

Tree barks used for ethnomedicine by primitive tribes of Paderu Division, Alluri Sitarama Raju District, Andhra Pradesh

M.V. Vidyullatha, Gunttamukkala Jeevan Babu, Boddu Preethi Chandrakala and Bodayya Padal Salugu *

Department of Botany, Andhra University, Visakhapatnam-530003, A.P, India.

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Abstract

Investigation on ethnomedicinal significance of tree bark used by primitive tribes of Paderu division, Alluri Sitarama Raju District, Andhra Pradesh. A total of 99 species of medicinal tree species belong to 74 genera and 39 families are commonly used to treat 78 types of diseases. Out of 39 families, Moraceae had the highest proportion of medicinal plants followed by the Caesalpiniaceae, Mimosaceae, Apocynaceae, Anacardiaceae, Combretaceae, Lamiaceae and Rubiaceae each with 5 species. The people of this area have been using a variety of plants for treating different diseases and ailments. They have abundant indigenous knowledge about plant collection, dosage form preparation, and their utilization.

Keywords: Investigation; Ethnomedicine; Tree barks; Paderu Division; Alluri sitaramaraju district

1. Introduction

India is a vast country with a variety of topographies, climates, vegetation and people. The significant differences among the barks of different species determine their use [1-2]. The bark of *Cinnamomum cassia* is not only a spice, but also has antibacterial and antifungal effects; moreover it encourages appetite [3]. *Magnolia* bark is traditionally used in Chinese and Japanese medicines [4]. Tea tree bark is popularly used against diabetes in Brazil. The water stem extract lowers the blood-sugar level, increasing metabolism [5]. Bark is important to the horticultural industry since in shredded form it is used for plants that do not thrive in ordinary soil, such as epiphytes [6]. Collection, identification and documentation of the ethnomedicinal uses of tree barks by tribal community of Paderu division, Visakhapatnam District.

2. Material and methods

2.1. Study area

The Paderu division has harbours luxurious vegetation with coffee and pepper plantations on the hilly slopes. There are in Ananthagiri, Araku, Dumbriguda, Paderu (Minumuluru), G. Madugula, and Munchingiputtu mandals of this division. Paderu division belongs to newly formed Alluri Sitarama Raju district, Andhra Pradesh. The division lies in between latitudes 17°50' and 18° - 35' north and longitude in between 82°-17' and 83°-1' East with a total geographical area of 3249.65 Sq. K.Ms. In this district different primitive tribal groups like Konda Dora, Valmiki, Nukha Dora, Manne Dora, Porja and Gadaba residing in the interior area of this division.

2.2. Methodology

Collected specimens were made into herbarium as per the methods suggested by Jain & Rao [7]. The collected specimens were identified only after a critical examination with the help of different floras like Flora of the Presidency of the

*Corresponding author: Bodayya Padal Salugu

Madras [8]. Flora of Visakhapatnam District [9] and Flora of Vizianagaram District [10]. The voucher specimens were deposited at the Botany Department Herbarium (BDH), Andhra University, Visakhapatnam.

Table 1 Ethnomedicinal uses of tree species by primitive tribes of Paderu division, Alluri Sitaramaraju District

