

Review article

THE PRE-EMINENT DRUGS FOR TOMORROW: AN ETHNOBOTANICAL STUDY ON THE FOLKLORE MEDICINAL PLANTS FOUND IN THE NAGA VILLAGE OF LUYONG, (MOLUNGYIMSEN B), NAGALAND

Tsuktirenla Longchar, Biman Bhuyan,* Pritisha Sadhu, Prakash Rajak, Arka Kamrakar

Department of Pharmaceutical Sciences, Dibrugarh University, Dibrugarh 786004, Assam, India.

Abstract

Background: Traditional medicinal plants are dominant element of native medical systems in rural areas and different parts of the plants are used in treating different ailments in the body. Luyong, being a small village, the utilization of medicinal plants is so prominent and the knowledge on the medicinal plants used in the village is not well recorded till date. **Objective:** To systematically document and study different ethnomedicinal practices using various plants of medicinal values.

Methods: A total of 20 traditional healers were interviewed and detailed information regarding the plants was noted. An ethnobotanical survey was conducted and detailed information was collected on 59 plant species of 37 families and 51 genera. **Results and Discussion:** Of the plant's families surveyed, majority belonged to the family Lamiaceae and the plant species of this family was used in treating hypertension, as an antidote against snake bites, relieving constipation and treating sinusitis. Leaves were used in highest number and decoction procedure was followed in many of the preparations. **Conclusion:** In this era of modern world, it has become very important to explore and preserve the importance of plants species used in our daily lives as it can cure the lives of many. The importance of this study was ventured to perpetuate the knowledge of local people with regard to medicinal plants and that the future generation can carry forward and preserve it.

Keywords: Ethnomedicine, Medicinal Plants, Nagaland, Pre-eminent drugs

*Corresponding author's E-mail: bimanbhuyan01@dibru.ac.in

Introduction

Since ancient days, the importance of medicinal plants is seen and even today their importance is seen. Our ancestors were totally dependent on plants and even animals for their survival and has also been archived that 80% of the population in the world has full reliance on traditional medicines, especially the plant drugs for their health care (Kala *et al.*, 2006).

Nagaland also known as the “Land of Festivals” is one among the states in the seven sisters of India which is located in the easternmost region of India. It shares border with Arunachal Pradesh to the north, Assam to the west, Manipur to the south and Myanmar to the west. The state of Nagaland is confounded with rich biodiversity owning variety of flora and fauna. Nagaland is comprised of 17 major tribes and the population is close to 2.3 million where 90% of the population are Nagas. Plants and animals were the major source for livelihood for all the different communities and till date these are of great importance. Certain medicines are used traditionally with their own knowledge and also it has proven to cure.

Study area and climate

Luyong (Molungyimsen B) is a village in Alongkima, under Mokokchung district and Nagaland State (Map given in Fig 1). According to census data of 2011, the total geographical area of Luyong (Molungyimsen B) is 0 hectares and the population density is 0 persons per hectares. The total number of households in village is 279 with a population of 1099 with a literacy rate of 84.1%. The inhabitant belongs to Ao Naga tribe and speaks Ao language. Topographically it is a plain area with varieties of plantations and vegetations. December and January being the coldest where the temperature drops to 14°C and July and August being the hottest with an average temperature of 32 to 35°C. The tabulated form of population and literacy rate is given in Table 1.

Table 1. Population and literacy rate of Luyong (Molungyimsen B) Village according to 2011 census of India.

Village	Population			Literacy rate		
	Total	Male	Female	Total	Male	Female
Luyong (Molungyimsen B)	1099	563	536	924	490	434

