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Inventory of Medicinal Plants for Fever Used by Four Dayak Sub Ethnic in West Kalimantan, Indonesia

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Abstract

Dayak ethnic in West Kalimantan consists of 151 subethnic, including Dayak Kanayatn, Daro', Bukat and Iban. Dayak community has long histrory on the knowledge of medicinal plants from the forest as one of the method to ward off the health problems. The knowledge of medicinal plants based on the experience and it has been inheritanced from the one generation to the next generation. One kind of disease that often affects to Dayak community and is treated using medicinal plants is fever. Aims of this research is to inventory medicinal plant species for fever used by four Dayak subethnic community in West Kalimantan. Method of the research is interviews to the traditional healers, traditional birth attendants, shaman and people who know the medicinal plants. The results showed that the medicinal plants for fever include 33 species of 19 family and the most dominant family (15.15%) is Rubiaceae. The most frequently used parts, process and administration route are leaves (51.52%), boiling (69.70%) and drinking (76.47%)., respectively.

Key words: inventory, fever, medicinal plants, Dayak ethnic, West Kalimantan

INTRODUCTION

West Kalimantan is the fourth largest area in Indonesia (26.98% of Indonesia total area) and forest cover in 2010 achieves 9.125.486 hectares (Sardana *et al*. 2011). People in forest community has been known and used medicinal plants from the forest as one of the method to ward off the health problems. Knowledge about medicinal plants is based on the experience and the skill have been inheritance from the one generation to the next generation. This knowledge also called ethnobotany, as the study of the utilitarian relationship between human beings and vegetation in their environment, including medicinal uses (Albuquerque *et al*. 2006). The dependence toward medicinal plants for cure of disease due to restrictiveness of health infrastructures and difficulties to find modern medicines. Even if modern health infrastructures are available, ability of people to buy modern medicine is limited, so the people will use medicinal plants that is easy to find in the forest. People who live in forest will be more motivated to conserve resources such as plant and animal, because they get benefit from this resources (Byg and Balsiev, 2001). The knowledge on utilization of medicinal plants from forest need to be conserved. Bennet (2005) stated that there is still lack documentation on indigenous knowledge on natural resources management in the forest, especially on utilization of medicinal plants. This condition made many researchers start to inventory the indigenous knowledge on medicinal plants such as Dutta *et al*. (2005) in Northeast India, Mahmood *et al*. (2011) in District Sialkot, Pakistan and Mala *et al*. (2012) in Kashmir Himalaya India.

People living around at the forest are dominated by Dayak ethnic. Dayak ethnic in West Kalimantan consist of 151 subethnic, including Dayak Kanayatn living mainly in Regency of Landak, Pontianak, Kubu Raya and Bengkayang and slightly in Ketapang and Sanggau; Dayak Daro' locate in Sanggau Regency; Dayak Iban and Dayak Bukat reside in Kapuas Hulu Regency (Aloy *et al*. 2008). Dayak's community use medicinal plants to treated several types of disease: scabies, wounds, sore eyes, broken bones, arthritis, treatment of pregnant and postpartum mothers, diabetes, fever and others. Diba *et al*. (2013) found that 70 species of plant has been used as a medicinal plant in Dayak ethnic. Among several type of diseases, fever is a disease that often people suffered. Based on the Damayanti research results (1999), malaria

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and fever was the first and second ranked types of disease suffered by various ethnic groups in Indonesia.

Fever is defined as a physiological response in the body against diseases that is mediated by cytokines and characterized by an increase of body temperature and activity of immune complexes. Fever is a symptom that accompanies some infectious diseases and non-infectious inflammatory diseases. On infectious diseases, fever can be caused by infection of viruses, bacteria, parasites, and fungi. Fever can also be caused by exposure to excessive heat (overheating), dehydration, allergies as well as immune system disorders. Fever symptoms can be ascertained from the examination body temperature that is higher than the normal range. It is also defined as high temperature of rectum (>38°C) or oral cavity (>37.8°C) or axillary (>37.2°C) (Susanti, 2012).

Plants used by Dayak ethnic in West Kalimantan as medicine for fever is very diverse. The diversity of medicinal plants species have not been completely documented This cause loss of the knowledge along with the reduction of traditional healers, traditional birth attendants, shaman and older people who knows medicinal plants well. Aim of this research is to inventory of species of medicinal plants used by Dayak Kanayatn, Dayak Daro', Dayak Bukat and Dayak Iban in West Kalimantan province as medicine for fever.

