

Diversity of medicinal plants sold in the traditional markets in Jambi, Indonesia

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Abstract. *Asra R, Ihsan M, Andriani F, Silalahi M, Fijridiyanto IA, Maryani AT. 2023. Diversity of medicinal plants sold in the traditional markets in Jambi, Indonesia. Biodiversitas 24: 1544-1550.* Traditional markets are places for local people to do transactions of medicinal plants and traditional cooking spices. The use of plants as traditional medicine is high in Jambi Province, Indonesia. This is because the population in Jambi Province consists of several ethnicities that still practice traditional medicine. This work aims to document and inventory local knowledge of medicinal plants in Jambi's two most important markets. An interview, participatory observation, and documentation were used for data collection. There were 14 respondents of various ages chosen randomly. Data analysis used the Shannon-Wiener diversity index (H') and Jaccard similarity index (Ji). A total of 78 medicinal plant species belonging to 42 families were found. Most species were from Zingiberaceae (14 species) and Rutaceae (9 species). The diversity indexes (H') of medicinal plants at traditional markets in Jambi are high in the Angso Duo (H' = 4.295) and Talang Banjar Markets (H' = 4.277). The similarity index (Ji) in both markets was high (Ji = 88.5%). Based on the type of disease, the medicinal plants used are classified into 19 groups. The plants are mainly used for digestive disorders (29.49%), muscle tenderness (20.51%), respiratory disorders (14.10%), skin (12.82%), and cancer (12.82%). The part of the plant most used for medicine is fruit (26.92%), followed by rhizomes (19.23%) and flowers (15.38%). The results can be used for bioprospecting studies that will lead to the discovery of new drugs.

Keywords: Jambi, medicinal plants, traditional market

INTRODUCTION

Indonesia is home to more than 30,000 plant species; around 7,000 species are recorded as medicinal plants (Ministry of National Development Planning 2016), and estimated 2,500 species are distributed in Sumatra. Medicinal plants produce various compounds that prevent and cure diseases, prevent fungal and insect attacks, and carry out specific biological functions (Kusuma et al. 2014). Bioactive compounds from plants are used in various commercial sectors such as the pharmaceutical, food, and chemical industries (Azmir et al. 2013), and most scientific research on the bioactive compound of medicinal plants is based on local knowledge (Abat et al. 2017).

The World Health Organization (WHO) estimates that around 80% of the population of Asia and Africa have used herbal medicine, and the total value of medicinal plants traded in 2011 reached more than 2.2 billion US dollars worldwide. Medicinal plant trading has long been carried out by local communities in Sumatra (Silalahi et al. 2015). Ethnobotany research can be done to reveal the uses of medicinal plants on the market. Purwanto (2021) described that ethnobotany research is an effective and efficient way, in terms of time and cost, to reveal the benefits of

medicinal plants and their prospects. Ethnobotany approaches in traditional markets can be used as the source of various information such as the benefits of medicinal plants (Silalahi et al. 2015), prices, conservation status (van Andel et al. 2012), and potential development (van Andel et al. 2012; Silalahi et al. 2015). Franco et al. (2020) researched an open-air market (Tamu Kianggeh Market) in Bandar Seri Begawan, Brunei Darussalam. They found that one factor that makes people go into a local market (non-supermarket) is buying medicinal plants (12.5%). This market is a meeting point for multiple ethnicities in Brunei and biological diversities, especially for medicinal plants.

Jambi province, Indonesia, is a multi-ethnic province with several ethnic such as Malays, Minangkabau, Palembang, and Suku Anak Dalam. Two studies on the medicinal plant in Jambi focused on Suku Anak Dalam (Andesmora et al. 2017; Asra et al. 2020), while research in the local market has not yet been conducted. The traditional market in the city of Jambi is the place to obtain various medicinal plants for the community and its surroundings. There are two largest traditional markets: The Angso Duo and Talang Banjar traditional markets. Those markets are the destination of suppliers of medicinal plant products from around Jambi and possibly the distribution center.

Information about medicinal plants in traditional markets is the main source for obtaining plants as the local community carries out traditional medicinal ingredients. Silalahi and Nisyawati (2019) reported that the Kabanjahe and Berastagi Markets medicinal plants traders had more knowledge of their uses than traditional healers. Although the market study has advantages in ethnobotany, market-based research in Sumatra is rarely done, and no study has been done for the market in Jambi. This study aims to document and inventory local knowledge, diversity, and benefits of medicinal plants traded in Jambi traditional markets.

