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The Diversity of Medicinal Plant Used by Local Community in Borneo, Indonesia: A Review

[Pemanfaatan Tumbuhan Berkhasiat Obat Oleh Masyarakat Lokal Kalimantan: Sebuah Studi Pustaka]

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ABSTRACT

As one of the biggest islands in Indonesia, Borneo or Kalimantan, is considered one of the lungs of the world. The local communities utilize the large biodiversity in Borneo as traditional knowledge on medicinal use. The purpose of this article was to find out data on the diversity of medicinal plants utilized by local communities as well as the parts of plants used, the preparation in the use of medicinal plants, and the phytochemical content of several types of plant species that are most widely used in the Kalimantan region. This article was developed using the literature review method by searching for articles, journals and literature on Google Scholar. A total of 204 species from 74 families are utilized by the people of Kalimantan as medicine. The results showed that the types of plants that the people of Kalimantan widely use came from the Asteraceae family (16 species), Euphorbiaceae (15 species), Rubiaceae (11 species), Zingiberaceae (10 species), and others. The local people of Kalimantan mostly utilize plant leaves and roots by boiling since the boiling method is more effective in the healing process for fever and stomach pain. The people of Kalimantan most often apply medicinal plants by boiling them and then drinking them because this treatment is the most effective. It is believed that drinking it can accelerate healing. Therefore, there is a need for new knowledge and data collection related to the use of plants as medicine by the people of Kalimantan.

Kata kunci:

Etnobotani Kalimantan
Tanaman Obat
Fitokimia Pada Tumbuhan
Keanekaragaman

ABSTRAK

Sebagai salah satu pulau terbesar di Indonesia, Borneo atau Kalimantan dianggap sebagai salah satu paru-paru dunia. Keanekaragaman hayati diBorneo dikombinasikan dengan pengetahuan tradisional tentang penggunaan tanaman sebagai obat oleh masyarakat. Tujuan artikel ini adalah untuk mengetahui data keanekaragaman tumbuhan obat yang dimanfaatkan masyarakat lokal Kalimantan serta bagian tumbuhan yang dimanfaatkan, penyiapan dalam penggunaan tumbuhan obat, dan kandungan fitokimia dari beberapa jenis spesies tumbuhan yang paling banyak dimanfaatkan di wilayah Kalimantan. Informasi dalam artikel ini diperoleh dengan menggunakan metode literatur review yaitu dengan mencari artikel jurnal dan literatur di Google Scholar Sebanyak 204 spesies dari 75 suku dimanfaatkan oleh masyarakat Kalimantan sebagai obat. Hasil penelitian menunjukkan bahwa jenis tumbuhan yang banyak dimanfaatkan oleh masyarakat Kalimantan ialah berasal dari suku Asteraceae (16 spesies), Euphorbiaceae (15 spesies), Rubiaceae (11 spesies), Zingiberaceae (10 spesies) dan lainnya.. Masyarakat lokal kalimantan lebih banyak memanfaatkan bagian daun dan akar tumbuhan dengan cara direbus. Hal ini terlihat lebih efektif sehingga obat herbal cepat berpengaruh dalam proses penyembuhan penyakit, seperti demam, sakit perut. Masyarakat Kalimantan paling sering menerapkan penggunaan tumbuhan obat dengan cara direbus lalu diminum karena pengobatan ini paling efektif dan dipercayai bahwa

dengan cara diminum dapat mempercepat penyembuhan. Maka dari itu perlunya pengetahuan dan pendataan baru terkait pemanfaatan tumbuhan yang dignakan sebagai obat oleh masyarakat Kalimantan.

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1. INTRODUCTION

Indonesia is a country with high biodiversity because it is located on the equator with a tropical climate, which has the potential for the growth and development of most plants. Kalimantan, one of the islands in Indonesia, has become one of the world's lungs because of its rich biodiversity. In addition, the Kalimantan region is also rich in the traditional knowledge of various Indigenous peoples and their relation to the local community's culture. The people of Kalimantan utilize the traditional knowledge of local tribes by utilizing various types of plants as medicine. This traditional medicinal knowledge was found thousands of years ago. This has the potential to support the development of rural areas, such as the manufacture of traditional herbal medicine (Budiman et al., 2018).

According to previous research, each region in West Kalimantan has diverse medicinal plants. For example, many types of medicinal plants are available in Mengkiang Village, Sanggau District, Kapuas, Sanggau Regency (Haryono et al., 2014). An additional study was conducted in Tonang Village, Sengah Temila Sub-district, Landak Province. Research findings include 135 types of medicinal plants used by the Dayak Kanayatn tribe, 118 types of medicinal plants used by the general public, 60 types used by shamans, and 43 types by the general public and shamans (Sari et al., 2021).

The people of Kalimantan generally use traditional medicine in a simple form. Traditional medicinal materials come from plants, and these plants are used to treat a variety of diseases and have healing properties and have been believed for generations. The ingredients taken from the environment are then cleaned and usually used directly in a fresh state by soaking or boiling and then used as a drink or bath. Some plants are partially processed by being crushed, pounded, or heated in a bundle of leaves. Humans have used plants as medicine since ancient times, and their use is still common in public. The utilization of medicinal plants is also widely used by the Kalimantan community because it has small or relatively mild side effects compared with chemical-related treatments (Meliki et al., 2013).

The people of Kalimantan have the ability to mix and prepare drugs from plants as traditional medicine. This ability has been passed down from generation to generation based on kinship systems and beliefs or can be obtained from personal experience. The side effects of unsatisfactory use of chemicals or traditional are very detrimental, including minimal or no benefits and side effects greater than expected. Therefore, traditional medicine is preferred by the Kalimantan people rather than chemical drugs (Komalasari, 2018). Plants commonly used as medicine also contain phytochemicals with effects that can stimulate the human immune system.

Research on the utilization of medicinal plants in many areas in Kalimantan has been conducted, but less information in the database of medicinal plant diversity of these studies. Therefore, a literature study is needed to examine the various findings of medicinal plants used by local Kalimantan communities.

The scope of this ethnobotanical study of medicinal plant utilization is expected to provide information related to the many types of medicinal plants used by the people of Kalimantan with the aim that the community can utilize natural resources and introduce traditional knowledge of Kalimantan to the public.

2. MATERIALS AND METHODS

The research method uses the literature review method by searching for articles and journals on Google Scholar published in the 2013-2023 range using data inclusion criteria in journals published nationally and internationally in Indonesian and English. The keywords used are "ethnobotany of Kalimantan, medicinal plants, *kandungan fitokimia*, *keanekaragaman*". Given the large number of local researchers studying the Kalimantan region, the keywords used are Indonesian. The review of related data that has been compiled is then analyzed in tables, graphs, or diagrams and carefully sorted according to the topics that will be discussed in this study.

3. RESULTS AND DISCUSSION

3.1. Distribution of Medicinal Plant Ethnobotany Research Sites in Kalimantan

Based on the data collected from several locations above, it is known that there are 204 plant species belonging to 75 families that are used as medicines by the people of Kalimantan. The plants are grouped by family, scientific name, local name, benefits, parts used, and location of utilization. According to (Hidayat, 2021), the number of medicinal plant species found in each bioregion in Indonesia was: Kalimantan 119 species, Sumatra totalling 126, Java recorded 223 species, then Sulawesi 126, Bali-Nusa Tenggara 242, Maluku 100 species, and Papua 105 species.

