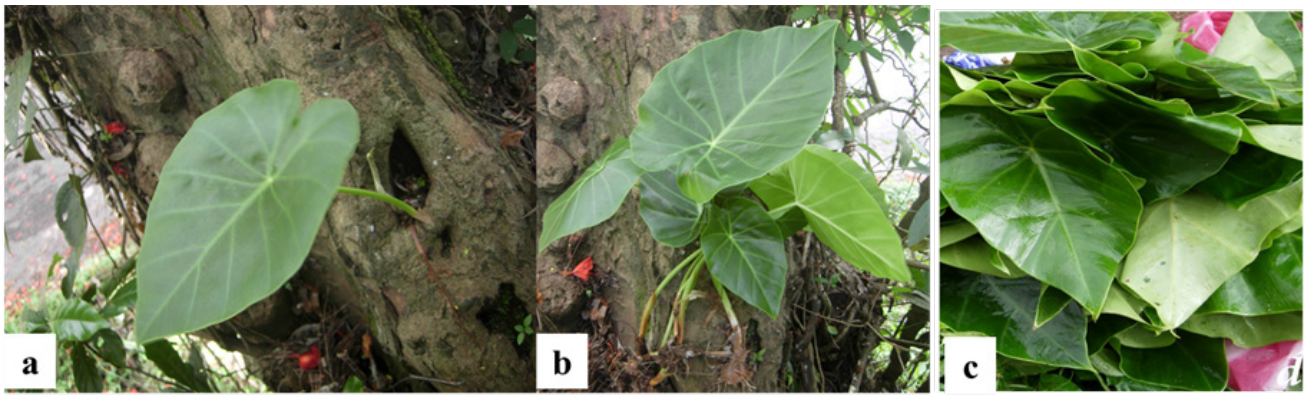

Fig. 3: (a, b) *Remusatia vivipara* grown in crevices on tree; (c) bundle of leaves sold in market of Madikeri, Kodagu, Karnataka

base, leaves dark green above and light green beneath, large arrowhead shaped leaves, petiole 6-11 cm long (Fig. 3c). Corms, stems and leaves are the edible parts.

Method of preparation

Usually the tender leaves are picked fresh for preparations. The strings from the stem are removed and cut it into small pieces for preparing dishes. Special types of dishes (*kaymbu* curry) are prepared out of its leaves and leaf petiole. Further, *Mara kaymbu* leaves are also used adjacent areas and favoured of patrode popular in Mangalorean and Konkani cuisine.

Leaves and tubers are the edible parts. It is consumed by the inhabitants of Kodagu as a source of food. It is rich in vitamins, sugars and quinines. The plant is used in folk medicine to cure inflammation, arthritis, to dispel worms and germs for disinfecting genito-urinary tract and for promoting conception, also used as an analgesic (Table 2). It has ayurvedic properties such as general debility and alleviating kapha and pitta. Apart from use as vegetable, the leaves are extensively used in local tribes for the treatment of inflammation, arthritis, analgesic, on the wound to dispel any worms and germs, for disinfecting genitourinary tract and for promoting conception, whooping cough and for the treatment of reddish boils.

Bambusa bambos

The edible bamboo shoot is locally called "*Watte baimbale*" (bamboo shoot) or *'Kanile'* and much loved and enjoyed delicacy of *Kodavas* during the monsoon season. Though most varieties of bamboo have edible shoots, the common ones in Kodagu is spiny or thorny bamboo (*Bambusa bambos* (Druce) / *B. arundinacea* (Retz.) Willd).

Bambusa bambos is a tall, bright-green colored spiny bamboo species, which grows in thickets consisting of a large number of heavily branched, closely growing culms (Fig. 4a). It grows up to the height of 10–35 m and is mainly distributed naturally in dry zones of forest. Each clump is characterized by stout and curved spined arms. They are bright green, turns brownish green upon drying, and the young shoots are deep purple. Internode length is 15–46 cm, and diameter is 3.0–20 cm. Culm walls are 2.5–5.0 cm thick. Nodes are prominent and rootstock is stout. Newly emerged shoot (Fig. 4b, 4c)

Newly emerged shoot are harvested from clumps during late May-August and processed by soaking in water for a minimum of 24 hours to get rid them of hydrocyanic acid. The shoots are then soaked in fresh water and allowed to undergo a light fermentation, which gives them an appealing tangy edge. Prepared shoots are eaten in curries and fries, pickled, or preserved in brine for later use. The slender shoots of watte baimbale

have a delicate, asparagus-like tenderness. They taste particularly good when cooked with minced meat. Tender bamboo shoot preparations are perfectly spiced for pairing with akki rottis and a touch of ghee

Time of use: During May-August, especially during the heavy rainy season.

