



Use of medicinal plants by the tribals of Ganjam district of Odisha, India: An Ethnobotanical approach

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Abstract

The present paper has been prepared enlisting the medicinal plants used by several Ayurveda practitioners, Vaidyas and locally available unrecorded information from common people of Ganjam district of Odisha, Extensive field survey of the entire area of Mahurikalua, Haladiapadar, Nimakhandi, Darubhadra was done We studied about 50 no of plant species belonging to 29 families which are collected and identified from the study area. 52% were observed to be herb, 30% were observed to be tree and the remaining 18% were shrub. Out of these, 44 species belong to dicotyledons, 5 were monocotyledons, 1 is pteridophyta. Out of these, 56% were taken orally, 40% were taken externally, 3% were taken through nasal and 1% from ear. Out of these, juice of 28% plants are used for medicine making, paste of 27% plants are made, decoction of 20% plants are made, powder of 13% were made, latex of 4% were extracted, brush of 3%, oil extracted and also fried are done from 2% and only 1% of smoke were used in the way to make medicines. Out of these, bulb and flower from one species, rhizome from 2 species, stem of three species, seed of 4 species, fruit and whole plant from 6 species, root of 8 species, bark of 10 species and leaf of 32 species were taken to make the medicines serving as lifeline of rural people.

Keywords: Ethno-medicinal plant; Ethno-botanical study; medicinal plants.

Introduction

Ethnobotany is generally defined as the 'science of people's interaction with plants'. It is the study of how people of a particular culture and region make the use of indigenous plants for various purposes (Palit and Gurung, 2008). It must have been the first knowledge acquired by man to satisfy his hunger, healing his wounds and curing various ailments (Kshirsagar RD, Singh NP. 2001). Medicinal plants are traditional; accessible and affordable sources of primary healthcare for marginalized people, who cannot afford or access formal health care. Promoting traditional health systems to meet primary healthcare needs, as side effects of allopathic drugs scare people, the healthcare systems are going to become more and

more, expensive. Traditional systems of medicines are assuming a great significance globally as "green drugs" which are healthier and safer than synthetic drugs. Several drugs sold today are simple synthetic modifications of the naturally obtained substances. Most of the Ayurveda based drugs are important in the manufacture of various immunological vaccines and antibodies. Rural people are far away from the modern medical facilities, which is why they use many locally available plant species for the treatment of various diseases, disorders and ailments. Odisha, one of the largest producers medicinal herbs, lies between 17° 48"-22° 94"N latitude and 81°24" - 87°29" Longitude (Agarwal and Ghosh, 1985). The Ethno botanical

investigation has led to the documentation of a large number of wild plants used by tribals for meeting their multifarious requirements. In this study, the present paper has been prepared enlisting the medicinal plants used by several Ayurveda practitioners, Vaidyas and locally available unrecorded information from common people of Ganjam district of Odisha, India for the treatment of various diseases they suffer from.

Objectives:

1. To collect the medicinal plants of the study area and making permanent records for the preservation of specimens.
2. To identify and collect the information about the local names and traditional uses of different plant species used by tribal areas of Ganjam.
3. To categorize these plant species according to their uses (immediate as well as ultimate).

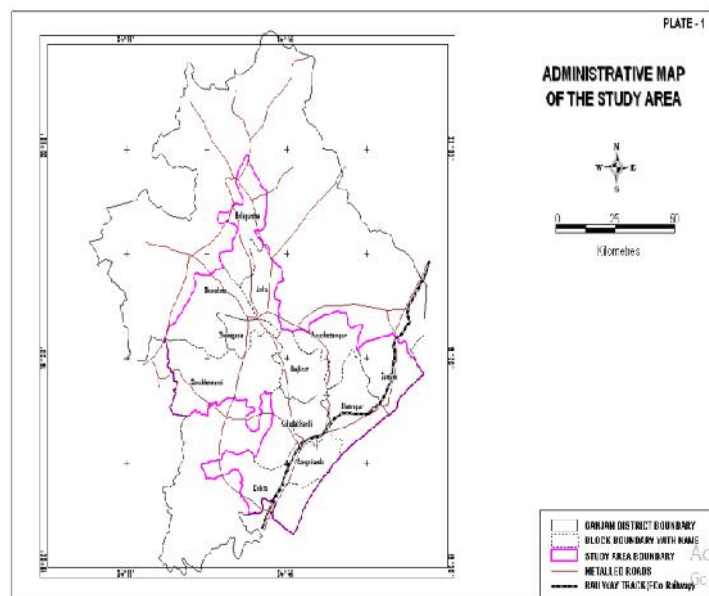
Materials and Methods

General description of the study area: Ganjam district is characterized by an equitable temperature all through the year, particularly in the coastal regions. We have selected places like Mahurikalua hill side with many villages like Darubhadra, Haladipadar and Nimakhandi for our study. The detailed methodology adopted for the field survey, data collection and

analysis of the information collected as per the requirement of the study are given below under the following headings:

Plant exploration and systematic enumeration of medicinal plants

Extensive field survey of the entire area of Mahurikalua, Haladiapadar, Nimakhandi, Darubhadra was done by going to the door of various tribal people living in near places so as to know how they are using these medicinal plants in order to get cured from various diseases. The collection of the voucher specimen was done during flowering and fruiting stage so as to facilitate the process of identification in month of April to October. Larger specimens were folded like W, N, M or V, depending upon their availability. At least 3-4 voucher specimens were collected under one collection number for each specimen. Identification of the specimens were done according to the field characters (already noted during collection) by comparison in the herbarium and consulting various floras for confirmation of identity. Nomenclature has been made up to date with the help of recent taxonomic literature. Inventory of entire medicinal plants were prepared. The documented information was used to delineate medicinal plants. They have been highlighted giving Botanical names, Local/Common name(s), locality, distribution, description and flowering/fruiting times.



Ethnobotanical Studies: The importance regarding the traditional knowledge, local uses of the plants of the study area, containing the information about the local name of the plant, part used, purpose for which used, mode of administration and curative properties were recorded through discussions with the knowledgeable and elderly local people of the study area.

Fidelity Level (FL): To determine the most frequently used plant species for treating a particular ailment category by the informants of the study area, we calculated the fidelity level (FL). The FL was calculated using the following formula: $FL (\%) = N_p/N \times 100$ where N_p = the number of use-reports cited for a given species for a particular ailment category. N = the total number of use reports cited for any given species.

Results

The area is dominated by tribals whose fast vanishing ethnobotanical knowledge needs urgent documentation. After ascertaining the identity, the plant species were referred to their respective families and arranged as per Bentham and Hooker's System of classification. The species have been arranged alphabetically and their family, local/common name along with ethnobotanical uses (wherever applicable) has been mentioned as follows:

Total number of **50** plants species belonging to **29** families have been collected and identified from the

study area that is Mahurikalua, Darubhadra, Haladiapadar and Nimakhandi of Ganjam district. Out of **50** plant species 44 species belong to dicotyledons, 5 to monocotyledons, 1 to pteridophyta. (Fig 1) 52% were observed to be herbs, 30% were observed to be trees and the remaining 18% were shrubs.(Fig 2) only one species was collected from various families named as Alangiaceae, Amaranthaceae, Asphodalaceae, Combretaceae, Convolvulaceae, Crassulaceae, Cucurbitaceae, Euphorbiaceae, Liliaceae, Marsileaceae, Menispermaceae, Moringaceae, Myrtaceae, Oleaceae, Papaveraceae, Phyllanthaceae, Poaceae and Solanaceae. Only two species were collected belonging to the family Asclepiadaceae, Acanthaceae, Apocynaceae, Lythraceae, Moraceae, Piperaceae and Zingiberaceae. Three species from Rutaceae family, Four species from Asteraceae, Lamaiceae, and seven species from Fabaceae. (Fig 3) ,56% were taken orally,40% were taken externally, 3% were taken through nasal and 1% from ear Fig 4),29 families were studied for their preparation of medicines. It was observed that 28% were taken as leaf juice, 27% as leaf pastes, 20% were taken as plant part decoction, 13% were taken as in powder form, 4% plants were taken as latex forms, 2% were fried and 1% smoked form. Out of these, bulb and flower from one species, rhizome from 2 species, stem of three species, seed of 4 species, fruit and whole plant from 6 species, root of 8 species, bark of 10 species and leaf of 32 species were taken to make the medicines (Fig 6).

Table 1- Documentation of ethno botanical information

Sl No	Botanical name with local name	Family	M/D	Habit	Plant parts & Used as medicine
1	<i>Achyranthes aspera</i> L. ଅପାମାରଙ୍ଗ (Apamaranga)	Amaranthaceae	D	Herb	Leaves- juice – increase strength of teeth (oral) Stem – brush – for cleaning teeth (oral) Seeds- seed powder mix with rice water – cure piles (oral)
2	<i>Aegle marmelos</i> (L.) (Bela)	Rutaceae	D	Tree	Leaf- juice or salad – relief from diabetes (oral) Leaf – juice mix with honey prevents from fever (oral) Fruit- juice relief from urinary disorder (oral)

