

TRADITIONAL KNOWLEDGE ON THE USES OF MEDICINAL PLANTS AMONG THE ETHNIC COMMUNITIES IN KUDAT, SABAH, MALAYSIA

Julius Kodoh

Faculty of Science and Natural Resources, Forestry Complex, Jalan UMS,
88400 Kota Kinabalu, Sabah, Malaysia
Email: julius@ums.edu.my

Andy Russel Mojiol

Faculty of Science and Natural Resources, Forestry Complex, Jalan UMS,
88400 Kota Kinabalu, Sabah, Malaysia
Email: andy@ums.edu.my

Walter Lintangah

Faculty of Sciences and Natural Resources, Forestry Complex, Jalan UMS,
88400 Universiti Malaysia Sabah
Email: walterjl@ums.edu.my

Folistinah Gisiu

Faculty of Science and Natural Resources, Forestry Complex, Jalan UMS,
88400 Kota Kinabalu, Sabah, Malaysia

Mandy Maid

Faculty of Sciences and Natural Resources, Forestry Complex, Jalan UMS,
88400 Universiti Malaysia Sabah
Email: mandy21@ums.edu.my

Liew Kang Chiang

Faculty of Sciences and Natural Resources, Forestry Complex, Jalan UMS,
88400 Universiti Malaysia Sabah
Email: liewkc@ums.edu.my

ABSTRACT

*Medicinal plants have been used by the ethnic communities of Sabah for ages. They have their own traditional practices of uses to treat ailments based on the traditional knowledge and experience inherited from the older generation. This paper presents the traditional practices of medicinal plants that were used as sources of alternative medicine by seven ethnic communities in Kudat district of Sabah. Data were collected from eight villages through personal interviews and observations. A total of 69 species of plants from 41 families were identified as medicinal plants used to treat 47 ailments, mainly high blood pressure, yellow fever, fever, stomachache and smallpox. *Areca catechu* (Palmae), *Zingiber officinale* (Zingiberaceae) and *Psidium guajava* (Myrtaceae) were the most frequently used medicinal plants being used with about 30 plants had similar uses among the ethnics groups. Fruit, leaves and rhizome were the most used parts of the plants. Boiling and mashing were the most traditional practices of preparation the prescriptions, which were commonly consumed by drinking and eating.*

Keywords: Traditional practices, medicinal plants, ethnic communities.

INTRODUCTION

Medicinal plants are one of the potential natural sources that mostly have been traditionally used by the local community as a traditional medicine (Mustafa et al., 2010). Most Medicinal plants are consist of herbs, shrubs and trees (Rao & Ramanatha, 1998), that can be obtained from forests (Kulip, 1997) and own farm around houses (Kulip, 1997; Kodoh, 2006). Malaysia's forest is among the world's 12 biodiversity richness spot in the world. This great diversity of flora species in the tropical rainforest of Malaysia is expected to be a potential source of valuable and beneficial usage of medicinal plants (Lee et al., 2014). Thus, Malaysia has an enormous potential in producing natural pharmaceutical products in the global market. But, selecting the local medicinal plants in Malaysia is yet to be studied (Lee et al., 2014).

Sabah, formerly known as North Borneo (situated in northern Borneo) is the second largest state in Malaysia with the total land area of approximately 7.4 million hectares, and the total forested area is 4.7 million hectares. Plants from the forest have been used for medicinal uses and play an important role in the socio-economic development of Malaysia (Azizol & Appanah, 1998); and have provided useful and valuable materials for the local people of the state of Sabah (Kodoh et al., 2009; Dransfield, 1984). There is an estimate of 42 ethnic groups with over 200 sub-ethnic groups in Sabah (Julia, 2016). Although medicinal plants have been used by the ethnic communities of Sabah for ages, the traditional ways of uses were rarely documented. Thus, it is

important to document the traditional practices of the different ethnic groups, in their ways of medicinal plants uses to sustain their livelihood and future generation references. Therefore, the objective of this study was to identify the species of medicinal plants that were used as sources of alternative medicine through traditional practices by the various ethnics in the selected villages of Kudat district. The results of this study will be documented as a future reference.