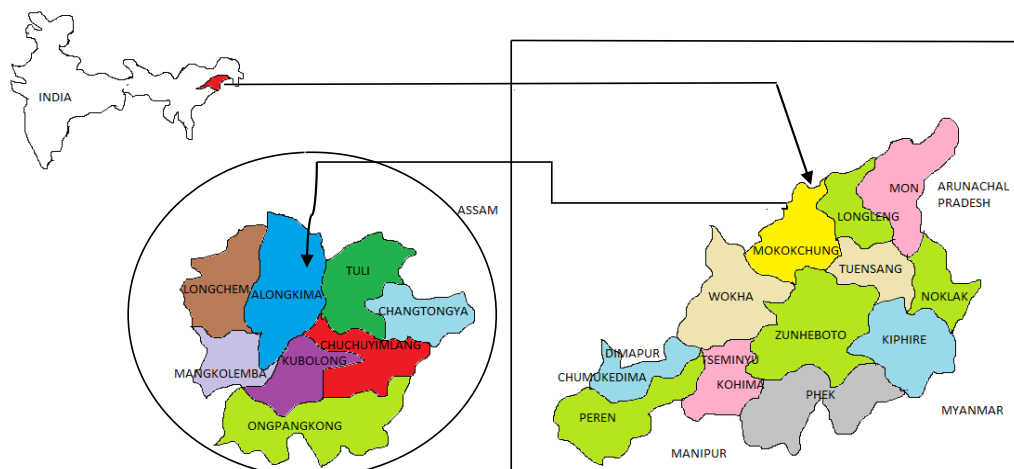


Fig 1: Location of study area, Luyong (Molungyimsen B) under Alongkima, Mokokchung.

Methods of conducting the study

The survey was conducted in the month of October 2021 to January 2022 to study the medicinal plants used by villagers of Luyong. Under the shelter of one of the informants, the study was carried out with few of the elders in the village. The informants were mostly aged and few of them had broad knowledge on the traditional uses of plants as they were practicing since decades ago. The plant parts were collected separately and the uses of the parts were noted respectively. Destructive means of collection was also done for some plants as root part was to be taken out. Some of the plants were found in the deep forest and the unique thing found in the village was most of the plants were planted on their backyards so that they can easily access it whenever required. The photographs of the plant species were taken and applicable literature were used for identification. The books used for the study were “Exploring our green wealth” published by oxford university press. SCERT, Nagaland and “Sungomozu” published by Mrs Meyisongla and also herbarium specimen was sent to Botanical survey of India, Shillong for authentication.

Plant parts used and mode of preparation and route of administration

In general, all parts of the plants were used but most cases leaf part was mostly used followed by fruits, seeds, rhizomes, bark, and whole plant. Water being the most suitable solvent was used in the preparation of many of the medicaments. Honey and sugars were added to those medicaments which are to be given to children to

decrease the bitterness of the recipe. The route of administration of the drugs was oral route in most cases and paste was applied externally in case of plants used for external purposes. Decoction and infusion methods were generally used and the paste was made by using grinders or by using mortar and pestle. The dose given to the patients is normally one glass, two tablespoon or two drops for making paste/poultice, required quantity is taken.

Results and Discussions

The survey was concluded with the findings of plants examined to have medicinal properties and the total number of plants species studied was 59 of 38 families and 51 genera. Out of these plants, 4 species (4 genera) belong to Lamiaceae, 3 species (1 genera) belong to Rutaceae and 3 Species (3 genera) belong to Zingiberaceae and Asteraceae each, 2 species (2 genera) belong to families of Amaryllidaceae, Apocynaceae, Meliaceae, Apiaceae, Araceae, Moraceae, Malvaceae, Cucurbitaceae Rubiaceae, 2 species (1 genera) belong to Urticaceae and Fabaceae each, 1 species (1 genera) belong to families of Arecaceae, Asphodelaceae, Thymelaeaceae, Avertroaceae, Basellaceae, Caricaceae, Costaceae, Vitaceae, Phyllanthaceae, Saururaceae, Onocleaceae, Hypoxidaceae, Musaceae, Piperaceae, Rosaceae, Punicaceae, Andropogoneae, Combretaceae, Rhamnaceae, Passifloraceae and 1 species belonging to families of Solanaceae, Poaceae, Rutaceae. The scientific name of the plants is arranged in alphabetical order followed by their family, local name (Ao language), parts used, utilization and depiction.

