

The Traditional Knowledge of Wild Edible Leaf used by Tribal People in Chhattisgarh

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ABSTRACT

Chhattisgarh, A state of rich biodiversity zone covered a wide range of forest having three climatic zones namely north and central eastern plateau zone, Eastern plateau zone, Western plateau zone supporting a rich biodiversity. Approximately, 30 tribal inhabitants depend on forest for survival and population live below the poverty line. The forest provide a significant role to provide them wild leafy vegetables, consumed by the tribal and other local inhabitants. These wild edible leaves not only provide the nutritional requirements of local population but ensure food security for the people living in and around forests areas. The role of present study was to enthruses the various wild edible leaves eaten by the local communities.

Keywords: Food security, Nutrition, Tribal Community, Wild leafy vegetables.

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INTRODUCTION

The human population has used leaves as food since decades. The different types of leaves depending from the place and the season were a part of the human diet since prehistoric times. According to many historians, Traces of edible leaves have been found in ancient Egyptian archaeological sites. Many edible leaves were historically documented since ancient Greece, in ancient Rome, in ancient Sri Lanka and in the middle Ages. Eventually, the passing of the centuries might have traditional leaf vegetables have been replaced by leaves (Chauhan *et al.*, 2014). The different wild Leaves are the gift of nature to the tribal people throughout the year which supplement their nutritional requirements. Interestingly, the wild green leaves play a significant role as primary food because they have a high vitamin K and food value in comparison to other fruit and vegetables. They are also rich source of minerals like iron, calcium, potassium and magnesium (Mishra and Mishra, 2013). The State of Chhattisgarh is not only a forest of natural rich state but also has a rich availability of wild edible leaves (Chowdhury and Mukherjee, 2012). It shows the poor situation of consumption of all the specific food items except green leaves (Cooper *et al.*, 1966). Due to presence of rich Biodiversity, Chhattisgarh state plays a significant role in food and nutritional security of the tribal inhabitants. The consumption of leafy vegetable not only provide food quantity but also enhance the population nutrition throughout the year (Grivetti and Ogle, 2000; Ogle, 2001; Ogle *et al.*, 2001, 2003). Normally the tribal inhabitants earn their livelihood by selling these nutritious leafy vegetables and contribute to household food security.

Pendra road is a forest region, which is situated in Northern region of Bilaspur district of Chhattisgarh state. The climatic condition of district is sub humid type. Average rainfall is 52.8 mm/year. Edible wild plants are an important source of food of tribes in this region. Tribal Population of Pendra road is approximately 25-30%. Fifty six species of wild plants were used by inhibited tribal's and villagers for food. Among those species 21 species are herb, belonging to 21 Genera, and 15 families, followed by 10 species are shrub, belonging to 10 Genera and 10 families and 17 species are trees belonging to 15 Genera and 12 families. 07 species are climber in nature belonging to 05 Genera and 05 families documented plants 16 were abundant 24 were common and 15 were uncommon in this area. Total number of genera and species

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are calculated (Ahirwar and Shakya, 2013; Ekka and Ekka, 2016; Sharma and Sharma, 2017).

In an another study in Bhoramdeo Wild life sanctuary three villages filed survey Thuhapani, Pahchrahi, and Bairkh, Kabirdham region of India. Chhattisgarh to document the diversity, indigenous uses and availability status of edible plants. The tribes of this region are dependent up to a large extent on wild resources for their food and other daily needs. Plant parts such as leaves, shoots, young twigs, roots, rhizomes, tubers, flowers, fruits, seeds, etc. are used for food by the tribal people. plant species were recorded which are being used as vegetables, drinks, fruits, dry fruits, pickles, foods, chutney, confection and curry. Lal *et al.* (2017) identifies 115 edible plant species under 108 genera and 45 families. They recorded species 59 were herbs, 09 shrubs, 29 trees and the rest 18 were climbers.

