



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2017; 6(6): 2560-2567
Received: 12-09-2017
Accepted: 15-10-2017

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Biodiversity of Ethnomedicinal plants used by the Tribal community in Bhadrachalam agency area, Khammam district, T.S.

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Abstract

Ethnobotanical research can provide a wealth of information regarding both past and present relationships between plants and the traditional societies. The study area was investigated to get information from local tribal people having practical knowledge of medicinal plants. The main aim of the present study is to identify plants collected for medicinal purposes by the tribal people of Bhadrachalam agency areas located in Khammam district of Telangana, India. The field surveys were conducted between June 2015 and February 2017. The information of ethnomedicinal plants was collected through interviews among the tribal people. The collected data was analyzed through Informants' consensus factor (ICF) and Fidelity level index (FL) methods. A total of 50 species of plants distributed in 47 genera belonging to 35 families were identified as commonly used ethnomedicinal plants by the tribal people of study area for the treatment of various ailments. It is extremely important to save this traditional knowledge of biological heritage and explore new resources and to conserve such medicinal plants for future use.

Keywords: Ethnomedicinal plants; Biodiversity; Informant consensus; Fidelity level index; Remedies.

Introduction

Khammam is a district in the eastern region of the Indian state of Telangana. It lies between 16° 45' and 18° 35' of Northern Latitude and 79° 47' and 80° 47' of the Eastern Longitude (Ghani *et al.*, 2014) [10]. It occupies an area of 16, 029 Sq. km and is bordered by the district of Chattisgarh to the North and North-west, Warangal to the West, Odisha to the North-east, East Godavari to the east and Krishna district to the South. It is located about 193 kms east of the state capital Hyderabad. Which has a clearly mixed Andhra and Telangana traditions, it is famous with its old fort as well as with a few wonderful natural lakes. Khammam district is divided into 4 Revenue Divisions and 46 Mandals. The Khammam district has the highest tribal population (26. 47%) in the state with six tribes, viz., Koya, Lambada, Gond/Naikpod, Yerukula, Nayak and Konda Reddi. It has the largest area with a total of 7.6 lakh hectares is under forest area. This works out to more than 47% of the total area. The forest area spreads over Bhadrachalam, Manuguru, Burgampahad, Kothagudem, and Yellandu. Important forest produces are teak, bamboo, eucalyptus, beedi leaves, honey, tamarind, nux-vomica etc. It experiences typical Indian climatic conditions. Summer season is hot due to the presence of coalmines and monsoon season brings higher annual rainfall due to the high amount of forest vegetation.

About Medicinal Plants

Medicinal plants play an important role in supporting healthcare system. Plant products have been part of phytomedicines since immemorial. These can be derived from any part of the plants like bark, leaves, flowers, seed etc. In India almost 95% of the prescriptions are plant based in the traditional systems of Unani, Ayurveda, Homeopathy and Siddha (Satyavati *et al.*, 1987) [15]. According to the world health organization (WHO), 80% of the rural population in developing countries utilizes locally available medicinal plants for their primary healthcare needs. About 90% of the countries' medicinal plants are found in forest habitats.

Significance of plant based medicine in the study area

Biodiversity is decreasing everywhere, due to industries and increasing population their activities like open grazing, destructive harvesting and habitat fragmentation (paddy field, building home etc.). Ethnomedicinal plants are incredible parts of biodiversity. Therefore,

conservation of these plants is necessary for future. So far a limited work has been done to document ethnomedicinal plants in Bhadrachalam agency forest area located in Khammam district of Telangana, India (Gupta *et al.*, 1987; Krishna *et al.*, 2011; Raju & Reddy., 2005) [15, 7, 12]. Keeping this in mind, the present attempt has been undertaken to contribute to the documentation of this valuable knowledge and information from the area before these are totally lost.