S. No	Name of taxa	Family	Ailments	Preparation Methods
1	<i>Acacia leucophloea</i> (Roxb.) Willd.	Mimosaceae	Wounds	Paste
2	<i>Acacia nilotica</i> (Linn.) Willd.	Mimosaceae	Backache	Powder
			Diarrhoea	Powder
			Dysentery	Decoction
			Leucorrhoea	Gum
			Mouth Ulcers	Decoction
3	<i>Aegle marmelos</i> (Linn.) Correa	Rutaceae	Antiemetic	Decoction
4	<i>Ailanthus excelsa</i> Roxb.	Simarubaceae	Cough & *Catarrh	Decoction
			Laxative	Paste
			Leucorrhoea & Menorrhagia	Decoction
5	<i>Alangium salvifolium</i> (L.f.)	Alangiaceae	Paralysis	Paste
6	<i>Albizia lebbek</i> (Linn.) Willd.	Mimosaceae	Asthma	Juice
			Itching & Skin Diseases	Paste
7	<i>Albizia procera</i> (Roxb.) Benth.	Mimosaceae	Rheumatism	Paste
8	<i>Alstonia scholaris</i> (Linn.) R. Br.	Apocynaceae	Hiccups	Juice
			Labour Pains	Decoction
			Leprosy	Powder
			Rheumatism	Paste
9	<i>Alstonia venenata</i> R. Br.	Apocynaceae	Galactagogue	Decoction
			Galactagogue	Decoction
10	<i>Anacardium occidentale</i> Linn.	Anacardiaceae	Gastritis	Paste
11	<i>Anthocephalus cadamba</i> Miq.	Rubiaceae	Blood Disorders	Decoction
			Skin Diseases	Decoction
			Blood Dysentery	Decoction
			Carbuncle	Decoction
			Galactagogue	Decoction
12	<i>Annona squamosa</i> L.	Annonaceae	Antidote	Juice
			Asthma	Juice
13	<i>Artocarpus heterophyllus</i> Lam	Moraceae	Diabetes	Decoction
14	<i>Azadirachta indica</i> A. Juss.	Meliaceae	Jaundice	Decoction
15	<i>Barringtonia acutangula</i> (L.)	Barringtoniaceae	Peripheral neuritis	Paste
			Rheumatoid arthritis	Pills
16	<i>Bauhinia purpurea</i> Linn.	Caesalpiniaceae	Leucorrhoea	Powder

17	<i>Bauhinia vahlii</i> Wight & Arn.	Caesalpiniaceae	Blood Dysentery	Decoction
18	<i>Bauhinia variegata</i> Linn.	Caesalpiniaceae	Skin Diseases	Paste
			Stomach ache	Juice
			Throat Pain & *Swellings	Decoction
19	<i>Bauhinia racemosa</i> Lamk	Caesalpiniaceae	Dysentery	Decoction
			Diarrhoea	Decoction
20	<i>Boswellia serrata</i> Roxb. ex Colebr.	Burseraceae	Asthma	Juice
			Diarrhoea	Paste
21	<i>Bridelia montana</i> (Roxb.) Willd.	Euphorbiaceae	Centipede Bite	Paste
			Jaundice	Decoction
22	<i>Bridelia retusa</i> (Linn.) Spreng.	Euphorbiaceae	Joint Pains & Arthritis	Decoction
23	<i>Buchanania lanzan</i> : Spreng	Anacardiaceae	Boils	Paste
			Diarrhoea	Powder
24	<i>Butea monosperma</i> (Lam.) Taub.	Fabaceae	Wounds	Juice
			Bone fracture	Paste
25	<i>Callicarpa arborea</i> Linn.	Verbenaceae	Anthelmintic	Paste
26	<i>Calycopteris floribunda</i> Lam.	Combretaceae	Boils & Wounds	Paste
27	<i>Cassia alata</i> Linn.	Caesalpiniaceae	Gangrene	Decoction
28	<i>Cassia fistula</i> Linn.	Caesalpiniaceae	Ring Worm	Juice
			Skin Diseases	Juice
29	<i>Chloroxylon swietenia</i> DC.	Flindersiaceae	Cold	Paste
			Epilepsy	Paste
30	<i>Ceiba pentandra</i> (Linn.) Gaertn.	Bombacaceae	Scabies	Paste
			Skin Diseases	Paste
31	<i>Cinnamomum camphora</i> (Linn.) Nees & Eberm.	Lauraceae	Tooth Decay	Powder
32	<i>Cinnamomum zeylanicum</i> Garc. ex Bl.	Lauraceae	Wounds	Powder
33	<i>Cipadessa baccifera</i> (Roth) Miq.	Meliaceae	Appetiser	Decoction
			Dyspepsia	Decoction
			Catarrh	Powder
34	<i>Cochlospermum religiosum</i> (Linn.) Alston	Cochlospermaceae	Bone Fracture	Paste
35	<i>Dichrostachys cinerea</i> (Linn.) Wt. & Arn.	Mimosaceae	Skin Diseases	Decoction
36	<i>Dillenia indica</i> Linn.	Dilleniaceae	Stomach ache	Paste
37	<i>Diospyros melanoxylon</i> Roxb.	Ebenaceae	Tumours	Paste
			Diarrhoea	Decoction
38	<i>Erythrina variegata</i> Linn.	Fabaceae	Scabies	Paste
39	<i>Ficus auriculata</i> Lour.	Moraceae	Scabies	Decoction