MATERIALS AND METHODS

Study area

The research location is in the traditional markets of Angso Duo and Talang Banjar in Jambi City, the capital of Jambi Province. Jambi City is located between 010 30' 2,98" - 010 40' 1,07" South Latitude and 1030 40' 1,67" - 1030 40' 0,22" East Longitude, with an average altitude of 10 to 60 meters above sea level (Figure 1). Jambi City has a tropical climate. In 2017, the average temperature in Jambi City ranged from 26,5°C to 27,2°C. The maximum temperature was 34,4°C in January, and the minimum temperature was 21,5°C in February and June. The rainfall varied greatly by month, ranging from 55 mm to 298 mm, with the rainy days ranging from 15 until 25 days per month (BPS-Statistics of Jambi City 2018).

Angso Duo Market is the largest market in Jambi Province, located on the Batanghari River riverbanks, which is a place for trading vegetables, food, clothing, household furniture, and medicinal plants. It is estimated that 5,000 traders are in this market; however, only seven

traders of medicinal plants have been found. Talang Banjar market is the second largest traditional market in South Jambi District, with only 900 and seven medicinal plant traders recorded. Most medicinal plant supplies come from suppliers and collectors from areas around Jambi such as Kumpe, Selat, Sabak, Sejinjang, and other provinces on islands such as Padang, Java, Palembang, Curub, Medan, and others. The medicinal plants' storage system was carried out using plastic bags, plastic baskets, and wooden drawers. Most traders in both markets are women from the Malay and Minang tribes. Both tribes use the Jambi Malay language during the sale and purchase activities, a mixture of the Jambi and South Sumatra region languages. The Malay tribe originates from around the Jambi province, while the Minang tribe originates from West Sumatra. Market trading activities are carried out every day from 05.00 to 18.00. Buying and selling transactions are carried out in semi-permanent stalls with sizes 4m² (pers. obs.).

Data collection and respondents

Information on medicinal plants was collected using surveys, Focus Group Discussions (FGD), and interviews (semi-structured, in-depth, and field participatory observation). Interviews were conducted with 14 medicinal traders, followed by documentation and identification of the medicinal plants. The interview guidelines referred to Albuquerque et al. (2014) and Silalahi et al. (2015). There were 13 questions in total with detail as follow; questions number 1 to 2 were on demographic in particular; 3 to 8 on medicinal plants for sale (source, diversity, use, part of use, source of knowledge, and existence of medicinal plants); 9 on the most wanted medicinal plant; 10 to 12 on sales mechanism of medicinal plants and 13 on the advantages from selling medicinal plants.