Study sites and Informants Selection

The study area is Bhadrachalam agency forest area located in Khammam district of Telangana, India. The study zone extends through East 80° 21' - 81° 09' longitudes and 17° 36' - 18° 38' North latitudes. The present location is empowered by river Godavari, which is believed to be a divine river by the local tribes. The Bhadrachalam Forest Division forms a part of Pranahita-Godavari valley region. Medicinal plants such as Jitregi (*Dalbergia latifolia*), Yegisa (*Pterocarpus marsupium*) and Yepi (*Hardwickia binata*) are abundantly found in the tribal areas in both Bhadrachalam and Palvanaha divisions of the district.

An Ethnobotanical survey was conducted in some villages of Bhadrachalam agency areas according to the forest coverage and population of tribal people. In this regard 8 sampling sites were surveyed to know about the status of medicinal plants distribution and indigenous knowledge in the study area. Informants were selected with the help of local elders and most of them are old people with traditional knowledge on medicinal plants.

Materials and Methods

Interview and Discussion

The survey was made in between June 2015 and February 2017. Ethnobotanical data was collected by using semi structured interviews and group discussions, where field visits were made based on procedures recommended by Martin and Alexiades (1996) [2]. Data collection was obtained on the basis of checklist (questionnaire) items prepared. The items include information on informant's personal background, local names of medicinal plants used, diseases treated, dosage, routes of administration, sources and management of medicinal plants.

Medicinal plants Collection and Identification

The information on medicinal plants was collected for treating different diseases and disorders by the local tribal community in the study areas with field walk interview and direct observation with informants. The plant specimens possessing both vegetative and reproductive parts were collected for easy identification. Taxonomic identification of the plants was carried out with the help of floras (Gamble and Fischer, 1915-1935) [3], e-floras, etc. After identification sample specimens were labelled by the name of collectors, local and botanical name of the species, locality, habit and habitat of the species, collecting date and indigenous use of the species. The prepared sample herbarium specimens were preserved at the Herbarium and Museum of Botany Department, Kakatiya University, Warangal.

Statistical Analysis of Data

A descriptive statistic procedure like percentage and frequency distribution were employed for analyzing plant habit, plant parts used and routes of administration. (Kawsar *et al.*, 2013) [6]

Informant Consensus

The level of homogeneity between information provided by different informants was calculated by using informant's consensus factor (the number of informants citing a given medicinal plant species) as given by Leonti *et al.*, 2001 [8]. Seven use-categories were used for that purpose. An ICF value close to 1 is taken as an indication of high intracultural consensus, that is, more healers use the same plant species, whereas a value close to zero as a low probability of similarity in use of plants by different informants.

Fidelity Level Index

The fidelity level (FL) is the percentage of informants claiming the uses of a certain plant species for the same major purpose or ailment to treat as described by Alexiades (1996) [2]. So, FL was calculated as FL index = (Np/N), where Np is the number of informants that claim the use of a plant species to treat a particular disease and N is the number of informants that use the plants as a medicine to treat any disease. So, in this study, 16 medicinal plant species were systematically selected, and their FL index is analyzed for their preference by the informant to treat stomachache, bites, fever, wounds, diabetes, skin diseases and kidney stones.

Results and Discussion

Ethnomedicinal plant species in the study area

Ethnomedicinal plants have important contributions in the healthcare system of local communities as the main source of medicine for the majority of the rural populations. This study is helpful to document 50 species of plants which are widely used in the treatment of numerous human and livestock diseases in Bhadrachalam agency area, Khammam District, Telangana State. Moreover, ethnomedicinal plants remain the most important and sometimes the only source of therapeutics. In our investigation the majority of medicinal plants are harvested from farmland and home-gardens (Table-1). In this regard, 02 species (04%) are solely cultivated ones and 32 species (64%) are collected from wild habitats, similarly most of the medicinal plant species obtained from wild habitats reported by Hong *et al* (2015) [5].

