SPECIES IDENTIFICATION OF TRADITIONAL MEDICINE PLANTS FOR WOMEN'S HEALTH IN EAST KALIMANTAN: LESSON LEARNED FROM LOCAL WISDOM

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SPECIES IDENTIFICATION OF TRADITIONAL MEDICINE PLANTS FOR WOMEN'S HEALTH IN EAST KALIMANTAN: LESSON LEARNED FROM LOCAL WISDOM. Traditional communities in East Kalimantan have been using traditional medicinal plants for centuries. This paper aims to identify the plant species used for traditional medicine for women's health in three tribes in East Kalimantan: Dayak Benuaq around Gunung Beratus Protection Forest, Dayak Bahau around Wehea Forest, and Kutai tribe around Kutai National Park. Medicinal plant species identification is important for plant breeding and developing utilization technology of those species. Data were collected by: 1) interview with traditional midwives and traditional medicinal plants users in those villages; 2) collecting the medicinal plant specimens in their natural habitat; 3) qualitative analysis of the interview records; 4) botanical identification of the specimens in Herbarium Wanariset Samboja; and 5) literature review about the usage of those medicinal plants by traditional communities in other places. This research result showed 44 medicinal plant species from 30 families for cosmetics, maternal uses, and women's reproductive health. The used parts of the medicinal plants were the roots, leaves, barks, stem, and fruits. The medicinal plants were processed by simple methods. There were 27 species also used by other communities for similar or different efficacies, and the active chemical compounds of 25 species have been known. The utilization of traditional medicinal plants are cheaper, more available, and accessible. However, the quality of the medicinal plants can not be guaranteed, and the dosage was not standardized. Therefore the medicinal plants need to be cultivated to ensure the quality and quantity, and to prevent species extinction.

Keywords: Traditional medicinal plants, species identification, East Kalimantan, tribes, women health

IDENTIFIKASI JENIS TUMBUHAN OBAT UNTUK KESEHATAN PEREMPUAN DI KALIMANTAN TIMUR: PEMBELAJARAN DARI KEARIFAN LOKAL. Masyarakat tradisional di Kalimantan Timur telah menggunakan tumbuhan obat tradisional sejak beratus tahun lalu. Tulisan ini bertujuan mengidentifikasi jenis-jenis tumbuhan obat tradisional yang dimanfaatkan untuk kesehatan perempuan oleh tiga suku di Kalimantan Timur, yaitu: suku Dayak Benuaq (sekitar Hutan Lindung Gunung Beratus), Dayak Bahau (Hutan Wehea), dan Kutai (sekitar Taman Nasional Kutai). Identifikasi jenis tumbuhan obat penting dilakukan sebagai dasar upaya budidaya dan pengembangan teknologi pemanfaatannya. Pengumpulan data dilakukan dengan cara: 1) melakukan wawancara dengan 5 (lima) bidan tradisional dan pengguna tanaman obat tradisional di desa-desa tersebut; 2) mengumpulkan spesimen tumbuhan obat di habitat alaminya; 3) melakukan analisis kualitatif terhadap hasil wawancara; 4) melakukan identifikasi botani spesimen tumbuhan obat di Herbarium Wanariset Samboja; dan 5) Studi pustaka untuk memperoleh informasi tentang penggunaan jenis-jenis tumbuhan obat tersebut oleh masyarakat tradisional di daerah lain. Penelitian ini telah mengidentifikasi dan mendokumentasikan 44 jenis tumbuhan obat dari 30 famili yang digunakan oleh masyarakat tradisional untuk kosmetika, kebidanan, dan kesehatan reproduksi perempuan. Bagian tumbuhan yang digunakan sebagai obat adalah daun, akar, batang, kulit batang, buah, bunga, dan biji. Pengolahan dilakukan dengan metode sederhana.

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Paling sedikit ada 27 jenis yang juga digunakan oleh masyarakat di tempat lain untuk khasiat yang sama maupun berbeda, dan senyawa kimia aktif 25 jenis telah diketahui. Penggunaan tumbuhan obat tradisional lebih murah, lebih tersedia, dan mudah diakses. Namun kualitas tumbuhan obat tersebut tidak bisa dijamin dan dosisnya tidak terstandar. Oleh karena itu tumbuhan obat tersebut perlu dibudidayakan untuk memastikan kualitas dan kuantitasnya, dan untuk mencegah kepunahan jenis.

Kata kunci : Tumbuhan obat tradisional, identifikasi jenis, Kalimantan Timur, suku, kesehatan perempuan

I. INTRODUCTION

Traditional communities living around the forest, especially those who had difficulties to reach modern health facilities, have been utilizing traditional medicinal forest plants from time immemorial. In those olden days herbal remedies provided the only relief when modern medicines were not available (Kulip, 2003). Traditional medicine is the only feasible source of healthcare for a vast number of people living in less developed countries, especially in rural areas (Marshall, 2011). Traditional medicine is the total sum of the knowledge, skill, and practices based on the theories, beliefs, and experiences indigenous to different cultures, used in the maintenance of health, and in the prevention, diagnosis, improvement or treatment of physical and mental illnesses. There is a significant demand for traditional and complementary medicine (TCM) both in terms of practices and practitioners worldwide. Over 100 million Europeans are currently users of traditional and complementary medicines. There are many more T&CM users in Africa, Asia, Australia and North America (World Health Organization, 2013). The Food and Agriculture Organization (FAO) reported in 2011 that an estimated 80% of the population in Africa and Asia rely largely on these plant-based drugs for their health care needs (Marshall, 2011). In the 21st century, natural products represent more than 50% of all drugs in clinical use. During the last 3 decades, up to 50% of the approved herbal medicines are either directly or indirectly taken from natural products, including plants, microorganisms, fungi and animals (Sakhya, 2016). The growing demand of herbal drugs are also driven by emphasis on a healthy living, and concerns over the side-effects of mainstream drugs (Rinaldi & Shetty, 2015). Therefore, further medical based research and cultivation efforts of the medicinal plant species is needed.

The tropical rain forests of East Kalimantan are rich in medicinal plant species. However, the medicinal plants are only known by their local names or specific characteristics. Traditional medicinal plant species identification has not yet been conducted. Species identification is important to plan further research on phytochemical contents and to conduct species cultivation in the future.

The women (as a different sex from men) have specific needs of medicine due to their biological and social conditions. Women are the main consumers of the herbal drugs, especially for the dietary supplements (Rinaldi & Shetty, 2015). The women in traditional communities around remoted forest areas are no exception for those specific need of medicine. The women in traditional communities usually use traditional medicinal plants for daily reproductive health, maternal purposes and beauty treatments. The knowledge of women's daily medicine needs has been inherited from mothers to daughters for years. A traditional community usually has one or several traditional midwives who are considered to have special knowledge in child birth, maternal, and reproductive health issues (Falah, Noorcahyati, & Sayektiningsih, 2013; Mupfimira, 2012; Okonofua, 2002; Strathy, 2000).

Knowledge about traditional medicinal plants for women's health has been handed down for generations orally, without written documentation. Moreover, in the inheriting process, the species used was only mentioned by local name, or even only by mentioning the specific characteristics of the species. The

species identification of women's medicinal plants has not been studied intensively. Once the medicinal plants species have been thoroughly identified and documented, then future research on their biological and phytochemical potential may provide important information on their safety and efficacy for women worldwide, who are searching for natural treatment for their medical problems. Furthermore, the cultivation effort of the medicinal plant species should be conducted.

This paper studies species identification and utilization of women's health medicine plants in three forest traditional communities in East Kalimantan. In addition to the purpose of documenting traditional knowledge, this paper is also expected to contribute information for ethno-botanists in developing technology for the utilization of medicinal plants.

