

ARTICLE

EXPLORING MEDICINAL PLANT DIVERSITY: AN ETHNOBOTANICAL STUDY OF THE SIDANG MAS MALAY COMMUNITY IN BANYUASIN REGENCY

[*Eksplorasi Keanekaragaman Tumbuhan Obat: Studi Etnobotani Masyarakat Melayu Sidang Mas di Kabupaten Banyuasin*]

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ABSTRACT

South Sumatra Province is one of the provinces with a diverse range of plants that can be used as traditional medicine. Research was conducted to explore medicinal plants in Sidang Emas Village, Banyuasin III District, Banyuasin Regency, South Sumatra Province. The people of Sidang Emas Village are part of the Malay community in South Sumatra. This study aims to analyze the ethnobotany of medicinal plants used by the Sidang Emas community, which has not been previously studied. Ethnobotanical exploration can reveal the use of traditional medicinal plants and their processing in curing diseases in Sidang Emas Village. The findings of the study showed 34 plant species from 25 different families that have been utilized as medicines. The phytochemical screening revealed that 33% of these plants contained alkaloids, 32% contained flavonoids, and 31% contained tannins; 4% contained phenols, and none contained saponins. It is correlated with the health benefits of plants, including the treatment of digestive problems, external wounds, shortness of breath, and blood sugar levels.

Keywords: Ethnobotany, Local Knowledge, Ethnomedicinal Plants, Phytochemistry, Sidang Emas.

ABSTRAK

Provinsi Sumatera Selatan merupakan salah satu provinsi yang memiliki keanekaragaman tumbuhan yang dapat dimanfaatkan sebagai obat tradisional. Penelitian yang dilakukan untuk melakukan eksplorasi tumbuhan obat di Provinsi Sumatera Selatan dilakukan di Desa Sidang Emas, Kecamatan Banyuasin III, Kabupaten Banyuasin, Provinsi Sumatera Selatan. Masyarakat Desa Sidang Emas merupakan bagian dari komunitas melayu yang ada di Sumatera Selatan. Penelitian ini bertujuan untuk menganalisis etnobotani tumbuhan obat yang dimanfaatkan oleh masyarakat Sidang Emas yang sebelumnya belum diteliti. Eksplorasi etnobotani dapat mengungkap pemanfaatan tumbuhan obat tradisional dan pengolahannya dalam menyembuhkan penyakit di Desa Sidang Emas. Hasil penelitian menunjukkan terdapat 34 spesies tumbuhan dari 25 famili yang dimanfaatkan sebagai bahan obat. Hasil uji fitokimia menunjukkan 33% tanaman obat mengandung alkaloid, 32% mengandung flavonoid, dan 31% mengandung tanin, 4% mengandung fenol dan tidak ada yang mengandung saponin. Hal ini berkorelasi positif dengan manfaat tumbuhan sebagai obat antara lain untuk mengatasi masalah pencernaan, luka luar, sesak nafas dan kadar darah.

Kata kunci: Etnobotani, pengetahuan local, tanaman obat, fitokimia, Sidang Mas

INTRODUCTION

Indonesia is an archipelagic country with a rich tradition of medicinal plants. According to the Traditional Medicine Policy (Kotranas) of 2006, 30,000 plants were identified, with approximately 7,500 of them being medicinal plants. According to Sumarni *et al.*, (2019), Indonesia has a long-standing tradition of utilising medicinal plants that dates back to ancient times. The study of the correlation between society and plants, including medicinal plants, is ethnobotany.

Ethnobotany is the study of the complex relationships between plants and humans, examining the utilisation of native plants in different cultures and regions, including their use in medicine, food, shelter, clothing, hunting, and religious rituals. Ethnobotany has evolved over the past century into an applied science that places a strong emphasis on the conservation and sustainable use of plant resources (Ogwu & Osawaru, 2022; Sonnino, 2017).

Medicinal plants exhibit a broad spectrum of natural and ecological activities, including defense against insects, fungi, and diseases with potential biological activity (Gillani *et al.*, 2024). According to Government Law No. 23 of 1992 concerning traditional medicine, namely treatment or care other than medical science or nursing science, including methods, treatments, and care which refer to knowledge, experience, and hereditary skills, both native or originating from outside Indonesia, and are applied according to the norms prevailing in society (Mutakin *et al.*, 2022).

South Sumatra Province is one of the provinces with a diverse range of plants that have been used as traditional medicine. Research was conducted to explore medicinal plants in Sidang Emas Village, Banyuasin III District, Banyuasin Regency, South Sumatra Province. Data from the Banyuasin Regency Forestry and Plantation Service shows that in 2016, Sidang Emas Village was located to the west of Tebing Abang Village and Pengumbuk Village and to the east of Rimba Alai Village and Ujung Tanjung Village and to the north of Galang Tinggi Village and also to the south of Sungai Sene Village and Pagar Bulan Village.

Ethnobotanical studies have been conducted in several regions of Indonesia, particularly the island of Sumatra. An ethnobotanical study in Pagar Ruyung Village, South Sumatra, identified 40 species of medicinal plants along with the parts used, including leaves, stems, roots, rhizomes, tubers, fruits, seeds, and latex (Rizal *et al.*, 2021). There are also Simalungun ethnic communities that utilize 92 types of medicinal plants comprising 28 Orders, 45 families, and 42 types of herbal remedies (Simanjuntak, 2017). This study aims to analyze the ethnobotany of medicinal plants used by the Sidang Emas community, which has not been previously studied. Ethnobotanical exploration can provide valuable insights into the Sidang Emas Village community's utilization of traditional medicinal plants and their processing for treating various diseases.

MATERIALS AND METHODS

This study employed a mixed-methods approach, utilizing both qualitative ethnobotanical techniques and quantitative laboratory analysis (phytochemical screening) to meet the stated objectives. Combination research describes medicinal plants in terms of their morphology, including the parts and methods to use them. This study employs a natural approach to obtain in-depth information without any deliberate influence (Cohen *et al.*, 2017).