RESEARCH METHODOLOGY

The investigation were achieved in the following area: Sungai Enau village of Kuala Mandor B Sub district, Kubu Raya Regency and Sekabuk village of Sadaniang Subdistrict, Pontianak Regency for Dayak Kanayatn subethnic; Darok sub village of Bonti Subdistrict, Sanggau Regency for Dayak Daro' subethnic; Merakai Panjang village of Puring Kencana Subdistrict for Dayak Iban subethnic and Nanga Huvat subvillage of North Putussibau Subdistrict for Dayak Bukat subethnic of Kapuas Hulu Regency – West Kalimantan Province, Indonesia (Figure 1).

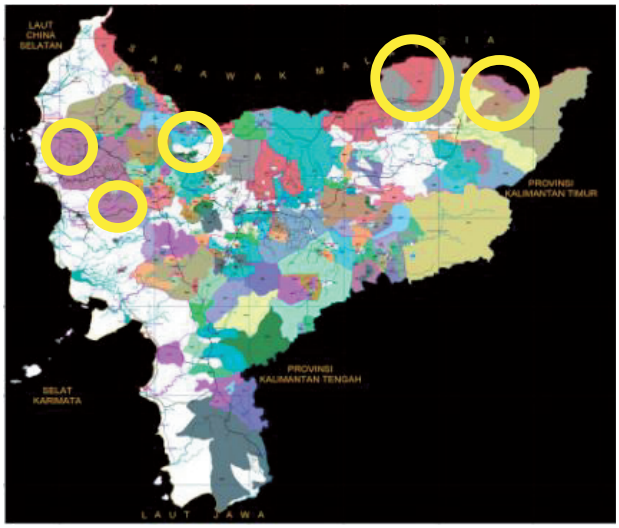

Figure 1. The five location of study (o) in West Kalimantan Province Indonesia.

The interview was conducted with snowball sampling technique using questionnaire, which consist of question about local name, plant part used, preparation method and way of usage and habitat of medicinal plants for fever. The informants are traditional healer, traditional birth attendants, shaman and the older people who knows about medicinal plants well. Based on the results of the interview, then the field observation for collecting voucher specimen and taking picture of the plants were continued. The plants specimen were collected, pressed, dried, and mounted on herbarium sheets. Their scientific names were identified by using hand lenses, monograph and floras and by matching with the scientific name in the book of flora of Kalimantan in laboratory.

RESULT AND DISCUSSION

Kinds of fever medicinal plants that used by each of Dayak sub ethnic are variety; Dayak Kanayatn sub ethnics have used the highest number of pkants (14 species) and the lowest kinds of species have been used by Dayak Bukat sub ethnics (6 species). Dayak Kanayatn sub ethnics have used the height number of medicinal plants for fever. This might be because they live two research area, Sungai Enau village and Sekabuk village. However, even just limited to one observation area, the highest kinds of plants (9 species) have been used in Sekabuk village. The complete result showed in Table 1.

Totally, 33 species have been used for fever by four Dayak sub ethnic in West Kalimantan Province. Among them, 11 species have been used for curing malaria. According to the study that conducted by Zuhud (2008), Indonesia have 2.039 medicinal plants species and 133 species (6.52%) of them have a function as fever medicinal plants that used by 30 ethnics, and 78 species (3.83%) have a function as anti malaria that used by 34 ethnics in Indonesia. Riswan and Andayaningsih (2008) stated that the people in Sasak ethnic in West Lombok province used 7 species as medicinal plant to overcome the fever. Result from the resarch of Lone *et al*. (2012) stated that 4 species is used for treating fever in Kupwara ethnic in Kashmir, India. Juliarti (2013) found that 4 species is used as medicinal plants to overcome fever in area of biosphere reserve in Giam Siak Kecil, Bukit Batu, Siak.

Table 1. The number of fever medicinal plants based on observation area.

No.	Observation Area	Dayak Subethnic	Medicinal Plant	Fever Medicinal Plant	Percentage (%)
1	Sungai Enau Village Kubu Raya Regency	Kanayatn	29	5	17.24
2	Sekabuk Village Pontianak Regency	Kanayatn	51	9	17.65
3	Darok Sub Village Sanggau Regency	Daro'	88	8	9.09
4	Nanga Huvat Sub village Kapuas Hulu Regency	Bukat	30	6	20
5	Merakai Panjang Village Kapuas Hulu Regency	Iban	51	8	15.69

The identification of medicinal plants for fever used by four Dayak sub ethnic showed that West Kalimantan Province have a big natural resources and biodiversity of medicinal plants. However, the existence of medicinal plants is feared to be lost with the decreasing of forest area. Sardana *et al*. (2011) reported that in 2010 the estimated forest cover will be decreasing rapidly to 1.962.614 ha or 21.51% of West Kalimantan due to the proposed changes of forest area to other purposes area. Threats to medicinal plant diversity by deforestation are not only in West Kalimantan, Indonesia. In Belize, south of Mexico and east of Guatemala the annual deforestation rate was 2.3%. The land clearing of forest area for agriculture made dameges of the habitat of medicinal plant. Plants such as contribo (*Aristolochia tribolata* L), greenstick (*Eupatorium morifolium* Mill), provision bark (*Pachira aquatica* Aubl), fig (*Ficus radule* Wild) and callawalla (*Phlebodium decumanum* Willd) become extinct. Many trees used for medicinal purposes are also used for timber, and continued logging of natural stands has significantly reduced their populations (Balick and O brien, 2004).

