

Ethnomedicinal Plant Knowledge among the Adi Tribe of Yingkiong and Mariyang Valley, Upper Siang District, Arunachal Pradesh, India

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ABSTRACT

The present study was carried out to focus on the indigenous uses of medicinal plants by the Adi tribe inhabiting in the Upper Siang District of Arunachal Pradesh. Traditional uses and utilization patterns of alleviative plant species were aggregated through conversations with native and old aged ethnic people. A total of 28 species belonging to 20 different families have been reported. Among the families recorded, most of the identified species belongs to Asteraceae, Rutaceae and Solanaceae families. Majority of the plant species are herbs (49 %) and allotment of leaves (60 %) are mostly been acclimated in abating various diseases. The study was conducted in an attempt to preserve and document the vanishing knowledge of ethnomedicine used by the Adi tribe and may facilitate the pharmaceutical research for developing medicines from plants for ailment of various diseases.

Key words: Ethnomedicine, Adi tribe, Upper Siang, Medicinal plants, Indigenous.

INTRODUCTION

In India, practice of ethnomedicine has always been an integral part among various communities and tribes. In the tribal society using vegetation and its components as drugs were widely practiced from ancient periods^{14,4}. Studies on traditional knowledge on folk medicine has accounted that over 7500 different plant species found in the ecosystem are used by various ethnic tribes for primary

health care¹⁰. Ethnomedicine pertains to the study of traditional medical practice which is concerned with the cultural interpretation of health, diseases and affliction, and additionally addresses the healthcare-seeking method and healing practices^{7,9}.

North-East India including Arunachal Pradesh supports remarkable floral diversity and is one of the richest repositories of medicinal plants.

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Therapeutic efficacies of abounding aboriginal plants for several disorders have been reported and during the last two decades, some notable advance has been made in the acreage of ethnomedicinal analysis on the tribes of Arunachal Pradesh by various scholars but still many tribes are awaited to be explored in phrases of ethnobotanical understanding of this Himalayan region⁸ and the Adi tribe is one of them. Adi tribe are one of the major tribe and constitutes about 26.52% of total scheduled tribes of Arunachal Pradesh. Traditional drug treatments are the mainstay of healthcare in this region and are known to support the treatment of many illnesses such as malaria, jaundice, bacterial infections, epilepsy, gynecological problems and others. Due to bare accessories and poor communication, villagers in the remote localities still rely on the traditional medicines for the alleviation of the local ailments. They mostly use herbals and sometimes blend of plants, animal and mineral substances accompanying with local rituals. The usage of plants for abating various ailments is known to several households and some of them are grown in backyard kitchen gardens. The elderly people as well as medicinal practitioners known as *Miri Abu* have traditional expertise of the ethnomedicinal plants found in the nearby forest and its vicinity. They are good in identification, extraction, use, preparation and applications of plants and herbs in various kinds of ailments locally occurring in the area. They have indigenous approach of remedy for different kind of diseases with the assist of local herbal medications.

There is abundance of medicinal plants for different ailments, but there is lack of proper identification and application in the treatment of diseases. Proper documentation of traditional information concerning plant use together with conservation and sustainable management of key habitats ought to make contribution to safeguarding this rich heritage. Including that it has provided the discovery of many important drugs of modern day^{2,3} providing a significant role in community

health care system. The present study attempts to showcase the use of ethnomedicinal plants by the Adi tribes in curing various diseases that has been enlisted in the Table 1. A study was carried out to provide authentic listing of plants used in folk medicinal practices, the plant part used and usage pattern of the plants for various diseases based on field assessment and documentation.

MATERIAL AND METHODS

Study area

Upper Siang District is located on the northern part of Arunachal Pradesh which stretches out between 28°18' latitude and 95°24' longitude. The study area cover two circles *viz* Yingkiong and Mariyang of the district, which covers several villages like Simong, Gette, Gobuk, Dalbing, Damro, Adi Pasi etc. The Yameng river divides the study area into two parts. The upper hilly and mountains tract is thickly vegetated while large patches of evergreen forest are found in Lower deposit areas. The natural vegetation consists of combined deciduous trees, grasses and bushes of sub-tropical species. There are three types of forest *viz* tropical semi-evergreen forest, sub-tropical forest and tropical wet evergreen forest. Mariyang Circle recorded higher dense vegetation cores in the area. The soil of study area varies from loamy to clayey with thick humus content especially in forested area. Mountain soil is mostly found in the upper hilly area with wide varieties of rocks and soil composition. Vast extensions of alluvial deposit are found along the banks of Simar, Sipit, Siat etc and along the streams in low lying areas. The study area is inhabited by mainly Adi tribe. The Adi tribe is a major tribe distributed in the temperate and sub-tropical area in the District East Siang, Siang, Upper Siang, West Siang, Lower Dibang Valley and Lohit (Figure 1).