Exploration ethnomedicine

The samples were collected from one village in Banyuasin III District, Banyuasin Regency, South Sumatra, specifically from the Sidang Emas Malay community. Data collection was carried out through structured interviews and questionnaires. Sampling is conducted using the purposive random sampling method, as it serves a specific purpose. This study utilised respondents from the Sidang Emas community who used plants as medicinal ingredients and individuals with knowledge about herbal plants.

Study Area, Population, and Sampling

The study was conducted in Sidang Mas Village (Sidang Emas Malay community) within Banyuasin III District, Banyuasin Regency, South Sumatra, Indonesia. A total of 50 respondents were included in the study. Purposive sampling (non-probability sampling) was utilized to select participants based on predefined inclusion criteria, aiming to gather specialized ethnobotanical knowledge. The criteria for inclusion were: active use of local plants as medicinal ingredients and/or possession of in-depth traditional knowledge regarding herbal remedies (e.g., traditional healers or recognized key informants).

Data Collection

Ethnobotanical data were collected through semi-structured interviews and questionnaires. The semi-structured format allowed for the systematic collection of standardized data (local name, plant part used, preparation method, ailment treated) while maintaining flexibility to probe deeper into specific uses and knowledge.

Phytochemical screening

The investigation of the medicinal plants commenced with a comprehensive phytochemical screening. This process began with the extraction of leaf material from each plant using ethyl acetate as the solvent. The resulting crude extract was concentrated via evaporation to yield a viscous residue. Subsequent qualitative phytochemical screening targeted five classes of compounds: alkaloids, flavonoids, saponins, phenols, and tannins.

Culvenor-Fitzgerald Method

The Culvenor-Fitzgerald method is a qualitative technique used to detect the presence of alkaloids. It determined by treating a 2 ml aliquot of the extract with 3 drops of Dragendorff's reagent. The formation of a brick-red precipitate serves as a positive confirmation for alkaloid compounds (Anoop and Bindu, 2014).

Cyanidin Test Method

Flavonoid detection can be carried out using the Cyanidin Test, also known as the Shinoda Test. This method was performed by treating a 2 ml sample of the leaves extract with 3-4 drops of sulfuric acid (H₂SO₄). The development of a red or yellow coloration constitutes a positive indication of flavonoid presence (Wijaya *et al.*, 2024).

Modified Simes et al. Method (Foam Test)

Modified Simes *et al.* Method (Foam Test) was determination of saponins. It performed by combining a 2 ml aliquot of the extract with 3-4 drops of deionized water and subjecting the mixture to vigorous agitation for 1-2 minutes. The formation of a persistent foam layer, stable for approx 7 minutes or longer, signifies a positive result for the presence of saponin compounds (Wijaya *et al.*, 2024).

Modified Simes et al. Method (Ferric Chloride Test)

Phenolic compounds were analyzed using the Modified Simes *et al.* Method (Ferric Chloride Test). The procedure was carried out by mixing a 2 ml aliquot of the leaves extract with 3-4 drops of 1% ferric chloride FeCl₃ solution. The development of a green coloration was utilized as a positive criterion for the presence of phenolic constituents (Ergina *et al.*, 2014).

Ferric Chloride Test

The Ferric Chloride test is used for the determination of tannin compounds. The test is carried out by adding 2-3 drops of 1% FeCl₃ reagent solution. The presence of tannin will be indicated by a color change to blackish blue and greenish.

The qualitative determination of tannins was conducted by adding 2-3 drops of 1% ferric chloride (FeCl₃) reagent solution to a 2 ml aliquot of the extract. A positive result is indicated by the formation of a dark blue-black or greenish precipitate/coloration (Sarjono *et al.*, 2019).

RESULTS

Exploration of medicinal plants in Sidang Emas Village

The results of the search for medicinal plants conducted in Sidang Emas Village, Banyuasin III, South Sumatra, yielded 34 types of plants with medicinal potential that local residents traditionally used to treat various diseases (Table 1).

Table 1. List of types of medicinal plants used by the people of Sidang Emas village (*Daftar jenis tanaman obat yang digunakan oleh masyarakat desa Sidang Emas*).

| Family (<i>Famili</i>) | Local Name (<i>Nama lokal</i>) | Scientific Name (<i>Nama Ilmiah</i>) | Parts used (<i>Bagian yang digunakan</i>) | How to Use (<i>Cara Penggunaan</i>) | Medical Benefits (<i>Manfaat Medis</i>) |
|-----------------------------|-------------------------------------|-------------------------------------------|------------------------------------------------|------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Acanthaceae | Keji Beling | <i>Strobilanthes crispata</i> L. | Leaves (<i>daun</i>) | Boil it and drink the water (<i>Rebus dan minum airnya</i>) | Diuretic (<i>diuretik</i>) (Wijaya <i>et al.</i> , 2024) |
| Acoraceae | Dlingo | <i>Acorus calamus</i> L. | Leaves and stem (<i>daun dan batang</i>) | Decoction for traditional medicinal preparation (<i>Rebusan untuk sediaan obat tradisional</i>) | Fever, diarrhea, constipation (<i>Demam, diare, sembelit</i>) (Dukkipati, 2023) |
| Annonaceae | Daun Sirsak | <i>Annona muricata</i> L. | Leaves (<i>daun</i>) | Boil the leaves and consume the fruit (<i>Rebus daunnya dan konsumsi buahnya</i>) | Lowers sugar levels, blood pressure, and fever (<i>Menurunkan kadar gula, tekanan darah, dan demam</i>) (Mutakin <i>et al.</i> , 2022) |
| Apocynaceae | Tapak Darah | <i>Catharanthus roseus</i> L. | Leaves (<i>daun</i>) | Boil the leaves and drink the boiled leaf water (<i>Rebus daunnya dan minum air daun matang</i>) | Lowers blood pressure and stops bleeding (<i>Menurunkan tekanan darah dan menghentikan pendarahan</i>) (Chaturvedi <i>et al.</i> , 2022) |
| Araceae | Nampu merah | <i>Homalomena javanica</i> L. | Stem (<i>batang</i>) | Grate it, and then apply it to the body (<i>Parut, lalu oleskan ke tubuh</i>) | To determine whether there are symptoms of typhoid, if there is no itchy reaction, it indicates that there are likely no symptoms of typhoid (<i>Untuk menentukan apakah ada gejala tifus, jika tidak ada reaksi gatal, itu menunjukkan bahwa kemungkinan tidak ada gejala tifoid</i>) (Syarif <i>et al.</i> , 2020) |
| Asteraceae | Bandotan | <i>Ageratum conyzoides</i> L. | Root (<i>akar</i>) | The roots are ground and then rubbed onto the body (<i>Akarnya digiling dan kemudian digosokkan ke tubuh</i>) | Treating wounds and fever (<i>Mengobati luka dan demam</i>) (Ramasamy <i>et al.</i> , 2021) |
| Asteraceae | Daun Kolesterol | <i>Vernonia amygdalina</i> Del. | Leaves (<i>daun</i>) | Boil the leaves, and drink the water made from them (<i>Rebus daunnya, dan minum air yang terbuat darinya</i>) | To lower cholesterol level (<i>Untuk menurunkan kadar kolesterol</i>) (Putri, 2019) |

