Folklore use of wild fruits by the Oraon tribe of Sarguja district of Chhattisgarh, India

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Research

Abstract

Background: Forests and trees are the major resources sustainably utilized by the tribals for their livelihood. The tribals communities have lived in and known the forests in an intimate manner and have also gathered information about possible use and conservation of forests and trees. In present times, however, the indigenous knowledge base that the tribals have gathered and preserved yet far has been endangered due to sociocultural hybridization as a result of modernization and globalization. This situation, hence, calls for an urgent need to device strategies to conserve tribal knowledge through various means. In this-respects, the present study attempts to survey, document and preserve the knowledge regarding the wild edible fruits consumed by Oraon tribes of Surguja district of Chhattisgarh and the Current status of the tribe concerning the interest towards the wild fruit collection, consumption and conservation.

Methods: The study was undertaken during December 2019-July 2020. The information was obtained through semi-structured schedule. The importance of wild edible fruits as ethnomedicine was expressed through Informant Consensus Factor (ICF), Use Value (UV) and Relative Frequency of Citation (RFC).

Results: A total of 26 wild fruit species, considered by the Oraon tribe to have medical values and ability to impart health benefits have been reported in this study. The reported fruit species belongs to 16 different families. Moraceae was the dominant family amongst the reported fruit species, the highest informant consensus factor (ICF) value was 0.94 for Liver related problems followed by Inflammation (0.91), Pain and Skin related disease as (0.86).The most frequently used fruit species were *Morus alba* (0.86), followed by *Syzygium cumini* (0.84), *Diospyros melanoxylon*, *Madhuca longifolia* and *Neolamarckia cadamba* (0.82) each, *Ficus religiosa* and *Ziziphus mauritiana* (0.80) each based on *Relative frequency of citation*.

Conclusions: Furthermore, the documentation of diverse therapeutic practices of wild fruit species by the Oraon and several other tribes shall support further pharmacological research to develop novel future generation drug molecules.

Keywords: Dietary nutrition, Folklore uses, Indigenous technical knowledge, Wild edible fruits.

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Background

The use of wild edible fruits (WEFs) as foodstuff and medicine is directly linked to spiritual, traditional, health and socio-demographic facets of human life (Shan *et al.* 2019). There are reports that wild fruits are rich sources of minerals, vitamins, antioxidants, phenolics, flavonoids which prevent risks of various disorders linked to oxidative disparity and malnutrition (Biswas *et al.* 2018; Abbasi *et al.* 2013). These wild fruits usually represent a major source of dietary nutrition for tribal communities and inhabitants of the forest (Biswas *et al.* 2018). Chhattisgarh is popularly known as "*HERBAL STATE*" for of its rich biodiversity and dependence of the indigenous tribal community on traditional knowledge for their health requirements. The state is situated in a Deccan bio-geographical area extending from latitude 21° 30' N to longitude 82° 0' E with a total area of 192,000 square km of which 44% is covered by forest with tropical forest, moist deciduous and dry deciduous forest coverage. The state is well known for rich diversity of medicinal plant species as reported in many previously published literatures (Kala 2009; Patra and Sharma 2021). The tribal people live in forests and mountains mostly depend on traditional medicines and engaged in preparation of plant extracts from various plant parts. The tribal population comprises 30.62 % of the total state population (Census 2011). A study was reported on documentation and remedial practices of indigenous medicines among Gond tribes in Bilaspur, Chhattisgarh (Patra and Sharma 2021). Sarguja district of Chhattisgarh is populated by many tribes who own a great deal of knowledge on the healing practices of various plant resources. Oraon is predominant among all the tribal populations found in Sarguja (Tripath 1985).They are mainly dependent on forest flora for their livelihood, get pleasure from accessing their surrounding habitat and have loaded with legacy of indigenous knowledge on ethnobotanical remedial practices but reports are scanty exclusively on traditional knowledge of Oraon tribe (Ekka 2015).

Ekka *et al.* (2016) reported wild edible plant parts(fruits, leaves, seeds, bark etc.) of 80 medicinal plant species belongs to 65 genera from different villages of north-east Chhattisgarh. Their study documented the consumable parts and their uses in the traditional system of medicine. WEFs are rich source of essential vitamins specially vitamin C, macro and micronutrients, and minerals for better human health (Suwardi *et al.* 2018). Wild edible fruits are one of the additional income generating sources of tribal communities (Suwardi *et al.* 2020) due to their remedial and dietary values (Biswas *et al.* 2018). In spite of its economic and therapeutic potentiality, no effort has been made to document the mode of consumption of WEFs of this ethnic group. Therefore, the present study was carried out to assess the therapeutic knowledge of Oraon tribes of Sarguja district of Chhattisgarh with reference to ethnomedicinal use of WEFs and to document various fruit-based formulations.

