Journal of Tropical Crop Science Vol. 3 No. 2, June 2016
www.j-tropical-crops.com

Study on Medicinal Plants Used by the Ethnic Mamuju in West Sulawesi, Indonesia

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Abstract

Indonesia is known as a country with very high biodiversity, within which are potential medicinal plants that have not been fully explored or utilized. The potential of this natural biodiversity for the health and welfare of the Indonesian community is regarded as high, if it is properly utilized. An example of the potential benefits of these plants is reflected in the types of traditional medicinal plants used by the Mamuju ethnic in West Sulawesi. This research aims to describe the types of plants used as traditional medicines by the Mamuju ethnic group. The study is based on descriptive approach that used a combination of observations, interviews and taxonomy. The results of the study revealed that there are 31 species of medicinal plants used as sources of traditional medicine by the Mamuju ethnic group, of which there are 33 medical herbs used for the treatment of 31 kinds of diseases. The health issues that are addressed through the use of medicinal plants include the treatment of some types of internal diseases, including cysts, cancer, tumors, high blood pressure, ulcers and diabetes; disease symptoms such as itching, swelling, myopic, new injuries and infections. Some traditional medicines are used in relation to onset of menstruation, and postpartum treatment. The plant components that are used for medicinal purposes include roots, stems, stem bark, leaves, flowers, fruit, seeds, rhizomes and tubers. However, the predominant plant component used for medicinal purposes is plant leaves.

Keywords**:** biodiversity, health, medical herbs, traditional medicinal plants, welfare

Introduction

Tropical Indonesia is the country with the second highest level of natural biodiversity in the world after Brazil. Indonesia has between 25,000 and 30,000 species of plants, representing 80% of the world's plant species and 90% of the plant species in Asia (Pramono, 2002; Erdelen et al., 1999). PT. Eisai (1986) compiling results of the inventory, there are 7,000 species of plants in Indonesia that are used as sources of natural drugs by the people, if utilized properly. According to Hargono (1985) Indonesia has approximately 1,100 species of medicinal plants, while according to Heyne (1987) there are approximately 1,040 species of medicinal plants in the country based on seed plants.

The use of traditional medicinal plants has been practiced in Indonesia for several thousand years, and is reflected in traditional art in Borobudur, and in written prescriptions on palm leaves in Bali in the period 991 to 1016 (Prianggono, 2007). Kuswanto et al. (2015) reported various medicinal plants used by communities live around mount Prau, Central Java, whereas Rifaí (2000) reported those in Madura Island. Medicinal plants of forest origin have received less attention, but their potential is regarded as being quite significant in terms of economic value, processing technologies and marketing.

In addition to richness in the diversity of medicinal plants, Indonesia is also recognized for its rich diversity of ethnic groups and cultures. Indonesia has 1,128 tribes or ethnic groups that are widely distributed, from Sabang to Merauke. This diversity of ethnic groups has also resulted in significant differences among the groups in the use of plants, in reference to economic, spiritual and cultural values, health, beauty and even the treatment of diseases (Prananingrum, 2007). Different ethnic groups have differences in repertoire, including their local knowledge of medicinal plants. This local knowledge about medicinal plants ranges from the introduction of plant species, the use and processing of different plant parts, and the efficacy of treatments based on medicinal plants.
However, the vast knowledge of the local communities about medicinal plants is gradually being lost (Correa, 2001), including in Indonesia. This reflects the changes in the patterns of community life, such that

the knowledge and use of traditional plant medicines is being retained by smaller groups of people within the different ethnic communities. Changes in lifestyle of the people are also resulting in fewer medicinal plants being grown in household yards, and fewer people also recognizing the medicinal value of traditional medicines based on indigenous plants. The reluctance of people to grow medicinal plants has resulted in the rapid decline in indigenous knowledge about the use and meaning of the ethnobotany of medicinal plants. The rate of loss of traditional knowledge is greater than the rate of decline in natural plant biodiversity.