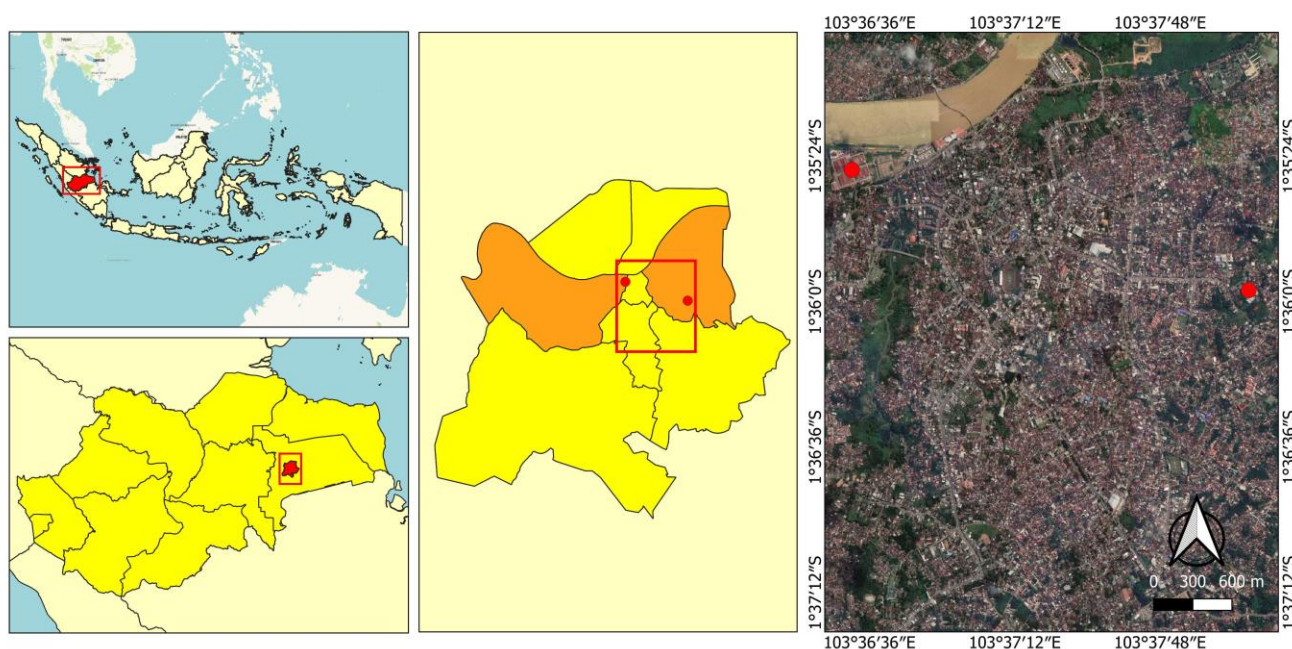


Figure 1. Geographical description of the study in Angso Duo and Talang Banjar traditional markets, Jambi, Indonesia

Most of the medicinal plant traders (71%) are women. More than 43% of traders in the Jambi traditional market have junior and senior high school education. The uses of medicinal plants are usually passed on to family members, and information is obtained from electronic media. Knowledge transfer involves children assisting in buying and selling transactions and helping to process medicinal plants. At first, traders only offered fresh or *Simplicia* form; however, as the community's desire to reconnect with nature grew, they began offering concoctions, herbs, and dry and wet medicinal plants.

Data analysis

Both qualitative and quantitative analyses were done on the data collected for this study. Qualitative data includes the types of medicinal plants, their advantages, and the parts of the plants used. Quantitative data is used to calculate the Shannon-Wiener diversity index (H') and the Jaccard similarity index (J_i) to determine the diversity of medicinal plant species (Kartawinata and Abdulhadi 2014). In addition, secondary data from publications by other researchers (Darwis 2012; Silalahi et al. 2015; Silalahi and Nisyawati 2018) were used to complete the analysis.

RESULTS AND DISCUSSION

Diversity of the medicinal plants

Medicinal plants traded in Angso Dua and Talang Banjar markets comprised 78 species of 42 families (Table 1). The top five families mostly found were the Zingiberaceae family (14 species), Rutaceae (9 species), Piperaceae (3 species), Apocynaceae (3 species), and Poaceae (3 species). The number of plants found in this study is far less than that of Silalahi et al. (2015), which found 245 species in the traditional Kabanjahe market. The number of plants found in the ethnobotany study, especially in markets, is strongly influenced by the number of respondents, the diversity of the surrounding environment, the traditions of local communities, and the area of kiosks (Silalahi et al. 2015). Further investigation shows that most medicinal plants traded in the Angso Duo and Talang Banjar Markets were mainly cultivated, while in Kabanjahe Market, wild plants dominated.

Based on the Shannon Wiener diversity index, the two markets in Jambi City have a high diversity index of 4.290459 (Angso Duo Market) and 4.276666 (Talang Banjar Market). In addition, the Jaccard similarity index between those markets was high ($J_i=88.5\%$). This index indicated that medicinal plants traded in both markets were relatively the same. The relatively similar species in both traditional markets indicate that geography does not affect the differences in the individual plants. It also shows that the knowledge from traders of both markets is the same (high consensus), so medicinal plants sold by traders are relatively the same. The trade-in species from the Zingiberaceae family in the Jambi City market has two functions: in medicinal use and as the main ingredient in cooking. The Zingiberaceae family is a herbaceous plant that its rhizomes frequently use as an efficient vegetative

propagation for this family (Gómez-Betancur and Benjumea 2014). This allows many farmers to cultivate medicinal plant species from the Zingiberaceae family and leads to many species from the Zingiberaceae family being found in the market.