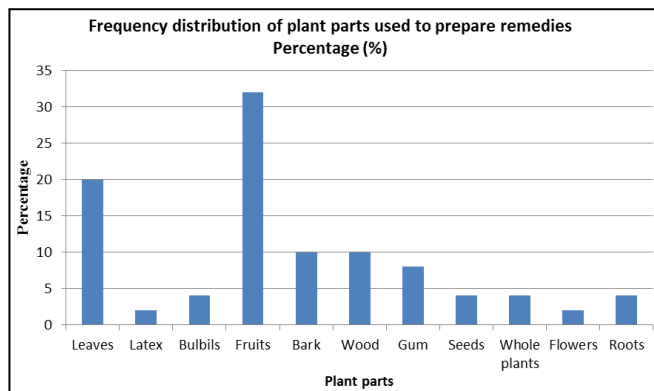
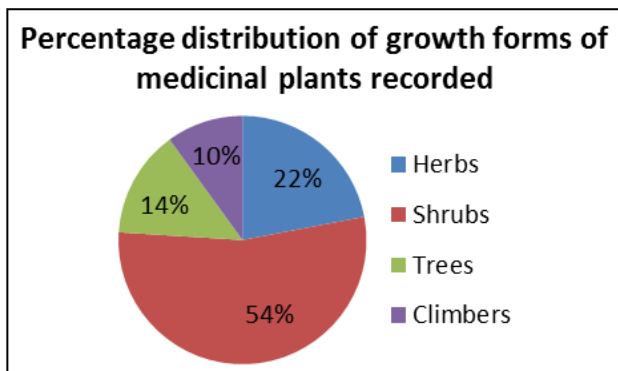
Table 1: Frequency distribution of sources of medicinal plants in the study area

Source	No.of medicinal plants	Percentage (%)
Wild (In-situ)	32	64
Cultivated (Ex-situ)	02	04
Both	16	32
Total	50	100

On the other hand, analysis of habits (Table-2) of plants documented shows that shrubs share the largest proportion with 27 species (54%), similarly shrubs vegetation higher in Himalyan region reported by Rashid *et al* (2015) [13], followed by herbs with 11 species (22%), trees with 07 species (14%) and climbers with 05 species (10%).

Table 2: Percentage distribution of growth forms of medicinal plants recorded

Growth form	No. of medicinal plants	Percentage (%)
Herbs	11	22
Shrubs	27	54
Trees	07	14
Climbers	05	10
Total	50	100



Distribution of medicinal plants into taxonomic groups

Analysis of taxonomic group of plants revealed that a total of 50 species belonging to 47 genera and 35 families are documented. On the other hand, the study has showed that the species belonged to diversified genera. In this regard, the genus *Acacia*, *Annona* and *Cassia* are found to have 2 species each. The remaining genera with one species each. With respect to families, Amaranthaceae, Caesalpinaceae and Papillionaceae consisted of 3 species, followed by Anacardiaceae, Annonaceae, Apocynaceae, Combretaceae, Liliaceae, Mimosaceae, Poaceae, Rubiaceae and Rutaceae with 2 species each and the remaining families with 1 species each.

Plant parts used for remedies

The outcome of interview resulted that the fruits are the most commonly used parts and accounted for 32% of the total, similarly Wild fruits play a significant role in human nutrition, especially as sources of carbohydrates, proteins, vitamins and minerals reported by Ajesh *et al* (2012) [1], followed by leaves 20%, bark and wood 10% and lower values for other parts (Table-3).

Table 3: Frequency distribution of plant parts used to prepare remedies

Plant part	Frequency occurrence	Percentage (%)
Leaves	10	20
Latex	01	02
Bulbils	02	04
Fruits	16	32
Bark	05	10
Wood	05	10
Gum	04	08
Seeds	02	04
Whole plants	02	04
Flowers	01	02
Roots	02	04
Total	50	100

On the other hand, analysis method of crude medicine preparation indicated that plant parts are often rendered into different forms of remedies. In this regard, from a total of 50 preparations (Table-4) oral mixture takes the highest accounted for 56%, similarly various plant extracts taken orally to cure various diseases reported by Nwauzoma & Dappa, (2013) [11] and Tugume *et al.*, (2016) [16], followed by topical having 42%.