METHODOLOGY

The general approach of this study was to survey the ethnic communities practised of medicinal plants uses as a source of alternative medicine. The study was conducted at Kudat district of Sabah. Kudat is situated at the tips North of Borneo with an estimated population of 119,200 comprises the Bajau, Rungus, Suluk, Murut and Dusun ethnic groups, besides the Chinese and Malay communities (Borneo Bulletin, 2017). The study areas consisted of eight villages, namely, Kg. Bukit Dompok, Kg. Limau-limauan, Kg. Indarasan Laut, Kg. Indarasan Dendulit, Kg. Longgom Besar, Kg. Longgom Kecil, Kg. Tongkan and Kg. Sungai Karang. Data were collected based on personal interviews and observations from the plant informants (respondents) who demonstrated the used of the medicinal plants from their backyard gardens, orchards and the surrounding forest (Alexiades & Sheldon, 1996). The medicinal plants that were easily identified in the field were not collected, but the unidentified plants were taken to the herbarium of Universiti Malaysia Sabah (UMS) for further identification by the staff of UMS. Previously publication on medicinal plants of Sabah by Mojiol et al. (2010), Kulip et al. (1999, 2005), Kodoh (2005), Sukup et al. (2000), and Guntavid (1992) was also referred. The types of data collected were based on Kulip et al. (2005) which are consist of information on the botanical and vernacular name, family name, types of ailment treated, parts of the plant used, preparation and uses methods, and the ethnic involved.

RESULTS AND DISCUSSIONS

A total number of 58 respondents were interviewed comprising of 40 females and 18 males. Most of them were uneducated and unemployed but still practising and using the traditional knowledge and experience of the older generation on the uses of the medicinal plants. There were seven ethnics involved, namely, Rungus, Kadazandusun, Bajau, Kedayan, Sungai, Irrannun and Jawa. A total of 69 species of plants from 41 families were identified as medicinal plants to treat 47 ailments as utilized by the ethnics which categorised based on parts of plants used (Table 1 to Table 6). The five foremost ailments being treated were hypertension, yellow fever, stomachache, fever and smallpox, while stomachache and fever were the common ailments treated among the Kadazandusun ethnic. According to Kulip et al., (2005), there are 120 species of medicinal plants used to treat 55 ailments by the Kadazandusun ethnic in Sabah.

Table 1: Rhizome as part of Medicinal plants used

No.	Species	Family	Types of ailment treated	Parts of plant used	Method of preparing medication	Method of using medication	Ethnic involved
1.	<i>Zingiber officinale</i>	Zingiberaceae	Sprain	Rhizome	Mash	Patch	S
			Flatulence, Stomachache	Rhizome	Boil	Drink	S
			Possessed	Rhizome	Mash	Bath	B
			Rheumatism/joint pain	Rhizome	Mash	Drink / Rub	B
			Flatulence	Rhizome	Boil / Mash	Drink / Rub	B,I,K,R
			Sprain	Rhizome	Mash	Rub, Patch	B,I
			Blood circulation	Rhizome	Boil	Drink	K
2.	<i>Curcuma longa</i>	Zingiberaceae	Boneache	Rhizome	Boil	Bath	R
			Flatulence	Rhizome	Boil	Drink	S,B,I
			Post-partum	Rhizome	Boil / Mash	Drink / Eat	I,K
			Reduce pimples	Rhizome	Mash	Rub	K
			Flatulence	Rhizome	Blanch	Eat,Rub	K
3.	<i>Alpinia spp.</i>	Zingiberaceae	Flu	Rhizome	Mash	Rub	R
4.	<i>Allium ascalonicum</i>	Liliaceae	Rheumatism/joint pain	Rhizome	Mash	Rub	B
			Fever	Rhizome	Mash	Rub	J
			Flatulence	Rhizome	Mash	Eat	KD
			Rheumatism/joint pain	Rhizome	Mash	Patch	R
5.	<i>Allium sativum</i>	Liliaceae	Headache	Rhizome	Mash	Rub	R
			Hypertension	Rhizome	Fry	Eat	B
			Stomachache	Rhizome	Mash	Patch	J

