

# Phytosociological study of ethno medicinal leafy vegetable flora of district Kondagaon Chhattisgarh

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## ABSTRACT

This paper deals with the phytosociological study of ethnomedicinal leafy vegetables flora of district Kondagaon Chhattisgarh. In this study many ethnomedicinal plants has been extensively studied during winter season October to February occurred in the year 2018 to 2019 in 5 different villages and weekly village markets of Kondagaon district. Study was conducted in the leafy plants of Kondagaon, Farasgaon, Makadi, Bade-Rajpur and Keshkal. Phytosociological studies of the 5 different sites were conducted for leafy vegetable plants with their phytosociological aspects that is frequency, relative frequency, density, relative density, abundance, relative dominance as well as importance value index (IVI).

**Keywords:** Phytosociology, Leafy vegetables, Ethnomedicinal plants, importance value index.

## Introduction

Plants have long been associated with human civilization. As the source of food, plants constitute more than 90% of our food requirements. Leafy vegetables occupy important place among food providing plants as these are the most important source of minerals and vitamins. A number of leafy vegetables are used world wide. Nutritionally, these are very much important because they not only provide us the nutrients but also function as roughage in our food (Ogle *et al.*, 2001; Ogle, 2001). Leafy vegetables not only provide food quantity but also make significant contribution to the population nutrition throughout the year. Moreover, Since the beginning of human civilization man has been using many leafy plants and plant part extract as medicine. Leafy vegetables are known as excellent sources of natural antioxidant. The importance of antioxidant constituents of leafy vegetables has also been established in the maintenance of health. The tribal people of the area use maximum number of leafy plant species for medicinal purpose (Kala, 2009; Jain and Tiwari, 2012; Chauhan *et al.*, 2014; Haile and Tesfu, 2014).

Being largely associated with mankind food yielding plants have been studied world wide for their various aspects like economic value, growth behavior, biochemical composition, ethnobotanical value etc. phytosociology is an important aspects for the study of economically important plants. This is because phytosociology not only provide in data about the prevalence of species content of an area rather such studies

also throw light on the impact of environmental/climatic changes on distribution of indigenous plants. In this regard (Rao *et al.*, 2015) have mentioned that phytosociology is the study of the characteristics classification, relationship and distribution of plant communities and it is useful to collect such as data to describe the population dynamics of each species studied and how they relate to the other species in the same community. Phytosociological information gathered for understanding the structure and function of the vegetation (Khare *et al.*, 1985; Negi and Nautiyal, 2005; Singh and Gupta, 2006; Ahmed *et al.*, 2009). Such studies also suggest the ways how to protect our biodiversity and also helps in understanding the changes that a particular flora has experienced in the past.

Phytosociological studies of different flora in our country have been made by various workers. Some of them needs to mention are (Sheela and Asha, 2007) in Kerala, (Rao *et al.*, 2015) in Khammam district of Telangana and (Shahid and Joshi, 2016) in Uttrakhand etc. However, such studies are few and far between in the state of Chhattisgarh. The only group working in the field of phytosociology and ethnobotany of food plants is being led by (Chauhan *et al.*, 2014) in Durg. Bastar of Chhattisgarh is an geographically and geologically important area of the globe but as far as botanical exploration of its flora is concerned, it has large been neglected for centuries. Therefore, the present study has been made about the phytosociology of leafy vegetables of the area.

In this piece of research work we have tried to study the frequency, relative frequency, density, relative density, abundance, relative dominance as well as importance value index (IVI) of the leafy vegetables of Kondagaon area of Bastar, Chhattisgarh.

## Materials and Methods

**Study Sites:** The study was conducted in different villages of Kondagaon, Farasgaon, Makadi, Bade-Rajpur and Keshkal. Kondagaon is also the District Headquarter. Kondagaon District has an area of 7768.907 square kilometers. It has population of 5,78,326, Out of the total population, more than 70% are tribal and comprised by Gond, Maria, Muria, Dhruva, Bhatra, Halba etc. The five villages under study have been marked by specific site number for the purpose of study. These are on-

Site-1: Kondagaon

Site-2: Farasgaon

Site-3: Makadi

Site-4: Bade-Rajpur

Site-5: Keshkal

**Climatic condition:** There are three main climatic seasons are summer, winter and rainy. The winter season starts of November and ends middle of February. The summer season starts from middle of February to May.

So, rainy season starts from June to October. In this area climate is tropical and sub humid with annual air temperature of 27.0°C and annual rainfall of 1534 mm. The temperature regime is isohyperthermic whereas moisture regimes are udic and ustic. The soils of Kondagaon district are red sandy, red and brown sandy loam, red and black, skeletal and black. The annual soil temperature is 26.0°C and in summer soil temperature is 29.3°C.

