



## Ethnopharmacology of medicinal plants in a rural community in Northern Philippines

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### Abstract

This study documents the medicinal plants used as medicines for the treatment of various diseases among the people of a rural community in Northern Philippines. An ethnopharmacological survey was conducted to collect information about the medicinal plants used by community people. Information was gathered from the traditional healers and local inhabitants of the community using an integrated approach of plant collections and interview schedules. Forty one (41) medicinal plant species distributed in thirty two (32) families have been documented. Based on the information gathered it reveals that the community largely depends on medicinal plants to meet their primary health care needs. However, the present study also reveals that the extent of knowledge of the people in the study area with regard to the utilization of medicinal plants is limited to treating simple health problems.

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## Introduction

Plants, from time immemorial, have served human beings as sources of food, shelter, clothing and medicines (Rahmatullah, Azam, Rahman, Seraj, Mahal, Mou., Nasrin, Khatun, Islam & Chowdhury, 2011). More importantly, Plants have been used for curing various diseases and ailments from the very beginning of human civilization, and records of the use of plants are available since about 5000 years ago (Gupta, Singh, Singh & Kaul, 2014). Previous researches and studies affirm this claim that indeed, plants are effective in curing various ailments in the world (Lal & Yadav, 1983; Hamayun, 2007; Karaman & Kocabas, 2001; Hutchings, 1989).

Despite the overwhelming influences and the dependence on modern medicine and tremendous advances in synthetic drugs and allopathic medicine, a large segment of the world's population still relies on plants as substitutes for laboratory-made drugs. In the report of the World Health Organization it revealed that almost 80% of the world's population especially in the developing countries relies on traditional medicines and 85% of the traditional medicines involve the utilization of medicinal plants (Ahmad & Ismail, 2003; Hossan, Hanig, Agarwala, Sarwarm, Karim, *et al.*, 2010).

The Philippines, a developing country in South East Asia, is home to more than 110 ethno-linguistic groups (Balilia & McHenry, 2013). Most of the residents in the country are farmers and fishermen who live near/on mountains, plains and farmlands, and on the coastal regions. Despite modernization and globalization being experienced in the country, majority of the Filipinos still are practicing traditional folk medicine (Gruyal, Del Rosario & Palmes, 2014; Tantiado, 2012) especially in the different rural communities such as in the Province of Cagayan in Northern Philippines. Knowledge on the use of plants as medicine was inherited by the Filipinos from their great ancestors through oral tradition (Olowa, Torres, Aranico & Demayo, 2012).

The Province of Cagayan is assumed to have unique characteristics and cultural heritage since it is home

to different indigenous groups and communities such as the *Ilocanos*, *Ybanags*, *Malauegs*, *Itawes*, and the *Agtas* (Hortelano, Juan & Tindowen, 2015). Due to its geographical location, many communities in the province do not yet embrace modernization, such as the San Miguel Community in the Municipality of Baggao. This rural community is surrounded by the mountain ranges of the Sierra Madre; hence, it is rich in floristic diversity. However, due to its location accessibility to modern health care facilities and services is far from reach. As a result, the community people are highly dependent on the use of medicinal plants to meet their health care needs.

Literatures suggest that the Philippines is rich with the different medicinal plants being utilized by the Filipinos. However, few studies had been conducted to document the availability and the utilizations of these plants (Gruyal, Del Rosario & Palmes, 2014; Tantiado, 2012; De Guzman, G. Q.; Nacua, A. E., Belgica, T. H., Clemente & Alejandro, 2014; Fiscal & Chavez, 2016). Especially in the different rural communities in Northern Philippines (Balangcod & Balangcod, 2011). This present study is conducted to document the medicinal plants used by the people of San Miguel community in Northern Philippines in order to preserve knowledge of medicinal plants in the community. Literature suggest that knowledge on traditional medicine has already started to decline due to the lack of recognition by younger generations as a result of a shift in attitude and ongoing social economic changes (Farooque, Majila & Kala, 2004; Kala, 2005). Moreover, the findings of this study will provide a baseline data for future research and potential resource for the development of new drugs (Gruyal, Del Rosario & Palmes, 2014). Finally, it will also enhance the knowledge of scientists and pharmacologists on indigenous knowledge on ethnopharmacology.

## Materials and methods

### Study area

San Miguel, Baggao is a remote and a rural area in the province of Cagayan, Northern Philippines. The community is bounded by the Sierra Madre Mountain.

The area of survey is located within roughly 18.28208° N and 121.67198° E. Farming is considered as the main occupation of the people. The principal products of the community are rice, corn, tobacco, mongo and lumber. Because of its location which is far from the central business district, modernization and accessibility to health care facilities and services is limited.