40	<i>Ficus benghalensis</i> Linn.	Moraceae	Memory Power	Powder
41	<i>Ficus benjamina</i> L.	Moraceae	Arthritis	Paste
			Rheumatism	Paste
42	<i>Ficus tomentosa</i> Roxb.	Moraceae	Boils	Paste
			wounds	Paste
43	<i>Ficus hispida</i> Linn. f.	Moraceae	Tumours	Paste
44	<i>Ficus microcarpa</i> Linn. f.	Moraceae	Blood Dysentery	Decoction
			Bone Fracture	Decoction
45	<i>Ficus palmata</i> Hook.	Moraceae	Gonorrhoea	Juice
46	<i>Ficus racemosa</i> Linn.	Moraceae	Diabetes	Juice
			Leucorrhoea	Powder
			Mouth Ulcers	Decoction
47	<i>Ficus religiosa</i> Linn.	Moraceae	Jaundice	Decoction
48	<i>Ficus semicordata</i> Bunch.	Moraceae	Menstrual Problem	Juice
49	<i>Gmelina arborea</i> Roxb.	Verbenaceae	Galactagogue	Decoction
			Galactagogue	Decoction
50	<i>Gmelina asiatica</i> Linn.	Verbenaceae	Dandruff	Paste
51	<i>Haldinia cordifolia</i> (Roxb.) Ridsd.	Rubiaceae	Carbuncle	Decoction
			Scabies	Decoction
			Wounds	Decoction
			Fertility	Powder
52	<i>Holarrhena antidysenterica</i> (L.) Wall. ex A. DC	Apocynaceae	Asthma	Powder
			Dysentery	Paste
53	<i>Holarrhena pubescens</i> (Buch.-Ham.) Wall. ex G. Don	Apocynaceae	Bleeding Piles	Powder
			Weak Heart	Paste
54	<i>Holoptelea integrifolia</i> (Roxb.) Planch	Ulmaceae	Fistula	Paste
			Heel Pains	Paste
			Rheumatism	Paste
			Scabies	Paste
55	<i>Jatropha curcas</i> Linn.	Euphorbiaceae	Rheumatic Pains	Paste
56	<i>Lagerstroemia parviflora</i> Roxb.	Lythraceae	Rheumatoid arthritis	Paste
			Stomach ache	Decoction
57	<i>Lannea coromandelica</i> (Houtt.) Merr.	Anacardiaceae	Headache	Paste
			Stomach-ache	Decoction
58	<i>Limonia acidissima</i> Linn.	Rutaceae	Insomnia	Paste
			Skin Diseases	Juice