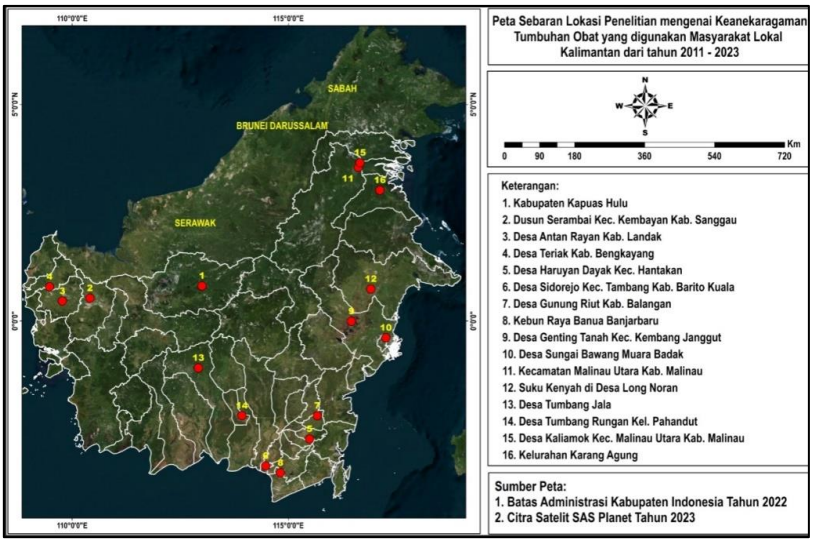

Figure 1. The distribution point of the research is the location of medicinal plant diversity used by local communities on the island of Kalimantan

Table 1. Comparative analysis of medicinal plant utilization in Kalimantan

Number of Villages / Criteria	KB*				KS			KTM				KTG		KU	
	1	2	3	4	1	2	3	1	2	3	4	1	2	1	2
Limited health facilities and cost constraints	√	√				√			√	√		√	√	√	√
The use of traditional medicine has been known from the time of the ancestors	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Traditional medicinal herbs come from traditional healer recipes		√	√	√											
Utilization of medicinal plants consumed naturally	√		√	√	√	√	√	√	√	√	√	√	√	√	√
Many medicinal plants are used by drinking	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Lants as medicine can help cure various diseases	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Plants used as medicine come from the yard	√	√		√	√				√		√			√	

*) KB: west Kalimantan; KS: south Kalimantan; KTG: Central Kalimantan; KTM:East Kalimantan; KU:North Kalimantan.

Based on the observation table of the review in several villages in the Kalimantan area, the community has been utilizing plants as medicine since ancient times with hereditary knowledge. Many medicinal plants help cure various diseases commonly experienced by the people of Kalimantan. Then, most of the people consume plants to be made into concoctions that are boiled and then drunk.

3.2. Medicinal Plant Diversity and Uses

The existence of this study can help identify an increasing number of species, therefore the Kalimantan region has been re-identified as having more species according to the data from the initial count at each location in Kalimantan, namely 42 species in southern Kalimantan, 27 species from northern Kalimantan, 68 species in eastern Kalimantan, then 52 species of medicinal plants from central Kalimantan, and 108 species from western Kalimantan. so that each number of species in each region when combined obtained a total data of 204 species of plants used by the people of Kalimantan because there are data on several species that overlap between regions.

Table 2. Data from the review of the utilization of medicinal plants by the people of Kalimantan from 2013 to 2023 is equipped

No	Family	Latin Name	Local Name	Usage	Used Parts	Location of Utilization
1	Acanthaceae	*Andrographis paniculata*	Sambiloto	Cholesterol, high blood pressure, gout, rheumatism, fever, ulcer, typhoid, scabies	Leaves	KB
2	Acanthaceae	*Justicia gendarussa*	Tuba lonyeng	Sprains, fractures, bone pain, back pain	Roots	KB
3	Acanthaceae	*Strobilanthes crispa*	Ureu beq bukun	Fever, kidney, pressure, cholesterol, prevent cancer, high fever, difficulty urinating	Leaves	KTM, KU
4	Acoraceae	*Acorus calamus*	Kariboro	Rheumatism, fever, body aches, headache	Rhizome	KTM, KB
5	Alismataceae	*Limnocharis flava*	Ginjer	Pressure, promote digestion	Leaves	KTM

6	Amaranthaceae	*Alternanthera sessilis*	Kremah-kremah	Sore throat, upset stomach	Leaves	KS
7	Amaryllidaceae	*Allium tuberosum*	Bawang kuda, kucai	Prevent tumor, indigestion, laxative	Seeds, leaves	KTM, KB
8	Amaryllidaceae	*Crinum asiaticum* Linn	Jaliango	Bleeding, sores, sleeplessness, fever, mouth ulcers, sprains	Leaves	KB
9	Anacardiaceae	*Anacardium occidentale*	Jambu mente	Boils	Stem sap	KS
10	Anisophylleaceae	*Anisophyllea disticha*	Semeangk	Wound	Leaves	KB
11	Annonaceae	*Annona muricata* Linn	Nangka belanda	Appendicitis, diabetes, heatstroke, malaria, lumbago, fever, high blood pressure	Fruit, leaf	KTG, KB
12	Apiaceae	*Apium graviolens* Linn	Seledri	Rheumatism	Leaves	KB
13	Apiaceae	*Hydrocotyle sibthorpioides*	Semanggi gunung	Deep heat	Roots	KB
14	Araceae	*Caladium bicolor*	Keladi	Cancer, Treating wounds	Leaves	KS, KB
15	Araceae	*Colocasia esculenta*	Talas	Medicine, antidote, wound medicine	Tubers, leaves, sap	KTM
16	Araceae	*Homalomena sp.*	Duli’	Wound	Leaves	KU
17	Araceae	*Syngonium angustatum Schott*	Ureu bakung	Absorbs pus in wounds	Leaves	KTM
18	Aralicaeae	*Panax*	Kayu ginseng	Male strength herbs, joint pain herbs	Roots	KTG
19	Arecaceae	*Arenga pinnata*	Hanau/aren	Syphilis	Roots	KS
20	Arecaceae	*Areca catechu* Linn	Gaat	Vaginal discharge, Toothache, Internal medicine, Headache, Fracture, Heartburn	Roots	KTM, KB, KTG
21	Arecaceae	*Cocos nucifera*	Kelapa	Heatiness, measles, lumbago, headache, asthma, rheumatism, drowsiness, sleeping pills	Root, fruit	KB
22	Arecaceae	*Metroxylon sagus*	Rumbia/sagu	Bloody bowel movements, body odor, muscle pain, high blood pressure, cholesterol, antioxidants	Root, tuber	KS, KB
23	Arecaceae	*Salacca zalacca*	Salak	Stomach pain	Fruit, leaf shoots	KTM
24	Aristolochiaceae	*Aristolochia foveolata Merr*	Tabar kedayan	Stomach pain, anti-poison, Insect bite pain, blood sugar, internal heat, cancer	Roots	KU, KTM
25	Asparagaceae	*Cordyline fruticosa*	Ranyuangk	Bone pain	Leaves	KB
26	Asphodelaceae	*Aloe vera*	Lidah buaya	Burns, shortness of breath	Sap	KTG, KB
27	Asphodelaceae	*Dianella ensifolia*	Kambang Nenggari	Vomiting blood, difficulty urinating	Roots	KB
28	Aspleniaceae	*Asplenium nidus*	Umuh	Ulcers, burns	Leaves	KB
29	Asteraceae	*Achillea millefolium*	Tawar seribu	Dysentery, deep wounds	Leaves	KTG
30	Asteraceae	*Ageratum conyzoides*	Ureu tai kading	Wounds, boils, fever, malaria, diabetes, Itching, colds, beriberi, liver, stomach pain	Leaves, stems, roots	KTM, KTG, KB, KU
31	Asteraceae	*Blumea balsamifera*	Ureu mpung	Wounds, Malaria, fever, cholera, cough, antidote, mouth ulcers, Headache, cold, diarrhea, diabetes, rheumatism, flatulence	Leaves	KTM, KS, KTG, KU
32	Asteraceae	*Chromolaena odorata*	Coronai	Wound	Leaves	KB
33	Asteraceae	*Clibadium surinamense* Linn	Turiaris	Wound	Leaves	KU
34	Asteraceae	*Cosmos caudatus Kunth*	Kenikir	Ulcer disease	Leaves	KTG
35	Asteraceae	*Eclipta sp.*	Udu’saku	Wound	Leaves	KU

