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## UNDERUTILIZED MEDICINAL PLANTS OF MON DISTRICT, NAGALAND INDIA

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### ABSTRACT

In this paper, we have documented 113 underutilized medicinal plants of Mon district under 93 genera and 61 families. The district is rich in traditional practices of curing various ailments. However, lacking of proper documentation is resulting in disintegration of imparting valuable practices to younger generation. During this survey, a maximum of 8 species of Moraceae and Rosaceae; 6 species of Asteraceae; 5 species of Arecaceae and Rutaceae; 4 species of Anacardiaceae and Solanaceae; 3 species of Cucurbitaceae, Lamiaceae, Phyllanthaceae, Theaceae, Zingiberaceae; 2 species each of Acanthaceae, Crassulaceae, Meliaceae, Myrtaceae, Oxalidaceae and Rubiaceae have been reported and the rest 43 families are represented by single species. An attempt has been made to record ethnomedicinal plants from Mon district for the first time.

**Keywords:** Medicinal plants, Ethnomedicine, Konyak, Nagaland

### INTRODUCTION

Over 60,000 years ago, plants have been used as a source of medicine (Ramashankar & Sharma, 2015). According to World Health Organization (WHO), 80% of world population still depends on traditional medicine as they are easily accessible, efficient and cost-effective. The Indian sub-continent has a rich diversity of medicinal plants. Its ethnic and tribal's still depends greatly on indigenous traditional system of medicine. More than 45,000 plant species are found in India of which 15,000-20,000 plants have medicinal values. Further on that, merely 7000-7500 plants are used for medicinal purpose by traditional communities (Lakshman, 2016). The country is widely acknowledged for its valuable tradition of herbal medicinal knowledge. According to study conducted by Mao and Hynniewta (2000), North-East India contributes around 50% of India's entire plant biodiversity and about 1,350 species of plants used as ethnomedicinal preparations have been reported so far (Dutta & Dutta, 2005).

Nagaland is located in the North Eastern region of India and endowed with rich and diverse array of biodiversity. It is one among the biodiversity hotspots of the 34 "Mega Biodiversity" regions of the world. According to state policy of environment and forest 2015, the number of plant species in the state is approximately 2,431 belonging to 963 genera and 186 families, half of which is believed to have therapeutic properties and are used by majority of people for their primary health care needs. Ethnobotanical studies on Nagaland state are still meager. Some of the researches based on ethnobotany of this region are those of (Changkija, 1999;

Jamir, 1999; Imchen and Jamir, 2011; Shankar and Devalla, 2012; Singh *et al.*, 2014; Pfoze *et al.*, 2014).

Mon district is adorned with beautiful mountains and has a rich floristic composition. The natural vegetation of the district comprises of northern tropical wet evergreen forests type. The people are primarily dependent on the forests and its product for their livelihood (Pradheep, 2016, Konyak and Konyak, 2020). The economy is mainly forest-based and agricultural. Rice is the main crop grown in this region. Besides that, tea plantation including both Assam and Chinese variety are also cultivated and famous in the state. In addition, the district is the hoard of numerous medicinal plants. The local inhabitants have vast knowledge of their plant resources as medicines and have been using from one generation to another in oral form based on the past experiences which are continuously inherited. The indigenous people of the region widely practice the use of several wild species of plants for the treatment of different ailments. Although, many plants have prime medicinal values there is still paucity of information regarding their traditional intellect.

A large number of medicinal plants used by various Naga tribes are reported (Jamir and Rao, 1990; Jamir 1997; Chase & Singh, 2013; Kichu *et al.*, 2015; Sumi & Shohe, 2018). However, ethnomedicinal plants used by the Konyak tribe are yet to be explored and documented. The present study have been surveyed and inventoried about the indigenous knowledge of medicinal plants used by various ethnic groups of the *Konyak-Naga* to enhance the furtherance of modern research in therapeutic properties as well as in pharmaceutical preparation for preventive and curative drugs.

A survey and documentation on underutilized medicinal plants by the folk of Konyak tribe was conducted.