Table 2: Leaves as part of Medicinal plants used

No.	Species	Family	Types of ailment treated	Parts of plant used	Method of preparing medication	Method of using medication	Ethnic involved
1.	<i>Eleusine indica</i>	Poaceae	Hair growth problems	Leaves	Mash	Rub	KD,R
2.	<i>Caladium sp.</i>	Araceae	Sting by insects	Leaves	Mash	Rub	K,R

3.	<i>Colocasia gigantea</i>	Araceae	Scabies	Leaves	Frozen	Rub	S
4.	<i>Momordica charantia</i>	Cucurbitaceae	Yellow fever	Leaves	Boil	Bath	B,R
			Hypertension	Leaves	Boil	Drink	KD
			Fever	Leaves	Boil	Bath	R
5.	<i>Aloe vera</i>	Liliaceae	Reduce pimples	Leaves	Squeeze	Rub	B, R
			External wound	Leaves	Squeeze	Rub	KD,R
			Sting by insects	Leaves	Squeeze	Rub	I
7.	<i>Solanum melongena</i>	Solanaceae	Diabetes	Leaves	Boil	Drink	R
8.	<i>Averrhoa bilimbi</i>	Oxalidaceae	Hypertension	Leaves	Boil	Drink	B
9.	<i>Blumea balsamifera</i>	Compositae	Intestinal worms	Leaves	Boil	Drink	R
10.	<i>Psidium guajava</i>	Myrtaceae	Stomach ache	Leaves	Boil / Squeeze	Drink / Eat	S,B,J, KD,I,R
			Post-partum, Scabies	Leaves	Boil	Drink	B
			Reduce pimples	Leaves	Mash	Patch	K
11.	<i>Pereskia bleo</i>	Cactaceae	Hypertension	Leaves	Boil	Drink , Eat	KD
12.	<i>Eupatorium odoratum</i>	Asteraceae	Sting by insects	Leaves	Mash	Patch	S
			External wound	Leaves	Mash	Patch	S,B,KD,K
			Scabies	Leaves	Mash	Patch	I
13.	<i>Morinda citrifolia</i>	Rubiaceae	Headache	Leaves	Mash	Patch	S
			Rheumatism/joint pain	Leaves	Boil	Drink	B
			Rheumatism/joint pain	Leaves	Fry	Patch	KD
			Hypertension	Leaves	Mash	Drink	I
14.	<i>Orthosiphon stamineus</i>	Lamiaceae	Hypertension	Leaves	Boil	Drink	S,B,KD,R
			Hypertension	Leaves	Boil	Eat	R
15.	<i>Lawsonia terma</i>	Lythraceae	Toothache	Leaves	Mash	Eat	J
16.	<i>Stenochlaena Palustris</i>	Stenochlaenae	Malaria	Leaves	Boil	Drink	R
17.	<i>Centella asiatica</i>	Mackinlayaceae	Yellow fever	Leaves	Boil	Drink / Bath	S,B
18.	<i>Melastomata sp.</i>	Melastomataceae	Post-partum	Leaves	Boil	Patch	S
19.	<i>Cymbopogon citratus</i>	Gramineae	Yellow fever	Leaves	Blanch	Bath	B
			Hair growth problems	Leaves	Squeeze	Rub	R
20.	<i>Cyrtandromoe a grandis</i>	Crussulaceae	Scalded skin	Leaves	Mash	Patch	B
			Sting by insects	Leaves	Mash	Rub	B
21.	<i>Piper betle</i>	Piperaceae	Body odour problem	Leaves	Squeeze	Bath	KD
			Whitening skin	Leaves	Squeeze	Rub	KD
			Diabetes	Leaves	Boil	Drink	KD
			Toothache	Leaves	Squeeze	Eat	I
			Fever	Leaves	Boil	Drink	K