Table 2. Brief description of medicinal plants found in Luyong Village

Scientific name	Family	Local name	Parts used	Utilization
<i>Acmella oleracea</i> Linn.	Asteraceae	Ansuh tu	Flower	Flower is powdered and applied on toothache.
<i>Allium schoenoprasum</i> Linn.	Amaryllidaceae	Repchi	Leaves	The leaves are either crushed or cut into smaller pieces and eaten to kill parasites in the body.
<i>Allium sativum</i> Linn.	Amaryllidaceae	Lasung	Bulbs	The bulbs are roasted in mustard oil and applied over the chest and also the bulbs are roasted in mustard oil and are chewed directly to cure

<i>Aloe vera</i> Linn.	Asphodelaceae	Tanulah o	Leaves	fever. The inner leaf juice is eaten to treat gastritis. Also, the juice is applied to wounds for cooling effect.
<i>Alstonia scholaris</i> L.	Apocynaceae	Sarep sung	Bark	Decoction of the bark with water is taken orally to cure jaundice and also to treat appendicitis.
<i>Aquilaria malaccensis</i> Lam.	Thymelaeaceae	Sungyaa	Leaves	Decoction of leaves is taken orally to treat dysentery and also it is used to relieve cough and fever.
<i>Averhoa carambola</i> L.	Averrhoaceae	Jarkona	Fruit, seeds	Fruits are eaten raw to treat thypoid and seeds are powdered and mix with water and taken orally to treat jaundice.
<i>Azadirachta indica</i> A. Juss	Meliaceae	Neem tu	Leaves	Decoction of the leaves is used for bathing to treat allergies.
<i>Bambusa vulgaris</i>	Poaceae	Etzuk	Shoots	Shoots are cut into small pieces and kept in a closed container and are allowed to ferment, and then the fermented shoots are made into a past and applied over cuts and wounds.
<i>Basella alba</i> Linn.	Basellaceae	Zua aobaonu	Leaves	Leaves are either boiled or eaten raw to treat diabetes.
<i>Catharanthus roseus</i> Linn	Apocynaceae	Tzumar naro	Leaves	Fresh leaves are chewed directly to treat high blood pressure and also decoction of the leaves is taken orally to kill parasites.

<i>Carica papaya</i> Linn.	Caricaceae	Mamazu	Leaves, Seeds	Decoction of the leaves is taken orally to treat dengue and the seeds are dried and crushed into powder and mix along with water to treat high blood pressure.
<i>Centella asiatica</i> L.	Apiaceae	Longsokur ok	Leaves	Leaves are eaten raw to purify blood.
<i>Chamaecostus cuspidatus</i> (C.D.Specht and D.W.Stev)	Costaceae	Asur mejitong	Leaves	Decoction of the leaves is taken orally to treat cancer and also the fresh leaves are applied on toothache to relieve pain.
<i>Chromolaena Odorata</i> L.	Asteraceae	Kersen-o	Leaves	Fresh leaves are crushed and the paste is applied topically to treat fresh cuts and wounds.
<i>Cissus quadrangularis</i> L.	Vitaceae	Veld grape	Stems	The stems are crushed and the paste is applied topically and bandaged to treat fractured/broken bones.
<i>Citrus maxima</i>	Rutaceae	Nareng	Peels	Peels are dried and used as a mosquito repellent.
<i>Citrus microcarpa bunge</i>	Rutaceae	Nimbutinga	Fruits	Fresh fruit juice is taken orally to treat gas formation and also aids in digestion.
<i>Clerodendrum colebrookianum</i> D. Don	Lamiaceae	Rem rem tu	Leaves	Boiled leaves are eaten to treat high blood pressure and also the fresh leaves are warmed in fire and applied over the breast area to relieve breast pain.
<i>Colocasia esculenta</i> L.	Araceae	Napang	Stems	Stems are warmed in fire and kept over the surface of bee stings.
<i>Curcuma longa</i>	Zingiberaceae	Wakong	Rhizo	Rhizomes are crushed

