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ETHNOBOTANICAL STUDY OF MEDICINAL PLANTS IN MARIDAN VILLAGE, PANAJM PASER UTARA DISTRICT, EAST KALIMANTAN, INDONESIA

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Abstract

Medicinal plants are generally very beneficial for treating various diseases or health problems. Knowledge about the use of medicinal plants is passed down orally from generation to generation. This research aims to determine the contribution of local knowledge about traditional medicinal plants in Maridan Village to treating certain diseases and the practice of using medicinal plants in Maridan Village. The results can provide information about the traditional medicinal uses of various local plants. Apart from that, it is also to increase public awareness to protect local biodiversity. The research results showed that the people of Maridan Village, Sepaku District, North Penajam Paser Regency, used 38 types of medicinal plants from 28 families. The part of the plant that is often used is the leaves; the processing that is often used is by boiling, and the method that is most often used is by drinking.

Keywords: *Etnhobotany, medicinal plants, Maridan Village*

INTRODUCTION

As a tropical country, Indonesia has a variety of plants that function as medicine. Indonesia has 143 million hectares of tropical forests, home to 90% of the medicinal plants in Asia. Of around 40,000 types of medicinal plants known worldwide, 30,000 are considered in Indonesia. Of this number, 25% of them or around 7,500 types, are known to have herbal or medicinal plant properties. *Medicinal plants* are very popular plants that can be used as raw materials for traditional medicines and herbal medicine, which, when consumed, will increase the body's immunity (immune system) (Agustina *et al.,* 2022). The Ministry of Agriculture, in this case, the Directorate General of Horticulture, as the government institution that handles the production of medicinal plants, states that what is meant by medicinal plants are plants that are useful for medicine, cosmetics and health which are consumed or used in plant parts such as leaves, stems, fruit, rhizomes. Or roots (Salim *et al*., 2017; Helmina and Hidayah, 2021; Andraini *et al.,* 2023).

Kalimantan is one of Indonesia's islands. It is rich in biodiversity, including plants with medicinal properties, both wild in the forest and cultivated. Unfortunately, the forest area in Kalimantan is decreasing

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over time, as is its potential. Medicinal plants are increasingly popular as alternative medicines that can prevent or treat disease independently as a first treatment measure. Science continues to develop side by side with the culture and habits of society as a means of meeting needs from generation to generation. People who live in forest areas that are still quite extensive, such as the forests of Kalimantan, have inherited knowledge about the potential use of forest plants as medicine. There is a diversity of local wisdom in Kalimantan society, especially in using plants for medicine. Local wisdom is formed evolutionarily, initiated by a certain group of people, and through gradual and continuous trial and error to become traditional knowledge for the community.

There are many medicinal plants in the forests of Kalimantan, ranging from undergrowth to trees, and from those that are very well known to those that are discarded because they are considered wild and nuisance plants. Often, plants considered a nuisance have benefits and are used as medicinal ingredients (Asadha, 2021; Bintari *et al.*, 2014; Gunarti *et al.*, 2021). Ethnic groups in Kalimantan use various types of plants for traditional medicine by relying on their natural habitat.

The use of medicinal plants in Indonesian society is extensive and covers almost all aspects of life. Some plants can be used as cheap medicines that are easy to find and have almost no side effects. Therefore, people must be able to process local plants for traditional medicine. The development of the use of medicinal plants is very prospective in terms of supporting factors such as the availability of rich and diverse biological resources. Diki and Dwisatyadini (2020) observed the effect of curcumin from turmeric (Curcuma longa) on cervical cancer cells.

Medicinal plants are generally very beneficial for treating various diseases or health problems. Considering these plants are easy to find in nature, even rural residents deliberately plant them in their yards. Therefore, medicinal plants are relatively cheap by utilizing plants that exist in nature. The types of medicinal plants usually used are leaves, stems, flowers, roots, rhizomes, flowers, fruit and seeds.

Knowledge about the use of medicinal plants is passed down orally from generation to generation. However, this information was not recorded and is expected to disappear over time. The lack of interest of the younger generation in learning traditional medicinal knowledge using plants can also cause this traditional heritage to become extinct gradually. Local knowledge, which comes from community experience from generation to generation, needs to be studied further scientifically, such as studying the bioactive ingredients contained in these types of plants and their properties for treating diseases or health problems. Scientific studies regarding the knowledge of local residents or traditional residents regarding types of medicinal plants are studied specifically in plant ethnobotany (Damai, 2023).

