A Review of Medicinal Plants Commonly Used in Manipur: with Special Reference Against COVID-19

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ABSTRACT

Prevention and cure are the part and parcel of the fight against any disease. Despite the advanced medical knowledge and skills, the global pandemic situation due to COVID-19 has strengthened the importance of age old traditional therapeutic system. The traditional therapy based on medicinal plants can be said as an alternative means to treat and cure several diseases. There are more than 1200 plant species reported to be used in the traditional medicine system in Manipur. When used in right ways, these plants can be effectively used to help protect against several diseases including symptoms similar to the SARS-Cov-2 infection.

Keywords: Disease, Covid-19, Therapeutic System, Medicinal Plants, Manipur.

INTRODUCTION

Human being has been using biological products of animal and plant sources for thousands of years, either in the pure form or crude extracts to treat many diseases. A number of herbs are used as bases of medicine in many ways [1-3]. Research interest has focused on various herbs that possess immune-stimulating properties as a useful feature in helping diminish the risk of infection from various causes as well as many diseases including cancer [4-5]. Herbs possess a wide range of phytochemicals, identified as flavonoids, lignans, terpenoids, polyphenolics, sulfides, saponins, carotenoids, curcuminoids, plant sterols and phthalides [6]. Several of these phytochemicals either inhibit nitration or the formation of DNA which stimulate the activity of protective enzymes such as the phase II enzyme glutathione transferase. Many plants contain potent antioxidant compounds that provide significant protection against chronic diseases. These compounds may defend LDL cholesterol from oxidation, inhibit cyclooxygenase and lipoxygenase enzymes, prevent lipid peroxidation, or have antitumor activity [7-8].

The use of medicinal plants in the prevention and treatment of various diseases have been a common practice all around the world since time immemorial. Such practices are a part of the tradition and culture of any community. Manipur, a north-eastern state of India, is no exception and there are several written and unwritten records of using medicinal plants as therapeutic agents [9]. In the traditional system in Manipur, the person who has the knowledge and skill of traditional treatment acquired the knowledge to perform such practices either through oral dissemination from knowledgeable elders or written edicts. They are locally known as ‘maiba’ or ‘amaiba’ in Manipuri. Apart from the Meitei community, almost all the tribal community residing in the state of Manipur have their own traditional form of plant and animal-based medicine system [10-13].

Medicinal plants are extensively used to treat and cure different types of infections and diseases. Such diseases include common ailments like cough, fever, headache, stomach problems, diarrhea, dysentery, fungal infections, etc. Several chronic diseases affecting heart, lung, liver, kidney and nerves are also subject to treatment with the help of medicinal plants in every community [14, 15]. Another unique tradition of using the medicinal plants in Manipur is the incorporation of them in the daily dietary intake as food. They are eaten either as raw or in cooked potions, which thus supplies the useful medicinal ingredients as a normal daily supplement [16].

One of the most important aspects of disease prevention and treatment is the development of the innate immune system of the body. In the last few decades, man has witnessed extensive knowledge and skills in immunology. This has expanded our view of the immune system and means of searching for its structures.
and functions in an impressive way. The basic function of the immune system is to protect against foreign pathogens and infectious agents \[17\]. When the immunity is well developed inside the body, several disease fighting agents called antibodies are produced through complex biochemical and physiological processes.

During normal biochemical reactions in our body, there is a generation of reactive oxygen and nitrogen species, which gets enhanced during patho-physiological conditions creating ‘oxidative stresses’ \[18\]. During this phenomenon, cellular constituents get altered resulting in various diseased states. This may be effectively neutralized by enhancing the cellular defenses in the form of antioxidants \[19-21\]. Dietary supplements having high antioxidant content may help greatly in such conditions. Many components present in food, such as beta-carotene, lycopene, lutein and other carotenoids function as important antioxidants which greatly boost the immune system \[22,23\]. Studies have revealed that the floral diversity especially those used as medicinal plants are a rich source of such substances that are claimed to induce overall immunity functions in the body.

Situated in the Indo-Burmese Biodiversity Hotspot, Manipur is a beautiful landlocked state with rich flora and fauna. The floral diversity of the region exhibits high degree of endemism which also includes valuable plants of medicinal properties \[21,23\]. Since time immemorial, the various floral diversity of the state has been a part of ethnic therapeutic system of different communities living in Manipur \[21,22\].

Herbal drugs play an important role in the treatment and prevention of diseases as well as in the overall immune boosting of the body. So far, there have been reports of more than 1200 plant species of medicinal importance in the state of Manipur \[17\]. These plants are used in different forms and extracts in fighting against several diseases \[24\]. The present review is an attempt to identify and address the use of medicinal plants of Manipur as an alternative means to fight against the impending global pandemic situation raised due to COVID-19. While considering the mode of use of these medicinal plants, it is also important to mention that the knowledge and skills of the traditional medicine practitioners will be of great help based on their extensive knowledge while using these floral resources in such times.