Material and Methods

Study Area

Sarguja is a hilly tribal dominated district of Chhattisgarh, India, located 22.94 94° North latitudes, 83.16 49° East longitudes (Fig 1). Sarguja district has very thick forest, rich flora, and tribes of this region consume various wild fruits as part of their diet, especially during food paucity. Reports are scanty regarding the diversity of wild edible fruits of this region and to date, no attempt has been made to document and explore these wild fruits, which are mainly significant in the face of extinction of valuable germplasm the era of climate change. The district's total area is 18,188 Km^2; forests occupy 10,849.079 Km^2.The average temperature fluctuates from an extreme of 46°C to at least of 1.3°C, yearly average rainfall is about 200-300cm Shukla and Singh (2012).

Data Collection

Semi-structured questionnaire method (Alexiades and Sheldon, 1996) was adopted to accumulate the first-hand data. The present study involved 50 informants from Oraon tribe with different backgrounds such as age group, sex, educational qualification and local language (Table 1) selected by simple random sampling from 2 different villages of Sarguja district. There were 50 Oraon households in the selected 2 villages, members from households with no knowledge on WEFs were excluded, so the final sample consisted of 50 respondents from 50 households (1 respondents from each household). To catch the Oraon respondents more in number the research team visited special religious events like Karma, Sarhool, Christmas (Christian respondents), Marriage ceremonies, community meetings and celebrations. In the case of illiterate respondents, the questionnaire was filled up as per their response. The consumable patterns and local use of fruits for various treatments were recorded. The knowledgeable respondents were identified, and the research team accompanied local forest area for some sample collection. The fruit species were recognized by Prof. S.K Jadhav, SoS Biotechnology, Pt Ravi Shankar Shukla University, Raipur and Prof. P.C. Pande, Department of Botany, Kumaun University, Nainital. All the plant names were checked in "The Plant List" (http://www.theplantlist.org/) and the herbarium sheets of specimens were deposited at the Department

of Biotechnology, Sant Gahira Guru University, Sarguja, Ambikapur, Chhattisgarh, as Herbarium specimens for future reference. The data was compiled and analyzed using various quantitative parameters as mentioned below.

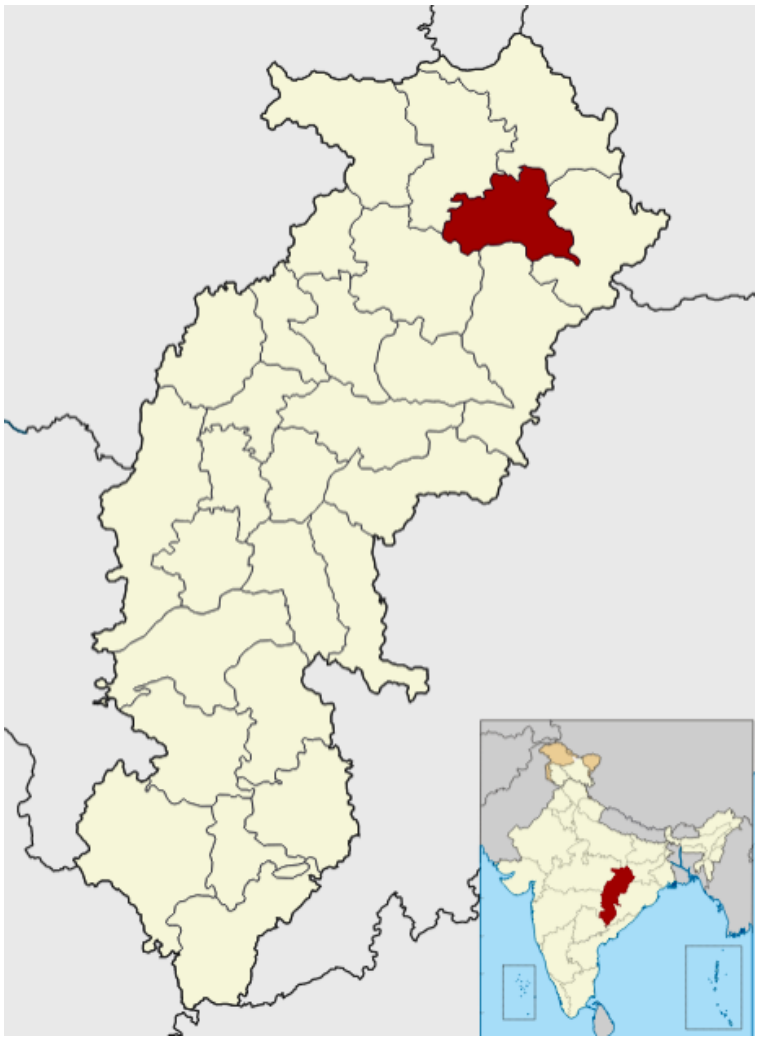

Figure 1. Map of the study area.