3	<i>Alangium salviifolium</i> Linn.f ଆଙ୍ଗୁଳୁ (Ankula)	Alangiaceae	D	Tree	Leaf – decoction with honey –relief from mice bite (external) Leaf – decotion with ghee – release poison (external) Bark – powder with honey – used when worm in stool (oral)
4	<i>Allium sativum</i> L. ରଶୁଣ (Rashuna)	Liliaaceae	M	Herb	Bulb – 2/3 in empty stomach – decreases high blood pressure (oral) Bulb – fried with mustard oil – relief from cold & joint pain .(external)
5	<i>Aloe vera</i> (L.) Burm. f. ଘିଅକୁଆଁରୀ (Ghee Kuanri)	Asphodelaceae	M	Herb	Leaf – juice – cleanses blackheads and acne of face (external) Leaf – juice –1 table spoon daily in empty stomach for stomach ache (oral)
6	<i>Andrographis paniculata</i> (Burm. F.) wall.exNees ଭୁଇଁନିମ୍ବା (Bhuin Nimba)	Acanthaceae	D	Herb	Leaf – juice –relief from fever and worm in stool (oral) Whole plant – juice 2 table spoon relief from fever (oral)
7	<i>Argemone mexicana</i> L. ଓଡ଼ଶମାରୀ (Odashamari)	Papaveraceae	D	Herb	Whole plant- juice used for ringworm (external) Latex – heal the wound (external)
8	<i>Barleria prionitis</i> L. କଣ୍ଟାମାଲତୀ (Kanta Malati)	Acanthaceae	D	Shrub	Root – powder mix with honey – cares rat poison (external)? Leaf – juice mix with honey – fever (oral)
9	<i>Blumeaoxyodonta</i> ପକେସୁଙ୍ଗା (Pokasunga)	Asteraceae	D	Herb	Leaves – juice – relief from constipation (oral)
10	<i>Bryophyllum pinnatum</i> (Lam.) Oken ଅମରପୋଇ (Amarapoi)	Crassulaceae	D	Herb	Leaves – one leaf with five black pepper corns cures dysentery (oral)
11	<i>Calotropis gigantea</i> (L.) Dryand. ଅରଖ (Arakha)	Asclepiadaceae	D	Herb	Latex – used in case of snake bite for decreasing the poison level (external)

12	<i>Catharanthus roseus</i> (L.) G.Don ସଦାବିହାରୀ (Sadabihari)	Apocynaceae	D	Shrub	Leaves – juice – cure diabetes (oral) Roots – paste used in treatment of menstrual problem (oral)
13	<i>Chromolaena odorata</i> (L.) R.M.King&H.Rob. ପଚାପତ୍ର (Pacha Patra)	Asteraceae	D	Shrub	Leaf – inhalation of leaf paste increases memory power (nasal)
14	<i>Citrus limon</i> (L.) Osbeck ଲମ୍ବୁ (Lembu)	Rutaceae	D	Shrub	Fruit- juice mix with mustard oil and salt used for toothache Fruit – juice mix with boiling water – solves indigestion problem (oral) Fruit – juice – massage in hair cures hair fall (external)
15	<i>Clitoria ternatea</i> L. ଅପରାଜିତା (Aparajita)	Fabaceae	D	Herb	Whole plant – decoction – fever (oral) Root – paste – neutralizes snake poison (oral)
16	<i>Curcuma longa</i> L. ହଳଦୀ (Haldi)	Zingiberaceae	M	Herb	Rhizome – paste with neem leaf – relief from skin disease (external) Rhizome – paste – relief from worm in stool (oral)
17	<i>Cuscuta californica</i> Hook. & Arn. ନିରମୁଲୀ (Nirmuli)	Convolvulaceae	D	Herb	Whole plant – paste – used in skin disease (external) Whole plant – decoction – solve worm in stool (oral) Whole plant – paste mix with til oil – solve hair fall (external)
18	<i>Cynodon dactylon</i> (L.) Pers. ଦୁବ (Duba)	Poaceae	M	Herb	Leaves- juice mix with honey – solves nasal bleeding Whole plant- powder – used for pyria
19	<i>Datura stramonium</i> L. ଦୁଦୁରା (Dudura)	Solanaceae	D	Herb	Leaves- juice mixed with til oil – solves ear problem (ear drop) Leaf – dry leaf smoke – used for cold and cough