### MATERIALS AND METHODS

Mon district is one of the largest districts in Nagaland and is inhabited by the Konyak Naga tribe. It has a total geographical area of 1,786 sq. km and an elevation of 897.64 m above sea level. The data was collected from two areas i.e. Tizit area and Longching area of Mon district. Tizit area lies on the coordinates 26°54'11"N 95°4'57"E and is bordered with Arunachal Pradesh on Northeast side, Sivasagar district of Assam in Northwest, and on the East with Myanmar.

Longching area lies on the coordinates 26°31'4"N 94°56'5"E and is bordered with Myanmar on the East, Longleng district on the West. The species were identified with the latest monographs published as well as identification by the experts on the concerned field. The investigation was done to document the underutilized medicinal plants found in the district.

### RESULTS AND DISCUSSION

In this paper, botanical names of underutilized medicinal plants, vernacular name, family, habit and its uses are tabulated alphabetically (Table 1).

**Table 1 :** Enumeration of underutilized medicinal plants of Mon district, Nagaland.

Botanical Name	Vernacular name	Family	Habit	Uses
<i>Adhatoda zeylanica</i>	Tippho	Acanthaceae	Shrub	Leaves are used in rheumatic pain,
<i>Ageratum conyzoides</i>	Kukdih	Asteraceae	Herb	Leaves are used in cuts and wounds
<i>Allium chinense</i> G. Don.	Teihsa	Amaryllidaceae	Herb	All parts of plants are used for treating cholera and stomach pain
<i>Alstonia scholaris</i>	Meipoa-pen	Apocynaceae	Tree	Entire plant parts are used in treating cholera and stomach pain
<i>Amomum subulatum</i> Roxb.	Ilachi, Cardamom (Eng)	Zingiberaceae	Herb	Fruits are used to treat Dyspnoea, thirst, nausea, itching, inflammations of the eyelids.
<i>Ananas comosus</i>	Wansaa	Bromeliaceae	Tree	Fruits are used in abortive purpose
<i>Aphanamixis polystachya</i>	-	Meliaceae	Tree	Leaves used for treating skin diseases
<i>Areca catechu</i> L.	Kovei (Konyak) Tamul (Nagamese)	Arecaceae	Tree	Pericarp is chewed raw to treat flatulence. Nuts are consumed against dysentery and also used to treat malaria.
<i>Artocarpus heterophyllus</i> Lamk.	Peyong (Konyak) Jackfruit (Eng)	Moraceae	Tree	Ripe fruits consumed for constipation.
<i>Artocarpus chaplasha</i> Roxb.	Kheangkha-pekong (Konyak)	Moraceae	Tree	Fruits used for constipation.
<i>Artocarpus lakoocha</i> Roxb.	Monkey fruit (Eng) Hoipahsho Ulikh (Konyak)	Moraceae	Tree	Fruits are edible.
<i>Averrhoa carambola</i> L.	Starfruit (Eng) Etang-peluk/Pansi-latlo (Konyak)	Oxalidaceae	Tree	Fruits are crushed and the extracted juice is drunk against jaundice.
<i>Azadiracta indica</i>	Neem-pen	Meliaceae	Tree	Leaves are used in treating malarial fever, wounds and skin diseases
<i>Baccaurea ramiflora</i> Lour.	Burmese grape (Common) awyu (Konyak)	Phyllanthaceae	Tree	Fruits used to treat skin diseases and its juice is used for the treatment of arthritis.
<i>Begonia picta</i>	Susumeipoa	Begoniaceae	Herb	Leaves are used in treating mouth ulcer & bristle on the tongue
<i>Bryophyllum pinnatum</i>	Jaktetnu	Crassulaceae	Herb	Leaves are used in cuts, burns and injuries
<i>Calamus erectus</i> Roxb.	Cane (Common) Veilikh (Konyak)	Arecaceae	Shrub	Ripe fruits are eaten raw and powdered seed used for indigestion and gastrointestinal problems.
<i>Calamus tenuis</i> Roxb.	Cane (Common) Veinyu likh (Konyak)	Arecaceae	Shrub	Fruits are edible.
<i>Canarium strictum</i> Roxb.	Raal (Common) Kong likh (Konyak)	Burseraceae	Tree	Fruits used for inflammatory, antibacterial, antifungal and anti-diabetic.

