



Original Article

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Medicinal Uses of Wild Edible Plants by the Wancho Tribe in Longding District of Arunachal Pradesh

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ABSTRACT

Wancho tribe is one of the major tribes of Arunachal Pradesh and uses various plants to cure different diseases traditionally. The main aim of the study was to document the wild edible plants used for medicinal purposes. The field survey for data collection was carried out from July 2019 to July 2021 in 23 Wancho tribe-dominated villages of the Longding district of Arunachal Pradesh through questionnaires and interviews. A total of 51 plant species belonging to 40 genera and 36 families were recorded. Clusiaceae was the most dominant family with 5 species. Use value (UV) was observed highest in *Clerodendrum glandulosum* Lindl., *Colocasia esculenta* (L.) Schott., *Diplazium esculentum* (Retz.) Sw., *Paederia foetida* L., *Solanum indicum* L. and *Houttuynia cordata* Thunb. The highest ICF was observed in disease categories, namely bone fracture, liver problem, malnutrition, gynecology, antidote, cold & cough problem. The highest Fidelity level (FL) was found in *Erythrina stricta* Roxb. (100%), *Clerodendrum glandulosum* Lindl. (100%) and *Euphorbia neriifolia* L. (100%). The current study revealed the importance of wild edible plants in treating various diseases for day to day life of the Wancho tribe.

Key words: Conservation, Ethnomedicine, Practices, Traditional knowledge, Wancho

INTRODUCTION

Plants that cure different diseases are called medicinal plants. All over the world, different tribes have their medicinal system [1]. About 80% of the world's population depends on traditional medicines for their primary health care [2]. Many of rural communities still rely on traditional medicine. Therefore, studying ethnomedicinal plants is recognized as an important field of research nowadays.

The northeast region is rich in both flora and fauna. It falls under Indo-Burma Global Biodiversity Hotspots [3]. Arunachal Pradesh is one of the wealthiest states of NE India and lies between from 26.28° N to 29.30°N latitude and 91.20° E to 97.30° E longitude. It covers an area of 83,743 sq. km. and shares its borders with Assam and Nagaland; international borders with Bhutan, China, and Myanmar. This state is ethnically diverse and has a home total of 26 major tribes and more than 100 sub-tribes. Major tribes are Adi, Nyishi, Monpa, Apatani, Mishmi, Nocte, Wancho, etc. [4]. The people of the Wancho tribe mainly inhabit in Longding district of Arunachal Pradesh, India. Culturally they are Naga and ethnically related to the Nocte tribe of Arunachal Pradesh and the Konyak tribe of Nagaland. The language of the Wancho tribe belongs to the Tibeto – Burman family. The religion of the Wancho tribe is mainly Christian, followed by Hindu, and some of them still believe in Animist. The Animist Wancho believes in the existence of two powerful deities, namely Rang and Baurang.

Nutrients, medicine, fodder, and spices are derived from wild edible plants. People prefer to use these plants due to their freshness, aromatic taste, pollution-free growing environment, and excellent vitality [5]. Similarly, people in rural areas not only consume wild plants as a source of food but also as a medicine [6]. There is limited

ethnobotanical information on the uses of plants by the Wancho tribe. The available literature reveals the studies on the fishing practices of the Tirap district [7], botanical resources used in the traditional wood curving industry [8], crop diversity in traditional Jhum cultivated land practices [4], festivals and ceremonial of Wancho society of Assam [9] and edible insects used as a food by Tangsa and Wancho tribes of Changlang district [10]. A preliminary investigation on ethnomedicinal plants and the anti-proliferating activity of some toxic and medicinal plants were conducted by Wangjen *et al.* and Wangpan *et al.* [11, 12]. Since there is no report on the use of wild edible plants by this tribe, therefore, the present study was an attempt to document wild edible plants used for medicinal purposes

MATERIALS AND METHODS

Study area

The study was conducted in the Longding district of Arunachal Pradesh which is geographically located at 26° 51' 51.84" N and 95° 19' 36.3" E. The district shares its boundary with Myanmar towards south and south-east, Nagaland and Assam state to west and north, and Tirap District of Arunachal Pradesh to north and east. The total area of this district is roughly 1200 square kilometers. The district consists of six circles, namely Longding, Kanubari, Pongchao, Wakka, Pumao, and Lawnu (**Figure 1**). The population of the Longding district is around 47,788 [9] and is mainly inhabited by the Wancho tribe.

