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Documentation of traditional herbal knowledge of *Khamptis* of Arunachal Pradesh

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In the present global milieu, documentation of the country's traditional ecological knowledge (TEK) particularly those associated with bioresources has assumed high priority. The paper records the use and ethnomedicinal values of 37 plant species belonging to 29 families, utilised by *Khamptis* of Arunachal Pradesh. For each plant species, the information lists plant name, crude drug preparation, and the method of use. Such documentation not only provides opportunities, but also holds potential for developing products for the pharmaceutical sector, safeguard from biopiracy and above all sustainable use. This will also act as a tool to the economic upliftment of the upland tribal communities by harnessing some of the potential and high value species.

Keywords: Traditional Knowledge, Ethnomedicine, *Khamptis*, Arunachal Pradesh, Lohit

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Evolution of mankind is integrated with development of indigenous technologies to meet their needs by informal experimentations[1,2]. Ethnomedicobotany is one of the tools that help to deal with the direct relationship of plants and man to prevent and cure ailments[3,4]. India is known for rich repository of biological wealth having more than 17,500 wild plant species, and of these 4,000 species have medicinal values[5]. Use of plants as medicine is not of recent origin, as above 1,200 herbal plants are mentioned in ancient Indian texts[6]. Even today, 80% of the world's population relies on traditional plant medicines as also in India by various rural and tribal communities through Indian Systems of Medicine and other undocumented traditional practices[7-9]. Indian Himalaya, a storehouse of biological resources with diverse ethnobotanical knowledge is under threats of habitat destruction and biopiracy[10-12]. In recent past, anthropogenic pressure lead to unsustainable harvesting of more than 70% identified medicinal plant species[13]. Viewing gravity of situation, Government of India enacted numerous legislations such as Indian Biodiversity Act, 2002; Indian Patent (Amendments) Act, 2002, and Plant Varieties & Farmers Rights Protection (PVP) Act, 2001 to check the unsustainable exploitation of rich biological resources.

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Northeast India is known for high ethnic and biological diversity and is often referred to as biological hotspot[14-15]. Huge pool of ethnomedicobotanical knowledge is confined in the region with exception of few documentation[16]. Arunachal Pradesh, a northeast state is characterized by uneven topography and diverse vegetation from tropical to alpine types[17,18]. The state is treated as a hotspot of medicinal plants harbouring nearly 450 species endemic and endangered having numerous uses[19-21]. Herbal plants used for the preparation of Ayurvedic, Unani, Sidha and homeopathic medicines are available in different climatic zones of the state[22-26]. Due to various physical barriers they have been leading practically a life of seclusion thereby preserving their traditional knowledge intact[27]. Selected studies have been carried out from time to time to document ethnomedicinal knowledge from different areas of this region[28-30]. Since till now, no such intensive study has been carried out in this region an attempt has been made to document traditional knowledge on medicinal plants.

Methodology

Extensive field survey has been carried out during all the seasons by using standard questionnaire[6]. *Khamptis*, a major tribe of the state Arunachal Pradesh are inhabitants of the Lohit district (Fig. 1). They are believed to have migrated from a place