II. MATERIAL AND METHOD

A. Studi Site

The field research has been conducted from June to November, 2010. Primary data was collected in three sites: a) Tanjung Soke and Gerunggung villages, around Gunung Beratus Protection Forest (GBPF), sub district of Bongan, West Kutai Regency; b) Nehas Liah Bing village, sub district of Muara Wahau, East Kutai Regency (around Wehea Forest); and c) Menamang villages, around the Kutai National Park (KNP), sub district of Sebulu, Kutai Kartanegara Regency. The three study sites were selected because traditional communities who lived in the surroundings have the knowledge and habit of using traditional medicinal plants for health. The research subjects included: a) Dayak Benuaq tribe community in Tanjung Soke and Gerunggung villages; b) Dayak Bahau community in Nehas Liah Bing village, and c) Kutai tribe community in Menamang Kiri and Menamang Kanan villages. The literature study had been conducted in 2013, and then it had been deepened in 2017.

General condition of the research location is described in Table 1.

B. Material and Tools

The objects of this research were: 1) the traditional midwives and village women in five villages (Tanjung Soke, Gerunggung, Nehas Liah Bing, Menamang Kiri, and Menamang Kanan villages) who considered have much knowledge about medicinal plants for women's health; and 2) medicinal plants around the Gunung Beratus Protection Forest, Nehas Liah Bing village, Wehea Forest, and Menamang villages.

Materials used in this study included: 1) an interview guidance, and 2) methylated spirit for preservation of medicinal plant specimens. Tools used in data collection were recorder, camera, plastic bags, machetes, cutting scissors, label paper, and newsprint.

C. Data Collection and Analysis Methods

This research used qualitative methods of the moderate participant observation, where the researchers were involved in the day-to-day activities of the informants (like farming activities or participation in traditional meeting), but did not follow the overall activities of the informants within a day (Sugiyono, 2007). The key informants were the traditional midwives, who according to the members of the traditional community were considered most knowledgeable or could recognize women's medicinal plants. There were five key informants who were selected using purposive sampling, one traditional midwife for each village of Tanjung Soke, Gerunggung, Nehas Liah Bing, Menamang Kiri, and Menamang Kanan. In addition to the key informants, interviews were also carried out with several village women who still use traditional medicines in everyday life. Interview with the village women have been conducted in their house separately (in Tanjung Soke and Gerunggung, and Menamang), and collectively in the community service centre (*gotong royong*) in Nehas Liah Bing.

The data were collected through the four steps outlined below :

1). Structured interviews with the key

Table 1. General conditions of research location

No	Aspect of condition	Tanjung Soke and Gerunggung	Nehas Liah Bing	Menamang
1.	Name of nearest forest area	Gunung Beratus Protection Forest (19,800 ha)	Wehea Forest (38,000 ha)	Kutai National Park (198,604 ha)
2.	Geographic location of the forest area	1°00'00.00" – 1°05'03.24" LS 16°15'51.61" - 116°21'22.98" BT	01° 34' 04.3" LU 116° 46' 02.2" BT	116° 57' 7.3" LU 0°13'41.7" BT
3.	Major tribe	Dayak Benuaq	Dayak Bahau	Kutai Menamang
4.	Other tribe	Banjar	Javanese, Buginese, and other tribes of Dayak	Javanese, Banjar, Buginese
5.	Number of residents	117 (Tanjung Soke), 99 (Gerunggung)	2500 people	1089 people
6.	Major religion	Islam	Catholics	Islam
7.	Major education level	Elementary school (> 70%)	Elementary school	Elementary school (>60%)
8.	Major livelihood	Farmers	Farmers	Farmers
9.	Other livelihoods	Wood industries labors, elementary school teacher	Chainsawmen, oil palm plantation and coal mining labors, fishermen, merchants	Oil palm plantation labors
10.	Customary ritual/ ceremonies	Still carried out several Dayak ceremonies as cultural heritages	Ritual ceremony before starting the rice planting and harvest festival	Not actively carried out, only for wedding ceremonies

informants. The local name, efficacy, used part, and utilization method of each medicinal plant were recorded;

2). Field observation guided by the key informants, and collecting herbarium specimens of the medicinal plants from their natural habitat around settlements, gardens, and the forest areas. Specimens that were easily identified in the field were only recorded, not collected. Unidentified specimens were numbered, collected and brought to the Herbarium at Wanariset Samboja for further identification. Whole parts of the small plants were should be collected. From a large plants or trees, 30-40 cm long pieces of organs were collected, mostly branches with leaves, flowers and fruit. Collected plant specimens were diluted in 70% alcohol in airproof plastic bag. These specimens were later dried and pressed in the Herbarium at Wanariset Samboja, East Kalimantan.

3). Identifcation of the herbarium specimens was done in the Herbarium at Wanariset. Species identification used morphological characteristics that could be compared with known databases in the Herbarium Wanariset. Characteristics observed included general characters, the structures of stems, roots and leaves, embryology

and flowers. The specimens were also deposited if have not yet been collected in the Herbarium Wanariset.

4). Literature review to get information about the usage of those medicinal plants by traditional communities in other places in the world.

III. RESULT AND DISCUSSION

People have found remedies within their habitat, and have adopted different strategies depending upon the climatic, phyto-geographic and faunal characteristics, as well as upon the peculiar culture and socio-structural typologies (Nichter, 1992 in Samuel et al., 2010). Due to their spesific biological and physical conditions and the socio-cultural demands, female human have specific needs of medication in order to maintain their health and beauties, as well as for the prevention and treatment of illnesses. For the women who live in the remote or isolated area where it is difficult to get medication or modern cosmetics, their special medicines were obtained from the plants that grew in the surrounding area, based on their ancestral knowledge passed down for decades or hundreds of years. They gained the knowledge and experience based on empirical and experimental observation of the existing plants in the vicinity, for example plant species that taste bitter allegedly is able to cure malaria, or a plant species that is able to regenerate quickly have the capability to recover the stamina (Falah et al., 2013).

A. Knowledge Inheritance System

The knowledge of utilization of traditional plants for women's health medicine passed down from mothers to daughter, usually being a secret or clandestine of a family lineage (Hariyadi, 2011; Noorcahyati, 2012; Trubus, 2010). In the Dayak community, although at the same tribe, each family can have traditional medicine knowledge which is different from their ancestors. The process of transfering medicinal plant knowledge is conducted orally, being a closed information or a secret, and not documented (Noorcahyati, 2012; Setyawati, 2010; Trubus, 2010). They stated that the knowledge of traditional medicine can only be passed on to people who have great intention and high willingness to learn (Falah et al., 2013).

In terms of delivering knowledge on utilization of medicinal plants, the results of interviews of several traditional healers indicated that they tend to be enclosed to outsiders. This is due to the consideration that traditional knowledge of medicinal plants is a heritage to be protected and kept secret. Knowledge is only delivered to certain people. Level of disclosure of information about the medicinal plants to outsiders is different at each location. For example, for the Dayak Siang people in Central Kalimantan, the act of delivering the information on medicinal plants to outsiders may be subject to a customary fine called jipen (Noorcahyati, 2012). The people of Dayak Benuaq in Tanjung Soke village required embedding nails and certain things of ritual offerings before taking specimens of medicinal plants in Gunung Beratus Protected Forest (Falah et al., 2013).

Respondents with the deepest traditional knowledge on women's health medicine were the traditional midwives who were all over 50 years age. At the present the usage of traditional medicine for women's health become abandoned and obsolette due to several factors such as the influence of modern education and lifestyle changes. The utilization of traditional plants is fading due to migration, restriction from religion, lost interest of younger generations and heavy dependence on modern medicine (Kulip, 2003). Deforestation for agricultural development and timber harvesting makes the resources scarce which also contributing to the loss of the knowledge. Currently, modern medicine is preferred by the youth because it is more practical (no need to collect ingredients, and to process and mix the potion) and is relatively easy to obtain (Falah et al., 2013). On the other hand, traditional herbal medicine has some advantages, especially for those living in remote areas : it's cheaper and affordable, the materials are available around the villages, the

efficacy had been proven by older people, and is considered to have no side effects compared to the mainstream modern chemical drugs.