Table 3: Fruit, seed, hull and kernel as part of Medicinal plants used

No.	Species	Family	Types of ailment treated	Parts of plant used	Method of preparing medication	Method of using medication	Ethnic involved
1.	<i>Cocos nucifera</i>	Palmae	Smallpox	Young fruit	Squeeze	Drink	B,I,R,S
			Scabies	Fruit hull	Burn	Steam	B
			Fever	Kernel	Squeeze	Rub	B
			Smallpox	Young fruit	Squeeze	Eat	KD
			Hair growth problems	Young fruit	Squeeze	Rub	KD,K
			Kidney stone, Smallpox	Young fruit	Squeeze	Drink	K
2.	<i>Cocos sp.</i>	Palmae	Hypertension	Fruit hull	Boil	Drink	K
			Smallpox	Young fruit	Squeeze	Drink	S
3.	<i>Areca catechu</i>	Palmae	Toothache	Mature fruit	Mash	Eat	KD / R
4.	<i>Benincasa hispida</i>	Cucurbitaceae	Fever	Young fruit	Boil	Drink	J,KD
5.	<i>Momordica charantia</i>	Cucurbitaceae	Cough	Young fruit	Mash	Drink	B

6.	<i>Citrullus Lanatus</i>	Cucurbitaceae	Hair growth problems	Young fruit	Squeeze	Rub	R
7.	<i>Musa acuminata</i>	Musaceae	Gastritis Mouth ulcer	Young fruit Mature fruit	Boil Squeeze	Eat Rub	B,J B
8.	<i>Citrus microcarpa</i>	Rutaceae	Hypertension Reduce weight	Young fruit Young fruit	Squeeze Squeeze	Drink Drink	S J
9.	<i>Citrus auranticum</i>	Rutaceae	Yellow fever	Young fruit	Blanch	Drink	B
10.	<i>Erythrina spp</i>	Fabaceae	Scabies	Fruit hull	Boil	Bath	KD
11.	<i>Tamarindus indica</i>	Leguminosae	Cough, Sting by insects	Young Fruit	Boil	Drink	B,I,K
12.	<i>Rhizophora apiculata</i>	Rhizophoraceae	Hypertension, Breast cancer	Young Fruit	Boil	Drink	B
13.	<i>Carica papaya</i>	Caricaceae	Haemorrhoids Increase breast milk Fever Hypertension	Mature fruit Young fruit Young fruit	Squeeze Boil Boil	Eat Eat Eat	KD KD R
14.	<i>Manilkara zapota</i>	Sapotaceae	Tooth ache	Young fruit	Mash	Patch	B
15.	<i>Morinda citrifolia</i>	Rubiaceae	Haemorrhoids Cancer	Young fruit Young fruit	Boil Mash	Eat Drink	I K
16.	<i>Centella asiatica</i>	Mackinlayaceae	Yellow fever	Young fruit	Squeeze	Drink	I
17.	<i>Scaphium longiflorum</i>	Sterculiaceae	Fever	Young fruit	Blanch	Drink	K
18.	<i>Oryza sativa</i>	Poaceae	Fever	Seed	Fry	Drink	B
19.	<i>Oryza spp.</i>	Poaceae	Smallpox	Seed	Boil	Eat	J
20.	<i>Vigna radiata</i>	Fabaceae	Fever	Seed	Boil	Drink	B

Table 4: Stem and bark as part of Medicinal plants used

No.	Species	Family	Types of ailment treated	Parts of plant used	Method of preparing medication	Method of using medication	Ethnic involved
1.	<i>Etilngera Coccinea</i>	Zingiberaceae	Kidney stone	Stem	Squeeze	Eat	KD
2.	<i>Curcuma aeruginosa</i>	Poaceae	Hypertension	Stem	Squeeze	Drink	R
3.	<i>Caladium sp.</i>	Araceae	Sting by insects	Stem	Mash	Rub	K,R
4.	<i>Alocasia macrorrhiza</i>	Araceae	Sting by insects	Stem	Squeeze	Rub	R
5.	<i>Momordica charantia</i>	Cucurbitaceae	Fever	Stem	Boil	Bath	R
6.	<i>Bambusa sp.</i>	Gramineae	Child developmental problems	Stem	Squeeze	Drip, Drink	KD
7.	<i>Pedilanthus titymaloides</i>	Euphorbiaceae	Sting by insects	Stem	Squeeze	Rub	KD
8.	<i>Musa acuminata</i>	Musaceae	Reduce intoxication	Stem	Mash	Eat	KD
9.	<i>Musa sp.</i>	Musaceae	Reduce intoxication Post-partum	Stem Stem	Mash Boil	Eat Eat	KD K
10.	<i>Averrhoa bilimbi</i>	Oxalidaceae	Hypertension	Stem	Boil	Drink	B
11.	<i>Blumea balsamifera</i>	Compositae	Rash	Stem	Boil	Drink	S
12.	<i>Ceiba pentandra</i>	Bombacaceae	Abscess	Stem	Frozen	Rub	B
13.	<i>Lansium domesticum</i>	Meliaceae	Toothache	Bark	Boil	Mouthwash	KD
14.	<i>Lawsonia terma</i>	Lyhraceae	Toothache	Stem	Mash	Eat	J
15.	<i>Terminalia catappa</i>	Combrataceae	Fever	Stem	Boil	Bath	K