Concerns about the loss of natural resources, especially medicinal plants and traditional knowledge, have not been studied, while advances in technologies have been fast and complex, resulting in the exploitation of natural resources, including the extinction of some plant species and irreversible damage to natural habitats. An impact of cultural modernization is leading to the loss of traditional knowledge within communities as reported by Sofowara (2007) in Africa, and (Yesilada et al., 2007) in Turkey. Another concern related to the loss of medicinal plants is based on the perception that Indonesian traditional medicines are old fashioned and unscientific, with there being a lack of clinical trials to provide their potential benefits. However, some Asian countries, including Singapore, Philippines and Thailand, are increasing their use of traditional medicines, while Indonesia is tending to lag behind. This is reflected in the level of technical reporting relating to medicinal plants, with only 0.0012% of technical reports in Indonesia being related to medicinal plants compared to 8% in Japan (Wijayakusuma, 2000).

There is a need for increased support for research and reporting on the potential value of medicinal plants within Indonesia. Wijayakusuma (2000) highlighted that, in order to utilize medicinal plants and to improve health services within communities, there is a need for increased support for the assessment of medicinal plants that are grow in different areas of Indonesia, and to share this information with the public.

The Mamuju are one of the local ethnic groups in West Sulawesi who had inhabited the area for a very long time. This community has a long specific culture which has included the use of traditional plants for medical purposes. However, there has been no research to examine the types of traditional medicinal plants used by the ethnic Mamuju.

Material and Methods

Study Time and Location

This study was conducted in the period May to September 2015. The study focused on local communities of the ethnic Mamuju in the province of West Sulawesi. The study focused on the collation of information relating to the use of traditional medicinal plants in an historic context, as well as currently. The location of the study was in Tamang Padang and Karampuang Island, which are the areas occupied by ethnic Mamuju.

Material and Tools

The materials used for this research included a range of plant identification guidebooks which are listed in the following table (Table 1)
Beside the taxonomic books, several websites were also used for accessing information: www.

Table 1. Plant taxonomy guidebooks used in this study.

Book Title	Authors
Example of an Analytical Description (ed) Manual of Herbarium Taxonomy, Theory and Practice	E. F. De Vogel (1987)
Plant Identification Terminology (An Illustrated Glossary)	J.G. Harris & Melinda Woolf Harris (1994)
Morfologi Tumbuhan	Gembong Tjitrosoepomo (2001)
Flora untuk Sekolah di Indonesia	C.G.G.J. van.Steenis (1997)
Atlas Tumbuhan Obat Indonesia (Jilid 1)	Setiawan Dalimartha (1999)
Atlas Tumbuhan Obat Indonesia (Jilid 2)	Setiawan Dalimartha (2000)
Tanaman Obat Tradisional Indonesia	A.P. Dharma (1985)
Tumbuhan Berguna Indonesia (Jilid 1)	K. Heyne, (1987)
Ensiklopedia Milenium Tumbuhan Berkhasiat Obat Indonesia (Jilid 1)	Hembing Wijayakusuma (2000)

theplantlist.org/; http://plants.usda.gov; www.flora.dempstercountry.org.

Research Methods

The selection of respondents was done using the snowball sampling method, i.e. respondents as informants / traditional healers (*"sando"*) were interviewed with their selection being based on information obtained from the village head and / or local community leaders. The collection of data was undertaken using an instrument or data collection tools, as outlined below:

- In-depth interviews were conducted using a questionnaire which had been prepared in advance. The information collected included the following: the categories of plants used in medicinal treatments; the plant components used; how the plants and plant components are used; when does the treatment commence; what were the sources of information about the use of the plants as a treatment; and where can the plants be found.
- Observations, particularly direct observation made in the field together with the respondents, were used to ensure the accuracy of the data collected, including: the environmental conditions in which the plants grow; the ecosystems in which the plants grow (primary forest, secondary forest, scrub, mangrove, etc.); and the location of growth in the ecosystem. Photographic records were also collated for documentation. In instances where the scientific name of a plant was not known, samples were collected for botanical identification at the Biology Laboratory at UNM. For respondents who were unable to participate in field visits for the identification of plants, use was made of plant identification documents to correctly identify the plants and plant components (Table 1).

The collected data were tabulated and analyzed in accordance with the research objectives of the study.

Results and Discussion

The Mamuju Ethnic Communities and Their Knowledge of Plant Medicines

The Mamuju ethnic group is one of the ethnic groups that are found in several regions in Mamuju, South Sulawesi, including several regions in Mamuju, such as in the area of Tampa Padang and surrounding areas, as well as the island of Karampuang which is located opposite the City of Mamuju. As with other ethnic communities in Indonesia, the Mamuju ethnic communities have knowledge of diversity management of natural resources and the environment. Part of this knowledge relates to the use of plants for fulfillment of their daily lives, including the use of plant based traditional medicines. In the context of this research, medicinal plants are all plants that can be used as a medicinal herb, either singly or as a component of mixtures, which are believed to cure a disease or potentially influence health.