Medicinal plant usage

There were 51 usages recorded from both traditional markets, such as to treat cancer, kidney, wounds, teeth, eyes, respiratory tract, malaria, jaundice, femininity, heart, and bathing (Table 1). These usages can be classified into 19 groups (Figure 2). Most of the plants found in this study were used to treat digestive disorders (29.49%), muscle tenderness (20.51%), respiratory disorders (14.10%), skin (12.82%), and cancer (12.82%) (Figure 2). Digestive disorders are common diseases such as ulcers, colds, diarrhea, and abdominal pain. Darwis (2012) reported 68 species found in Bengkulu City, Sumatra, used as traditional medicine for curing digestive disorders. Among them, six species are the same as our finding: *Acorus calamus* L., *Areca catechu* L., *Curcuma mangga* Val & Zijp, *Curcuma zedoaria* (Christm.) Rosc., *Foeniculum vulgare* Mill. and *Strobilanthes crispa* Blume.

Moreover, 14 species were used for a steam bath (betangas sauna). Betangas sauna is a steam bathing herb in ethnic Malays, especially for the bride. However, empirically, it is seen that the local community has abandoned the stem bark for various reasons such as a long process, less practical, difficulty in obtaining raw materials, and the presence of modern salons. Therefore, to preserve the local wisdom of betangas sauna, further studies are needed, especially to modernize the process of betangas and make it easier to access betangas.

Steam baths in this study are probably similar to steam baths at the Okay Shou ceremony for girls in North Halmahera. Wakhidah et al. (2017) described that steam bathing for girls aims to maintain the health of intimate organs and make skin smoother and healthier. The plants used in Batangas bathing are similar to those of the Karo ethnic of North Sumatra by utilizing plants rich in essential oils from the Zingiberaceae family (Silalahi et al. 2015; Silalahi and Nisyawati 2019). Hot steam can warm the body, stimulate intense sweat, and cleanse the body by removing toxic compounds, providing a good effect of relaxation and blood circulation (Silalahi et al. 2015; Silalahi and Nisyawati 2019). Currently, betangas can also treat rheumatism, high cholesterol, hypertension, headaches, and strokes, refreshing and maintaining smooth skin (Silalahi et al. 2015; Silalahi and Nisyawati 2019).

Because of its high mortality rate, cancer is one of the diseases that society fears the most. Some plants used to treat cancer includes *Garcinia mangostana*, *Atropurpurea scurrula*, *Loranthus parasiticus*, *Morinda citrifolia*, *Fortunella polyandra*, *Kaempferia rotunda*, *Curcuma zedoaria*, and *Curcuma longa*. Some plants found as new cancer drugs, such as *G. mangostana*, *A. scurrula*, and *F. polyandra*, while the utilization of *K. rotunda*, *C. zedoaria*, and *C. longa* have been widely reported (Silalahi et al. 2015; Rahmawaty et al. 2019).

Table 1. List of medicinal plants traded at Angso Duo and Talang Banjar Traditional Markets, Jambi, Indonesia