| Family (<i>Famili</i>) | Local Name (<i>Nama lokal</i>) | Scientific Name (<i>Nama Ilmiah</i>) | Parts used (<i>Bagian yang digunakan</i>) | How to Use (<i>Cara Penggunaan</i>) | Medical Benefits (<i>Manfaat Medis</i>) |
|-----------------------------|-------------------------------------|-------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cambretaceae | Ketapang | <i>Terminalia catappa</i> L. | Leaves (<i>daun</i>) | Crush the ketapang leaves, then apply them to the infected body part (<i>Hancurkan daun ketapang, lalu oleskan ke bagian tubuh yang terinfeksi</i>) | To treat fungal infections, such as tinea versicolor (<i>Untuk mengobati infeksi jamur, seperti tinea versicolor</i>) (Mbekou <i>et al.</i> , 2021) |
| Campanulaceae | Daun Katarak | <i>Hippobroma longiflora</i> L. | Flower (<i>bunga</i>) | External use; Filtered floral macerate applied via ocularly (drops) (<i>Penggunaan luar; Maser bunga yang disaring diterapkan melalui ocularly (tetes)</i>) | Treating cataracts (<i>Mengobati katarak</i>) (Imelda <i>et al.</i> , 2023) |
| Crassulaceae | Cocor Bebek | [Lam.] Pers. | Leaves (<i>daun</i>) | External use; compressed (<i>Penggunaan luar; terkompresi</i>) | Treating malaria and liver disease (<i>Mengobati malaria dan penyakit hati</i>) (Faundes-Gandolfo <i>et al.</i> 2024) |
| Euphorbiaceae | Daun Betadine | <i>Jatropha curcas</i> L. | Leaves (<i>daun</i>) | External use; crush the leaves, apply (<i>Penggunaan luar; hancurkan daun, oleskan</i>) | Prevent bleeding (<i>Mencegah pendarahan</i>) (Andiana., 2018) |
| Euphorbiaceae | Jarak | <i>Ricinus communis</i> L. | Sap and leaves (<i>getah dan daun</i>) | External use; mouth ulcer drops (<i>Penggunaan luar; Tetes Penutup Mulut</i>) | Treating mouth ulcers and liver disease (<i>Mengobati tukak mulut dan penyakit hati</i>) (Chouhan <i>et al.</i> , 2021) |
| Euphorbiaceae | Meniran | <i>Phyllanthus niruri</i> L. | All parts of the plant (<i>semua bagian tumbuhan</i>) | Boiled, drunk (<i>Rebus, diminum</i>) | Treating urinary tract infections (<i>Mengobati infeksi saluran kemih</i>) |
| Graminae | Tebu | <i>Saccharum officinarum</i> L. | Stem (<i>batang</i>) | squeezed juice (<i>jus perasan</i>) | To reduce body temperature (<i>Untuk menurunkan suhu tubuh</i>) (Antikasari, 2023) |
| Hypoxidaceae | Marasi | <i>Curculigo latifolio</i> | Fruit (<i>buah</i>) | Eat the ripe fruit directly (<i>Makan buah matang langsung</i>) | Treating tonsillitis (<i>Mengobati tonsilitis</i>) |
| Lamiaceae | Kumis Kucing | <i>Orthosiphon spicatus</i> B.B.S. | All parts of the plant (<i>semua bagian tumbuhan</i>) | Boil the plant, and drink the water made from the boiled plant (<i>Rebus tanaman, dan minum air yang terbuat dari tanaman rebus</i>) | To treats shortness of breath and facilitates bowel movements (<i>untuk mengobati sesak napas dan memfasilitasi buang air besar</i>) (Hussain <i>et al.</i> , 2024) |
| Lauraceae | Alpukat | <i>Persea americana</i> Mill. | Fruit (<i>buah</i>) | Consumption of the fruit (<i>Konsumsi buah</i>) | To lower cholesterol levels (<i>Untuk menurunkan kadar kolesterol</i>) (Brai <i>et al.</i> , 2020) |
| Menispermaceae | Brotowali | <i>Tinospora crispa</i> (L.) | All parts of the plant (<i>semua bagian tumbuhan</i>) | Boil it, then drink the boiled water (<i>Rebus, lalu minum air matang</i>) | Treating itching (<i>Mengobati gatal</i>) (Haque <i>et al.</i> , 2023) |
| Mirtaceae | Jambu Biji | <i>Psidium guajava</i> L. | Leaves (<i>daun</i>) | Crushed or eaten directly (<i>Dihancurkan atau dimakan langsung</i>) | Treat stomachache or diarrhea (Syarif <i>et al.</i> , 2020) |