Table 4: Major forms of preparation of plant remedies in the study area

Forms of preparation	Frequency of occurrence	Percentage (%)
Oral	28	56
Topical	21	42
Drops in the nostril	01	02
Total	50	100

Informant Consensus

Informant Consensus values have given good indication about particular species that serve for particular purpose. In this study, a total of 50 plants with medicinal importance are documented and these plants also found to have multiple use-categories. Therefore, based on the information gathered, seven (07) use categories (Table 5) were set in which a total of 395 use-reports were recorded from 50 species of medicinal plants. Therefore, based on the statistical analysis of ICF showed that there exists a uniformity of plant consumption among local people in the study area (Table-5), all ICF values (and also the mean ICF which is 0.76) are near to 1 showing the presence of homogeneity in use of plants for multiple purposes. In this regard, Seed dye use category takes the highest ICF value (1.00) followed by Firewood (0.94) and Gum (0.90).

Table 5: Informants' consensus factor (ICF) computed for seven use-categories (Leonti *et al.*, 2001; Sagioglu *et al.*, 2013) [8]

Use category	No. of species (n _i)	Percentage	Use-reports (n _{ur})	Percentage	ICF (n _{ur} -n _i /n _{ur} -1)
Medicinal	50	100	156	39.5	0.68
Food	26	52	33	8.3	0.21
Construction	04	08	24	6.1	0.86
Firewood	06	06	35	8.8	0.94
Fence	01	18	38	9.6	0.78
Gum	04	20	97	24.5	0.90
Seed dye	02	02	12	3.2	1.00
Mean ICF					0.76

Fidelity Level Index:

In our present investigation 16 medicinal plants were systematically selected and analyzed for their fidelity level index that they give value in treating 07 diseases (Table 6). In this regard, it seems that *Dioscorea bulbifera* L. (FL = 1.00) is

more preferable than *Alternanthera sessilis* (L.) (FL = 0.75) in treating stomachache. But total number of user of *Alternanthera sessilis* (L.) is much higher than *Dioscorea bulbifera* L.

Table 6: Fidelity level index for plant species used to treat different common diseases in the study area (Alexiades., 1996; Sagioglu *et al.*, 2013) [2]

Ailments	Species	Np	N	Fidelity index (Np/N)
Stomachache	<i>Alternanthera sessilis</i> (L.) R. BR.ex DC	25	33	0.75
	<i>Dioscorea bulbifera</i> L.	8	8	1.00
Bites	<i>Allium sativum</i> L.	35	47	0.74
	<i>Bixa orellana</i> L.	13	18	0.72
	<i>Anogeissus latifolia</i> (Roxb. Ex DC) Wallex Guicc	14	31	0.45
Fever	<i>Strebulus asper</i> Lour	14	15	0.93
	<i>Euphorbia thirucalli</i> L.	66	68	0.97
	<i>Solanum nigrum</i> L.	29	33	0.87
Wounds	<i>Acacia nilotica</i> (L.) Delie	21	34	0.61
	<i>Holarrhena pubescens</i> Wall. Ex G. Don	16	29	0.55
Diabetes	<i>Luffa acutangula</i> (L.) Roxb	32	35	0.91
	<i>Catharanthus pusella</i> (L.) G. Don	23	27	0.85
Skin diseases	<i>Asparagus racemosus</i> Wild.	24	31	0.77
	<i>Cynodon dactylon</i> (L.) Pers.	29	34	0.85
	<i>Cassia auriculata</i> L.	43	48	0.89
Kidney stones	<i>Aerva lanata</i> (L.) Juss	31	44	0.70

Table 7: List of Ethnomedicinal plants used by tribes in the study area.