59	<i>Litsea deccanensis</i> Gamble	Lauraceae	Bone Fracture	Paste
60	<i>Litsea glutinosa</i> (Lour.) C.B. Robinson.	Lauraceae	Rheumatoid arthritis	Paste
			Diarrhoea and dysentery	Decoction
61	<i>Madhuca indica</i> Gmel.	Sapotaceae	Dog Bite	Paste
62	<i>Mangifera indica</i> L.	Anacardiaceae	Leucorrhoea	Decoction
63	<i>Manilkara hexandra</i> (Roxb.) Dubard	Sapotaceae	Galactagogue	Juice
64	<i>Memecylon umbellatum</i> Burm. f.	Melastomaceae	Leucorrhoea	Decoction
65	<i>Mesua ferrea</i> L.	Clusiaceae	Jaundice	Powder
66	<i>Melia azadirachta</i> L.	Meliaceae	Skin disease	Paste
67	<i>Michelia champaca</i> L.	Magnoliaceae	Cracks in feet	Paste
68	<i>Moringaoleifera</i> Lam.	Moringaceae	Paralysis	Juice
69	<i>Morinda pubescens</i> Sm.	Rubiaceae	Body Pains	Juice
			Stomach ache	Paste
70	<i>Naringi crenulata</i> (Roxb.)	Rutaceae	Dysentery	Paste
			Puerperal fever	Decoction
71	<i>Nyctanthes arbor-tristis</i> Linn.	Nyctaginaceae	Malaria	Decoction
72	<i>Oroxylum indicum</i> (Linn.) Vent.	Bignoniaceae	Asthma	Powder
			Cough & Jaundice	Decoction
			Leg Pains & *Swellings	paste
73	<i>Pavetta indica</i> L.	Rubiaceae	Epilepsy	Decoction
			Jaundice	Decoction
74	<i>Pongamia pinnata</i> (Linn.) Pierre	Fabaceae	Herpes	Paste
			Piles	Paste
75	<i>Phoenix sylvestris</i> (L.) Roxb.	Arecaceae	Asthma	Paste
76	<i>Plumeria alba</i> L.	Apocynaceae	Stomach ache	Decoction
77	<i>Pterocarpus marsupium</i> Roxb.	Fabaceae	Diabetes	Powder
78	<i>Pterospermum xylocarpum</i> (Gaertn.) Sant. & Wagh.	Sterculiaceae	Galactagogue	Paste
79	<i>Psidium guayava</i> L.	Myrtaceae	Blood dysentery	Juice
80	<i>Schefflera stellata</i> (Gaertn.) Harms	Araliaceae	Dental Disorders	Decoction
81	<i>Schleichera oleosa</i> (Lour.) Oken.	Sapindaceae	Bone fracture	Paste
82	<i>Semecarpus anacardium</i> Linn	Anacardiaceae	Rheumatic Swellings	Paste
83	<i>Sterculiaurens</i> Roxb.	Sterculiaceae	Easy Delivery	Powder
84	<i>Streblus asper</i> Lour.	Moraceae	Galactagogue	Paste
85	<i>Strychnos nux-vomica</i> Linn.	Loganiaceae	Paralysis	Paste
			Snake Bite	Juice
86	<i>Soymida febrifuga</i> (Roxb.) A. Juss.	Meliaceae	Dysmenorrhoea	Paste
87	<i>Syzygium cumini</i> (Linn.) Skeels	Myrtaceae	Dysentery	Paste

			Menstruation	Decoction
88	<i>Tamarindus indica</i> L.	Caesalpiniaceae	Asthma	Decoction
89	<i>Tarenna asiatica</i> (L.) Kuntze ex Schummann	Rubiaceae	Dysentery	Paste
			Emetics	Paste
90	<i>Terminalia alata</i> Roth	Combretaceae	Jaundice	Decoction
91	<i>Terminalia arjuna</i> (Roxb. ex DC.) Wight & Arn.	Combretaceae	Blood Dysentery	Powder
			Bone Fracture	Powder
92	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Combretaceae	Abdominal Pain	Decoction
93	<i>Terminalia chebula</i> Retz.	Combretaceae	Abdominal Pain	Decoction
			Diarrhoea	Decoction
			Vomiting	Decoction
94	<i>Vitex leucoxydon</i> L.	Lamiaceae	Carbuncle	Juice
95	<i>Vitex negundo</i> L.	Verbenaceae	Body swelling	Paste
			Head ache	Paste
96	<i>Wrightia tinctoria</i> (Roxb.) R. Br.	Apocynaceae	Laxative	Juice
			Pain	Juice
97	<i>Xylia xylocarpa</i> (Roxb.) Taub.	Mimosaceae	Gonorrhoea	Decoction
98	<i>Zanthoxylum armatum</i> DC.	Rutaceae	Dysentery	Powder
			Scabies	Paste
99	<i>Ziziphus mauritiana</i> Lam.	Rhamnaceae	Antiemetic	Paste
			Stomachache	Paste
			Cuts	Paste
			Dental Disorders	Decoction