METHODOLOGY

The present study has been conducted within Chhattisgarh state looking food supplement of poor people covers an area of 8,537 km². The gross population rate in 2006 was 2,997,100, out of which 30% were scheduled tribes. A regular survey alongwith local market and village of different district have been surveyed in the year 2016-2018. The state has been diversified into different climatic zones on the basis of the heterogeneity of soil type, topography, and atmospheric weather. The identified and collected plant

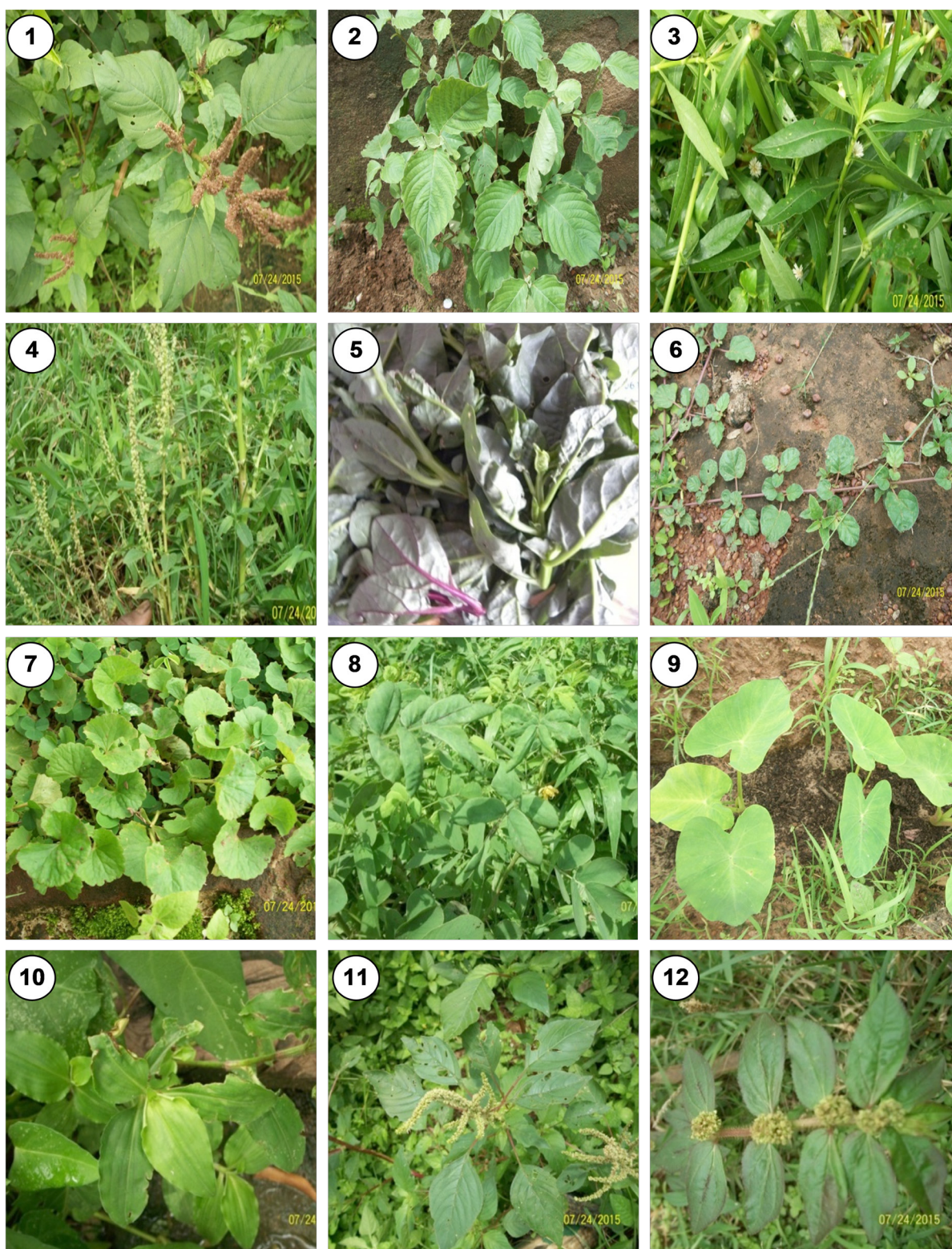
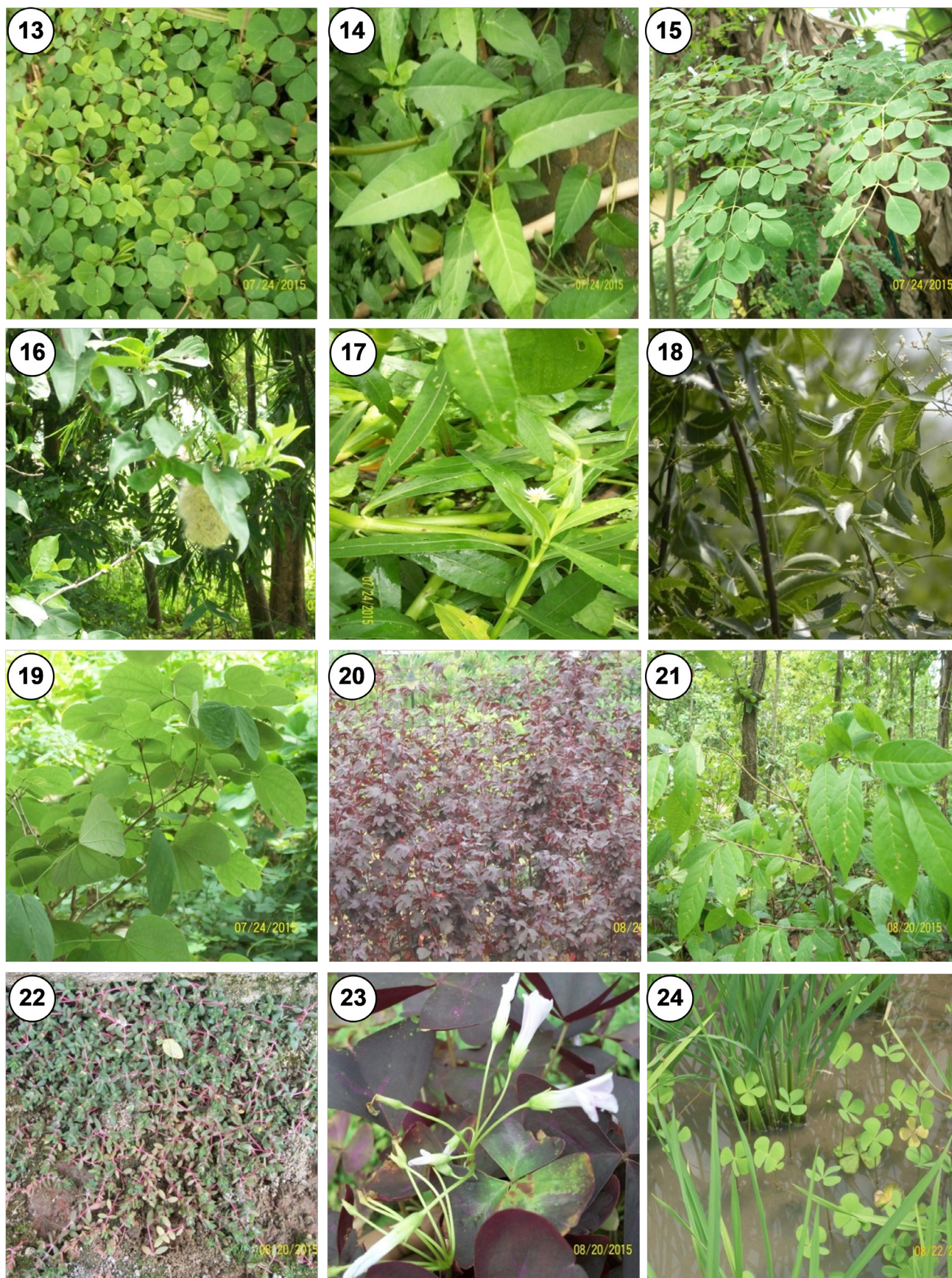