Exploration and documentation

Extensive filed survey was conducted in and around Yingkiong and Mariyang valley of Upper Siang District of the state Arunachal Pradesh. Various indigenous uses and utilization patterns of medical plants species

were gathered through interviews, group discussion and conversations with old aged ethnic people, and photographs of the plants were taken in their natural habitat. Specimens of each of the species were collected and herbariums were prepared with standard technique⁵. Results of the present survey have been represented in tabular form with scientific names, family, local name, habit, parts used and uses for curing diseases.

RESULTS AND DISCUSSION

Arunachal Pradesh, the land of rising sun is the abode of biological and socio-cultural diversity (26 major and 110 subtribes) among the north eastern states of India. The local inhabitants are mostly dependent on forest and forest resources and carry rich indigenous knowledge on practices of medicinal plant species for healing various ailments. They have a deep belief in their native folklore medication for treatments and they rely exclusively on their own herbal cure¹¹. Present study has been carried out to document the use pattern of medicinal plant species by the Adi tribe of Upper Siang District of Arunachal Pradesh. Information was gathered from elderly indigenous people inhabiting nearby the forest areas. The valley is not only rich in vegetation also vibrant in various ethno-medical, socio-cultural system since long time^{13,1} and in the present study documentation of ethnomedicinal knowledge of the Adi tribe of Arunachal Pradesh has been partially attempted. It is these ethnic groups who has been in close association with forest and have adequate knowledge on utilization of forest resources which are playing a vital role in their life style. Reports reveal that these plant species might have splendid financial capability in the medicinal plant market.

Present study exhibited a total of 28 plant species distributed over 20 distinct families. As observed from results, Asteraceae, Rutaceae, Solanaceae families were prominent among others and each of these families consisted of three distinct species. Asteraceae family is one of the highly prevalent group of medicinal plants in Northeast India¹². A

precise information on scientific names, local names, habits, plant parts used and their medicinal uses are represented in the Table 1. Figure 2 shows photographs of some of the medicinal plants used by Adi tribes. Pie chart of plant habit and parts of the plant used are shown in Figure 3a & 3b. Herbs contributed highest with 49%, shrubs 25%, tree 25% and rest are other of the total recorded medicinal plant species. Out of the total medicinal plant species collected about 70% of the species are harvested from wild, 20% are cultivated whereas 10% are both cultivated and from wild. It has also been observed that medicinal plants species are grown in home gardens according to people needs. Leaves are the significant plant parts widely utilized which is contributing 60% of the recorded plant species followed by the rest % are the other parts like roots, rhizomes and whole plants.

The remedies are prepared either from freshly collected plant parts or after drying according to its uses and are either taken orally or used externally. Among the recorded species, few zone medicinal plants uses are being precisely explained. The oil of *Zanthoxylum rhetsa* commonly known as Onger is a very useful traditional remedy for cholera. The peel of the fruits, seeds, barks of the stems and roots in addition to oil extracted from the fruits are used for other medicinal cause. A decoction of the bark is taken internally as a cure for pains in the chest. The fruits are used in the treatment of asthma, bronchitis, heart trouble and tooth ache⁴. The flower head of *Spilanthes paniculata* are chewed to get relieve from toothache and other mouth related troubles. Leaves are used externally in treatment of skin diseases. Leaf decoction is used as diuretic and lithotriptic. Whole plant is used in treatment of dysentery¹¹. Tender leaves of *Clerodendrum colebrookianum* used as vegetable and its boiled leaves are taken against high blood pressure and diabetes. Leaf juice or decoction is used for curing stomach ailments¹. Leaves of *Solanum indicum* are consumed as vegetable and considered good for stomach ailments. *Coptis teeta* is a rare species of