Not all the people who belong to the ethnic Mamuju at research sites have the same level of knowledge to the use of medicinal plants. General beliefs about the usefulness or efficacy of a medicinal plant species is not only derived from the experience and hereditary, but is also often associated with religious values. The public perceptions of ethnic Mamuju about pain depend on the viewpoint of each person. In general, it can be said that pain is a condition that is not balanced, so it can affect their daily activities. The cause of the different diseases also varies among the diseases. There is the general belief that nothing came of God, but some medical issues have supernatural origins. Therefore, the sando always rely on traditional medication, with constant appeals to the Creator for help, these appeals being expressed in the form of prayers or incantations, i.e. readings on the treatment of certain diseases, primarily derived from the supernatural.

Types of Plants Used as Sources of Medicinal Drugs
Based on the survey results there are 30 types of plants which are primarily used as medicines by people of ethnic Mamuju origin (based on the ethnic/local names of the plants). Of the 30 plant categories, 23 have been botanically identified to species level, and all have been identified to family level (Table 2). However, there are also 7 plant types which have yet to be taxonomically identified.

Table 2 shows that this diversity of medicinal plants used by ethnic Mamuju is generally derived from local/native plants, except for a small number of plants which are cultivated, including the following: coconut (*Cocos nucifera* L.), durian (*Durio zibenthinus*), avocado (*Persea americana*), papaya (*Carica papaya* L.), soursop (*Annona muricata*), and guava (*Psidium guajava* L.).

The Mamuju ethnic group has advanced considerably since the time when they were fully reliant on different types of plant based traditional medicines. Their inheritance of the knowledge of the use of traditional medicines has been lost by many of the more recent younger generation. The loss of this traditional knowledge is believed to partly reflect the impact of government policy aimed at increasing public awareness of health, through visits of representatives

of the health department and the related distribution of drugs and vitamins, which has resulted in a decline in the public interest in traditional medicinal plants. In order to preserve this traditional knowledge, it is necessary to counsel young people about the potential benefits of the use of medicinal plant medicines.

Based on the results of the interviews of representative of the Mamuju ethnic communities in this study, and the related survey of medicinal plants in the study area, it was apparent that the number of medicinal plants available to the ethnic communities has been reduced. This reduction is believed to be the result of the opening up of traditional forested areas for use as residential areas and for oil palm plantations.

Plant Components Used in Traditional Medicines

Based on the research data collected in the study it was apparent that the people in the Mamuju group use almost all parts of different plants for the treatment of various diseases. Of the 30 species of plants which were recorded as being used for medicinal purposes, almost all plants components were being commonly used, including the rhizome roots, rhizomes, stems, fruit, leaves and bark. Only plant roots and tubers