**Formula:** The following formula were used to compute different phytosociological parameters was evaluated by analyzing the %Frequency, Density, Abundance, Relative Frequency, Relative Density, Relative Dominance and IVI according to Curtis and Mc Intosh (1950), Curtis and Mc Intosh (1951), Curtis and Cottom (1956), Curtis (1959), Mishra (1968) and as given below:-

$$\% \text{Frequency} = \frac{\text{Total no.of quadrats in which species occurred}}{\text{Total no.of quadrats studies}} \times 100$$

$$\text{Density} = \frac{\text{Total no.of individuals of a species in all the quadrats}}{\text{Total no.of quadrats studied}}$$

$$\text{Abundance} = \frac{\text{Total no.of individuals of the species in all the quadrats}}{\text{Total no.of quadrats in which the species occurred}}$$

$$\text{Relative Frequency} = \frac{\text{Total no.of occurrences of a species in all the quadrats}}{\text{Total no.of occurrences of all species in all quadrats}} \times 100$$

$$\text{Relative Density} = \frac{\text{Total no.of individuals of a species in all the quadrats}}{\text{Total no.of individuals of all species in all quadrats}} \times 100$$

$$\text{Relative Dominance} = \frac{\text{Total basal area of each species in all quadrats}}{\text{Total basal area of all species in all quadrats}} \times 100$$

$$\text{Importance Value Index (IVI)} = \text{Relative Frequency} + \text{Relative Density} + \text{Relative Dominance}$$

**Results and Discussions:-** The informations given in the species list below has been analyzed in all sites. Species are classified on the basis of the habit. So, the investigations have recorded 52 leafy vegetable plants used by tribal communities and belonging to 31 families. Out of them 39 were herb species, 3 were shrub species, 4 were tree species, 6 were climber species. In my Phytosociological study, green colour of the table shows maximum value of plant while orange colour shows minimum value of plant. So, the Maximum IVI of plant *Commelina benghalensis* and Minimum IVI of plant *Cucurbita maxima* are present in site1. Maximum IVI of plant *Leucas cephalotes* and Minimum IVI of plant *Vigna radiata* are present in site2. Maximum IVI of plant *Cassia tora* and Minimum IVI of plant *Phaseolus vulgaris* are present in site3. Maximum IVI of plant *Hibiscus sabdariffa* and Minimum IVI of plant *Bauhinia purpurea* are present in site 4. Maximum IVI of plant *Amaranthus tricolor* and Minimum IVI of plant *Allium cepa* are present in site5. The investigations of wild edible leafy plants in all sites have been given below in table:1-

**Table 1: Ethnomedicinal importance of wild edible leafy plants in all sites:-**

S. No.	Botanical Name	Local Name	Family	Habit	Medicinal Uses
1	<i>Achyranthes aspera</i>	Chirchida Bhaji	Amaranthaceae	Herb	Snakebite, stomach pain, fever and cough
2	<i>Allium cepa</i>	Pyaj Bhaji	Liliaceae	Herb	Sunstroke, vomiting
3	<i>Amaranrthus dubius</i>	Khedha Bhaji	Amaranthaceae	Herb	Lactating mothers, haemorrhage, anaemia, kidney problems, fever
4	<i>Amaranthus hybridus</i>	Ropa Bhaji	Amaranthaceae	Herb	Intestinal bleeding, diarrhea, excess menstruation.
5	<i>Amaranthus spinosus</i>	Kanta Bhaji	Amaranthaceae	Herb	scorpion bite and snake bite
6	<i>Amaranthus tricolor</i>	Lal Bhaji	Amaranthaceae	Herb	Astringent and diuretic, intestinal bleeding, diarrhea, excess menstruation.
7	<i>Amaranthus viridis</i>	Chaulai Bhaji	Amaranthaceae	Herb	Diuretic, heart troubles, gonorrhea, eye infections
8	<i>Asteracantha longifolia</i>	Mokhla Bhaji	Acanthaceae	Herb	Diabetes, liver problems, blood diseases, tonic
9	<i>Basella rubra</i>	Red Poi Bhaji	Basellaceae	Climber	Dysentery, leprosy, swelling
10	<i>Bauhinia purpurea</i>	Koliaari Bhaji	Caesalpiniaceae	Tree	Piles, diabetes, skin diseases, asthma, dysentery, diarrhea
11	<i>Boerhavia diffusa</i>	Punarnava Bhaji	Nyctaginaceae	Herb	Asthma, jaundice, anaemia, snake venom, liver diuretic, dysentery
12	<i>Borreria hispida</i>	Gundru/Nuniya/ Patur Bhaji	Rubiaceae	Herb	Headache, wounds, haemorrhoids and sores, toothache, diarrhea and dysentery
13	<i>Brassica compestris</i>	Sarso Bhaji	Brassicaceae	Herb	Fever, weakness, menstrual disorder, internal pains
14	<i>Brassica oleracea</i>	Gobhi Bhaji	Brassicaceae	Herb	Cleansing qualities, glaucoma and pneumonia