<i>Carica papaya</i>	Omita, Thoa-ko-ak	Caricaceae	Tree	Fruits are used in gastric & urinary disorder
<i>Caryota urens</i>	Jaggary palm (Common) Loklikh (Konyak)	Arecaceae	Tree	Powdered nuts are used as a tonic to strengthen vigor and vitality.
<i>Cassia alata</i>	Apameipoa	Leguminosae	Herb	Leaves used in skin diseases specially ringworm
<i>Castanopsis tribuloides</i> (Smith) A. DC	Chinkapin (Common) Lahkhao likh (Konyak)	Fagaceae	Tree	Seeds are eaten raw or cooked.
<i>Carallia brachiata</i> (Lour.) Merr.	Freshwater-mangrove (Common) yongkeih-luk (Konyak)	Rhizophoraceae	Tree	Ripe fruits are eaten raw.
<i>Celosia argentea</i>	Onnu-meipoa	Amaranthaceae	Herb	Flowers, leaves and roots are used in treating skin rashes, itching etc.
<i>Centilla asiatica</i>	Puseannatu	Apiaceae	Herb	Leaves are used in treatment of dysentery, cholera, stomach-ache
<i>Citrus grandis</i> L.	Pomelo (Eng) Tanyen-nyennyu (Konyak)	Rutaceae	Tree	Fruits juice used against jaundice.
<i>Citrus medica</i> L.	Citron (Eng) Maikoh-tanyen (Konyak)	Rutaceae	Tree	Fruits juice used for kidney problems and urinary complains.
<i>Citrus limon</i> L.	Lemon (Common) Neimpu-tahnyei (Konyak)	Rutaceae	Tree	Fruits juice used for preventing gastrointestinal problems, and also to improve appetite.
<i>Citrus indica</i> L.	Wild Orange (Common) Chong chengpe (Konyak)	Rutaceae	Tree	Fruit juice helps in gaining appetite,
<i>Choerospondias axillaris</i> (Roxb.) B.L Burt & A.W	Hill-hog Plum (Eng) Kosheang likh (Konyak)	Anacardiaceae	Tree	Fruit is used medicinally to promote the flow of blood.
<i>Clerodendrum colebrookianum</i> Walp.	Mangmikjak	Lamiaceae	Shrub	Shoots and part of leaves are used in treatment of malarial fever
<i>Camellia sinensis</i>	Khalappen	Theaceae	Shrub	Dried leaf is chewed to remove foul smell from mouth, juice applied to cuts and wounds
<i>Cordia dichotoma</i>	Glue berry (Eng) Chumpu luk (Konyak)	Boraginaceae	Tree	Fruits used as fodder, Medicinal properties
<i>Crassocephalum crepidiodes</i>	Hingpoa	Asteraceae	Herb	Leaves used in Cuts and wounds
<i>Croton oblongifolius</i>	Phaopen	Euphorbiaceae	Tree	Leaves used in snakebites & bites of poisonous insects
<i>Cucumis hystris</i> Chakrav.	Cucumber (Eng) Aoha maikoh (Konyak)	Cucurbitaceae	Creeper	Fruits eaten either raw or cooked.
<i>Curculigo capiculata</i> (Lour.) Kuntze	Chakphea	Hypoxidaceae	Herb	Eyes diseases
<i>Curuma angustifolia</i>	kakpongsteanu	Zingiberaceae	Herb	Rubbed on swelling of body, Paste is bound with cloth on fractures
<i>Cymbopogen citratus</i>	Pusimaksi	Poaceae	Herb	Treat insect bite, Severe fever and headache
<i>Debregeasia longifolia</i>	Orange wild rhea (Eng) Visha likh (Konyak)	Urticaceae	Shrub	Fruits help in Digestion.
<i>Dillenia indica</i> Linn.	Elephant apple (eng) Nyeishah likh (Konyak)	Dilleniaceae	Tree	Fruit are used as tonic, used in chest pain, cholera, dysentery and fever.
<i>Diospyros lanceifolia</i>	Penzeak	Ebenaceae	Tree	Seeds are used in skin diseases
<i>Docynia indica</i> (Wall.) Decne	Wild apple (Eng) Shangpai likh (Konyak)	Rosaceae	Tree	Fruits used to treat digestive problems.
<i>Drymaria diandra</i> Blume	Kanamiasa	Caryophyllaceae	Herb	Insects bites, remove stinging hairs of caterpillar
<i>Elaeagnus conferta</i> Roxb.	Wild olive (Eng) Phang likh (Konyak)	Elaeagnaceae	Shrub	Fruits are used to treat sores and ulcer.
<i>Emblia officinalis</i> Gaerthn.	Goose berry (Eng) Phangluk/Phang (Konyak)	Euphorbiaceae	Tree	Dry fruit is used for treating hemorrhage, and diarrhea.
<i>Eupatorium adenophorum</i>	Kuk-dih-poa	Asteraceae	Herb	Leaves are used in treating cuts and injuries

