

Ethnomedicinal plants used by different tribes of Arunachal Pradesh

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The study reveals about the vast diversity of herbal medicinal plants used by the various tribes of Arunachal Pradesh. The potential of ethnobotanical research and need for documentation of traditional knowledge pertaining to the medicinal plant utilization for the greater benefit of mankind is carried out. The investigation was performed by collection of local medicinal plants in consultation with the local tribal experts. The common medicinal plants used by *Apatami*, *Mongpa*, *Sinpho* and *Tangsa* tribes were studied and around 28 species were listed where mostly herbs are used for medicine. The *Padam*, *Ngishi* and *I-Idu* tribes of Arunachal Pradesh commonly used about 56 plant species as medicine from 29 families. The local people believed that dreadful diseases like cancer and diabetes can be treated with local herbal plants. Thus, the study focuses on potentials of ethnobotanical research, the needs for conservation and documentation of traditional medicinal knowledge for further availability and utilization to the benefit of mankind.

Keywords: Ethnobotany, Traditional medicine, Arunachal Pradesh, *Apatami*, *Mongpa*, *Sinpho*, *Tangsa*, *Padam*, *Ngishi*, *I-Idu* tribes

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Arunachal Pradesh is the region where the pre-Tertiary Tethys Sea first began to close, opening up a pathway for the Palaeoartic biota of Tibet and Malayan elements from the South east, which resulted in enormous ecological and floristic diversity. Arunachal Pradesh covered 83,743 sq km of forest which has been enriched by plants (5,000 spp), terrestrial mammals (85 spp) and birds (500 spp). Arunachal Pradesh is one of the states in North East India inhabited by 28 major tribes and 110 sub-tribes¹. Such a rich biodiversity in the state has provided an initial advantage to its inhabitants for observing, and scrutinizing the rich flora and fauna for developing their own traditional knowledge in curing various ailments. Medicinal plants continue to provide health security to millions of rural people all over the world. According to WHO's estimates², over 80% of people in developing countries depend on traditional medicines for their primary health needs. There are over 500 species of medicinal plants reported so far from Arunachal Pradesh. Millions of rural households

in India use medicinal plants in a self help mode. Thus, for some 4-5 hundred million people, traditional medicine is the only alternative source of healthcare in the absence of the ailing Government run healthcare systems. They are supported by over one million traditional village based carriers of the herbal medicinal traditions³. There are estimated to be around 8000 manufacturing units of traditional medicinal systems in India, medicinal plants and aromatic plants have also become critically important in supporting livelihoods of millions of rural people who are fully or partially dependent on these plants as a source of income.

Methodology

Tangsas tribe occupies the Changlang district along the Indo-Myanmar front. The *Singphos* live on the banks of Teang and Noa Diking rivers and extend towards the South east into the land of the *Khamptis*. The *Apatamis* are settled in a valley in the centre of the lower Subansiri district around the district headquarters. The *Monpas* of Tawang and West Kameng district have a population of 38,862. *Adis* are

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tribes of East, West and upper Siang district where the main sources of food and medicine are the plants from the reserve forest. *Padam* clans are famous for their medicinal practices among the *Adis*. Exploration of the forest in different district of Arunachal Pradesh was conducted with the help of local guides. Routine methods of plant collection⁴ have been followed in the study. The leaves, seeds and reproductive plant parts were collected, dried and maintained in a herbarium. Information was gathered from the local medicinal experts, village chiefs and elderly peoples through discussion about the utilization of medicinal plants by different tribes of Arunachal Pradesh. Identification of plants was done in NEBRC, NEHU, Shillong and BSI, Shillong. Literature and other valuable information were also gathered from the Arunachal Forest News, books and bulletin that are published in the state and outside.