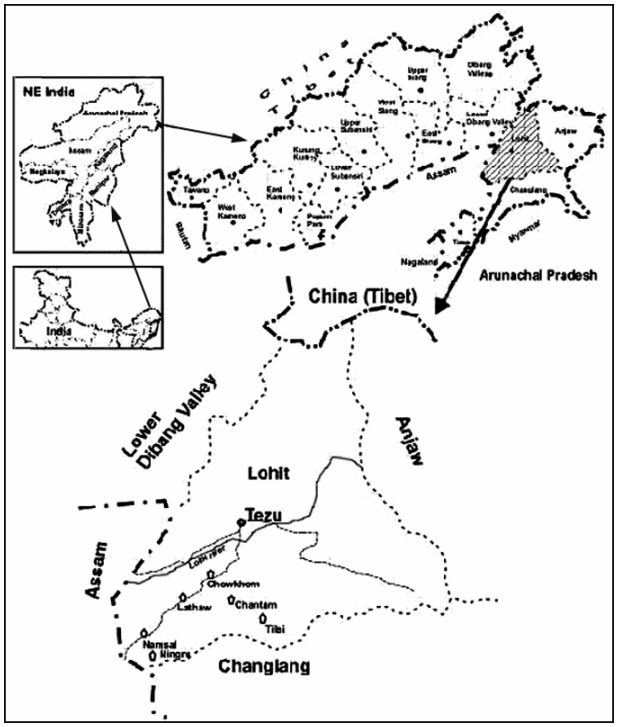

Fig. 1—Map of the study area

called Bor Khamptis, near Irrawady river[31]. They are chiefly agrarian and cultivate a wide variety of crops[32]. The district lies between 95° 15' to 97° 24' E and 27° 33' to 29° 22' N with an altitude from 150-1690 msl[33]. The district records an annual average rainfall of 2,800 mm, and minimum and maximum daily temperature of 6^0C and 32^0C. Most of the precipitation occurs during monsoon (June to August); winters are short and relatively milder. The soil is characterized by loam to sandy loam frequently mixed with pebbles and stones. The study is the result of intensive botanical exploration carried out in the Lohit district of Arunachal Pradesh. Available literature, local and regional herbaria on the subject were consulted[4,34,35]. Efforts have been made to enlist the plants that are used as medicines by *Khamptis*. Intensive discussion with the locals was carried out and the usage of each plant species was recorded. The plant specimens were collected from surrounding forests and home gardens with the help of local experts, which was later on identified and deposited to the GB Pant Institute of Himalayan Environment and Development, NE Unit, Itanagar herbarium.

Table 1—Medicinal plant species used by *Khamptis* of Arunachal Pradesh

Plant name	Family	Local name	Uses
Aerva Sanginolenta Linn.	Amaranthaceae	*Mritasanjeebani*	Leaf paste is applied to the injuries.
Amaranthus spinosa Linn.	Amaranthaceae	*Mokhonkai Phak*	Plant paste mixed with deer musk is applied for the treatment of gout.
Ananas comosus (L) Merr.	Bromeliaceae	*Kinghom*	Burnt fruits powder is administered for the treatment of urinary tract ailments. White portion of the leaves is used for deworming.
Andrographis paniculata Neex.	Acanthaceae	*Kamtok*	Crushed leaves mixed in warm water is administered for the treatment of malaria and cough.
Artocarpus heterophyllus Lam.	Moraceae	*Tonmalang*	A root soaked in water is administered for the treatment of mild fever in children.
Averrhoa carambola Linn.	Averrhoeaceae	*Maakphung*	Decoction of leaf, root, bark and twig is given in jaundice.
Bambusa arundinaria Willd	Poaceae	*Maissang*	Peeled green epidermal layer is applied on severe wounds or injuries for quick relief. Tender leaf decoction is given in urinary problems.
Carica papaya Linn.	Caricaceae	*Maak sangfo*	Fruits cut open at one end, seeds are taken out and filled with common salt and tightly plugged with bamboo pins. This is burned in a *chulha* and the charred material is then cooled and mixed in water and filtered. Filtrate used is administered for the treatment of stubborn and dry cough.

(*Contd*)