S. No	Botanical Name	Common Name	Family	Growth Form	Useful Part	Medicinal Uses	Common Use
01	<i>Acacia leucopholea</i> (Roxb.) Willd.	Tella tumma	Mimosaceae	Tree	Gum	Dental diseases: Stem bark in dental diseases; Leaves: Leaves as fodder and wood for agricultural implements.	G
02	<i>Acacia nilotica</i> (L.) Delile	Nalla tumma	Mimosaceae	Tree	Bark	Wounds: Dried stem bark powder mixed with camphor and ghee applied on wounds.	G
03	<i>Aegle marmelos</i> (L.) Corr	Maredu	Rutaceae	Tree	Fruit	10 gms of fruit pulp is given with water to children who are suffering with diarrhoea. Wounds: Leaf paste is applied over the wounds once in a day until cured.	F
04	<i>Aerva lanata</i> (L.) Juss	Kondapindi	Amaranthaceae	Herb	Leaves	Calcine powder of dry root, placed in water after 1 day it drinks for Kidney stones.	F
05	<i>Alangium salvifolium</i> (L. f) Wangerin	Oodugu	Alangiaceae	Tree	Fruit	Fruits are given to the patient who is suffering with loss of appetite.	F
06	<i>Allium sativum</i> L.	Ulli	Liliaceae	Herb	Bulbils	Bulbils are grinded and applied over Scorpion bitten area.	F
07	<i>Alternanthera sessilis</i> (L.) R. Br.ex Dc	Ponnaganti kura	Amaranthaceae	Herb	Leaves	Leaf in night blindness, malarial fever, diarrhoea, dysentery, rabid dog bite etc; also eaten as vegetable.	F
08	<i>Amaranthus spinosus</i> L.	Mullathokura	Amaranthaceae	Herb	Leaves	Whole herb in fevers and to increase sweating; root laxative, used in colic, eczema, scorpion sting. Seed in colds and cough. Leaf eaten as vegetable for its blood purifying properties.	F
09	<i>Annona reticulata</i> L.	Ramaphalamu	Annonaceae	Tree	Fruit	Stem bark: Anti-dysenteric, astringent, and vermifuge, leaves and seeds insecticide. Fruit pulp sweet to taste.	F, Fw
10	<i>Annona squamosa</i> L.	Sitaphalamu	Annonaceae	Tree	Fruit	Leaf juice is used as nasal drops to bring down night hang over due to excessive intake of intoxicating drinks. Leaf is tied on wounds and sprains for healing and to alleviate pains.	F, Fw