Indigenous people in Vila Velha Brazil is keen to conserve the plant in the forest which is used as medicines (Albuquerque and Albuquerque, 2005). They know the value of the plant. The knowledge of healers has long ancestral origin, which is the result of an intimate relationship with nature and experience. On the other hand, the influence of foreign cultures and the activity of clearing of land for agriculture such as plantation, industry and rural expansion are threatening these cultural and biological resources (Gazzaneo *et al*., 2005). This situation is similar with the forest condition in West Kalimantan. Therefore the conservation of plant and knowledge on medicinal plants need to documented. All of medicinal plants for fever in Dayak community in West Kalimantan can be seen in Table 2.

Table 2 shows that 19 family are used for fever, consisting of Rubiaceae (4 species), Euphorbiaceae (2 species), Menispermaceae (2 species) and other family (each of them is one species). The family of medicinal plants in Indonesia are 203 family, and the four highest family are Fabaceae (110 species), Euphorbiaceae (94 species), Lauraceae (77 species) and Rubiaceae (72 species) (Zuhud, 2008). The Dayak Tunjung sub ethnic in East Kalimantan used 47 species that consist of 27 families and 46 genus. The plants family are dominated by Euphorbiaceae (8 species), Rubiaceae (5 species), Verbenaceae (4 species) and Fabaceae (3 species) (Setyowati, 2010). Beside of that, the authors can not identifiy the scientific names of 7 fever medicinal plants species. The six of these seven species can be seen in Figure 2.

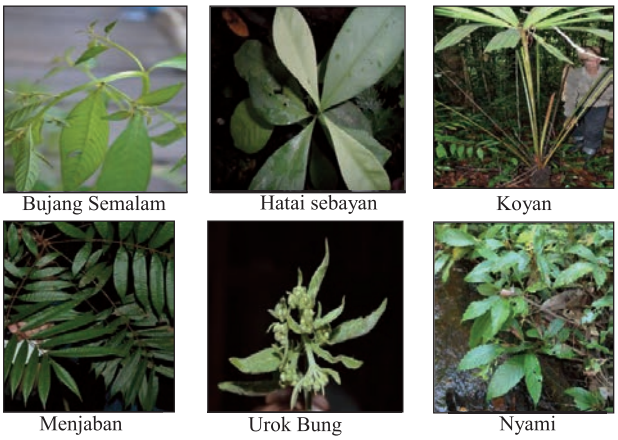

Figure 2. The unidentified of fever medicinal plants.

The Dayak ethnic have four ways to preparation medicinal herbs to treat the fever: boiling with water or soaked with hot water, crushed, shredded and without process. Thus the boiling with water are commonly used by Dayak ethnic and shredded way is the least to preparation medicinal herbs, that are 22 plants species (69.70%) and 2 species (6.06%), respectively. These result accord

Table 2. Medicinal plants for fever.