Quantitative Ethnobotany

Relative Frequency of Citation (RFC)

The Relative frequency of citation (RFC) index (Tardio and Pardo 2008) was measured by dividing the number of participants mentioned the use of the fruit species (FC) by the total number of respondents contributing to the present study (N). RFC index differs from 0 (no one mentions the wild fruit as beneficial) to 1 (all informers cited it as suitable). The RFC value was calculated using the succeeding formula:

$$RFC = FC/N$$

Informant Consensus Factor (ICF)

The ICF was used to find the medicinal significance of the wild fruit and to examine the degree of consent of the informants' awareness about each group of ailments (Zheng and Xing, 2009; Heinrich, 1998; Heinrich, 2009). The ICF (Logan 1986; Heinrich 1998) was considered using the subsequent formula:

$$ICF = Nur - Nt \div Nur - 1$$

Where Nur is the number of use reports for each disease category and Nt is the number of wild fruit species cited. The uppermost value should be close to 1, which specifies the major association of respondents in using a specific wild fruit in a particular type of use (Trotter and Logan, 1986).

Jaccard index (JI)

The JI is calculated to find out the similarity of use reports with previously published findings by using the following formula:

$$JI = c \times 100 \div a + b - c$$

where "a" is the number of species of the area A, "b" is the number of species of the area B, and "c" is the number of species common to area A and B (Gonza *et al.* 2008).

Results and Discussion

Demographic Profile of Informants

The demographic information of the 50 respondents of the Oraon tribe of Sarguja district of Chhattisgarh, that are the part of this study, have been documented in Table 1. Out of 50 respondents, 74% were male and 26% were female. The age groups of the respondents were categorized into 5 different groups, age group between 18-25 years being the lower while the higher age group included individuals of age 56 or above as indicated in Table 1. Majority of the respondents surveyed, corresponded to age groups 26-35 years 36% of the total surveyed individuals, young respondents corresponding to age group 18-25 constituted only 16% of the total surveyed individuals. Interestingly, 76% of the surveyed individuals were literate with most of the responding individuals i.e. 36% were educated till secondary school level, however only 6% of the individuals were educated till University degree level. The economy of the respondents is largely farming (38%), farming and government private services (20%), government private services (16%), labor work (14%), farming and labor works (12%).

Table 1. Demographic characteristic of informants in the study area.

Baseline characteristics		**Total Number**	**Percentage**
Gender	**Male**	30	60
	Female	20	40
Age	**18-25**	8	16
	26-35	18	36
	36-45	16	32
	46-55	5	10
	Above 56	3	6
Religion	**Hindu**	18	36
	Christian	23	46
	Sarna	9	18
Education level	**Illiterate**	12	24
	Primary	8	16
	Secondary School level	18	36
	Intermediate	9	18
	Bachelor and Masters' degree	3	6

Documented Fruit Species

The tribal people of Oraon, Agharia, Gond and Korwa tribes have been reported to possess vast knowledge regarding promiscuous plant used (Singh and Bharti 2015).Oraon is a representative tribe of entire Chotanagpur plateau and adjoining regions including Jashpur (Tiwari et al., 2014). Our study documented a total of 26 wild edible fruit species belonging to 16 families. The overall coverage in terms of taxonomic diversity at species level is higher than those reported in similar studies by Shrivastava and Kanungo 2013 (14 Plant species) from Sarguja District, Chhattisgarh and Painkara *et al.* 2015 (19 Plant species) reported from Jashpur district, Chhattisgarh. However, it is comparable to 30WEFs reported from Santal paraganas, Jharkhand (Das et al., 2018). The most dominant families were Moraceae (7 fruit species), followed by Anacardiaceae (2 species), Combretaceae (2 species), Ebenaceae (2 species), Euphorbiaceae (2 species) and other 11 families represented by single species (Fig. 2). Photographs of a few wild edible fruits collected from the study area are shown in Fig. 3. Similar findings have been reported by Painkara *et al.* 2015, in their studies in Jashpur district which is located in north-eastern corner of the Chhattisgarh state of the Indian union. Many ethnobotanists reported similar findings that fruit species of Moraceae family (Figs) are rich sources of minerals, vitamins, and dietary fiber and have many therapeutic benefits as purgative, respiratory, cardiac and antispasmodic remedies (Slatnar *et al.* 2011; Veberic *et al.* 2008; Solomon *et al.* 2006; Guarrera *et al.* 2005).Studies also reported that the daily consumption of Figs helps to regulate cholesterol level as it contains polyunsaturated fatty acids such as omega 3 and omega 6 fatty acids (Hussain *et al.* 2021).The

paste of Figs is also applied to blisters, inflammation and swellings to get rid of pain (Mawa *et al.* 2013). It was also reported that the fruits of *Ficus hispida* constitute many phyto-compounds i.e. Betulinic acid (Triterpenoids), 3'-Formyl-5, 7-dihydroxy-4'- methoxy isoflavone, Isowigtheone hydrate, and Alpinumisoflavone (flavonoids), Marmesin, 7-Hydroxycoumarin (Coumarins) etc. (Zhang *et al.* 2018). *Buchanania lanzan, Madhuca longifolia* and *Diospyros melanoxylon* were common wild fruits among all participants because these fruit species have rich phytochemicals with therapeutic potential and have been used for many generations.