11	<i>Anogeissus latifolia</i> (Roxb. Ex DC) Wallex Guicc	Thirumanu	Combretaceae	Tree	Gum	Scorpion sting: Stem bark is pasted and applied on injury of scorpion sting. Asthma: 1 tea spoon full of stem bark extract is given by adding pepper powder in it thrice in a day for twenty days.	G
12	<i>Anthocephalus chinensis</i> (Lam.) A. Rich ex walp	Kadamba	Rubiaceae	Tree		Stem bark: Tonic, astringent, useful in fever and snake bite, leaf decoction as gargle in apthae and stomatitis. Ripe fruit edible, sweet and sour to taste.	G
13	<i>Argemone mexicana</i> L.	Pitchikusuma	Papaveraceae	Herb	Leaves	Burns: Leaf paste is applied on burns. Root:- Root anti-inflammatory used in piles, skin diseases	Fc
14	<i>Asparagus racemosus</i> Wild.	Pilliteegalu	Liliaceae	Climber	Root	Body cooling: A small piece of root is tied around the ears to relive vertigo due to excessive heat.	Fc
15	<i>Atylosia scarabaeoides</i> (L.) Benth	Adavikandi	Papilionaceae	Shrub	Fruit	Fresh leaves (2-3) can be chewed for Toothache.	Fc
16	<i>Azadirachta indica</i> A. Juss.	Vepa	Meliaceae	Tree	Leaves	The tender leaves of Neem and <i>Pongamia pinnata</i> were crushed and later applied for Piles treatment.	G
17	<i>Bambusa arundinacea</i> (Retz.) Wild.	Veduru	Poaceae	Tree	Leaves	Sprain: Fresh Leaves are gently warmed and tied on sprain of back pain.	C
18	<i>Bauhinia racemosa</i> Lam.	Arechettu	Fabaceae	Tree	wood	Mouth ulceration: Young leaves are ground to paste and applied to lips and in mouth.	C
19	<i>Bixa orellana</i> L.	Sinduri	Bixaceae	Tree	Seeds	Leaf used in snake bite, seeds a source of vegetable dye.	Sd
20	<i>Boerhavia diffusa</i> L.	Galigeru	Nyctaginaceae	Herb	Leaves	Leaves are used as vegetables, useful for Fever.	Fw
21	<i>Boswellia serrata</i> Roxb. Ex Colebr	Anduga	Burseraceae	Tree	Gum	Stem bark is used for Arthritis and gum used for Nutrition	G
22	<i>Buchanania lanzan</i> Spreng	Chinamorri	Anacardiaceae	Tree	Fruit	Morri gum used for Nutritional purpose and good healthy.	F, G
23	<i>Canthium parviflorum</i> Lam.	Balusu	Rubiaceae	Shrub	Fruit	Root in swellings of the neck, febrifuge, leaf eaten as vegetable, fruit pulp eaten.	F
24	<i>Capparis zeylanica</i> L.	Adonda	Capparidaceae	Shrub	Fruit	Collie, convulsion	F
25	<i>Cassia auriculata</i> L.	Thangedu	Caesalpiniaceae	Shrub	Flower	White discharge: Handful flowers are crushed and mixed with 100 ml of cow milk and given orally to treat white discharge.	Fc
26	<i>Cassia fistula</i> L.	Rela	Caesalpiniaceae	Tree	Fruit	Leprosy: 50 ml stem bark decoction is given orally.	Fw
27	<i>Catharanthus pusillus</i> (L.) G. Don	Billaganeru	Apocynaceae	Herb		Diabetes: 10 gm whole plant powder is mixed with 100 ml of water and given orally.	
28	<i>Ceiba pentandra</i> (L.) Gaertn.	Tellaburuga	Malvaceae	Tree	Bark	White discharge: 50 ml juice is extracted from stem bark and a pinch of zeera powder and sugar is mixed to taste and given orally before breakfast alternate days.	C
29	<i>Chloroxylon swietenia</i> DC	Billudu	Rutaceae	Tree	Bark	Dandruff: Stem bark powder is mixed with coconut oil and applied to hair and scalp to cure dandruff.	G
30	<i>Cissus quadrangularis</i> L.	Nalleru	Vitaceae	Climber	Leaves	The whole plant is crushed and applied externally on Fracture area.	Fw
31	<i>Cleome</i>	Vaminta	Cleomaceae	Herb	Leaves	Wounds: Leaf paste is applied topically to heal	Fw