| Family (Famili) | Local Name (Nama lokal) | Scientific Name (Nama Ilmiah) | Parts used (Bagian yang digunakan) | How to Use (Cara Penggunaan) | Medical Benefits (Manfaat Medis) |
|--------------------|----------------------------|--------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Moraceae | Daun Sukun | <i>Artocarpus altilis</i> L. | Leaves (daun) | Boil or dry the leaves (Rebus atau keringkan daunnya) | To lower cholesterol levels (Untuk menurunkan kadar kolesterol) (Estalansa et al., 2018) |
| Moringaceae | Daun Kelor | <i>Moringa oleifera</i> L. | Leaves (daun) | Boil it and then drink the water, it can also be cooked like other vegetables (Rebus lalu minum airnya, bisa juga dimasak seperti sayuran lainnya) | Treating rheumatism (Mengobati rematik) (Syarif et al., 2020) |
| Piperaceae | Sirih | <i>Piper betle</i> L. | Leaves (daun) | Eaten directly, boiled, and drunk it (Dimakan langsung, direbus, dan diminum) | To overcome bad breath and toothache. Red <i>Piper betle</i> is used to (normalizes blood pressure) (Untuk mengatasi bau mulut dan sakit gigi. Red <i>Piper mustle</i> digunakan untuk (menormalkan tekanan darah)) (Sumual et al., 2021) |
| Poaceae | Serai | <i>Cymbopogon citratus</i> L. | Leaves (daun) | Boil it, then drink the boiled water (Rebus, lalu minum air matang) | To treat colds (Untuk mengobati pilek) (Syarif et al., 2020) |
| Rubiaceae | Mengkudu | <i>Morinda citrifolia</i> L. | Fruit (buah) | Made into juice, eat directly (Dibuat menjadi jus, makan langsung) | Lowering high blood pressure (Menurunkan tekanan darah tinggi) (Fauziyah et al., 2023) |
| Rutaceae | Jeruk Nipis | <i>Citrus aurantifolia</i> L. | Fruit (buah) | Topical application (Aplikasi topikal) | Treating wounds (mengobati luka) (Alozie and Isiwu, 2020) |
| Thymelaeaceae | Mahkota Dewa | <i>Phaleria macrocarpa</i> (Scheff.) | Fruit (buah) | Boil the dried fruit, and then drink the boiled water (Rebus buah kering, lalu minum air rebus) | To treat rheumatism, high blood pressure, and cholesterol (Untuk mengobati rematik, tekanan darah tinggi, dan kolesterol) (Irawan et al., 2022) |
| Xanthorrhoeaceae | Lidah Buaya | <i>Aloe vera</i> L. | Stem (batang) | The mucus was applied directly to the burns (Lendir dioleskan langsung ke luka bakar) | To treat burns (Untuk mengobati luka bakar) (Liang et al., 2021) |
| Zingiberaceae | Bangle | <i>Zingiber cassumunar</i> Roxb. | Rhizome (rimpang) | External use; as a compress on the forehead (Penggunaan luar; sebagai kompres di dahi) | To treat a high fever (Untuk mengobati demam tinggi) (Lianah et al., 2020) |
| Zingiberaceae | Kunyit | <i>Curcuma domestica</i> Linn. | Tuber (umbi) | Grated and squeezed. The juice is drunk while the pulp is rubbed all over the body (Parut dan diperas. Jus diminum sementara daging buahnya digosok ke seluruh tubuh) | To treat hives (Untuk mengobati gatal-gatal) (Khotimah, 2016) |
| Zingiberaceae | Kunyit Putih | <i>Curcuma zedoaria</i> L. | Stem (batang) | Drink the juice (minum jus) | To treat a stomachache (Untuk mengobati sakit perut) (Zheng et al., 2020) |

| Family (Famili) | Local Name (Nama lokal) | Scientific Name (Nama Ilmiah) | Parts used (Bagian yang digunakan) | How to Use (Cara Penggunaan) | Medical Benefits (Manfaat Medis) |
|--------------------|----------------------------|----------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Zingiberaceae | Lempuyang | <i>Zingiber zerumber</i> L. | Rhizome (rimpang) | Puree the rhizome, then apply it to the body, such as the forehead () | To treat high fever (<i>untuk mengobati panas tinggi</i>) (Aji and Zakkiyah, 2021) |
| Zingiberaceae | Lengkuas | <i>Alpinia galangal</i> L. | Tuber (umbi) | The crushed rhizome is applied to a bloated stomach, or the boiled rhizome water is drunk (<i>Rimpang yang dihancurkan dioleskan pada perut kembung, atau air rimpang rebus diminum</i>) | To treat a cold (<i>Untuk mengobati pilek</i>) (Khumpirapang <i>et al.</i> , 2021) |
| Zingiberaceae | Temu Putih | <i>Curcuma mangga</i> L. | Stem (batang) | As a spices (<i>sebagai bumbu</i>) | Medicine for childbirth (<i>Obat untuk persalinan</i>) (Zheng <i>et al.</i> , 2020) |
| Zingiberaceae | Temulawak | <i>Curcuma zanthorriza</i> L. | Tuber (umbi) | Grated ginger rhizome's starchy exudate was collected and ingested (<i>Eksudat bertepung rimpang jahe parut dikumpulkan dan dicerna</i>) | To increases appetite and to treat colds (<i>Untuk meningkatkan nafsu makan dan mengobati pilek</i>) (Zheng <i>et al.</i> , 2020) |

Figures 1–3 illustrate the medicinal plants documented in Sidang Mas village. The utilization patterns observed among the villagers fall into three principal categories: direct oral intake (Figure 1), consumption of aqueous extracts prepared via boiling (Figure 2), and external pharmacological use (Figure 3).