B. Utilization Method of Medicinal Plants

This study has gathered data of about 44 medicinal plants species from 30 families which are used for women's health in forest communities around Gunung Beratus Protection Forest, Wehea Forest, and the villages of Menamang Kiri and Menamang Kanan. Out of the total seven species were used as reproductive health medicinal plants, 30 species as postpartum and maternal medicine, and 9 species as cosmetics. The families that had used most as medicinal plants are Leguminosae (6 species), Zingiberaceae (five species), Rubiaceae (5 species), and Euphorbiaceae (5 species). Three species used as medicine for more than one efficacies are: *Callicarpa longifolia*, *Blumea balsamifera*, and *Brucea javanica*.

The types of herbs that were often used by people have different life forms such as shrubs, trees, bushes, epiphytes, lianas, roots and grass. Utilization of shrubs as an ingredient in traditional medicines is more favorable than trees because it was easily collected by women. The use of trees as medicinal plants could be a possible threats to the species extinction, because they could be extinct if people are taking them excessively (Noorhidayah & Sidiyasa, 2005). In addition, cultivation of the trees is a long time process and the growth requirements are difficult. In GBPF, people did a specific ritual before taking the plants, by driving a nail to mark the location of the medicinal plants. In terms of conservation, the ritual was performed by the community to prevent excessive removal to and avoid the scarcity of medicinal plants in the future (Falah et al., 2013).

The mostly used parts of the plants as medicine were the roots (43.18%). Other used parts were the leaves (29.54%), barks (13.63%), stem (6.82%), fruits (4.54%), and all parts (2.27%). The roots become the most used parts, because the Dayak Benuaq in Tanjung Soke used the roots from various species to make potions for maternal uses, due to special phylosophy that every plant that could naturally germinat after being uprooted has the efficacy to recover health and stamina for the mother after childbirth (Falah et al., 2013). But from the conservation perspective, the uses of roots as medicine ingredients could led to the death of the plants (Noorhidayah & Sidiyasa, 2005).

People used simple methods to process the medicinal plants, such as squeezing, soaking, boiling, shredding, and pounding. The treatment dose was determined only by habits (such as a glass of water) or size of the patient's body.

Most of the medicinal plants were found in the forest (58.33%), while the rest grow wild in the resettlement area (41.67%). This indicates that cultivation of medicinal plants has not been conducted by the community. Collecting medicinal plants from the wild often causes inconsistent quality (variations in active ingredients) depending on the area the plants grow (Sakhya, 2016). Collecting from the wild also often results in the plants being mistaken and unwanted plant material included (World Health Organization, 2013).

C. Species Identification of Medicinal Plants Used for Women's Health

The species of traditional medicines plants used for women's health could be divided into three categories, i.e: a) medicinal plants species for women's reproductive health; b) medicinal plants species for maternal purposes; and c) medicinal plants species used as cosmetics for women's beauty care. Each category of women's medicinal plants would be described in the following paragraphs.

1. Species identification of medicinal plants used for women's reproductive health

An immense number of plant species have been and continue to be used by women and traditional healers worldwide in all aspects of women's health, such as menstruation, conception, pregnancy, birth, lactation, and the menopause (Stuart, 2004 in Michel et al.,

2007). Just like women and traditional healers in other traditional communities, women around Gunung Beratus Protected Forest, Wehea Forest, and Kutai National Park have used medicinal plants for maintain their reproductive health and cure reproductive organ illnesses. The species of medicinal plants used for women's reproductive health were described in Table 2.

The medicinal plants for women's reproductive health (Table 2) includes the species which are easily taken according to women physical condition, and could be found in gardens, yards, or the forest edge. The herbs were utilized to cure the regular problems of women's reproductive organs. The herbs processing was very simple and done manually, and the dosage was determined subjectively, only by habit or based on estimation of body-sized.

Almost all of the medicinal plants species in Table 2 are also used as folk medicinal plants

Table 2. The traditional medicinal plants used for women's reproductive health

No	Species/Family	Local name	Life form	Location*	Efficacy	Proceed and usage methods
1.	*Callicarpa longifolia* (Verbenaceae)	Garam payau	Little trees	1	Leucorrhoea treatment	Squeezing the leaves, boiling, then drinking the potion
2.	*Drymoglossum piloselloides* (L.) Presl. (Polypodiaceae)	Kete-kete	Epiphyt	3	Endometriosis treatment	A minimum of 3 leaves shredded, filtered, then drink once a day
3.	*Flemingia macrophylla* (Willd.) Merr. (Leguminosae)	Kayu kemudaan	Lianas (vines)	3	Maintaining feminine organ muscle in good condition	Boiling the roots then drink the potion
4.	*Macaranga winkleri* Pax & K.Hoffm (Euphorbiaceae)	Nge-laq meh biang	Trees	2	Treatment for menstrual cycle problem	Boiling the stems, drink the potion
5.	*Parameria polyneura Hook.f.* (Apocynaceae)	Manggarsih/ Serapat	Trees/ Shrubs	3	Firm vaginal muscles and strengthen the uterus	Boiling the roots, then drinking for 3 times a week
6.	*Phyllanthus urinaria* L. (Euphorbiaceae)	Niur Songo	Shrubs	3	Fertilizer	Washing then eating the fruits after menstrual period
7.	*Tinospora crispa* (Menispermaceae)	Sampai	Lianas	3	To treat abdominal pain during menstrual period Endometriosis	Washing then eating the roots sufficiently

Key* = 1. Gunung Beratus Protection Forest 2. Wehea Forest 3. Menamang

for the same or different efficacies in Asia and the tropical region worldwide (see Table 5). *Parameria polyneura* is also used by the Malay people for the same efficacy. The species have commercially produced as herbal medicine for women in Indonesia and Malaysia.

Some species belonging to the same genus as the medicinal plants in Table 2 are also used by other traditional communities as herbs for women. For example, in Lao PDR, *Macaranga denticulate* (Blume) Müll. Arg. (the same genus as *Macaranga winkleri*) is also used for postpartum recovery treatment. Also in Lao PDR, *Callicarpa arborea* Roxb. (the same genus as *Callicarpa longifolia*) is used for postpartum recovery treatment, expelling lochia, postpartum abdominal pain, perineal healing, and for uterus retracting (Lamxay, de Boer, & Bjork, 2011).

2. Species identification of traditional medicinal plants used for maternal uses

The traditional midwives usually gave medicinal plants for childbirth, postpartum use to recover mothers' stamina after delivering a baby, and increasing breast milk supply (lactogogue). The species of medicinal plants used for maternal use is described in Table 3.

Delivering a baby (childbirth) is a riskfull and exhausting struggle, therefore traditional midwives tend to used easily gained plants from the surrounding gardens, yards, or forest edge, so the postpartum medicinal treatment could be done quickly and efficiently for the safety and health of the mother and the baby. Most of the species listed in Table 3 have the life forms as lianas, shrubs, bushes, or small trees which could easily be collected by women. Traditional midwives only took the bark part of the large trees. Due to the emergency treatment of the mother, the traditional midwives also used to do simple method to proceed the plants to become traditional herb medicine, such as squeezing, simple cutting, and boiling. Indegenous people around Gunung Beratus Protection Forest have special philosophy to select plants species for the postpartum recovery, i.e. every plant that could naturally be germinated after being uprooted has the efficacy to recover health and stamina for the mother after childbirth (Falah et al., 2013).

