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Plants Used as Ethanomedicine by the Adi Tribes of Sille-Oyan Circle of Arunachal Pradesh: Source for Livelihood and Medicine

Tantulung Tatan*, T. S. Mehra, Senjem Semba, Haffis Mohammed and Fullmoon Puwein

College of Horticulture and Forestry, Central Agricultural University, Pasighat, Arunachal Pradesh-791102, India
**Corresponding author*

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A B S T R A C T

The objectives of the present study were to document the ethno-medicinal plants use by the Adi tribes of Sille-Oyan Circle of Arunachal Pradesh for therapeutic diseases. These are not only for treat ailments but also for the potential source of economy of the peoples as well as to the village. The present study recorded 59 plant species which belong to 34 families for various uses from which Asteraceae family, (6) is mainly used and mostly are herbs. The local practitioner has a vast knowledge regarding identification, extraction, uses, preparation and applications of plants and herbs for the treatment of various kinds of ailments locally. Traditional drug treatments are the mainstay of healthcare in this region and are known to support the treatment of many illnesses. Some of the medicinal plants used by aboriginal peoples are *Zanthoxylum rhetsa, Acmella oleracea, Clerodendum colebrookianum, Houttuynia cordata, Solanum indicum* and *Solanum nigrum,* etc. The folk use some plants has also been scientifically validated such as the leaves of *Clerodendrum colebrookianum* (Ongin) are consumed by aboriginal peoples to check high blood pressure and the same is evident by the research that the extract of plant possesses hypotensive properties. In the present paper, emphasis is given to highlight some of the important plants consumed by the Adi tribe of Arunachal Pradesh and their medicinal benefits to serve as a basis for their further scientific validation. The study was done to conserve the importance of traditional knowledge of tribes as these tribal people are rapidly acquiring the modern culture and custom threatening the plants and vanishing the traditional value of the plants.

Introduction

From the early age, people used various materials from nature to cure their ailments to improve their health. There is only one source of medicinal agent i.e., is nature. Many modern drugs are being isolated from natural sources which are based on their use in traditional medicine. These plant- based traditional medical systems continue to play an essential role in health care, with about 80% of the world's inhabitants relying mainly on traditional medicines for their primary health care (WHO 2002-2005). Ethno-medicine is defined as the interdisciplinary science of biologically active traditionally observed by man (Holmstedt and Bruhn, 1983). India has vast ethnomedicinal

knowledge since ancient times. Origin of all such knowledge in India is from the great traditional system of Ayurveda. Arunachal Pradesh with a total geographical area of 83,743 sq km. is the largest state of Northeast India which occupies a major portion of the Eastern Himalaya global biodiversity hotspot harbouring over 500 species of medicinal plants, latitude 26° 28'N and 29°33' N and between 91°31'E and 97°30' E longitude (Mandal *et al.,* 2002). An ethnomedicinal study takes into account knowledge of the Adi tribes inhabiting in the area, with particular reference to their distribution, language/dialect spoken, food habit, rituals and practices, traditional practices followed in agriculture, house building, art and craft objects made out of plant and their products, etc. An ethnomedicinal study of the area, therefore, aims to cover under its purview the whole of information about plants namely plants used as medicine. The Adi language spoken by the people of this region belongs to the Tibeto-Burman language family (Mandal *et al.,* 2002; Singh 1998; Dutta and Ahmad 1995). Earlier studies published on different districts on Adi tribe include Singh *et al.,* (2008), Singh *et al.,* (2012), Nimasow *et al.,* (2012), Baruah *et al.,* (2013) Sharma and Borthakur (2008), Yumnum and Tripathi (2013) and Singh *et al.,* (2010). Adi people celebrate different festivals like solung, etor and aaran etc., which are essential parts of their socio-cultural life. Ethnomedicine studies depend on comprehensively on indigenous and local knowledge; they face the challenge of adequately bringing evidence from these knowledge systems. The challenge arises not only because unwritten forms of knowledge can be difficult to transpose to into written scientific studies (Raid *et al.,* 2006, Berkes, 2018), but more importantly because scientific studies might decontextualize the information and remove it from the cultural environment that gives it meaning (Stevenson 1996). Festivals reflect the traditions, costumes and lifestyle of the people. The festivals are mainly celebrated for feasts, a good harvest of crop, merriment and for narrating the myths, legends, folklore and mythologies.