15	<i>Cantella asiatica</i>	Bramhi Bhaji	Apiaceae	Herb	Decoction of whole plant is used as tonic
16	<i>Carthamus tinctorius</i>	Kera/Burre Bhaji	Asteraceae	Herb	Heart diseases, lower cholesterol level, menstrual pains, measles, fevers and skin problems, rheumatism, tumours
17	<i>Cassia tora</i>	Charota Bhaji	Caesalpiniaceae	Herb	Skin diseases, leprosy, arthritis, ringworm, itching, snakebites
18	<i>Celastrus paniculatus</i>	Peng/Malkangini Bhaji	Celastraceae	Climber	Leprosy, skin diseases, paralysis, asthma, fever, sharpening the memory
19	<i>Celosia argentea</i>	Siliyari Bhaji	Amaranthaceae	Herb	Snakebites, uterine bleeding, dysentery, diarrhea, hypertension, bloodshot eyes, skin irritation, eczema
20	<i>Chorchorus olitorius</i>	Safed Chech Bhaji	Tiliaceae	Herb	Hairfall and also to kill lice
21	<i>Cleome viscosa</i>	Balakut/Hurhur Bhaji	Cleomaceae	Herb	Dysentery, wounds, ulcers, herpes, earaches, diarrhea, dysentery, stomach pain, piles
22	<i>Colocasia antiquorum</i>	Kochai Bhaji	Araceae	Herb	Promote menstruation, stomach problems, cysts, knee pain
23	<i>Colocasia esculenta</i>	Doba/Jangal Kochai	Araceae	Herb	Stomatitis, hemorrhoids, cancer, weakness
24	<i>Commelina benghalensis</i>	Kenna Bhaji	Commelinaceae	Herb	Infertility in women, eye ailments, sore throat and burns, diarrhea, stomach pain
25	<i>Corchorus capsularis</i>	Budkari Bhaji	Malvaceae	Herb	Stomachache, dysentery, fevers, dyspepsia and liver disorders
26	<i>Corchorus trilocularis</i>	Gudhkal/Lal Chech Bhaji	Tiliaceae	Herb	The leaves are used as a plaster to reduce swellings

27	<i>Cordia myxa</i>	Bohar Bhaji	Boraginaceae	Shrub tree	Stomach aches, coughs and chest pain. sleeping-sickness, headaches, ulcers, fever, skin diseases, broken bones, to improve healing
28	<i>Cordia subcordata</i>	Bodi Bhaji	Boraginaceae	Climber	The leaves can be used as fodder for livestock, to control blood pressure
29	<i>Costus speciosus</i>	Basey/Kew bhaji	Costaceae	Herb	Head-ache, eye and ear infections, fever, dysentery, cough, snake bite, jaundice, arthritis, burning sensation, leprosy, skin diseases, asthma, bronchitis, nose pain, vomiting
30	<i>Cucurbita maxima</i>	Kumhda Bhaji	Cucurbitaceae	Climber	Anti-diabetic, anti-oxidant, anti-inflammatory, digestive problems
31	<i>Dolicus lablab</i>	Sem Bhaji	Papilionaceae	Herb	Anti-helminthic, cough, skin diseases
32	<i>Ficus religiosa</i>	Pikadi/Pipal	Urticaceae	Tree	To treat throat infection
33	<i>Hibiscus cannabinus</i>	Patawa Bhaji	Malvaceae	Shrub	Acidity, coughs, dysentery, blood and throat disorders, stomach pain, anaemia
34	<i>Hibiscus sabdariffa</i>	Jhirra/ Khatta Bhaji	Malvaceae	Shrub	Dysentery, diarrhea, liver diseases, hypertension, skin diseases, stomach pain, digestions, high blood pressure
35	<i>Ipomoea aquatic</i>	Kalmi/Karmota Bhaji	Convolvulaceae	Herb	Coughs, fever, tonic, antidiabetic, jaundice, liver
36	<i>Ipomoea batatas</i>	Kanda Bhaji	Convolvulaceae	Herb	Asthma, burns, fever, stomach, distress and tumours, antidiabetic, antioxidant
37	<i>Lathyrus sativus</i>	Tiwara Bhaji	Fabaceae	Herb	Prolonged periods, paralysis
38	<i>Leucas cephalotes</i>	Gumee Bhaji	Lamiaceae	Herb	Fever, malarial fever, headache, urinary complaints, snake bites, wounds and sores, skin diseases, cold and cough, asthma