Family	Scientific name	Local name	Uses	TM		Coll. no.
				AD	TB	
Apiaceae	<i>Foeniculum vulgare</i> L.	<i>Adas</i>	Rheumatism, fever, gastrointestinal disorder	+	+	FR 28
Acanthaceae	<i>Cuminum cyminum</i> L.	<i>Jintan putih</i>	Fever, itchy	+	+	FR 40
	<i>Andrographis paniculata</i> (Burm.f.) Nees.	<i>Sambiroto</i>	Malaria fever, gout, itchy, headache, fever	+	+	FR 39
	<i>Strobilanthes crispa</i> Blume	<i>Pecabeling</i>	Jaundice, heartburn, ulcer, kidney, kidney disease	+	+	FR 18
Apocynaceae	<i>Urceola aevigata</i> (Juss.) D.J. Moldenke & Livish.	<i>Kayurapat</i>	Vagina curing, postpartum, cholesterol	+	+	FR 41
	<i>Alyxia reinwardtii</i> Blume	<i>Pulosari</i>	Fever, appetite enhancer	+	+	FR 54
	<i>Plumeria alba</i> L.	<i>Kemboja</i>	Sauna Betangas	+	+	FR 35
Araceae	<i>Acorus calamus</i> L.	<i>Jeringo</i>	Gout, curing internal, itchy	+	+	FR 63
Arecaceae	<i>Areca catechu</i> L.	<i>Pinang</i>	Aprosidia, worms disease, diarrhea, tooth curing	+	+	FR 26
Annonaceae	<i>Cananga odorata</i> (Lam.) Hook. f. & Thomson	<i>Kenanga</i>	Sauna betangas	+	+	FR 32
Araliaceae	<i>Schefflera</i> sp.	<i>Kuku Sinde</i>	Curing childbirth	+	+	FR 55
Balsaminaceae	<i>Impatiens balsamina</i> L.	<i>Pacar air</i>	Sauna betangas	+	+	FR 33
Brassicaceae	<i>Anastatica hierochuntica</i> L.	<i>Rumput patimah</i>	Curing childbirth	+	-	FR 42
Caricaceae	<i>Carica papaya</i> L.	<i>Kates</i>	Diabetes mellitus, malaria fever.	-	+	FR 64
Cucurbitaceae	<i>Benincasa hispida</i> (Thunb.) Cogn.	<i>Kundur</i>	Mouth disease, diarrhea	+	+	FR 25
Clusiaceae	<i>Garcinia atroviridis</i> Griff. ex T. Anderson	<i>Asam gelugur</i>	Diabetes mellitus	+	+	FR 43
Dioscoreaceae	<i>Dioscorea hispida</i> Dennst.	<i>Gadunglaut</i>	Wound	+	+	FR 72
Euphorbiaceae	<i>Aleurites moluccanus</i> (L.) Willd.	<i>Kemiri</i>	Curing hair, diarrhea	+	+	FR 56
Fabaceae	<i>Parkia roxburghii</i> G. Don.	<i>Kedaung</i>	Gastrointestinal disorder, fever, cough	+	+	FR 20
	<i>Caesalpinia sappan</i> L.	<i>Secang</i>	Mouth disease	+	+	FR 73
	<i>Saracai indica</i> L.	<i>Asoka hutan</i>	Intestinal disease	+	+	FR 36
Fagaceae	<i>Senna alexandrina</i> Mill.	<i>Jaticina</i>	Gastrointestinal disorder	+	+	FR 65
	<i>Quercus lusitanica</i> Lam.	<i>Manjakani</i>	Candiasi, curing vagina	+	+	FR 02
	<i>Garcinia mangostana</i> L.	<i>Manggis</i>	Cancer	+	+	FR 44
Guttiferae	<i>Eleutherine bulbosa</i> (Mill.) Urb.	<i>Bawang Dayak</i>	cholesterol, rheumatism	+	+	FR 27
Iridaceae	<i>Illicium verum</i> Hook.f	<i>Kembang lawang</i>	Rheumatism	-	+	FR 01
Lamiaceae	<i>Orthosiphon aristatus</i> (Blume) Mig.	<i>Kumis kucing</i>	Kidney disease	+	+	FR 45
Loganiaceae	<i>Strychnos ligustrina</i> Blume	<i>Bedaro putih</i>	Diabetes mellitus	+	-	FR 37
Loranthaceae	<i>Loranthus parasiticus</i> (L.) Merr.	<i>Benalu kopi</i>	Cancer	-	+	FR 66
	<i>Scurrula atropurpurea</i> (Blume) Danser	<i>Benalu teh</i>	Cancer, tumor, kista	+	+	FR 57
Lauraceae	<i>Eusideroxylon zwageri</i> Teijsm. & Binn.	<i>Bulian/ulin</i>	Allergy, swollen pus, toothache	+	+	FR 19
Liliaceae	<i>Allium sativum</i> L.	<i>Bawang putih tunggal</i>	Heart problem, cholesterol, fever, cough	+	+	FR 24
Manispermaceae	<i>Tinospora crispa</i> (L.) Hook. f. & Thomson	<i>Brotowali</i>	Malaria fever, diabetes mellitus	+	+	FR 03
Myrtaceae	<i>Syzygium aromaticum</i> (L.) Merr. & L.M.Perry	<i>Cengkeh</i>	Inflamasi, hemorrhoids	+	+	FR 46
Myristicaceae	<i>Myristica fragrans</i> Houtt.	<i>Palo</i>	Sipilis	+	+	FR 16
Malvaceae	<i>Scaphium marcopodum</i> (Miq.) Beumee ex K. Heyne	<i>Semangkok</i>	Mouth disease	+	+	FR 17
Meliaceae	<i>Swietenia macrophylla</i> King.	<i>Mahoni</i>	Malaria, fever, influenza, fever	+	-	FR 22
Magnoliaceae	<i>Magnolia coco</i> (Lour.) DC.	<i>Cempaka telur</i>	Sauna betangas	-	+	FR 31
	<i>Michelia champava</i> Lour. ex Gomes	<i>Cempakakuning</i>	Sauna betangas	+	+	FR 34
	<i>Jasminum sambac</i> (L.) Aiton	<i>Melati</i>	Sauna betangas	+	+	FR 47
Pandaceae	<i>Pandanus amaryllifolius</i> Roxb.	<i>Pandan</i>	Sauna betangas	+	+	FR 23
Piperaceae	<i>Piper cubeba</i> Bojer	<i>Kemukus</i>	Toothache	+	+	FR 15
	<i>Piper longum</i> L.	<i>Cabejawa</i>	Gastrointestinal disorder, rheumatism, kidney disease	+	+	FR 14
	<i>Piper betle</i> L.	<i>Sirih</i>	Candidiasis, hives, eyes, toothache, body odor	+	+	FR 67
Poaceae	<i>Chrysopogon zizanioides</i> (L.) Roberty	<i>Akarwangi</i>	Rheumatism, sauna betangas, body odor	+	+	FR 58
	<i>Imperata cylindrical</i> (L.) Raeush.	<i>Alang-alang</i>	Kidney disease, sprue	+	+	FR 03
	<i>Cymbopogon nardus</i> (L.) Rendle.	<i>Sereh wangi</i>	Sauna Betangas, body odor, massage	+	+	FR 21