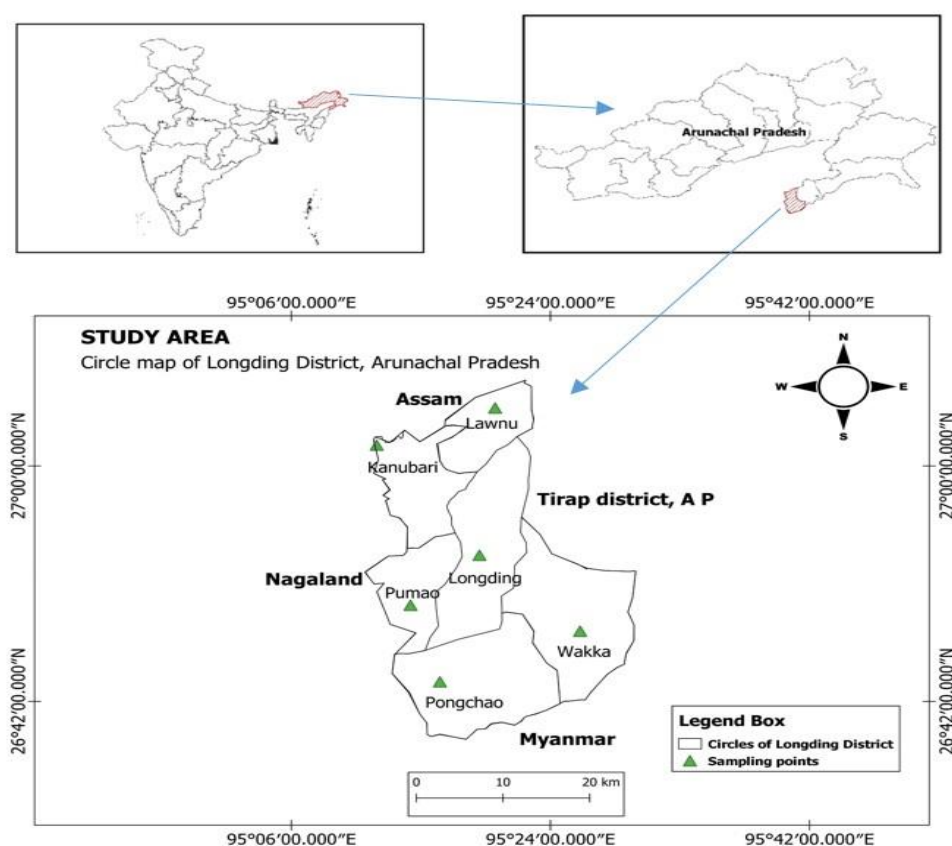


Figure 1. Geographical location of the study area

Field visits were conducted in 23 villages of Longding district for two years (2019 – 2021). The respondents were selected for the interview according to the stratified random sampling method. The personal interviews and group discussions among villagers were carried out with the help of a semi-structured questionnaire to obtain detailed information on wild edible plants used for medicinal purposes. A total of 392 respondents were interviewed for data collection. The documented plant species were identified with the help of taxonomists and available literature.

The ethnobotanical indices

The use-value (UV), Fidelity level (FL), and informant consensus factor (ICF) were determined by using the formulae given below, as suggested by Phillips *et al.* [13], Friedman *et al.* [14] and Trotter *et al.*, Heinrich *et al.* [15, 16].

$$\text{Use-value (UV)} = \Sigma U/n \quad (1)$$

Where, U is the sum of the total number of use citations by all informants for a given species, and N is the total number of informants.

$$\text{The Fidelity level (FL)} = (N_p/N \times 100) \quad (2)$$

Where N_p is the number of informants that reported the use of a plant species to treat a particular disease, and N is the number of informants that used the plant as a medicine to treat any given disease.

$$\text{The informant consensus factor (ICF)} = (N_{ur} - N_t) / (N_{ur} - 1) \quad (3)$$

Where N_{ur} refers to the number of use reports for a particular use category, and N_t refers to the number of taxa used for a particular use category by all informants.