According to the Kodava community, the consumption of bamboo shoots along with mushroom is said to balance the body temperatures during heavy rainy days. Consumption of dishes prepared out of bamboo shoots is preferred, when people fall sick to cold during monsoon season, and it is believed that these foods help to increase immunity. *Bambusa bambos* have been widely used in Indian folk medicine for anti-inflammatory, laxative, astringent, diuretic, anti-ulcer and anti-obesity activities (Table 3).

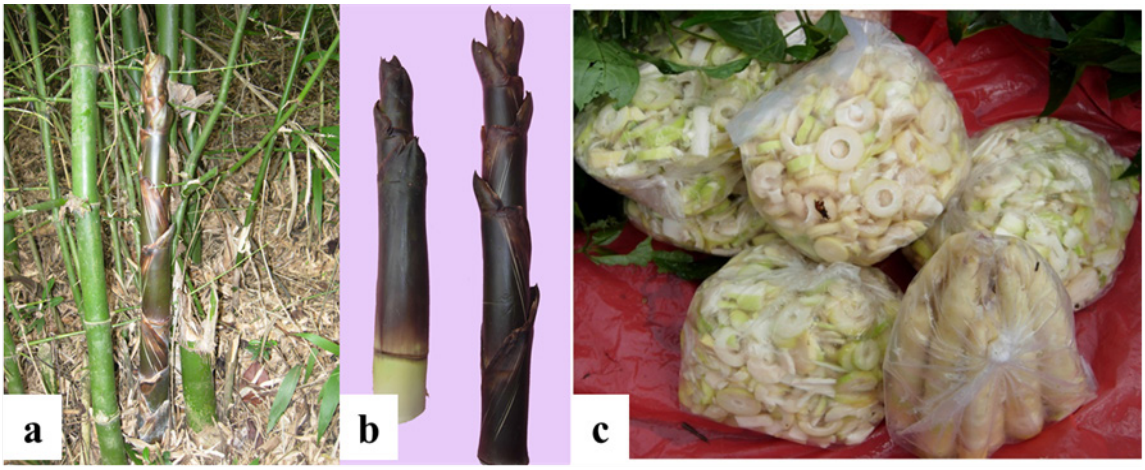

Fig. 4: (a) *Bambusa bambos*; (b) immature stems used as vegetable; (c) bundle of cut tender stems sold in market of Madikeri, Kodagu, Karnataka

Table 2: Traditional medicinal benefits of *Remusatia vivipara* as described by *Kodavas*

Plant/herb	Habitat	Plant parts	Medicinal benefits
Remusatia vivipara	Herb epiphytic species	Leaves and tubers	The leaves are extensively used in folk medicine for the treatment of • inflammation • arthritis • analgesic • on the wound to dispel any worms and germs • disinfecting genitourinary tract • conception • whooping cough • reddish boils The tubers are strongly poisonous but used externally to treat • breast mastitis • abscesses • ascariasis

Table 3: Traditional medicinal benefits of *Bambusa bambos* as described by *Kodavas*

Plant/herb	Habitat	Plant parts	Medicinal benefits
Bambusa bambos	Tree, tall, grows in thickets consisting closely growing culms	Newly emerged shoot	• balance the body temperatures during heavy rainy days • increase the overall immunity • anti-inflammatory • laxative • astringent • diuretic • anti-ulcer • anti-obesity activities.

Conclusion

This study revealed that knowledge on three leafy vegetable species is open to everybody, which helps to secure knowledge continuity and future development and conservation of plans. However, loss of indigenous knowledge on leafy vegetables may occur if the resources disappear from the landscape. Thus, documentation of traditional knowledge and conserve these wealth is important besides working towards minimizing the threatening factors for these species. Moreover, it is crucial to work towards developing technologies that increase the productivity of such crops with medicinal value considering farmers prioritized requirement.

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