Figure 1. Medicinal plants that are consumed directly. (A) Alpukat (B) Jambu biji (C) Kunyit putih (D) Marasi (E) Mengkudu (F) Sirih (G)Tebu (H) Temulawak (*Tanaman obat yang dikonsumsi secara langsung.* (A) Alpukat (B) Jambu Biji (C) Kunyit Putih (D) Marasi (E) Mengkudu (F) Sirih (G)Tebu (H) Temulawak).

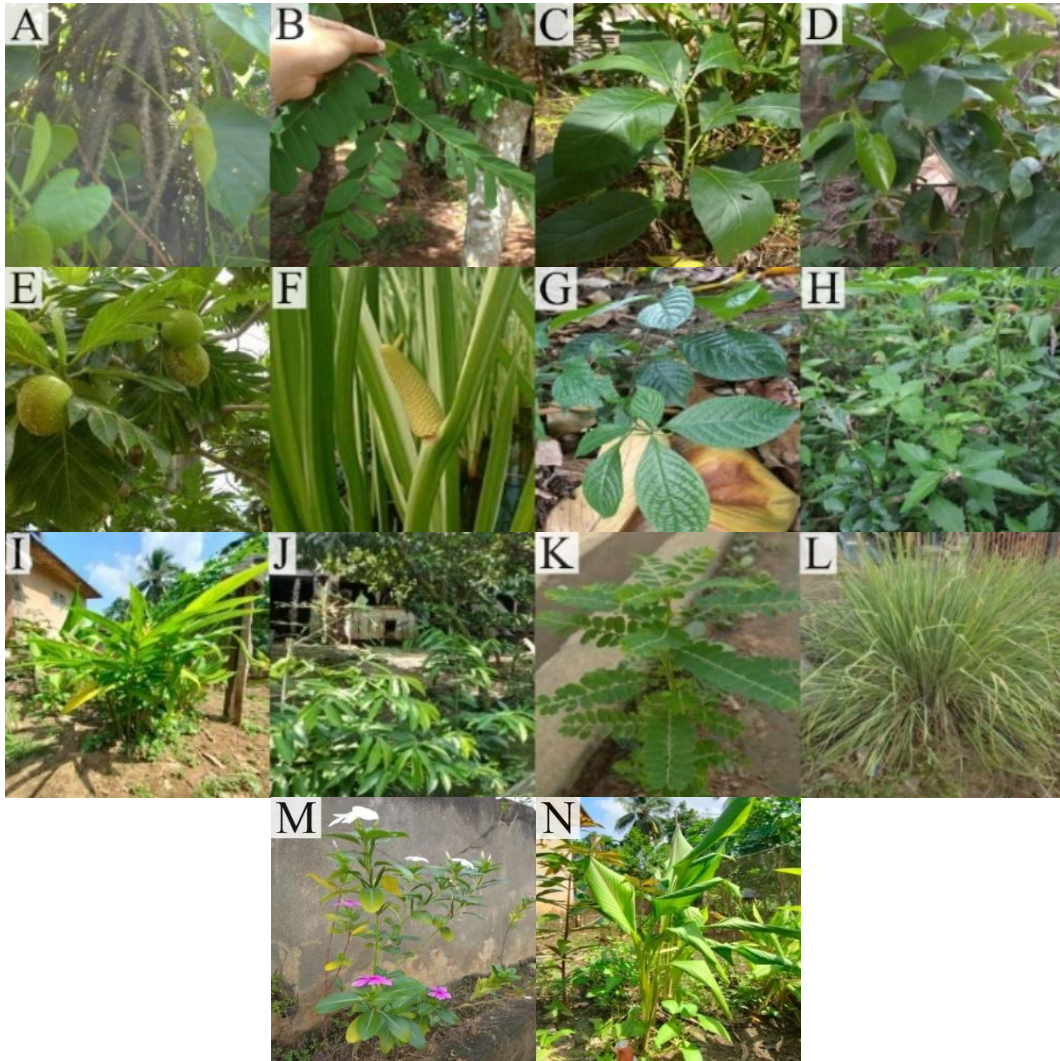


Figure 2. Medicinal plants that are used by boiling before use. (A) Brotowali (B) Kelor (C) Kolesterol (D) Sirsak (E) Sukun (F) Dlingo (G)Keji beling (H) Kumis kucing (I) Lengkuas (J) Mahkota dewa (K) Maniran (L) Serai (M) Tapak darah (N) Temu putih (*Tanaman obat yang digunakan dengan cara direbus sebelum digunakan.* (A) Brotowali (B) Kelor (C) Kolesterol (D) Sirsak (E) Sukun (F) Dlingo (G) Kevi beling (H) Kumis kucing (I) Lengkuas (J) Mahkota para dewa (K) Maniran (L) Serai (M) Jejak darah (N) Temu putih).