Ethnobotanical studies can be used as a parameter to perpetuate public knowledge about using plants as medicine. Ethnobotanical studies concern taxonomic data and involve regional botanical knowledge in the form of reviewing the reciprocal relationship between humans and plants and regarding the use of these plants, which is prioritized for cultural and sustainability purposes. Ethnobotany is pure scientific research that uses traditional knowledge and experiences to improve the quality of life, not only for humans but also the quality of the environment. This study has a double benefit because it is beneficial

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for humans and the environment and protects this knowledge by protecting the types of plants used. Habibah (2014) stated that ethnobotany is the traditional use of various plants by inland people. Along with the times, ethnobotany has finally developed as an interdisciplinary branch of science that studies the relationship between humans and the natural surroundings.

Ethnobotany refers to the study of interactions between humans and plants. This study is a descriptive form of documenting the traditional botanical knowledge of the local community. The use of plants among ethnic groups in Indonesia tends to be diverse. The diversity of ethnic groups that inhabit this territorial area is commensurate with the large diversity of traditional rituals which continue to be preserved by each tribe in Indonesia. Various plants exist in certain tribal environments, which are processed or used directly for food, medicine and other purposes. Medicine and traditional rituals (Dharmono, 2007). Ethnobotany has benefits, namely plant conservation, guaranteeing local, regional and global food, strengthening ethnic characteristics and nationalism, observing the attractiveness of plants and projects in their use, and being useful as the latest drug processing innovation (Permatasari, 2013).

Maridan Village is one of the areas in Sepaku District, North Penajam Paser Regency, East Kalimantan, which has pristine forests. This is because the people of Maridan Village still care for and preserve the surrounding environment, especially the medicinal plants they obtain from the forest. However, people's habits of using plants as traditional medicine have decreased over time. This knowledge is only preserved and documented if it is preserved. The reality of society shows that the interest of today's younger generation is decreasing. As more and more people use modern medicine, the use of traditional medicine is becoming increasingly abandoned. If this is allowed, then the knowledge and use of plants used as traditional medicine will cease so that knowledge can disappear. The loss of knowledge will have a negative impact on nature conservation because people no longer know the patterns of knowledge and use of natural resources.

Based on the problems described above, this research aims to determine the contribution of local knowledge about traditional medicinal plants in Maridan Village to treating certain diseases and using medicinal plants in Maridan Village. The results can provide information about the traditional medicinal uses of various local plants. Apart from that, it is also to increase public awareness to protect local biodiversity.

RESEARCH METHODS

The research was conducted in Maridan Village, Sepaku District, North Penajam Paser Regency, for 2 weeks, effectively in the field, and data processing and analysis took approximately 2 months. The research method used is the Participatory Rural Appraisal (PRA) method, involving community participation in research so that it can produce data that is more accurate and relevant to the community. Interviews were conducted directly with local people who know about medicinal plants. They aimed to identify the medicinal plants used, how to process them, the dosage used, and the purpose of their use

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by taking samples mentioned by the respondents. The number of informants was 40 people from Maridan Village. To select various informants, researchers visited vital informants such as village heads and local traditional heads to request research permission. They asked various competent people with in-depth knowledge and experience in traditional medicine using medicinal plants. Various groups of people who were used as informants were divided into 2 groups, namely crucial informants consisting of a) village heads and village staff, b) village elders, and c) medical experts (shaman), and non-key informants consisting of local communities with aged 35 years and over and domiciled in Maridan Village for more than 10 years, assuming that based on their age and length of residence, these people already have knowledge and experience in using medicinal plants. Interviews with informants were conducted in-depth regarding various aspects related to various diseases commonly suffered by the population, types of medicinal plants, uses of medicinal plants, and how to process medicinal plants. With this research method, the data obtained is comprehensive and can help identify the types of medicinal plants used by the local community so that it can provide insight, especially for the Maridan Village community, or literature guidelines for further research regarding communities that use medicinal plants as ingredients for traditional medicine. With this research method, the data obtained is comprehensive and can help identify the types of medicinal plants used by the local community so that it can provide insight, especially for the Maridan Village community, or literature guidelines for further research regarding communities that use medicinal plants as ingredients for traditional medicine.