**Sampling method**

An ethnopharmacological survey was conducted to collect information about the medicinal plants used by community people. Information was gathered from the traditional healers or *Mangngagas* in local dialect and local inhabitants of the community using guided field walk, as described by Maundu (1995) and Rahmatullah *et al.* (2010) and interview schedules.

**Data analysis**

Standard methods necessary for taxonomic study have been followed for field collections. Taxonomy of identified plants in this research study was verified from the classification of local plants by Quisumbing (1978).

**Results**

*Medicinal Plants Available and Used in the Study Area*

The present paper documents the different medical plants being utilized by local inhabitants of a rural area in Northern Philippines. The result of the study showed that 41 plant species belonging to 32 families are available and used by the community people to treat various ailments and diseases. The Lamiaceae and Malvaceae family provided the largest number of species (3), followed by Amaryllidaceae, Annonaceae, Apocynaceae, Fabacea, Malvaceae, Myrtaceae, and Solanaceae (2 species each). Other families were represented by one plant each. It is also important to note that majority of the medicinal plants found in the area are cultivated and used for consumption among the people of the said place. Moreover, other plants found in the area are grown around the backyard and along rural roads. Furthermore, it can be gleaned on the result (Table 1) that the 41 plant species found in the area are used to treat 30 illnesses and diseases.

**Table 1.** Characteristics of Medicinal Plants in a Rural Area in Northern Philippines.

Family Name	Scientific Name	Local Name	Utilized Part	Mode of Preparation	Ailment/ Diseases
Amaryllidaceae	<i>Allium sativum</i>	Bawang	Bulb	Raw	Sore throat
	<i>Allium tuberosum</i>	Kutsay	Leaves	Pounding	Swelling
Annonaceae	<i>Annona squamosal</i>	Atis	Leaves	Boiling	Dizziness, Fainting, Fever, and Rheumatism
	<i>Annonamuricata</i>	Guanaba	Fruits	Raw	Diarrhea
Apocynaceae	<i>Rauwolfia serpentine</i>	Sepentina	Leaves	Boiling	Diarrhea
	<i>Nerium oleander</i>	Adelfa	Leaves	Pounding	Wounds
Asphodelaceae	<i>Aloe barbadensis</i>	Sabila	Leaves	Extracting	Skin Burns
Asteraceae	<i>Chrysanthemum indicum</i>	Mansanilla	Leaves	Extracting Heating	Skin Burns and wounds Cramps
Basellaceae	<i>Basella alba</i>	Bilunak	Leaves	Extracting	Boils
Boraginaceae	<i>Carmon retusa</i>	Kalamoga	Leaves	Boiling	Diarrhea
Bromeliaceae	<i>Ananas comosus</i>	Pinya	Leaves	Boiling	Swelling
Caricaceae	<i>Carica papaya</i>	Papaya	Leaves	Extracting	Dengue
Combretaceae	<i>Quisqualis indica</i>	Tartaraok	Leaves	Boiling	Cough
Compositae	<i>Blumea balsamifera</i>	Subusub	Leaves	Boiling	Urinary Tract Infection
Crassulaceae	<i>Bryophyllum pinnatum</i>	Abisrana	Leaves	Pounding	Skin wounds and sprain
Cucurbitaceae	<i>Momordica charantia</i>	Parya	Leaves	Boiling	Ringworm and Cough
				Raw	Hyperglycemia
Ebenaceae	<i>Diospyros blancoi</i>	Mabolo	Leaves	Boiling	Sore throat, stomach ache, Diarrhea, and Fever
Euphorbiaceae	<i>Antidesma bunius</i>	Bugnay	Leaves	Boiling	Constipation
	<i>Sesbania grandiflora</i>	Katuday	Leaves	Boiling	Mumps
Fabaceae	<i>Tamarindusi ndica</i>	Salamagi	Fruit	Boiling	Cough and Fever
Labiatae	<i>Coleus blumeibenth</i>	Dara-dara	Leaves	Pounding	Bruises
	<i>Coleus amboinicusbenth</i>	Oregano	Leaves	Extracting	Cough
Lamiaceae	<i>Vitexn egundo</i>	Dangla	Leaves	Boiling	Cough and Fever
	<i>Mentha arvensis</i>	Herba Buena	Leaves	Extracting	Insect bites, Stomach ache, Headache, and Fever