39	<i>Marsilia vestita</i>	Chunchunia Bhaji	Marsileaceae	Herb	Cold, malaria, swelling, relieving pain, stop bleeding, skin problem, diabetes
40	<i>Medicago denticulate</i>	Chanauri Bhaji	Fabaceae	Herb	Helpful in lowering cholesterol levels, arthritis, kidney problems, cardiogenic, fever, anti- cancer
41	<i>Momordica charantia</i>	Karela Bhaji	Cucurbitaceae	Climber	To reduce blood sugar level, diabetes
42	<i>Moringa pterygosperma</i>	Munga Bhaji	Moringaceae	Tree	Heart disease, liver, spleen, dental disorders
43	<i>Phaceolus radiatus</i>	Urad Bhaji	Papilionaceae	Climber	Paralysis, rheumatism, coughs, fever, liver ailments
44	<i>Phaseolus vulgaris</i>	Barbatti Bhaji	Papilionaceae	Herb	Diuretic especially kidney and heart ailments, diarrhea.
45	<i>Polygonum plebeium</i>	Chanti Bhaji	Polygonaceae	Herb	To control blood pressure
46	<i>Portulaca oleracea</i>	Non/Dal/Ghol Bhaji	Portulacaceae	Herb	Diuretic, cough and sores, stomach pain, headaches, skin burn, skin diseases, earaches
47	<i>Raphanus sativus</i>	Mooli Bhaji	Brassicaceae	Herb	Asthma, and chest pain, stomach pain, indigestion, diarrhea, bronchitis
48	<i>Semecarpus anacardium</i>	Bhelva Bhaji	Anacardiaceae	Tree	Fruits, leaves are used for anti-cancer purpose
49	<i>Solanum tuberosum</i>	Aloo Bhaji	Solanaceae	Herb	Burns, corns, cough, cystitis, scurvy, tumors, diuretic
50	<i>Spinacea oleracea</i>	Palak Bhaji	Chenopodiaceae	Herb	Diabetes, arthritis, migraine, headaches, asthma, cancer, eye and kidney diseases
51	<i>Trigonella foenum</i>	Methi Bhaji	Fabaceae	Herb	Rheumatism and diabetes
52	<i>Vigna radiata</i>	Jhudga Bhaji	Fabaceae	Herb	Paralysis, rheumatism, coughs, fever and liver ailments

The data of such phytosociological studies made in the above said five sites have been represented in table-2 to table-6, Similar data have also been represented through pie diagram (fig. 1-10).

**Table 2: Phytosociological characteristics of leafy vegetables of site-1 of Kondagaon district**

S.No.	Name of Plants	%Frequency	Density	Abundance	Relative frequency	Relative Density	Relative Abundance	Importance Value Index
1	<i>Amaranthus spinosus</i>	80	4.6	4.6	6.2	7.3	5.4	18.9
2	<i>Amaranthus tricolour</i>	90	5.6	6.2	6.9	8.9	7.2	23
3	<i>Basella rubra</i>	40	3.8	7.6	3.1	6	8.9	18
4	<i>Bauhinia purpurea</i>	30	0.3	0.5	2.3	0.4	0.5	3.2
5	<i>Borreria hispida</i>	90	3.5	3.8	6.9	5.5	4.4	16.8
6	<i>Cantella asiatica</i>	40	1.6	2	3.1	2.5	2.3	7.9
7	<i>Carthamus tinctorius</i>	20	0.8	1.1	1.5	1.2	1.2	3.9
8	<i>Cassia tora</i>	100	4.2	4.6	7.7	6.6	5.4	19.7
9	<i>Celosia argentea</i>	80	4	5.7	6.2	6.3	6.6	19.1
10	<i>Cleome viscosa</i>	30	4.2	4.2	2.3	6.6	4.9	13.8
11	<i>Colocasia antiquarum</i>	20	1.3	3.2	1.5	2	3.7	7.2
12	<i>Colocasia esculenta</i>	20	1.1	2.7	1.5	1.7	3.1	6.3
13	<i>Commelina benghalensis</i>	100	5.5	6.8	7.7	8.7	7.9	24.3
14	<i>Corchorus capsularis</i>	40	1.8	2.2	3.1	2.8	2.5	8.4
15	<i>Corchorus trilocularis</i>	70	0.8	1.3	5.4	1.2	1.5	8.1
16	<i>Cucurbita maxima</i>	10	0.4	0.5	0.7	0.6	0.5	1.8
17	<i>Hibiscus sabdariffa</i>	90	2.1	2.1	6.9	3.3	2.4	12.6
18	<i>Ipomoea aquatic</i>	60	4.1	10.2	4.6	6.5	11.9	23
19	<i>Moringa pterygosperma</i>	50	1.2	2	3.8	1.9	2.3	8
20	<i>Phaceolus radiatus</i>	80	5.6	6.2	6.2	8.9	7.2	22.3
21	<i>Portulaca oleracea</i>	70	1.4	2.8	5.4	2.2	3.2	10.8
22	<i>Vigna radiate</i>	80	4.8	4.8	6.2	7.6	5.6	19.4