RESULTS AND DISCUSSION

Based on the interview results, 38 species of medicinal plants are used by the Maridan Village community and belong to 28 families. Then, information was also obtained regarding how to use it, process it, and the parts of the plant used as medicine. The part of the plant that is often used is the leaves, with a citation of 30%; the method of use that is often done is by drinking it, with a citation of 65%, and the processing method that is often used is by boiling it with a citation of 55%. Medicinal plants that are used can be seen in Table 1.

Table 1. Data on Medicinal Plants in Maridan Village

No	Regional name	Scientific name and family	Part of plant	Processing method	How to use	Benefits
1	Sambung nyawa	*Gynura procumbens (Asteraceae)*	Leaves	Boiled then add a pinch of salt	Drink	Urinary tract infections
2	Jambu biji	*Psidium guajava* L. *(Myrtaceae)*	Young leaves	Without processing	Eaten	Diarrhea
3	Lidah buaya	*Aloevera (Asphodeloideae)*	Leaves	without processing	Smeared	Burns
4	Petai	*Parkia speciosa (Fabaceae)*	Seeds	without processing	Eaten	Diabetes
5	Gambas	*Luffa acutangula (Cucurbitaceae)*	Old seeds	without processing	Eaten	Malaria

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6	Kantil	*Magnolia champaca (Magnoliaceae)*	Flowers	without processing	Eaten	Keputihan
7	Kayu Manis	*Cinnamomum verum (Lauraceae)*	Stem bark	Boiled	Drunk	Diabetes
8	Sirih	*Piper betle (Piperaceae)*	Leaves	Boiled then add a pinch of salt	Drunk	Antiseptic
9	Kumis Kucing	*Orthosiphon aristatus (Lamiaceae)*	Leaves	Boiled	Drunk	Asam urat
10	Brotowali	*Tinospora cordifolia (Menispermaceae)*	Stems and Roots	Boiled	Drunk	Diabetes and Malaria
11	Sambiloto	*Andrographis paniculata (Acanthaceae)*	Leaves	Boiled	Drunk	Diabetes
12	Mahoni	*Swietenia mahagoni (Meliaceae)*	Seeds	without processing	Eaten	Diabetes
13	Seledri	*Apium graveolens (Apiaceae)*	Leaves	Crushed	Drunk	Hypertension
14	Kecibeling	*Strobilanthes crispus (Acanthaceae)*	Leaves	Boil then add a pinch of salt	Drunk	Facilitates urine
15	Pepaya	*Carica papaya (Caricaceae)*	Fruit	Without processing	Eaten	Facilitates digestion
16	Kunyit	*Curcuma longa* L. *(Zingiberaceae)*	Rhizome	Shredded	Smeared	Deep wounds
17	Temulawak	*Curcuma xanthrorrhiza* Roxb *(Zingiberaceae)*	Rhizome	Baked then washed then boiled and add salt	Drunk	Indigestion
18	Kelapa	*Cocos nucifera (Arecaceae)*	Coconut water	without processing	Drunk	Poisoning
19	Jagung	*Zea mays (Graminaceae)*	Fruit	Shredded	Smeared	Cacar
20	Timun	*Cucumis sativus* L. *(Cuecubitales)*	Buah	Boiled	Drunk	Smallpox
21	Lengkuas	*Alpinia galanga (Zingiberaceae)*	Rhizome	without processing	Rubbed	Tinea versicolor
22	Bawang merah	*Allium cepa* L. *(Amaryllidaceae)*	Root	Chop finely then add oil	Smeared	Fever in children
23	Alang-alang	*Imperata cylindrica (Ploaceae)*	Rhizome	Boiled	Drunk	Deep heat
24	Tembelekan	*Lantana camara* L. (*Verbenaceae)*	Leaves	Boil then add a pinch of salt	Drunk	Appendicitis
25	Ketepeng Cina	*Senna alata (Fabaceae)*	Leaves	Smoothed	Rubbed	Tinea versicolor, scabies and ringworm
26	Kencur	*Kaempferia galanga* L. *(Zingiberaceae)*	Rhizome	Grate it then squeeze it and add	Drunk	Cough