Table 1—Medicinal plant species used by *Khamptis* of Arunachal Pradesh

Plant name	Family	Local name	Uses
Cassia fistula Linn.	Caesalpinaceae	*Khoongo*	Leaf extract is administered during indigestion.
Cassia tora Linn.	Caesalpinaceae	*Ptaak moon*	Roots tied in red, white and black threads are tied on the arm in case of severe one-sided headache.
Centella asiatica (Linn.) Urban.	Apiaceae	*Panaang*	Plant extract mixed with honey is is taken in empty stomach every morning in the treatment of chronic dysentery, high blood pressure and for enriching memory.
Citrus medica Linn.	Rutaceae	*Makhmuyum*	Fruit juice used for common cold is also applied on head for dandruff.
Curcuma caesia Roxb.	Zingiberaceae	*Chongkah*	Collar crushed and made into a paste is applied to heal severe wounds and injuries.
Curcuma longa Linn.	Zingiberaceae	*Khumein Nak*	Rhizomes are chewed for relief from asthma.
Diaplazium esculentum (Retz.) Sw.	Dryopteridaceae	*Pukutfet*	Root extract mixed with raw rice is filtered and administered in case of food poisoning.
Drymaria cordata (Linn.) Willd.	Caryoplyllaceae	*Yatikhoi*	Whole herb wrapped in banana leaf is burned in a *chulha* and the smoke is inhaled for relief from headache.
Garcinia pedunculata Roxb.	Guttifereae	*Mhahau*	Fruit pulp extract is used as a treatment against blood dysentery.
Mesua ferrea Linn.	Guttifereae	*Vahou*	Sap soaked in clean water for about 2-3 hrs is used during eye problems.
Ocimum americanum Linn.	Lamiaceae	*Pichim khimnik*	Equal proportions of the herb, ginger and honey mixed together is administered for whooping cough.
Pogostemon bengalensis Kuntze	Lamiaceae	*Yakinpit*	Plant extract is used for the treatment of food poisoning, vomiting and stomach troubles.
Hedyotis scandens Roxb.	Rubiaceae	*Yakauka*	Leaf extract is used for the treatment of diabetes.
Paederia scandens (Lour.) Merr.	Rubiaceae	*Khamkingkham*	Leaves boiled with *Goroi* fish (*Channa punctatus*) is taken in weakness and during indigestion.
Spermococa hipsida (Linn.) Miq. ex. Hook	Rubiaceae	*Kinphet*	Leaf extract is used against vomiting, food poisoning and post-natal ailments.
Kalanchoe pinnata (Lam.) Pers.	Crassulaceae	*Yasumsangrishi*	Leaf extract taken in empty stomach is used in the treatment of urinary bladder stones & fever in children.
Lobelia sinensis	Lobelliaceae	*Yahang-en*	Leaf extract is used for the treatment of diabetes.
Luffa acutangula (Linn.) Roxb	Cucurbitaceae	*Mohoi*	Whole leaf is applied on the breasts to avoid over lactation after childbirth.
Musa paradisiacal Linn.	Musaceae	*Koiathia*	Fruit epicarp dried and burned completely is transferred to a glass of water to filter. The filtrate is used against diarrhoea and in deworming.

(*Contd*)

Table 1—Medicinal plant species used by *Khamptis* of Arunachal Pradesh

Plant name	Family	Local name	Uses
Phyllanthus acidus Skeels.	Euphorbiaceae	*Makhanom*	Plant decoction with *khowmin* (turmeric) and *milooborn* (lemon) is used the treatment of blood vomiting.
Plumbago indica Linn.	Plumbaginaceae	*Nanchuni*	Root extract is applied on mouth ulcers; leaves are used as vegetables.
Psidium guajava Linn.	Myrtaceae	*Mantaka*	Tender leaves are chewed for relief from diarrhoea.
Punica granatum Linn.	Puntaceae	*Dalim*	Young buds, shoots and fruits are chewed for relief from dysentery.
Rauwolfia serpentina Benth. Et. Kurz	Apocynaceae	*Bhungmaraja*	Roots are chewed for stomach pain and fever.
Vinca rosea Linn.	Apocynaceae	*Nayan tara*	Leaf extract is used the treatment of diabetes.
Scrophularia lindernia (Linn.) Dubia	Scrophulariaceae	*Yakep*	Stem extract is used for the relief from chest pain.
Spilanthes paniculata Wall.	Asteraceae	*Yamoklun*	Latex is applied for treating tongue ulcers.
(i) Urginea indica Kunth.	Liliaceae	*Plonam*	Bulbs along with mid rib of betel leaf are crushed and the extract is used for the treatment of asthma and bronchitis.
Zingiber officinalis Linn.	Zingberaceae	*Moronda*	Rhizomes along with *Jabung Nag* (*Nigella sativa* Linn.) and *Konkoa* (spider) are made into a paste and applied on the inflammation from irritation caused by caterpillars.

Results and discussion

A diverse use of medicinal plant has been identified for the treatment of various diseases, among these highest recorded number of species used is for lung related diseases (Table 1). *Khamptis* have different methods of drug preparation and application which is unique. Each disease has specific or mixture of plant species for treatment. Among the species listed, leaf is the commonly used plant part having 9 families and 11 species followed by root and fruit with 5 families and species each. These species are normally collected from wild with exception of few species like *Ananas comosus* Linn. Merr., *Carica papaya* Linn., *Citrus medica* Linn., etc, which are cultivated in home garden.

The impact of modern amenities leads to slow and steady diminishing of ethnobotanical knowledge. Therefore, there is an urgent need to document the knowledge, which was built-up through tireless informal experimentation to cope up the challenging task of curing human sufferings**.** Documentation of species used and commercialisation through cultivation will not only help to improve their socioeconomic status but will reduce the pressure on natural stand, which will enhance the conservation activity among the community. The wealth of their traditional knowledge needs to be tapped and preserved for sustainable development. This can be exploited in a positive manner in pharmacognosy, which in turn would boost the economy of the community and also help in saving a few high value potential drug yielding species.

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