**Table 3: Phytosociological characteristics of leafy vegetables of site-2 of Kondagaon district**

S.No.	Name of Plants	%Frequency	Density	Abundance	Relative frequency	Relative Density	Relative Abundance	Importance Value Index
1	<i>Achyranthes aspera</i>	100	3.4	3.4	5.4	3.4	1.8	10.6
2	<i>Allium cepa</i>	40	5	12.5	2.1	5.1	6.8	14
3	<i>Amaranthus dubius</i>	100	4.8	4.8	5.4	4.9	2.6	12.9
4	<i>Amaranthus tricolour</i>	70	5.9	8.4	3.7	6	4.5	14.2
5	<i>Amaranthus viridis</i>	100	2.5	2.5	5.4	2.5	1.3	9.2
6	<i>Asteracantha longifolia</i>	50	3.7	7.4	2.7	3.7	4	10.4
7	<i>Boerhavia diffusa</i>	10	0.8	8	0.5	0.8	4.3	5.6
8	<i>Borreria hispida</i>	80	2.3	2.8	4.3	2.3	1.5	8.1
9	<i>Cantella asiatica</i>	40	1.8	4.5	2.1	1.8	2.4	6.3



10	<i>Carthamus tinctorius</i>	90	2.5	2.7	4.8	2.5	1.4	8.7
11	<i>Cassia tora</i>	100	5.4	5.4	5.4	5.5	2.9	13.8
12	<i>Celastrus paniculatus</i>	90	5.3	5.8	4.8	5.4	3.1	13.3
13	<i>Celosia argentea</i>	70	3.5	5	3.7	3.5	2.7	9.9
14	<i>Commelina benghalensis</i>	50	3.3	6.6	2.7	3.3	3.5	9.5
15	<i>Corchorus trilocularis</i>	70	4	5.7	3.7	4	3.1	10.8
16	<i>Cordia myxa</i>	70	2.8	4	3.7	2.8	2.1	8.6
17	<i>Costus speciosus</i>	30	4.2	14	1.6	4.2	7.6	13.4
18	<i>Ficus religiosa</i>	30	2.1	7	1.6	2.1	3.8	7.5
19	<i>Hibiscus cannabinus</i>	100	1.7	1.7	5.4	1.7	0.9	8
20	<i>Ipomoea batatas</i>	60	4.4	7.3	3.2	4.5	3.9	11.6
21	<i>Leucas cephalotes</i>	20	3.6	18	1	3.6	9.8	14.4
22	<i>Momordica charantia</i>	70	3.7	5.2	3.7	3.7	2.8	10.2
23	<i>Phaceolus radiatus</i>	100	5.4	5.4	5.4	5.5	2.9	13.8
24	<i>Polygonum plebeium</i>	80	4.6	5.7	4.3	4.7	3.1	12.1
25	<i>Portulaca oleracea</i>	10	0.9	9	0.5	0.9	4.9	6.3
26	<i>Semecarpus anacardium</i>	80	1.5	1.8	4.3	1.5	0.9	6.7
27	<i>Solanum tuberosum</i>	40	3.2	8	2.1	3.2	4.3	9.6
28	<i>Spinacea oleracea</i>	80	4.3	5.3	4.3	4.4	2.8	11.5
29	<i>Vigna radiate</i>	20	1.1	5.5	1	1.1	2.9	5

Table 4: Phytosociological characteristics of leafy vegetables of site-3 of Kondagaon district

S.No.	Name of Plants	%Frequency	Density	Abundance	Relative frequency	Relative Density	Relative Abundance	Importance Value Index
1	<i>Achyranthes aspera</i>	30	2.4	8	4.2	6.6	12.5	23.3
2	<i>Amaranthus spinosus</i>	70	4.3	6.1	9.8	11.8	9.5	31.1
3	<i>Amaranthus viridis</i>	80	4.7	5.8	11.2	12.9	9.1	33.2
4	<i>Asteracantha longifolia</i>	40	3.4	8.5	5.6	9.3	13.3	28.2
5	<i>Basella rubra</i>	20	2.3	11.5	2.8	6.3	18	27.1
6	<i>Cassia tora</i>	100	5.8	5.8	14	16	9.1	39.1
7	<i>Cordia myxa</i>	80	1.6	2	11.2	4.4	3.1	18.7
8	<i>Costus speciosus</i>	50	2.2	4.4	7	6	6.9	19.9
9	<i>Marsilia vestita</i>	90	2	2.2	12.6	5.5	3.4	21.5
10	<i>Phaseolus vulgaris</i>	60	1.8	3	8.4	4.9	4.7	18
11	<i>Trigonella foenum</i>	90	5.7	6.3	12.6	15.7	9.9	38.2