36	Asteraceae	*Elephantopus scaber* Linn	Tutup bumi	Shortness of breath, appendicitis, menstruation, typhoid	Leaves	KB
37	Asteraceae	*Emilia sonchifilia*	Payak babi	Fractures, abdominal pain, vomiting blood, flu, congestion, ulcers, inflammation	Leaves	KB
38	Asteraceae	*Erigeron sumatrensis*	Jalantir	Headache	Leaves	KS
39	Asteraceae	*Gynura procumbens*	Dait -Dait	Burns, malaria, cholesterol, high blood pressure, gout, rheumatism, ulcer, headache	Leaves	KB
40	Asteraceae	*Pluchea indica*	Beluntas	Rheumatic, hypertension	Roots, leaves	KS
41	Asteraceae	*Pseudelephantopus spicatus Juss. Ex Aubl*	Tembo dae	Fever, poisoning	Roots	KB
42	Asteraceae	*Senecio vulgaris* Linn	Hansabi kijang	Puffiness, beriberi	Leaves	KB
43	Asteraceae	*Synedrella nodiflora*	Kacumbit	Toothache	Leaves	KB
44	Asteraceae	*Thitonia diversifolia (Hemsley) A. Glay*	Insulin	Hypertension cholesterol	Leaves	KS
45	Balsaminaceae	*Impatiens balsamina* Linn	Pacar air	Rheumatism, ulcers	Flowers, leaves	KTG
46	Basellaceae	*Basella rubra* Linn	Luro	Inflammation of the bladder, appendicitis	Roots	KTM
47	Bixaceae	*Bixa orellana*	Kesumba keling	Dysentery, fever	Leaves	KTG
48	Blechnaceae	*Stenochlaena palustris*	Kalakai	Increased blood pressure, fever, diarrhea	Leaves	KTG, KTM
49	Bromeliaceae	*Ananas Comosus*	Nanas	Thrush	Fruit	KS
50	Caricacaea	*Carica pepaya*	Mancan	Anti-cancer, joint inflammation, dengue symptoms, malaria, appendicitis, difficult to pass stool	Leaf, fruit	KTM, KTG, KB, KU
51	Clusiaceae	*Garcinia Mangostana*	Langis	High blood pressure	Leaves	KB
52	Convolvulaceae	*Ipomoea aquatic Forsk*	Kangkung bala	Prevents diabetes, high blood pressure, constipation, immunity	Roots	KTM
53	Convolvulaceae	*Merremia umbellata*	Kalambit	Wound	Leaves	KB
54	Costaceae	*Costus speciosus*	Pacing tawar	Water fleas, High fever,	Trunk	KS, KTG
55	Crassulaceae	*Bryophyllum pinnatum*	Ben bibek	High fever, high fever, fever in children	Leaves	KTM
56	Crassulaceae	*Kalanchoe pinnata*	Cocor bebek	Burns, hemorrhoids, boils, cough, dysentery, fever, rheumatism	Leaves	KTM, KU
57	Cucurbitaceae	*Cucurbita moschata*	Labu kuning	Medicine ingredients	Seeds	KTM
58	Cucurbitaceae	*Momordica balsamina*	Piyaq pulung	Constipation, diabetes, eye health, heatiness	Leaves	KTM
59	Cyperaceae	*Cyperus rotundus* Linn	Ureu siit	Diarrhea, postpartum, fever, malaria	Leaves	KTM
60	Cyperaceae	*Scleria sumatrensis Retz.*	Jagu	Diabetes	Roots	KB
61	Dilleniaceae	*Dillenia indica*	Simpur	Fractures, sprains	Leaves	KB
62	Dilleniaceae	*Dillenia suffruticosa (Griff ex Hook.f. & Thomson) Martelli*	Buant	Muscle pain, injury	Leaf, bark, stem	KB
63	Euphorbiaceae	*Aleurites moluccana (L) Willd.*	Kemiri	Cholesterol, sprains, genital cleanser, hair loss, growing a beard	Seeds, leaves	KB, KS

64	Euphorbiaceae	*Codiaeum variegatum*	Patah kemudi	Abdominal pain, worms	Leaves	KB
65	Euphorbiaceae	*Croton tiglium*	Cerakin	Laxative	Roots	KS
66	Euphorbiaceae	*Euphorbia hirta*	Arak babo	Tara/Rahim down	Roots	KB
67	Euphorbiaceae	*Euphorbia tirucalli*	Patah tulang	Bone fracture	Stem sap	KS
68	Euphorbiaceae	*Euphorbia tithymaloides*	Pohon lipan	Ulcers, scabs, antidote	Leaves	KTM
69	Euphorbiaceae	*Excoecaria cochinchinensis*	Sambang darah	Dysentery, vomiting blood, coughing, wounds, bleeding	Leaves	KTG, KB
70	Euphorbiaceae	*Hevea brasiliensis Mull. Arg.*	Karet	Bone fracture	Leaves	KB
71	Euphorbiaceae	*Homalanthus populneus*	Ureu baaq	Itching	Leaves	KTM
72	Euphorbiaceae	*Jatropha gossypifolia*	Karongan	Bone fracture	Leaves, roots	KB
73	Euphorbiaceae	*Macaranga bancana (Miq) Mull Arg.*	Lampapan	Back pain	Stem bark, leaf shoots	KB
74	Euphorbiaceae	*Mallotus paniculatus*	Balik angin	Expedite labor	Roots	KTG
75	Euphorbiaceae	*Manihot esculenta*	Singkong	Wound	Trunk	KS
76	Euphorbiaceae	*Phyllanthus niruri*	Hambin buah/menira n hijau	Lumbago, fever, dysentery, jaundice, malaria, Asthma, hepatitis, beriberi, liver, difficulty urinating, diabetes, poisoning	Leaf, stem, root, fruit, flower	KS, KTG, KB, KU
77	Euphorbiaceae	*Sauropus androgynus*	Katu	Headache, increase breast milk, Ulcers, ulcers, dirty blood cleanser, Flu	Leaves	KS, KB, KTM
78	Fabaceae	*Adenanthera pavonina*	Saga	Itching, scabies, ringworm	Leaves	KU
79	Fabaceae	*Cassia alata* Linn.	Ketepeng	Panu or ringworm, itching	Leaves	KB, KU
80	Fabaceae	*Crotalaria retusa* Linn	Balilang	Ringworm	Leaves	KU
81	Fabaceae	*Desmodium triflorum*	Sisik betok	Gastric pain, diarrhea, dysentery, ulcers	Roots, leaves	KTM
82	Fabaceae	*Falcataria moluccana*	Ukah balimingk	Smallpox	Leaves	KB
83	Fabaceae	*Mimosa pudica,* Linn	Putri malu	Diabetes, toothache, bloody chapter, stomach ache, diabetes, sores, cough, fever	Roots, leaves	KTG, KB, KTM
84	Fabaceae	*Senna alata*	Ureu kep	Panu, ringworm, drying out of the womb, skin allergies	Leaves	KTG, KTM
85	Fabaceae	*Sindora wallichii Benth*	Tampar antu	Deep wounds	Roots	KB
86	Fabaceae	*Spatholobus littoralis*	Ukah binke	Grumbling, internal heat	Leaves	KB
87	Gramineae	*Bambusa vulgaris striata*	Bambu kuning	Jaundice	Bamboo shoots	KTG
88	Gramineae	*Cymbopogon citratus*	Serai	Thunderstruck, broken bones, sprains	All parts	KTG, KB
89	Hypoxidaceae	*Curculigo orchioides*	Rama dengot	Descending intestine	Leaves, Roots	KB
90	Iridaceae	*Eleutherine bulbosa*	Bawang kenyah	Cholestrol pressure	Leaves	KTM
91	Iridaceae	*Eleutherine palmifolia*	Bawang dayak	Cancer, coughing up blood, Fever, malaria, ginja	Tubers	KTG, KB
92	Lamiaceae	*Callicarpa longifolia*	Ucung ace	Diarrhea, postpartum, fever, malaria, diabetes, cholesterol	Leaves, roots	KTM, KTG, KB
93	Lamiaceae	*Coleus scutellarioides* Linn	Kambankn saatiati	Breast milk enhancer, itching	Leaves	KB