Family Name	Scientific Name	Local Name	Utilized Part	Mode of Preparation	Ailment/ Diseases
Lauraceae	<i>Persea americana</i>	Abukadu	Leaves	Boiling	Convulsion
Leguminosae	<i>Cassia alata</i>	Andadasi	Leaves	Extracting	Ringworm and Scabies
Lytharaceae	<i>Lagerstroemia speciosa</i>	Banaba	Leaves	Boiling	Urinary Tract Infection
	<i>Corchorus catharticus</i> Blanco	Saluyot	Leaves	Extracting	Swelling
Malvaceae	<i>Hibiscus rosasinensis</i>	Kayanga	Roots	Boiling	Cough Swelling
			Flower and Leaves		
Menispermaceae	<i>Theobroma cacao</i>	Kakao	Roots	Boiling	Mennorrhagia
	<i>Tinospora rumphii</i>	Makabuhay	Leaves	Boiling	Fever
Moringaceae	<i>Moringa oleifera</i>	Marunggay	Leaves	Boiling	Headache and Rheumatism
Myrtaceae	<i>Psidium guajavalinn</i>	Bayabas	Leaves	Boiling	Eczema and bad breathe
	<i>Syzygium cumini</i>	Lumbuy	Leaves	Boiling	Bad breathe
Oxalidaceae	<i>Averrhoa carambolalinn.</i>	Garulan	Fruits	Raw	Asthma, Vomiting, Fever, and Angina
Pandnaceae	<i>Pandanus</i>	Pandan	Leaves	Boiling	Headache Rheumatism
			Roots		
Piperaceae	<i>Peperomia pellucida</i>	Li-linnaaw	Leaves	Boiling	Boils and Gout
Rutaceae	<i>Citrus medicalinn.</i>	Kalamansi	Fruit	Extracting	Eczema
Sapotaceae	<i>Chrysophyllum cainito</i>	Kaimito	Leaves	Boiling	Bad Breathe
	<i>Solanum lycopersicumlinn</i>	Kamatis	Fruits	Extracting	Asthma and Constipation
Solanaceae	<i>Solanum melongena</i>	Tarung	Leaves	Boiling	Body odor and sore throat
			Fruits	Heating	Swelling

*Parts of Medicinal Plants and its Modes of Preparations to treat various ailments*

The results of the study likewise reveal that different parts of medicinal plants are used in treating various ailments such as the leaves, fruits, roots, flowers, and bulb. In totality, 47 uses of plant parts are reported for the 41 species of medicinal plants documented in the present study. Among the different parts being used, leaves are the most frequent part being utilized by the traditional folk healers and local inhabitants of the study area (34 species). Usually, the leaves are being boiled with water and taken orally to treat almost various illnesses in the community such as rheumatism, gout, urinary tract infection, blood related problems, swelling and mumps, headache, dizziness, fainting, convulsion, fever, eczema, and body odor. Aside from this mode of preparation, extracting is also commonly used where in the juice is extracted from the leaves and applied directly in the affected body parts. Other parts of the plant like fruits are also used in the community to treat various illnesses in which it is consumed directly. Roots and flowers are also used through extraction, boiling, pounding and heating. The result also revealed that majority of the plant species [of plants] in the area can be used to treat same illnesses and ailments with the same mode of preparation such as boiling and extracting.

Few species of plants are being utilized in the area to treat same ailments with different modes of preparation.

*Medical Applications of the different Medicinal Plants*

The results of the study also show the therapeutic applications of the different medicinal plants found in a rural area in Northern Philippines. It can be revealed in the results that some medicinal plants in the area are used by the traditional folk healers or *Mangngagas* and local inhabitants to cure multiple ailments which can be as high as five in number such as *Averrhoa carambolalinn*, *Mentha arvensis*, *Annona squamosal*, *Diospyros blancoi*, *Solanum melongena*, *Momordica charantia*, and *Chrysanthemum indicum*.

The present study also reveals that medicinal plants in the study area are primarily used to treat oral and skin problems. Fourteen (14) plant species are used to treat oral problems such as sore throat, bad breathe, cough, and asthma; thirteen (13) plants are used to treat skin problems such as eczema, ringworm, insect bites, scabies, bruises, skin burns, wounds, and body odor; and eight (8) plants found in the area are being utilized by the local inhabitants to treat swelling and inflammation problems such as swelling, boils, and mumps.

Moreover, eight (8) medicinal plants are also available in the area to treat fever and dengue. Other plants that are present in the area are being utilized to treat stomach problems, headache, dizziness, and fainting, vomiting, convulsion, joint pains, blood-related problems, and urination problem.