Table 5: Phytosociological characteristics of leafy vegetables of site-4 of Kondagaon district

S.No.	Name of Plants	%Frequency	Density	Abundance	Relative frequency	Relative Density	Relative Abundance	Importance Value Index
1	<i>Amaranthus hybridus</i>	60	2.5	4.1	4.9	4.6	4.1	13.6
2	<i>Amaranthus spinosus</i>	70	4	5.7	5.7	7.4	5.8	18.9
3	<i>Basella rubra</i>	20	0.3	1.5	1.6	0.5	1.5	3.6
4	<i>Bauhinia purpurea</i>	10	0.1	1	0.8	0.1	1	1.9

5	<i>Borreria hispida</i>	40	1.3	3.2	3.3	2.4	3.2	8.9
6	<i>Brassica compestris</i>	40	2.4	6	3.3	4.4	6.1	13.8
7	<i>Brassica oleracea</i>	20	0.2	1.5	1.6	0.3	1.5	3.4
8	<i>Cassia tora</i>	100	3.3	3.3	8.2	6.1	3.3	17.6
9	<i>Celosia argentea</i>	40	1.2	3	3.3	2.2	3	8.5
10	<i>Chorchorus olitorius</i>	30	1.1	3.6	2.4	2	3.6	8
11	<i>Colocasia antiquarum</i>	10	0.3	1.5	0.8	0.5	1.5	2.8
12	<i>Colocasia esculenta</i>	40	2.2	5.5	3.3	4.1	5.6	13
13	<i>Commelina benghalensis</i>	50	3.3	6.6	4.1	6.1	6.7	16.9
14	<i>Cucurbita maxima</i>	10	0.5	5	0.8	0.9	5.1	6.8
15	<i>Dolicus lablab</i>	90	4.7	5.2	7.4	8.7	5.3	21.4
16	<i>Hibiscus cannabinus</i>	70	4.3	6.1	5.7	8	6.2	19.9
17	<i>Hibiscus sabdariffa</i>	100	5.3	5.3	8.2	9.9	5.4	23.5
18	<i>Ipomoea aquatic</i>	60	1.6	2.6	4.9	2.9	2.6	10.4
19	<i>Ipomoea batatas</i>	20	1.4	7	1.6	2.6	7.1	11.3
20	<i>Lathyrus sativus</i>	100	4.2	4.2	8.2	7.8	4.2	20.2
21	<i>Moringa pterygosperma</i>	30	0.8	2.6	2.4	1.4	2.6	6.4
22	<i>Phaceolus radiatus</i>	90	3.5	3.8	7.4	6.5	3.8	17.7
23	<i>Portulaca oleracea</i>	30	1.6	5.3	2.4	2.9	5.4	10.7
24	<i>Vigna radiate</i>	80	3.4	4.2	6.6	6.3	4.2	17.1

**Table 6: Phytosociological characteristics of leafy vegetables of site-5 of Kondagaon district**

S.No.	Name of Plants	%Frequency	Density	Abundance	Relative frequency	Relative Density	Relative Abundance	Importance Value Index
1	<i>Allium cepa</i>	10	0.1	1	1.2	0.2	1.6	3
2	<i>Amaranthus dubius</i>	80	4.3	5.3	10.2	12.1	8.7	31
3	<i>Amaranthus hybridus</i>	50	2.1	4.2	6.4	5.9	6.9	19.2
4	<i>Amaranthus tricolour</i>	100	5.4	5.4	12.8	15.2	8.8	36.8
5	<i>Asteracantha longifolia</i>	30	1.3	4.3	3.8	3.6	7	14.4
6	<i>Carthamus tinctorius</i>	20	0.2	1	2.5	0.5	1.6	4.6
7	<i>Celastrus paniculatus</i>	90	2.6	2.8	11.5	7.3	4.6	23.4
8	<i>Cleome viscosa</i>	60	3.1	5.1	7.6	8.7	8.3	24.6
9	<i>Corchorus capsularis</i>	50	2.3	4.6	6.4	6.4	7.5	20.3
10	<i>Cordia subcordata</i>	10	0.6	6	1.2	1.6	9.8	12.6
11	<i>Leucas cephalotes</i>	40	1.2	3	5.1	3.3	4.9	13.3
12	<i>Marsilia vestita</i>	70	4.1	5.8	8.9	11.5	9.5	29.9
13	<i>Medicago denticulata</i>	90	5.3	5.8	11.5	14.9	9.5	35.9
14	<i>Polygonum plebeium</i>	60	2.4	4	7.6	6.7	6.5	20.8
15	<i>Raphanus sativus</i>	20	0.5	2.5	2.5	1.4	4.1	8