94	Lamiaceae	*Mentha piperita*	Kakompol	Smallpox, fever, cough,	Leaves	KB
95	Lamiaceae	*Ocimum sanctum* Linn	Kemangi	Body odor, weak nerves	Flower leaves	KB
96	Lamiaceae	*Orthosiphon aristatus*	Kumis kucing	Fever, kidney inflammation, asthma, diabetic pressure, difficulty urinating, jaundice, Gout, blood pressure, rheumatism	Roots, leaves	KS, KU, KTM, KTG, KB
97	Lamiaceae	*Peronema canescens*	Songkai	Fever, typhoid	Leaves	KTG, KTM
98	Lamiaceae	*Premna pubescens blume*	Babuas	Body odor, anticancer, colds, worms, bad breath,	Leaf, root, bark, stem	KB
99	Lamiaceae	*Vitex pinnata*	Laban	Fever, appetite enhancer, wounds, stomach pain, ulcer, cold, diabetes, constipation, tonsils, menstruation, measles, typhoid, smallpox	Stem bark, leaf shoots, roots	KTM, KTG, KB
100	Lauraceae	*Cinnamomum Burmannii*	Ubah	Stroke, asthma, mouth ulcers, stomach pain	Leaves, bark, shoots	KB, KTM
101	Lauraceae	*Cinnamomum javanicum*	Tabar	Medicine ingredients	Bark, leaves	KTM
102	Lauraceae	*Eusideroxylon zwageri*	Kayu ulin	Medicinal materials, stomach pain, heart disease, hepatitis, diabetes	Fruit, leaves	KTM, KB
103	Lauraceae	*Leea indica*	Mali-mali	Dizziness, bone pain, back pain, sprains	Leaves	KTG, KB
104	Liliaceae	*Allium cepa*	Bawang merah	Colds, Bleeding from wounds, Appetite enhancer, hair loss, step, tuberculosis, smallpox	Tubers	KB
105	Liliaceae	*Allium Sativum* Linn	Bawang putih	Fights viruses, has natural antibiotics	Tubers	KU
106	Lomariopsidaceae	*Nephrolepis exaltata schoot*	Pakeu julut	Urinary tract disorders, booster for breastfeeding	Leaves	KTM
107	Loranthaceae	*Macrosolen cochinchinensis*	Benalu	High blood pressure, tumor, headache	Leaves, roots, stems	KB
108	Lygodiaceae	*Lygodium flexuosum*	Jari sembilan	Mumps	Leaves	KB
109	Lygodiaceae	*Lygodium microphyllum*	Tigu-rigu	Hepatitis, lumbago, kidney disease, bone fractures, shortness of breath, stroke,	Leaves, roots, stems	KB
110	Malvaceae	*Ceiba pentandra*	Kapuk randu	Medicine ingredients	Fruit	KTM
111	Malvaceae	*Durio zibethinus*	Durian	Sore tongue, cleansing dirty blood after childbirth	Fruit peel	KB
112	Malvaceae	*Hibiscus rosa-sinensis*	Kembang sepatu	Ulcers, fever, decreased heatiness	Leaves	KTG, KB
113	Malvaceae	*Hibiscus sabdariffa*	Rosela	High blood pressure, cholesterol	Fruit	KB
114	Malvaceae	*Hibiscus tiliaceus*	Waru	Cough	Leaves	KS
115	Malvaceae	*Theobroma cacao*	Kupi	Accelerate external wound healing, prevent external wound infection	Leaves	KTM
116	Malvaceae	*Urena lobata*	Empalut	Pire/bone pain	Roots	KB
117	Melastomataceae	*Melastoma polyanthum Bl.*	senggani	Diarrhea, sores, itching	Leaves	KB
118	Melastomataceae	*Melastoma malabathricum*	Cengkodok	Abdominal pain, sores	Leaves	KB
119	Melastomataceae	*Melastoma Sp*	Kang	Fever, pain relievers, urine relaxants	Leaves	KTM
120	meliaceae	*Lansium Domesticum*	Langsat	Diarrhea, ulcer, malaria, bloody chapter, jaundice, worms, fever	Bark, rind, seed	KB, KTM
121	Meliaceae	*Mischocarpus. sp*	Talatak manuk	Ambeyen, bloody stool	Root, skin and fruit	KTG
122	Menispermaceae	*Arcangelisia flava* Linn	Kayu kuning	Diabetes, malaria, jaundice, stomach ache, eye drops,	Roots	KTG, KTM