RESULTS AND DISCUSSION

Arunachal Pradesh is a homeland of a large number of precious medicinal plants. All tribal communities of Arunachal Pradesh use ethnomedicines for their health care practices. They use different parts of the plants to cure illnesses and diseases. In the present study, a total of 131 wild edible plants were recorded, of which 51 plant species were recorded for curing different diseases by the Wancho tribe and were listed in alphabetical order in **Table 1**. The listed species belonged to 40 genera and 36 families. The highest number of plants were from the family Clusiaceae (5), followed by Asteraceae (4), Araceae (3), Lauraceae (3), Acanthaceae (2), Lamiaceae (2), Apiaceae (2), Euphorbiaceae (2), etc. Habit-wise, trees were most dominant (39.21%), followed by herbs (33.33%), shrubs (21.56%), and climbers (5.88%) (**Figure 2**). Traditional healers and other life forms used trees because the trees were commonly available around their surroundings and easily accessible to collect their different parts. In this study, it was found that the most common plant parts used were leaves (47.36%) followed by fruit/seed (24.56%), the whole plant (8.77%), roots (7.01%), bark, stem, and flowers (3.5% each) as given in **Figure 3**. Due to the potential existence of active chemical compounds, leaves are widely used for the preparation of herbal medicines as compared to other parts [17]. In the present study, digestive and stomach-related disorders were the most common ailments, followed by dysentery and blood clotting. The UV value ranged from 0.114 to 1. Based on UV (**Table 1**), the most commonly used ethnomedicinal plant species were *Clerodendrum glandulosum* Lindl. (1), *Colocasia esculenta* (L.) Schott. (1), *Diplazium esculentum* (Retz.) Sw. (1), *Paederia foetida* L. (1), *Solanum indicum* L. (1), and *Houttuynia cordata* Thunb. (1) These species are consumed daily as vegetables by local people in one or another forms to treat multiple diseases. The lowest UV was observed in *Euphorbia neriifolia* L. (0.114), which may be due to its use to treat a single disease, i.e., bone fracture.