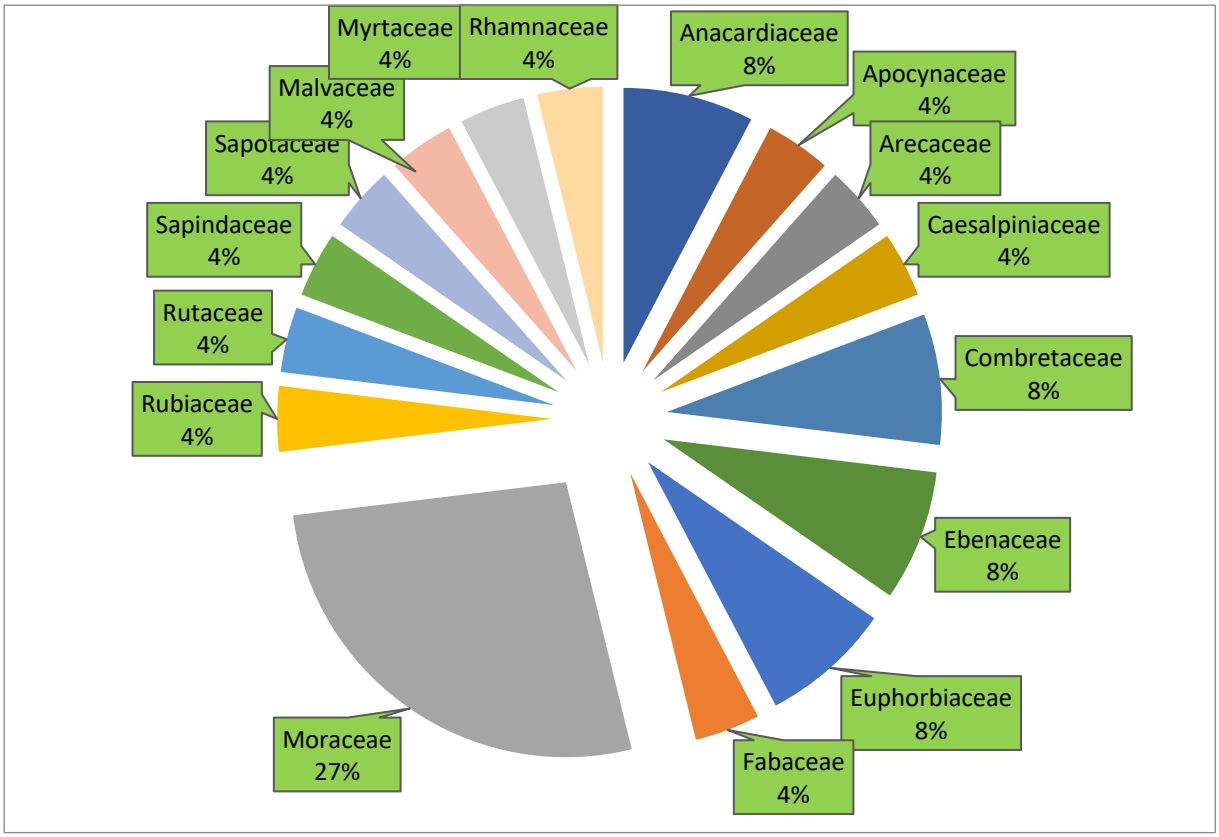

Figure. 2. Distribution of reported fruit species by family.

Quantitative Ethnobotany

The reported fruit species were used for treatment of various diseases that were grouped into 10 disease categories. The ICF varied from 0.63 to 0.94. The uppermost ICF value of 0.94 was observed for Liver related problems followed by inflammation (0.91), Pain and Skin related disease (0.86), while the lowermost ICF was 0.63 for Fever and Cough, microbial infections (Table 2). The ICF validated that the comparative significance of wild fruits in treating the common illness is still practiced among the tribe. Plants with high value can further focus on their phytocompound screening to progress the discovery of new bioactive compounds. The maximum number of ethnomedicinal fruit species was used for treatment of digestive gastrointestinal system ailments (10 species), whereas only 2 fruit species were reported to treat liver and Kidney related problems (Table 2). Faruque *et al.* (2018) also found the maximum number of ethnomedicinal plant species cited to treat the digestive disorder. Digestive system disorders were the second most disease category treated with edible wild fruits (Khan *et al.* 2015). A total of 32 Use Reports from 10 medicinal plants were reported to treat Digestive system Disorders (dysentery and diarrhea, stomachache, killing intestinal worms, upset stomach and constipation) with ICF value 0.71. *Diospyros melanoxylon* was highly cited for stomach pain and diarrhea with RFC 0.82, it is commonly known as Tendu. Venugopal *et al.* 2022 also similarly stated that the genus *Diospyros* have been used since long time for stomachache and dysentery. Maximum number of citations 34 from 4 fruit species was observed for inflammation (with ICF = 0.91) for treatment of rashes, boils, swelling, fever and pain. Inflammations are commonly occurred in Oraon tribes due to their inextricable engagement with nature in hilly forests. Total 14 Use Reports from 4 fruit species were cited for respiratory disorders. *Terminalia chebula* commonly known Harra, was highly cited for cough and cold as reported by Upadhyay *et al.* 2014 for cough, cold and sore throat. *Phyllanthus emblica* was cited only for hair problems. The fruit paste is used as shampoo and mostly cited to check hair fall and get rid of dandruff. The present study indicates that Oraon tribes mainly used wild fruits for inflammation, pain and digestive system disorders.