20	<i>Ficus benghalensis</i> L. ବର (Bara)	Moraceae	D	Tree	Bark – powder mixed with pepper powder – used for cleaning teeth (oral) Latex – used for waist pain (external)
21	<i>Ficus religiosa</i> L. ଓଷ୍ଟ (Osta)	Moraceae	D	Tree	Leaf – paste mixed with jaggery relief from stomach pain. Bark – powder – relief from toothache (oral)
22	<i>Hygrophila auriculata</i> Schumach. କୋଇଲିଖିଆ (Koilikhhia)	Fabaceae	D	Herb	Leaf – juice mixed with black pepper – jaundice (oral) Leaf- juice mixed with honey – skin disease (external)
23	<i>Lawsonia inermis</i> L. ମହେନ୍ଦେନ୍ଦି / ମଞ୍ଜାତି (Mehendi)	Lythraceae	D	Shrub	Leaves-for dysentery (oral), bacterial and fungal disease (external) Bark-decoction cures liver problem
24	<i>Leucas aspera</i> ଗୟାଶା (Gayasha)	Lamiaceae	D	Herb	Leaf - mix with rock salt and honey - relief from cough & asthma (oral)
25	<i>Marsilea quadrifolia</i> L. ସୁନୁସୁନିଆ (Sunusunia)	Marsileaceae	Pteridophyta	Herb	Whole plant-paste heals wound (external) whole plant- decoction cure cough (oral)
26	<i>Millettia pinnata</i> (L.) Panigrahi କରଞ୍ଜ (Karanja)	Fabaceae	D	Tree	Bark – powder – cure toothache (oral) Seed – oil – solve itching and skin disease (external)
27	<i>Momordica charantia</i> L. କଲରା (Kalara)	Cucurbitaceae	D	Climber	Leaf/fruit – juice – maintain blood sugar (oral) Leaf – paste mix with turmeric relief from skin disease (external)
28	<i>Moringa oleifera</i> Lam. ମୁନିଗା/ ସଜନା (Sajana/Muniga)	Moringaceae	D	Tree	Bark – paste –used in pimple (external) Leaf – juice – used for itching
29	<i>Murraya koenigii</i> (L.) ମିରିସିଂଗିଆ (Mirsingia)	Rutaceae	D	Tree	Leaf – juice – cure indigestion and gastric (oral) Leaf & bark – decoction – cure diabetes (oral)

30	<i>Nyctanthes arbor-tristis</i> L. ଗଞ୍ଜଗିରି (Gangasiuli)	Oleaceae	D	Tree	Leaves – juice – malaria treatment (oral) Leaf – juice – blood purifier (oral)
31	<i>Ocimum basilicum</i> L. ଦୁର୍ଲଭା (Durlava)	Lamiaceae	D	Herb	Leaves – powder & decoction cure cough and cold (oral)
32	<i>Ocimum sanctum</i> Linn. ତୁଳସୀ (Tulshi)	Lamiaceae	D	Shrub	Leaf – juice mixed with honey – relief from cough and cold (oral) Leaf – juice mixed with black pepper – relief from fever (oral) Leaf – juice – relief from skin problem (external)
33	<i>Ocimum tenuiflorum</i> L. ଗନ୍ଧତୁଳସୀ (Gandha Tulashi)	Lamiaceae	D	Herb	Leaves – paste – used to stop bleeding (external) Leaves – paste- used for cure of piles .(oral)
34	<i>Pergularia daemia</i> (Forssk.) Chiov. ଉତୁଲି (Utuali)	Asclepiadaceae	D	herb	Leaf - juice - healing wound (external) Root - boiled with water – fungal disease (external)
35	<i>Phyllanthus niruri</i> L. ଭୂଇଁଅଳା (Bhuin Amla)	Phyllanthaceae	D	Herb	Leaves – paste mixed with turmeric – solves skin problem Leaves – paste mix with castor oil – heal the wound (external)
36	<i>Piper betle</i> L. ପାନ (Pana)	Piperaceae	D	Herb	Leaf – juice mixed with honey – cold and cough (oral) Leaf – juice – removes dandruff (external) root – juice with piper – abortion (oral)
37	<i>Piper longum</i> L. ପିପଲି (Pipalli)	Piperaceae	D	Shrub	Fruit-powder mixed with honey cures cough and cold (oral) Fruit-decoction cures fever
38	<i>Pterocarpus santalinus</i> L.f ରକ୍ତଚନ୍ଦନ (Rakta Chandana)	Fabaceae	D	Tree	Wood-paste mix with and ghee cure vision disability (external) Wood-paste used in forehead for headache (external)