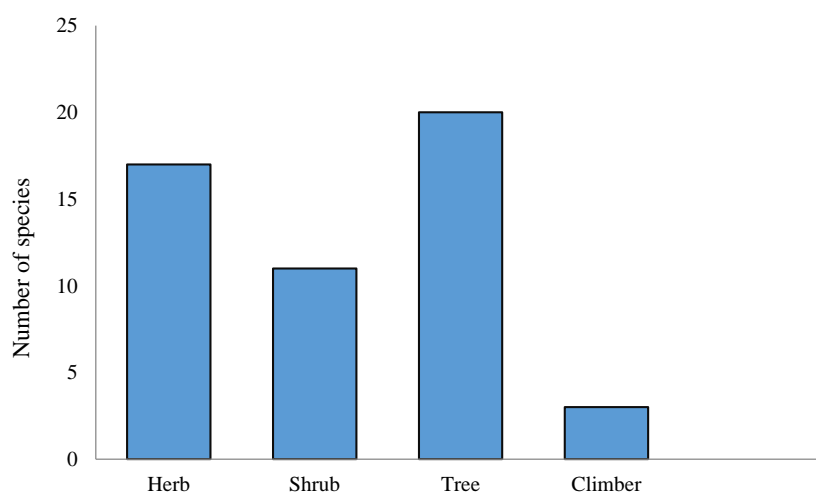


Figure 2. Habit of plant species

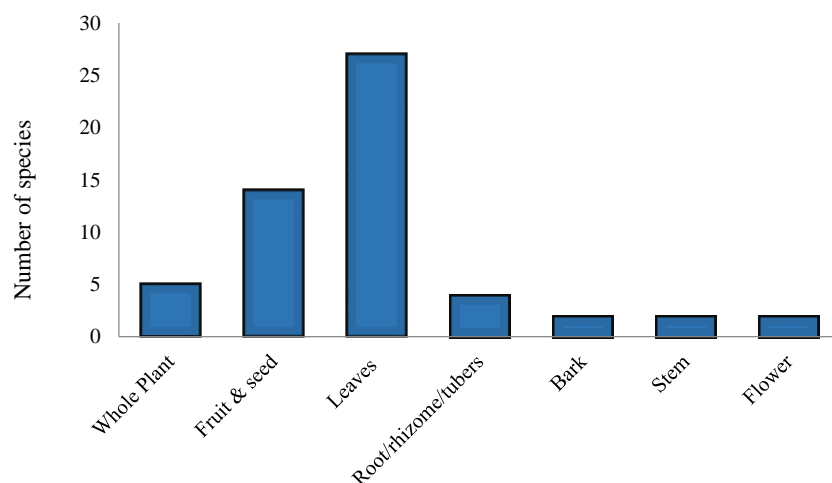


Figure 3. Plant parts used in ethnomedicinal practices

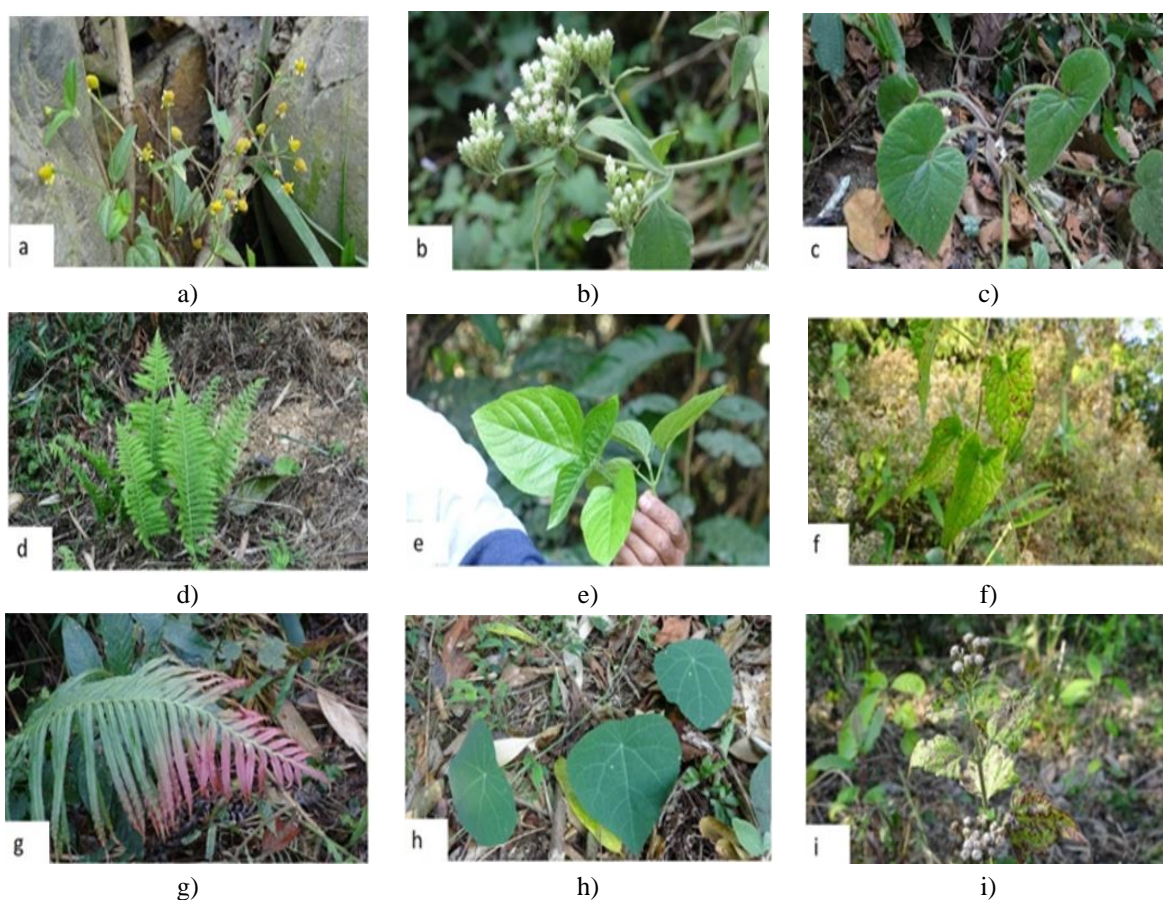


Figure 4. Some wild edible plants used as medicine by the Wancho tribe: a) *Acmella repens* (Walter) Rich. ex Pers., b) *Ageratina altissima* (L.) R.M.King & H.Rob., c) *Begonia roxburghi* A.DC., d) *Christella parasitica* H.Lev., e) *Clerodendrum glandulosum* L., f) *Mikania micrantha* Kunth, g) *Blechnum novae-zelandiae* T.C.Chambers & P.A.Farrant, h) *Stephania* sp. and i) *Chromolaena odorata* (L.) R.M. King & H.Rob.