Medicinal plants of Luyong

L.		tanem	me	and the paste is applied topically and bandaged to treat fractured/ broken bones.
<i>Eucalyptus globulus labil</i>	Myrtaceae	Menemtsu o	Seeds, leaves	Oil removed from the seeds is applied over the chest to cure asthma. Also, decoction of the leaves is used to treat diabetes.
<i>Elatostema sessile</i> (J.R.Forst and G.Forst).	Urticaceae	Ayong sungo	Leaves	Fresh leaves are eaten raw which aids in good digestion.
<i>Emblica officinalis</i> Gaertn.	Phyllanthaceae	Lozu	Fruit	Fruits are boiled in water and taken orally to treat digestion disorders.
<i>Entada rheedii</i>	Fabaceae	Sutsung	Seeds	The flesh inside the seeds are dried and powdered and taken orally with water to treat kidney disorders. Also, the flesh is used as a shampoo for cleaning hair.
<i>Eryngium foetidum</i> Linn.	Apiaceae	Local Thonia	Leaves	Fresh leaves are crushed and applied topically over fresh wounds and also used as an anti-helminthic.
<i>Ficus glomerata</i> L.	Moraceae	Munguzun o	Fruits	Decoction of the fruit in water is taken orally to treat diabetes.
<i>Hibiscus sinensis</i> L.	Malvaceae	Yimpangna ro	Leaves	Decoction of the leaves is taken orally to treat gastritis.
<i>Hibiscus sabdariffa</i> L.	Malvaceae	Tasenla	Leaves, Dark calyx	The leaves are used to enhance taste in curry. Decoction of the calyxes is taken orally to treat diabetes.
<i>Houttuynia</i>	Saururaceae	Nokna	Whole	Eaten raw to kill

<i>cordata</i> Thunb.			plant	parasites in the body. It also purifies the blood.
<i>Kaempferia parviflora</i> L.	Zingiberaceae	Wakong tanak	Rhizome	Rhizomes are crushed and sniffed through nose to treat sinusitis.
<i>Lansium parasiticum</i> L.	Meliaceae	Dangshi	Fruits	Fresh fruits are eaten which aids in digestion.
<i>Lasia spinosa</i> L.	Araceae	Jurang	Whole plant	The whole plant is boiled and eaten to kill parasites in our body.
<i>Leucasaspera</i> (Willd).	Lamiaceae	Thumbai	Leaves	Fresh leaves is crushed and used as an antidote against snake bites.
<i>Livistona jenkinsiana</i> Griff.	Arecaceae	Surajang	Fruits	Fruits are eaten raw to treat gastritis.
<i>Matteuccia struthiopteris</i> L.	Onocleaceae	Aasang	Leaves	Boiled leaves are eaten to improve digestion.
<i>Mentha cordifolia</i> L.	Lamiaceae	Pudina	Leaves	Leaves are crushed and sniffed through nostrils to treat sinusitis and also fresh leaves are chewed to relieve from cold and fever.
<i>Mimosa pudica</i> L.	Fabaceae	Aakmesen naro	Roots, flowers	Roots are grinded and the paste is applied topically to heal pain in joints. The white flowers are powdered and applied in toothache
<i>Mikania micrantha</i> (Burm. F.) B.L. Rob.	Cucurbitaceae	Limayangp ang	Leaves	Fresh leaf paste is applied over cuts to stop clotting of blood and also decoction of the leaves is used to treat dysentery.
<i>Molineria latifolia</i> (Dryand.Ex W.T. Aiton) Herb	Hypoxidaceae	Kore	Rhizomes	Rhizomes are peeled off and the white fluids are applied over the eyes to treat eye injuries.
<i>Momordica</i>	Cucurbitaceae	Kohra	Leaves	Decoction of the leaves is