Results and discussion

The people of Arunachal Pradesh find their way of survival by using locally available medicinal plants. The local tribes are largely self contained, ritually sanctioned way of life where they practice utilization of plant part for diseases and sickness⁵. The region is producing thousands of medicinal plants and most of the areas are still unexplored. Twenty eight medicinal plant used by the *Apatami*, *Mongpa*, *Singpho* and *Tanga* tribe of Arunachal Pradesh are listed (Table 1) which shows that herbs are the common plants used for medicine⁶. The plant like *Ageratum conyzoides* and *Amaranthus spinosus* are common herbs used by the 4 tribes⁷⁻⁸. *Catharanthus roseus* (L) G. Don, is highly used as anticancer drug yielding plant⁹ in the region against diabetes, and the use of *Centella asiatica* (L) against stomach disorder and brain tonic, is common to different tribes and communities of India¹⁰.

The *Padam*, *Ngishi* and *I-Idu* tribes of Arunachal Pradesh commonly used about 56 plant species for its medicinal values (Table 2), out of which 26 species are herbs, 9 species are shrub, few trees and climbers.

The plant species of Solanaceae and Lamiaceae are widely used as medicinal plants by the people of Arunachal Pradesh. In the North eastern states of India, Asteraceae is the most dominant family of medicinal plants¹¹. The local tribes also collect a number of wild edible fruits and vegetables from the nearby forest areas to supplement the domestic nutritional requirements. Traditionally, the tribals group of villages was not only familiar with the knowledge of medicinal plants but they were also expert traders and met their necessities in exchange of paddy, which was always in excess of their requirements¹². Their immediate dependence on nature had developed knowledge, which ultimately is reflected in their traditional culture, religion, local belief, folklore, language and dialects. For many centuries, the *Apatani* had kept alive a self managed system of folk medicine that was mainly based on herbal remedies¹³. Their ingenuity still reflects their traditional management and sharing of natural resources in a way that there is optimum utilization of such resources¹⁴⁻¹⁵.

The local tribes' uses different parts of medicinal plant species as medicine for various ailments where leaves and fruits are the common parts utilized for preparation of medicines. The above ground plant parts are used more as medicine than the underground parts. The diseases like jaundice, stomach problems, etc. are common health problem that can be cured by the local herbal medicines. The used of medicinal plants by the various tribes of Arunachal Pradesh shows the importance of the local medicinal plants to the peoples of the state. The extensive used of herbs by the people for medicinal plants has a great impact on the diversity of the herbal plants. The conservation and awareness programme of the medicinal plant diversity should be conducted at the earliest in order to retain the vast medicinal diversity. The needs and importance of the plants by the tribes as medicine may be the cause of extinction if exploitation rates are not maintained.

Table 1—Medicinal plants used by *Apatani* (Ap), *Mongpa* (M), *Singpho* (S) and *Tangsa* (T) tribes of Arunachal Pradesh

Scientific name	Family	Local name	Uses
<i>Aesculus assamica</i> Griffith	Hippocastanaceae	<i>Ozon sak</i> (M)	The paste leaves is applied against skin infection, and bathing with the plant extract reduces backache.
<i>Ageratum coyzoides</i> L.	<i>Compositae</i>	<i>Chinmut</i> (S), <i>Namninyng</i> (T)	The whole plant paste is applied to the fresh wound and for blood clotting.
<i>Amaranthus spinosus</i> L.	Amaranthaceae	<i>Maon</i> (M), <i>Yankhi soulpa</i> (S)	The roots paste is applied to the body against contagious skin infection.

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Table 1—Medicinal plants used by *Apatani* (Ap), *Mongpa* (M), *Singpho* (S) and *Tangsa* (T) tribes of Arunachal Pradesh—Contd