3. Results and discussion

Among the 30 traditional medical practitioners interviewed, 20 of them were men and 10 were women. Their ages ranged from 28 to 70 years, with 60% of them being older than 50. In Table 1, it is reported that 99 species of medicinal tree species belong to 74 genera and 39 families, and are commonly used to treat 78 types of diseases. It is interesting to note that the Moraceae had the highest proportion of medicinal plants (12%), followed by the Caesalpiniaceae (7%), Mimosaceae and Apocynaceae (6% each), and Anacardiaceae, Combretaceae, Lamiaceae and Rubiaceae (5% each). Each of all other families had less than four plant species associated with the treatment of the diseases documented in Table 1. Most of the plant species were used to treat one disease, while some were used to treat two or more diseases. The plant species used to treat the highest percentage of diseases were *Acacia nilotica* (Linn.) Willd and *Anthocephalus cadamba* Miq. each reported to treat five diseases and *Holoptelea integrifolia* (Roxb.) Planch and *Haldinia cordifolia* (Roxb.) Ridsd. Each reported to treat four diseases. In terms of frequency of medicinal plant uses, the highest percentage of plant species (5% each) were used to treat stomachache, Skin Diseases, Galactagogue and followed by (4% each) Jaundice, Diarrhoea and Asthma and Bone fracture, Leucorrhoea, Scabies and Wounds (3% each), Other diseases were treated with less than 2% of the medicinal plants recorded. Some specific herbal preparations were taken by mixing with food, honey or drunk together with coffee prepared from leaves of the coffee plant. Most medicinal plant preparations were taken orally (75.6%), while 24.4% were administered topically for diseases such as skin infections and wounds.

The finding that majority of the informants interviewed were aged above 50 years augments [11]. This implies that the elderly people are the main custodians of traditional knowledge, and this poses a serious challenge of the knowledge gap between the elderly and the young generation if framework to ensure apprenticeship is not put in place. Trees are the most valuable natural resources that have an immense importance both to living organisms and to derive economy to the country. Trees form the major structural and functional basis of tropical forest ecosystems and can serve as robust indicators of changes at the landscape scale [12]. A tree is a woody plant that reaches a minimum height of at least 3m having a single stem with a definite crown shape [13]. Padal *et.al* [14] reported 121 tree barks were used for ethnomedicinal purpose by tribes of Paderu division, Alluri Sitaramaraju District, Andhra Pradesh. Previous reports on bark ethnomedicine, *Bauhinia racemosa* Lam. (Caesalpiniaceae) Stembark (10-12gm) paste administered twice a day by Konda Reddis. *Brideliaairy-shawii*P.T.Li (*B.retusa* (L.) Spreng.) (Euphorbiaceae) Stem bark crushed with those of *Terminalia bellerica* (equal proportions) and the prepared is paste administered (of red gram size) once daily for 3 days by Koyas. *Ailanthus excels* Roxb. (Meliaceae) Stem bark extract (50ml) administered once daily for 3 days for diarrhoea and dysentery by local Vaidyas [15].

4. Conclusion

The present study revealed that the tribal people of Paderu Division, Alluri Sitarama Raju District, In Andhra Pradesh is rich in plant resources that are traditionally used as medicines. The people of this area have been using a variety of plants for treating different diseases and ailments. They have abundant indigenous knowledge about plant collection, dosage form preparation, and their utilization. The medicinal values of tree barks different plant species were recorded for the first time in the district. The medicinal properties of the plants were justified by comparing them with relevant literature published from different parts of the world. The domestication of medicinal plants will create new opportunities for the local people such as provision of an alternative income and could help reduce the pressure on the wild population. Successful conservation strategies should be developed and priority given to sustainable harvesting of the plants.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that they hold no competing interests.

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