Plate 1: Photograph of some wild edible leaves. 1. *Amaranthus viridis*, 2. *Alternanthera philoxeroides*, 3. *Achyranthus aspera*, 4. *Amaranthus spinosus*, 5. *Basella rubra*, 6. *Centella asiatica*, 7. *Centella asiatica*, 8. *Cassia tora*, 9. *Colocasia esculenta*, 10. *Commelina benghalensis*, 11. *Chenopodium album*, 12. *Euphorbia hirta*, 13. *Oxalis corniculata*, 14. *Ipomoea aquatica*, 15. *Moringa oleifera*, 16. *Vangueria spinosa*, 17. *Alternanthera sessilis*, 18. *Azadirachta indica*, 19. *Bauhinia retusa*, 20. *Albesmuscus cannabinus*, 21. *Antidesma diandrum*, 22. *Portulaca oleracea*, 23. *Oxalis corymbosa*, 24. *Marsilia minuta*, 25. *Monochoria vaginalis*, 26. *Mentha piperta*, 27. *Mentha spicata*, 28. *Hygrophila auriculata*, 29. *Eryngium foetidum*, 30. *Polygonum plebejum*, 31. *Limnophila confirta*, 32. *Piper longum*, 33. *Cordia dichotoma*, 34. *Celosia argentea*, 35. *Tamarindus indica*, 36. *Ficus infectoria*, 37. Dry leaves sold out in market, 38. Survey with tribals.