Manipur can be considered a place rich in medicinal plants and many plants of the place have high medicinal properties as highlighted above. Although, the list of plants with medicinal properties available in the state is quite long, there are few such plants which are frequently used in everyday life by the local people specially to cure or minimize ailments similar to the symptoms of Covid-19 such as, cold, cough, and fever. The information collected and noted below are thus used by the local community of Manipur to fight against symptoms similar to covid-19 during this pandemic situation which are very easy to use and can be consumed without any expertise. The details of such plants and the common mode of consumption are given below.

Table 1: List of medicinal plants found in Manipur which can be effective against Covid-19

| Sl. No. | Botanical name | Family | Common name and local name | Parts used | Medicinal values |
|--------|----------------|--------|-----------------------------|------------|-----------------|
| 1.     | Acacia catechu (L.F) Wild | Mimosaceae | Babul bark & Ching-gonglei | Seed, tender, pod | Muscular pain, cough, fever |
| 2.     | Acorus calamus Linn | Araceae | Sweet flag & Oak-hidak | Leaves, root, rhizome | Cough, fever, |
| 3.     | Adiantum capillus-veneris (L.) | Polypodiaceae | Arjunterminalia & Mayur-pambi | Leaves | Cough, chest diseases |
| 4.     | Andrographis paniculata (Burm.f.) Wall. | Acanthaceae | Bhubati King of bitters/ Andrographio | Leaves | Fever |
| 5.     | Ardisia crenata Sims. | Myrsinaceae | Coralberry & U-thum | Leaves | Cough, diarrhoea |
| 6.     | Benincasa hispida (Thunb.) Cogn. | Cucurbitaceae | Torbot | Fruit | Fever |
| 7.     | Brassica rapa L. | Brassicaceae | Hanggam | Leaf | Headache |
| 8.     | Centilla asiatica Linn. | Apiceae | Indian penny wort Peruk | Whole plant/ leaf | Sore Throat |
| 9.     | Clerodendrum serratum (L.) Moon | Lamiaceae | Bharngt & Moirang-khanambi | Leaves, inflorescence root | Cold, cough, rheumatism, asthma |
| 10.    | Clerodendrum siphonanthes R.Br | Verbeaceae | Turk’s turban & Charoi-tong | Stem, leaves | Cough, fever, dysentery, asthma, bronchitis |
| 11.    | Clerodendrum colebrookianum | Verbeaceae | Turk’s turban & Kuthab-lei | Leaves | Cough, |
| 12.    | Clerodendrum indicum (L.) Kuntze | Verbeaceae | Charoi-utong | Leaves | Upper respiratory tract infection |
| 13.    | Cinnamomum zeylanicum Breyn. | Lauraceae | Cinnamon & U-shingsha | Bark | Cold, astringent carminative, cough |
| 14.    | Cucurma angustifolia Rosc. | Zingiberaceae | East Indian arrow root & Yaipal | Inflorescence | Cough, diarrhoea |
| 15.    | Cucurma caesia Roxb. | Zingiberaceae | Black zedoary &Yaimu | Rhizome | Fever, cough, Sprain |
| 16.    | Cymbopogon flexuosus | Poaceae | Citronella grass &Houna | Leaves | Throat problem, back –pain, |
| 17.    | Cyndon doctylon (L) Pers. | Poaceae | Doob grass&Tingthau | Leaves | Throat problem |
| 18.    | Eclipta prostrata (L.) L. | Compositae | Uchi sumbal | Whole plant | Fever & cough |
| 19.    | Eclipta alba (L.) Hask. | Asteraceae | Long pepper & Uchi-sumbal | Leaves | Headache, cough, fever |
| Sl. No. | Botanical name | Manipuri Name | Parts used | Diseases | Treatment method | Reference |
|--------|----------------|---------------|------------|----------|------------------|-----------|
| 20.    | *Eupatorium nodiflorum* | Asteraceae | Leaves | Fever, cough | | |
| 21.    | *Ficus auriculata* | Moraceae | Fruit and Bark | Lungs disease | | |
| 22.    | *Hedychium aurantiacum* Wall. | Zingiberaceae | Inflorescence, rhizome | Bronchitis | | |
| 23.    | *Hedychium coronarium* Koenig | Zingiberaceae | Rhizome | Throat problem, tonic, dyspepsia | | |
| 24.    | *Hedychium marginatum* C.B. Clarke. | Zingiberaceae | Rhizome, leaves | Bronchitis, tonic | | |
| 25.    | *Helianthus annus* Linn. | Asteraceae | Seed, leaves | Muscular pain, cold, cough, bronchitis | | |
| 26.    | *Houttuynia cordata* Thunb. | Sauraceae | Leaves, rhizome | Dysentery, muscular pain, antiviral | | |
| 27.    | *Hibiscus rosa-sinensis* L. | Malvaceae | Flower | Headache | | |
| 28.    | *Jatropha curcus* (L) | Euphorbiaceae | Leaves | Cough, dysentery, fever | | |
| 29.    | *Melothria perpusilla* (Blume) | Cucurbitaceae | Whole plant | High fever, diarrhoea | | |
| 30.    | *Mesua ferrea* Linn. | Clusiaceae | Seed, inflorescence | Dysentery, cough, diarrhoea | | |
| 31.    | *Perilla ocymoides* L. | Lamiaceae | Leaves, fruit | Cough, lung infection | | |
| 32.    | *Plantago erosa* Wall | Plantaginaceae | Leaves, seed, root | Fever, muscular sprain | | |
| 33.    | *Phyllanthus emblica* (L) | Labiatae | Fruit | Dry Cough/ Asthma | | |
| 34.    | *Pinus kesiya* | Pinaceae | Wood, leaves | Cough, headache | | |
| 35.    | *Phyllanthus emblica* (L) | Labiatae | Fruit | Dry Cough/ Asthma | | |
| 36.    | *Psophocarpus tetragonolobus* (Linn.) D.C. | Papilionaceae | Young fruit | Cough | | |
| 37.    | *Rhus chinensis* | Annacardiaceae | Young shoot, fruit | Antiviral, antibacterial, anti-diarrhea, antioxidant activities and as a digestive | | |
| 38.    | *Santalum album* Linn. | Santalaceae | Wood | Headache, high fever, skin diseases | | |
| 39.    | *Sapindus trifoliatus* L. | Sapindaceae | Seeds | Fever | | |
| 40.    | *Sesbania sesban* (L.) | Fabaceae | Seed, leaves, root | Cough, fever | | |
| 41.    | *Solanum viarum* Dunal | Solanaceae | Fruit | Upper respiratory tract infection | | |
| 42.    | *Syzygium fruticosum* DC. | Myrtaceae | Leaf | Fever (especially for children) | | |
| 43.    | *Thysanolaena latifolia* (Roxb. ex Hornem.) Honda | Poaceae | Leaf | Fever | | |
| 44.    | *Wendlandia glabrata* DC. | Rubiaceae | Shoot, inflorescence | Cough, dysentery | | |
| 45.    | *Zingiber montanum* (J.Koenig) Link ex A.Dietr. | Zingiberaceae | Tuber | Cough | | |