At least 22 medicinal plant species in Table 3 are also used for the same or different efficacies in other communities, such as *Eurycoma longifolia* and *Ficus deltoidea*. Those two species not only have been used as medicines for various ailments in the Malay Archipelago, but also pharmaceutically tested to have medicinal chemical compounds (see Table 5). *Eurycoma longifolia* and *Ficus deltoidea* have been distributed and formulated as capsules, tea, and tonic tea throughout Malaysia (Bunawan, Amin, Bunawan, Baharum, & Noor, 2014; Effendy, Mohammed, Muhammad, Mohammad, & Shuid, 2012). The species *Arbus precatorius* that is used to make easy and smooth the childbirth by the Kutai people in Menamang villages also used for the same efficacy in Guinea-Bissau and Ivory Coast. The same species is also used for antifertility, contraceptive, and abortifacient in several communities in Asia and Africa (see Table 5), and has pharmaceutically be proven to have some medicinal effects, i.e. abortifacient, antiestrogenic, antifertility, anti-implantation, antispermatogenic, and contraceptive and/or interceptive effects (Ross, 2003).

3. Species identification of traditional medicinal plants used for cosmetics

Women always have an instinct to care for and beautify herself, even if they live in the isolated area. Therefore the women of the forest community have knowledge of utilizing the surrounding plants as cosmetics. The knowledge had passed down from mothers to daughters for the time immemorial. The species of medicinal plants used for cosmetics is described in Table 4.

All the herbs species in Table 4 were externally used medicines, used as powder or shampoo for skin and hair care. The herbs were manually processed into powder or shampoo by refining, squeezing, or pounding the leaves, roots, or fruit. Not all the species were easily taken, such as the leaves of the *Cananga odorata*

Table 3. The species of medicinal plants used for maternal uses

No	Species	Local name	Life form	Finding location	Efficacy	Processing and usage method
1.	*Abrus precatorius* L. Gaertn.(Leguminosae)	Penisip	Shrubs	3	1	Boiling the roots of penisip, belimbing and tabat barito, then drink the potion
	Cnestis platantha Griff. (Connaraceae)	Belimbing bikut	Woody lianas			
	Ficus deltoidea Jack. (Moraceae)	Tabat Barito	Epiphyte			
2.	*Aleurites moluccana* (Euphorbiaceae)	Kemiri	Trees	3	3	The bark is heated over a fire, then be trampled
3.	*Alpinia galanga* Willd. (Zingiberaceae)	Teraran	Shrubs	1,3	2	Washing the root, soaking, boiling, then drink the potion, or shredded and rubbed into skin of stomach
4.	*Blumea balsamifera* DC. (Asteraceae)	Kutai Sembung	Shrubs	1	2	Cutting the roots of *Morinda citrifolia, Hyptis brevipes, Blumea balsamifera, and mimosa pudica* into pieces, soaking, boiling, then drinking the potion
	Hyptis brevipes Poit. (Lamiaceae)	Rumput Fatimah	Shrubs			
	Morinda citrifolia L. (Rubiaceae)	Mengkudu	Shrubs			
	Mimosa pudica (Leguminosae)	Putri malu	Bushes			
5.	*Blumea mollis* (D.Don) Merr. (Compositae)	Sembung	Shrubs	3	2	Boiling the roots, drink the potion Refining the young leaves, mix with cold powder, apply to the whole body
6.	*Bougainvillea spectabilis* (Nyctaginaceae)	Kembang Kertas	Shrubs	1	2	Cutting the roots into pieces, boiling, then drinking the potion
7.	*Brucea javanica* (L) Merr. (Simaroubaceae)	Kayu Sumpit	Trees	1	2	Cutting the stem into pieces, boil it
8.	*Caesalpinia sappan* L. (Leguminosae)	Sepang	Shrubs	3	1	Drying inside part of the bark, brew it, then drink the potion during pregnancy and before childbirth
9.	*Callicarpa longifolia* Lam. (Verbenaceae)	Garam payau	Small trees	3	2	Boiling the bark then drink the potion
					4	Shredding the leaves, pouring water, filtering, then drink the water
10.	*Carica papaya* (Caricaceae)	Pepaya	Tree shaped shrubs	3	6	Soaking the root into boiled water, then drink the potion
11.	*Durio zibethinus* (Bombacaceae)	Durian	Trees	3	2	Pounding the bark, mix with the cold powder, apply to the whole body

Table 3 (Continued)

No	Species	Local name	Life form	Finding location	Efficacy	Processing and usage method
12.	*Eurycoma longifolia* Jack (Simaroubaceae)	Tongkat ali (pasak bumi)	Small trees	3	4	Boiling the roots, drink 3 times a day (minimum for 3 days)
13.	*Gonocaryum calleryanum* (Baill.) Becc. (Icacinaceae)	Kayu mati hidup	Small trees	3	2	Boiling the roots, drink the potion
14.	*Hiptage bengalensis* (Malpighiaceae)	Temelekar	Woody lianas	1	2	Cutting the roots into pieces, boiling, then drinking the potion Cutting the bark into pieces, pound it, taking the sap, then rubbing into stomach
15.	*Lepisanthes amoena* (Hassk.) Leenh (Sapindaceae)	Bengalun	Small trees	3	2, 6	The fruits and young leaves be cooked, mixed with fish, then be eaten
16.	*Lygodium circinnatum* (Burm.) Sw. (Schizaeaceae)	Mintu	Lianas	1	2	Cutting the roots into pieces, soaking, boiling, then drinking the potion
17.	*Mitragyna speciosa* Korth. (Rubiaceae)	Kedemba	Trees	3	2	The bark smothered in hot water, then be drunk one week after childbirth
18.	*Oroxylum indicum* (L.) (Bignoniaceae)	Bentolan	Trees	1	2	Cutting the roots into pieces, soaking, boiling, then drinking the potion
19.	*Paspalum conjugatum* (Graminae)	Beriwit	Herbs / grass	3	2	Refining the young leaves, soaking, filtering, then drink the potion
20.	*Passiflora foetida* L. (Passifloraceae)	Terong kumut	Lianas	3	5	Squeezing all of parts, soaking in the water, then drink the potion
21.	*Piper betle* (Piperaceae)	Sirih/ kerakap	Lianas	3	2	Boiling the leaves, drink the potion
22.	*Rothmannia schoemanii* (Teijsm. & Binn.) Triveng. (Rubiaceae)	Bentan Basap	Trees	3	2	Boiling the roots, drink the potion 3 times a day
23.	*Sida* sp. (Malvaceae)	Bembe	Bushes	1	2	Washing the root, soaking, boiling, then drink the potion
24	*Syzygium* sp. (Myrtaceae)	Kayu Serai	Trees	3	2	Boiling the stem, drink the potion 2 or 3 times a day
25	*Tamarindus indica* L. (Leguminosae)	Asam Jawa	Trees	3	2	Squeezing the root, soaking, boiling, then drink the potion

Notes : Finding location: 1. Gunung Beratus Protection Forest 2. Wehea Forest 3. Menamang
Efficacy: 1. Easy and smoothing childbirth; 4. Postpartum fever treatment ;
2. Health and stamina recovery after childbirth; 5. To stop postpartum bleeding;
3. Leg swelling after childbirth; 6. Increasing breastmilk supply.