Materials and Methods

The present study was done in the Sille-Oyan Circle Villages which is located in East Siang District of Arunachal Pradesh State, India. The method used for collecting the information is both from primary and secondary sources. The relevant secondary information was collected from both published and unpublished materials available in various government agencies, newspapers, libraries, books, journals and magazine. The ethno-medicinal information was collected by field survey among Adi community of the villager and discussions among the informants in their own local dialogue (Adi) and identifying the Knowledgeable traditional healers known as *Miri Abu* based on their experience on herbal medicine and interviews were carried out with the identified local people and traditional healers. The questionnaire allowed responses on the plant prescribed, part of the plant used, medicinal uses for each part, mode of preparation (i.e., decoction, paste, powder and juice), a form of usage (either fresh or dried) and additional plants used as ingredients. The information collected was noted in the note book.

Results and Discussion

There are various types of medicine practiced in the world, with its own beliefs and therapeutics but with one collective purpose: easing of disease. The objective of the study was not only for medicinal used but conservation and management were also included for the sustainable use of the plants (Fig. 1).

Table.1 Plants used by Adi tribe of Sille-Oyan circle of Arunachal Pradesh

Sl. No.	Common Name	Scientific Name	Family	Used	Habit	Part used	Method
1	Namsing ing	*Ageratum conyzoides L.*	Asteraceae	Leaf Paste Applied On Cuts For Blood Clotting	Herb	Leaves	Poultices
2	Kordoi	*Averrhoa carambola L.*	Oxalidaceae	For Treat Jaundice	Tree	Ripe Fruits	Raw
3	Pasi tirbin	*Ardisia solanacea Roxb.*	Myrsinaceae	Antidote For Insect Poisoning	Tree	Tender Leaves	Paste
4	Buri	*Baccaurea ramiflora Lour.*	Phyllanthaceae	Constipation	Tree	Fruits	Raw
5	Sising Bayong	*Begonia josephii A. DC.*	Begoniaceae	Jaundice, Burning Of Urine	Herb	Shoot, Leaves	Infusion, Decoction
6	Taso lapyo	*Bidens pilosa L.*	Asteraceae	Wound-Root Diarrhoea-Leaves	Herb	Root Paste Leaves	Paste Infusions
7	Kat-Buk	*Bryophyllum pinnatum (Lam.) Oken*	Crassulaceae	Skin Burn And Fracture	Shrub	Leaves	Paste
8	Ramsing	*Caesalpinia pulcherrima (L.) Sw.*	Fabaceae	Constipation And Kidney Stones	Shrub	Leaves	Infusion
9	Akon Atang	*Calotropis gigantea (L.) W.T.Aiton*	Apocynaceae	Sprains, Boils And Body Pains	Shrub	Leaves	Raw
10	Omri	*Carica papaya L.*	Caricaceae	Cracks Of Feet, Gastritis , Malaria	Herb	Flower, Fruit	Decoction, Infusion, Raw
11	Kiling Kro	*Centella asiatica (L.) Urb.*	Apiaceae	Gastritis, Malaria-Typhoid Jaundice	Herb	Leaves	Infusion
12	Jilmil sak	*Chenopodium album L.*	Amaranthaceae	Anaemia, Debility, Eye Tonic	Herb	Seeds ,Leaves, Roots	Decoction, Infusion

13	Hira Tarpa	*Cissampelos pareira L.*	Menispermaceae	Antidote For Snakebite	Herb	Tubers	Decoction, Infusion
14	Ongin	*Clerodendrum colebrookeanum Walp*	Verbenaceae	High Blood Pressure	Shrub	Leaves	Raw, Decoction, Infusion
15	Urom banggen	*Costus spp.*	Costaceae	Respiratory Problem, Urinary Problem	Herb	Leaves And Stem	Decoction, Infusion
16	Yakana Kelodi	*Curcuma caesia Roxb.*	Zingiberaceae	Diarrhoea , Dysentery And Wound	Shrub	Rhizome	Decoction
17	Makung	*Cucumis sativus L.*	Cucurbitaceae	Acidity, Diabetes, High Blood Pressure, Stone, Deworming	Shrub	Fruit, Seeds	Raw, Boil
18	Okolibo	*Deeringia amaranthoides (Lam.) Merr.*	Amaranthaceae	Piles, Constipation,	Shrub	Leaves	Decoction, Infusion
19	Kekut	*Eleutherococcus trifoliatus (L.) S.Y.Hu*	Araliaceae	For Improve Memory, Cough And Cold	Shrub	Bark	Dried, Decoction
20	Ritak	*Eryngium floridanum J.M.Coult. and Rose*	Apiaceae	Cough, Cold , Body Pain, Headache	Herb	Leaves	Paste
21	Gende	*Gynura crepidioides Benth.*	Astereacea	Gastritis, Stone, Headaches	Herb	Leaves	Decoction, Infusion
22	Notke	*Gonostegia hirta (Hassk.) Miq.*	Urticaceae	Antidote For Gandhi Bug Poisoning	Herb	Tender Leave	Decoction, Infusion