Table 2: Compound Ethnobotanical Plants of Manipur used in Treatment of Covid 19

*References:*

1. P. thrysiformis Nees + Zanthoxylum acoanthopodium + Ginger + white sugar cube
2. Terminalia arjuna Roxb. + Premna bengalensis + Acacia nilotica

| Sl. No. | Botanical name | Manipuri Name | Parts used | Diseases | Treatment method | Reference |
|--------|----------------|---------------|------------|----------|------------------|-----------|
| 1.     | *P. thrysiformis* Nees + *Zanthoxylum acoanthopodium* + Ginger + white sugar cube | Nongmankha angangba + Nongmankha angouba + Mukthrubi + Sing + Sitamasi | Tender leaf + Tender leaf + seed + rhizome+sugar | Dry cough/throat congestion and fever | The leaves, seeds and tuber along with white sugar cube are boiled together till the colour turns blackish and half a glass full is serve as decoction before food. | [21]. |
| 2.     | *Terminalia arjuna* Roxb. + *Premna bengalensis* + *Acacia nilotica* | Mayokpha, + Upongtha Kikar | Bark+Bark+Bark | Antiviral | The barks of these trees are boiled together and the decoction of the bark is taken orally. | Traditional knowledge (Needs to be Scientifically validated) |
1. **Phlogacanthus thyrsiformis**

   Family: Acanthaceae
   Manipuri Name: Nongmangkha
   Parts used: Leaves and flower

   It is an evergreen shrub found in the sub-tropical Himalayas spreading up to Bhutan, upper Gangetic plains, Bihar, North Bengal, Assam, Arunachal and Manipur (Anonymous, 1969). It is commonly known by the name Nongmangkha in Manipur. There are three different species namely, *P. hysiformis*, *P. pubinervius* and *P. curviflorus*, having all medicinal importance [25]. Whole plant is used for curing coughs, colds and asthma while fruits and leaves are burnt and prescribed for fevers. In Manipur, local people during this pandemic used the leaves of the plant which is boiled and the steam is inhaled through the nostril and also the boiled decoction of leaves is taken orally. Table 2 indicates that the local community of Manipur also uses certain compound in the treatment of covid -19.