39	<i>Punica granatum</i> L. ଡାଲିମ୍ବ (Dalimba)	Lythraceae	D	Tree	Root – paste mixed with honey – relief from worm on stool (oral) Fruit – paste of fruit skin relief from dysentery (oral) Fruit – seed increase blood level in body (oral)
40	<i>Rauvolfia serpentina</i> (L.) <i>Benth. ex kurz</i> ପାତାଲଗରୁଡ଼/ସରପଘନ୍ଧା (Patala Garuda)	Apocynaceae	D	Shrub	Leaf –paste mixd with pepper – decrease the poison level in body (oral) Root- decotion – decrease blood pressure (oral) Root – paste – chest pain (external)
41	<i>Ricinus communis</i> L. ଜଡା (Jada)	Euphorbiaceae	D	Tree	Seed – oil – promotes wound healing (external) Seed – oil –relief from hair fall (external) Seed – oil – relief from ring worm (external)
42	<i>Saraca asoca</i> (Roxb.) de wilde ଅଶୋକ (Ashoka)	Fabaceae	D	Tree	Leaf – juice – worm on stool (oral) Leaf- paste – relief from pimple (external) Bark – decoction with milk – menstrual disorder (oral) Flower – juice mixd with curd – increases fertility power in women (oral)
43	<i>Syzygium jambolanum</i> (L.) Skeels. (Jamukoli)	Myrtaceae	D	Tree	Leaf /fruit – juice – relief from diabetes (oral) Seed – powder- – relief from diabetes (oral)
44	<i>Terminalia arjuna</i> (Roxb.) Wight & Arn. ଅରଜୁନ (Arjuna)	Combretaceae	D	Tree	Bark – decotion mix with milk – relief from heart disease(oral) Bark – paste with pepper – used for swollen muscle (external)
45	<i>Tinospora cordifolia</i> (Thumb.) Miers ଗୁଲୁଚି (Guluchi)	Menispermaceae	D	Herb	Stem- decoction- cures cold and cough(oral)
46	<i>Tridax procumbens</i> L. ବିଶଲସ୍ତାକରଣୀ (Bisalyakarani)	Asteraceae	D	herb	Leaves- paste – healing the wound (external)
47	<i>Trigonella foenum- graecum</i> L. ମଥେ (Methi)	Fabaceae	D	Herb	Seed – paste – applying on face –relief from black spot (external) Seed – boiled with coconut oil – relief from hair fall (external) Leaf /seed – paste relief from diabetes (oral)

48	<i>Vachellia nilotica</i> (L.) P.J.H.Hurter&Mabb. ବଢ଼ୁଲ୍ଲ (Babul)	Fabaceae	D	Tree	Bark–powder/decoction – tooth and gum pain (oral)
49	<i>Vernonia cinerea</i> (L.) ଘଡ଼ଢ଼େବୀ (Sahadebi)	Asteraceae	D	Herb	Leaves – leaf decoction cure fever and cold (oral) Root – paste – for good sleep (external)
50	<i>Zingiber officinale</i> Roscoe ଅଜା (Ada)	Zingiberaceae	M	Herb	Rhizome – juice mixed with honey and tulsi leaf relief from cold and cough (oral) Rhizome – decoction – relief from high blood pressure (oral)

Table 2 (Fidelity Level)

FL	Disease	Np	N	FL%
<i>Achyranthes aspera</i> L.	Teeth	4	4	100%
<i>Allium sativum</i> L.	Cold	3	4	75%
<i>Aloe vera</i> (L.) Burm. f.	Pimple/dark spot	3	3	100%
<i>Argemone mexicana</i> L.	Ringworm	2	4	50%
<i>Bryophyllum pinnatum</i> (Lam.) Oken	Dysentery	6	6	100%
<i>Clitoria ternatea</i> L.	Fever	2	3	67%
<i>Curcuma longa</i> L.	Skin infection	4	4	100%
<i>Cynodon dactylon</i> (L.) Pers.	Nasal bleeding	2	3	66.66%
<i>Lawsonia inermis</i> L.	Liver problem	2	4	20%
<i>Millettia pinnata</i> (L.) Panigrahi	Toothache	3	4	75%
<i>Murraya koenigii</i> (L.)	Diabetes	2	3	67%
<i>Nyctanthes arbor-tristis</i> L.	Malaria	5	5	100%
<i>Ocimum sanctum</i> Linn.	Cough and cold	3	3	100%
<i>Pergularia daemia</i> (forssk) hiov	Wound	3	4	75%
<i>Punica granatum</i> L.	Dysentery	6	6	100%
<i>Rauvolfia serpentina</i> (L.) Benth. Ex kurz	Blood pressure	6	6	100%
<i>Terminalia arjuna</i> (Roxb.) Wight & Arn.	Heart diseases	6	6	100%
<i>Tridax procumbens</i> L.	Wound	4	4	100%
<i>Zingiber officinale</i> Roscoe	Cough	3	3	100%