23	Taki sidik	*Gynocardia odorata Roxb.*	Achariaceae	Ant Diabetic, Tooth Decay	Tree	Bark, Leaves, Fruits	Decoction, Infusion
24	Rokpomeyo	*Gynura nepalensis DC.*	Asteraceae	Piles. Appendicitis	Herb	Leaves And Flower	Decoction, Infusion
25	Asi pum	*Homonoia riparia Lour.*	Euphorbiaceae	Antidote For Snake Bite, Skin diseases	Shrub	Leave	Decoction, Poultice,
26	Loram	*Houttuynia cordata Thunb.*	Saururaceae	Deworming, Gastritis	Herb	Leave	Decoction, Infusion
27	Engin Taree	*Plectranthus esculentus N.E.Br.*	Convolvulceae	Goitre, Dysentery, Hypertension, Constipation	Herb	Tender Leave	Decoction, Infusion
28	Beying	*Lasia spinosa (L.) Thwaites*	Araceae	Dysentery, Liver Tonic	Herb	Leave ,Stem	Decoction, Infusion
29	Eki sypiak	*Leucas aspera (Willd.) Link*	Lamiaceae.	Reduce Fever, Antidote, Headache	Herb	Leaves, Flower	Paste
30	Singe Engin	*Manihot esculenta Crantz*	Euphorbiaceae	Debility, Weakness	Shrub	Tender Leaves, Tubers	Decoction
31	Kerala	*Momordica charantia L*	Cucurbitaceae	Debility, Stone, Diabetes	Climber	Leaves, Fruit,	Decoction
32	Aksap	*Mussaenda frondosa L.*	Rubiaceae	Urinary Problem	Tree	Leaves	Decoction
33	Take-mareng	*Ocimum gratissimum L.*	lamiaceae	Cough, Gastritis	Herb	Leave	Decoction, Infusion
34	Riki modon	*Operculina turpethum (L.) Silva Manso*	Convolvulaceae	Cut, Weakness, Nerve Disorder, Jaundice, Constipation	Herb	Whole	Decoction, Infusion

35	Piyak iyub	*Oxalis corniculata L.*	Oxalidaceae	Ring Worm .Stone Diabetes, Tonsillitis, Dysentery	Herbs	Leaves	Poultices, Infusion
36	Yepe tare	*Paederia foetida L.*	Rubiaceae	Dysentery, Diabetes	Climber	Leaves	Infusion
37	Namdung	*Perilla ocymoides L.*	Lamiaceae	Heart Problems, Allergies Cold And Coughs	Herb	Seed	Powder
38	Pan anne	*Piper betle L.*	Piperaceae	Cold And Cough, Mouth Wash	Climber	Leaves	Raw, Paste
39	Jalub	*Piper nigrum L*	Piperaceae	Cold And Cough, Fever	Climber	Fruit	Raw, Paste ,Infusion
40	Rori	*Piper pedicellatum C.DC*	Piperaceae	Constipation, Stomach Tonic	Herb	Leave, Fruit	Raw, Paste
41	Donyi sunkang	*Plantago major L.*	Plantaginaceae	Gastritis, Urine Flow Stone, Tonic,	Herb	Leave	Decoction, Infusion
42	Tapir	*Phoebe cooperiana U.N Kanjilal ex A. Das*	Lauraceae	Dysentery, Diarrhoea	Tree	Fruit, Leaves	Raw
43	Sayong	*Polygonum hydropiper L.*	polygonaceae	Menstrual Problem,	Herb	Leaves	Decoction, Infusion
44	Oyik	*Gonostegia hirta (Hassk.) Miq.*	Urticaceae	Stomach Ache	Herb	Leaves	Decoction
45	Aki Rokmi	*Ricinus communis L*	Euphorbiaceae	Wound Healing, Backache, Muscle Ache	Shrub	Leaves	Raw, Poultice
46	Gam oying	*Breynia androgyna (L.) Chakrab. and N.P.Balakr*	Phyllanthaceae	Eye Tonic, Multi-Vitamins.	Shrub	Leave	Decoction, Infusion
47	Tasut Nekung	*Smilax aspera L.*	Smilacaceae	Itching, Rash	Climber	Fruit	Raw, Paste