<i>charantia</i> L.				used to treat high blood pressure.
<i>Musa paradisiaca</i> L.	Musaceae	Sumomo	Stem, flower	Fresh juice (white colour) is taken out when the flower is cut from the stem and 2 to 3 drops of it is taken orally to treat dysentery. The flower of the plant is boiled and eaten to increase the levels of iron in the body.
<i>Ocimum basilicum</i> L.	Lamiaceae	Nangperra	Whole plant	Decoction of the plant is taken orally to treat constipation and gas formation.
<i>Passiflora edulis</i> Sims.	Passifloraceae	Entsulashi	Leaves	Decoction of the leaves is taken orally to treat hypertension.
<i>Paederia foetida</i> L.	Rubiaceae	Sutzu	Roots	Decoction of the roots in water is taken orally to treat intestinal disorders.
<i>Piper betel</i> L.	Piperaceae	Patiwa	Leaves	Fresh leaves are crushed and the paste is applied topically to treat cuts and wounds. Also, mustard oil is spilled over the leaf and warmed in fire and applied to remove blood clots caused from injuries.
<i>Prunus persica</i> L.	Rosaceae	Amboker	Leaves	Decoction of leaves is used while bathing to treat skin allergies.
<i>Psidium guajava</i> L.	Myrtaceae	Moteram	Leaves	Fresh leaves are chewed and swallowed to treat diarrhoea.
<i>Psychotria viridis</i> L.	Rubiaceae	Nokdangtip en	Leaves	Fresh leaves are crushed and few 1-2 drops is added on the nose to treat sinusitis.

<i>Punica granatum</i> L.	Punicaceae	Jarem	Leaves, Fruits	Leaf paste is applied to relieve toothache. The cover of the fruits are dried and powdered and taken orally to improve digestion.
<i>Sacred fig</i> L.	Moraceae		Leaves	Fresh leaves are grinded in a mixer and the powder is mixed with little amount of water and taken orally to kill parasites in the body.
<i>Saccharum officinarum</i> L.	Andropogoneae	Moji	Stems	The stems are grinded and the extract is taken orally to treat jaundice.
<i>Solanum xanthocarpum</i>	Solanaceae	Entsu likok	Fruits	Fruits are eaten raw to treat high blood pressure. Also, the fruit is crushed and applied over toothache to relieve pain.
<i>Terminalia chebula</i> Retz.	Combretaceae	Ningka	Drupes	Decoction of the drupes is taken orally to treat high blood pressure and also it acts as anti emetic.
<i>Urtica dioica</i>	Urticaceae	Demongtsu	Leaves, Roots	Decoction of the leaves is taken orally to treat diabetes. Roots are grinded and the paste is applied to heal joint pains.
<i>Wedelia chinensis</i> (Osb.) Merrill.	Asteraceae	Enze	Leaves	Fresh leaves are eaten raw to treat gastrointestinal problems.
<i>Zanthoxylum acanthopodium</i>	Rutaceae	Mong mong	Leaves, Roots	Infusion of the leaves is useful for deworming. Also, decoction of the leaves and roots is useful in treating cholera.
<i>Zingiber officinale</i> L.	Zingiberaceae	Sungmok	Rhizo mes	The rhizomes are cut into small pieces and chewed

<i>Ziziphus mauritiana</i> Lam.	Rhamnaceae	Peetok	Roots	to relieve cough. Decoction of the roots is taken orally to treat thypoid.
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The Medicinal plant description listed in Table 2 is discussed below with their pharmacological activities.

1. Gastrointestinal ailments: 23 out of 28 plant species with their pharmacological and phytochemical studies owing to their biological activities are reported and such activities seem to be equivalent with the activities reported in the village. These biological activities include anti-helminthic, anti-diarrhoeal, gastro protective, hepatoprotective anti-bacterial and anti-ulcer. Medicinal plants used for treating gastro protective reported for *Citrus microcarpa bunge*, *Lansium parasiticum*, *Ocimum basilicum*, *Paederia foetida*, *Punica granatum*, *Wedelia chinensis*; anti-helminthic includes *Catharanthus roseus*, *Eryngium foetidum*, *Houttuynia cordata*, *Lasia spinosa*, Sacred fig; hepatoprotective activity reported for *Alstonia scholaris*, *Averrhoa carambola*, *Saccharum officinarum*; anti-diarrhoeal activity reported for *Aquilaria malaccensis*, *Mikania micrantha*, *Musa paradisiaca*, *Psidium guajava*; anti-bacterial reported for *Centella asiatica*, *Zanthoxylum acanthopodium* *Ziziphus mauritiana*; anti-ulcer reported for *Aloe vera*, *Hibiscus sinensis*, *Livistona Jenkinsiana*. No reports equivalent to activities reported in the village was found for *Allium schoenoprasum*, *Elatostema sessile*, *Houttuynia cordata*, *Livistona jenkinsiana* and *Matteuccia struthiopteris*.

