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ETHNOCHEMISTRY STUDY OF THE USE OF PLANTS AS TRADITIONAL MEDICINE IN THE COMMUNITY OF SAMADUA DISTRICT, SOUTH ACEH REGENCY

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ABSTRACT

Research on the ethnochemistry study of the use of plants as traditional medicine in the Samadua District community has been carried out. In general, there are two ways to use plants as medicine, internal medicine (oral) and external medicine (topical). This type of research is descriptive qualitative with an ethnographic approach that aims to determine the types, benefits, processing methods, and chemical content of plants used as internal medicine by the people of Samadua District. Data collection techniques in this study were observation, interviews, and documentation. The sampling technique was carried out by purposive sampling, namely by conducting interviews with herbal practitioners, community leaders, and users. The results showed that in Samadua District there were 54 types of plants used by the community to treat diabetes, high blood pressure, cough, gout, cholesterol, diarrhea, and other complaints. The processing of medicinal plants is carried out by boiling, grinding, kneading, eating, making juice, or brewing. The most processing method is by boiling, which is 46.34% while the least is by brewing at 1.21%. Plants can be used as drugs because they contain certain chemicals produced from secondary metabolites. The chemical constituents of these medicinal plants include flavonoids, alkaloids, saponins, tannins, terpenoids, phenolic compounds, glycosides, vitamins, steroids, and essential oils. Ethnochemistry studies combine public opinion with science regarding the effectiveness of plants that are considered useful as drugs, based on the chemical compounds contained in these plants.

Keywords: Ethnochemistry, medicinal plants, Samadua community.

INTRODUCTION

Indonesia is a country that has the second most significant natural wealth in the world. More than 90,000 plant species grow in Indonesia, of which 9,600 plants are known to have medicinal properties 300 species have been used as ingredients in traditional medicine by the traditional medicine industry [1]. As a tropical country, Indonesia has a wide variety of plants that can be utilized as much as possible to benefit humans. Since ancient times, Indonesian people have known plants that have medicinal properties or can cure various diseases [2]. Medicinal plants are plants that are used as medicine, both intentionally planted and those that grow wild. The community will use the plants to mix

and serve as medicine to treat various diseases [3].

One way to use medicinal plants is as internal medicine, by drinking or eating. People believe that the use of medicinal plants by drinking or eating has a very fast reaction when compared to smeared, pasted, and rubbed [4]. Parts of plants that are used as medicine are leaves, stems, flowers, fruit, roots, or sap [5]. Traditional medicine started with a self-medicating experience and was transmitted to others and the next generation.

Samadua District is one of the sub-districts in South Aceh Regency, which has natural biological resources so that many medicinal plants are found. However, the use of plants as traditional medicine is still mostly done by the Samadua community to treat various types of certain diseases. The use of plants as traditional medicine is more in demand by the people of Samadua because it uses ingredients that are simple, easy to obtain, easy to process, and considered safer for consumption in the long term. In addition, there is doubt in the community about the negative effects caused by the use of chemical drugs, causing many people to switch to using traditional medicine [6].

Knowledge of plants as traditional medicine used in the Samadua District has never been well documented. Usually, knowledge and information about utilizing plants as medicine are only conveyed orally by word of mouth, not in writing. Moreover, the use of medicinal plants is carried out only to the extent of passing on from parents to grandchildren from generation to generation in the family, so it is feared that the knowledge of using plants as medicine is starting to fade as technology advances.

Ethnochemistry studies are one of the scientific ways to document plants used as traditional medicines in the Samadua District community. Ethnochemistry is a subset of ethnoscience. Ethnoscience means knowledge possessed by a nation or tribe, or social group as a form of local wisdom [7]. The emphasis is on indigenous and distinctive knowledge of a community culture [8]. The product is then processed based on community knowledge passed down from generation to generation and becomes the hallmark of the community [9].

Ethnochemistry is a branch of chemistry that studies chemistry from a cultural perspective, how chemistry shapes culture and how culture has contributed to the science of chemistry and its changes [10]. Ethnochemical studies can influence people's views of chemistry, that chemistry is not only something that is dangerous but has many benefits in everyday life [11]. For example, the medical culture that the community has carried out using plants as medicine has scientific reasons from a chemical point of view.