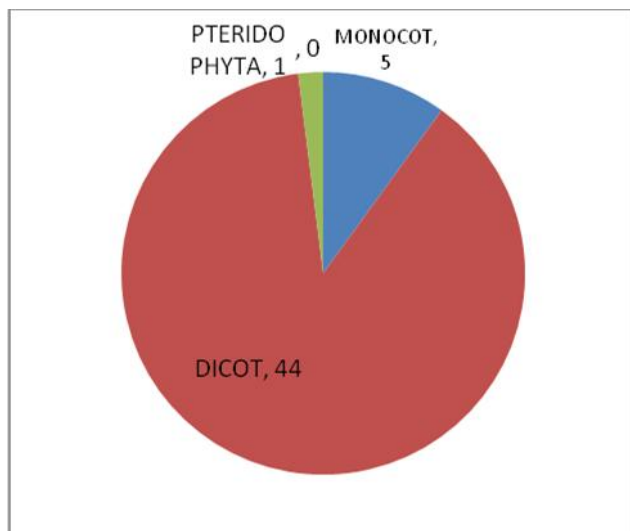


Fig -1-Different types of plants used in medicine preparations

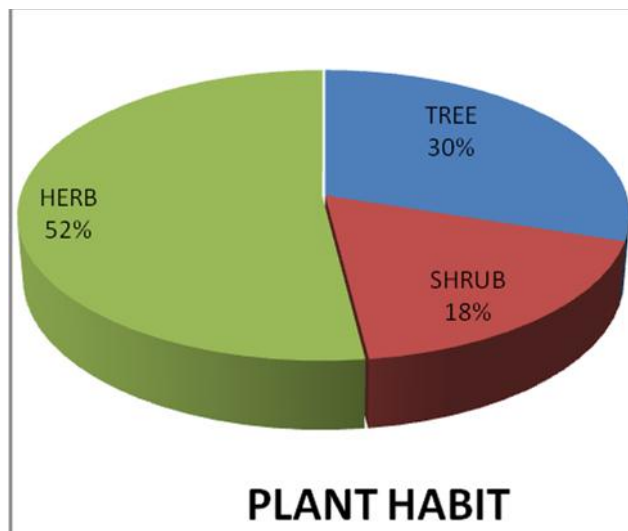


Fig 2.Habit wise distribution of the medicinal plants in the study area

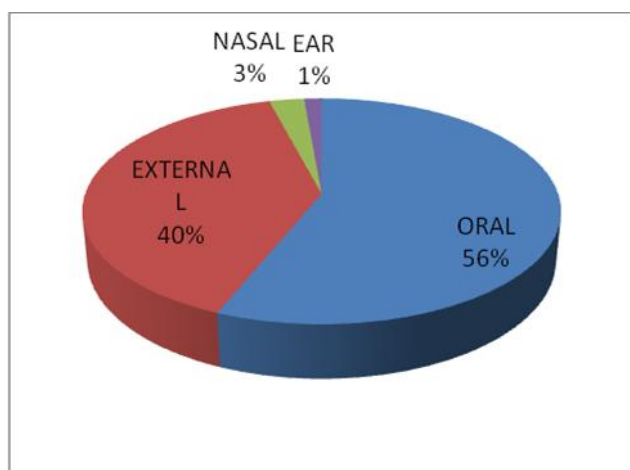


Fig 3. Family wise distribution of the medicinal plants studied.

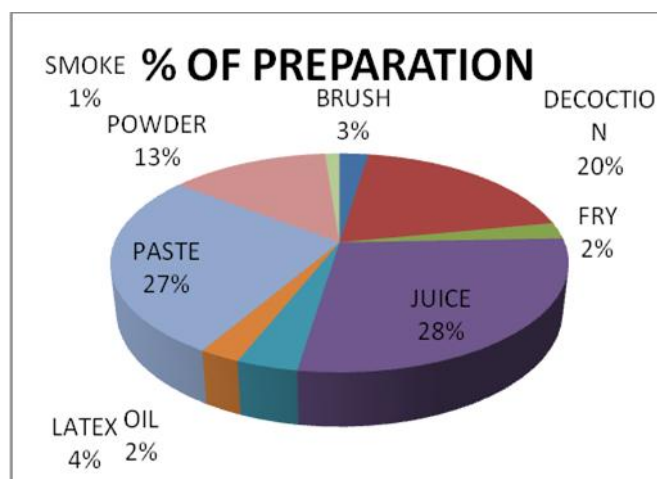


Fig 4.Distribution based on mode of administration on as medicine.

