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An Ethnobotanical Assessment of Medicinal Uses of Edible Plants in Malappuram District, Kerala, India

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ABSTRACT

Ethnobotanical investigation is essential for documenting and preserving the rapidly falling traditional knowledge of medicinal plants. The present study aims to document the traditional knowledge about medicinal uses of edible plants in Malappuram district, Kerala, India. Ethnomedicinal data was gathered from 16 informants of *Cholanaikkan* tribes in Nilambur forest through semi structured interview. A total of 42 edible plant species were mentioned by informants as medicinal. Fruits (44%) are the most preferably used plant part for herbal preparation. The study revealed that *Phyllanthus emblica* L. has the highest use value (UV=0.87), showing its significant use among the tribes. It is observed that the increasing significance of allopathic medicine and modernization caused many traditional practices to be at risk of being lost. A critical analysis of traditional knowledge concerning therapeutically important wild edible plants is urgently needed, to conserve this valuable cultural heritage and to potentially facilitate future advancements in drug discovery.

KEYWORDS: Ethnobotany; Wild edible plants; Traditional medicine; *Cholanaikkan* tribe; Malappuram district; Use value (UV)

INTRODUCTION

Traditional knowledge and biological resources provide similar responsibilities in practice, offering informative data and analysis (Laird S. A., 2010). An ethnobotanical study is essential for highlighting the significant plant species found in the area. These species could have a big impact on the pharmaceutical, agricultural, medical, and nutraceutical industries. Traditional knowledge documentation serves as the foundation for the creation of many modern medications. About 25% of modern medicine is thought to be derived from plants, and most of the allopathic medicine uses synthetic analogues to natural substances that have been identified from different plant species (Cox PA., 2000). Wild edible plants play an important role in folk traditions. However, the use of wild edible plants as food and medicine is the most significant and reliable reason for improved management of these species. Ethnobotanical research is therefore crucial for exploring new food sources and supplying raw materials for the development of new drugs (Msuya TS *et al*., 2010). The key decision made during malnutrition for survival is the invention of food plants, which has a big impact on nutrition for humans throughout the year (Deb D. *et al*., 2013). The Western Ghats zone in southern India is known for being a vast and hotspot for a variety of wild edible species because of its rich and varied soil, climate, and ongoing and interrupted new life (Nandini N. and Siddhamallayya N., 2014). The correlation between food and health is more critical than ever, and humans are looking for

natural, functional nourishment that are satisfying and obtained from reliable sources. Despite the emphasis on healthy eating traditional knowledge of wild edible plants used for centuries as both medicine and nutrition in various regions is rapidly fading. This decline is primarily because valuable information has only been passed down verbally between generations. To prevent this heritage from becoming extinct, the popular and beneficial usage of these plants must be adequately documented as soon as possible. The current study documented the ethnomedicinal knowledge of wild edible plants and quantitatively analyzed the data by use value, informant consent factor and fidelity level.

MATERIALS AND METHODS

The Malabar coastal plain is in Southern India, between the Western Ghats mountain range and the Arabian Sea. Nilambur, located in the eastern sector of the Malappuram district, is notable for its rich biodiversity and the existence of considerable tribal populations. This region under study is approximately within the geographical coordinates of 11°26'–11°9' N latitude and 75°48'–76°33' E longitude (Thomas *et al*., 2013). An ethnobotanical study was conducted in the forest regions of Nilambur taluk, Malappuram district, to collect data on ethnomedicinal edible plants used by *Cholanaikkan* tribes. The data was acquired through semi-structured interviews with 16 elderly people of the *Cholanaikkan* tribes. Botanical name, vernacular name, family, habit, parts used, use value and disease category of the plant species were recorded**.** The observed ethnomedicinal data of edible plants was quantitatively evaluated using the following indices.

Use value (UV): To examine the relative value of each plant species, the use value was calculated based on informant use.

$$UV = \Sigma U / n$$

Here, Σ U indicates the total number of uses reported for each species by all informants; n indicates the total number of informants included in the study (Zenderland *et al*., 2019).