Several studies have been conducted to explore the society's culture that relates to chemistry and its changes. The study shows that many cultural practices in the community are chemically related, both in the fields of food, crafts, and medicine [11][12]. Especially in the health sector, people in certain areas use plants in the surrounding environment to treat various types of diseases based on chemical content such as alkaloids, flavonoids, essential oils,

phenols, saponins, terpenoids, and other compounds found in these plants [13][14]. In addition, the medical culture practised by the community in utilizing plants as medicine can contribute to chemistry and its changes [15]. However, so far, no research has been conducted on the ethnochemistry study of the use of medicinal plants by the people of Samadua District.

Knowledge of using plants as traditional medicine by the Samadua community is carried out from generation to generation based on their beliefs without knowing the scientific reasons behind the treatment. With this ethnochemistry study, it is hoped that the public will know the scientific reasons for using plants as medicine, a cultural heritage that has been carried out for a long time. Based on the problems described above, the researchers are interested in researching ethnochemistry studies on the use of plants as traditional medicine in the Samadua District, South Aceh Regency community.

METHODS

This research was carried out in 10 villages out of 28 villages in Samadua District, Air Sialang Hulu Village, Air Sialang Tengah, Lubuklayu, Suaq Hulu, Payonan Gadang, Baru, Ujung Tanah, Gunung Ketek, Batee Tunggai, and Kuta Blang from the 11th- November 30, 2021. This research method is descriptive qualitative with an ethnographic approach. The data collection techniques used are observation, interviews, and documentation. Observations were made to see and directly observe traditional medicine in Samadua District using medicinal plants. Interviews were conducted on 30 residents selected based on a purposive sample or specific criteria/objectives. The community criteria used as research samples are herbal practitioners, community leaders, and users. The next stage is to document the medicinal plants used by the people of Samadua as traditional medicine. The research instrument used in this study was a preliminary observation sheet, an interview guide for herbal practitioners, an interview guide for community leaders, and an interview guide for users and researchers as the key instrument. The data obtained from the research results were analyzed descriptively qualitatively, presenting medicinal plants used as internal medicine by the community in Samadua District.

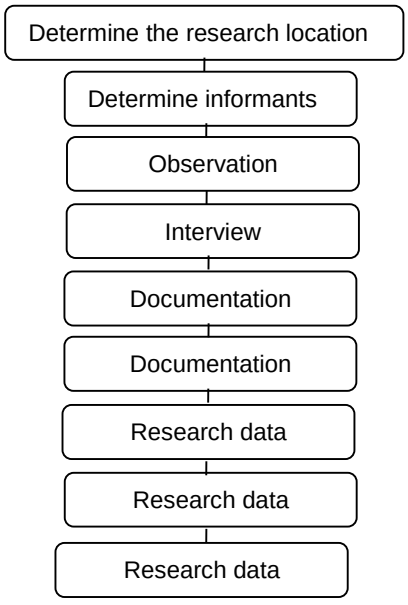

Figure 1. Research Flowchart

RESULTS AND DISCUSSION

1. Samadua Community Traditional Medicine

The Samadua community uses medicinal plants as an alternative first aid in

healing before being taken to a hospital or health centre. One of the traditional treatments using plants around is known as " *marampot* ". The use of plants as traditional medicine is considered more effective in treating various diseases, where now the price of all necessities has soared, including medicines. Traditional herbs are cheaper because they are easily available in the surrounding environment. If you go to the Puskesmas for treatment, you must wait in line, which takes a long time.

Knowledge about treatment using medicinal plants owned by the people of Samadua District is generally obtained from generation to generation, based on personal experience, and passed on to the next generation. Rarely is this knowledge obtained from ancient medicine books or books. This knowledge will continue to be preserved for the next generation after a child is considered an adult and capable.

2. Medicinal Plants

Based on the research results and interviews that have been conducted with 30 resource persons consisting of herbal practitioners, village parents, and users, it is known that there are 54 types of plants used by the people of Samadua District to treat diabetes, high blood pressure, cough, gout, cholesterol, fever, diarrhea, malaria, fever, medicines ready to give birth, rheumatism, dizziness, colds, stomachache, ulcers, shortness of breath and backache.