flowering plant in the buttercup family. The root is a pungent, very bitter that controls bacterial and viral infections, relaxed spasms, lower fevers and stimulates blood circulation. They are a safe and effective treatment for ailments such as some forms of dysentery that are caused by bacteria, improves appetite, gas, jaundice, tumor, boil and skin inflammation conditions¹. The perennial plant *Aconitum heterophyllum* found in alpine & sub-alpine habitats, usually in open places are traditionally used as source of arrow poison by many tribal group. Its use in commercial allopathic system of medicines is still largely unexplored. An extract of root is used in some medicines for curing diarrhea and as an antidote against snake bite. The whole plant of *Ageratum conyzoids* is anti-inflammatory and anti-allergic. The plant contains 0.7–2.0 % essential oil, plus alkaloids and saponin. The essential oils contained in the plant have antibiotic properties. The juice of the plant is used to treat cuts, wounds and for blood clotting⁶. The bitter annual herb *Andrographis paniculata* has been proved to have hepatoprotective properties. The drug produced from this antihelmentic and liver tonic. It is a blood purifier too. It is a high demand species in herbal markets as the whole plant is used in making the drugs. It grows very well in open or partial shade habitats in low altitudes. It cures malaria and gives relief during cough. The species of *Centella asiatica* is eaten as vegetable as well as medicine. The stems are slender, creeping, green to reddish-green in colour, connecting plants to each other. It is used for the treatment of diabetes, ulcer, headache, pain killer, dysentery and cough¹¹. Although no specific mention of medicinal use has been seen for *Allium hookeri*, members of this genus are in general very healthy additions to the diet. They contain sulphur compounds and when added to the diet on a regular basis they help in reducing blood cholesterol levels, act as a tonic to the digestive system and circulatory system. The leaves of *Oxalis corniculata* are quite edible with a tangy taste of lemons. A drink can be made by infusing the leave in hot water for

about 10 minutes, sweetening and then chilling. The entire plant is rich in vitamin C. It is safe in low dosages, but if eaten in large quantities over a length of time can inhibit calcium absorption by the body. *Houttuynia cordata* is used traditionally for pneumonia. The leaf extract is taken during dysentery. The crushed leaves and stems are used in case of measles, gonorrhoea and skin troubles⁶. It can cause severe allergic reactions. The herb *Drymarria cordata* is used to cure headache, malaria etc. Young leaves of *Ficus* sp. are cooked in boiled diluted curd for 40-50 min. on slow fire, then mixed with seasoned garlic and spices. Unripe fruits are boiled in water for 15-20 min. and mix with seasoned garlic and spices. Ripened fruits are eaten raw. It is very effective for dysentery¹. The roots of *Solanum aculeatissimum* are purgative. A decoction is drunk to cure back pain, male impotence and flatulence. A root maceration is drunk to treat snakebites. A decoction of the fruit is administered as an enema to cure constipation. Plants were uprooted and root is chewed during tooth ache that gives instant relief. Citron fruit *Citrus medica* look like a beg lemon, with very thick skin with very less inner pulp content. Its fruit peel, seed, pulp etc are used in Ayurvedic treatment. It is widely used for treating abdominal colic, digestive disorders, piles etc.

Plants here reported overall are used to cure various ailments like allergy, bleeding, blood pressure, body ache, cold, cough, cuts, diarrhea, dysentery, fever, headache, jaundice, stomach ache, swells, wound etc. Earlier studies provide vital clues as to the formulation of potential products for pharmaceutical purposes. This study indicates that medicinal plants resources of Upper Siang valley is abundant and the region can be suitable agroclimatic zone for cultivation associated with traditional folk medicinal practices by the Adi tribe. It is extremely essential to encourage and conserve the traditional knowledge with a scope of improving rural economy of the state as a whole. Moreover, scientific impart on indigenous knowledge is likely to benefit the

traditional society as well as in conservation of useful plants species. Therefore, it is high time to adopt holistic approach for conservation and

documentation of ethnomedicinal-botanical knowledge of the tribal people for greater benefit of the future generation.

Table 1: List of Ethnomedicinal plants used by Adi tribe of Upper Siang Valley of Arunachal Pradesh

