

## **Role of Plant bioresources in Traditional Health care system: A case study from the Upper Siang District of Arunachal Pradesh, India**

**G. Ghosh**

Department of Botany, Bejoy Narayan Mahavidyalaya,  
Itachuna, Hooghly-712147 (India)  
E mails: [goutambot@rediffmail.com](mailto:goutambot@rediffmail.com)

### **Abstract**

Plant bioresources occupy a central position in tribal culture and economy. The ethnic group as Adis in Upper Siang of Arunachal Pradesh, whose dependency is more or less cent percent in the surrounding forests for their sustained livelihood. Through the years of co-existence, people have in depth knowledge of their forests, forests plants, their utilization, management and conservation through their own indigenous ways. Due to their close association with forests, people are well familiar with medicinal plants and have their own means and ways to use them. An effort has been made in this study to explore the composition of indigenous medicines and methods of their uses.

**B**ioresources include all products and services coming from natural environment that satisfies the needs and wants of human. The survival of mankind depends upon the availability of bioresources and their proper management<sup>6</sup>. The bio-resources which forms a major component of the natural resource, occupy a central position in tribal culture and economy. Since tribal communities live in close proximity with biodiversity rich landscapes, they have evolved local specific and novel livelihood strategies based on their indigenous knowledge. Ethnic groups across the globe possess tremendous amounts of traditional knowledge (TK), most of which are poorly

documented and hence are largely unknown. This knowledge was passed on through generations and it played an important role in the conservation and sustainable use of biodiversity<sup>4</sup>. Traditional resource management systems are considered as unbiased system and often ensure equitable sharing of benefits from forests and other natural resources<sup>1,5,6</sup>. Bio-resources and ethno-medicinal practices Ethnomedicine is the belief and practice relating to health and diseases that are products of indigenous cultural knowledge of the particular communities. Plants have been used in healthcare since time immemorial. Studies have been carried out globally to verify their

efficacy and some of the findings have led to the production of plant-based medicines. Some notable progress has been made in the field of ethno-medicinal research on the tribes of Arunachal Pradesh region use their traditional knowledge in health care system where herbs, plants and roots of some trees and plants locally available are used for curing the ailment. They have indigenous method of treatment for different kinds of diseases with the help of local herbal medicines. Villagers of the remote localities are still relaying their traditional medicines for the alleviation of the local ailments. They mostly use herbals and sometime an admixture of plants and mineral substances coupled with local rituals. The native folks have learnt to utilize indigenous plants in various ways; many of these plants are being used in the treatment of different diseases after centuries of trials at the risk of human life. Much of this wealth is preserved as an unwritten materia medica of the tribal flock. Due to lack of communication, exchange among these ethnic groups is limited and many times many tribal believes forbid them to unravel the medicinal virtues of plants to the out-side world. Thus, there is not much attention on the use of plants in folklore and folk life. The folk medicine of Himalaya has gifted many plant drugs to modern medicine<sup>5</sup>. However, very little information is available in connection with composition of ethnomedicine from plant bioresources in Upper Siang district of Arunachal Pradesh. In this paper, an attempt has been made to deal with the composition and dozens of indigenous medicines for some common diseases practiced by the indigenous tribes of Upper Siang of Arunachal Pradesh.

#### *Study area :*

The study area covers two circles viz Tuting and Singa (28°-49' N latitude and 95°-12'E longitude) of northern greater part of Upper Siang district, which covers several villages like Pekong, zido, Ngaming, Kuging & Yortung, Mankota, Deokota Simuge, Sing and Simuling etc. The Siang and Dibang river divide the study area into two parts. The Siang area is almost wholly a rugged mountainous terrain. The tract to the right of the Siang River is less hilly than the area lying between Siang and Dibang river 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. 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. The study area is inhabited by mainly Adi tribe. The Adi tribe is a major tribe followed by the Idus distributed in the temperate and sub-tropical area in the district.