Informant consensus factor (ICF)

The consensus among informants about the use of edible plants for curing different illness categories was checked by using ICF.

$$ICF = Nur - Nt / (Nur - 1)$$

Here, Nur is the number of use reports for a particular disease category; Nt is the species number used for that disease category (Heinrich *et al.*, 1998).

RESULT AND DISCUSSION

A total of 42 ethnomedicinal edible plant species were reported by 16 informants of *Cholanaikkan* tribes in Nilambur forest. These species belong to 35 distinct families with Zingiberaceae representing the predominantly occurring family followed by Amaranthaceae, Araceae, Moraceae, Dioscoraceae and Piperaceae. Trees (36%) were found to be used mostly followed by herbs (31%), climbers (26%) and shrubs (7%) (Figure-1). In this study, it is found that fruits (44%) are the frequently used edible plant part as medicine followed by leaves (19%), tuber (14%), seeds (9%), rhizome (5%), stem (5%), root (2%) and whole plant (2%) (Figure

2). The list of edible ethnomedicinal plants used by the *Cholanaikkan* tribes of Malappuram district is given in Table-1. *Phyllanthus emblica* L. exhibits a high use value (UV=0.87), followed by *Curcuma longa, Asparagus racemosus, Piper longum, Aegle marmelos, Boerhavia diffusa, Aerva lanata, Hemidesmus indicus, Syzygium cumini, Terminalia bellirica* with UV=0.81 each. ICF was used to determine the consensus of informants on the use of wild edible plants to treat various ailments. The highest value of ICF is 0.96 for gynaecological disorders followed by endocrine disorders (0.91), respiratory disorders (0.87) and digestive disorders (0.61) (Table 2). An ethnobotanical study was conducted by Haridas *et al.* (2020) on the food value of wild edible plants used by the *Cholanaikkan* and *Kattunaikkan* tribes in the Nilambur forest of Kerala, India. A total of 102 plants and plant parts were identified with fruits, tubers, leafy vegetables, seeds, and various other parts that are used for food purposes. Ethnobotanical studies in Wayanad district resulted in the documentation 165 edible plants used by *Kattunaikka, Paniya* and *Kuruma* tribes (Narayanan MR *et al*., 2011).

Table 1: The list of edible ethnomedicinal plants used by the *Cholanaikkan* tribes

Sl No.	Botanical name	Vernacular name	Family	Habit	Parts used	Use value	Disease category
1.	*Acalypha fruticosa* Forssk.	Kuppameni	Euphorbiaceae	Shrub	Leaves	0.43	Respiratory disorders
2.	*Aegle marmelos* (L.) Correa	Koovalam	Rutaceae	Tree	Fruit	0.81	Digestive disorders
3.	*Aerva lanata* (L). Juss. ex-Schult.	Cherula	Amaranthaceae	Herb	Leaves	0.81	Urinary disorders
4.	*Alpinia galanga* (L.) Willd.	Aratha	Zingiberaceae	Herb	Rhizome	0.62	Digestive disorders
5.	*Amaranthus viridis* L.	Kuppacheera	Amaranthaceae	Herb	Leaves	0.56	Reproductive disorders
6.	*Amorphophallus paeoniifolius* (Dennst.) Nicolson	Kattuchena	Araceae	Herb	Tuber	0.56	Digestive disorders
7.	*Artocarpus heterophyllus* Lam.	Plavu	Moraceae	Tree	Fruit & Seeds	0.56	Digestive disorders