Table 1. Documentation of wild edible plants used as medicine by the Wancho tribe

Sl. No.	Botanical name	Family	Local name	Habits	Plant parts	Mode of preparation	Uses	UV
1	<i>Acmella repens</i> (Walter) Rich. ex Pers.	Asteraceae	Wa kak hing	Shrub	Flower	Paste/raw	Tooth pain.	0.99

2	<i>Acorus calamus</i> L.	Acoraceae	Wok kak hing	Herb	Leaves and Root	Paste and powder	Digestive disorder.	0.19
3	<i>Ageratina altissima</i> (L.) R.M.King & H.Rob.	Asteraceae	Rak-Nu-Thuwa	Herb	Leaves	Paste	Digestive disorder and a cut wound	0.51
4	<i>Alocasia macrorrhizos</i> (L.) G.Don	Araceae	Ti tuwa	Herb	Whole plant	Boiled	Cure dysentery.	1
5	<i>Alstonia scholaris</i> (L.) R. Br.	Apocynaceae	Sam son pan	Tree	Leaves	Paste	Wound healing	0.14
6	<i>Arisaema erubescens</i> (Wall.) Schott	Araceae	Kai kuwak	Herb	Tuber	Powder/water infusion	Pain relief (Drug)	0.24
7	<i>Begonia roxburghii</i> A.DC.	Begoniaceae	Chu-Chu	Herb	whole plant	Boiled	Digestive disorder.	0.76
8	<i>Blechnum novae-zelandiae</i> T.C.Chambers & P.A.Farrant	Blechnaceae	Ma khi chok sho	Herb	Leaves	Paste	Itching repellent.	0.65
9	<i>Callicarpa arborea</i> Roxb.	Lamiaceae	Ket	Tree	Young leaves and bark	Raw and paste	Digestive disorder.	0.31
10	<i>Cannabis sativa</i> L.	Cannabaceae	Lao Choi	Herb	Leaves and seed	Raw and paste	Pain relief.	0.93
11	<i>Cassia alata</i> L.	Leguminosae	Khatri pan	Shrub	Leaves	Paste	Skin disease	0.38
12	<i>Centella asiatica</i> (L.) Urb.	Apiaceae	Lum loh	Herb	Whole plant	Raw / boiled	Digestive disorder and dysentery	1
13	<i>Christella parasitica</i> H.Lev.	Thelypteridoidaceae	Chak sa	Herb	Leaves	Raw	Anti-fungal and antibacterial properties.	0.87
14	<i>Chromolaena odorata</i> (L.) R.M.King & H.Rob.	Asteraceae	Hingchan	Shrub	Young leaves	Raw	Digestive disorder	0.35
15	<i>Chrysanthemum indicum</i> L.	Compositae	Hah, kak rang kak	Shrub	Leaves	Paste	Pain relief	0.60
16	<i>Cinnamomum Tamala</i> (Buch.-Ham.) T.Nees & Eberm.	Lauraceae	-	Tree	Leaves	Boiled	Diarrhoea.	1
17	<i>Citrus maxima</i> (Burm.) Merr.	Rutaceae	-	Shrub	Fruit and leaves	Raw	Hemorrhage disease.	1
18	<i>Clerodendrum glandulosum</i> Lindl.	Lamiaceae	Mangmik	Shrub	Young leaves	Boiled	To control high blood pressure.	1
19	<i>Clerodendrum infortunatum</i> L.	Verbenaceae	-	Shrub	Tender leaves	Raw	To control high blood pressure.	1
20	<i>Colocasia esculenta</i> (L.) Schott	Araceae	Gangdung	Herb	Whole plant	Boiled	Blood purifier.	1
21	<i>Dillenia indica</i> L.	Dilleniaceae	Pam (Elephant apple)	Tree	Fruit	Raw and paste	Diabetes and Dandruff.	1
22	<i>Dimocarpus longan</i> Lour.	Sapindaceae	-	Tree	Fruit	Raw	Malnutrition.	0.63
23	<i>Diplazium esculentum</i> (Retz.) Sw.	Athyriaceae	Chaksui	Herb	Young leaves and bark	Water decoction	Haemoptysis and cough.	1
24	<i>Eryngium foetidum</i> L.	Apiaceae	Choing yan	Herb	Whole plant	Boiled	Digestive disorder.	1