Scientific name	Family	Local name	Uses
<i>Bidens pilosa</i> L.	Asteraceae	<i>Hou bok</i> (Ap)	The fresh leaves are applied to wounds and the leaf juice mixed with water is given for ulcers, ear and eye problems.
<i>Cannabis sativa</i> L.	Cannabaceae	<i>Bhang</i> (Ap)	The leaves alongwith water are taken for stomach disorder.
<i>Carica papaya</i> L.	Caricaceae	<i>Omita</i> (Ap)	The plant latex is applied against burns, cuts, wounds and heel's crack.
<i>Centella asiatica</i> L.	Apiaceae	<i>Ngyarikor</i> (Ap)	The plant extract mixed with water is taken as health tonic against leprosy, tuberculosis and dysentery.
<i>Citrus medica</i> L.	Rutaceae	<i>Narang</i> (S)	The fruits extract is taken during indigestion.
<i>Clerodendron colebrookianum</i> Walp	Verbenaceae	<i>Poto</i> (Ap)	The boiled leaves and the infusion is taken against high blood pressure.
<i>Clerodendron viscosum</i> Vent	Verbeneceae	<i>Oin</i> (S)	The boiled leaves and the infusion is taken against high blood pressure to purify blood.
<i>Costus speciosus</i> (Koen.) Smith	Costaceae	<i>Jamlakhuti</i> (S)	The fresh roots are taken during respiratory blockage and the stems are eaten during urination burning sensation.
<i>Dillenia indica</i> L.	Dilleniaceae	<i>Champak</i> (Ap)	The dried fruits are chewed during severe cough to reduce the throat dryness and the fruit juice is taken against fever.
<i>Emblica officinalis</i> Gaertn.	Euphorbiaceae	<i>Amolodi</i> (Ap)	Fresh fruits are taken as liver tonic. The dried fruits are chewed against the treatment of diabetes, jaundice, and heart related problems.
<i>Houttuynia cordata</i> Thunb.	Saururaceae	<i>Nekir name</i> (S)	The leaf extract is taken during dysentery. The crushed leaves and stems are used in case of measles, gonorrhoea and skin troubles.
<i>Melia superba</i> Roxb.	Meliaceae	<i>Neem</i> (Ap)	The leaves extract and barks is used against malarial diseases and as shampoo to kill lice.
<i>Mentha arvensis</i> L.	Lamiaceae	<i>Pudina</i> (Ap)	The fresh leaves are taken against stomach disorder and influenza.
<i>Mikania scandens</i> Willd.	Asteraceae	<i>Chakpan</i> (T)	Crushed leaves are applied on cuts and wounds to stop the excessive bleeding that helps blood clotting.
<i>Mimosa pudica</i> L.	Mimosaceae	<i>Haniang</i> (S)	The roots extract is taken to kill the worms inside the stomach.
<i>Ocimum sanctum</i> L.	Lamiaceae	<i>Eulochi</i> (Ap)	The decoction of leaves is mixed with honey is taken to reduced cough. The seed powdered mixed with water is taken for bronchitis problems.
<i>Oroxylum indicum</i> (L) Vent.	Bignoniaceae	<i>Bhatgilla</i> (M)	Fresh pieces of barks are used in liver problems, stomachache and rheumatism. The root extract is used against treatment of tuberculosis and diarrhoea.
<i>Paedaria foetida</i> L.	Rubiaceae	<i>Phadobas lodi</i> (Ap)	The fresh leaves paste is applied on the body during body pain and the tubers are eaten along with the food as salad for active digestion
<i>Piper mullesua</i> Ham. ex D. Don	Piperaceae	<i>Namar</i> (S)	The seed powder mixed with honey is taken against rheumatism, cough and bronchitis problems.
<i>Piper nigrum</i> L.	Piperaceae	<i>Namar</i> (S) <i>Ahoma</i> (T)	The seed powder mixed with water is used as stimulants and preservative.
<i>Solanum khasianum</i> Clarke	Solanaceae	<i>Hadha bagul</i> (Ap)	The fruits are sliced and heated on top of a fire. The patients inhale the smokes produced by heating against toothache and gum bleeding.
<i>Solanum indicum</i> L.	Solanaceae	<i>Paitae bakey</i> (T)	The dried fruits are chewed to increase the boby stimulation.
<i>Spilanthus acmella</i> L.	Asteraceae	<i>Namlang marching</i> (M)	The roots and flowers are crushed together and the extract is pasted inside the gums during toothache.
<i>Terminalia chebula</i> Retz.	Combretaceae	<i>Marcha</i> (Ap) <i>Ontyal</i> (Ap)	Fresh fruits extract is taken against dehydration and constipation.
<i>Zanthoxylum armatum</i> DC.	Rutaceae	<i>Oeigin</i> (T)	The dried fruits are warmed and eaten against cough, bronchitis and throat pain.