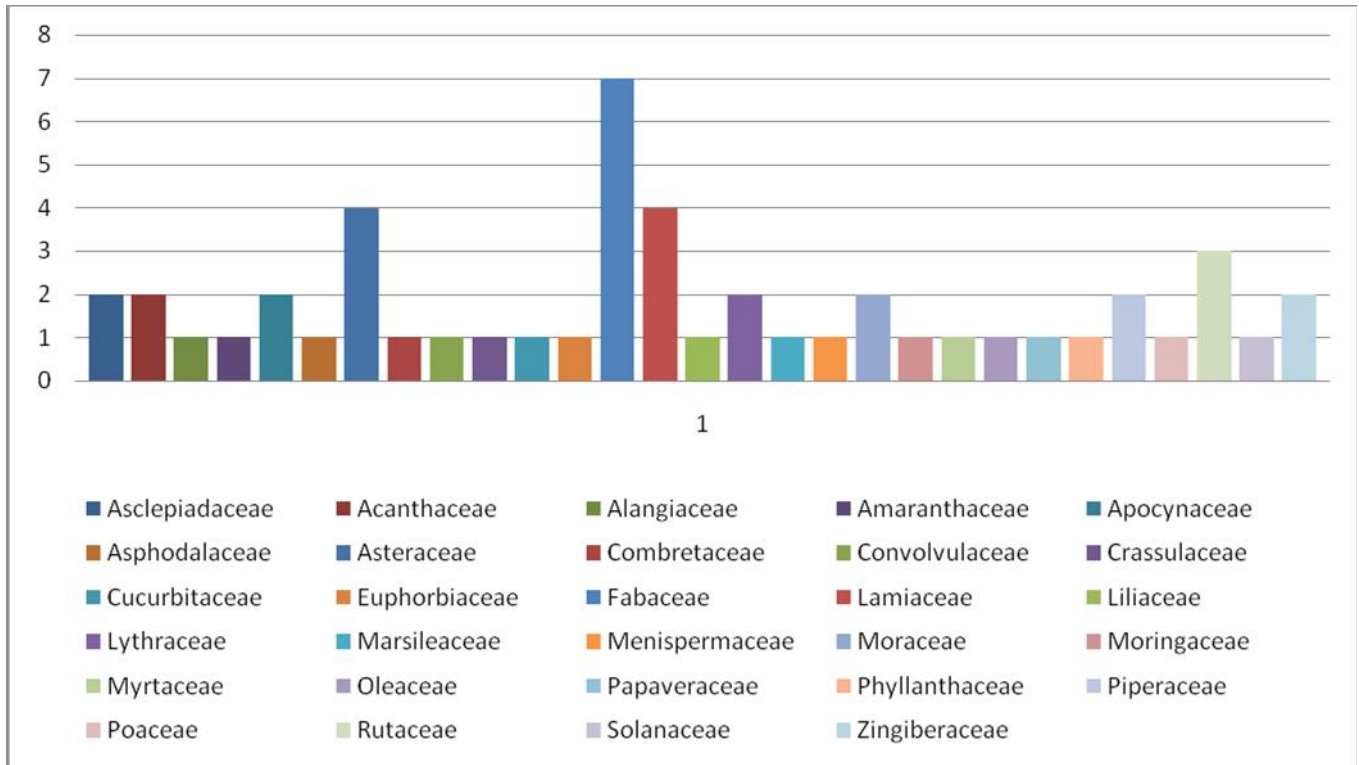


Fig 5. Use of medicinal plant parts by various ways.