	<i>viscosa</i> L.		eae			wounds.	
32	<i>Curculigo orchiooides</i> Gaertn.	Nelatadi	Hypoxidaceae	Herb	Root	Aphrodisiac: 50 gms of root powder is mixed with 200 ml of goat milk and it is given orally twice every day.	Fw
33	<i>Cynodon dactylon</i> (L) Pers.	Garika gaddi	Poaceae.	Herb	Whole plant	Body cooling: 50 ml whole plant decoction is taken orally to keep the body cool	Fw
34	<i>Dioscorea bulbifera</i> L.	Govinda gadda	Dioscoreaceae	Climber	Bulbils	Stomatitis	F
35	<i>Euphorbia thirucalli</i> L.	Kada jemudu	Euphorbiaceae	Shrub	Latex	Tooth problems: The latex applies on the aching tooth.	Fc
36	<i>Holarrhena pubescens</i> Wall. Ex G. Don	Palakod ishe	Apocynaceae	Tree	wood	Plant latex applied on Wounds for Healing.	Fw
37	<i>Luffa acutangula</i> (L.) Roxb	Beera	Cucurbitaceae	Climber	Fruit	Fruit epicarp crushed to form powder, mixed with water and it consumed for Diabetes.	F
38	<i>Manilkara hexandra</i> (Roxb.) Dubard	Paalapa ndlu	Sapotaceae	Tree	Wood	Leaves and fruits are used in summer season for Ulcers.	G
39	<i>Opuntia dillenii</i> (Ker Gawl.) Haw	Nagajemudu	Cactaceae	Shrub	Fruit	Phylloclade is ground with 10 gms of stem bark of the same plant and paste is applied on the bitten area and 2 or 3 spoons of the above paste is administered with a glass of water twice a day for 2 days.	F
40	<i>Pongamia pinnata</i> (L.)	Kanuga	Fabaceae	Tree	Wood	Fresh leaves are crushed and add half tea spoon of salt, take this mixture twice a day for Cough	Fw
41	<i>Pterocarpus marsupium</i> Roxb.	Peddegi	Papilionaceae	Tree	Gum	Twigs are used as tooth brush for healthy Teeth.	G
42	<i>Scleichera oleosa</i> (Lour.) Merr	Pusugu	Sapindaceae	Tree	Fruit	Stem bark is crushed to form powder mixed with oil and applied over the chest for Chest pain.	Fw
43	<i>Semecarpus anacardium</i> L.f	Nallajeedi	Anacardiaceae	Tree	Fruit	Haemorrhagic	Fw
44	<i>Solanum nigrum</i> L.	Kamanchi	Solanaceae	Herb	Fruit	Leprosy : Applied the leaf juice soil on the skin night times Diabetic: Grind the seed of <i>solanum nigrum</i> in to crystallized form and mixed with water and honey, it consumed.	F
45	<i>Strebulus asper</i> Lour.	Barrinka	Moraceae	Tree	Wood	Twigs are used as tooth brush for healthy Teeth.	Fc
46	<i>Strychnos potatorum</i> L.f	Chillaginjal	Loganiaceae	Tree	Seeds	The plant seeds grinded to powder form, which is applied to relieve from Snakebite.	Fc
47	<i>Syzygium cumini</i> (L.) Skeels	Neredu	Myrtaceae	Tree	Fruit	Plant root made as bowel, water placed in bowel after 8 hours it is consumed for Urinary calculi.	F
48	<i>Terminalia arjuna</i> Roxb.	Tellamaddi	Combretaceae	Tree		Pimples: 5 gms of bark powder of <i>Terminalia arjuna</i> is mixed with one glass full of curd and it consumed orally.	C
49	<i>Tinospora cordifolia</i> (Willd.) Miers	Tippatega	Menispermaceae	Climber	Leaves	Leaf extract is administered along with black pepper – 3 – 4 times a day.	Fc
50	<i>Ziziphus oenopolia</i> (L.) Mill	Pariki	Rhamnaceae	Shrub	Fruit	Dried stem bark powder mixed with oil to apply for Wounds and Cuts.	F, Fc

(F – Food; C – Construction; Fw – Firewood; Fc – Fence; G – Gum; Sd – Seed dye)

Figure-1



Figure 1: Some important medicinal plants used by ethnic tribes in Bhadrachalam agency area.

a) *Atylosia scarabaeoides* b) *Canthium parviflorum* c) *Cassia fistula* d) *Pterocarpus marsupium*

e) *Holarrhena pubescens* f) *Ceiba pentandra* g) *Alternanthera sessilis* h) *Pongamia pinnata*

i) Data collecting from tribal medicinal practitioner j) Tribal festival rhythm

k) Traditional women of koya tribe l) Interaction with traditional practitioner of koya tribe.

Conclusion

In our investigation, the result of Ethnobotanical survey of medicinal plants in Bhadrachalam agency area, Khammam District, Telangana State, revealed that the existence of medicinal plants and use of traditional knowledge by local tribal people in the study site. In this regard, a total of 50 medicinal plants used for treating various purposes are documented.