<i>Eurya acuminate</i> D.C	Penpoa	Theaceae	Shrub	Leaves are used in treating cholera, dysentery and stomach disorder
<i>Ficus auriculata</i> Lour	Fig (Common) Phuk likh (Konyak)	Moraceae	Tree	Fruits are eaten raw.
<i>Ficus hispida</i> L.	Fig (Common) Poksok (Ao) Khab-likh (Konyak)	Moraceae	Tree	Fruits are good for liver.
<i>Ficus semicordata</i> Buch.-Ham ex J.E. Smith	Fig (Common) Koro nem (Ao) Satha likh (Konyak)	Moraceae	Tree	Fruits are eaten raw.
<i>Fragaria indica</i> L.	Wild strawberry (Eng), Bhuin (Hindi)	Rosaceae	Herb	Fruits are good for liver and used as tonic.
<i>Garcinia pedunculata</i> G. Don.	Bor Thekera (Assamese) Bhunk (Konyak)	Clusiaceae	Tree	Fruit extract are used for cardiac problems and as diuretic.
<i>Gynocardia odorata</i>	Chhal mogra (Common) Baikhah likh (Konyak)	Achariaceae	Tree	Medicinal potential.
<i>Hedyotis scandens</i> Roxb.	Hingzang	Rubiaceae	Climber	Leaves are rubbed for skin diseases
<i>Hodgsonia macrocarpa</i> (Bl.) Cogn.	Pig Fruit (Common) Bai (Konyak)	Cucurbitaceae	Climber	Fruit pulp used in skin infections.
<i>Houtluynia cordata</i>	Bao-lap-hing	Saururaceae	Herb	Whole plant parts are used in cold and fever, stomach-ache
<i>Hypericum montanum</i>	Hingpoa	Hypericaceae	Herb	Whole plant parts are used to treat eyes diseases
<i>Juglans regia</i> L	Walnut (Eng), Vuhlikh (Konyak)	Juglandaceae	Tree	Fruits are edible
<i>Kalanchoe laciniata</i>	Chaktetnu	Crassulaceae	Herb	Leaves relieves body pain
<i>Lasia spinosa</i>	Shoasui	Araceae	Herb	Leaves are used in cuts and wounds
<i>Livistona jenkinsiana</i> Griff	Fan palm (Eng) Luluk (Konyak)	Arecaceae	Tree	Fruits are consumed raw to prevent stomach ailments like indigestion and gastritis problems.
<i>Maesa indica</i> (Roxb.) A. DC.	Wild berry (Eng) Penyakha (Konyak)	Primulaceae	Shrub	Fruits are eaten raw.
<i>Mangifera andamanica</i> L.	Mango (Common), Aam (Hindi), Aotoi (Konyak)	Anacardiaceae	Tree	Ripe fruits are edible.
<i>Manihot esculenta</i>	Penkhen	Euphorbiaceae	Shrub	Crushed leaves are used in Skin diseases
<i>Mikania micrantha</i> Kunth	Zhusaa	Asteraceae	Climber	Leaves are used in cuts, injuries, skin disease
<i>Mimosa pudica</i>	Pooyip	Fabaceae	Herb	Leaves are used in treating joint pain, arthritis, Jaundice
<i>Mirabilis jalapa</i> L.	Marvelmeipoa	Nyctaginaceae	Herb	Leaves are applied on wounds, ringworm, piles
<i>Morus alba</i> L.	Mulberry (Eng) Lihlikh (Konyak)	Moraceae	Tree	Fruits are edible.
<i>Morus nigra</i> Linn.	Blackberry (Eng) Lihlikh (Konyak)	Moraceae	Tree	Fruits have tonic effect on kidney.
<i>Musa balbisiana</i>	Wild banana (Eng), Gnu-cho (Konyak)	Musaceae	Herb	Fruits are eaten raw or cooked..
<i>Myrica esculenta</i>	Bayberry (Eng) Yin (Konyak)	Myricaceae	Tree	Fruits are consumed fresh for indigestion.
<i>Myrioneuron nutans</i>	Niktu	Rubiaceae	Shrub	Used for eyed foe various eyes diseases
<i>Nephelium lappaceum</i>	Rambutan (Eng) Yalikh (Konyak)	Sapindaceae	Tree	Green fruit is said to be astringent, stomachache, and anthelmintic.
<i>Osimum basilicum</i>	Hingseabuzia	Lamiaceae	Herb	Cough, stomach-ache, Dysentery
<i>Oxalis corniculata</i> Linn	Sleeping beauty (Eng) Awha-meishung (Konyak)	Oxalidaceae	Herb	Fruits are edible.
<i>Trichosanthes wallichiana</i> (Ser.)	Trichosanthes (Common name), Oyohpong (Konyak)	Cucurbitaceae	Climber	Fruits edible and also used as a bird trap.