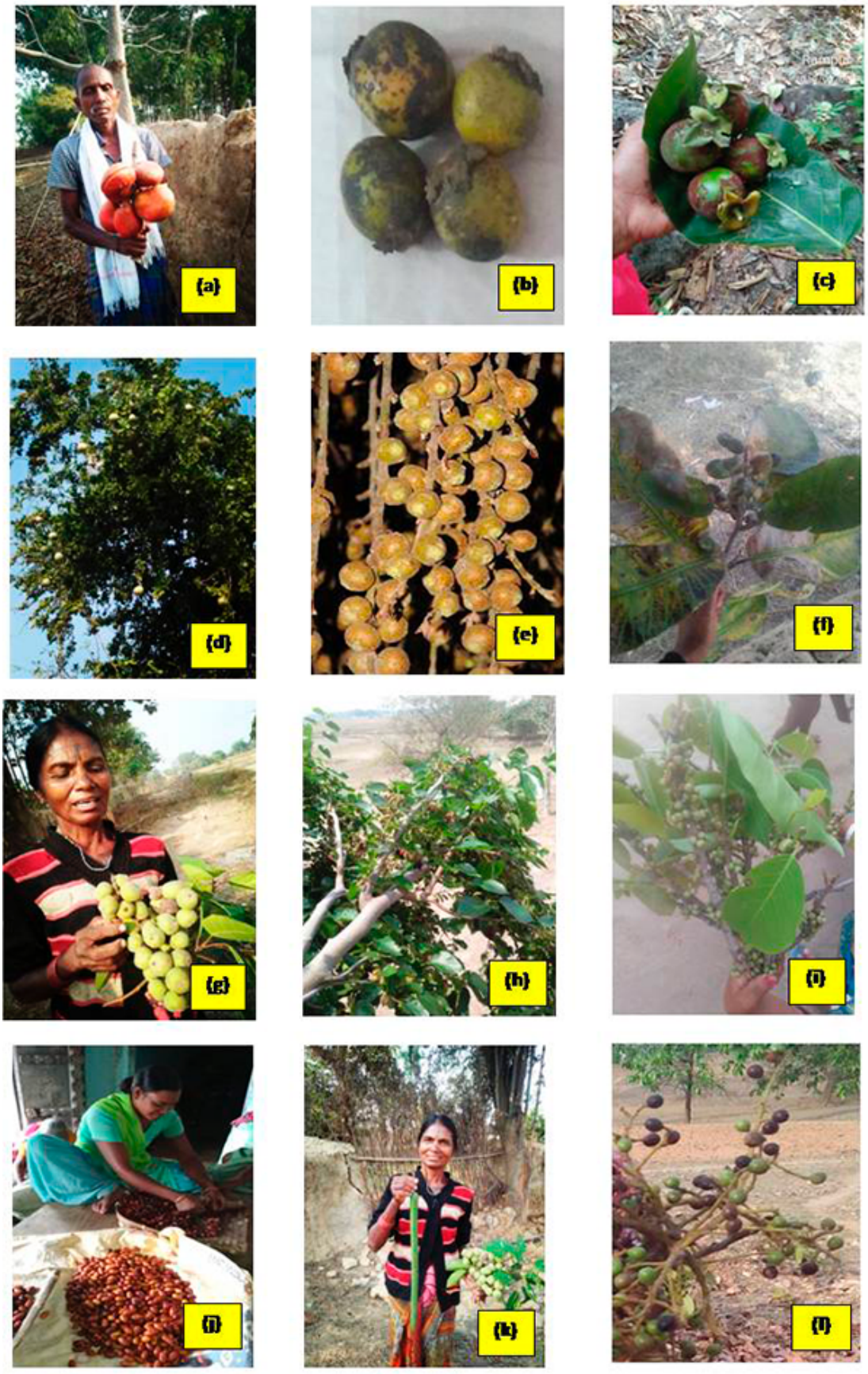

Figure 3. Wild edible fruits collected and consumed by Oraon tribe: (a) *Sterculia foetida,* (b) *Diospyros melanoxylon*, (c) *Diospyros peregrina*, (d) *Aegle marmelos*, (e) *Ficus semicordata*, (f) *Semecarpus anacardium*, (g) *Ficus racemosa*, (h) *Morus alba* ; (i) *Ficus religiosa*, (j) *Phoenix dactylifera*, (k) *Cassia fistula*, (l) *Buchanania lanzan*

Table 2. Use-based categories and ICF (Informant Consensus Factor).

