



Underutilized edible plants (UEPs) from Dimapur district of Nagaland-an important resource

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Abstract

Nagaland is a state that is blessed with favorable environmental conditions which favors the growth of diverse plant species. During the current study, 26 UEPs were documented and identified from the study area. The rich diversity of underutilized plants in Dimapur and the rest of Nagaland can be judiciously exploited for the betterment of society. These plants are known to be rich in nutrients and bioactive compounds that have the potential to improve health and provide nutritional security. The present world situation necessitates the importance of these plants as a significant food source especially for the native population. There is the need for further research into these underutilized plants to establish them as an important food resource. The study's major goal was to raise awareness about UEPs' potential and to catalogue the UEPs that are already available in Dimapur, which would serve as a database for future research and commercial purposes.

Keywords: biodiversity, Dimapur, Nagaland, underutilized edible plants

Introduction

The quality of the environment affects human health (Panda, 2014). The interdependence of society and nature, as well as the importance of environmental health to human health, are dependent on biodiversity, which has a direct impact on human well-being. In developing countries, the human population is increasing at an alarming rate, and only 30 plant species are used to supply 95% of the world's food requirements, which are referred to as "major crops" (Asfaw and Tadesse, 2001; Jain, 2012) ^[1, 5]. Millions of people in underdeveloped countries lack sufficient food to meet their daily needs, and their diets are deficient in one or more nutrients (Food and Agriculture Organization of the United Nations, 2004), and the same is true in India, the world's second most populous country (Rashid et. al. 2008) ^[13].

Only a tiny number of plant species are regularly used as food sources globally, despite the fact that 40–100,000 plant species have been commonly employed throughout history for food, shelter, fibre, as well as for cultural, commercial and therapeutic uses. The remaining is regarded as underutilized plants (Magbagbeola *et al.* 2010) ^[6].

With an ever-increasing population, reliance on a few crop species has become a serious issue. Underutilized crops, on the other hand, may be a less expensive option than those few crop species to sustain future generations. These crops are also known as neglected and underutilized species, orphan crops and minor crops (Padulosi *et al.* 2002) ^[8]. Underutilized crops have excellent nutritional and medicinal properties but their full potential is not being realized. Some are essential for medicinal properties, dyes, veggies, textiles, construction materials and so on in addition to their usage as food. Underutilized crops have a lot of adaptability in agro-ecological and edaphic conditions (Thies 2000; Rai *et al.* 2002; Deb *et al.* 2016) ^[14].

Agriculture continues to be the state's most important industry. The gross area under agriculture is 3,68,130 hectares, out of a total geographical area of 16,57,900 ha, with shifting or jhum farming accounting for about 90% of the land under agriculture (Nakro 2011). The Jhum fields are grown with a variety of crops, including legumes, which have traditionally been utilized for family nutrition, but farmers have recently begun to produce the crops for commercial purposes due to market demand. Nitrogen-fixing legumes can also be used to restore and improve the fertility of jhum fields, making jhum farming more productive and long-term. To supply the needs of staple foods, humanity relies on a few number of crop plants (Williams and Haq, 2000) ^[16]. Increased reliance on these primary food crops causes the food basket that mankind has relied on for aeons to shrink (Prescott and Prescott, 1990) ^[11] and the requirement to feed hundreds of thousands of mouths has resulted in hunger in many emerging countries (Deb et. al. 2016) ^[2]. The disparity between human population and food supply has already become a global hazard and an international issue (Ekanayake *et al.* 2000) ^[3]. Efforts are being made to find and evaluate underutilized food sources to close the gap (Tomar et. al. 2015) ^[15]. Man has lived through hunting and gathering and has relied on wild plants for nourishment since the dawn of humanity.

Biodiversity is the basic foundation of human existence and economic well-being, and it is the source of resources that families, future generations and nations rely on. With the increasing growth of the world's population, there is a greater demand for food to feed millions of people. As a result of the people's reliance on a few large staple crops to supply their needs, famine and poverty have increased. Underutilized edible plants provide a less expensive and more accessible option for increasing crop diversification

and ensuring food security to the poor in general and developing countries in particular.