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				honey		
27	Lemon	*Citrus limon (Rutaceae)*	Fruit	Squeeze then add soy sauce	Drunk	Cough
28	Jahe	*Zingiber officinale (Zingiberaceae)*	Rhizome	Add lemongrass then boil	Drunk	Maintain immunity
29	Tapak dara	*Catharanthus roseus* L. G. Don *(Apocynaceae)*	Fruit	Boiled	Drunk	Kidney stone
30	Kenanga	*Cananga odorata (Annonaceae)*	Flowers	Boiled	Drunk	Eliminates body odor
31	Bengle	*Zingiber montanum (Zingiberacea)*	Rhizome	Boiled	Drunk	Stomach ache
32	Laban	*Vitex pinnata (Lamiaceae)*	Stem	Peel the stems, scrape out the sap, then add a pinch of salt and cover with hot water	Drunk	Diarrhea
33	Bawang Dayak	*Eleutherine bulbosa (Iridaceae)*	Rhizome	Boiled	Drunk	Diabetes
34	Bajakah	*Spatholobus littoralis (Fabaceae)*	Roots	Boiled	Drunk	Cancer
35	Kayu Kuning	*Arcangelisia flava (Menispermaceae)*	Roots	Boiled	Drunk	Malaria
36	Pasak Bumi	*Eurycoma longifolia (Simaroubaceae)*	Roots	Boiled	Drunk	malaria
37	Cimplukan	*Physalis angulata (Solanaceae)*	Leaves, Roots, and Stems	Boiled	Drunk	Diabetes
38	Sukun	*Artocarpus altilis (Moraceae)*	Leaves	Dried, then boiled	Drunk	Jaundice

Table 1 above shows that the highest number of species was found from the Zingiberaceae family, namely 6 species, followed by 3 species from the Fabaceae family. The plant organs used by each plant also vary, starting from stems, fruit, seeds, leaves, flowers, roots and rhizomes. Four processing methods are used: boiling, dousing with hot water, mashing and using straight away without processing.

The Zingiberaceae family is widely used in the Maridan Village community because apart from being a medicinal plant, Zingiberaceae family plants are also used as cooking spices. Hence, they are easy to find in traditional and modern markets and people's home gardens. Zingiberaceae plants that have been used to date are cultivated plants. Ethnic groups in Indonesia widely use Zingiberaceae based on knowledge passed down from generation to generation, information from neighbours or mass media. Zingiberaceae plants are used for medicinal purposes, food, drinks and cooking spices.

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The part used as a medicinal ingredient is the rhizome of the plant. There are various ways of using it, including boiling it, making herbal medicine and then taking the water to drink, extracting the juice or rubbing it on the part of the body being treated, and there are also those who rub it directly on the body part without having to process. Several types of plants from the Zingiberaceae family that the Maridan village community uses as medicine include turmeric (*Curcuma longa* L.), ginger (*Curcuma xanthrorrhiza* Roxb), galangal (*Alpinia galanga*), galangal (*Kaempferia galanga* L.), ginger (*Zingiber officinale*), bengle (*Zingiber montanum*).

Rhizome-rooted plants have active compounds such as flavonoids, saponins, and essential oils consisting of camphene, cineol, metal cinnamate, galangal, galangin, and alpine. These ingredients have many medical benefits, including improving blood circulation, stimulating bronchial glands and inhibiting microbial growth. The plant has a long history of ethnobotanical use because many rhizomes have antimicrobial properties derived from their essential oil content. The rhizome of the Zingiberaceae plant is a source of essential oil. Plant organs that contain natural essential oils are flowers, leaves, bark, roots, seeds, fruit, rhizomes, and exudate sap or oleoresin (Handajani *et al*., 2008). Extracts from several Zingiberaceae plants have anti-inflammatory, analgesic, anti-diarrhea, anti-microbial, sedative, cytotoxic, insecticidal and anthelmintic properties.