Rubiaceae	<i>Uncaria gambir</i> (Hunter) Roxb.	<i>Gambir</i>	Toothache, hemorrhoids, stomachache, mouth disease	+	+	FR74
	<i>Morinda citrifolia</i> L.	<i>Mengkudu</i>	Cancer	-	+	FR 68
Ranunculaceae	<i>Nigella sativa</i> Wall. Ex Lindl.	<i>Jintan hitam</i>	Diabetes mellitus	+	+	FR 38
Rosaceae	<i>Rosa sericea</i> L.	<i>Mawar putih</i>	Sauna betangas	+	+	FR 33
	<i>Rosa sinensis</i> L.	<i>Mawar merah</i>	Sauna betangas	+	+	FR 59
Rutaceae	<i>Citrus aurantifolia</i> (Christm) Swingle.	<i>Jeruk nipis</i>	Cought, gout, pimples, anti obesitas	+	+	FR 05
	<i>Citrus hystrix</i> DC	<i>Jeruk purut</i>	Sauna betangas, gastrointestinal disorder	+	+	FR 48
	<i>Rutaangusti folia</i> Pers.	<i>Inggu</i>	Fever, boils, possessed headache	+	+	FR 69
	<i>Citrus limonia</i> Osbeck	<i>Jeruk lemon</i>	Vitamin c resources	+	+	FR 75
	<i>Citrus</i> sp.1	<i>Jeruk sangkis</i>	Cancer	+	+	FR 08
	<i>Citrus</i> sp.2	<i>Jeruk pecal</i>	Cough, influenza	+	+	FR 78
	<i>Citrus</i> sp.3	<i>Jeruk hantu</i>	Sauna betangas	+	-	FR 49
	<i>Fortunella polyandra</i> (Ridl.) Tanaka	<i>Jeruk timun</i>	Cancer, gastrointestinal disorder, stamina	+	+	FR 60
	<i>Triphasiatrifolia</i> (L.) DC.	<i>Jeruk kunci</i>	Sauna betangas	+	+	FR 76
Simaroubaceae	<i>Eurycoma longi folia</i> Jack.	<i>Pasak bumi</i>	Hypertension, malaria fever	+	+	FR 29
Sterculiaceae	<i>Helicteres isora</i> L.	<i>Lada putar</i>	Rheumatism	+	+	FR 06
Thymelaeaceae	<i>Phaleria macrocarpa</i> (Scheff.) Boerl.	<i>Mahkota dewa</i>	Hypertension, malaria fever	+	+	FR 70
Usneaceae	<i>Usnea barbata</i> L.	<i>Tahi angin</i>	Gastrointestinal disorder, enhanced circulation system, diarrhea	+	+	FR 77
Zingiberaceae	<i>Boesen bergia rotunda</i> (L.) Mansf.	<i>Temu kunci</i>	Gastrointestinal disorder, cough	+	+	FR 50
	<i>Curcuma aeruginosa</i> Roxb.	<i>Temu hitam</i>	Malaria fever	+	+	FR 71
	<i>Curcuma longa</i> L.	<i>Kunyit</i>	Stomaache, appetite enhancer, would, cancer, asthma, curing menstruation	+	+	FR 09
	<i>Curcuma heyneana</i> Val & Zijp	<i>Temugiring</i>	Ichty, fever, gastrointestinal disorder	+	+	FR 13
	<i>Curcuma mangga</i> Val & Zijp	<i>Temupauh</i>	Gastrointestinal disorder, appetite enhancer	+	+	FR 61
	<i>Curcuma zanthorriza</i> Roxb.	<i>Temulawak</i>	Stomach ache, pimples, diarrhea, Appetative enhancer	+	+	FR 51
	<i>Curcuma zedoaria</i> (Christm.) Rosc.	<i>Temu putih</i>	Stomacahce, cancer, curing bruised skin, gastrointestinal disorder	+	+	FR 11
	<i>Curcuma</i> sp.	<i>Induk kunyit</i>	Cancer, irritation, kidney disease, asthma, rheumatism, enhanced circulation system	+	+	FR 30
	<i>Kaempferia galangal</i> L.	<i>Kencur</i>	Sprain, gastrointestinal disorder	+	+	FR 62
	<i>Kaempferia rotunda</i> L.	<i>Kunyit putih</i>	Cancer, cyst	+	+	FR 52
	<i>Zingiber aromaticum</i> Val.	<i>Lempuyang</i>	Appetitive enhancer, asthma, worms disease, diarrhea	+	+	FR 07
	<i>Zingiber officinale</i> Rosc.	<i>Jahe merah</i>	Curing circulation system, gastrointestinal disorder	+	+	FR 12
	<i>Zingibe rofficinale</i> Rosc.	<i>Jahe</i>	Gastrointestinal disorder, cough	+	+	FR 53
	<i>Zingiber purpureum</i> Rosc.	<i>Bangle</i>	Cough, gastrointestinal disorder, fever	+	+	FR 10