2. Five plants that are used by the villagers to treat diabetes revealed to have anti-diabetic property. The plant species include *Basella alba*, *Carica papaya*, *Ficus glomerata*, *Eucalyptus globulus*, *Hibiscus sabdariffa*, *Urtica dioica*. The compounds responsible for ant diabetic activity have not reported in *Basella alba*.

3. Skin Allergy: Six plants species with their pharmacological and phytochemical studies owing to their biological activities are reported and such activities seem to be equivalent with the activities reported in the village. The biological activities include anti-microbial, anticoagulant. Anti-coagulant reported for *Chromolaena odorata*, *Eryngium foetidum*, *Piper betel*; anti-microbial reported for *Azadirachta indica*, *Prunus persica*, *Aloe vera*. No reports relevant to the biological activity indicated were reported for *Bambusa vulgaris*.

4. Hypertension: Five plants species with their pharmacological and phytochemical studies owing to their biological activities are reported and such activities seem to be equivalent with the activities reported in the village. The plant species include *Catharanthus roseus*, *Momordica charantia*, *Passiflora edulis*, *Solanum xanthocarpum* and *Terminalia chebula*. The compounds responsible for causing

high blood pressure were not isolated in *Catharanthus roseus*, *Momordica charantia* and *Solanum xanthocarpum*.

5. Five plants species were used by the villagers in the treatment of toothache. The species includes *Acemella oleracea*, *Chamaecostus cuspidatus*, *Mimosa pudica*, *Punica granatum*, *Solanum xanthocarpum*. All these plant species were reported for the same activity.

6. Mucoskeletal problems: Four plants species with their pharmacological and phytochemical studies owing to their biological activities are reported and such activities seem to be equivalent with the activities reported in the village. The plant species include *Cissus quadrangularis*, *Curcuma longa*, *Mimosa pudica*, *Urtica dioica*.

7. Eye, Nose, Flu, Cold and Fever: Three out of six plants species with their pharmacological and phytochemical studies owing to their biological activities are reported and such activities seem to be equivalent with the activities reported in the village. The plant species used for treating fever include *Allium sativum*, *Mentha cordifolia*; for cough include *Zingiber officinale*; for sinus include *Kaempferia parviflora*, *Mentha cordifolia* and *Psychotria viridis*; for eyes include *Molineria latifolia*. No reports equivalent to activities reported in the village was found for *Kaempferia parviflora* and *Psychotria viridis*.

8. Kidney disorder: One plant, *Entada rheedii* was used by the villagers to treat kidney disorders. No reports were found to be equivalent with the biological activity of the plant used in the village.

9. Bee stings, snake bites, mosquito repellent: Four plants species with their pharmacological and phytochemical studies owing to their biological activities are reported and such activities seem to be equivalent with the activities reported in the village. The plant species include *Colocasia esculenta* for bee stings, *Leucas aspera* for snake bites and *Citrus maxima* as mosquito repellent.

Conclusion

In conclusion, plants found in the wild were found to be an importance source to the villagers. The plant species used in the treatment were to cure the different ailments such as toothache, diarrhoea, anti- helminthic, gastrointestinal disorders, improving digestion, cough, cuts and wounds, rheumatism, jaundice, thypoid, high blood pressure and diabetes. Certain plant species like *Allium schoenoprasum*, *Clerodendrum colebrookianum*, *Entada rheedii*, *Elatostema sessile*, *Houttuynia Cordata thunb*, *Kaempferia parviflora*, *Livistona jenkinsiana*, *Matteuccia struthiopteris*, *Molineria latifolia* and *Psychotria viridis* have fewer papers to be viewed and further phytochemistry and pharmacological validations can be carried out. The medicinal plants used have fewer side effects compared to allopathic medicines and they does not cause any harm to humans and to the environment. So,

the urge to protect them solely becomes our responsible as to which the importance of these medicinal plant will be known to the future generations.

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Conflict of interest

The authors declares no competing interest.

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