				thrush, worms		
123	Menispermaceae	*Coscinium fenestratum (Gaertn) Colebr.*	Akar kuning	Anti-cancer, diabetes, poisoning, hepatitis, cholesterol, facilitating menstruation, abdominal pain	Leaves, roots, stems	KS, KB
124	Menispermaceae	*Pynarrhena cauliflora Diels*	Mekai	Lower blood sugar	Leaves	KTM
125	Menispermaceae	*Stepania sp*	Bala'an	Stomach pain	Leaves	KU
126	Menispermaceae	*Tinospora crispa* Linn	Brotowali	Malaria, appetite enhancer, fever, diabetes, jaundice, toothache, eye pain, liver, ulcer, diabetes	Roots, stems, leaves	KS, KTM, KTG, KB
127	Mimosaceae	*Parkia speciosa*	Petai	Removes dandruff	Fruit	KB
128	Mimosaceae	*Pithecellobium jiringa*	Jengkol	Improves urine flow	Fruit	KB
129	Moraceae	*Ficus grossularioides*	Ketawi	Bone fracture	Leaves	KB
130	Moraceae	*Artocarpus heterophyllus*	Nangka	Boils	Fruit	KB
131	Moraceae	*Artocarpus odoratissimus*	Tarap atau marang	Fever	Leaves	KS
132	Musaceae	*Musa paradisiaca S*	pisang ambon	Pressure, Diarrhea, Difficulty passing stool, Diarrhea, External wounds, Facilitate breastfeeding	Leaf, sap, root, fruit	KTM, KS, KB
133	Myrtaceae	*Psidium guajava* Linn	Jambu biji	Diarrhea, abdominal pain, body odor, dysentery	Leaves	KTM, KTG, KB
134	Myrtaceae	*Rhodomyrtus tomentosa*	Karamunting	Sugar disease	Roots	KTG
135	Myrtaceae	*Syzygium polyanthum*	Daun salam	Cough, hypertension, gout, diarrhea	Leaves	KTG, KB
136	Nepenthaceae	*Nepenthes ampularia Jack.*	Hudon	Labor facilitator	Leaves	KB
137	Nepenthaceae	*Nepenthes sp*	Kantong semar	Cough, hypertension, gout	Liquid, roots	KTG
138	Nymphaeaceae	*Nymphaea lotus*	Teratai kecil	Skin, anti-seizure	Flowers	KS
139	Ophioglossaceae	*Helminthosta chys zeylanica*	Pakat langit	Cough, syphilis, malaria, dysentery, cataract, tuberculosis	Leaves	KTM
140	Orchidaceae	*Bromheadia finlaysoniana (Lindl) Miq*	Akir -akir	Dysentery, bleeding, rheumatism, asthma, sprains, boils, earache	Roots, leaves	KB
141	Oxalidaceae	*Averrhoa bilimbi*	Belimbing tunjuk	Cholesterol, heart health, cough, fever, flu, malaria, hemorrhaging	Leaf, fruit	KTM, KTG
142	oxalidaceae	*Averrhoa carambola*	Belimbing manis	Hypertension, malaria	Fruit	KTG, KB
143	Pandanaceae	*Pandanus amaryllifolius*	Pandan	Treating wounds	Leaves	KB
144	Pandanaceae	*Pandanus tectorius*	Sekke	Sore throat	Leaves	KB
145	Passifloraceae	*Passiflora foetida*	Rambusa	Thrush, heatiness, asthma relief, diabetes, kidney, cancer, blood loss	Leaf, fruit, root	KTG, KB, KTM
146	Phyllanthaceae	*Phyllanthus urinaria*	Maniran	Prevent kidney stones, anti-cancer	Roots	KTM
147	Piperaceae	*Peperomia pellucida*	Suruhan	Headache, joint pain	Leaves	KTG
148	Piperaceae	*Piper betle* Linn	Sirih	Bad breath, body odor, nosebleeds, vaginal discharge, toothache, sore tongue, febrifuge	Leaves	KTG, KB
149	Piperaceae	*Piper nigrum*	Sahang/lada	Ulcer, hypertension, shortness of breath	Fruit	KS, KTM
150	Piperaceae	*Piper ornatum*	Uwit amot	Fracture, back pain	Leaves	KB
151	Piperaceae	*Piper villipedunculum*	Sakang hutan	Pig farming	Leaves	KTM

152	Poaceae	*accharum officinarum*	Tabu merah	Fractures, sprains	Leaves	KB
153	Poaceae	*Axonopus compressus*	Rumput bulu ayam	Toothache	Leaves	KB
154	Poaceae	*Cymbopogon Nardus (L)*	Sereh	Fractures, colds, diabetes, muscle pain, sprains, back pain	Trunk	KB
155	Poaceae	*Eleusine indica*	Sangke afau	For mothers who have had a miscarriage	Roots	KTM
156	Poaceae	*Imperata cylindrica*	Alang-alang tapuhkah	Diabetes, urinary tract infection, anti-diabetes, treat postpartum, high blood pressure, fever, malaria, appendicitis, back pain	Rhizome, root	KTG, KTM, KB
157	Poaceae	*Lophatherum gracile*	Tamiang barangin	Back pain, fever, urinary stones, mouth ulcers	Root, leaf, stem	KB
158	Poaceae	*Paspalum conjugatum Berg.*	Uru balanda	Bleeding stoppers	Leaves	KTG
159	Poaceae	*Saccharum officinarum*	Tebu	Dysentery, cough, tonicum, eye pain	Roots, stems, buds	KTM
160	Poaceae	*Saccharum spontaneum*	Gelagah	Eye pain	Buds	KTM
161	Polygalaceae	*Xanthophyllum excelsum*	Kayu telur	Stomach pain, mouth ulcers	Stem bark, seeds	KTM
162	Polypodiaceae	*Pyrrosia piloselloides*	Sisik naga	Asthma, rheumatism, mouth ulcers, pulmonary TB	Leaves	KTG
163	Rubiaceae	*Anthocephalus cadamba Miq.*	Jabon	Burns	Leaves	KS
164	Rubiaceae	*Coffea sp.*	Kopi	Wound	Seeds	KS
165	Rubiaceae	*Gardenia jasminoides*	Kacapiring	Fever, headache, itching of the head	Leaves, flowers	KS, KU
166	Rubiaceae	*Ixora coccinea*	Bunga jarum	Improves menstruation	Flowers	KS
167	Rubiaceae	*Morinda citrifolia,* Linn	Mangkudu	Bone fractures, hypertension, ulcers, flatulence	Leaf, fruit	KS, KTG, KB
168	Rubiaceae	*Mussaenda frondosa* Linn	Kacampak	Measles, vomiting blood, eye wash, wounds	Leaves	KB
169	Rubiaceae	*Nauclea sp*	Tembalu luwohon	Vomiting blood	Leaves	KU
170	Rubiaceae	*Nauclea subdita*	Bangkal	Facial health	Bark	KS
171	Rubiaceae	*Paederia foetida*	Kakantut	Bone pain	Leaves	KB
172	Rubiaceae	*Uncaria ferrea*	Kait besi	Sores, intestinal inflammation	Leaves, roots	KTM
173	Rubiaceae	*Uncaria gambir*	Gambir	Relieves nasal congestion, cough, jaundice, stomach pain, tonsils, prevent dandruff, asthma	Gambir extract, leaf, stem water	KS, KTM
174	Rutaceae	*Citrus ×aurantifolia*	Jeruk nipis	Cough	Fruit	KB
175	Rutaceae	*Citrus ablycarpa*	Jeruk sambal/limau	Thrush	Fruit	KB
176	Rutaceae	*Citrus hystrix DC*	Jeruk pangir	Appendicitis, back pain, weak nerves	Skin, fruit, root	KB
177	Rutaceae	*Citrus maxima*	Jeruk bali	Cough with phlegm vomiting blood	Fruit	KB
178	Rutaceae	*Lavanga sarmentosa*	Saluang bilung/saluang belum	Back pain, increase male stamina, kidney disease, antioxidant,	Root, stem	KS, KTG
179	Sapindaceae	*Lepisanthes amoena*	Kukang	Acne, dark spots, allergies, bruntusan, pox, panu, bumps	Leaves	KTM
180	Schisandraceae	*Kadsura scandens*	Kilebur	Cough, sore throat, after delivery	All parts	KTM