16.	<i>Eurycoma longifolia</i>	Simaroubaceae	Diabetes	Stem	Boil	Drink	I
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Table 5: Flower, shoot and root as part of Medicinal plants used

No.	Species	Family	Types of ailment treated	Parts of plant used	Method of preparing medication	Method of using medication	Ethnic involved
1.	<i>Areca catechu</i>	Palmae	Hypertension	Root	Boil	Drink	B
2.	<i>Calamus</i> sp.	Palmae	Headache Yellow fever	Shoot Root	Mash Boil	Patch Drink	KD KD
3.	<i>Eleusine indica</i>	Poaceae	Hair growth problems	Root	Mash	Rub	KD,R
4.	<i>Saccharum officinarum</i>	Poaceae	Yellow fever Flu	Root Root	Boil Boil	Drink Drink	R KD
5.	<i>Alocasia macrorrhiza</i>	Araceae	Sting by insects	Root	Squeeze	Rub	R
6.	<i>Bambusa vulgaris</i>	Gramineae	Yellow fever	Root	Boil	Drink	S
7.	<i>Imperata cylindrica</i>	Graminae	Flatulence, Fever Stomachache Post-partum Smallpox	Root Root Root Root	Boil Boil Boil Boil	Drink Drink Drink Drink	S B K R
8.	<i>Manihot esculenta</i>	Euphorbiaceae	Scalded skin	Shoot	Frozen	Rub	KD
9.	<i>Hibiscus rosasinensis</i>	Malvaceae	Abscess Yellow fever	Flower Flower	Mash Boil	Patch Bath	KD R
10.	<i>Hibiscus rosasinensis</i> L. <i>albus</i>	Malvaceae	Menstrual cramps	Root	Boil	Drink	KD
11.	<i>Heritiera littoralis</i>	Malvaceae	Stomachache	Root	Boil	Drink	S
12.	<i>Capsicum frutescens</i>	Solanaceae	Menstrual cramps	Root	Boil	Drink	KD
13.	<i>Solanum tarvum</i>	Solanaceae	External wound	Shoot	Mash	Patch	R
14.	<i>Averrhoa carambola</i>	Oxalidaceae	Gastritis	Root	Boil	Drink	KD
15.	<i>Citrus auranticum</i>	Rutaceae	Continuous menstruation	Root	Boil	Drink	R
16.	<i>Rhizophora apiculata</i>	Rhizophoraceae	Hypertension	Root	Boil	Drink	B
17.	<i>Amaranthus</i> sp.	Amaranthaceae	Cough	Root	Boil	Drink	B
18.	<i>Carica papaya</i>	Caricaceae	Malaria Sinusitis Hypertension Fever, rheumatism/joint pain Fever Hypertension	Shoot Flower, Root Shoot Shoot Shoot Flower	Boil Mash Boil Boil Mash Boil	Eat Respire Eat Drink Patch Eat	S B J I K R
19.	<i>Blumea balsamifera</i>	Compositae	Rash	Root	Boil	Drink	S
20.	<i>Artocarpus champeden</i>	Moraceae	Yellow fever	Root	Boil	Drink	KD
21.	<i>Annona squamosa</i>	Annonaceae	Food poison	Shoot	Squeeze	Drink	K
22.	<i>Andrographis paniculata</i>	Acanthaceae	Stomach ache	Root	Boil	Drink	KD
23.	<i>Psidium guajava</i>	Myrtaceae	Stomach ache Fever	Shoot Shoot	Boil Boil	Drink / Eat Drink	S,B,J, KD,I,R K
24.	<i>Ceiba pentandra</i>	Bombacaceae	Sprain	Shoot	Boil	Drink	KD