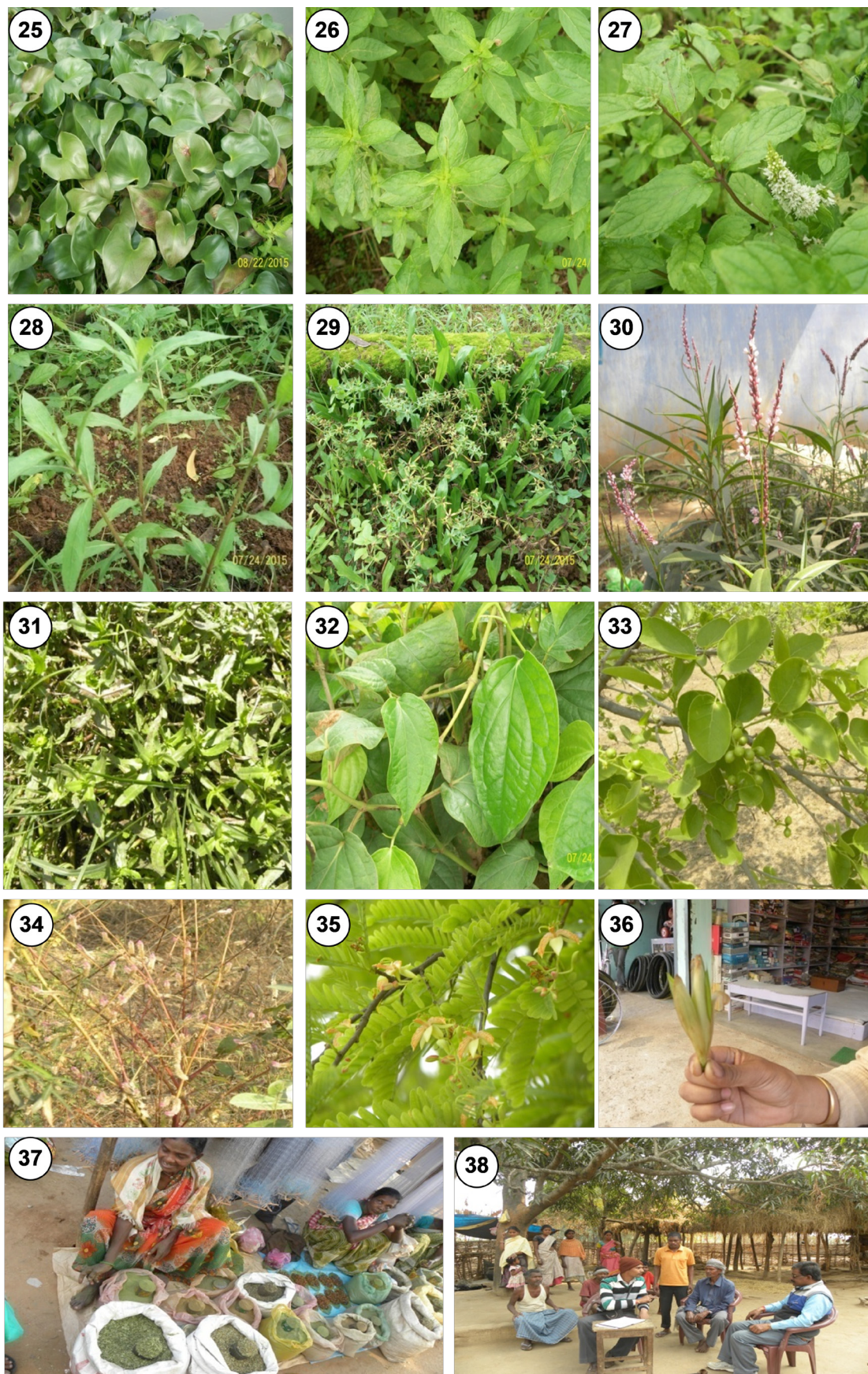


Plate 1 continued



Fig. 1: Map showing adjacent parts of sample collection in Chhattisgarh.