181	Selaginellaceae	*Selaginella doederleini*	Cakar ayam	Fever, cough, stop wound blood	Leaves	KTG
182	Simaroubaceae	*Brucea javanica (L) Merr.)*	Mengumpit/ buah makasar	Toothache	Leaf shoots	KS
183	Simaroubaceae	*Eurycoma longifolia*	Pasak bumi	Lumbago, increase male stamina, malaria, tonic, fever, blood purifier, dysentery, thrush, appetite, high blood pressure	Roots	KS, KTG, KB, KTM, KU
184	Solanaceae	*Capsicum frutescens*	Cabe	Boils	Fruit	KB
185	Solanaceae	*Physalis angulata* Linn	Ciplukan	Blood-lowering, Treating bone, skin, Asthma disease, lowering cholesterol levels, diabetes mellitus disease	Leaf, root, stem, fruit	KS, KB, KTM, KTG
186	Solanaceae	*Solanum mammosum* Linn	Terong susu	Breast cancer	Fruit	KTG
187	Solanaceae	*Solanum torvum*	Terong pipit	Cough, Fever, wounds, toothache, hypertension, asthma, diabetes mellitus, gout, heat, improve blood circulation	Root, fruit	KS, KTG, KB, KTM
188	Sterculiaceae	*Guazuma ulmifolia Lam*	Kalanduyung	Tonsils, cough	Root, stem	KTG
189	Thymelaeaceae	*Aqualaria malaccensis*	Sekau	Tired, feverish medicine	Leaves	KTM
190	Thymelaeaceae	*Phaleria macrocarpa*	Mahkota dewa	Reduces pain, reduces the risk of developing coronary heart disease	Fruit	KTM, KB
191	Tiliaceae	*Pentace sp.*	Iyur kuda	Cough and sore throat	Leaves	KU
192	Verbenaceae	*Stacytarpheta jamaicensi*	Kaya rianggas	Cough	Leaves	KS
193	Verbenaceae	*Vitex Pubescens Vahl*	Halaban/alaban	Back pain treatment	Trunk	KS, KU
194	Vitaceae	*Cayratia trifolia*	Lambai	Appetite enhancer	Fruit	KS, KTG, KB, KTM
195	Zingiberaceae	*Alpinia galanga*	Laos	Panu, stomach ache, Measles, Skin diseases, respiratory, mouth cancer, stomach, Panu, rheumatism, spleen pain, increase appetite, improve urination	Rhizome	KTM, KU
196	Zingiberaceae	*Curcuma aeruginosa*	Temu hitam	Asthma, cough	Rhizome	KB
197	Zingiberaceae	*Curcuma domestica Val Z*	kunyit	Runny nose, stomach pain	Rhizome	KTM, KB, KTG, KS, KU
198	Zingiberaceae	*Curcuma mangga Val.*	Liye' lisit	Appetite enhancer and cold prevention	Rhizome	KU
199	Zingiberaceae	*Curcuma xanthorriza*	Temulawak	Liver disease, appetite enhancer, stomach, cough, asthma, ulcer, stamina enhancing herbs, Diabetes, rheumatism,, constipation, colds, scabies	Leaf, rhizome	KTG, KU
200	Zingiberaceae	*Curcuma zedoaria (Christm.)*	Kunyit putih	Diarrhea, cold, appetite enhancer	Rhizome	KTM, KB, KU
201	Zingiberaceae	*Etlingera elatior*	Ufut nyanting	Joint pain, muscle pain, menstrual relief	Trunk	KS, K B
202	Zingiberaceae	*Kaempferia galanga*	Kencur	Ulcer, cold, cough, appetite suppression, jaundice, postpartum care, diabetes, flatulence, fractures, sprains	Stem, rhizome	KB
203	Zingiberaceae	*Zingiber officinale Rosc.*	Jahe	Frequent colds, abdominal pain, colds, postpartum, body warming, sprains, rheumatism	Rhizome	KU, KB

204	Zingiberaceae	*Zingiber aromaticum Val*	Liye' fasut	Ulcer	Rhizome	KU

*) KB: west Kalimantan; KS: south Kalimantan; KTG: Central Kalimantan; KTM:East Kalimantan; KU:North Kalimantan

The types of plants that are often used as medicines in Kalimantan communities come from the families Asteraceae (16 species), Euphorbiaceae (15 species), Rubiaceae (11 species), Arecaceae (5 species), Fabaceae (9 species), Lamiaceae (8 species), Malvaceae (7 species), Menispermaeae (5 species), Poaceae (9 species), and Zingiberaceae (10 species) and Rutaceae, Piperacaae (5 species) (Figure 2). One of the families that are widely used by local Kalimantan communities is Asteraceae. The Asteraceae tribe ranks first as the highest species that are widely used by Kalimantan people as medicine, because the Asteraceae family plants generally have the potential to be used as medicine (Nurchayati, 2022).

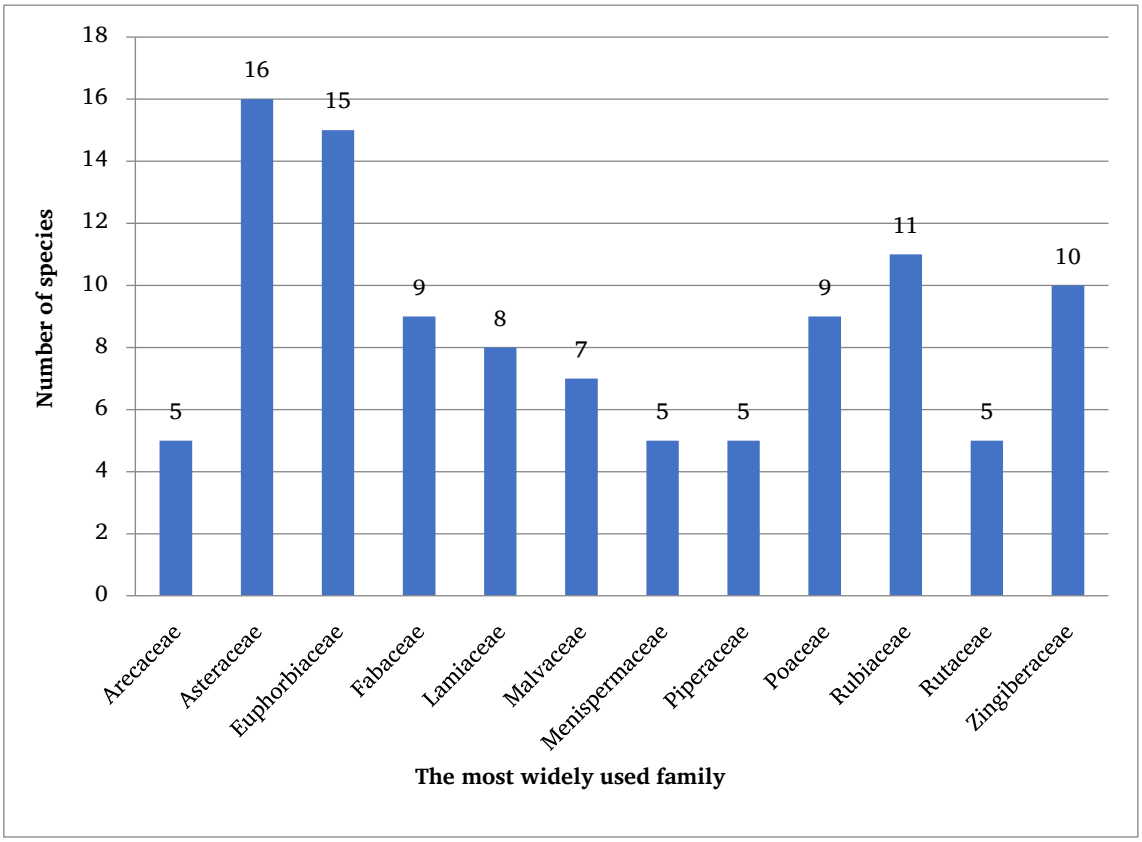

Figure 2. Twelve families of medicinal plants widely used by local Kalimantan communities based on literature studies in the last 10 years.

High diversity and the number of species that dominate with distinctive characteristics have medicinal benefits such as the type of tai kading plant (*Ageratum conyzoides* Linn.) can be found in several regions such as central Kalimantan, East Kalimantan, and West Kalimantan. This species is believed to cure fever, ulcers, liver,diabetes, stomach pain (Elisetana et al., 2023). Asteraceae identified in Gaza Palestine has significant benefits in the treatment of kidney disease, liver disease, indigestion, rheumatism, fever, skin diseases (Auda, 2023). The Asteraceae family is cosmopolitan, with species concentrated in temperate, cold, and subtropical regions (Medeiros et al., 2018)

The use of medicinal plants that are often used by the people of Kalimantan varies, from plants that grow in the yard or come from the forest. One of the oldest plant families is Arecaceae, which means palms. The kinship line is unique and in different places in the plant group (Alandana et al., 2015). The results of the revie of literature review data on gaat plants (*Areca catechu* Linn.) are often used by Kalimantan people to overcome the problem of vaginal discharge in women (Sari et al., 2017). *Areca catechu* Linn. is also used by the people North Maluku as an itching medicine, appetite enhancer, strengthening teeth, clearing eyes, cleaning toddlers' tongues, overcoming discomfort in the mouth of adults, and neutralizing dizziness (Muna, 2021).