Scientific Name & Family	Habit	Local Name	Parts used	Used for ailments
<i>Aconitum heterophyllum</i> (Ranunculaceae)	Herbs	Emmo	Roots	Snake Bite (antidote) and Diarrhea
<i>Ageratum conyzoides</i> (Asteraceae)	Herb	Namsing Ing	Leaves	Blood Clotting
<i>Allium hookeri</i> (Amaryllidaceae)	Herb	Iinying	Leaves	Cold and Cough
<i>Alocasia macrorrhizos</i> (Araceae)	Plant	Engee	Edible Part (tuber)	Pain reliever of insect Bite
<i>Amaranthus spinosus</i> L. (Amaranthaceae)	Herbs	Gubor Oying	Tender Leaves	Antidote in Snake Bite and Gonorrhoea
<i>Andrographis paniculata</i> (Acanthaceae)	Tree	Tagam	Leaf	Malaria and Cough
<i>Blumea fistulosa</i> (Asteraceae)	Shrub	Rumbdum	Leaf	Diarrhea
<i>Calamus inermis</i> (Arecaceae)	Creeping Shrub	Tarra	Leaves buds	Malaria
<i>Centella asiatica</i> L. (Apiaceae)	Herb	Golgi Sipum or Dolgi	Whole Part	Dysentery and Blood Pressure
<i>Citrus medica</i> L. (Rutaceae)	Tree	Cingkom	Fruits & Leaves	Dandruff
<i>Clerodendrum colebrookianum</i> (Verbenaceae)	Tree	Ongin	Leaves	Blood Pressure
<i>Coffea bengalensis</i> Roxb. (Rubiaceae)	Shrub	Wanco	Fruits	Stomach disorder
<i>Coptis teeta</i> Wall (Ranunculaceae)	Herb	Diko	Roots	Malaria fever and stomach disorder
<i>Diplazium esculentum</i> (Athyriaceae)	Shrub	Takang	Root	Food Poisoning
<i>Drymaria cordata</i> L. (Caryophyllaceae)	Herb	Pipi	Whole Part	Headache
<i>Ficus</i> sp. (Moraceae)	Tree	Takuk	Roots	Dysentery
<i>Houttuynia cordata</i> Thunb (Saururaceae)	Herbs	Roram	Tender Leaves	Measles and dysentery
<i>Ixora</i> sp. (Rubiaceae)	Creeping herbs	Japan-Ing	Leaves	Stomach Ache
<i>Oxalis corniculata</i> L. (Oxalidaceae)	Creeping Herb	Piak Iip	Leaves	Relievers Intoxication from wine and Diarrhea.
<i>Piper attenuatum</i> (Piperaceae)	Creeping Herb	Dolopan	Leaves & Fruits	Liver and Urinary troubles
<i>Solanum aculeatissimum</i> (Solanaceae)	Shrub	Bengela Thang	Roots	Tooth ache
<i>Solanum indicum</i> (Solanaceae)	Shrubs	Bangko	Fruits and Leaves	Stomach Pain
<i>Solanum nigrum</i> L (Solanaceae)	Shrubs	Okomamang	Whole Part	Digestion, Liver Problem
<i>Spilanthes paniculata</i> (Asteraceae)	Herbs	Marsang	Flower or fruits	Tooth ache
<i>Valeriana jatamansi</i> (Caprifoliaceae)	Herb	Okung	Roots	Boils and wounds
<i>Zanthoxylum hamiltonianum</i> (Rutaceae)	Tree	Ombe	Roots and Barks	Malaria
<i>Zanthoxylum rhetsa</i> (Rutaceae)	Tree	Onger	Leaves	Hair Cleaning, Jaundice and Wart
<i>Zingiber zerumbet</i> (Zingibeaceae)	Herbs	Kekiir	Tubers	Stomach Ache, Vomiting, Diarrhea and Cough



Fig. 1: Map of India showing the state Arunachal Pradesh and district Upper Siang. The study circle viz Yingkiang and Mariyang are shown with green and blue color respectively



Fig. 2: Photographs of some of the medicinal plants. (a) *Zanthoxylum rhetsa*; (b) *Spilanthes paniculata*; (c) *Clerodendron colebrookianum*; (d) *Solanum indicum*; (e) *Coptis teeta*; (f) *Agertum conyzoids*; (g) *Andrographis paniculata*; (h) *Oxalis corniculata*; (i) *Houttuynia eorcata*; (j) *Allium hookeri*; (k) *Drymaria cordata*; (l) *Aconitum hetrophyllum*

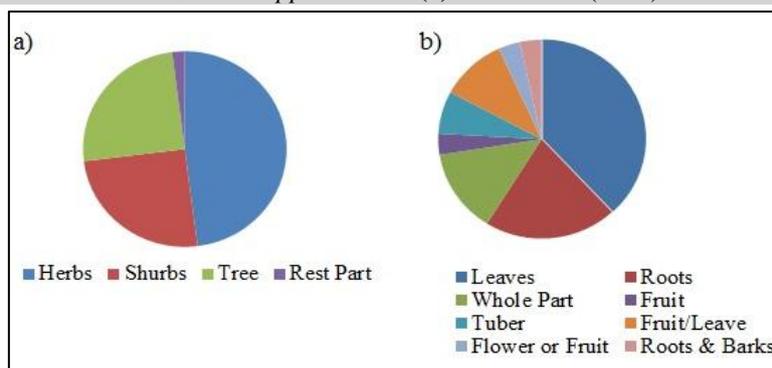


Fig. 3: Pie chart showing a) plant species habit and b) plant part used for medicines