#### *Exploration and documentation :*

Extensive survey works were conducted during the months of November 2000 January, September and November of 2001 in several Adis tribal dominated villages (Mollo, Payum camp (H.Q.), and Payum basti in the districts of West Siang; Karko, Ramsing, Ningin, Tuting basti, Hong Kong basti, Tuting panikheti, Zido, Naming, Kuging and Nyering in Upper Siang district of Arunachal Pradesh) and their surroundings. Several days were spent among the local people in each area of

the study. The village Head Man (Gram bura) and herbal practitioners were interviewed and various uses of the plants as well as their names were recorded in the study field. Among village experts, one person from each village was hired to help in survey and collections of the medicinal plants. To eliminate any chance of error in identification of specimen plants along with the medicinal values as gathered from the village experts, the specimen plants were brought to the laboratory for further identification and kept in a herbarium with full information. The data

had been collected either from tribal expert that accompanied in the field or from old tribes who were experienced and actually prescribing these materials to cure different diseases. The materials collected were kept on the Herbarium sheets giving botanical names, tribal names and uses. The specimens were thus dried, poisoned and mounted as per standard methods and deposited as voucher specimens in Forestry Department, North Eastern Regional Institute of Science and Technology, Itanagar, Arunachal Pradesh.

Table-1. Ethno-medico uses of plants growing in Upper Siang area \*

| Health problems             | Plant species used                                 | Composition of medicine and methods of its use.   |
|-----------------------------|--|---|
| <b>Antiseptic</b>           | <i>Zanthoxylum acanthopodium</i> DC.<br>(Eyar –ma) | The paste of the fresh leaves applied with edible oil over the wounded areas to heal the wound quickly. The paste of the fruits mixed with water if taken thrice a day, cure the wounds.  |
| <b>Women Anti-fertility</b> | <i>Zanthoxylum acanthopodium</i> DC.<br>(Eyar –ma) | The fruits and leaves jointly or singly of this plant along with one insect ( <i>Taring</i> ) ground into a paste with water if taken by married women continuously for 15 days four times in a year at three months interval yield positive results. She will not conceive for 1-2 years.<br><b>Caution:</b> Drinking of wine is strictly prohibited and taking lot amount of water is required. |
| <b>Anorexia</b>             | <i>Zanthoxylum rhesta</i> (Roxb.) DC.<br>(On-ear)  | The fruits of this plant ground into a paste and mixed with water if taken after meal continually for a weak, yield an effective result.  |
|                             | <i>Begonia</i> spp. ( <i>Bung kung</i> )           | The rhizomes of this plant along with large number of seeds of pumpkin ( <i>Cucurbits</i> Spp.) ground into a paste with water or dry powder with water if taken on empty stomach for a weak, yield effective results.  |
| <b>Anti-Cancer</b>          | <i>Zanthoxylum acanthopodium</i> DC.<br>(Eyar –ma) | The paste of the leaves of the two species <i>Zanthoxylum</i> , <i>Phegopteris aurita</i> mixed with an insect locally called as <i>Tari</i> applied over the cancer affected areas gives relief to the patients and even cure the ailment.   |