Table 4. The traditional medicinal plants used for cosmetics

No	Species	Local name	Life form	Finding location	Efficacy	Usage methods
1.	*Baccaurea lanceolata* (Miq.) Muell.Arg. (Euphorbiaceae)	Rambai	Trees	3	Brighten the skin tone	Yellowed leaves mixed with cold powder, then apply into face
2.	*Brucea javanica* (L) Merr. (Simaroubaceae)	Kayu Sumpit	Trees	1	Acne treatment	Pounding the leaves, apply into acnes
3.	*Blumea balsamifera* DC. (Compositae)	Wekiah guaq	Shrubs	2	Hair blackening	Burning the roots, mix it with palm oil, apply into hair
4.	*Cananga odorata* (Lamk.) Hook. F. Thomson (Annonaceae)	Kanghit	Trees	1	Soften the facial skin	Squeezing young leaves, apply into face
5.	*Morinda citrifolia* (Rubiaceae)	Mengkudu	Trees	3	Anti dandruff	Crush the ripe fruits, use the water as a shampoo
6.	*Boesenbergia pandurata* *Curcuma zanthorrhiza* *Curcuma zedoaria* *Kaempferia galanga* L. (Zingiberaceae)	Temu putih Temulawak Temu kunci Kencur	Herbs	3	Asteringent	Refining the roots/tubers of *K. galanga, C.zaedoaria, B.pandurata,* and *C. zanthorrhiza*, squeezing, use as a cold powder, apply into face
7.	*Mussaenda* sp. (Rubiaceae)	Pilanggang Bulan	Shrubs	1	Soften the facial skin	Squeezing young leaves, apply into face
8.	*Paspalum conjugatum* (Graminae)	Beriwit	Herbs / grass	3	Blackening the hair	Squeezing the leaves, use the water as a shampoo
9.	*Senna alata* (L.) Roxb. *(Leguminosae)*	Ketepeng	Little trees	3	Soften the skin	Refining young leaves and flower, use as powder, apply into face

Notes : Finding location: 1. Gunung Beratus Protection Forest 2. Wehea Forest 3. Menamang

and *Brucea javanica*, but the herbs are still used for daily treatment of the skin. At least two medicinal plants species used as cosmetics in Table 4 have been pharmaceutically tested for the similar efficacy (see Table 5). *Baccaurea lanceolata* (used in Menamang to brighten the skintone) has been pharmaceutically tested as antioxidant agent (Bakar, Ahmad, Karim, & Saib, 2014; Manullang, Daniel, & Arung, 2013). *Brucea javanica* (used for acne treatment) has been pharmaceutically tested as antibacterial agent (Sornwatana, Roytrakul, Wetprasit & Ratanapo, 2013). Other species in Table 4 are also used as medicinal plants in other communities for the similar or different efficacies.

D. Utilization of the Same Medicinal Plants Species by Other Communities

Several medicinal plant species for women's health that were used by traditional forest communities in the villages of Tanjung Soke, Gerunggung, Nehas Liah Bing, Menamang Kiri and Menamang Kanan were also used by other traditional communities, for similar or different efficacies. Based on the literature study, at least 27 species were also used by other communities

for many efficacies, and the active chemical compounds of 25 species were known, as described at Table 5.

The results of the literature study described in Table 5 shows that for several medicinal plants species (such as *Arbus precatorius*, *Baccaurea lanceolata*, *Brucea javanica*, *Eurycoma longifolia*, and *Ficus deltoidia*), the traditional knowledge of medicinal plants (which is based only on empirical observations and experiences) turned out to be scientifically proven based on pharmaceutical tests. However, further studies are needed to determine the dose treatment and the active chemical composition of those species which have not been tested yet.

Compared to modern pharmaceuticals, the utilization of traditional medicinal plants in this research sites (Tanjung Soke, Gerunggung, Nehas Liah Bing, Menamang Kiri, and Menamang Kanan) are cheaper, more available, and easy to be accessed. But the utilization of those traditional medicinal plants also have several weakness as follows:

1. The quality of medicinal plants can not be guaranteed, because they were harvested from the wild, not cultivated. Traditional

Table 5. The uses of similar medicinal plants by other communities based on literature study

No	Botanical name	Utilization by other communities	Active chemical compound	References
1.	*Aleurites moluccana* (L.) Willd.	Contusion, swelling (Jambi), hair growth (Java), anti cancer	Saponin, flavanoid, poliphenol, tannin	Sangat, Zuhud, & Damayanti (2000)
2.	*Alpinia galanga* Willd.	Postpartum recovery, anaemia, high puerperal, lactagogue (Lao PDR), inhalation problem, ringworm (Jambi), rheumatism, emmenagogue, aphrodisiac, diabetes, bronchitis, antipyretic, anti-inflammatory, heart diseases, chronic enteritis, kidney disorders	Tannin, phenol, gallic acid, glycosides, monoterpenes, carbohydrates, galangin, alpinin, zerumbone, kampferide	Hariyadi & Ticktin (2012); Kaushik, Yadav, Kaushik, Sacher, & Rani (2011); Lamxay et al.(2011)
3.	*Arbus precatorius* L.Gaertn.	Aphrodisiac (Afghanistan, East Africa, Egypt, Mozambique, Nepal, Pakistan); nerve tonic (Brazil and Jamaica); snake bite remedy, treat intestinal worms, oral contraceptive, improving menstrual cycle (Central Africa); gonorrhea, stomach troubles, chest pain, antiemetic, facilitate childbirth, abortion (Guinea-Bissau, Ivory Coast), coughs and flu (Haiti, Kenya, Virgin Islands); eye diseases, abortion, emmenagogue, antifertility agent, abortifacient and prevent conception, toxic, tuberculosis, painful swellings (India, Pakistan); antimalaria and anticonvulsant (Nigeria); treat bronchitis, and hepatitis (Taiwan), anti-inflammatory (Thailand)	Among others: abruquinone, alanine, choline, anthrocyanins, aspartic acid, campesterol, chrysanthenin, cysteine, dolphin, eicosane, galactose, gallic acid, glutamine, glycine, lectin, leucine, lysine, polysaccharide, etc	Ross (2003)

Table 5 (Continued)

No	Botanical name	Utilization by other communities	Active chemical compound	References
4.	*Baccaurea lanceolata*	Antioxidant, abdomen pain (Serawak), treat water fleas (Jambi)	Phenolic, flavonoid, anthocyanin, carotenoid	Bakar et al. (2014); Hariyadi & Ticktin (2012); Kulip (2003); Manullang et al. (2013)
5.	*Blumea balsamifera* (L.) DC.	Postpartum recovery (Lao and Southeast India), perineal high, retraction of high uterus, miscarriage recovery (Lao), diarrhea, dysentery, colic, leucorrheasis, helminthic (Southeast India), nosebleed (Sabah)	Flavanoid, terpens, lactones, sineol, borneol, kamper, tannin	Dewi, Nisaa', Kabangnga', Boiga, & Rahmah (2007); Kulip (2003); Lamxay et al. (2011); Noorcahyati, Falah, & Ma'ruf (2010); Rahayu, Sunarti, Sulistiarini, & Prawiroatmodjo (2006); Rositta SMD, Rostiana, Pribadi, & Hernani (2007)
6.	*Blumea mollis* (D.Don) Merr. (Compositae)	Anti-bacterial, anti-inflammatory, hepatoproctivity, eucorrhoea (India)	Alkanes, chrysanthaenone, methanol	Devi, Namratha, Kumar, & Kumar (2011); Ratnam K. & Raju R. (2005)
7.	*Brucea javanica* (L.) Merr.	Hepatitis, diarrhea, fever (Jawa), disentery, malari, (Kutai), diabetes (Dayak Meratus), antibacterial	Saponin, tannin, poliphenol, peptide	Dewi et al. (2007); Hidayat (2005); Sangat et al. (2000); Sornwatana et al. (2013)
8.	*Caesalpinia sappan* L.	Antibacterial, anticoagulant, menorrhagia, cardiovascular, cerebrovascular diseases (China)	Homoisoflavanoid, juglone	Zhao et al. (2014)
9.	*Callicarpa longifolia* Lam.	Cure wounds (Aceh and Dayak), malari, inflammation (Aceh); diarrhea (etnis Talang Mamak); face powder (Dayak Tanjung); ulcer (Belitung), diarrhea, malari, kidney disease (Kutai)	Saponin, karbohidrat, tanin, alkaloid, steroid	Dewi et al. (2007); Hidayat (2005); Karmilasanti & Supartini (2011); Kloppenburg-Versteegh (1983); Sangat et al. (2000)
10.	*Carica papaya* L.	Appetite enhancer, malari (Jawa, Kamerun), hypertension (Sunda, Kamerun)), helminthic (Kamerun)	Flavonoid, tanin, steroid-triterpenoid, carbohydrate	Hidayat (2005); Indrawati (2002)
11.	*Cnestis platantha* Griff.	High fever ailment (Malaysia)	No reference	Samuel et al. (2010)