Table 2—Medicinal plants used by *Padam* (P), *Nyishi* (N) and *I-Idu* (I) tribes of Arunachal Pradesh

Botanical Name	Local Name	Family	Mode of utilization
<i>Acorus calamus</i> L.	Acoraceae	<i>Boch</i> (P)	The rhizomes are carminative and considered to improve voice and intellectual capacities. The juice of rhizome is taken as antidote to snake bites. It is also used for treatment of asthma, bronchitis and different types of stomach problem to children.
<i>Adhatoda zeylanica</i> Med.	Acanthaceae	<i>Vasak</i> (P)	Leaves extract is taken for cold and cough. The decoction of leaves is used for treatment of tumour and uterine problems.
<i>Ageratum conyzoides</i> L.	Compositae	<i>Namninyng</i> (P), <i>Enepu</i> (I)	The leaves are styptic. Leave paste is used for blood clotting and root juice is taken against anthelmintic.
<i>Aloe barbadense</i> Mill.	Aloecaceae	<i>Ghrit-kumari</i> (N)	The mucilage of leaves is applied to cuts and burns. The fresh cut leaves are applied on face for smoother skin. Also used for dermatitis.
<i>Andrographis paniculata</i> (Burm.f.) Wall. ex Nees	Acanthaceae	<i>Chiraita teeta</i> (N)	The whole plants extract is taken for malaria, jaundice, liver tonic, diabetes and stomach ailment
<i>Berberis aristata</i> D.C.	Berberidaceae	<i>Kanchan</i> (P)	Stem and root decoction is bitter tonic, given against intermittent fever. The alkaloid obtain from plants is used as dye. Crushed bark mixed with water is used as eye lotion.
<i>Callicarpa arborea</i> Roxb.	Verbenaceae	<i>Bon-mula</i> (P)	Crushed or raw bark is taken for indigestion and gastric problems.
<i>Cannabis sativa</i> L.	Cannabaceae	<i>Bhang</i> (P)	Two-three pieces of fresh leaves are eaten during stomach disorder.
<i>Centilla asiatica</i> L.	Apiaceae	<i>Aghinya</i> (N)	The whole plants juice is given for leprosy, tuberculosis and asthma patients.
<i>Citrus medica</i> L.	Rutaceae	<i>Narang</i> (N)	The fruits are taken in indigestion and also given as cardio tonic. The leaves are used for the treatment of epilepsy, convulsion and cough. The leaves juice is applied on the hair as hair vitalizer.
<i>Clerodendron colebrookianum</i> Walp.	Verbanaceae	<i>Poto</i> (N), <i>Naphaphu</i> (I)	The leaves are kept on top of cooked rice to soften it and are then taken to reduce blood pressure.
<i>Coptis teeta</i> Salisb.	Ranunculaceae	<i>Mishmi</i> (P)	Decoction of leaves is used as hair tonic to eradicate dandruff. The rhizome crushed with palm oil is taken during stomachic, dysentery, diarrhoea and fever.
<i>Costus speciosus</i> (J. Kong) Sm	Zingiberaceae	<i>Keu</i> (P)	The luke warm sap of the plants is used in ear pain and the decoction of the rhizomes is given for urinary disorder especially stone case.
<i>Dillenia indica</i> L.	Dilleniaceae	<i>Outenga</i> (N)	The fruits are taken for cough, fever and weakness on the body. It also helps in digestion when added in a curry.
<i>Dioscorea floribunda</i> M. Martin & Galeotti	Dioscoreaceae	<i>Khamalu</i> (P)	Plants tuber cut into small pieces is given to man as vitalizer.
<i>Emblica officinales</i> L.	Euphorbiaceae	<i>Amla</i> (P)	The fresh as well as the dried fruits are taken for liver trouble, diabetes, jaundice, heart related problems and blood purifier.
<i>Euphorbia hirta</i> L.	Euphorbiaceae	<i>Laldodhi</i> (N)	The plants mixed with water is taken for bronchial and asthma. The juice is also taken to kill worm inside thw stomach.
<i>Gmelina arborea</i> Roxb.	Verbenaceae	<i>Gamari</i> (P)	The crushed root is taken to purify the blood. Barks are chewed in case of stomach trouble.
<i>Houttynia cordata</i>	Saururaceae	<i>Machandari</i> (P)	The whole plants extract is taken for cholera. Rhizome is eaten as raw for cough; roots for stomach disorder, and leaf for dysentery.
<i>Maesa indica</i> Roxb.	Myrsinaceae	<i>Chonium</i> (N)	The fruits juice is taken to decrease the body temperature.
<i>Mentha arvensis</i> L.	Lamiaceae	<i>Pudina</i>	Crushed whole plant is taken for stomach problem. The root juice of mixed with cumin seeds and sugar in cold milk is given for spermatorrhoea remedy. The dried plants are given for stomach pain. Leaves soaked in water and the infusion is taken as a cooling medicine for stomach.
<i>Musa paradisiacal</i> L.	Musaceae	<i>Kopak</i> (P) <i>Akona</i> (I)	The fruits are given as raw for insanity. Roots mixed with leaves of <i>Aegle marmelos</i> are taken for backache, fever and vomiting problems.