25	<i>Erythrina stricta</i> Roxb.	Fabaceae	Shit pan	Tree	Flower	Paste	Antidote for Scorpion sting.	0.25
26	<i>Euphorbia nerifolia</i> L.	Euphorbiaceae	Thamran hingnu	Herb	Stem	Paste	Bone fracture	0.11
27	<i>Flacourtia indica</i> (Burm.f.) Merr.	Salicaceae	-	Tree	Fruit	Raw	Diarrhoea and pneumonia.	0.9
28	<i>Garcinia cowa</i> Roxb. ex Choisy	Clusiaceae	-	Tree	Fruit	Raw/ water infusion	Digestive disorder and dysentery	0.89
29	<i>Garcinia lanceifolia</i> Roxb.	Clusiaceae	-	Tree	Fruit	Raw/ water infusion	Digestive disorder.	0.9
30	<i>Garcinia moella</i> (Gaertn.) Desr.	Clusiaceae	Nesa (Thekera)	Tree	Fruit	Raw/ water infusion	Digestive disorder.	0.89
31	<i>Garcinia pedunculata</i> Roxb. ex Buch.-Ham.	Clusiaceae	-	Tree	Fruit	Raw/ water infusion	Digestive disorder.	0.89
32	<i>Garcinia xanthochymus</i> Hook.f. ex T.Anderson	Clusaceae	-	Tree	Fruit	Raw/ water infusion	Digestive disorder.	0.83
33	<i>Houttuynia cordata</i> Thunb.	Saururaceae	Jan hing	Herb	Leaves	Raw/ boiled	Digestive disorder.	1
34	<i>Litsea cubeba</i> (Lour.) Pers.	Lauraceae	Alu	Tree	Tender leaves	Boiled	Diarrhoea and digestive disorder	0.82
35	<i>Litsea monopetala</i> (Roxb.) Pers.	Lauraceae	Ngop	Tree	Stem	Powder/paste	Blood clotting agent.	0.76
36	<i>Mallotus apelta</i> (Lour.) Müll.Arg.	Euphorbiaceae	Pongmi	Tree	Leaves	Raw	Anti-fungal and anti-microbial properties.	0.99
37	<i>Mikania micrantha</i> Kunth	Asteraceae	Rurann	Climber	Leaves	Paste	Loose motion and cut wound.	0.88
38	<i>Molineria capitulata</i> (Lour.) Herb.	Hypoxidaceae	Chakphe	Herb	Root and leaves	Paste	Blood clotting agent.	1
39	<i>Oroxylum Indicum</i> (L.) Kurz	Bignoniaceae	Pan okui	Tree	Root	Powder (infusion with water)	Digestive disorder.	0.68
40	<i>Paederia foetida</i> L.	Rubiaceae	-	Climber	Leaves	Boiled	Digestive disorder.	1
41	<i>Phlogacanthus curviflorus</i> (Wall.) Nees	Acanthaceae	Thamran hingsa	Shrub	Leaves	Paste	Blood pressure control	0.77
42	<i>Phlogacanthus thyriformis</i> (Roxb. ex Hardw.) Mabb.	Acanthaceae	Panchak	Shrub	Tender leaves	Boiled/ raw	Dysentery.	0.89
43	<i>Phyllanthus emblica</i> L.	Phyllanthaceae	Phang	Tree	Fruit	Raw	Digestive disorder.	1
44	<i>Psidium guajava</i> L.	Myrtaceae	Mariliyam	Tree	Fruit	Raw	Diarrhoea, dysentery and digestive disorder.	1
45	<i>Sarcochlamys pulcherrima</i> Gaudich.	Urticaceae	-	Shrub	Tender leaves	Raw/ boiled	Diarrhoea and dysentery.	0.7
46	<i>Scoparia dulcis</i> L.	Scrophulariaceae	Lumpu panchong	Herb	Leaves	Raw / paste	Jaundice	0.28
47	<i>Solanum indicum</i> L.	Solanaceae	-	Shrub	Fruit	Raw/ boiled	Skin diseases.	1