### Discussion

The present study aims to document the different medicinal plants available and used [being utilized] by traditional healers and local inhabitants in one of the rural communities in Northern Philippines. The study reveals that there are 41 plant species belonging to 32 families that are being utilized in the community to treat various ailments. This suggests that the community is rich with the existence of the medical flora that is being utilized by the inhabitants. The result is confirmed by previous researches and studies that indeed, Philippines is rich, not only in terms of cultural heritage, but also with the availability of medicinal plants (Gruyal, Del Rosario & Palmes, 2014; Olowa, Torres, Aranico & Demayo, 2012; Balangcod & Balangcod, 2011; Abe & Ohtani, 2012).

Moreover, the utilization of the different medicinal plants in the area demonstrates an in-depth knowledge of the local inhabitants and traditional healers on ethnopharmacology and its applications. The result of the study is consistent with previous studies with regard to the in-depth knowledge of people especially in the rural communities around the world in terms of ethnopharmacology (Mesfin, Tekle & Tesfay, 2013; Yirga, 2010; Ong & Nordiana, 1999). The result of the study also show that the community people are highly dependent on medicinal plants to meet their healthcare needs which can be attributed to lack of accessibility to modern healthcare facilities and services and even poverty (Tantiado, 2012).

Among the 32 families of plants available in the study area, Lamiaceae family and Malvaceae family provided the largest number of species. Lamiaceae family is also known as the mint family which is important for flavors, fragrance, and medicinal purposes (Morilla, Sumaya, Rivero & Madamba, 2014).

Many related studies were conducted to determine the effectiveness of the said plant family and the results showed that some species under this family were proven to contain various chemical compounds that have medicinal properties that treat several disorders (Yalcin & Kaya, 2006). Meanwhile, Malvaceae family includes such important crops i.e. cotton, okra, and rosella, which are mainly used as sources of fiber, food and beverages, medicines, timber, and in horticulture (Gad, El-Sherif & Refaei, 2013). The said plant family as revealed in literatures has medicinal components that are used in treating muscle pain, nervous disorders, and cardiac diseases (Mahesh & Satish, 2008).

The study also revealed that leaves are considered as the most utilized part of the medicinal plants available in the community to treat various ailments and diseases. The results affirmed previous researches that leaves are considered as the most common part being utilized (Hamayun, 2007; Mukherjee & Wahil, 2006; Sahu, Nayak & Dhal, 2013). The findings also imply that local inhabitants of the area have an attitude of preserving their environment especially their flora and fauna since extraction of the different parts of the plants, besides leaves, destructs the whole plants that can cause destruction to the environment. Research suggests that the use of the leaves provide conservation for the plants compared to those remedies that require roots or whole plants that requires to be uprooted. Moreover, leaves are the most abundant part of the plant and it can be easier to collect and to regenerate (Focho, Nkeng, Fonge, Fongod, Muh, Ndam & Afegime, 2011). Meanwhile, boiling or decoction is considered as the most common mode of preparation of the different plant parts in treating various ailments and diseases in the study area. The result corroborated other studies that revealed that boiling or decoction is the most common method used especially in rural areas (Morilla, Sumaya, Rivero & Madamba, 2014; Balangcod & Balangcod, 2011). The result also affirmed previous studies that decoction or boiling as a method has a higher efficiency of treating ailments since oil and other medicinal compounds are being extracted from the plants (Olowa, Torres, Aranico & Demayo, 2012; Sathiyaraj, Sivaraj, Thirumalai & Senthilkumar, 2012).

It is also important to note that most of the ailments that are being treated using medicinal plants in the area are common illnesses and diseases experienced by the community people such as fever, urinary tract problems, dizziness, skin and oral problems, and stomach problems. Further, no medicinal plants are being utilized in the community to treat serious illnesses and life-threatening illnesses such as cancer, kidney failures, and heart problems. This suggests that the local inhabitants and traditional folk healers are utilizing medicinal plants for treating simple health problems.

### Conclusion

This study documented 41 species of medicinal plants belonging to 32 families available and used in treating 30 illnesses and ailments by the *Ilocano* people of a rural community in Northern Philippines. Plants belonging to the Lamiaceae family and Malvaceae family are the most dominant types of plants available in the community. Also, leaves are the most utilized part of plants in treating various illnesses and diseases.

The said community is a home to different medicinal plants that the local inhabitants still rely on due to poverty and lack of accessibility to modern health care facilities and services. However, the extent of utilization of the different medicinal plants being documented in this study is only limited to treating simple health problems.

A very important contribution of this present study indicates that a substantial number of medicinal plants documented in the study area have a validity in their uses in traditional medicine since it has published scientific reports and with comparison with other previous literatures on ethnopharmacology.

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