As the world's population grows, so does the demand for food to feed hundreds of thousands of people, resulting in a shrinking of the world's food basket, necessitating crop/food diversification to fulfill the needs of the hungry. The goal of this work is to collect and document UEPs in Nagaland's Dimapur area in order to learn more about the varied types and usage of these plants. UEPs have the potential to provide long-term food security for future generations. The study will help to raise consumer awareness about the potential nutritional values of UEPs. The majority of the products (UEPs) sold in local markets are gathered from the forest. UEPs are in high demand due to their taste, medicinal properties, and so on. Sustainable collection and proper conservation strategies are required to prevent natural population depletion and habitat loss caused primarily by anthropogenic activities. Understanding the phytochemical and nutraceutical properties of these UEPs will aid in their marketability.

Materials and Methods

During the study period, the local markets were surveyed to document the UEPs' from the district. Regular field survey was also carried out in the forest areas. The UEPs' were collected and identified during the study. Herbarium was also maintained and deposited in Dept. of Botany, St. John College, Dimapur, Nagaland.

Conclusion

Nagaland is a state that is blessed with favorable environmental conditions which favors the growth of diverse plant species. During the current study, 26 UEPs were documented and identified from the study area. The details are listed below in Table 1 and Figure 1 shows some images of the UEPs collected. The 26 UEPs belonged to 25 genera. The medicinal benefits of UEPs are also mentioned in the table.

Table 1: List of UEPs collected during the survey from the study area

Sl. No.	Name of Species	Local Name	Medicinal Benefits
1	<i>Amaranthus cruentus</i> L.	Red amaranth	Boost immunity, reduces bad cholesterol which is responsible for many cardiac problems.
2	<i>Bacopa monnieri</i> (L.) Wettst	Bang patta/Brahmi	To manage cold, chest congestion and bronchitis
3	<i>Cajanus cajan</i> (L.) Huth	Pigeon pea	Maintains blood pressure, prevents anemia, and improves digestion.
4	<i>Chenopodium album</i> L.	Pathor sak/ white goosefoot	Prevents piles, urinary bladder stone, spleen or liver disorders.
5	<i>Dillenia indica</i> L.	Elephant apple	Ensure high energy levels, elevate brain operations as well as stamina.
6	<i>Diplazium esculentum</i> (Ritz.) Sw.	Asang/edible fern	Treatment of diabetes, small pox, measles, constipation, headache, fever, etc.
7	<i>Eryngium foetidum</i> L.	Naga dhaniya	Helps in constipation, hypertension, malarial, diarrhea, stomach ache, etc.
8	<i>Eriobotrya japonica</i> (Thunb.) Lindl.	Loquat	Lower blood pressure, lower the risk of cancer, helps calm respiratory system.
9	<i>Elsholtzia blanda</i> (Benth.) Benth.	Napa	Prevents digestion problems and common cold.
10	<i>Hedychium coronarium</i> J. Koenig	Ginger lily	Aromatic oil, bioactivity,
11	<i>Lablab purpureus</i> (L.) Sweet	Hyacinth bean	People take hyacinth beans by mouth to prevent pregnancy and for diarrhea
12	<i>Livistona jenkinsiana</i> Griff.	Sura jang	Prevents stomach ailments like indigestion and gastritis problems.
13	<i>Mucuna pruriens</i> (L.) DC.	Mesemerh	Used for management of male infertility, and also as aphrodisiac.
14	<i>Musa balbisiana</i> Colla	Banana flower	Supports menstrual wellness, controls diabetes, improve lactation, anti-ageing.
15	<i>Myrica esculenta</i> Buch.-Ham. ex D. Don	Metiong	Helps in indigestion, decoction of the bark is used in treating asthma, chronic bronchitis and diarrhea.
16	<i>Ocimum tenuiflorum</i> L.	Nangpra	Antimicrobial, anti-viral, used in cough, arthritis, indigestion, asthma etc.
17	<i>Parkia speciosa</i> Hassk.	Yongchak /bitter bean	To treat diabetes, hypertension and kidney problem.
18	<i>Passiflora edulis</i> Sims	Entsulashi/passion fruit	Treatment of bronchitis, asthma, urinary infection, insomnia, etc and the leaves are highly beneficial for diabetic patients.
19	<i>Perilla frutescens</i> (L.) Britton	Silam seeds	Treating asthma, used for nausea, sunstroke, inducing sweating.
20	<i>Phaseolus vulgaris</i> L.	Kholar	Aid weight loss; promote colon health and moderate sugar level.
21	<i>Phyllanthus emblica</i> L.	Lozu/ goose berry/ amla	Reduces heartburn severity and cancer risk, improves immune health.
22	<i>Rhus semialata</i> Murray	Tangmo/ naga tenga	Treatment of diarrhea, stomachache, food poisoning etc.
23	<i>Solanum aethiopicum</i> L.	Bitter eggplant	Helps with digestion, improves heart health and prevent cancer.
24	<i>Trigonella foenum-graecum</i> L.	Methi patta/ Fenugreek	Reduces risk of diabetes, reduces inflammation, cures mouth ulcers, and helps indigestion.
25	<i>Zanthoxylum simulans</i> Hance	Sichuan pepper	Stimulate the immune system, reduce pain, boost appetite, and increase blood circulation.
26	<i>Zanthoxylum oxyphyllum</i> Edgew.	Michinga patta/prickly ash	Used for the treatment of dental caries, dizziness and bloating, malaria etc