The following types of medicinal plants are used as traditional medicine by the people of Samadua District:

Table 1. Traditional Medicinal Herbs by the Community of Samadua District

No.	Disease Name	Medicinal Plants	Used part	Processing
1.	Diabetes	*Centella asiatica*	Leaves and stems.	Prepare 1 handful of *Centella asiatica* leaves and stems, 2 *Andrographis paniculata* stalks (leaves and stems), 7 *Blumea balsamifera* leaves, 2 *Elephantopus scaber* stems (leaves, stems, roots), 2 stalks (stems and leaves), 1 handful of meniran leaves, 1 handful of ciplukan leaves, 7 bay leaves, 1 handful of pulutan leaves, 7 *Orthosipon aristatus* stalks (leaves and stems), 7 *Pandanus amaryllifolius* leaves, and 7 *Annona muricat* leaves boiled with 5 liters of water using an aluminum pot to boil for 15 minutes. After cooling, strain and drink the filtered water twice a day, morning and evening, each cup. The remaining cooking water can be stored in the refrigerator to drink again. The process of boiling plants using water as a solvent is an application of chemistry learning materials in the form of polar and non-polar covalent. Water is a universal solvent that is polar. This discussion of polar and non-polar covalent is studied in the subject matter of class X chemical bonds.
		Peperomia pellucida	Leaves and stems.	
		Syzygium polyanthum	The leaves are not too young and not too old.	
		Elephantopus scaber	Leaves, stems and roots.	
		Phylanthus niruri	Leaf.	
		Blumea balsamifera	Leaf.	
		Andrographis paniculata	Leaves and stems.	
		Annona muricata	The leaves are not too young and not too old.	
		Physalis anglata L.	Leaf.	
		*Urena lobat*a	Leaf.	

		Pandanus amaryllifolius	Leaf	In addition, the composition of plants and the amount of water in the boiling process is an application of chemicals in the form of class X mole concepts. Processing plants by boiling to boiling shows the solubility of compounds related to the solution's colligative properties, namely the increase in boiling point in class XII. The chemical relationship in the form of corrosion can also be seen in using aluminium pans in boiling ingredients. When boiling ingredients, you should use tools and equipment free from rust/corrosion. This is because tools and equipment that are rusty, if used, can interfere with health. Thus, the use of aluminium pans is related to the subject matter of class XII corrosion.
		Orthosiphon aristatus	Leaves and stems	
		Momordica charantia	Fruit.	*Momordica charantia* is washed and eaten directly or processed into food.
		Piper ornatum	Leaf.	Prepare 5-10 pieces of *Piper ornatum* leaf, wash and then boil in an aluminium pot with 3 cups of water until it boils and the remaining 1 cup of water. Once cool, filtered and drunk boiled water once a day.
		Lansium domesticum	Bark.	Prepare 3 pieces of *Lansium domesticum* bark measuring 10 cm. Then pounded and boiled with 1 liter of water using an aluminium pot until it boiled and the remaining ½ liter. Once cool, filtered and drunk boiled water 3 times a day after eating.
		Garcinia mangostana	Dried fruit skin.	Prepare 3 pieces of mangosteen peel, then dry in the sun. Then the dried mangosteen skin is boiled with liter of water in a saucepan until it boils. Once cool, strain and drink the boiled water 2-3 times a day, morning and night.
		Syzygium cumini	Bark.	Prepare 3 pieces of *Syzygium cumini* bark, then pound and boil with liter of water using a saucepan until it boils. Once cool, filter and drink the water 2x a day, morning and night.
		Phaleria macrocarpa	Dried fruit skin.	Prepare 1 handful of dried *Phaleria macrocarpa* skin, and boil it with liters of water until it boils using a saucepan. Then filtered and drank the water 2x a day.
2.	High blood pressure	*Centella asiatica*	Leaves and stems	Prepare 1 handful of *Centella asiatica* leaves and stems, wash, then ground, add a cup of water, and filter. The filtered water is drunk once a day.
		Averrhoa bilimbi	Starfruit leaves that are not too young and not too old	Prepare 2 stalks of *Averrhoa bilimbi* leaves, squeeze them with 1 cup of water, strain and drink the filtered water once a day.