The majority of plant species are found wild habitats and growth forms are shrubs followed by herbs and trees. Fruits followed by leaves are the dominant plant parts used for preparation of most commonly used remedies. The larger proportions of remedies are administrated in oral route, while to some extent treated commonly using topical route. Our present investigation states that due to urbanization, deforestation, drought and overgrazing are the major threats to decrease the medicinal plants and making them to be the parts of red data list. Our study suggests that *in-situ* and *ex-situ* conservation of medicinal plants in the study area can ensure the continuity of the medicinal plants in their natural habitat.

Acknowledgement

Authors thankful to tribal people of Bhadrachalam agency area, Khammam District, Telangana State and Forest Department for their co-operation during field work.

References

1. Ajesh TP, Naseef SA, & Kumuthakalavalli R. Ethnobotanical documentation of wild edible fruits used by Muthuvan tribes of Idukki, Kerala-India. *Int J Pharm Bio Sci.* 2012; 3(3):479-487.
2. Alexiades MN. Collecting ethnobotanical data: An introduction to basic concepts and techniques. In: *Selected Guidelines for Ethnobotanical Research: A Field Manual.* The New York Botanical Garden, Bronx, New York, 1996.
3. Gamble JS. Fischer CEC (1915-1935). *Flora of the Presidency of Madras* (Adlard & Son, W.C. London) 1-3.
4. Gupta VG, Hussain SJ, Imam S. Medicoethno Botanical survey of Paderu forest of Araku valley, Andhra Pradesh, India. 1997; 68:45-48.
5. Hong L, Guo Z, Huang K, Wei S, Liu B, Meng S, et al. Ethnobotanical study on medicinal plants used by Maonan people in China. *Journal of ethnobiology and ethnomedicines.* 2015; 11(1):32.
6. Kawsar Md, Raihana Raufa, Sohel Md, Kumar Nath, Akbar Md, Hossain Aninda. Medicinal Plants Biodiversity and Ethno-Medicinal Plants Use By The Tribal Community in Chittagong Hill Tracts, Bangladesh. *Unique Journal of Ayurvedic and Herbal Medicines,* 2013; 1:45-50.
7. Krishna MB, Mythili S, Kumar KS, Ravinder B, Murali T, Mahender T. Ethno botanical survey of medicinal plants in Khammam District, Andhra Pradesh, India, 2011.
8. Leonti M, Vibrans H, Sticher O, Heinrich M. Ethnopharmacology of the populace, Mexico: an evaluation. *J. Pharm. Pharmacol.* 2001; 53:1653-1669.
9. Martin GJ. *Ethnobotany: a method manual.* Royal, Chapman and Hall, Kew, London, 2001.
10. Ghani Md, Suresh V, Raju S, Dr. Mustafa Md. Ethnomedicinal Plants used by Tribal Communities for the Treatment of Various Diseases. *Int. J. Ayur. Pharma Research.* 2014; 2(6):57-62.
11. Nwauzoma AB, Dappa MS. *Ethnobotanical Studies of Port Harcourt Metropolis, Nigeria.* ISRN Botany, 2013.
12. Raju VS, Reddy KN. *Ethnomedicine for dysentery and diarrhoea from Khammam district of Andhra Pradesh,* 2005.
13. Rashid S, Ahmad M, Zafar M, Sultana S, Ayub M, Khan MA, et al. Ethnobotanical survey of medicinally important shrubs and trees of Himalayan region of Azad Jammu and Kashmir, Pakistan. *Journal of Ethnopharmacology.* 2015; 166:340-351.
14. Sağıroğlu M, Dalgıccedil S, Toksoy S. Medicinal plants used in Dalaman (Muğla), Turkey. *Journal of Medicinal Plants Research.* 2013; 7(28):2053-2066.
15. Satyavati GV, Gupta AK, Tandon N. *Medicinal plants of India,* Indian Council of Medical Research, New Delhi, India, 1987.
16. Tugume P, Kakudidi EK, Buyinza M, Namaalwa J, Kamatenesi M, Mucunguzi P. Ethnobotanical survey of medicinal plant species used by communities around Mabira Central Forest Reserve, Uganda. *Journal of ethnobiology and ethnomedicines.* 2016; 12(1):5.