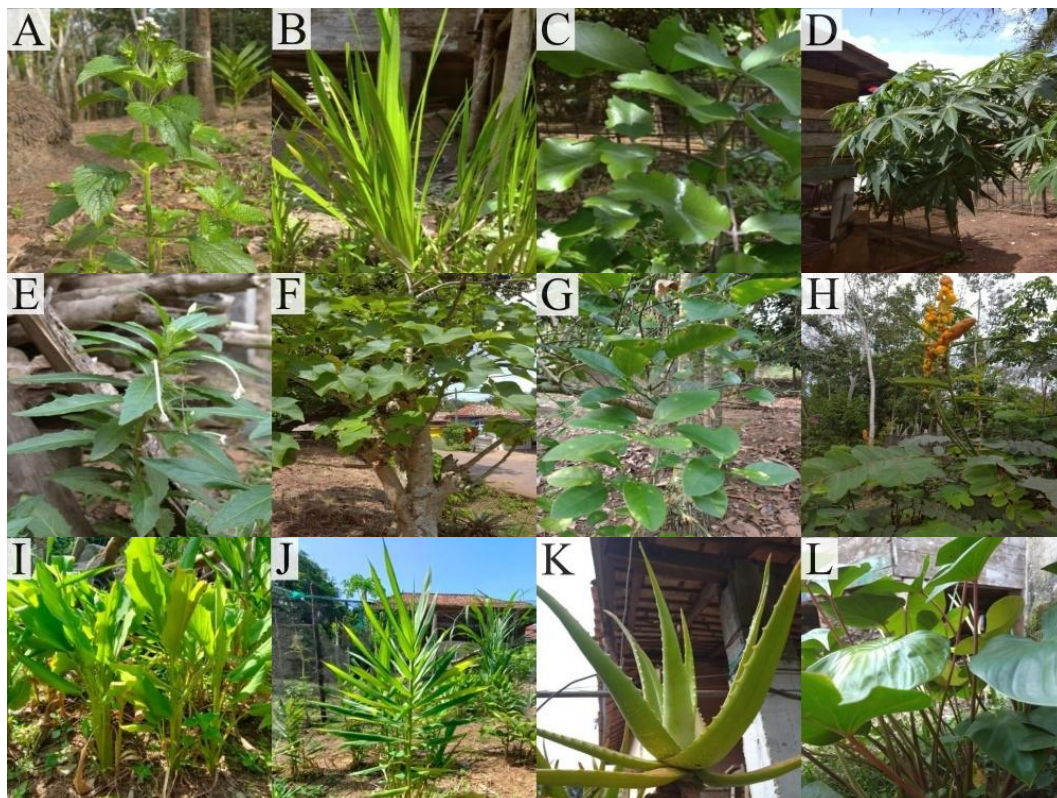


Figure 3. Medicinal plants for external use. (A) Bandotan (B) Bangle (C) Cocor bebek (D) Betadine (E) Katarak (F) Jarak pagar (G) Jeruk nipis (H) Ketapang (I) Kunyit (J) Lempuyang (K) Lidah buaya (L) Nampu merah (*Tanaman obat untuk penggunaan eksternal. (A) Bandotan (B) Gelang (C) Bebek Cocor (D) Betadine (E) Katarak (F) Pagar (G) Jeruk Nipis (H) Ketapang (I) Kunyit (J) Lempuyang (K) Lidah Buaya (L) Nampu Merah*).

Phytochemical Test of Medicinal Plant Extracts

Alkaloids, flavonoids, saponins, phenols, and tannins were analysed (Figure 4). The results show that 33% of the plant extracts contain alkaloids, 32% of the plant extracts contain flavonoids, 31% of the plant extracts contain tannins and only 4% contain phenols (Figure 5).

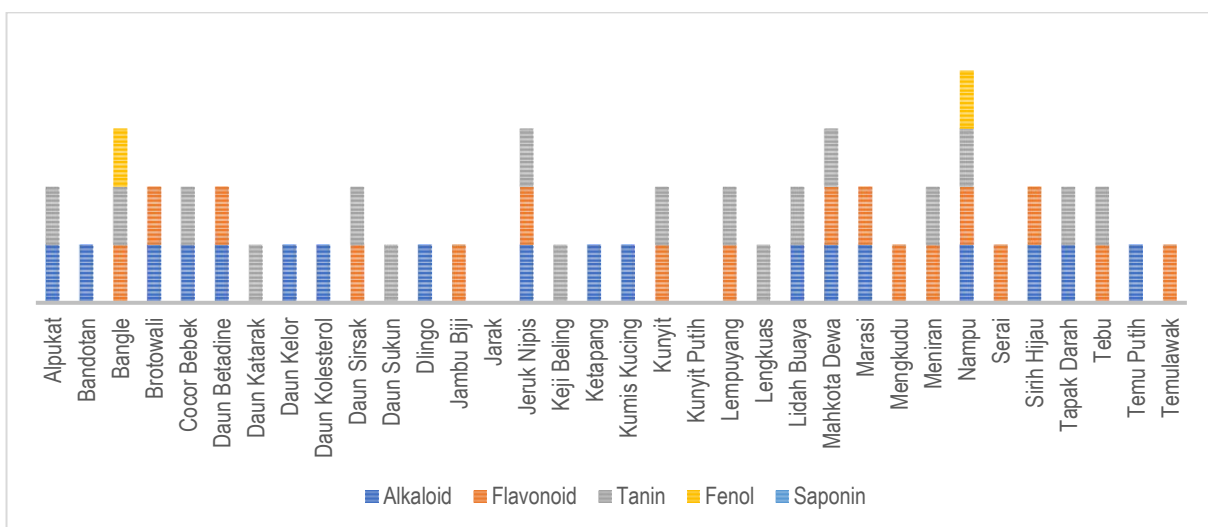


Figure 4. Qualitative phytochemical test results of medicinal plant extracts in Sidang Mas village (*Hasil uji fitokimia kualitatif ekstrak tanaman obat di Desa Sidang Mas*).