		Morinda citrifolia	Ripe fruit.	Prepare 1 *Morinda citrifolia* fruit, peel the skin and then eat directly, or it can be made into juice.
		Cucumis sativus	Fruit.	1 *Cucumis sativus* is washed and then eaten directly or made into juice, taken 2x a day, morning and evening.
3.	Cough	*Averrhoa bilimbi*	Ripe and mushy fruit.	Prepare 3 *Averrhoa bilimbi* ripe and soft, then squeeze until the water comes out. After that is filtered, add a little sugar and drink.
			Flower.	Prepare 1 handful of *Averrhoa bilimbi* flowers, add 3 tablespoons of water, then squeeze and strain the water. Add a little sugar, and drink once a day.
		Lannea nigritana	Leaves that are not too young and not too old	3 stalks of *Lannea nigritana* are washed, then squeezed with ½ cup of water, filtered and add a little salt. The filtered water is drunk once a day.
		Elephantopus scaber	Leaf	Prepare 3 stems of *Elephantopus scaber*, take the leaves, 3 leaves of *Blumea balsamifera*, add *Curcuma longa*, then grind. Add cup water, sugar and strain. Drink filtered water once a day.
		Blumea balsamifera	Leaf.	3 *Blumea balsamifera* leaves are ground with a little *Curcuma longa*, add ½ cup of water, and filter. Drink filtered water once a day.
		Adesnotema viscosum	Leaf.	1 handful of *Adesnotema viscosum* leaves, add ½ cup of water, filter and drink the filtered water once a day.
		Diplazium esculentum	Leaf.	Prepare 5 stalks of *Diplazium esculentum*, take the leaves and knead with ½ cup of water. Then drink the filtered water once a day.
		Piper betle L.	The leaves are not too young and not too old.	Boil 15 pieces of *Piper betle* L.with 3 cups of water using an aluminium pan until the remaining. Then filtered and drink boiled water 2x a day.
		Solenostemon scutellarioides L.	Leaf.	1 handful of *Solenostemon scutellarioides* L, 1 handful of *Centella asiatica* leaves, 1 handful of *Adesnotema viscosum*, and a little *Curcuma longa*. Add ½ cup of water, filtered, and drink the filtered water once a day.
		Kaempferia galanga	Rhizome.	Wash 1 rhizome of *Kaempferia galanga* as big as your thumb, 1 handful of rice and 1 clove of garlic and then eat it all at once.
4.	Gout	*Peperomia pellucida*	Leaf.	Prepare 7-10 of *Peperomia pellucida* leaves, wash and then eat immediately.
		Syzygium polyanthum	The leaves are not too young	Prepare 10-15 *Syzygium polyanthum* leaves, wash thoroughly, and boil with 1 liter of water using an aluminium pot until

			and not too old.	20 minutes. Once cool, then filtered and drunk 2x a day.
		Orthosiphon aristatus	Leaf.	Wash 7-15 leaves of Orthosiphon aristatus. Boil with 2 cups water, until boiling and the remaining ½ cup water. Once cool, then filtered and drunk once a day.
5.	Cholesterol	*Syzygium polyanthum*	The leaves are not too young and not too old.	Wash 10-15 *Syzygium polyanthum* leaves, then boil with 3 cups of water using an aluminium pot until it boils and the remaining 1 cup of boiled water. Once cool, strain and drink the filtered water 2x a day.
		Annona muricata	The leaves are not too young and not too old.	Prepare 7-10 *Annona muricata* leaves, wash thoroughly, then boil with liter of water using a saucepan for 15 minutes. Once cool, strain and drink boiled water 2x a day.
		Passiflora foetida	Leaf.	Wash 10-15 *Passiflora foetida* leaves and boil them with 3 cups of water using an aluminium pot until it boils. After it cools down, then filter it and drink the boiled water 2x a day
		Artocarpus altilis	The leaves are brownish yellow.	Prepare 1 *Artocarpus altilis* leaf that has fallen and is brownish yellow. Then cut into small pieces and then boil with liter of water until boiling. Once cool, filtered and drunk, boiled water 2x a day.
		Allium sativum	Bulbs.	Prepare 1 clove of garlic, peel the skin, wash and eat immediately.
6.	Ulcers	*Chromolaena odorata*	Leaf.	Wash 10-15 leaves of *Chromolaena odorata*, then boil with liter of water to boil for 15 minutes. Once cool, filtered and drink filtered water once a day.
		Annona muricata	The leaves are not too young and not too old.	Prepare 10-15 *Annona muricata* leaves, wash thoroughly, then boil with liter of water using a saucepan for 15 minutes. Once cool, strain and drink boiled water 2x a day.
7.	Diarrhea	*Psidium guajava*	Leaf shoots.	Wash 10 *Psidium guajava* leaves and eat them with a little salt.
		Areca catechu	The fruit is still young (soft texture).	Prepare 3 *Areca catechu* that is still young (soft texture) and then eat little by little.
8.	Malaria	*Andrographis paniculata*	Leaf.	Wash 10-15 *Andrographis paniculata* leaves, soak them in 1 cup of warm water for 10 minutes and then drink once a day.
		Carica papaya	Yellow leaves.	Prepare 1 sheet of yellow *Carica papaya* leaves, add a little *Curcuma longa* and grind it. Add cup of water, filter and drink the water once a day.
9.	Heartburn	*Graptophyllum pictum* L.	Leaf.	Prepare 5 *Graptophyllum pictum* L. leaves, wash them and grind them with 1 handful of grated coconut and add ½ cup of water. Strain, then drink the filtered water once a day.
		Anredera cordofolia	Leaf.	Prepare 1 handful of *Anredera cordofolia* leaves or about 5-10 pieces, then wash and knead with ½ cup of water. Strain, and drink the filtered water once a day.