<i>Parthenocissus semicordata</i>	Himalayan Woodbine (Common) Ahley-yuhet (Konyak)	Vitaceae	Climber	Fruits are edible and are used in making desserts, smoothie etc.
<i>Psidium guajava</i>	Pantsaa	Myrtaceae	Tree	Bark decoction used for stomach-ache and leaves decoction used for high fever and headache
<i>Prunus nepaulensis</i> (Serr.)	Bird cherry (Eng) Keanglang (Konyak)	Rosaceae	Tree	The fruit is consumed fresh which reduces the incidence of cancer.
<i>Passiflora edulis</i> Sim.	Passion fruit (Eng), Hoikhah likh (Konyak)	Passifloraceae	Climber	Fruits are eaten raw.
<i>Phoebe cooperiana</i>	Kuh (Konyak)	Lauraceae	Tree	Fruits are eaten raw.
<i>Phyllanthus acidus</i> (Linn.) Skeels	Star gooseberry (Eng), Phang (Konyak)	Phyllanthaceae	Tree	Fruits are taken raw for dyspepsia and jaundice.
<i>Phyllanthus emblica</i> Linn.	Goose berry (Eng), Phang likh (Konyak).	Phyllanthaceae	Tree	Dry fruit is useful in diarrhea and dysentery.
<i>Physalis peruviana</i>	Poanan	Solanaceae	Shrub	Leaves are eaten during dysentery and diarrhoea
<i>Piper nigrum</i> Linn.	Black pepper (Eng), Gol morich (Nagamese)	Piperaceae	Climber	Dried fruits are good for Stomachache, diarrhea, toothache.
<i>Pratia begonifolia</i> (Wall.) Lindl.	Fruiting plant (Eng), Mengling maikoh (konyak)	Campanulaceae	Creeper	Fruits are edible.
<i>Prunus salicina</i> (L.)	Plum (Eng)	Rosaceae	Tree	Fruits are taken as a source of antioxidants.
<i>Prunus persica</i> (L.) Batsch	Peach (Eng), Shongshangpai (Konyak)	Rosaceae	Tree	Fruits are eaten raw, cooked, or dried and has good source of vitamin A
<i>Punica granatum</i>	Pomegranate (Eng), Jarem (Ao)	Lythraceae	Tree	Fruits along with its rind are consumed for cardiac disorders.
<i>Rhus chinensis</i>	Nutgall tree (Eng), Aomah (Konyak)	Anacardiaceae	Tree	Fruit is good for gastric problems and stomachache.
<i>Rubus ellipticus</i>	Golden Raspberry (Eng), Aoweilikh (konyak)	Rosaceae	Shrub	Fruits are used to treat indigestion
<i>Rubus idaeus</i> L.	Red raspberry (Eng) Aoweilikh (Konyak),	Rosaceae	Shrub	Red raspberry have antioxidant effects in killing stomach colon cancer cells.
<i>Rubus moluccanus</i>	Broad-leaf bramble (English), Takkok/ Aoweilikh (Konyak)	Rosaceae	Shrub	Fruits are commercially extant in jams and sauces.
<i>Saurauia napaulensis</i>	Saurauia (Common), Oteyluk (Konyak)	Actinidiaceae	Tree	Folk medicine.
<i>Schima wallichii</i>	Yamuk-zeak	Theaceae	Tree	Bark are used in stomach-ache, intestinal pain
<i>Solanum kurzii</i>	Kamkhah	Solanaceae	Shrub	Fruits are used to treat malaria
<i>Solanum myriacanthum</i>	Thohkhah	Solanaceae	Shrub	Fruits are used to treat toothache
<i>Solanum virginianum</i>	Khahsaa	Solanaceae	Shrub	Fruits are used in gastritis, fever, high pressure
<i>Sonchus asper</i>	Shoasui	Asteraceae	Herb	Leaves are used in cuts and wounds
<i>Spondias pinnata</i> (L.f.) Kurz	Ambara (Hindi), Yamyao (Konyak)	Anacardiaceae	Tree	Fruits are consumed against dysentery, gastric burns and are diuretic.
<i>Stachytarpheta jamaicensis</i>	Jonghing	Verbenaceae	Herb	Leaves are used in stomach-ache, cholera & dysentery
<i>Sterculia villosa</i> Roxb.	Hairy Sterculia (Common), Yemhaluk (Konyak)	Sterculiaceae	Tree	Seeds are edible.
<i>Stixis suaveolens</i> (Roxb.) Pierre	Fragrant caper vine (Eng), Songtan luk (Konyak)	Resedaceae	Climber	Fresh fruit is consumed to cure dizziness, fever and headache
<i>Syzygium jambos</i> Linn. Alston	Rose apple (Eng) Runyu (Angami)	Myrtaceae	Tree	Fruits are edible