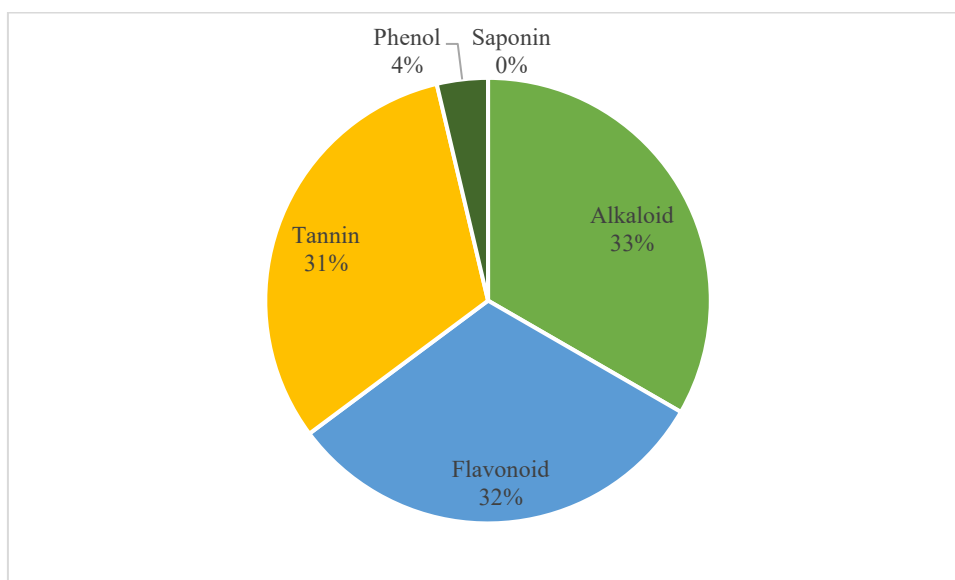


Figure 5. The percentage of chemical compounds content of medicinal plant extracts in Sidang Mas village (*Persentase kandungan senyawa kimia ekstrak tumbuhan obat di Desa Sidang Mas*).

DISCUSSION

The use of medicinal plants is broadly divided into three methods: consuming them directly (Figure 1), consuming them after boiling them (Figure 2), and as external medicine (Figure 3). Medicinal plants consumed directly include avocado, guava, white turmeric, marasi, noni, betel, sugar cane, and Javanese ginger. These plants are more effective when consumed directly than when cooked.

Avocado (*Persea americana* Mill.) is a plant native to Central America. It was introduced to Indonesia in the 18th century. It has spherical flowers, fruiting berries with a ball or oval shape, green or yellowish. The flesh of the ripe fruit is soft with a green or yellowish color (Mutakin *et al.*, 2022). The people of Sidang Emas Banyuasin III village use avocados (Figure 1-A) to lower cholesterol by juicing or eating them directly. Avocados can be used as a traditional medicine for various diseases, including the treatment of cancer sores. The leaves of the fruit can also be used as a medicinal remedy for nerve pain, stomach pain, lowering high blood pressure, and alleviating kidney stones, in addition to the fruit and leaves (Rizal *et al.*, 2021). Avocado seeds are used to lower blood sugar levels.

Guave (*Psidium guajava* L.) has several leaf shapes, namely: oval, oblong, and inverted egg-shaped leaves. The most dominant leaf shape being the oval (Fadhilah *et al.*, 2018). The people of Sidang Emas Banyuasin III village use the leaves of Jambu biji (Figure 1-B) to treat stomachaches and diarrhea by crushing them or eating them directly. According to Fratiwi (2015), *P. guajava* is known to contain several active ingredients including tannins, flavonoids, guayaverine, leukocyanidins, essential oils, malic acid, resin, and oxalic acid. Among these, the antidiarrheal properties are attributed to flavonoids, tannins, essential oils, and alkaloids have pharmacological effects as antidiarrhea.

Curcuma zedoaria or known as kunyit putih (Figure 1-C), and *Curcuma mangga* commonly referred to as temu putih (Figure 2-N). Two of them are part of the genus *Curcuma* which is widely used as medicine and cooking spices. In Indonesia, the leaves of *C. zedoaria* and *C. mangga* leaves are used as an additional spice to enhance the taste of fish dishes and other foods (Chew *et al.*, 2022). *C. zedoaria* has long been used by various ethnic groups in Indonesia, Malaysia and India. In Malaysia as a medicinal plant. *C. zedoaria* and *C. mangga* is widely consumed as a spice and food for postpartum mothers. The use of plants as medicine is related to the content of secondary metabolites.

Marasi plant (*Curculigo latifolia* L.) is an upright, clumping herbaceous plant with tuberous rhizome roots, creeping stolons. The leaves were oval to lanceolate, and the fruit is a berry, round

with black seeds, and striped like dragon fruit (Taufik *et al.*, 2024). The people of Sidang Emas Banyuasin III village use the fruit of the Marasi tree (Figure 1-D) to treat tonsillitis by eating the ripe fruit directly.

Noni (*Morinda citrifolia* L.) is a plant with a round woody stem and leaves that are single, with thick, flat edges. The fruit is shaped like a lump with an irregular surface (Fauziyah *et al.*, 2023). The people of Sidang Emas village use the fruit of mengkudu (Figure 1-E) to treat high blood pressure or hypertension by eating it directly or boiling the fruit. Noni fruit is utilized to lower blood pressure due to its scopoletin content (Fauziyah *et al.*, 2023).

Sirih or Sirih hijau (*Piper betle* L) is a climbing shrub characterized by leaves resembling a heart shape with pointed tips, which are shiny and measure 6 to 17.5 cm long and 3.5 to 10 cm wide. They have a distinctive aroma (Sumual *et al.*, 2021). The people of Sidang Emas use the leaves of green sirih (Figure 1-F) prevent bad breath and toothache by chewing them directly or boiling and then drinking the water. The use of betel leaves is closely related to dental and oral health (Rabbani *et al.* (2017), as it helps strengthen teeth, cure canker sores, eliminate bad breath, and stop bleeding gums due to the presence of astringents, phenols, and essential oils, which facilitate antibacterial activity.

Sugarcane (*Saccharum officinarum* L.) belongs to the Poaceae family. *S. officinarum* has the highest sucrose content and the lowest fiber content (Wilisaberta and Saptadi, 2018). The stalks (Figure 1-G) can be consumed directly or ground to extract the water. It is used to eliminate internal heat.