CONCLUSION

The present study reveals novel information from the area where the inhabitants of Upper Siang, especially the people of Adi tribe having immense knowledge of medicinal plants practiced the formulation of ethnomedicine from generations for treating various diseases. In this region, herbs are major source of medicinal plants as compared to shrubs and trees. Due to close association of natural resources with sociocultural and spiritual festivals of indigenous people, preservation of natural resources has been possible. However due to modernization, inadequate conservation, loss of habitat due to deforestation and jhum cultivation, and more dependency on allopathic medicines, this rich knowledge on medicinal uses of plants might fade away in the lapse of time. Therefore both *Ex-situ* and *in-situ* conservation strategies together with biotechnological techniques have to be taken care of by the upcoming educated younger generations, local inhabitants supported by government and non government agencies for future survival of such precious knowledge. The current study aims to help in conservation of medicinal plants and traditional ethnomedicine knowledge of the indigenous people for betterment of human society.

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REFERENCES

1. Baruah, S., Borthakur, S.K., Gogoi, P., Ahmed, M., Ethnomedicinal plants used by *Adi- Minyong* tribe of Arunachal Pradesh, eastern Himalaya. *Indian Journal of Natural Products and Resources*. **4(3)**: 278-282 (2013).
2. Cox, P.A. and Ballick, M.J., The ethnobotanical approach to drug discovery. *Scientific American*. **270(6)**: 82-87 (1994).
3. Fabricant, D.S. and Farnsworth, N.R., The Value of Plants Used in Traditional Medicine for Drug Discovery. *Environmental Health Perspectives*. **109(1)**: 69-75 (2001).
4. Gibji, N., Ringu, N. and Dai, N.O. Ethnomedicinal Knowledge among the Adi Tribes of Lower Dibang Valley district of Arunachal Pradesh, India. *International Research Journal of Pharmacy*. **3(6)**: 223-229 (2012).
5. Jain, S.K and Rao, R.R., A Handbook of field and Herbarium Methods, Today and Tomorrow Publication, New Delhi, 1977, 157pp.
6. Khongsai, M., Saikia, S.P. and Kayang, H., Ethnomedicinal plants used by different tribes of Arunachal Pradesh. *Indian Journal of Traditional Knowledge*. **10(3)**: 541-546 (2011).

7. Lowe, H., Jamaica's Ethnomedicine: Its potential in the healthcare system. Canoe Press; University of the West Indies, Kingston, Jamaica, 2001, 250 pp.
8. Nimachow, G., Taga, T., Tag, H. and Dai, O., Linkages between Bio-Resource and Human Livehood. A case study of Adi tribes of Mirem village, Arunachal Pradesh, India. *The initiation*. **1**: 183-197 (2008).
9. Pieroni, A., Price, L.L. and Vandebroek, I., Welcome to the Journal of Ethnobiology and Ethnomedicine. *Journal of Ethnobiology and Ethnomedicine*. **1(1)**: 1-4 (2005).
10. Pradhan, B.K. and Badola, H.K., Ethnomedicinal plant use by Lepcha tribe of Dzongu valley, bordering Khangchendzonga Biosphere Reserve, in North Sikkim, India. *Journal of Ethnobiology and Ethnomedicine*. **4(22)**:1-18 (2008).
11. Sajem, A.L. and Gosai, K., Traditional use of medicinal plants by the Jaintia tribes in North Cachar Hills district of assam, northeast India. *Journal of Ethnobiology and Ethnomedicine*. **2(33)**:1-7 (2006).
12. Saklani, A. and Jain, S.K. Cross cultural ethnobotany of Northeast India. Deep Publications, New Delhi, 1994.
13. Singh, R.K., Singh, A. and Tag, H., Traditional skill among Adi tribes of Arunachal Pradesh. *Indian Journal of Traditional Knowledge*. **7(1)**: 27-36 (2007).
14. Uniyal, S.K., Singh, K.N., Jamwal, P. and Lal, B., Traditional use of medicinal plants among the tribal communities of Chhota Bhangal, Western Himalaya. *Journal of Ethnobiology and Ethnomedicine*. **2(14)**: 1-8 (2006).