Table 5 (Continued)

No	Botanical name	Utilization by other communities	Active chemical compound	References
12.	*Drymoglossum piloselloides*	The leaves are used to treat rashes, whilst a decoction is used in a lotion for smallpox, and used in a poultice for headaches (Malay)	Phenol, alcohol, alkanes, alkenes, ethers, aldehyde, ketones, carboxylic acids, esters carboxylic acids	Bali, Fatimawali, & Wehantouw (2014); Giesen, Wulffraat, Zieren, & Scholten (2006)
13.	*Eurycoma longifolia* Jack	Sexual stimulant, aphrodisiac, treatment of male osteoporosis (Malaysia)	Eurycomanone, eurycomanol, eurycomalactone, alkaloid, phenolic components, tannins, triterpenes, quanissoids	Effendy et al., (2012); Samuel et al. (2010)
14.	*Flemingia macrophylla*	Anti-oxydant, analgesic, anti-inflammatory , anti-tyrosinase (China)	Flavanoid, flavanone, genistein, flemiphyllin	Shiao, Wang, Wang, & Lin (2005); B. S. Wang et al. (2012); YJ et al. (2010)
15.	*Ficus deltoidia* Jack.	Afterbirth treatment to contract uterus and vaginal muscles, treat disorder menstrual cycle, leuchorroea, wounds healing, sore of rheumatism (Malaysia); relieve headache, cold, toothache, aphrodisiac and health tonic (Indonesia); antidiabetics, anti-inflammatory, antimelanogenic, antibacterial antiphotoaging, antioxidant, antiulcerogenic	Shikimic acid, terpenoids, flavonoid, monoterpenes, aliphatic, sesquiterpenes, terpenes, triterpenes	Bunawan et al. (2014)
16.	*Hiptage benghalenzis* L. Kurz	Burning skin (India)	Saponin, tannin, flavonoid	Agharkar (1991)
17.	*Hyptis brevipes* Poit.	Headaches (Panama); diarrhea (Paraguay); protective medicine after childbirth (Malaysia and Indonesia), protection against worms for newborn infants (Java)	Methylene chloride, methanol extracts, bioactive flavonoids, triterpenoids	Rositta SMD et al. (2007); Sakr, Roshdy, & El-Seedi (2013)
18.	*Lepisanthes amoena* (Hassk). Leenh	Treatment of facial skin, antibacterial	alkaloids, terpenoids, steroids, flavonoids, saponin, carbohydrate	Kuspradini, Susanto, & Ritmaleni, Mitsunaga (2012)
19.	*Melastoma malabathricum* Linn.	Man vitality (Dayak Bahau), swollen mouth (Aceh), diarrhea	Naringenin, kaempfenol	Hussain, Abdullah, Noor, Ismail, & Ali (2008); Noorcahyati et al. (2010); Sangat et al. (2000); Sunison, Anandarajagopal, Kumari, & Mohan (2009)

Table 5 (Continued)

No	Botanical name	Utilization by other communities	Active chemical compound	References
20.	*Mimosa pudica* Linn.	Sedative, expectorant, anti inflammation, fever, helminthic, insomnia, dysentery	Tanin, mimosin, asam pipekollinat	Dalimantha (2006); Dewi et al. (2007); Rahayu et al. (2006); Saputra (2009)
21.	*Morinda citrifolia* L.	Hypertension (Sunda, Kutai), amandel (Dayak Kendayan), man vitality (Sumba); inflammatory bowel, laryngitis, hepatitis, fever, cough (Kutai), jaundice (Perak, Malaysia)	Alkaol, sterol, polysaccharide, courmarin, scopoletin, ursolic acid, linoleic acid, caproic acid, capryllic acid, alizarin, acubin, xeronin iridoid glycoside, vitamin C, A, karotena	Dalimantha (2006); Dewi et al. (2007); Samuel et al. (2010); M. Y. Wang et al. (2002)
22.	*Oroxylum indicum* (L.) Benth.ex Kurz	Fever, stomach ache (Kutai), malari, kidney ache, snake bite (Mentawai), swelling (Sabah)	Saponin, poliphenol, flavonoid	Dewi et al. (2007); Hidayat (2005); Kulip (2003)
23.	*Parameria polyneura* Hook.f.	Make the uterus shrink after childbirth (Java and Malaysia), teeth blackening	saponin, poliphenol, flavonoid, tanin	van Valkenburg (2001)
24.	*Phyllanthus urinaria* L.	Cough (Malaysia), backpain (Jambi), anticancer, antitumor, and anti angiogenic	Corilagin, gallic acid, ellagic acid	Kulip (2003); S.T., Pang, & Yang (2010)
25.	*Senna alata/Cassia alata* Linn.	Ring worm,scabies, (Indonesia, Malaysia, Thailand), himnithic, eye drops, fever, hepatitis (Kamerun), anti-implantation, abortifacient, anti-gonadotropic, anti-progesteronic	Antraquinone (rhein and aloe-emodin), chrysophanic acid, glucose, alkaloid	Gritsanapan & Magneesri (2009); Jiofack et al. (2010); Kulip (2003); Yakubu & Musa (2012)
26.	*Tamarindus indica*	Postpartum recovery, varicella, mild puerperal, neonatal high fever (Lao); abdominal pain, diarrhea and dysentery, helminthes, wound healing, malaria, constipation, inflammation, cell cytotoxicity, gonorrhea, eye diseases (India, Pakistan, Bangladesh, Africa)	copper, iron, sodium, manganese, magnesium, otassium, phosphorus, lead, and zinc	Bhadoriya, Ganeshpurkar, Narwaria, Rai, & Jain (2011); Khanzada et al. (2008); Lamxay et al. (2011)
27.	*Tinospora crispa* (L.) Hook.f.Thomson	Malaria, rheumatics, bruising, appetite enhancer, hepatitis, hemnithic, cough, calligata, diabetes	Alkaloid, saponin, tannin, flavonoid, glikosida, pikroretin, baberin, palmatin, kolumbin, jatrohize	Samuel et al. (2010); Sangat et al. (2000); Supriadi (2001); Windadri, Rahayu, Uju, & Rustiami (2006)

medicinal plants have various material qualities depending on the source of the countries and plants, due to genetic differences, environmental conditions, and the methods of harvesting, transportation and storage (Rinaldi & Shetty, 2015; Sakhya, 2016).

2. The dosage of medicinal plants was not standardized. In these research sites the treatment dose was determined only by habits (such as a glass of water) or size of the patient's body. Modern medicine demands standardized dosage based on factors such as bodyweight or disease severity. Traditional healers are more likely to give patients a unique dosage or combination of medicines that is decided during the consultation (Rinaldi & Shetty, 2015).
3. The extensive use of trees and root parts of medicinal plants can lead to the extinction of the medicinal plants species.

Therefore, to ensure the supply and quantity, the medicinal plants need to be cultivated, particularly the trees and those species where the roots are used. It is also important to do cultivation efforts of forest medicinal plant species to anticipate the scarcity due to deforestation and forest conversion. The cultivation, harvesting, and transportation methods also need to be standardized to ensure the product quality. It is also important to do further medical research to determine the proper dosage, and also to get information about the pharmatical compound of the medicinal plants.