Types of ailments	**Nur (Use citation)**	**% of use reports**	**Nt (No. of plants used)**	**ICF**
Digestive system Disorders	32	15.60	10	0.71
Fever and Cough	20	9.75	8	0.63
Sexual and related disorders	7	3.41	4	0.50
Pain	29	14.14	5	0.86
Microbial infections	17	8.29	7	0.63
Liver related problems	19	9.26	2	0.94
Kidney related Disease	10	4.87	2	0.89
Respiratory Disorder	14	6.82	4	0.77
Inflammation	34	16.58	4	0.91
Skin related disease	23	11.21	4	0.86
	Total: 205			

The highest RFC was found for *Morus alba* (0.86) followed by *Syzygium cumini* (0.84), *Diospyros melanoxylon* (0.82), *Madhuca longifolia* (0.82) and *Neolamarckia cadamba* (0.82), *Ficus religiosa* (0.80) and *Ziziphus mauritiana* (0.80) (Table 3). The wild edible fruit species having maximum RFC values specified their profuse use and extensive familiarity among the Oraon communities. Plants with low RFC value are difficult to find in the nearby villages of the study area, such as *Diospyros peregrine*. This study is consistent with Silalahi *et al.* (2018) that plants hard to catch in the nearby area is usually not well acknowledged by the respondents and have small RFC values. To check the similarity and novel use reports the present study was compared with few published ethnobotanical studies of adjoining region of the study area and Western Himalaya (Table 4). The Jaccard index ranged from 2.97 – 27.27. The maximum similarity was found with Das *et al.* 2018 with JI 27.27 which indicates the exchange of ethnomedicinal knowledge on uses of wild fruits among the Oraon tribes of Santal Paraganas, Jharkhand and Surguja, Chhattisgarh. It also specifies the analogous ethno-genesis of Oraon tribal people in these areas (Savikin *et al.* 2013). The lowest similarity was found with Singh *et al.* 2017 (JI = 2.97) due to the distance between the present study site and Rudraprayag District, western Himalaya. The greater geographical separation of these two regions causes less cultural exchange however, same flora used in different ways in various regions.

Many ethnobotanical studies (Das et al., 2018; Kumar & Saikia 2019; Suwardi *et al.* 2020) have also indicated that inventory record of traditional indigenous tribal knowledge through ethno-botanical research are vital for the conservation as well as sustainable consumption of the wild medicinal plants, present investigation is an attempt in this direction. The WEFs recorded in the present study grow in forests; however their domestication efforts must be sustained by the government through training to local communities. The awareness among the villagers through community participation programs will help in *in-situ* and *ex-situ* conservation of these WEFs.

The findings of our survey imitated that maximum of the young informants were not interested in collecting and consuming the wild fruits, rather preferred seasonal fruits obtainable in the market. Paul *et al.* (2020) also observed that the new generation is more attentive in fruits that are easily accessible in the market rather than gathering wild fruits from the deep forest. It is much remarkable to know that the native knowledge related to wild fruit is much higher among the old-aged group people and was also found interested in fruit collection from the forest for their family and have resilient belief that wild fruits are good for health. The old-aged informants also believe that many unknown nutritious fruits occur in the deep forest that is yet to be documented and explored. They firmly believe that wild edible fruits are more nutritious as forest soils have less agrochemical exposure than private lands. The fruits available in the market are generally packed with chemicals for their excellent appearance, rapid growth, production, etc**.**

Table 3 Folklore uses of wild edible fruits

Botanical name/ specimens numbers	Local name	Family name	Time of availability	Mode of utilization	Earlier reported phytochemicals	RCF	References
Aegle marmelos (L). Correa SUSL-22	L-Bael K- Khotta	Rutaceae	April - May	Pulp is crushed to paste and mixed with water and used in relieve thirst and digestive problems. It is also used to prepare drinks (Sharbat) energizer in summers.	Marmelosin, Luvangetin, Aurapten, Psoralen	0.60	Venthodika *et al.* 2021
Artocarpus lakoocha Roxb. SUSL-17	L-Barhar, K-Dahu	Moraceae	June - July	Fruit pulp eaten raw, considered good for liver. It is generally used in chutney and other medicinal preparations.	Oxyresveratrol, Artobiloxanthone, Elastixanthone	0.34	Lathiff*et al.* 2021
Buchanania lanzan Spreng. SUSL-35	L-Char K-Kitti	Anacardiaceae	April - May	Eaten fresh or dried for later consumption; fruit extract is used to treat snake bite.	valuable fatty acids, plant sterols like stigmasterol, γ-sitosterol, β-sitosterol	0.64	Khatoon *et al.* 2015
Carissa carandas L. SUSL-25	L-Karaunda K-Kanwoad	Apocynaceae	July - September	Ripe fruits are eaten raw; juice is used as an appetizer and considered good for heart muscles.	myo-inositol, 4-c-methyl, 2-acetoxymethyl-1,3,3-trimethyl-4t-(3-methyl-2-buten-1-yl)-1t-cyclohexanol	0.64	Anupama *et al.* 2014
Cassia fistula L. SUSL-23	L-Bhalmusri K- Sonarkhi	Fabaceae	April - May	Fresh or dried fruit pulp is used as a laxative.	2(3H)-furanone, rhein, thymoland oleic acid	0.24	Irshad *et al.* 2014
Diospyros melanoxylon Roxb. SUSL-46	L-Tendu K- Tella	Ebenaceae	February - March	The pulp of the fruit is mainly used for stomach pain, diarrhoea and mouth blisters.	Tannic acid and Gallic acid	0.82	Jamil *et al.* 2021
Diospyros peregrine (Gaertn.) Gurke SUSL-41	L-MakadTendu	Ebenaceae	March - May	Paste used externally to heal sores and wounds, bowel movement get relief by consuming the fruit pulp, it also improves digestion, used as gargle for sore throat.	Diospyrin, 8-hydroxydiospyrin, plumbagin, ebenone	0.20	Rauf *et al.* 2017