No.	Kinds of plant		Part of plants	Used Method	Dayak Subethnic
	Local name	Latin name (Family)			
1.	Bujang Semalam	-	Whole plants	Boiled (drink)	Kanayatn
2.	Putar Wali	*Tinospora crispa* (L.) Miers (Menispermaceae)	Stem (Malaria)	Boiled (drink)	Kanayatn
3	Daun Kupu	*Bauhinia* sp (Caesalpinioideae)	Leaf	Boiled (drink)	Kanayatn
4	Kencur/cekur	*Kaempferia galanga* (Zingiberaceae)	Rhizome	Grated (compress)	Kanayatn (Sungai Enau village)
			Leaf	Boiled (drink)	Kanayatn (Sekabuk village)
5	Mengkudu	*Morinda citrifolia* L (Rubiaceae)	Fruit	Boiled (drink)	Kanayatn
6	Akar kolera	*Tetracera akara* (Burm.f.)Merr. (Dilleniaceae)	Root	Boiled (drink)	Daro'
7	Boik cola	*Piper bsormentosum* Roxb (Piperaceae)	Leaf	Without treated (compress)	Daro'
8	Daun mondayan	*Litsea firma* Hook (Lauraceae)	Leaf	Boiled (drink)	Daro'
9	Hatai sebayan	-	Leaf	Mashed (compress)	Daro'
10	Juka mbawa	*Justicia gendarussa* (Acanthaceae)	Leaf	Mashed (compress)	Daro'
11	Langsat	*Lansium domesticum* (Moraceae)	Bark (malaria)	Boiled (drink)	Daro'
12	Ongkoh kondie	*Chassalia curviflora* (Rubiaceae)	Root	Boiled (drink)	Daro'
13	Pohon arok	*Baccaurea lanceolata* (miq.) (Phyllanthaceae)	Bark	Boiled (drink)	Daro'
14	Pepaya/rungan	*Carica papaya* (Caricaceae)	Leaf (malaria)	Boiled (drink)	Kanayatn and Iban
15	Kelimau	*Ageratum conyzoides* L (Asteraceae)	Leaf	Mashed (compress)	Kanayatn
16	Pugaga	*Centella asiatica* (Apiaceae)	Whole plant	Boiled (drink)	Kanayatn
17	Limpeet	*Aglaonema litidum* (Euphorbiaceae)	Leaf (malaria)	Boiled (drink)	Kanayatn
18	Tamar Besi/sabar besi	*Geunsia petandra* (Rubiaceae)	Leaf (malaria)	Boiled (drink)	Kanayatn and Iban
19	Sosor Bebek	*Kalanchoa pinnata* (Crassulaceae)	Leaf	Without treated (compress)	Kanayatn
20	Jambu Batu	*Psidium guajava* L (Myrtaceae)	Fruit (dengue)	Grated (drink)	Kanayatn
21	Kokontut/daun kentut	*Paedaria feotida* (Rubiaceae)	Leaf	Boiled (drink)	Kanayatn and Iban
22	Koyan	-	Young stem (malaria)	Without treated (eat)	Bukat
23	Menjaban	-	Bark (malaria)	Mashed (drink)	Bukat
24	Urok Bung	-	Bark	Boiled (drink)	Bukat
25	Kihik	*Scleria sumatrensis* Retz (Cyperaceae)	Leaf	Boiled (drink)	Bukat
26	Akar Pahit	-	Root (Malaria)	Mashed (drink)	Bukat
27	Nyami	-	Fruit (Malaria)	Without treated (Eat)	Bukat
28	Kapuk	*Ceiba petandra* (Bombacaceae)	Leaf	Boiled (drink)	Iban
29	Kelampai	*Elateriospermum tapos* Bl (Euphorbaceae)	Leaf (malaria)	Boiled (drink)	Iban
30	Pasak Bumi	*Eurycoma longifolia* Jack (Simaroubaceae)	Root	Boiled (drink)	Iban
31	Rajang	*Asplenium nidus* L (Aspleniaceae)	Young leaf	Boiled (drink)	Iban
32	Temu akar	*Arangelisia flava* Merr (Menispermaceae)	Root (malaria)	Boiled (drink)	Iban
33	Medang	*Litsea odorifera* (Lauraceae)	Leaf	Boiled (drink)	Iban

with those of Mirdeilami *et al*. (2011) and Johnsy *et al*. (2013), in which they reported that preparation medicinal plants before consumption are boiling or extraction with water.

For administration, three method, drinking, putting and eating, are used. The highest number of using is a drinking (26 species/76.47%) and the lowest is eating (2 spesies/5.58%). The part of plants commonly used are leaves (17 species/51.52%), root (5 species/15.5%), 3 species of each part of fruit, bark, whole part and 2 species of wood stem. These result accord with the result of Zuhud (2008), in which the leaves is the highest plant part used as medicine (749 species/33.50%) in Indonisia. The highest usage rate of leaves is due to easiness of obtaining and processing them for medicine rather than those of bark, stem or root (Hamzari, 2008; Setyowati, 2010). Beside of that, the using of leaves will not cause apprehansion of conservation of medicinal plants (Setyowati, 2010).

CONCLUSION

Medicinal plants for fever used by Dayak Kanayatn, Daro', Bukat and Iban in West Kalimantan, Indonesia are 33 species. Among them, 11 species have a function as anti malaria. Rubiaceae is the family that are used most frequently. Used plant parts are leaves, stems, bark, roots, fruit and whole plant. Preparation of medicinal plants before use are boiled, crushed, shredded and without processed. Drinking, putting and eating are major administration ways. The proven scientific benefits of medicinal plants for fever is necessary in the later stages: bioactivity test both *in vitro* and *in vivo* and then identification of bioactive compounds.

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