IV. CONCLUSION

This research has identified and documented 44 medicinal plants species from 30 families which are used for women's health in forest communities around Gunung Beratus Protection Forest, Wehea Forest, and the villages of Menamang Kiri and Menamang Kanan. Out of the total 7 species were used as reproductive health medicinal plants, 30 species as postpartum and maternal medicine, and 9 species as cosmetics. At least there were 27 species which were also used by other communities for similar or other efficacies, and the active chemical compounds of 25 species have been known.

Compared to modern pharmaceuticals, the utilization of traditional medicinal plants are cheaper, more available, and easy to be accessed. But those medicinal plants were grown wild, and have not yet been cultivated by the community, so the quality of medicinal plants can not be guaranteed and the dosage of medicinal plants was not standardized. The extensive use of trees and roots part of medicinal plants can lead to the extinction of the medicinal plant species. Therefore, they need to be cultivated to ensure their quality and quantity, and also to avoid species extinction.

The traditional forest communities also need guidance and facilitation to learn and do cultivation effort of the medicinal plants as an exsitu conservation, especially for the species where the root part and trees are used. The ethno-botanists should do phytochemically and further medical tests of the medicinal plant samples found in the three research locations.

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REFERENCES

Agharkar, S. P. (1991). *Medicinal plants of bombay precidency*. Jodhpur: Scientific Publishing India.

Bakar, M. F. ., Ahmad, N. E., Karim, F. A., & Saib, S. (2014). Phytochemicals and antioxidate properties of Borneo pndigenous Liposu (*Baccaurea lanceolata*) and tampoi (*Baccaurea*

macrocarpa) fruits. *Antioxidants*, *3*, 516–525. doi:10.3390

Bali, F. A., Fatimawali, & Wehantouw, F. (2014). Toksisitas dan karakterisasi gugus fungsi daun sisik naga (*Drymoglossum piloseloides* (L).Presl). *Pharmacon Jurnal Ilmiah Farmasi*, *3*(3)335-341.

Bhadoriya, S. S., Ganeshpurkar, A., Narwaria, J., Rai, G., & Jain, A. P. (2011). *Tamarindus indica* : Extent of explored potential. *Pharmacogn Rev.*, *5*(9), 73–81.

Bunawan, H., Amin, N. M., Bunawan, S. N., Baharum, S. N., & Noor, N. M. (2014). *Ficus deltoidia* Jack: A Review on its phytochemical and pharmacological importance. evidence based complementary and alternative medicine, 2014. Retrieved from http://dx.doi.org/10.1155/2014/902734

Dalimantha, S. (2006). *Atlas of Indonesia medicinal plants 2*. Jakarta: Trubus Agriwidya.

Devi, R. S., Namratha, S., Kumar, S. A., & Kumar, K. E. (2011). Anti inflamatory activity of aqueous leaf extract of *Blumea mollis*. *Pharmanest*, *2*(5–6).

Dewi, S. J. T., Nisaa', Z., Kabangnga', Y., Boiga, & Rahmah. (2007). *Medicinal plants of Kutai National Park*. Bontang: The Kutai National Park Authority.

Effendy, N. M., Mohammed, N., Muhammad, N., Mohammad, I. N., & Shuid, A. N. (2012). *Eurycoma longifolia* : Medicinal plant in the prevention and treatment of male osteoporosis due to androgen deficiency. Evidence-based complementary and alternative medicine. Retrieved from http://dx.doi.org/10.1155/2012/125761

Falah, F., Noorcahyati, & Sayektiningsih, T. (2013). Diversity and utilization of medicinal plants by local community around Gunung Beratus protection forest, East Kalimantan. J*ournal of Natural Forest*, *10* (1), 1-18.

Giesen, W., Wulffraat, S., Zieren, S., & Scholten, L. (2006). *Mangrove guidebook for southeast Asia*. Bangkok, Thailand: Food and Agriculture Organization of the United Nations. Retrieved from ftp://ftp.fao.org/docrep/fao/010/ag132e/ag132e00.pdf

Gritsanapan, W., & Magneesri, P. (2009). Standardized *Senna alata* leaf extract. *Journal of Health Research*, *23*(2), 59–64.

Hariyadi, B. (2011). Obat Rajo Obat Ditawar : Medicinal Plants and Traditional Medicine of Serampas – Jambi. *Biospecies*, *4*(2), 29–34.

Hariyadi, B., & Ticktin, T. (2012). Uras: Medicinal and ritual plants of Serampas, Jambi Indonesia. *Ethnobotany Research & Applications*, *10*, 133–149.

Hidayat, S. (2005). *Traditional potion of 12 ethnics in Indonesia*. Depok: Penebar Swadaya.

Hussain, F., Abdullah, M. A., Noor, S. M., Ismail, S., & Ali, H. M. (2008). Gastroprotective effects of *Melastoma malabathricum* aqueos leaf extract against ethanol-induced gastric ulcer in rats. *American Journal of Biochemistry and Biotechnology*, *4*(4), 438–441.

Indrawati, Y. (2002). Phytochemical study on (*Carica papaya* L.) and antioxydant activity test. Bandung Technology Institute. Retrieved from Phytochemical study on (*Carica papaya* L.) and antioxydant activity test

Jiofack, T., Fokunang, C., Guedje, N., Kemeuze, V., Fongoizosse, E., Nkongmeneck, B., … Tsabang, N. (2010). Ethnobotanical uses of two ethnoecological regions of Cameroon. *African Journal of Pharmacy and Pharmacology*, *2*(3), 60–79.

Karmilasanti, & Supartini. (2011). Diversity Of Medicinal Plants And It's Utilization At Tane' Olen Setulang Village Malinau, East Kalimantan. *Journal of Dipterocaps Research*, *5*(1) 23-38.

Kaushik, D., Yadav, J., Kaushik, P., Sacher, D., & Rani, R. (2011). Current pharmacological and phytochemical studies of the plant *Alpinia galanga*. *Journal of Chinese Integrative Medicine*, *9*(10), 1061–1065.

Khanzada, S. K., W, S., S, S., G, K. T., K., U., A., K., & T., S. (2008). Chemical constituents of *Tamarindus indica* L. medicinal plant in sindh. *Pakistan Journal of Botany*, *40*(6), 2553–2559.

Kloppenburg-Versteegh, J. (1983). *Complete guide on Plants in Indonesia and their efficacies as medicine*. Yogyakarta: RS Bethesda & Andi Offset.

Kulip, J. (2003). An ethnobotanical survey of medicinal and other useful plants of Muruts in Sabah Malaysia. *Tealope*, *10*(1), 81–98.

Kuspradini, H., Susanto, D., & Ritmaleni, Mitsunaga, T. (2012). Phytochemical and comparative study of anti microbial activity of Lepisanthes amoena leaves extract. *Journal of Biology, Agriculture and Healthcare*, *2*(11), 80-86.

Lamxay, V., de Boer, H. J., & Bjork, L. (2011). Traditions and plant use during

pregnancy,childbirth and postpartum recovery by the Kry ethnic group in Lao PDR. *Journal of Ethnobiology and Ethnomedicine*, *7*(14), 1-15. doi: 10.1186/1746-4269-7-14

Manullang, L., Daniel, & Arung, E. T. (2013). Toxicity test and antioxidant extract of kelepesoh fruit (*Baccaurea lanceolata* (Miq) Mull. Arg.) *Journal Science of East Borneo*, *1*(1).

Marshall, E. (2011). *Health and wealth from medicinal aromatic plants*. Rome, Itali: Rural Infrastructure and Agro-Industries Division, Food and Agriculture Organization of the United Nations. Retrieved from http://www.fao.org/docrep/015/i2473e/i2473e00.pdf

Michel, J., Duarte, R. E., Yao, P., Bolton, J. L., Huang, Y., Caceres, A., Mahady, G. B. (2007). Medical potential of plants used by the Q'eqchi Maya of Livingston, Guatemala for the treatment of women's health complaints. *Etnopharmacol*, *114*(1), 92–101.