Ficus benghalensis L. SUSL-43	L-Bargad K- Bara	Moraceae	March - April	Ripe fruits are eaten; its pulp is mixed with coconut oil and use to treat hair growth problems and also consumed during food shortage.	7-tetradecenal, , n-hexadecanoic acid, octadecanoic acid	0.58	Jayasree Radhakrishnan *et al.* 2020
Ficus hispida L .f. SUSL-18	L-Dumar K- Dumbari	Moraceae	September - May	Unripe green fruits are cooked as vegetable while ripe fruits are eaten raw; juice of the fig is used in the treatment of liver problems.	3′-formyl-5,7-dihydroxy-4′-methoxyisoflavone, , 5,7-dihydroxy-4′-methoxy-3′, isoflavone,	0.74	Zhang *et al.* 2018
Ficus racemosa L. SUSL-29	L-Gular K- Umar	Moraceae	February - April	Raw fruits are used to control heavy menstrual bleeding (The consumption of dried figs with honey is used to control the excessive menstrual bleeding).	glauanol, hentriacontane, β-sitosterol, glauanolacetate	0.78	Chaware *et al.* 2020
Ficus religiosa L. SUSL-04	L-Peepal K- Chitkha	Moraceae	March - May	The dried fruit, crushed and taken with water to treat asthma, considered good for heart.	Aromadendrene, Bycyclogermacrene	0.80	Utami*et al.* 2020
Ficus semicordata Buch.-Ham. ex Sm. SUSL-39	L-Ghui K- Podai	Moraceae	March - July	Immature fruit is used to treat constipation; paste of the fruit is applied external to cure headaches.	Not Reported	0.70	Not Found
Kirganelia reticulate (Poir.) Baill. SUSL-09	L-Pithor K-Dudkho	Euphorbiaceae	March - July	Raw Fruits are eaten and useful in inflammations, diseases of the blood	Phytol, Lupeol, Squalene	0.60	Sudha *et al.* 2013
Madhuca longifolia (J. Koenig ex L.) J.F. Macbr. SUSL-28	L-Mahua K- Madgi	Sapotaceae	May - July	The fleshy outer coat of the fruit is used as a vegetable and roasted fruits are used to treat Asthma.	Δ5-avenasterol and β-sitosterol	0.82	Ramadan *et al.* 2006

Morus alba L. SUSL-02	L-Shahtoot K- Toonti	Moraceae	March - May	Fruits are eaten raw or cooked and used as laxative, refrigerant in fever and remedy for sore throat.	Moracin C	0.86	Yuan & Zhao 2017
Neolamarckia cadamba (Roxb.) Bosser SUSL-15	L-Kadamb K- Kadamb	Rubiaceae	September - December	Fruit juice is used to treat excessive sweating, thirst and burning sensation of the body	Quercetin, Rutin, Ferulic acid, Syringic acid	0.82	Pandey & Negi 2018
Phoenix dactylifera L. SUSL-05	L- Khajur K- Kinda	Arecaceae	July - November	The ripe fruit is eaten raw, dried used to treat sore throat, colds, asthma, to relieve fever, liver and abdominal troubles.	Coumaric acid, Ferulic acid	0.64	Anjum *et al.* 2012
Phyllanthus emblica L. SUSL-11	L- Amla K- Awada	Euphorbiaceae	November - February	Eaten raw or cooked into various dishes, such as dal, used in making pickles, Used for hair fall, skin problem	Gallic acid, phyllemblin, corilagin, furosin, and geranin	0.50	Saini *et al.* 2022
Saraca asoca (Roxb.) Willd. SUSL-14	L-Sitaasok K-Ashok	Caesalpiniaceae	May - July	Fruits are eaten raw to treat women related problems such as, leucorrhoea, menorrhagia, uterine bleeding etc.	Catechol and Epicatechol, Leucocyanidin	0.36	Singh *et al.* 2015
Schleichera oleosa (Lour.) Merr. SUSL-07	L-Kusum K-Fusra	Sapindaceae	March - June	Ripe fruit is eaten raw and is used to treat ulcers for both human and cattle.	Luteolin, rutin, quercitin and kaempferol,	0.72	Sahu*et al.* 2022
Semecarpus anacardium L.f. SUSL-44	L-Bhelwa K-Kiero	Anacardiaceae	December - February	Sweet raw fruits are eaten and used for digestion	Bhilwanol, anacardoside, semecarpetin, nallaflavanone, jeediflavanone	0.68	Nikam 2022
Sterculia foetida L. SUSL-03	L-Jangali Badam	Malvaceae	January - February	The uncooked or roasted seeds are edible and consumed mainly during food scarcity. It is used for glowing skin tone and as anti-inflammatory	Tannin, saponin, terpenoid, glycoside, and flavonol	0.30	Teli and Pandit 2018