Table 2. Plants used for medicinal purposes by the ethnic Mamuju

No	Local Name	Latin Name	Family	Plant type
1	Anggune	*Ageratum conyzoides*	Asteraceae	Shrub
2	Bawang merah	*Alium cepa*	Liliaceae	Shrub
3	Sirsak	*Annona muricata*	Annonaceae	Tree
4	Paku layang-layang	*Blechnum sp.*	Pteridaceae	Shrub
5	Daun gajah	*Caesalpinia alata*	Caesalpiniaceae	Shrub
6	Pepaya	*Carica papaya*	Caricaceae	Clump crop
7	Bungang/Jengger ayam (red)	*Celosia cristata*	Amaranthaceae	Shrub
8	Bungang/Jengger ayam (yellow)	*Celosia sp.*	Amaranthaceae	Herba
9	Kelapa	*Cocos nucifera* L.	Aracaceae	Tree
10	Kunyit	*Curcuma domestica*	Zingiberaceae	Herb
11	Durian	*Durio zibenthinus*	Bambocaceae	Tree
12	Jambu Merah	*Eugenia sp.*	Myrtaceae	Tree
13	Boda-boda	*Ficus septica*	Moraceae	Tree
14	Sambung nyawa	*Gynura procumbens*	Asteraceae	Herb
15	Illitoransi/Benalu	*Loranthus sp.*	Loranthaceae	Shrub
16	Benalu batu	*Loranthus sp.*	Loranthaceae	Shrub
17	Paria	*Momordica charantia*	Cucurbitaceae	Herb
18	Mengkudu	*Moringa citrifolia*	Rubiaceae	Tree
19	Kumis kucing	*Orthosipon stamineus*	Lamiaceae	Shrub
20	Kaca-kaca	*Peperonia pelucida*	Piperaceae	Herb
21	Alpukat	*Persea americana*	Lauraceae	Tree
22	Letup-letup	*Phisalis angulate*	Solanaceae	Shrub
23	Jambu Batu	*Psidium guajava*	Myrtaceae	Clump crop
24	Jamur Sakkiana	*Unidentified*	Basidiomycota	Mushroom
25	Jamur Tangkiddi’	*Unidentified*	Basidiomycota	Mushroom
26	Kalonji	*Unidentified*	*Unidentified*	-
27	Kayu Cina	*Unidentified*	*Unidentified*	Clump crop
28	Manurung	*Unidentified*	*Unidentified*	-
29	Panynyolong	*Unidentified*	*Unidentified*	Clump crop
30	Bararoang	*Unidentified*	*Unidentified*	Clump crop

were not recorded as being used. The parts of the plant which are used medicinally depend on the type of the disease to be treated, and were taken orally. The plant component most commonly used in medicinal treatment is the leaves. This may reflect the ready availability of leaves in large quantity than other plant components. The respondents reported that leaf size was not a consideration but rather the quantity of leaf material is the main criteria, based on their experience or based on the information passed down to the generation of their parents.

In reference to the types of diseases commonly treated by using plant parts as the basis traditional

Table 3. Data on medicinal plants used by ethnic Mamuju, West Sulawesi, to treat medical problems

No	Latin Name	Botanical Family	Medical Uses	Parts Used
1	*Ageratum conyzoides*	Asteraceae	New injuries, diabetes, ulcers	Leaf
2	*Alium cepa*	Liliaceae	Itches, headaches and Tetanus	Tuber
3	*Annona squamusa*	Annonaceae	Hypertension	Leaf
4	*Blechnum sp.*	Pteridaceae	Ulcers and asthma	Rhizome
5	*Caesalpinia alata*	Caesalpiniaceae	Tinea versicolor, scabies and ringworm	Leaf
6	*Carica papaya*	Caricaceae	Fever	Leaf
7	*Celosia cristata*	Amaranthaceae	Menstrual clogging	Leaf
8	*Celosia sp.*	Amaranthaceae	Menstrual clogging	Leaf
9	*Cocos nucifera*	Aracaceae	Itches	Fruit
10	*Curcuma domestica*	Zingiberaceae	Itches, ulcers and tetanus	Rhizome root
11	*Durio zibenthinus*	Bambocaceae	Postpartum	Bark
12	*Eugenia sp.*	Myrtaceae	Postpartum	Bark
13	*Ficus septica*	Moraceae	Hemorrhoid, eye pain / red eyes	Stem
14	*Gynura procumbens*	Asteracceae	Sprains	Leaf
15	*Loranthus sp.*	Loranthaceae	Swellings	Leaf
16	*Loranthus sp.*	Loranthaceae	Cysts, cancer, internist and mumps	Leaf
17	*Momordica charantia*	Cucurbitaceae	Itches and coughing	Leaf
18	*Moringa citrifolia*	Rubiaceae	Rheumatism,	Buah
19	*Orthosipon stamineus*	Lamiaceae	difficulty in urination, Jaundice, tuberculosis and maag	Leaf
20	*Peperonia pelucida*	Piperaceae	Cholesterol	All parts of the plant except the roots
21	*Persea americana*	Lauraceae	Itches	Leaf
22	*Phisalis angulata*	Solanaceae	Cough / asthma / bronchitis	All parts of the plant except the roots
23	*Psidium guajava*	Myrtaceae	Diarrhea	Leaf and fruit
24	*Unidentified*	Basidiomycota	Tumors	All plant parts
25	*Unidentified*	Basidiomycota	Myopic	All plant parts
26	*Unidentified*	*Unidentified*	New injuries	Leaf
27	*Unidentified*	*Unidentified*	Hypertension, anemia and ulcers	Leaf
28	*Unidentified*	*Unidentified*	New injuries	Leaf
29	*Unidentified*	*Unidentified*	Constipation	Leaf
30	*Unidentified*	*Unidentified*	Jaundice	Leaf

medicines, a total of 28 kinds of diseases were reported to be treated. Due to limited access to health facilities, these traditional medicinal plants still have an important role in some ethnic Mamuju communities. The medical uses of different plants and plant components which were reported by the survey respondents are summarized in Table 3.