2. **Azadiracta indica A. Juss**

   Family: Meliaceae
   Manipuri name: Neem
   Parts used: Leaves

   It is fast growing deciduous tree that can reach a height of 15 to 20 meters, shedding many of its leaves during the dry winter months. The leaf of the tress is used for treating many ailments. The crushed leaves are mixed with little water and about 2-3 tea spoonful is taken twice a day before each meal. Since time immemorial, neem has been respected and widely used as an immunity booster. It is very effective in keeping the body safe from attacks by harmful pathogens, thanks to its anti-viral, anti-bacterial and anti-fungal properties. Neem can also keep your blood clean. It purifies the blood by flushing away toxins and this can strengthen immunity.

3. **Ocimum tenuiflorum**

   Family: Lamiaceae
   Manipuri name: Tulsi
   Parts used: Leaves

   It is an aromatic perennial plant which is native to the Indian subcontinent and widespread as a cultivated plant throughout the Southern Asian tropics. Tulsi contains the phytochemicals compounds like oleanolic acid, ursolic acid, rosmarinic acid, eugenol, carvacrol, linalool and β-caryophyllene. Tulsi essential oil consists mostly of eugenol (nearly 70%), β-elemene (nearly 11%) and β-caryophyllene (8%) and with the balance being made up of various trace compounds mostly terpenes. This aromatic leaf can be our primary line of defence against COVID-19. Tulsi or basil is a powerful germicide. Because of its phytochemicals and antioxidants, it can effectively locate germs, viruses and bacteria the moment they enter our body and destroy them [27]. In Manipur, people chew a few leaves first thing in the morning directly or by consuming tulsi tea.

4. **Zingiber officinale**

   Family: Zingiberaceae
   Manipuri name: Yai ngang
   Part used: Rhizome

   It is herbaceous perennial which grows annual pseudostems about one meter tall. There are different varieties of ginger which are well known for their medicinal and economic significances. Ginger has been an age-old remedy for flu and the common cold. It can also be effective against COVID-19 [28]. It contains gingerol – an antioxidant that can power up our immune system and kill viruses. Ginger is particularly good in preventing respiratory tract infections. In Manipur, local people consume ginger tea during the pandemic.

5. **Curcuma longa Linn**

   Family: Zingiberaceae
   Manipuri name: Sing
   Part used: Rhizome

   It is a rhyzomatous aromatic herb extensively cultivated in both plain and hills of North Eastern states. The rhizome contains an essential oil consisting of sesquiterpenes, zingiberene, cineol and the crystalline colouring compound known as cucurmin. This cucurmin which is a phytochemical can remove toxins from our body and strengthen our immune system to fight off germs and bacteria [29]. People consume turmeric with milk to boost their immunity.

6. **Allium sativum**

   Family: Amaryllidaceae
   Manipuri name: Chanam
   Parts used: Bulb

   Allium sativum is a perennial flowering plant growing from a bulb. It has a tall, erect flowering stem that grows up to 1 m (3 ft). The major active components of garlic are its organosulfur compounds, such as diallyl thiosulfonate (allicin), diallyl sulfide (DAS), diallyl disulfide (DADS), diallyl trisulfide (DATS), E/Z-ajoene, S-allyl-cysteine (SAC), and S-allyl-cysteine sulfoxide (alliin) [30]. Like ginger, garlic too will protect us from coronavirus by stimulating our immunity. It contains alliin- a plant compound that acts as a germicide. Most people consume garlic as raw or partially cooked.

The review thus serves as a pool of information about the medicinal plants easily available in the state of Manipur and the ways of its consumption. This information can be vital for people residing in the state as well as those who have access to the above noted plants to reap the benefit of it in the right way. One of the positive aspects of using such medicinal plants in natural way is that there is extremely less or no side effects. In many cases, the mode of consumption is easy and can be included in regular diet. Small lifestyle changes by inculcating healthy habits of including such medicinal plants in one's
diet may result in improvement of immunity and protection from numerous ailments.

CONCLUSION

The present review will help in exploring the potential of the various medicinal plants found in Manipur to face the current pandemic situation. Since prevention is the foremost precautionary measure against any disease, we can be assured that medicinal plants available at our own backyard, when taken at the right form in the correct dose at the right time can be a healthy alternative in addition to the advanced medical practices.

Acknowledgement

The authors are grateful to the competent authorities of the Central Agricultural University, Imphal and the Dean, College of Food Technology, CAU, Imphal for the encouragement and technical support to prepare the work.

Conflict of Interest

None declared.

Financial support

None declared.

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HOW TO CITE THIS ARTICLE

Maibam P, Sahi PV, Singh TG. A Review of Medicinal Plants Commonly Used in Manipur: with Special Reference Against COVID-19. J Ayu Herb Med 2022;8(3):204-208. DOI: 10.31254/jahm.2022.8312

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