Mupfimira, R. (2012). *An assessment of african traditional medicines in pregnancy and on birth outcomes; pharmacist's perceptions of complimentary medicine's in pregnancy*. South Africa: Rhodes University, Retrieved from https://core.ac.uk/download/pdf/11984955.pdf

Noorcahyati. (2012). Ethnobotanical study of anti diabetics and colesterol medicinal trees in Central Kalimantan. Samboja, East Kalimantan, Indonesia.

Noorcahyati, Falah, F., & Ma'ruf, A. (2010). Ethnobotanical study of medicinal forest plants in Kalimantan. Samboja, East Kalimantan, Indonesia.

Noorhidayah, & Sidiyasa, K. (2005). Biodiversity of medicinal plants in Kutai National Park, East Kalimantan. *Journal of Forest Policy Analysis*, *2*(2), 115–128.

Okonofua, F. (2002). Traditional medicine and reproductive health in Africa. *African Journal of Reproductive Health*, *6*(2), 7–12.

Rahayu, M., Sunarti, S., Sulistiarini, D., & Prawiroatmodjo, S. (2006). Traditional utilization of medicinal plants by local communities in Wawonii Island Southeast Sulawesi. *Biodiversitas*, *7*(3), 245–250.

Ratnam K., V., & Raju R., V. (2005). Folk medicine used for common women ailments by Adivasis in the eastern Ghats of Andhra Pradesh. *Indian Journal of Traditional Knowledge*, *4*(3), 267–270.

Rinaldi, A., & Shetty, P. (2015). Traditional medicine for modern times: Facts and figures. Retrieved from http://www.scidev.net/global/medicine/feature/traditional-medicine-modern-times-facts-figures.html March 3, 2017

Rositta SMD, Rostiana, O., Pribadi, E. R., & Hernani. (2007). Exploration and Development of Indigenous Knowledge of Ethnomedicine at Gede Pangrango Mountain. *Bulletin of Research on Spice and Medicinal Crops* (*Bul.Littro*), *XVIII*(*1*), 13–28.

Ross, I. A. (2003). *Medicinal Plants of the World, Volume 1 : Chemical Constituents, Traditional, and Modern Medicinal Uses*. Humana Press. Retrieved from http://www.springer.com/us/book/9781588292810

S.T., H., Pang, J. H., & Yang, R. C. (2010). Anti-cancer effects of *Phyllanthus urinaria* and relevant mechanism. *Chang Gung Medical Journal*, *33*(5), 477–487.

Sakhya, A. K. (2016). Medicinal plants: future source of new drugs. *International Journal of Herbal Medicine*, *4*(4), 59–64.

Sakr, H. H., Roshdy, S. H., & El-Seedi, H. R. (2013). *Hyptis brevipes* (Lamiaceae) Extracts strongly inhibit the growth and development of *Spodoptera littoralis* (Boisd.) Larvae (Lepidoptera: Noctuidae). *Journal of Applied Pharmaceutical Science*, *3*(10), 083–088. doi:10.7324/JAPS.2013.31014

Samuel, A. J. S. J., Kalusalingam, A., Chellappan, D. K., Gopinath, R., Radhamani, S., Husain, H. A., … Promwichit, P. (2010). Ethnomedical survey of plants used by the Orang Asli in Kampung Bawong, Perak, West Malaysia. *Journal of Ethnobiology and Ethnomedicine*, *6*(5), 1-6.

Sangat, H. M., Zuhud, E. A. M., & Damayanti, E. K. (2000). *Dictionary of Diseases and Indonesia Medicinal Plants (Etnofitomedika)*. Jakarta: Yayasan Obor Indonesia.

Saputra, E. (2009). *Antibacterical test of Mimosa pudica extract on Shigella dysentriae growth*. Muhammadiyah University of Surakarta. Retrieved from eprints.ums.ac.id/7450/1/A420040005.pdf

Setyawati, T. (2010). The utilization of medinal plants in natural sanctuary of Mount Picis and Mount Sigogor, Ponorogo Regency, East Java. *Journal of Forest and Natural Conservation Research*, *VII*(*2*), 177–192.

Shiao, Y. J., Wang, C. N., Wang, W. Y., & Lin, Y. L. (2005). Neuroprotective flavonoids from Flemingia macrophylla. P*lanta Medica*, *71*(9), 835–840. http://doi.org/10.1055/s-2005-871297

Sornwatana, T., Roytrakul, S., Wetprasit, N., & Ratanapo, S. (2013). Brucin, an antibacterial peptide derived from fruit protein of Fructus Bruceae, *Brucea javanica* (L.) Merr. *Letters in Applied Microbiology*, *57*(2), 129–136. http://doi.org/10.1111/lam.12085

Strathy, K. (2000). WAINIMATE : Valuing women's traditional medicine knowledge. *WE INTERNATIONAL*, *48*(49).

Sugiyono. (2007). *Understanding qualitative research*. Bandung: Alfabeta.

Sunison, J. A. ., Anandarajagopal, K., Kumari, A. V. A. G., & Mohan, S. (2009). Antidiarrhoeal activity of leaves of Melastoma malabathricum. *Indian Journal of Pharmaceutical Sciences*, *71*(6), 692–695.

Supriadi. (2001). *Indonesia medicinal plants: Utilization and eficacies*. Jakarta: Yayasan Obor Indonesia.

Trubus. (2010). *Indonesian herbs efficacy: scientific evidence and processing methods*. Bogor: PT Trubus Swadaya.

van Valkenburg, J. L. C. H. (2001). *Parameria laevigata* (A.L. Juss.) Moldenke[Record from Proseabase. In J. L. C. H. van Valkenburg & N. Bunyapraphatsara (Eds.), *PROSEA (Plant Resources of South East Asia)*. Bogor: PROSEA Foundation. Retrieved from www.proseanet.org

Wang, B. S., Juang, L. J., Yang, J. J., Chen, L. Y., Tai, H. M., & Huang, M. H. (2012). Antioxidant and Antityrosinase Activity of Flemingia macrophylla and Glycine tomentella Roots. *Evidence-Based Complementary and Alternative Medicine*, 2012. doi:10.1155

Wang, M. Y., West, B. J., Jensen, C. J., Nowicki, D., Su, C., Palu, A. K., & Anderson, G. (2002). *Morinda citrifolia* (Noni): A literature review and recent advances in noni research. *Acta Pharmacologica Si Nica*, *23*(12), 1127–1141.

Windadri, F. I., Rahayu, M., Uju, T., & Rustiami, H. (2006). The utilization of medicinal plants by local community of Muna tribe in sub district of Wakarumba Muna Regency North Sulawesi. *Biodiversitas*, *7*(4), 333–339.

World Health Organization. (2013). *The WHO Traditional Medicine Strategy 2014-2023*. Geneva, Switzerland: World Health Organization. Retrieved from http://www.who.int/iris/bitstream/10665/92455/1/9789241506090_eng.pdf.

Yakubu, M. T., & Musa, I. F. (2012). Effects of Post-coital Administration of Alkaloids from Senna alata (Linn. Roxb) Leaves on some Fetal and Maternal Outcomes of Pregnant Rats. *Journal of Reproduction and Infertility*, *13*(4), 211–217.

YJ, K., TC, L., Kitanaka, S., Liu, C. Y., J.B., W., C.L., K., & Peng, W. H. (2010). Analgesic and anti-inflammatory activities of the aqueous extracts from three Flemingia species. *American Journal of Chinese Medicine*, *38*(3), 625–638. doi:10.1142/S0192415X1000810X

Zhao, M., Li, J., Shi, S., Cai, C., Tu, P., Tang, L., Jiang, Y. (2014). Two new phenolic compounds from the heartwood of *Caesalpinia sappan* L., 1–8. doi:10.3390/molecules19010001