Some of the medicinal plants used by the people of Maridan Village have had their efficacy scientifically proven. The following table contains medicinal plant compounds which have been summarized from various sources:

Table 2. Compounds contained in medicinal plants in Maridan village

No	Regional Name	Scientific name	Compound content and explanation
1.	Jambu biji	*Psidium guajava* L.	Quercetin (inhibits acetylcholine release and intestinal contractions), tannin (reduces intestinal peristalsis), and alkaloids (growth inhibitors and kills microorganisms in the intestine)
2.	Lidah buaya	*Aloevera*	Water (increases skin elasticity and reduces its fragility), muco-polysaccharides with amino acids and zinc (improves skin integrity, retains moisture and reduces erythema of the skin
3.	Petai	*Parkia speciosa*	Hypoglycemic, hypolipidemic, antioxidant, anti-inflammatory and antihypertensive properties
4.	Kantil	*Magnolia champaca*	Antimicrobial against protozoa, bacteria and fungi
5.	Kayu Manis	*Cinnamomum verum*	Flavonoids (control blood sugar levels)
6.	Sirih	*Piper betle*	Essential oils (inhibit the growth of Candida albicans)
7.	Kumis Kucing	*Orthosiphon aristatus*	Orthosiphon aristatus orthosiphonin and potassium salt (helps dissolve uric acid, phosphate and oxalate in the body)
8.	Brotowali	*Tinospora cordifolia*	Borapetoside C and borapentol B (lowers blood sugar levels in type 2 diabetes) and tinocrysposite (antimalarial)

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9.	Sambiloto	*Andrographis paniculata*	Andrographolide, andrografin, flavonoids, peniculin (antidiabetic)
10.	Mahoni	*Swietenia mahagoni*	Antioxidants in the form of methanol extract (lowers blood glucose levels)
11.	Seledri	*Apium graveolens*	Apigenin (prevents narrowing of blood vessels and high blood pressure), flavonoids, vitamin C, apiin, calcium, and magnesium (reduces high blood pressure)
12.	Pepaya	*Carica papaya*	Protein enzymes such as papapin chymopapin, caricain, and glycyl endopeptidase (smooth digestion)
13.	Kunyit	*Curcuma longa* L.	Curcumin (inhibits the formation of prostaglandins and suppresses the activity of the cyclooxyginase enzyme so that it can help the wound healing process by speeding up the inflammatory phase and preventing infection)
14.	Temulawak	*Curcuma xanthrorrhiza* Roxb	Antioxidants such as phenols, flavonoids, and curcumin (capture free radicals in the body, stabilize cell membranes and inhibit lipid peroxidation, increase the content of mucosal prostaglandins and mucus in the gastric mucosa by stimulating cylooxygenase-1 (COX-1), and reduce the secretion of acid and pepsinogen in stomach)
15.	Kelapa	*Cocos nucifera*	Antidote (reduces toxic symptoms in the form of abnormal body posture or poisoning)
16.	Jagung	*Zea mays*	Thiamin (cures smallpox)
17.	Timun	*Cucumis sativus* L.	Potassium, magnesium, phosphorus, as detoxification, 90% water (diuretic effect for hypertension sufferers)
18.	Lengkuas	*Alpinia galanga*	Essential oils and methanol fraction (inhibits microbial growth in several species of bacteria and fungi)
19.	Bawang merah	*Allium cepa* L.	Diphenyl-amine, cycloaliin, phloroglucinol, kaempferol, diallyl-trisulfide, prostaglandin A-1, adenosine, alliin (fever reducer)
20.	Alang-alang	*Imperata cylindrica*	Diuretic, antipyretic effects and contains antioxidants
21.	Ketepeng Cina	*Senna alata*	Antifungal
22.	Kencur	*Kaempferia galanga* L.	Essential oils that have anti-inflammatory properties (treat coughs)
23.	Lemon	*Citrus limon*	Flavonoids, folic acid, tannins, vitamins (A. B. And C) and minerals (anti-inflammatory)
24.	Jahe	*Zingiber officinale*	Antioxidant
25.	Kenanga	*Cananga odorata*	Flavonoid which is effective against epidermal *Staphylococcus bacteria*
26.	Bengle	*Zingiber montanum*	Flavonoids, saponins, tannins, alkaloids, and steroids (relieves stomach aches)

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27.	Laban	*Vitex pinnata*	Tannins which are astringent (prevent dysentery and diarrhea)
28.	Bawang Dayak	*Eleutherine bulbosa*	Berberine (treats malaria)
29.	Pasak Bumi	*Eurycoma longifolia*	Euryconabobe derivative compound (anti-malarial)