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8.	*Artocarpus hirsutus* Lam.	Anjili	Moraceae	Tree	Fruit	0.56	Respiratory disorders
9.	*Asparagus racemosus* Willd.	Sathavari	Asparagaceae	Climber	Tuber	0.81	Gynaecological disorders
10.	*Bambusa bambus* (L.) Voss	Illi	Poaceae	Shrub	Seeds	0.5	Endocrine disorders
11.	*Boerhavia diffusa* L.	Thazhuthama	Nyctaginaceae	Herb	Leaves	0.81	Cardiac disorders
12.	*Calamus rotang* L.	Chooral	Arecaceae	Tree	Seeds	0.25	Endocrine disorders
13.	*Carica papaya* L.	Kappalanga	Caricaceae	Tree	Fruit	0.75	Digestive disorders
14.	*Centella asiatica* (L.) Urban	Kodangal	Apiaceae	Herb	Leaves	0.68	Digestive disorders
15.	*Cinnamomum verum* Presl	Vayana	Lauraceae	Tree	Leaves	0.75	Respiratory disorders
16.	*Cissus quadrangularis* L.	Changalamparanda	Vitaceae	Climber	Stem	0.62	Digestive disorders
17.	*Colocasia esculenta* (L.) Schott	Kattuchembu	Araceae	Herb	Whole plant	0.56	Digestive disorders
18.	*Costus speciosus* (Koenig) Sm.	Channakoova	Costaceae	Herb	Stem	0.62	Urinary tract infections
19.	*Curcuma longa* L.	Manjal	Zingiberaceae	Herb	Tuber	0.81	Digestive disorders
20.	*Dillenia indica* L.	Punna	Dilleniaceae	Tree	Fruit	0.62	Endocrine disorders
21.	*Dioscorea oppositifolia* L.	Kavalakizhangu	Dioscoreaceae	Climber	Tuber	0.56	Gynaecological disorders

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22.	*Dioscorea wallichii* Hook. f.	Narakizhangu	Dioscoreaceae	Climber	Tuber	0.56	Digestive disorders
23.	*Entada rheedii* Spreng	Kakkumkai	Fabaceae	Climber	Seeds	0.18	Digestive disorders
24.	*Garcinia gummi-gutta* (L.) Roxb.	Kudampuli	Clusiaceae	Tree	Fruit	0.68	Digestive disorders
25.	*Hemidesmus indicus* (L) R.Br.	Nannari	Asclepiadaceae	Herb	Root	0.81	Digestive diseases
26.	*Ipomoea mauritiana* Jacq.	Palmuthakku	Convolvulaceae	Climber	Tuber	0.56	Digestive diseases
27.	*Kaempferia galanga* L.	Kacholam	Zingiberaceae	Herb	Rhizome	0.62	Respiratory disorders
28.	*Mangifera indica* Linn.	Mavu	Anacardiaceae	Tree	Fruit	0.75	Digestive diseases
29.	*Mimusops elengi* L.	Elengi	Sapotaceae	Tree	Fruit	0.31	Digestive diseases
30.	*Oxalis corniculata* L.	Puliyarila	Oxalidaceae	Climber	Leaves	0.62	Digestive diseases
31.	*Passiflora foetida* L.	Poochapazham	Passifloraceae	Climber	Fruit	0.43	Digestive diseases
32.	*Phyllanthus emblica* L.	Nelli	Phyllanthaceae	Tree	Fruit	0.87	Respiratory & Digestive disorders
33.	*Physalis angulata* L.	Njotanga	Solanaceae	Herb	Fruit	0.5	Endocrine disorders
34.	*Piper longum* L.	Thippali	Piperaceae	Climber	Fruit	0.81	Respiratory disorders
35.	*Piper nigram* L.	Kattukurumulaku	Piperaceae	Climber	Fruit	0.75	Digestive disorders
36.	*Pouzolzia zeylanica*	Kallurukki	Urticaceae	Herb	Leaves	0.25	Digestive disorders

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	(L.) Benn. & R. Br						
37.	*Schleichera oleosa* (Lour.) Merr	Poovam	Sapindaceae	Tree	Fruit	0.25	Digestive disorders
38.	*Solanum torvum* Sw.	Chunda	Solanaceae	Shrub	Fruit	0.56	Respiratory disorders
39.	*Syzygium cumini* (L.)	Njaval	Myrtaceae	Tree	Fruit	0.81	Endocrine disorders
40.	*Tamarindus indica* L	Puli	Caesalpineaceae	Tree	Fruit	0.68	Digestive disorders
41.	*Terminalia bellirica* (Gaertn.) Roxb	Thanni	Combretaceae	Tree	Fruit	0.81	Digestive disorders
42.	*Trichosanthus lobata* Roxb.	Kattupadavalam	Cucurbitaceae	Climber	Fruit	0.25	Endocrine disorders