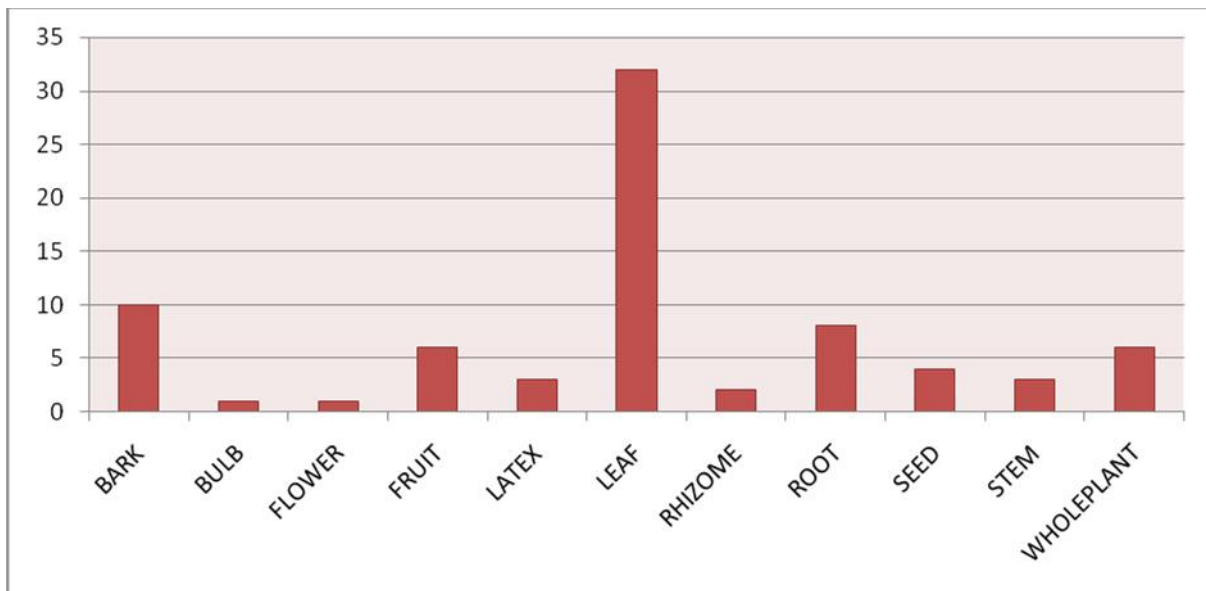


Fig 6. Distribution of medicinal plants based on plant parts used

Discussion

The tribal people have a great belief in Ayurveda and hence, they go for the medicines prepared from the locally available plants for any type of medical issues. Obviously due to financial condition also they prefer to go for home-made Ayurvedic medicines and these home-made medicines are prepared by taking plant parts like stem, roots, fruit, seeds, flower, bulb, rhizome, bark used in different forms like paste, oil, powder, pulp, decoction, juice, exudates from plant parts and make the medicines to be used for curing various diseases.

Conclusion and Summary

The tribal people are having a great knowledge about ethnobotanical uses since long ago. But the preservation and documentation of this knowledge about uses of plants in medicines is on the border line. So it has to be recorded in a well documented manner so that it will be preserved for the upcoming generations and beyond. The collective efforts of ethnobotanists, photo-chemists, Pharmacologists are needed to document and evaluate the efficiency and safety measures for this research. To test the scientific validity of the herbal preparation of drugs, clinical studies are required to be conducted safely. We studied about 50 no of plant species belonging to 29 families which are collected and identified from the study area. Out of these, only one species was collected from various families named as Alangiaceae, Amaranthaceae, Asphodalaceae, Combretaceae, Convolvulaceae, Crassulaceae, Cucurbitaceae, Euphorbiaceae, Liliaceae, Marsileaceae, Menispermaceae, Moringaceae, Myrtaceae, Oleaceae, Papaveraceae, Phyllanthaceae, Poaceae and Solanaceae. Only two species were collected belonging to the family Asclepiadaceae, Acanthaceae, Apocyanaceae, Lythraceae, Moraceae, Piperaceae and Zingiberaceae. Three species from Rutaceae family, Four species from Asteraceae, Lamaiceae, and seven species from Fabaceae. Out of these, 52% were observed to be herbs, 30% were observed to be trees and the remaining 18% were shrubs. Out of these, 44 species belong to dicotyledons, 5 were monocotyledons, 1 is pteridophyta. Out of these, 56% were taken orally, 40% were taken externally, 3% were taken through nasal and 1% from ear. Out of these, juice of 28% plants are used for medicine making, paste of 27% plants are made, decoction of 20% plants are made, powder of 13% were made, latex of 4% were extracted, brush of 3%,oil extracted

and also fried are done from 2% and only 1% of smoke were used in the way to make medicines. Out of these, bulb and flower from one species, rhizome from 2 species, stem of three species, seed of 4 species, fruit and whole plant from 6 species, root of 8 species, bark of 10 species and leaf of 32 species were taken to make the medicines.

Acknowledgments

The investigators acknowledge the efforts of the village Vaidyas who have put in hard labour to popularize the cost effective medicinal plants among villagers and who have shared their oral knowledge unhesitatingly with us to prepare the written record of this rare study.

2. Our acknowledgement is also due to the villagers of our field study area who have come forward to share their practical healing experience using these medicinal plants.

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DOI: 10.22192/ijarbs.2020.07.03.010	

How to cite this article:

Rasmita Padhy, Harisankar Durga, Anjali Kumari. (2020). Use of medicinal plants by the tribals of Ganjam district of Odisha, India: An Ethnobotanical approach. *Int. J. Adv. Res. Biol. Sci.* 7(3): 81-93.

DOI: <http://dx.doi.org/10.22192/ijarbs.2020.07.03.010>