48	<i>Spondias pinnata</i> (L. f.) Kurz	Anacardiaceae	-	Tree	Fruit	Raw	Diarrhoea and digestive disorder.	0.6
49	<i>Stephania</i> sp.	Menispermaceae	Roti	Climber	Leaves	Paste	Cut wound and blood clotting.	0.38
50	<i>Terminalia chebula</i> Retz.	Combretaceae	Chi-Kha	Tree	Fruit	Raw	Digestive disorder.	1
51	<i>Tetrastigma serrulatum</i> (Roxb.) Planch.	Vitaceae	Van huak hing	Herb	Leaves	Paste	Heal the Fire burn.	0.5

A total of 14 aliment groups were categorized as given in **Table 2**. The ICF ranged from 0.951 to 1. The highest ICF was observed for bone fracture, liver problems, malnutrition, gynecological problems, antidote, and cold & cough problems because only one plant was reported to cure each disease group (**Table 2**). ICF value ranged from 0.95 (digestive disorder) to 1 (antidote, blood pressure, bone fracture, liver problem, etc.). The lowest value of ICF in digestive problems may be due to the use of more plant species than other disease categories. It is observed that people of this tribe used to consume fruits of *Terminalia chebula* Retz., *Spondias pinnata* (L. f.) Kurz, *Garcinia cowa* Roxb. ex Choisy and leaves of *Houttuynia cordata* Thunb., *Paederia foetida* L., *Chromolaena odorata* (L.) R.M. King & H. Rob., *Begonia roxburghi* A. DC., as vegetables either raw or in the boiled form in their daily meals to cure digestive problems. The Fidelity level (FL) of the 14 most preferred plant species in **Table 2** showed the highest FL value (100%) in *Clerodendrum glandulosum* Lindl. and *Erythrina stricta* Roxb is ubiquitous in the study area and highly effective for treating blood pressure and antidote, respectively. The lowest FL level was observed in *Citrus maxima* (Burm.) Merr. (8.67%) as only a few informants reported the use of this plant to cure the gynecological problem.

Table 2. Informant's Consensus Factor (ICF) of most cited species against major disease categories along with Fidelity Level (FL)

Sl. No.	Disease category	ICF	Most cited species	FL (%)
1	Antidote	1	<i>Erythrina stricta</i> Roxb.	100
2	Blood pressure control and blood purifier	0.992	<i>Clerodendrum glandulosum</i> Lindl.	100
3	Bone fracture	1	<i>Euphorbia neriifolia</i> L.	100
4	Blood clotting and cutting wound	0.984	<i>Mikania micrantha</i> Kunth	90.56
5	Drug	0.997	<i>Cannabis sativa</i> L.	90.56
6	Immune system problem/ booster	0.959	<i>Centella asiatica</i> (L.) Urb.	90.56
7	Pain relief	0.994	<i>Acmella repens</i> (Walter) Rich. ex Pers.	74.66
8	Anti-fungal/ Anti-microbial properties	0.993	<i>Christella parasitica</i> H.Lev.	65.30
9	Cold & cough	1	<i>Diplazium esculentum</i> (Retz.) Sw.	38.26
10	Liver problem	1	<i>Scoparia dulcis</i> L.	37.93
11	Skin and hair problem	0.994	<i>Cassia alata</i> L.	36.98
12	Malnutrition	1	<i>Dimocarpus longan</i> Lour.	31.63
13	Digestive problem	0.951	<i>Houttuynia cordata</i> Thunb.	25
14	Gynecological problem	1	<i>Citrus maxima</i> (Burm.) Merr.	8.67

CONCLUSION

The present study reveals the information on traditional knowledge of wild edible plants as medicines by the Wancho people, which shows that the traditional treatment system is still prevalent in this tribe. The conservation of these plant species should be encouraged for their adequate supply of food resources. There is an urgent need to conduct pharmacological studies on these plants, which may lead to the development of new medicines.