(Source: Shanbhag *et al*. 2011; Arie *et al*., 2014; Amanah *et* al., 2018; Dharmayati. 2019; Essa *et al*. 2020; Mufida and Puspitasari 2020; Noviyanto *et al.,* 2020; Saputra, 2021); Fatikhurokhmah 2022; Nurhaini *et al*., 2022; Rosyida e*t al*., 2023)

The plant organs most widely used as medicine by the people of Maridan Village are the leaves. Apart from the fact that the leaves are easy to obtain, this is also because the leaves have a soft texture with a high content (70-80%). The soft texture of the leaves makes them easy to extract for use as medicine. In addition, leaves are a place for accumulating photosynthate, which is thought to contain elements (organic substances) that have disease-curing properties. Substances that are abundant in leaves are essential oils, phenols, potassium compounds and chlorophyll. Chlorophyll in leaves has been tested to overcome anemia well because this substance has the same function as hemoglobin in human blood (Handajani, 2008). The percentage of medicinal plant parts used can be seen in Figure 1, namely leaves 30%, rhizomes 20%, fruit 15%, roots 15%, stems 8%, seeds 7% and flowers 5%.

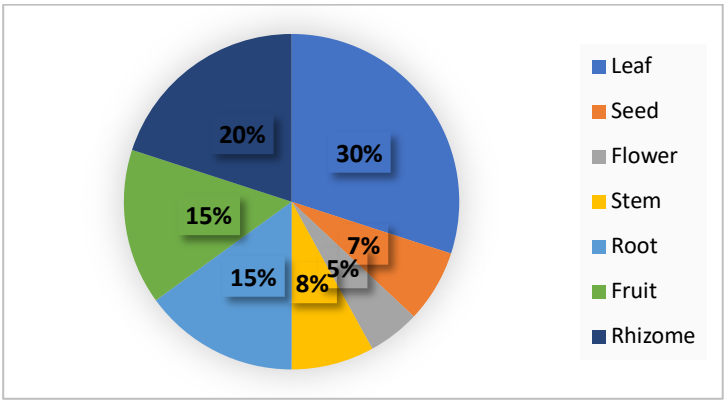

Figure 1. Percentage of medicinal plants used by the Maridan Village community.

The most widely used method of processing medicinal plants is by boiling. According to local people, boiling is a way to remove plants' medicinal contents, which are believed to be efficacious. Through the boiling technique, the active ingredients in plants, such as flavonoids, become soluble in water, so the body quickly digests them. The boiling process can release substances contained in plants compared to burning. The percentage of plant processing methods can be seen in Figure 2: boiling 55%, without processing 26%, mashing 8%, grating 8%, and brewing 3%.

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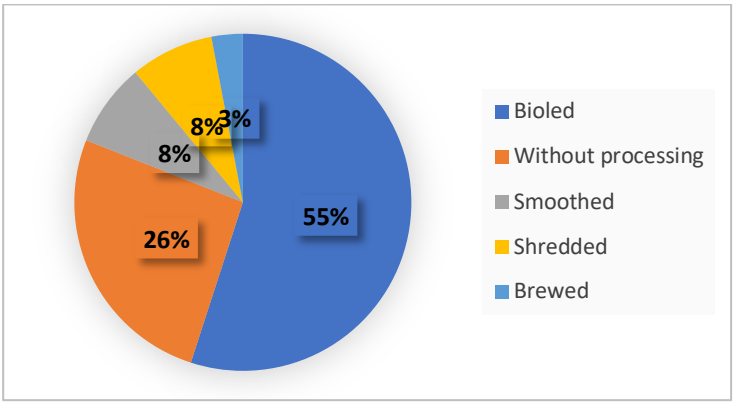

Figure 2. Percentage of methods of processing medicinal plants in Maridan Village.

CONCLUSION

The medicinal plants used by the people of Maridan Village, Sepaku District, North Penajam Paser Regency are 38 types of medicinal plants from 28 families and the most widely used plants are from the Zingiberaceae family. The plant parts used are leaves, rhizomes, fruit, roots, stems, flowers and seeds. The processing methods used by the Maridan Village community are by boiling, mashing, brewing, grating, squeezing, and without processing.

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