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| <b>Snake bite</b>       | <i>Coptis teeta</i> Wall. (Manbai)<br><br><i>Musa</i> spp.(Copack)<br><br><i>Tephrosia candida</i> (Roxb)DC.<br>and other legumes(Tapey)  | The dried roots of <i>Coptis teeta</i> and rhizome of <i>Zingiber officinale</i> ground into a paste with water. if taken orally as well as (with or without <i>Kasturi</i> and the skin of <i>Mithun</i> ) ointment, cure for cure snake –bite.<br><br>The seeds of Banana and <i>Tephrosia candida</i> or any type of legumes ground into paste with water or Seed of banana and legumes if chewed immediately after the dog bite, yields positive results.                         |
| <b>Fire burn</b>        | <i>Ricinus communis</i> , Linn. (Toti)  | The latex if spread over the burnt parts of the body or the juice (latex) of any part of fresh plant rubbed very softly over the fire- wound, restores normal condition of the skin.  |
| <b>Bone fracture</b>    | <i>Pothos scandens</i> L.<br>(Lomangloset)<br><br><i>Zanthoxylum acanthopodium</i> DC.<br>(Eyar –ma)  | The fresh leaf ground into a paste if plastered on the fracture parts and immediately covered with bandage made of small pieces of bamboo, reduces the pain and cures fracture. This is administered as treatment against bone fracture of domestic animals and human beings.<br><br>The fresh leaves of <i>Zanthoxylum</i> sp. or <i>Phegopteris aurita</i> ground into a paste if applied over the boils for 4-5 days, reduces the pain and cures the boils.                        |
| <b>Boils</b>            | <i>Phegopteris aurita</i> (Rukjee)  | For better results use the above two plants in equal proportions.   |
| <b>Blood pressure</b>   | <i>Solanum torvum</i> Sw.<br>(Bangko)<br><i>Clerodendrum colebrookianum</i><br>(Hoyun)  | The paste of fruits with or without leaves with cold water or with boiled water can be taken 6 teaspoons per day, decrease the blood pressure.<br>-do-  |
| <b>Cut &amp; wounds</b> | <i>Ricinus communis</i> Linn.<br>(Akirore /Toti)<br><i>Ageratum conyzoides</i> , Linn.<br>( Pakku)<br><i>Hedychium spicatum</i> Hamilt.ex<br>Smith. (Royik)<br><br><i>Pouzalzia viminea</i> Wedd.( Oyek)<br><br>Bamboo spp. | The burning wounds of human and animals are cured by the use of the latex of these plants.<br><br>The fresh leaf juice if applied to the freshly cut area, check the bleeding.<br><br>The hair like structure and paste or juice of the leaves of freshly collected plants if applied on the wounds, stop bleeding.<br><br>After removal of bark (epidermis) from the fresh root, if applied on the wound check bleeding.<br><br>After scrapping the green skin of Bamboos if applied |

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|   | <i>Colocasia</i> sp. ( Engin)  | over wounds, stop bleeding.<br>Crushed leaves of this plant (called limamsu by Galo tribe) if used over the wounds check bleeding due to clotting.   |
| <b>Constipation</b>                               | <i>Solanum torvum</i> Sw.<br>(Baque/ Bak).   | The fresh young/mature fruits ground into paste and mixed with water if taken or 3-4 fruits if chewed, reduce pain and yield positive results.   |
| <b>Cold &amp; Cough</b>                           | <i>Zingiber officinale</i> Rosc.<br>(Kekir /Takey)<br><i>Trevesia palmate</i> Vis.<br>(Tang-gongs)<br><br><i>Allium sativum</i> , Linn.<br>(Jackok)<br><i>Z. officinale</i> Rosc.<br>(Kekir)   | The rhizome of <i>Zingiber</i> and a piece of stem except bark (xylem wood) of <i>Trevesia palmata</i> if chewed, cure cold and cough trouble.<br><br>Few pieces of rhizome of <i>Zingiber officinale</i> , <i>Allium sativum</i> . and 12-15 drops of bee honey if taken which cures cold and cough.  |
| <b>Diarrhoea &amp; dysentery and stomach ache</b> | <i>Begonia</i> spp.<br>(Buku, /Abibying)<br><br><i>Garcinia pedunculata</i> Roxb.<br>(Tabing-asing.)<br><br><i>Callicarpa arborea</i> Roxb.<br>(Toti)<br><i>Zingiber officinale</i> Rosc.<br>(Kekir)<br><i>Solanum torvum</i> Sw.<br>(Bangko)<br><br><i>Ricinus communis</i> Linn.<br>(Akirore)<br><br><i>Psidium guajava</i> Linn.<br>(Madhuriam)<br><br><i>Musa</i> spp.<br>(Luro) | Extract of the red rhizomatous part boiled with water if taken orally for few days on an empty stomach, to produces an effective result<br><br>The boiled water of this dry fruit pieces if taken orally for few days on an empty stomach, cure the ailment.<br><br>The young shoots of <i>Callicarpa arborea</i> with rhizome of <i>Zingiber</i> along with fruits and leaves of <i>S. torvum</i> grounded into a paste and mixed with water if taken, cure the ailment.<br><br>The mature dried fruits ground into powder and mixed with water (suspension).<br>Or mature fresh fruit paste mixed with water if used like the above ways, cure the ailment.<br><br>The freshly collected leaf juice (young leaves) if taken orally for 4-7 days on an empty stomach, yields positive result.<br><br>The ¼ spoon of powder of dried seeds mixed with a glass of water if taken on an empty stomach yields an effective result for appendicitis and stomachache. |