48	Peyomg	*Scoparia dulcis L*	Plantaginaceae	Gastric	Herb	Leaves	Decoction, Infusion
49	Donyi gori	*Senna alata (L.) Roxb*	Caesalpinioideae	Fungal Infection, Ringworm	Herb	Leaves	Decoction, Infusion
50	Bangko	*Solanum spirale Roxb.*	Solanaceae	Gastritis, Malaria and Debility	Shrub	Leaves and Fruit	Decoction,Infusion
51	Kopir	*Solanum viarum Dunal*	Solanaceae	Spleen Problem. Kidney Stones	Shrub	Leaves, Fruit	Decoction, Infusion
52	Okomamang	*Solanum nigrum L.*	Solanaceae	Anaemia, Liver Tonic Gynaecological Disorders	Herb	Leaves, Fruit	Decoction, Infusion
53	Kodu	*Solanum torvum Sw.*	Solanaceae	Spleen And Stone Problem	Herb,	Fruit, Seed	Decoction, Infusion
54	Ogen	*Sonchus oleraceus L.*	Asteraceae	Stone, Gastritis	Herb	Leaves	Decoction, Infusion
55	Marsang	*Acmella oleracea (L.) R.K.Jansen*	Asteraceae	Cough, Toothache Painkiller	Herb	Seeds, Leaves	nfusion, Raw
56	Peji-pemang	*Urtica urens L.*	Urticaceae	Headache With Spleen Pains.	Herb	Tender Leave	Decoction, Infusion
57	Onger	*Zanthoxylum rhetsa (Roxb.) DC.*	Rutaceae	Painkiller, Cough ,Asthma	Shrub	Leaves, Fruits, Seeds,	Infusion
58	Rekom	*Zanthoxylum nitidum (Roxb.) DC.*	Rutaceae	Cancer, Pain Killer Asthma, Toothache	Shrub	Seeds, Stem, Leave	Infusion
59	Takeeng	*Zingiber officinale Roscoe*	Zingiberaceae	Cold and Cough, Tonsillitis, Vomiting	Herb	Rhizome	Decoction

Fig. 2 -- (a) Pouzolzia hirta; (b) Acmella oleracea; (b) ; (b) Spilanthes paniculata; (c) Clerodendron colebrookianum; (d) Solanum spirale; (e) Ageratum conyzoides; (f) Sauropus androgynus; (g) Carica papaya; (h) Zantholum rhetsa; (i) Ardisia solanacea.