Note: TM: Traditional Market, AD: Angsa Duo, TB: Talang Banjar, Coll. no.: Collection number

Further research needs to be done to prove the plant's efficacy as a cancer drug scientifically. The usage of *K. galanga* as a cancer drug has been reported by Ali et al. (2018). The *K. galanga* extract significantly decreases the viability of Ehrlich Ascites Carcinoma (EAC) cells because it causes cell membrane blebbing, chromatin condensation, and EAC core fragmentation (Ali et al. 2018). Ethyl-p-methoxycinnamate isolated from *K. galanga* extract showed antiangiogenic activity and was used as and anti-cancer (Umar et al. 2014).

The method of using Sinde nails (Figure 3) is mixed with other spices such as *jeringo* (*Acorus calamus*), *bangle* (*Zingiber purpureum*), *kencur* (*Boesenbergia pandurata*),

mayang pinang (*Areca catechu*), and *pandan wangi* (*Pandanus amaryllifolius*) inserted into a black cloth and sewn. When examined further, the plants combined with sinde nails produce essential or volatile oil, easily evaporating at room temperature. Various volatile oils from Asaron from *A. calamus* have a sedative effect (Rajput et al. 2014), an anti-cancer (Das et al. 2019). Essential oils found in various *B. rotunda* organs, especially the rhizome, include 1,8-cineole, methyl cinnamate, and camphor (Chahyadi et al. 2014; Atun et al. 2018); α -terpinene, geraniol, α -ocimene, myrcene, borneol, camphene, terpineol, geranial, and neral (Chahyadi et al. 2014); which are thought to have a relaxing effect.



Figure 3. Sindenail plants (*Schefflera* sp.)