Syzygium cumini (L.) Skeels SUSL-52	L-Jamun K-Jambo	Myrtaceae	February - April	Water-diluted juice is used as a gargle for sore throat and as a lotion for ringworm of the scalp.	Lutein, zeaxanthin, β-carotene and β-cryptoxanthin	0.84	do Nascimento-Silva *et al.* 2022
Terminalia bellirica (Gaertn.) Roxb. SUSL-51	L-Baheda K- Baheda	Combretaceae	March - May	The ripe fruit is used in diarrhoea and indigestion; whilst the unripe fruit is used as a laxative in cases of chronic constipation Externally, it is used to make a lotion for sore eyes.	Arjunetin, Chebulagic acid, Chebulinic acid, Gallic acid	0.76	Gupta *et al.* 2020
Terminalia chebula Retz. SUSL-54	L-Harra K- Hadrra	Combretaceae	November - March	Fruit pulp is eaten and considered good for eyes, dysentery, cough, asthma and as a mouthwash gargle, diuretic, and laxative.	Terminaliate A gallic acid, methyl gallate, three chebulic acid derivatives, 1,2,6-tri-O-galloyl-β-D-glucopyranose, and arjungenin	0.76	Ou-Yang*et al.* 2022
Ziziphus mauritiana Lam. SUSL-21	L-Ber K- Paan	Rhamnaceae	October - February	Eaten raw and dried and powdered and stored. It increases stamina.	Propanoic, hexanoic, heptanoic, octanoic, nonanoic, decanoic, dodecanoic, n-pentadecanoic, hexadecanoic, benzoic, and trihydroxybenzoic acids	0.80	Memon *et al.* 2012

L-Local Language, K-Kurukh Language.

Table 4. Similarity of uses of present study compared with published literature from adjoining region

Study Area	Study Year	Number of Plants reported	Total common species in both areas	Plants with similar use	Plants with dissimilar use	% of common plant species	% of plants with similar uses	% of plants with dissimilar uses	Jaccard index	Reference
Boridand Forest Korea District, Chhattisgarh	2013-14	41	9	4	5	21.9	9.75	12.19	15.51	Ahirwar 2015
Surguja District, Chhattisgarh	2008	73	18	6	12	24.65	8.21	16.43	22.22	Kala 2009
Bilaspur District, Chhattisgarh	2019	65	12	5	7	18.46	7.69	10.76	15.18	Patra & Sharma 2021
Rudraprayag district, Western Himalaya	2014-15	78	3	1	2	3.84	1.28	2.56	2.97	Singh *et al.* 2017
Santal Paraganas, Jharkhand	2012-17	30	12	4	8	40	13.33	26.66	27.27	Das *et al.* 2018
Jashpur, Chhattisgarh	2013-14	50	5	3	2	10	6.00	4.00	7.04	Painkra *et al.* 2015

Conclusion

The medicinal importance of the wild edible fruits from the deep forest is much greater than the seasonal fruits found in the market. The Oraon tribes also used many unidentified wild fruits from deep forests whose names are unknown. The plants with high use reports should be further investigated to identify their bioactive phytocompounds. These wild fruit species are essential to be preserved immediately before the disappearance of the genetic pool. The present study and several other related studies indicate that there still exists a form of intelligence within the tribal community which is most commonly accredited as traditional knowledge.

This form of knowledge, however, is rather very volatile on account of the fact that it has not been very well documented and has only been passed verbally or through experiences. The change in the occupation and earning system as well as the advent of new medical practices has led to the discouragement as well as downfall of the traditional treatment methods from old herbal healers. The rural-urban relocation of young generation for better job prospects has further led to the loss of necessary indigenous ethnomedical knowledge of Oraon tribes that has gathered over many generations. Efforts from government, NGOs and local community are required to preserve this ethnomedicinal wealth from being vanished in the nearby future. The afforestation of waste lands must include wild fruit tree saplings by which extinction risk of wild fruit species will be reduced, it also enhances the socioeconomic development of local community, create photosynthetic pool and act as CO_2 sinking zone.

Declarations

Ethics Approval: Verbal informed consent was obtained from each informant before interviews. The interview procedure was explained to each in their local language.
Data Availability: The authors confirm that the data supporting the findings of this study are available within the article.
Competing Interests: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.
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Author contributions: SL collected the samples, S performed the interviews, AKP, KP and RM analyzed the data and wrote the paper. A Kumar and A Kerketta helped in analyzing the data. SPS critically analyzed the study and helped in drafting the article as well as edited the manuscript. All authors read and approved the final manuscript.

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