Table 3. Data on medicinal plants used by ethnic Mamuju, West Sulawesi, to treat medical problems

In treating a specific type of disease, people often use more than one type of plant in the form of potions. The use of traditional medicine is still widely practiced by people of Mamuju ethnicity, particularly for the treatment of medical issues that are regarded as being relatively mild, including coughs, skin diseases, diarrhea, wounds, fevers and headaches.

For the relatively mild problem of itches, the most widely plants used are red onion (*Allium cepa*), coconut (*Cocos nucifera* L.), pariah (*Momordica charantia*), and avocado (*Persea americana*). Among the four types of medicinal herbs, the most frequently and commonly used by people in the Mamuju ethnic group to treat itches is *Momordica charantia.* This plant species is generally readily accessible and is often cultivated in household yards and gardens.

The types of traditional medicinal herbs used by the Mamuju ethnic group involve as many as 33 types of herbs. The herbs in question may be used individually (one species) or more than one kind, to treat various types of medical problems. Among the respondents in this study, one fourth reported that they used various plants in the form of herbs for the treatment of a range of medical problems. The use of the herbs varied, ranging from being boiled and then consumed as a drink, being used for bathing, or being crushed into a powder and then used to cover a medical problem (e.g. an injury). Some herbs are also first burnt with the ashes then being used for treatment. There is one medicinal herb which is mixed with chicken broth and then used as a protein supplement to accelerate the healing process.

Although there has been a reduction in the use of traditional plant based medicines in recent time, the ethnic Mamuju still appreciate the belief and traditions related to their use, which have been handed down through generations. The continuing use of these plants is reflected in the fact that they are often present in the house yards or gardens, and/or in community gardens, allowing them to be readily collected and used. Also, based on the interviews, the ethnic Mamuju have a concern about the loss of medicinal plants from the traditional/wild environment as a result of urban and agricultural developments, such that the plants are becoming less available in the natural environment. Included among these plants are *Loranthus* species which grows on rock and is only harvested when needed.

Despite the constraints about the ongoing use of plants for medicinal purposes, one point highlighted in the ongoing choice of this type of medicine is the fact that the cost of such treatment is relatively inexpensive relative to other options based on the use of processed and retailed medicines. Furthermore, these 'natural drugs' are regarded as being safe and do not require close supervision for their use or need the help of paramedics. Rather, family members can administer the medical treatment if the diagnosis of the medical problem needing treatment is clear. Further research will be conducted to examine medicinal plants and their traditional uses by other communities in different parts of Sulawesi.

Conclusion

There are 30 types of plants which are used as traditional medicines by the people in the Mamuju ethnic group ethnic Mamuju to treat 28 types of diseases. The 30 plant types used as sources of traditional medicines comprise 23 different species while 7 plants have yet to be taxonomically identified. The plant components which are used for medicinal purposes by the ethnic Mamuju include all plant components with the exception of roots, stems, rhizomes and tubers. The plant components most commonly used are the leaves, fruit and bark. The forms in which the traditional medicinal plants are mostly used by the ethnic Mamuju include kneaded or crushed materials, boiled and baked materials.

Acknowledgments

This study is the result of the cooperation of a number of people and agencies. The authors would like to thank the Higher Education (DIKTI), Indonesian Ministry of Education Research Centre/Lembaga Penelitian, Universitas Negeri Makassar for their support to this study. The authors specifically thank Ms. Ati for introducing the researchers to local informants and for being a guide to Karampoang Island, Mamuju, Mr. Zamzam for his assistance in working with the informants and for assisting in preparing the plant samples, Mr. Adiputra Rahman for his assistance in preparing plant samples, Mr. Muhamad Akbar, Mr. Aswal and other friends who cannot be named individually, for a lot of assistance provided throughout the study. Special thanks

also traditional healers in West Sulawesi for their willingness to share information about the plants used as sources of traditional medicines.

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