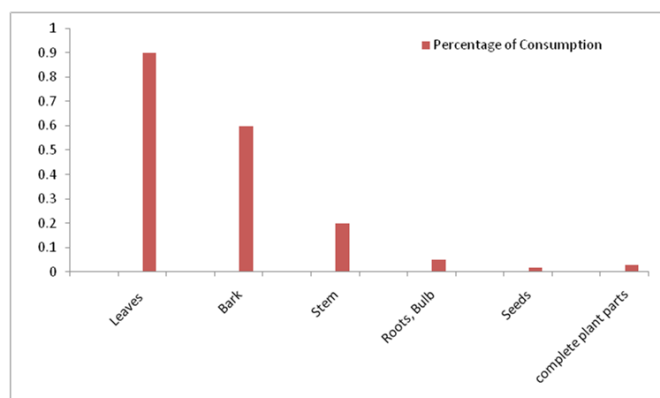


Fig. 2: The consumption of plant parts by the tribes and local people of Chhattisgarh.

samples were arranged and documented according to their local names.

RESULT AND DISCUSSION

India has approximately 900 species, are consumed as wild edible plants by the tribal people. This study pertains to only the wild edible leaves consumed by the tribal and local communities of Chhattisgarh state. The total respondents were 20-22 in numbers per villages to collect sample of leafy vegetables which were identified from forest department (Fig. 1). In this study, it was found that the plant belonging to Amaranthaceae is a vigorous, erect, perennial, branched growing to 10-100 cm tall. The plant is often harvested from the wild as a source of food and medicines. It is sometimes cultivated in the Tropics for its edible leaves and is often sold in local markets (Plate 1). In Mimosaceae, The leaves

Table 1: Some wild edible plants parts with their consumption in Chhattisgarh.

S.N.	Botanical name	Family	Vernacular names	Part consumed	Method of consumption
1	<i>Achyranthus aspera</i> L.	Amaranthaceae	Chirchithi	Leaves	Fresh leaves cooked
2	<i>Adathoda vasica</i>		Bakas	Leaves	Fresh leaves
3	<i>Adenanthra pavoniana</i> L.	Mimosaceae	Rakht kanchan	Leaves	Dry leaves
4	<i>Aerva lantana</i> Juss.	Amaranthaceae	Lopong Sag	Leaves	As vegetable
5	<i>Alternanthera philoxiroids</i> Br.	Amaranthaceae	Garundi	Young plant	Fried/Roasted
6	<i>Alternanthera pungens</i> Kunth.	Amaranthaceae	Guri bhaji	Leaves	As vegetable
7	<i>Alternanthera sessilis</i> Br.	Amaranthaceae	Saronchi	Young plant	Fried/Roasted
8	<i>Amaranthus gangeticus</i> Roxb.	Amaranthaceae	Lal sag	Leaves	Fresh leaves are cooked
9	<i>Amaranthus spinosus</i> Linn.	Amaranthaceae	Kanteli Chaulai	Leaf shoot	Leaves cooked
10	<i>Amaranthus viridis</i> Linn.	Amaranthaceae	Bhaji sag, Lotia sag	Leaf and shoot	Roasted then eaten
11	<i>Ampelocissus latifolia</i> Planch.	Vitaceae	Ban angur	Leaves	As vegetable
12	<i>Andrographis paniculata</i>	Acanthaceae	Kalmegh	Leaves	Fresh dry leaves
13	<i>Antidesma diandrum</i> Roxb.	Euphorbiaceae	Matha arak	Leaves	Young leaves are used in curry and as vegetable
14	<i>Averrhoa carambola</i> L.	Averrhoaceae	Kaamrakh	Leaves	Dry leaves
15	<i>Azadirachta indica</i>	Meliaceae	Neem	Leaves	Dry fresh leaves
16	<i>Bacopa monnieri</i>	Scrophulariaceae	Brahmi	Leaves	Fresh leaves
17	<i>Basella rubra</i> L.	Basellaceae	Poi sag	Leaves	Stem and leaves are used to prepare curry
18	<i>Bauhinia purpurea</i> L.	Caesalpiniaceae	Singara	Leaves	Young shoots leaves are cooked as curry or fried
19	<i>Bauhinia retusa</i> Roxb.	Caesalpiniaceae	Laba	Leaves	Young shoots leaves are cooked as curry
20	<i>Beta vulgaris</i> L.	Chenopodiaceae	Sakarkand	Leaves	As vegetable
21	<i>Biden pilosa</i>	Asteraceae	Myna sag	Leaves	As vegetable
22	<i>Bignonia picta</i>	Bigoniaceae	Pakhanachatta lundi ara	Leaves	Leaves are cooked as curry
23	<i>Boerhaavia diffusa</i> Linn.	Nyctaginaceae	Khapra sag	Fresh leaves	Tender leaves fried/ roasted
24	<i>Butomopsis latifolia</i>	Alismataceae	Lundi ara	Leaves	Boiled then water is squeezed out and then cooked
25	<i>Cassia occidentalis</i> L.	Caesalpiniaceae	Barka chakonda	Leaves	Tender leaves are cooked
26	<i>Cassia tora</i> L.	Caesalpiniaceae	Chakoara	Leaves and seeds	Leaves are cooked
27	<i>Celosia argentea</i> L.	Amaranthaceae	Siliari	Leaves	Young leaves and shoots are roasted
28	<i>Centella asiatica</i> Linn.	Umbelliferae	Beng sag	Whole plant	Leaves and young shoots are roasted