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| <b>Eye complaints</b> | <i>Acanthopanax aculeatum</i> Seem.<br>(Tako-laksin) | A few drops of stem extract (water like substance) if used on the infected eyes, cure irritation and infection of eyes.  |
| <b>Fever</b>          | <i>Zanthoxylum rhetsa</i> (Roxb.) DC.<br>(On-ear)    | The fruits of these plants ground into paste and mixed with water if taken after meal continuously for a week, cure fever.   |
|                       | <i>Zanthoxylum acanthopodium</i> DC.<br>(Eyar –ma)   | The paste of the fruits mixed with two teaspoons of water if taken thrice a day, cures fever.  |
|                       | <i>Zingiber officinale</i> Rosc. (Kekir)             | The paste of rhizome if taken twice a day, cures fever.  |
|                       | <i>Coptis teeta</i> Wall. (Manbai)                   | One spoonful of dried root yellow extract (boiled in water in aluminum pot) if taken twice a day, cures fever. For better results mixture of the root extract with few drops of latex of <i>Opuntia</i> spp. and juice of <i>Ricinus communis</i> fruits (young) may be used.                                      |
|                       | <i>Callicarpa arborea</i> Roxb. (Toti)               | The young shoots of <i>Callicarpa arborea</i> along with rhizome of <i>Zingiber officinale</i> and leaves and fruits of <i>S. torvum</i> ground into a paste and mixed with water if taken, cure fever.  |
| <b>Fat degrading</b>  | <i>Paris polyphylla</i> , Sm.<br>(Dipogoiak)         | The rhizome and fruits ground into paste (or powder) with water if taken orally, decrease fat.   |
|                       | <i>Begonia</i> spp.<br>(Bungkung/SudumBumkung)       | The rhizome of the plants ground into paste and mixed with water if taken (four teaspoonfuls each time) thrice a day, it cures high fat problems.<br>The rhizome, stem and leaves ground into paste and mixed with water if taken thrice a day (four spoonful) each time, cures the excessive fat of human beings. |
|                       | <i>Solanum torvum</i> Sw. (Bipak)                    | The young dried fruits powdered and mixed with water if taken thrice a day (one teaspoon each time), reduce fatness.   |
| <b>Gastric</b>        | <i>Centella asiatica</i> (L.) Urban.<br>(Loram.)     | The fresh leaves (5-6 leaves) and twigs if chewed, relieves gastric problems.  |
| <b>Headache</b>       | <i>Zanthoxylum rhetsa</i> (Roxb.) DC.<br>(On-ear)    | The immature fruits ground into paste and mixed with water if taken orally during headache, gives relief.  |
|                       | <i>Zanthoxylum acanthopodium</i> DC.<br>(Eyar –ma)   | The fresh fruit paste mixed with water if taken orally for few days, yields positive results.  |

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|                             | <i>Zingiber officinale</i> Rosc.<br>(Kelong)   | The pastes of <i>Z. officinale</i> (red var.), bulbs of <i>A. cepa</i> along with Mithun lever if used, cures headache.  |
|                             | <i>Callicarpa arborea</i> Roxb. (Toti)   | The young shoots of <i>Callicarpa arborea</i> along with rhizome of <i>Zingiber officinale</i> and leaves& fruits of <i>S. torvum</i> ground into paste and mixed with water if used, cures headache.  |
| <b>Insecticides</b>         | <i>Phegopteris aurita</i><br>(Rukje.)  | The dried leaves if used for making bedding for poultry birds, act as an insecticide.  |
| <b>Human worm parasites</b> | <i>Milletia pachycarpa</i> Benth.<br>(Tasmu)   | The fruits and underground parts mixed with water (or powder in dry condition) if administered orally, act against any type of worms in the stomach.<br><b>Caution:</b> Excessive doze should not be taken For children low doze is prescribed.  |
| <b>Jaundice</b>             | <i>Saccharum officinarum</i> Linn.<br>(Tabey)<br><br><i>Averrhoa carambola</i> .Linn.<br>(Kordoi)<br><i>Carex</i> sp.<br>(Tabey) | During Jaundice the juice of <i>S. officinarum</i> & <i>A. carambola</i> if taken after mixing,cures jaundice.<br><br>The juice of the stem of fresh plant if taken, cures the ailment.  |
| <b>Leprosy</b>              | <i>Phrynium parviflorum</i> , Roxb.<br>(Hakoda)  | The latex of the corm if spread over the affected part of the body as ointment /cream, cures Leprosy.<br><br>The tablets prepared from the paste of the fresh corm if taken after drying, cure Leprosy.  |
| <b>Malaria</b>              | <i>Coptis teeta</i> Wall.<br>(Manbai)  | One spoonful of dried root yellow extract (boiled in water) if taken twice a day, cures malaria.<br>For better results mixture of the root extract with few drops of latex of <i>Opuntia</i> spp. and juice of <i>Ricinus communis</i> fruits (young) may be used.<br>Dozes: for mature person's one teaspoonful three times a day. In case of child, ½ or ¼ teaspoon three times a day. |
| <b>Piles</b>                | <i>Coptis teeta</i> Wall. (Manbai)   | The boiled water of root extract mixed with boiled juice of bear liver if taken, reduces piles problem.  |