The Euphorbiaceae family is more commonly found in tropical rainforests, mostly in open areas such as grasslands or shrubs with many variations of shrub, shrub and tree habitus (Gunawan et al., 2023). Like *Phyllanthus niruri* Linn. which is widely used by local people in Kalimantan as an alternative medicine because it has phytochemical content that can cure lumbago, fever, dysentery, jaundice, malaria, asthma, hepatitis, beriberi, liver, difficulty urinating, diabetes, poisoning and immunity. According to (Ulfa, 2021) the people of Teluk Pulai Raya Village, Seberang Kota District, Tanjung Jabung Barat Regency, Jambi Province, use *Phyllanthus niruri* Linn because it is effective for curing pain when urinating.

The Fabaceae family of legumes is mostly tree-shaped, but there are also shrubs and herbs. The Fabaceae family is widely used in various fields, such as medicine, cosmetics, hair care, food additives, and building materials. According to the data, the Fabaceae family has 9 types of species that are often used by the people of Kalimantan as medicine. One of them (*Mimosa pudica* Linn), this plant is widely used by the people of Central Kalimantan, West Kalimantan, and East Kalimantan becauseit can cure several diseases such as diabetes, toothache, bloody stools, stomach pain, diabetes, wounds, coughs, and fever (Jafar & Djollong, 2018). Another use according to (Mahanani, 2015) is used as a hernia medicine by the people of Jayawijaya district. The method of application is to dip one handful of (*Mimosa pudica* Linn) leaves, then roasted until it becomes charred, then smeared with various kinds of native coconut oil and eaten.

Orthosiphon aristatus (Blume) Miq also known as kumis kucing, is the most commonly used medicinal plant by the people of Kalimantan from the Lamiaceae tribe. Orthosiphon aristatus (Blume) Miq is a medicinal plant distributed in India, Indo-China, Thailand, Malaysia and Australia. All boiled parts of *Orthosiphon aristatus* (Blume) Miq are useful for treating hypertension, diabetes, and stomach ulcers among residents around the Cibodas Botanical Garden, West Jawa (Fahrurozi, 2014) It is also used by people in Central Kalimantan, West Kalimantan, East Kalimantan, North Kalimantan, and South Kalimantan as a medicine for fever, kidney inflammation, asthma, diabetic pressure, difficulty urinating, jaundice, gout, blood pressure, rheumatism pulse, by utilizing root and leaf parts (Diana et al., 2023).

In addition, the Malvaceae family or cotton-spirits tribe is a dicotyledonous plant group. There are 7 types of species used in its utilization as medicine, namely the species (*Hibiscus rosa* sinensis Linn). Besides being used as an ornamental plant, the people of Central Kalimantan, and West Kalimantan often use it to heal boils, cure fever, reduce heatiness (Ricky et al., 2019) Furthermore, the people of Mesu Boto Hamlet Jatiroto Wonogiri Central Java according (Suproborini et al., 2018) also utilize hibiscus as a medicine to reduce malaria fever.

In the Menispermaceae family, the brotowali species (*Tinospora crispa* (Linn) Miers) is often found in forests and home yards. Brotowali is usually more often used as a medicinal herb to drink. Utilization of brotowali in Kalimantan is used to cure malaria, appetite enhancers, fever, diabetes, jaundice (Ricky et al., 2019) Toothache, eye pain, liver, ulcer. According to Research (Putri et al., 2021) Central Java Region, Baturraden Botanical Garden, Banyumas Regency, the use of brotowali is used as a medicine for rheumatism, fever, jaundice, cough, and worms by the local community.

The utilization of alang-alang (*Imperata cylindrical* L. Raeusch) as a medicine is quite widely known by Indonesian ethnic communities. Especially in Kalimantan, the use of alang-alang as a medicine to cure diabetes, urinary tract infections, anti- diabetes, treating postpartum (Qamariah et al., 2018) In addition, alang-alang is used for the treatment of anemia in ethnic Balinese and kidney stone healers in southeast Sulawesi communities. Parts of the alang-alang plant that are utilized by several ethnic communities also have similarities, namely by using the roots and leaves (Manar, 2018).

Lafare et al. (2018) state that the Rubiaceae family has the greatest diversity, is clearly concentrated in humid tropical and subtropical regions and cannot grow in extreme environments such as poles. *Morinda citrifolia* Linn which is often called mengkudu has benefits as an herbal medicine that is widely used by the people of Kalimantan. Especially the parts of South Kalimantan, Central Kalimantan and West Kalimantan. This medicinal plant has many benefits in curing hypertension, boils, and flatulence (Elisetana et al.,2023) using the leaves and fruit. Furthermore, the utilization of noni or *Morinda citrifolia* Linn in the area of Nuku Village, South Oba Subdistrict, Tidore Islands City is used to eliminate cough, high blood pressure, headache medicine, prevent cancer (Kamaluddin & Tamrin, 2023)

Included in the Zingiberaceae family, *Curcuma domestica* Val is widely used to cure colds, and stomachaches in Kalimantan communities. This family includes the most types used by the southern Sangihe ethnic community with one of them using turmeric plants as a medicine to reduce heat and headaches (Pelokang et al., 2018) In addition, the benefits of *Luvunga sarmentosa* (Blume) Kurz as a Rutaceae family in Tahawa village are used to overcome menstrual irregularities in women, help accelerate wounds after childbirth to dry out. The processing method is enough to use only the roots and leaves (Yanarita et al., 2023). In addition, saluang has not itself been used to treat lumbago, kidney disease by the people of Kalimantan. Furthermore, the use of Betel plants used by the people of West Kalimantan and Central Kalimantan as a cure for bad breath, body odor, nosebleeds, vaginal discharge, toothache, tongue pain (white), heat reduction. In addition, betel can also be useful as an anti-infection that can be caused by pathogenic microbes (Kennedy et al., 2020).

3.3. Phytochemical Constituents of Medicinal Plants

The use of medicinal plants were more popular because has relatively little side effects in synthetic drugs (Meliki et al., 2013) Moreover, the danger of using drugs that are not appropriate according to their content is very impactful or less likely to provide benefits, the possibility of side effects is greater than the benefits.

Data from the review of 12 plant species that are most widely used by local Kalimantan communities above, contain phytochemical compounds that can provide a healing effect on a disease. For example, the betel plant (*Piper bettle* L*)* commonly used by the people of Kalimantan can treat bad breath, body odor, nosebleeds, vaginal discharge with compounds containing flavonoids, essential oils, saponins and polyphenols (Ricky et al., 2019). Besides that the use of (*Curcuma domestica* Val*)* as a medicine for stomach pain is widely used by local people in Kalimantan.

Table 3. Some medicinal plants widely used by local communities in Kalimantan, diseases believed to be treatable, phytochemical content, and bioactivity and frequency of use in the last 10 years study.