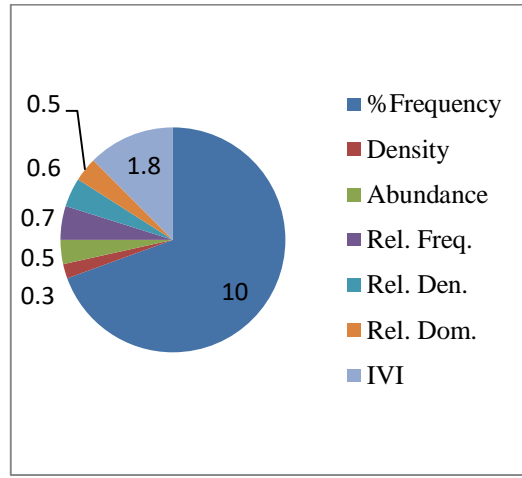
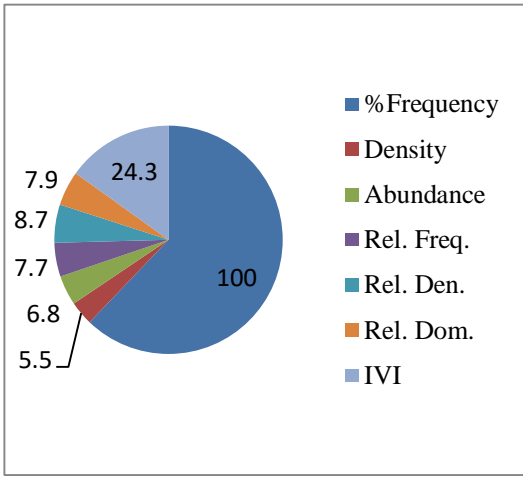


Fig1-Site1: Maximum IVI of *Commelina benghalensis*

Fig2-Site1: Minimum IVI of *Cucurbita maxima*

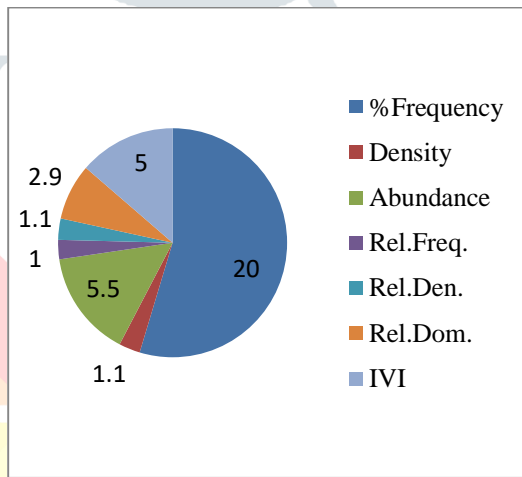
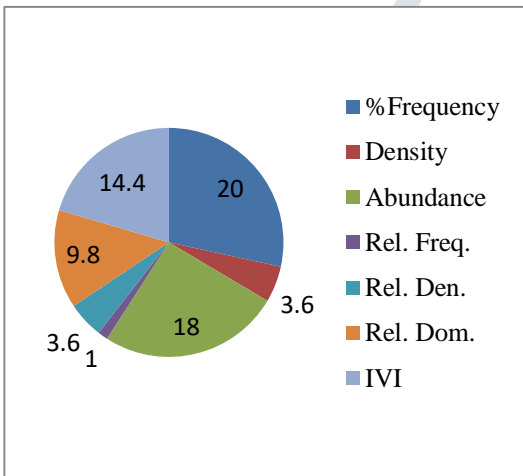


Fig3-Site2: Max IVI of *Leucas cephalotes*

Fig4- Site2: Minimum IVI of *Vigna radiata*

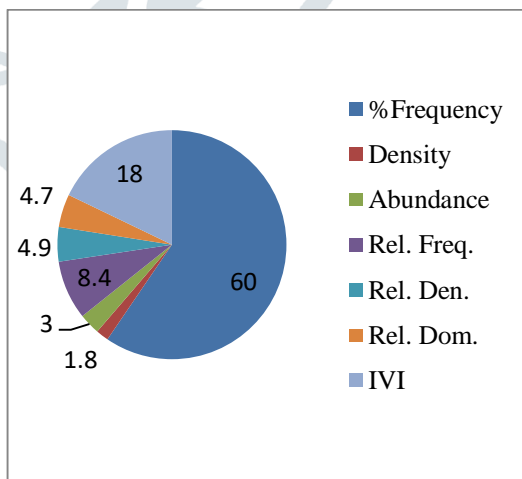
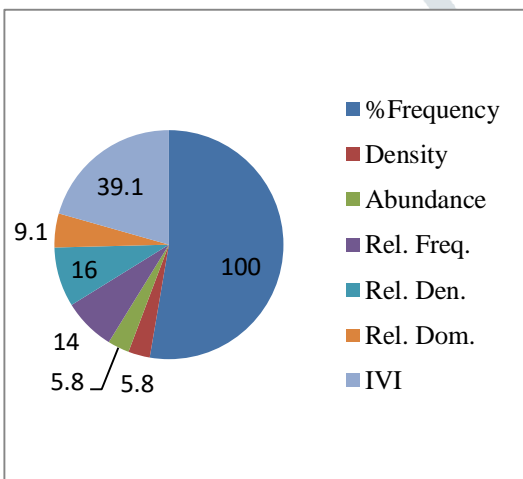