<i>Terminalia chebula</i>	Balliric myrobalan (Eng), Hinglei (Konyak)	Combretaceae	Tree	Fruit used as purgative.
<i>Thunbergia grandiflora</i>	Tsavat-meipoa	Acanthaceae	Climber	Leaves are used during gastric
<i>Tithonia diversifolia</i>	Poanannu	Asteraceae	Shrub	Leaves are used in treatment of fever, dysentery
<i>Vitex negundo</i>	Phaohing	Lamiaceae	Tree	Leaves are used during cold and fever
<i>Zanthoxylum armatum</i>	Makkat	Rutaceae	Shrub	Leaves and seeds are used in stomach-ache
<i>Zingiber officinale</i>	Khin-tsea	Zingiberaceae	Herb	Juice of rhizomes given to pregnant woman just before delivery to reduce labour pain
<i>Ziziphus mauritiana</i>	Indian jujube (Eng)	Rhamnaceae	Shrub	Fruits are cooling, tonic, laxative, and useful in blood disease.

In this paper, we have recorded 113 underutilized medicinal plants of Mon district belonging to 93 genera and 61 families. A maximum of 8 species of Moraceae and Rosaceae; 6 species of Asteraceae; 5 species of Arecaceae and Rutaceae; 4 species of Anacardiaceae and Solanaceae; 3 species of Cucurbitaceae, Lamiaceae, Phyllanthaceae, Theaceae, Zingiberaceae; 2 species each of Acanthaceae, Crassulaceae, Meliaceae, Myrtaceae, Oxalidaceae and Rubiaceae have been reported and the rest 43 families are represented by single species. Apart from its medicinal values, many of the plant possess economic values such as leaves of *Zanthoxylum armatum*, rhizome of *Zingiber officinale*, seeds of *Phoebe cooperiana*, and *Gynocardia odorata* etc. fetch good price and has huge demand in the local market. Interesting plant like *Gynocardia odorata* seeds which are thought to be toxic for mammals are enjoyed as salad after removing toxins in running water and cooked properly. Most of the habit of the documented ethnomedicinal plants was trees with 54 species, herbs with 27 species, shrubs with 21 species, climbers with 9 and creepers with 2 species. However, due to increase in anthropogenic activities like jhum cultivation in the district and lack of proper cultivation and management of the medicinal plants, there is huge threat for the extinction of valuable medicinal plants.

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