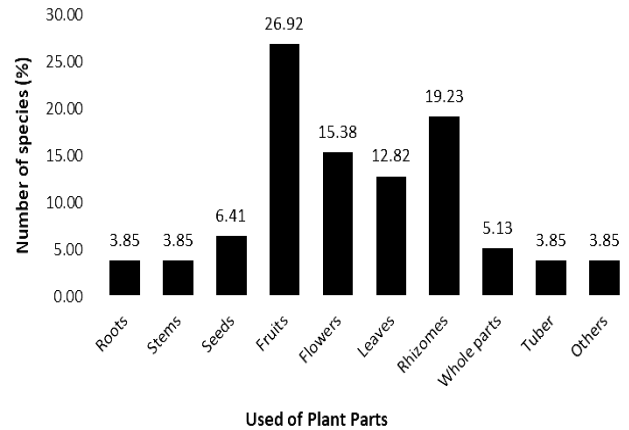


Figure 4. Plant parts used as medicine in the traditional markets of Angsa Duo and Talang Banjar, Jambi, Indonesia

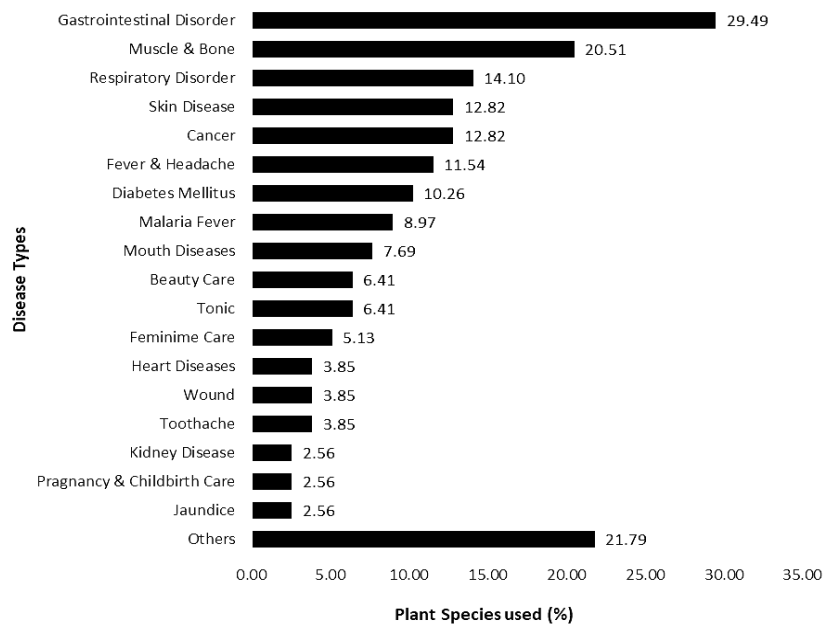


Figure 2. Percentages of medicinal plant species used were based on the type of diseases

Part of the plant used

Based on the part of the plant used, the fruit showed the highest percentage (26.92%), followed by rhizomes (19.23%) and flowers (15.38%) (Figure 4). Rhizomes mostly come from Zingiberaceae, while the fruit comes from Rutaceae, especially the genus *Citrus*. Some examples of species with medicinal plants sold in the form of fruit are *pinang* (*Areca catechu*), *kundur* (*Benincasa hispida*), kaffir lime (*Citrus hystrix*), lime (*Citrus aurantifolium*), lemon (*Citrus lemonia*). However, different from this result, in the remote areas of Pakistan was reported that whole plant (Shuaib et al. 2023) and leaves (Sharif et al. 2024) are the most plant part used in medicinal. Most traded plants recorded in this study are cultivated. Therefore, there is no risk to its sustainability. However, some researchers showed that wild medicinal plants' quality or efficacy is better than cultivated species (Chen et al. 2016). Therefore, it is necessary to observe the

quality of medicinal plants traded to meet the standards of medicinal ingredients.

In conclusion, a total of 78 species belonging to 42 families of medicinal plants have been recorded from Angso Dua and Talang Banjar, Jambi markets. The plant parts mostly used for medicinal are fruit, rhizomes, and flowers. The similarity of medicinal plant species traded in both markets is high. It shows that the knowledge of traders from the two markets is the same, so medicinal plants sold by traders are relatively the same. Most medicinal plants are traded to treat digestive disorders, muscle tenderness, respiratory disorders, skin, and cancer. The ingredients used in the Betangas sauna need to be studied further so they can be used as traditional commercial saunas. The medicinal plant species reported in this study need further research, especially these plants' phytochemical content, so they may result in new drug discoveries.

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