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29	<i>Chenopodium album</i> Linn.	Chenopodiaceae	Bhathua sag	Leaves	Leaves and young shoots are fried/roasted
30	<i>Cissus adnata</i> Roxb.	Vitaceae	Khatta sag	Leaves	Leaves cooked as vegetable.
32	<i>Cissus quadrangularis</i> L.	Vitaceae	Hadjor	Leaves	As vegetable
33	<i>Cleome gynandra</i> L.	Capparidaceae	Sad hurhuria sag	Leaves	Leaves roasted
34	<i>Cleome monophylla</i> L.	Capparidaceae	Hurhuria sag	Leaves	Leaves and young shoots are roasted
35	<i>Cleome viscosa</i> Linn.	Capparidaceae	Namkani	Young plant	Leaves and young shoots are, fried/roasted
36	<i>Colocasia esculenta</i> L.	Araceae	Pechki	Leaves	Young tender leaves cut into small piece, cooked with salt and chilly
37	<i>Commelina benghalensis</i> Linn.	Commelinaceae	Kenna sag	Leaves	Leaves and young shoots are fried/roasted
38	<i>Commelina erecta</i>	Commelinaceae	Bas kena	Leaves	As vegetable
39	<i>Corchorus capsularis</i> Linn.	Tiliaceae	Pat sag	Leaves	Tender leaves cooked
40	<i>Corchorus olitorius</i>	Tiliaceae	Pat sag	Leaves	Tender leaves cooked
41	<i>Cordia dichotoma</i>	Boraginaceae	Dhanul	Leaves	Tender leaves are cooked
42	<i>Cynotis cristata</i>	Commelinaceae		Leaves	As vegetable
43	<i>Eclipta alba</i>	Asteraceae	Bhangara	Leaves	As vegetable
44	<i>Eclipta prostrate</i>	Asteraceae	Bhrigraj	Leaves	Fresh leaves
45	<i>Enhydra fluctuans</i>	Asteraceae	Muchri ara	Leaves	Chopped cooked/steamed
46	<i>Enhydra fluctuans</i> Lour.	Asteraceae	Nunga sag	Leaves	As vegetable
47	<i>Eryngium foetidum</i>	Apiaceae	Kanta dhania	Leaves	Adds flavour
48	<i>Euphorbia hirta</i>	Euphorbiaceae	Marang dudhi	Leaves	Tender leaves are cooked
49	<i>Ficus geniculata</i> Kurz.	Moraceae	Putkal	Leaves	Young leaves cooked. Pickle is also made
50	<i>Ficus infectoria</i> Roxb.	Moraceae	Phutkal	Leaves	Young leaves cooked. Pickle is also made.
51	<i>Gymnema sylvestris</i> R.Br.	Asclepiadaceae	Gurmar	Leaves	Fresh leaves
52	<i>Hygrophila auriculata</i>	Acanthaceae	Koila ara	Leaves	Cooked/Steamed and eaten
53	<i>Impatiens balsamina</i> L.	Balsaminaceae	Murga phul	Leaves	As vegetable
54	<i>Ipomoea aquatic</i>	Convolvulaceae	Kalmi	Leaves	Leaves cooked
55	<i>Leea macrophylla</i>	Leeaceae	Hathi kana	Leaves	As vegetable
56	<i>Leucas aspera</i> Spreng.	Labiatae	Guma	Tender leaves	Leaves taken as food
57	<i>Leucas cephalotes</i> Spreng.	Labiatae	Choti guma	Tender leaves	Leaves roasted
58	<i>Limnophila aromatica</i>	Scrophulariaceae	Lasodh	Tender leaves and shoots	Cooked/Steamed Chatni is also prepared
59	<i>Limnophila confirta</i> Benth.	Scrophulariaceae	Muchari	Tender Leaves and shoots	Leaves and young shoots are roasted
60	<i>Limnophila gratioloids</i> R.Br.	Scrophulariaceae	Kado sag	Tender leaves and shoots	Cooked/Steamed and Chatni is also prepared
61	<i>Limnophila rugosa</i>	Scrophulariaceae	Lasodh Ara	Tender leaves and shoots	Cooked/Steamed and Chatni is also prepared. Have essence of unripe mango.
62	<i>Lobelia alsinoides</i>	Companulaceae	Bari ara	Tender leaves and shoots	Cooked/Steamed, often cooked in curry.
63	<i>Ludwigia adseendens</i>	Onagraceae	Machli sag	Leaves	As vegetable
64	<i>Ludwigia octovalvis</i>	Onagraceae	Machli sag	Leaves	As vegetable
65	<i>Marsilia minuta</i> L.	Marsiliaceae	Sunsunia	Leaves	Tender leaves roasted
66	<i>Melochia corchorifolia</i> Linn.	Sterculiaceae	Susuni	Leaves	Leaves cooked
67	<i>Mentha piperta</i>	Lamiaceae	Pipermint	Leaves	As flavor
68	<i>Mentha spicata</i>	Lamiaceae	Pudina	Leaves	As chatni
69	<i>Monochoria vaginalis</i>	Pontederiaceae	Lochkor ara	Leaves	Cooked/Steamed
70	<i>Moringa oleifera</i>	Moringaceae	Munga sag	Leaves	Leaves frying or roasting