Fig5-Site3: Maximum IVI of *Cassia tora*

Fig6- Site3: Minimum IVI of *Phaseolus vulgaris*

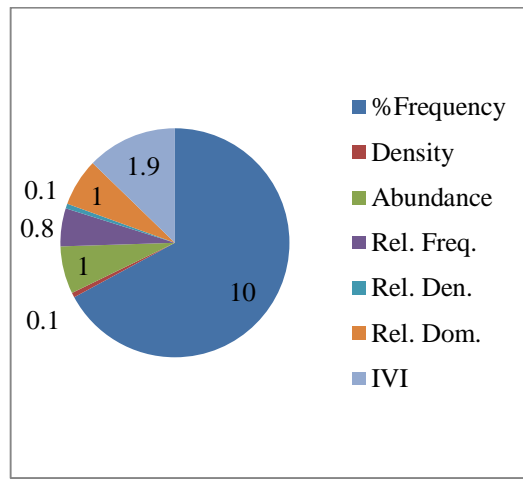
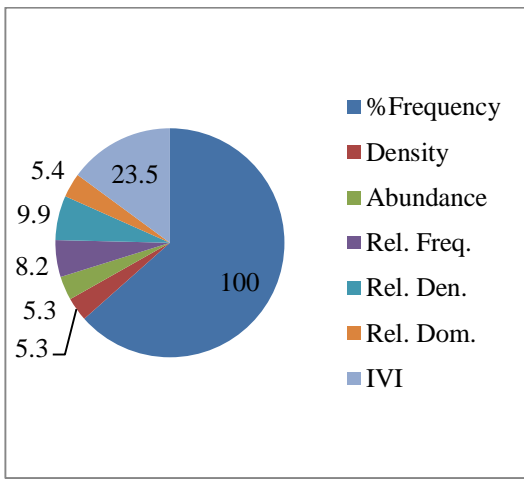


Fig7-Site4: Maximum IVI of *Hibiscus sabdariffa*

Fig8-Site4: Minimum IVI of *Bauhinia purpurea*

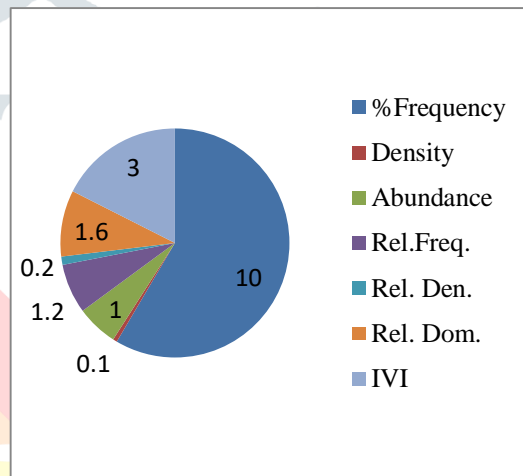
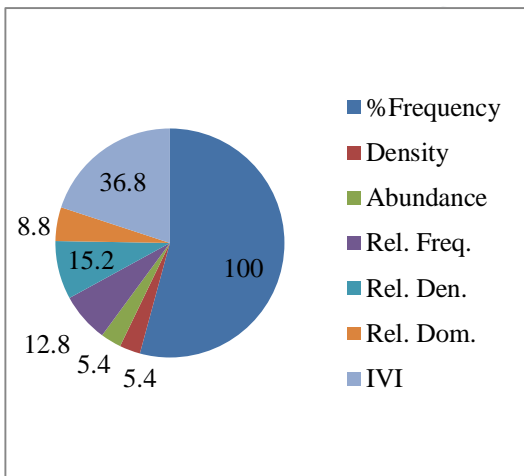


Fig9-Site5: Maximum IVI of *Amaranthus tricolor*

Fig10-Site5: Minimum IVI of *Allium cepa*

## Conclusion

The output of the present piece of research reflects the phytosociological and ethnobotanical importance of the leafy vegetables grown wild and cultivated in the area of Kondagaon district of Chhattisgarh. The data thus obtained reveal that different sites studied showed different plants having maximum and minimum IVI. Difference in the values of other sociobiological attributes was also observed.

Ethnobotanical importance of the leafy vegetables have also been study with the help of local people as well as literature collected. It was concluded that even in this modern age, people of this area of Bastar depend on plants for the treatment of various diseases. The phytochemical study made in future will also through light and put evidence for their ethnobotanical importance.

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