Fig 1: Underutilized edible plants- 1. *Elsholtzia blanda*, 2. *Myrica esculenta*, 3. *Diplazium esculentum*, 4. *Hedychium coronarium*, 5. *Rhus semialata*, 6. *Trigonella foenum-graecum*, 7. *Chenopodium album*, 8. *Lablab purpureus*, 9. *Parkia speciosa*, 10. *Perilla frutescens*, 11. *Dillenia indica*, 12. *Cajanus cajan*, 13. *Amaranthus cruentus*, 14. *Eriobotrya japonica*, 15. *Passiflora edulis*, 16. *Mucuna pruriens*

Since time immemorial, underutilized plants have served as significant sources of food, medicine and nutrition enhancing diet diversity, reducing malnutrition and contributing to food security. The forests offer all of the basic essentials, such as raw materials, food, wood, fuel, fodder, medicines, shelter and much more. Additionally, the indigenous people harvest forest resources for trade, which is a sizable additional source of income (Zingkhai, 2015)^[17]. Providing people with healthy and safe foods particularly for low-income groups and undernourished populations living in developing countries has manifested to be quite a challenge. Due to lack of food, high prices, and an unstable supply system in emerging and underdeveloped nations; finding affordable and alternative sources of good and nourishing food has become a major concern. By utilizing UEPs to their full capacity, we will be able to provide a

significant solution to the issue of food insecurity (Peduruhewa *et al.* 2021)^[10].

The study helps to create awareness about the potential of the UEPs among the consumers. Most of the UEPs sold in the local markets are collected from forest. The UEPs are in high demand because of its nutritional value. Sustainable collection and proper conservation strategies need to be worked out to prevent depletion of natural population and loss of the natural habitat caused mainly by anthropogenic activities. Knowledge of the phytochemical and nutraceutical properties of these UEPs will help improve its marketability. The study's major goal was to raise awareness about UEPs' potential and to catalogue the UEPs that are already available in Dimapur, which would serve as a database for future research and commercial purposes.

The rich diversity of underutilized plants in Dimapur and the rest of Nagaland can be judiciously exploited for the

betterment of society. These plants are known to be rich in nutrients and bioactive compounds that have the potential to improve health and provide nutritional security. The present world situation necessitates the importance of these plants as a significant food source especially for the native population. There is the need for further research into these underutilized plants to establish them as an important food resource.

Conflicts of interests

Authors declare that there are no conflicts of interests of any kind.

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