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71	<i>Nyctanthus arbortistis</i>	Oleaceae	Harsingar	Leaves	Fresh leaves
72	<i>Oxalis corniculata</i> Linn.	Oxilidaceae	Netho sag	Leaves	Leaves fried and taken
73	<i>Oxalis corymbosa</i> Linn.	Oxilidaceae	Tandi chatom ara	Leaves	Leaves are fried and taken
74	<i>Paderia foetida</i>	Rubiaceae	Gandhraj	Leaves	Fresh leaves
75	<i>Pergularia daemia</i> Forssk.	Asclepiadaceae	Mausi sag	Leaves	Cooked as vegetable
76	<i>Phyllanthus nuriri</i>	Euphorbiaceae	Bhumi awla	Leaves	Fresh leaves
77	<i>Pringlea antiscorbutica</i>				
77	<i>Piper longum</i>	Piperaceae	Pipli	Leaves	Fresh leaves
78	<i>Polygonum barbatum</i> L.	polygonaceae	Sake sag	Leaves	Young plants are cooked
79	<i>Polygonum glabrum</i> Willd.	polygonaceae	Sauri arak	Leaves	Young plants are cooked
80	<i>Polygonum plebejum</i> R.Br.	polygonaceae	Chimti sag	Leaves	Young plants are cooked
81	<i>Portulaca oleracea</i> Linn.	Portulacaceae	Golgala	Young Plant	Tender leaves roasted
82	<i>Portulaca quadrifida</i> Linn.	Portulacaceae	Noni sag	Young Plant	Tender leaves roasted
83	<i>Rumex vesicarius</i> L.	polygonaceae	Tissa palak	Leaves	Leaves are cooked
84	<i>Rungia parviflora</i> Nees.	Acanthaceae	Kawoa sag	Young Plant	Tender leaves cooked
85	<i>Sagittaria sagittifolia</i> L.	Alismataceae	Luchkor	Leaves	Boiled then water is squeezed out and then cooked
86	<i>Scoparia diltis</i> L.	Scrophulariaceae	Van dhania	Young plant	Adds flavour
87	<i>Trianthema decandra</i> Linn.	Aizoaceae	Purni	Tender leaves	Leaves fried
88	<i>Tridax procumbence</i>	Asteraceae	Jharmakhan	Leaves	A vegetables
89	<i>Vangueira spinosa</i> roxb.	Rubiaceae	Sarla kanta	Leaves	As vegetable
90	<i>Dryopteris cochleata</i>	Pteridaceae	Machli sag	Leaves	As vegetable