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CONFLICT OF INTEREST : None

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ETHICS STATEMENT : Permission was obtained from the village Head or King of the Wancho tribe to conduct the study.

REFERENCES

1. Bhuyan M. Comparative study of ethnomedicine among the tribes of Northeast India. *Int Res J Soc Sci.* 2015;4(2):27-32.
2. Azaizeh H, Khalil S, Said O. Ethnomedicinal Knowledge of local Arab practitioner in the Middle East region. *Feloterapia.* 2003;74(1-2):98-108.
3. Myers N, Mittermeier RA, Mittermeier CG, da Fonseca G, Kent J. Biodiversity hotspots for conservation priorities. *Nature.* 2000;403(6772):853-8.
4. Bhuyan SI, Teyang T. Crop Diversity in Traditional Jhum Cultivated Land Practiced by Ethnic Nocte and Wancho of Eastern Himalaya. *Int J Adv Res Sci Eng Technol.* 2015;2(1):365-75.
5. Cao Y, Li R, Zhou S, Song L, Quan R, Hu H. Ethnobotanical study on wild edible plants used by three trans-boundary ethnic groups in Jiangcheng County, Pu'er, Southwest China. *J Ethnobiol Ethnomed.* 2020;16(66):1-23.
6. Panta S, Parajulee D, Subedi G, Giri B. Ethnobotanical study of wild edible plants in Pyuthan, Nepal. *Int J Environ Agric Biotech.* 2021;6(4):79-87.
7. Dutta R, Bhattacharjya BK. An indigenous community fishing practices of Tirap district, Arunachal Pradesh. *Indian J Tradit Knowl.* 2008;7(4):624-6.
8. Tag H, Das AK, Pallabi H, Singh RK, Palit G. Botanical resources used in traditional wood curving industry among the Wancho tribe of Arunachal Pradesh. *Indian J Tradit Knowl.* 2008;7(1):148-56.
9. Maut K. Festivals and ceremonial of Wancho society of Assam: A descriptive study. *Int J Recent Sci Res.* 2019;10(11):35858-61.
10. Gogoi R, Chetri S, Ahmed R. Edible insect used as a food by Tangsa and Wancho tribes of Changlang district, Arunachal Pradesh. *Indian J Entomol.* 2021;36:1-3.
11. Wangjen K, Chaudhry S, Arya SC, Samal PK. A preliminary investigation on ethnomedicinal plants used by Wancho tribes of Arunachal Pradesh, India. *J Non-Timber Forest Prod.* 2011;18(2):129-32.
12. Wangpan T, Wangpan A, Chetry LB, Tanjang S. Anti-proliferating activity of some toxic and medicinal plants used by Wancho tribe of Arunachal Pradesh, India. *Not Sci Biol.* 2021;13(2):10894.
13. Phillips O, Gentry AH, Reynel C, Walkin P, Galvez-Durand BC. Quantitative ethnobotany and amazonian conservation etnobotanica cuantitativa y la conservacion de la Amazonia. *Conserv Biol.* 1994;8:225-48.
14. Friedman J, Yaniv Z, Dafni A, Palewitch D. A preliminary classification of the healing potential of medicinal plants, based on a rational analysis of an ethnopharmacological field survey among Bedouins in the Negev desert, Israel. *J Ethnopharmacol.* 1986;16(2-3):275-87.
15. Trotter R, Logan M. Informant Consensus: A New Approach for Identifying Potentially Effective Medicinal Plants. In: Etkin, N.L., Ed., *Plants in Indigenous medicine and Diet, Behavioural Approaches*, Redgrave Publishing Company, Bedford Hills, New York; 1986. pp.91-112.
16. Heinrich M, Ankli A, Frei B, Weimann C, Sticher O. Medicinal plants in Mexico: healer's consensus and cultural importance. *Soc Sci Med.* 1998;47(11):1859-71.
17. Ghorbani A. Studies on pharmaceutical ethnobotany in the region of Turkmen Sahra, north of Iran: (Part 1): general results. *J Ethnopharmacol.* 2005;102:58-68.