25.	<i>Morinda citrifolia</i>	Rubiaceae	Hypertension	Root	Boil	Drink	J
			Hypertension	Root	Mash	Drink	I
			Yellow fever	Shoot	Boil	Bath	R
26.	<i>Orthosiphon stamineus</i>	Lamiaceae	Hypertension	Root	Boil	Drink	S,B,KD,R
			Diabetes	Shoot	Boil	Drink	K
27.	<i>Terminalia catappa</i>	Combrataceae	Fever	Root	Boil	Bath	K
28.	<i>Melastomata</i> sp.	Melastomataceae	Ease childbirth	Root	Boil	Drink	KD
29.	<i>Eurycoma longifolia</i>	Simaroubaceae	Hypertension	Root	Mash	Drink	I

Table 6: Whole plant part of Medicinal plants used

No.	Species	Family	Types of ailment treated	Parts of plant used	Method of preparing medication	Method of using medication	Ethnic involved
1.	<i>Phyllanthus amarus</i>	Euphorbiaceae	Reduce pimples	Whole plant	Mash	Rub	K
2.	<i>Flammulina</i> sp.	Auriculariaceae	Yellow fever	Whole plant	Boil	Bath	R
3.	<i>Centella asiatica</i>	Mackinlayaceae	Fever	Whole plant	Blanch	Drink	B

Abbreviation for ethnic involved: Bajau=B, Rungus=R, Kadazandusun=KD, Kedayan=K, Irrannun=I, Sungai=S and Jawa=J

The medicinal plants that most used by all the ethnics involved in this study were *Zingiber officinale* (Zingiberaceae), *Psidium guajava* (Myrtaceae), *Carica papaya* (Caricaceae) and *Morinda citrifolia* (Rubiaceae), while the most frequently used was *Areca catechu* (Palmae). The families under Zingiberaceae, Palmae and Poaceae were the most utilised as medicinal plants where mostly cultivated around the communities houses as it was hard and time-consuming to collect them in the forest (Kulip, 1997). Based on the used parts of the plant, about 30 plants are being used similarly by the ethnics. Mostly were *Zingiber officinale* (Zingiberaceae), *Tamarindus indica* (Leguminosae), *Psidium guajava* (Myrtaceae), *Eupatorium odoratum* (Asteraceae), *Cocos nucifera* (Palmae), *Curcuma longa* (Zingiberaceae), *Aloe vera* (Liliaceae) and *Orthosiphon stamineus* (Lamiaceae). Parts of the plant used were from rhizome, fruits (young/mature), leaves, root, stem, shoot and bark. The whole parts of some plants can also being used (Mustafa et al., 2010). Their traditional practices of preparation the prescriptions were boiling, mashing, squeezing, blanching, burning and frying, which were consumed by drinking, eating, patching, rubbing, bathing, steaming, dripping, respiring and mouth washing. The differences in the use of the medicinal plants was influenced by the species of the medicinal plants used, the type of disease treated, the condition of the individual being treated, the content of the plants being used, the culture of practice, the experience and knowledge of the ethnics. This study was also found that most of the respondents still using their traditional methods or ways of the uses of the medicinal plants, based on practical experience, observation, and rituals derived from socioreligious beliefs (Sooi and Keng, 2013), which inherit from generation to generation (Mustafa et al., 2010), usually the elderly (Kulip et al., 2005).

CONCLUSION

There are 69 species of medicinal plants utilized by all ethnics involved, with about 30 species were being used in a similarly way. The most frequently medicinal plants used are from the families of Zingiberaceae, Palmae and Poaceae. A total of 47 ailments were recorded with hypertension, yellow fever, stomachache, fever and smallpox as the most ailments being treated. Fruit, leaves and rhizome are the most used parts. Boiling and mashing were the most traditional practices of preparation the prescriptions, which were commonly consumed by drinking and eating. These medicinal plants are still significant resources for the well-being of the local communities in Kudat district of Sabah. The local communities are still practising and using the traditional knowledge and experience inherited from the older generation on the uses of the medicinal plants. This traditional knowledge should be documented as a future reference for development of traditional medicine education and pharmaceutical industry.

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