are bipinnate and stipulate. The inflorescence is cymose head and flowers are actinomorphic small. The calyx and corolla are valvate while petals are connate. Interestingly, the stamens number varies from 4 to many and fruit are legume. On the other hand, the plant belonging to family Tiliaceae are generally trees or rarely herbs comprise of 50 genera and 450 species which may be characterized by the presence of branched or stellate hairs. The leaves are simple and alternate, stipules are present. The flowers are actinomorphic and always bisexual (Plate 1). The reported plants do not have any authentic herbarium submitted to Department in current study.

The graphical presentation showed the highest percentage of leaves consumption in comparison to other plant parts (Fig. 2). The wild edible leafy vegetables are enumerated in Table 1, in which plants are arranged alphabetically with their local names and parts used method of consumption. The fundamental biological process of leafy vegetables used for the survival of the living beings. On the basis of knowledge gained through successive generations and experience, food habits have been developed (Richards, 1948). The Table 1 showed that the wild edible leaves are seasonable throughout the year. Commonly called 'Phutkal' is very popular in Chhattisgarh. It is not only popular vegetable but its pickle is prepared which is very common in most of the households of tribal and local inhabitants. In India leafy vegetables are commonly called sag includes Muchari, Khapra sag, Beng, Sunsunia, Koinar leaves, Bathua and Chimti are common leafy vegetables. These leaves are dried and used in off season; called Sukti, Green leafy vegetables are boiled the dried and then stored. Such dried food stuffs are cooked with starch (Gupta, 1974; Tewari and Sharma, 1989). Hence, Traditional leafy crops are important fresh crops during the rainy season. They are especially important in dried form during winter and spring seasons (Jain and Tiwari, 2012).

The most important thing about these vegetable species is that in spite of most being seasonal, these are consumed throughout the

year. Most of these wild leaves are consumed after cooking, roasting or frying. Local tribal's get the leaf dried and store them to be used in off season (Bhatt and Bhargava, 2006). In the local market, one can find the fresh leafy vegetables as well as dried leaves. Thus, these wild leafy vegetables are the chief source of nutrients such as proteins, carbohydrates; fat, vitamins and minerals for tribal peoples (Dwivedi, 2007). The communication deals with the native uses of ethnobotanical species identification and chemical analyses of different edible parts of wild plant species consumed by the local people inhabiting in the tribal areas of Bilaspur district, situated in the eastern part of Chhattisgarh state of India. Total seventy wild edible plant species were identified and recorded. Out of seventy plants species 25 are chemically analyzed and presented in this paper. The methods employed in this study were designed with the purpose of providing baseline information on the wild edible plant species in local system through surveys (field visits) and there nutritional potential through chemical analysis of different edible parts. Plants were collected, photographed, identified and voucher specimens prepared for the herbarium. The proximate nutritional composition, ash, moisture, carbohydrate, crude protein, crude fat, crude fiber, energy and iron were determined (Vishwakarma and Dubey, 2011).

CONCLUSION

Thus it was concluded that wild edible leaves are the solution to solve the poverty and socio-economic condition of the tribal and local inhabitants of Chhattisgarh for their day to day food requirements. These are the nature's gift to the inhabitants of forests to fulfill their nutrition requirements. Overall these leafy vegetable seems to provide a great opportunity to the tribal peoples for their better livelihood. The utilization of different method may enhancing their production both *in vitro* and *in vivo* can manage the ecological biota of tribal people.

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