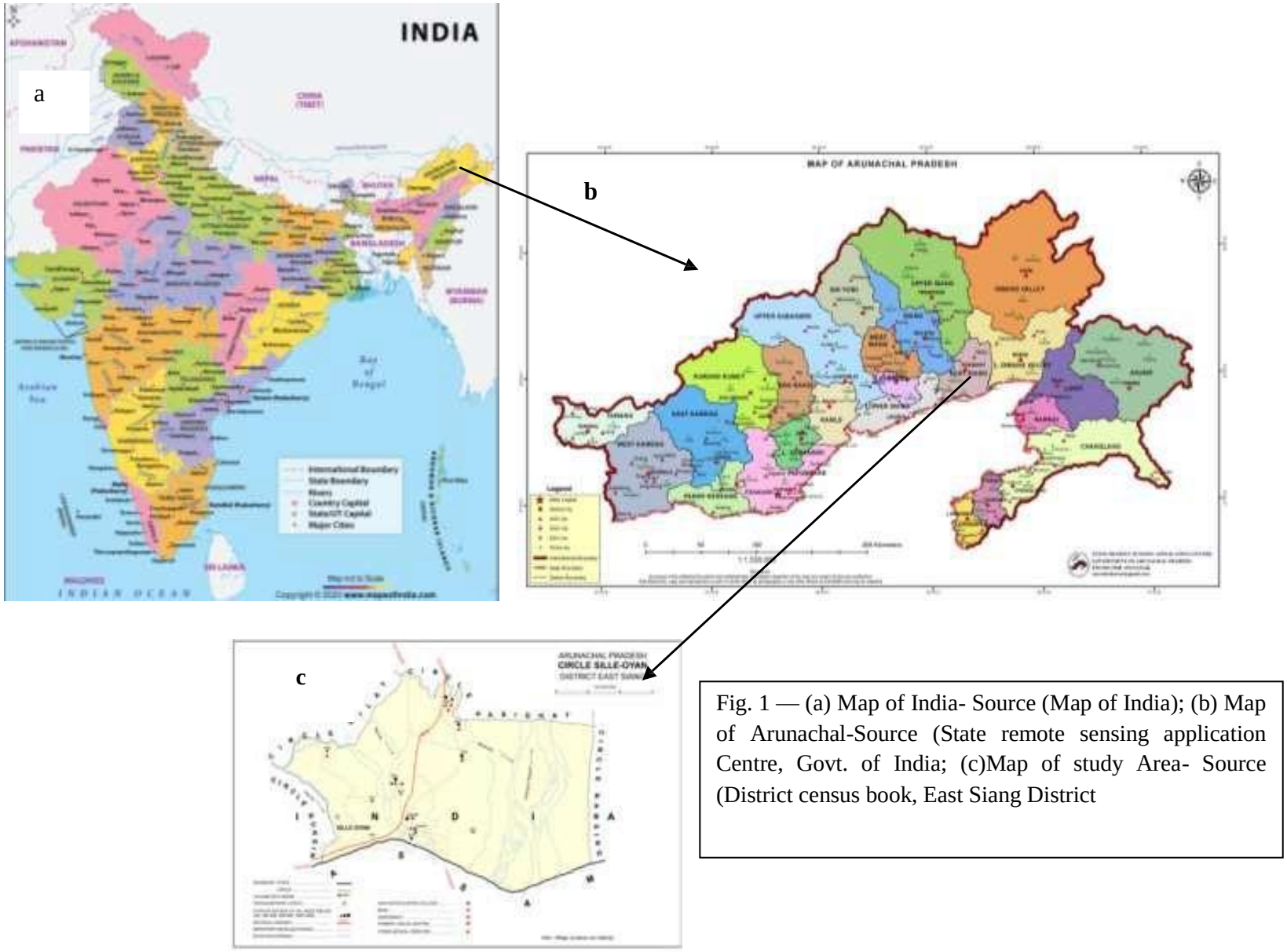

Fig. 1 — (a) Map of India- Source (Map of India); (b) Map of Arunachal-Source (State remote sensing application Centre, Govt. of India; (c)Map of study Area- Source (District census book, East Siang District

The study identified 59 plants which are used by the peoples residing in the oyan-sille circle treating ailments and has been presented in table 1. During the survey, it was found that various parts of the plants' species are used like seeds, stem, root and rhizome which belong to 34 families. Among the family Asteraeceae (6) species, solanaceae (4) were mostly used. Out of total plant species 36 herbs, 16 shrubs, 6 trees and 5 climbers. The leaves were then widely used plant parts and the method was both decoction and infusion. During the study it was found the various plants are also used in religious and most of the plants which are used in traditional medicine are used as vegetables by the villagers and the people residing in the city buy vegetables which are sell by those villagers for income generation, the plants like *Clerodendron colebrookianum, Houttuynia cordata, Sauropus androgynous, Splinthus acmella etc.,* through which the family income of the villagers are also generated and they can improved their living standard by growing these plants as home garden.

In conclusion, traditional medicines are importance for the primary healthcare in this region since most of the village has to go far from the village to city for the modern medical facility. There is a significant aspect of studying the traditional method of medicine from which we can know the importance of the plants and in which ailments they are used by which scientific validation of plants used by local communities could be beneficial for the development of modern potential drugs. Therefore there is an urgent need of scientific screening of the plants for identifying the bioactive compounds for the formulation of new drugs. They are useful for the management, conservation and documentation of some plants which are widely exploited by which their populations in the wild are in a great risk of extinction so; they must be brought in cultivation for their availability. The state forest department, NGOs in collaborating with villager should conduct awareness program for the management, protection and cultivation of the species. They should teach them not to take out all the plant species from a particular area as these plants may be endemic to that area and if these are harvested we should leave some plant and spread seeds in that area from regeneration. The women should also play a key role in conservation and sustainable use of the biodiversity, as they are the primary collectors of the house for domestic consumption.

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