Latin name	Local name	Phytochemical content	Bioactivity	Frequency of use
Areca catechu Linn.	*Gaat*	Terpenoids, flavonoids, and alkaloids. Major alkaloids (arecoline, arecaidine, guvacoline and guvacine)	Anti microbe, Anti schizophrenia, anti- inflammatory, anti migraine	4 Villages
Ageratum conyzoides Linn.	*Ureu tai kading*	Flavonoids, glycosides, alkaloids, saponins, tannins, sterols, terpenoids, coumarins and essential oils	Anti-microbial, antioxidant, antiplasmodial	5 Villages
Phyllanthus niruri Linn.	*Hambin buah/meniran*	Flavonoids, lignan, terpenoids, alkaloids	Antispasmodic, antioxidant, anticancer, anti- inflammatory, antimalarial, antibacterial, anti-allergic	6 Villages
Mimosa pudica Linn.	*Putri malu*	Flavonoids, alkaloids, terpenoids, saponins and coumarins	Antioxidants	4 Villages
Orthosiphon aristatus (Blume) Miq.	*Kumis kucing*	Flavonoids, saponins, tannins and essential oils	Antimicrobial, antioxidant	7 Villages
Hibiscus rosa-sinensis Linn.	*Kembang sepatu*	Ethanol, flavanoids, saponins and steroids	Anti-bacterial, antioxidant	3 Villages
Tinospora crispa Linn.	*Brotowali*	Alkaloids, flavonoids, tannins, and saponins	Antioxidant, anti- diabetic, antimalarial	6 Villages
Imperata cylindrical (L) *Raeusch.*	*Alang-alang tapuhkah*	Flavonoids, phenolics and steroids while secondary metabolites are alkaloids, quinones and triterpenes	Anti-cancer, anti- bacterial, antioxidant	7 Villages
Morinda citrifolia Linn.	*Mangkudu*	flavonoids, phenols, glycosides, and triterpenoids	Anti-microbial, anti-cancer, antioxidant, anti-diabetic	6 Villages
Curcuma domestica Val.	*Kunyit*	Essential oil, resin, curcumin, oleoresin, desmethoxycurcumin, and bidesmethoxycurcumin	Anti-malarial, antioxidant, anti-inflammatory	5 Villages
Luvunga sarmentosa (Blume) Kurz.	*Saluang belum*	Saponins, flavonoids, tannins	Anti-bacterial, antioxidant	3 Villages
Piper bettle Linn.	*Sirih*	Flavonoids, essential oils, saponins, and polyphenols	Anti-bacterial, antioxidant	5 Villages

Flavonoid compounds are often found in foods and beverages of plant origin, such as fruits and vegetables. Flavonoids have health-promoting effects with a broad spectrum and are an indispensable component in various nutraceutical, pharmaceutical, medicinal and cosmetic applications (Khoirunnisa & Sumiwi, 2019). Therefore, there are many phytochemicals in the form of flavonoid compounds contained in various plant species data that are often used by local Kalimantan communities (**Table 3**) because flavonoids have a variety of biochemical and antioxidant effects.

3.4. Part of the plant that used as medicine

Recorded in the review of the use of plant parts as medicine, there are 9 parts used in Kalimantan (Figure 3) from 204 medicinal plant species 129 species were utilized for their leaf (45%), root (19%) was utilized from 54 species, stem (10%) was used as medicine from 29 species, fruit (12%) from 33 species, and 13 species were used for medicine by their rhizomes (5%). Other parts of plant, ie. Flowers, bulbs, seeds and buds ware used as much as 1-3%. Regarding this, leaves was the most part that used in medicinal in Kalimantan. Similar findings were found in Marimbate Village, West Halmahera, that leaf was the most widely used as a medicine (from 16 species) in the region (Wakhidah et al., 2017).

According to (Ergina, 2014) leaves also have the potential and content of secondary organic matter also known as secondary metabolites. Secondary organic matter comes from primary organic matter such as protein. Leaves have a seasonal nature (Situmorang & Sihombing, 2018), therefore leaves are widely chosen by the community. In addition, leaves are the easiest part of the plant to obtain and the most widely used. The use of leaves for medicine does not have a negative impact on plant growth

because leaves can regrow easily, unlike other plant parts such as roots, stems, or tubers that can affect ecological roles.

Furthermore, the other most common use is roots. Roots are parts of plants that can directly absorb water and nutrients from the soil. For example, the Saluang plant has not whose root use is quite famous in Kalimantan and is still widely used. Previous studies have shown that saluang yet functions as an antioxidant and relieves waist and stomach pain (M. Agustina et al., 2019). In addition, the type of Areca catechu Linn which is called the Gaat plant is also well known by local Kalimantan people to cure heartburn, leucorrhea, toothache, internal diseases, headaches, bone fractures, and other diseases by using its root parts (Sari et al., 2017).

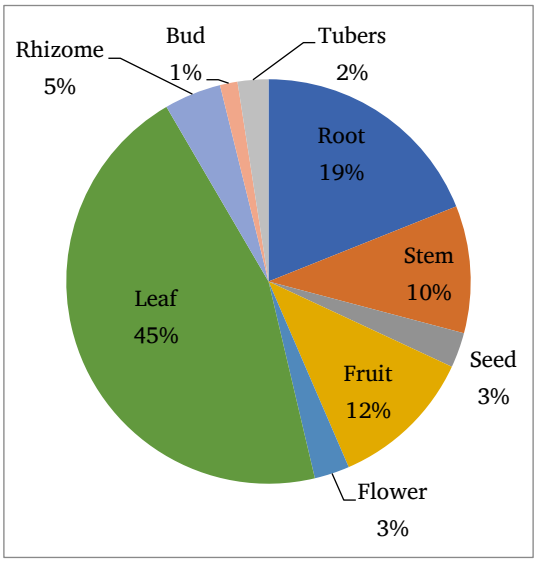

Figure 3. Comparison of plant parts used as medicine by local Kalimatan

3.5. Preparation of medicinal plants

There are 5 ways of Preparation medicinal plants used by the people of Kalimantan, namely boiled, pounded, smeared, taped, grated. The results of the review show that the majority of local Kalimantan residents prefer to use the medicinal plant method by boiling and then drinking. This is due to the strong belief of the community that processing by boiling and drinking is more effective because it has been used for generations from the time of the ancestors. This finding is also in line with research on the utilization of Sangihe Ethnic medicinal plants in the Southern Sangihe Islands, North Sulawesi which states that the most widely done processing is by boiling. This is because in general people use medicinal plants in the form of potions and boiling is the easiest way of processing compared to other methods (Pelokang et al., 2018).

Boiling is an effective and easy way of processing as people prefer if the plant is boiled and produces decoction juice rather than direct consumption (Jafar & Djollong, 2018) Accordinto (Haryono et al., 2014) people believe and understand that drinking boiled water will quickly cure the disease and more pronounced in its recovery effect.

4. CONCLUSION

Based on the research, it can be concluded that there are 204 plant species from 74 families that are used by the people of Kalimantan as medicine. The types of plants that are most widely used by the people of Kalimantan come from the Euphorbiaceae, Asteraceae, Rubiaceae, and Zingiberaceae families. A total of 12 types of medicinal plants are most widely used by local Kalimantan communities.

Among these plants Betel (Piper bettle L) is most often used by local Kalimantan people to treat bad breath, nosebleeds and vaginal discharge with compounds containing flavonoids, essential oils, saponins, and polyphenols. In addition, the people of Kalimantan also commonly use (Curcuma domestica Val) as a medicine for stomach pain. There are many phytochemicals in the form of flavonoid compounds contained in plant species data that are often used by local Kalimantan communities because flavonoids have various biochemical and antioxidant effects.

The use of plant parts commonly used by the people of Kalimantan are roots, leaves, stems, seeds, flowers, rhizomes, tubers and fruits. Leaf are the most widely used as medicine by the people of Kalimantan because they are easy to find and handling.

Kalimantan people usually process medicinal plants by boiling and then drinking because this treatment is the most effective and is believed by drinking it can accelerate healing. Furthermore, with the emergence of a new gap, further research can be carried out related to the identification of the utilization of medicinal plants in North Kalimantan because it is felt that there is a lack of reference sources for the utilization of medicinal plants used.

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