Temulawak (*Curcuma zanthorrhiza*) is a native plant from Indonesia that usually grows wild in the forest. This plant can thrive in loose soil. It is a flowering herbal medicine (Lianah *et al.*, 2020). It is used (Figure 1-H) to increase appetite and alleviate angina by drinking water made from grated rhizome. Its curcumin content is also known to have anti-tumor, antioxidant, antimalarial, and antiviral properties as well as the ability to prevent HIV infection in humans (Sumarni *et al.*, 2022).

Medicinal plants that are boiled before use (Figure 2) include brotowali, kelor, kolesterol, sirsak, sukun, dlingo, keji beling, kumis kucing, lengkuas, mahkota daun, maniran, sereh, tapak darah, and temu putih. The boiling process is used to extract the active compounds.

Brotowali (*Tinospora crispa* L.) is a climbing shrub that reaches a height of 2.5 meters. The stem is green and densely packed. Brotowali leaves are 7-12 cm long and 5-10 cm wide, with a pink fruit that is 7-8 mm long (Suanda and Sumarya, 2019). People use all parts of brotowali (Figure 2-A) to treat itching by boiling them and then drinking the water. This plant is used to treat fever, cholera, rheumatism, jaundice, and as a stimulant. It can be used as immunomodulators, antimalarials, antibacterials, antivirals, antiallergics, antiproliferatives, and antioxidants (Taufik *et al.*, 2024).

Kelor (*Moringa oleifera*) is a perennial tree, 7-12 m high, with upright, woody stems that have a rough surface (Roshetko *et al.*, 2017). The people of Sidang Emas village use the leaves of Kelor (Figure 2-B) to treat rheumatism by boiling them and drinking the resulting water, or cooking them like other vegetables. Moringa leaves have also been used to treat cataracts by squeezing the leaves and then applying them to the affected eyes (Roshetko *et al.*, 2017).

Kolesterol leaves or African leaves (*Vernonia amygdalina*) are a woody plant with a round-stem and dark green leaves (Putri, 2019). The decoction of the leaves (Figure 2-C) was used to treat cholesterol. The kolesterol leaves were used as a vegetable, and their extract was used as a tonic in China, Malaysia, Nigeria, Singapore, and Africa. African leaves are safe for consumption and do not have any adverse effects on the liver and kidneys (Putri, 2019).

Soursop (*Annona muricata*) typically reaches heights of 5-6 meters. The soursop plant's leaves are egg-shaped or lanceolate, with pointed tips, flat edges, and a yellowish-green color, featuring white fruit flesh and light brown roots (Mutakin *et al.*, 2022). The decoction of the leaves (Figure 2-D) lowered sugar levels, blood pressure, and treated fever.

Sukun (*Artocarpus altilis*) reaches a height of up to 30 m and produces fruit and flowers every two years. It has single, broad leaves with rough hair (Estalansa *et al.*, 2018). The community in Sidang Mas uses boiled Sukun leaves (Figure 2-E) to lower cholesterol levels.

Dlingo or Jeringau (*Acorus calamus*) is a perennial herb that reaches a height of 75 cm. The leaves and rhizomes have a strong aroma (Sokoloff *et al.*, 2021). Dlingo stems and leaves (Figure 2-F) Dlingo stems and leaves (Figure 2-F) are boiled to treat digestive problems, including diarrhea and constipation (Subha *et al.*, 2011).

Kejibeling (*Strobilanthes crispata*) is a shrub characterized by its round, purple stems with green spots, compound flowers that are white with a slight yellow hue, resembling grains, and featuring funnel-like flower crowns (Wijaya *et al.*, 2024). The people of Sidang Emas village use the leaves of the kejibeling plant (Figure 2-G) as a traditional remedy for treating urinary tract infections by boiling the leaves and drinking the resulting boiled water. Kejibeling leaves can help dissolve kidney stones and bladder stones because the potassium content, combined with potassium salts in kejibeling, acts as a strong diuretic. The content of other active compounds in kejibeling includes saponins, alkaloids, flavonoids, and polyphenols (Nur *et al.*, 2024).

Bandotan, bangle, cocor bebek, betadine, katarak, jarak pagar, jeruk nipis, ketapang, kunyit, lempuyang, lidah buaya, and nampu merah (Figure 3) are medicinal plants that are used as external medicines to treat eyes care, skin care, wounds, itching, and skin diseases.

Ageratum conyzoides, which has local names Bandotan and Babandotan, is a herbaceous plant that has high adaptability. It can grow almost anywhere as a perennial herbaceous plant, reaching 30-80 cm in height (Aulia, 2020). The people of Sidang Emas village use bandotan roots (Figure 3-A) to treat wounds and fever by grinding the roots and then applying them to the affected areas of the body. Atisha and Soraya (2018) stated that bandotan is widely used as a traditional medicine in tropical and subtropical regions, commonly known as 'Billy goat weeds' because the stems and leaves of the plant are entirely covered with fine white hairs. *A. conyzoides* was found to contain phenol, phenolic ester, and coumarin (Ramasamy *et al.*, 2021).

CONCLUSION

An exploration of medicinal plants in Sidang Mas village revealed a diverse array of medicinal plants, comprising 34 species from 25 different families. The method of using medicinal plants is mainly for external use (41.2%), others are consumed by boiling (35.3%) and directly (23.5%). The potential of medicinal plants includes treating digestive system disorders (23.5%), topical (23.5%), anti-cholesterol (11.8%), anti-pruritis (5.9%), fever (11.8%), colds (8.8%), high blood pressure (5.9%), urinary tract infections (5.9%), and anti-rheumatic (3%). It correlates with the active compounds of the plant, in which 33% of medicinal plants contain alkaloids, 32% contain flavonoids, 31% contain tannins, and 4% contain phenols, while none contain saponins.

ACKNOWLEDGMENT

Thank you to all colleagues who have supported the author in completing the research.

AUTHOR CONTRIBUTIONS

S: designed the research and supervised all the processes. S, D: collected and analyzed the data. S, D: assisted with the laboratory work.

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