Table 2: ICF values of ethnomedicinal edible plants used as remedy

Sl. No.	Disease category	Nur	Nt	ICF
1.	Digestive disorders	60	24	0.61
2.	Respiratory disorders	38	6	0.87
3.	Endocrine disorders	45	5	0.91
4.	Gynaecological disorders	27	2	0.96
5.	Urinary disorders	16	1	1.00
6.	Reproductive disorders	11	1	1.00
7.	Cardiac disorders	19	1	1.00
8.	Urinary tract infection	6	1	1.00

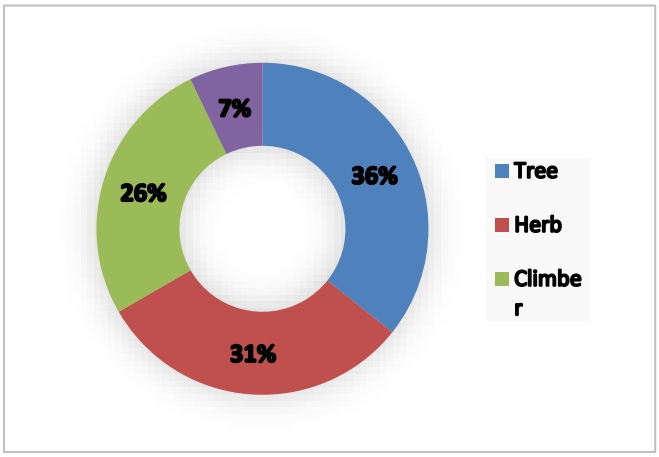

Figure 1: Percentage of habits of edible ethnomedicinal plants

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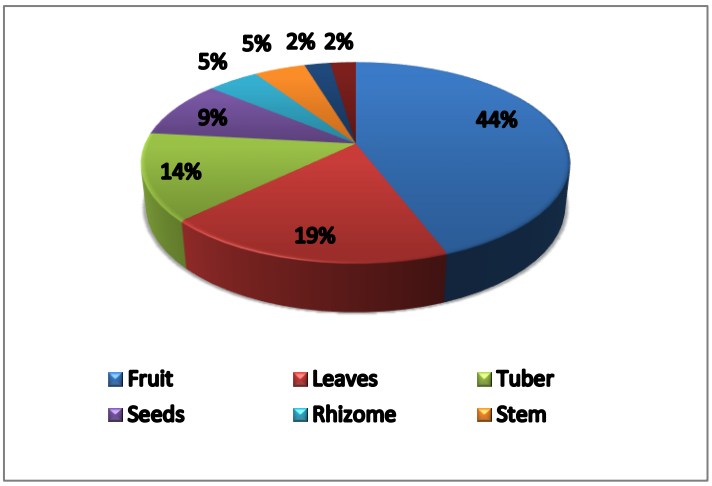

Figure 2: Percentage of plant part(s) used as edible ethnomedicinal plants

CONCLUSION

The tribal communities use their traditional ecological knowledge to determine which wild plants should be avoided and which should be consumed. They can create nutritious and safe meals for their frequently restricted diets because they have an extensive knowledge of the procedures required to remove harmful or dangerous substances from wild plants. *Phyllanthus emblica* L. exhibits a high use value (UV=0.87), which statistically shows its prevalence and significant utilization within the *Cholanaikkan* tribal community. Ethnobotanical studies can provide important guidance for scientific research aimed at evaluating the efficacy and safety of traditional plant-based medicinal treatments. Indigenous tribal communities frequently maintain their own rules and regulations for managing and preserving the medicinal plants within their lands. Maintaining traditional knowledge and sustainably using ethnomedicinal plants can contribute to protecting human health and the natural environment.

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