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Table 2—Medicinal plants used by *Padam* (P), *Nyishi* (N) and *I-Idu* (I) tribes of Arunachal Pradesh—Contd

Botanical Name	Local Name	Family	Mode of utilization
<i>Ocimum sanctum</i> L.	Lamiaceae	<i>Tulsi</i> (N)	The seed powder mixed with honey is taken for cough and bronchitis. Leaves paste is used for parasitical skin diseases and is applied on finger and toe nails during fever for better adaptability to extreme cold.
<i>Oroxylum indicum</i> Vent.	Bignoniaceae	<i>Batghila</i> (P)	The barks along with water is given for stomachache and rheumatism problem. The root is used for treatment of TB and diarrhoea.
<i>Oxalis corniculata</i> L.	Oxalidaceae	<i>Amrul</i> (N)	The whole plants are eaten as raw for bowel disorder and easy digestion. The leaf extract is taken against scurvy diseases.
<i>Piper brachystachylum</i> Wall.	Piperaceae	<i>Namar</i> (P) <i>Ahoma</i> (I)	The whole plant extract is taken for rheumatism and the leaf decoction is used as a tonic for cough and bronchitis.
<i>P. nigrum</i> L.	Piperaceae	<i>Namar</i> (P) <i>Ahoma</i> (I)	The decoction of the fruits is used as hair tonic to eradicate the lice.
<i>Rauvolfia serpentina</i> (L) Benth. ex Kurz.	Apocynaceae	<i>Sarpagandha</i> (N)	The crushed root mixed with water is taken to lower blood pressure.
<i>Solanum indicum</i> L.	Solanaceae	<i>Paitae bakey</i> (N)	Fresher dried fruits are eaten as stimulant.
<i>S. khasianum</i> C.B. Clarke	Solanaceae	<i>Bonboingan</i> (P)	Dried fruits burn and the smoke is utilized for the treatment of toothache.
<i>S. torvum</i> Sw.	Solanaceae	<i>Bonboingan</i> (P)	The fresh roots are prescribed for oral contraceptive and leaves decoction is given for indigestion. The fruits paste is applied for itching.
<i>Spilanthes paniculata</i> Wall ex DC.	Asteraceae	<i>Namlang marching</i> (P) <i>Marcha</i> (I and N)	The flowers are used as pain killer by chewing during severe toothache and bodyache.
<i>Syzygium cumini</i> L.	Myrtaceae	<i>Jamun</i> (P)	The fruits are eaten for stomach disorder, diarrhoea and dysentery.
<i>Zanthoxylum armatum</i> Skeels DC Roxb.	Rutaceae	<i>Oegin</i> (P) <i>Wenier</i> (N)	The leaves juice is used for eradication of lice.
<i>Zingiber officinale</i> Roscoe	Zingiberaceae	<i>Avanti</i> (P)	Rhizome is consumed as raw with honey for treatment of cough, bronchitis, fever, influenza and other throat problems.

Key: Sh-Shoot, Rt-Roots, WP-Whole plants, Sd-Seeds, Fr-Fruits, Rh-Rhizomes, Fl-Flowers, Bk-Barks, Tu-Tubers, Sa-Saps.

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