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\* Names in parentheses indicate vernacular names

A total of 33 plant species were reported to be commonly used by the local peoples in traditional health care system to cure 24 ailments in the buffer zone villages of protected area (Table-1). Among the 33 medicinal plants species, 15 species were used to cure more than one ailment. The method of using these plants varied according to the nature of the ailments. 20 species were administered in the form of single drug as antiseptic, anti-fertility, anorexia, and for leech bite, *dumdim* bite, fire burns, bone fracture, boils, cuts & wounds, constipation, diarrhea-dysentery & stomach pain, eyes complain, fever, decreasing of fats, gastric, headache, insecticides, anti-human worm parasitic, jaundice, leprosy and malaria. In seven cases, compound preparations were used against cancer, snakebite, dog bite, bone fracture, cold & cough, diarrhea- dysentery & stomach pain, fever and malaria. Considering individual plants parts, roots are used in two cases, stem except bark in one case, leaves in 10 cases, rhizomes in three cases, whole plant in one, fruits in seven, young shoot in one, bulbs in one, whole seeds in three, oil from seeds in four species, corms in two and dried plant in one case and fresh plants in 18 cases were used. of the total 33 plants involved, 26 plant species were collected from wild sources and seven plant species were grown in the cultivated areas by the tribals under this study area.

#### *Conservation :*

Study of ethno medicinal plants in Arunachal Pradesh gives an idea about the indigenous knowledge of medicinal plants used in the treatment of diseases like septic, women anti-fertility, anorexia, cancer, snake-bite, fire burn, bone fracture, boils, blood pressure, cut

and wounds, constipation, cold and cough, diarrhea, dysentery, stomach pain, eye complaints, fever, fat degrading, gastric, head ace, human worm parasites, jaundice, leprosy, malaria and piles. Some plants have insecticidal properties too.

Natural drugs can be extracted from such plants for proper chemical analysis. Many wonder drugs discovered during the last fifty years indicate that there are still untouched plants of unknown medicinal value used as tribal medicine. So, a wild indigenous germplasm of such important medicinal plants could be established to achieve the socio-economic and industrial development of the tribal areas without changing the environment of the Adis and Idus tribe of Upper Singa Valley district of Arunachal Pradesh. The Idus conserved the *Coptis teeta* (Mishmi tita) in the hilly forests to be used as common medicine of some diseases. Other tribal also cultivated *Solanum torvum*, *Zingiber officinalis*, *Psidium guajava*, *Musa* sp. and *Saccharum officinarum* etc. in order to use them for relief against some diseases. Medicinal plants used by ethnic communities could be consider as substitute of Allopathic medicine with proper conservation and cultivation measures. There is a need to gear up documenting process of vast knowledge of medicinal plants of the tribal peoples of Arunachal Pradesh scientifically and conserve the plants for a better future of the human society of the world.

Financial support from Ministry of Environment and Forests, New Delhi, for the research project is acknowledged. Thanks to the Director, NERIST for providing facilities for the project work. Thanks, are also due to the Forests authorities of Govt. of Arunachal

Pradesh and Dr. K. Haridasan for encouragement and identification of plant species. Special thanks are due to village Headman's and local tribal peoples for their cooperation and help during the field survey.

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