		Costus speciosus	Young stems that have not yet grown leaves.	Prepare 3 *Costus speciosus* stems that have not yet grown leaves, then crush and squeeze the water. Add 1 handful of rock sugar and drink the water once a day.
		Lawsonia inermis	Leaf.	Prepare 3 stalks of *Lawsonia inermis*, then pick the leaves. Wash clean, then grind or blend with 1 coconut water. Strain, then drink filtered water once a day.
		Cocos nucifera	Fruit (coconut water).	
		Kalanchoe Pinnata	Leaf.	Prepare 5 *Kalanchoe Pinnata* leaves, grind with ½ cup of water, and drink the water once a day.
10.	Medicine ready to give birth	*Graptophyllum pictum* L.	Leaf.	Wash 5-10 *Graptophyllum pictum* L leaves and 1 handful of *Lawsonia inermis* leaves, then boil with 1 liter of water using an aluminium pot to boil for 20 minutes. Once cool, strain and drink 3 times a day after meals. This herb is efficacious so that the body does not shiver after giving birth.
		Lawsonia inermis	Leaf.	
		Carica papaya	Yellow leaves and green leaves.	Prepare 1 sheet of yellow *Carica papaya* leaves, 1 sheet of green and a little *Curcuma longa*, then grind it. Add ½ cup of water, filter and drink the water once a day. This herb is to relieve pain after childbirth.
		Solenostemon scutellarioides L	Leaf.	Prepare 1 handful of *Solenostemon scutellarioides* L leaves, wash them and grind them. Add a cup of water, filtered, and drink the filtered water once a day.
		Sauropus androgynus	Leaf.	Prepare 3-5 sprigs of *Sauropus androgynus* leaves, wash them and then boil them as vegetables. Katuk leaf vegetable is believed to be able to facilitate breast milk.
		Curcuma longa	Rhizome.	Peel and wash 1 ounce of *Curcuma longa*, ounce of *Curcuma zedoaria*, ounce of *Boesenbergia rotunda*, ounce of *Zingiber montanum*, ounce of *Zingiber officinale*, 1 ounce of *Zingiber officinale Var Rubrum*, 1 ounce of *Kaempferia galanga*, 1 ounce of *Alpinia purpurata*, 1 ounce of *Alpinia galanga*, 1 ounce of *Curcuma zanthorrhiza*, and 1 ounce a single clove of garlic then grated and squeeze the water. Add 1 liter of water, 1 ounce of brown sugar, and one ounce of tamarind and cook/boil until all ingredients are mixed. After a cold drink before breakfast cup every day for 20 days. This herb is efficacious for restoring energy after childbirth, overcoming pain, and launching breast milk.
		Curcuma zedoaria		
		Boesenbergia rotunda		
		Zingiber montanum		
		Zingiber officinal	Rhizome.	
		Zingiber officinale Var Rubrum		
		Kaempferia galanga	Rhizome.	
		Alpinia galanga	Rhizome.	
		Alpinia purpurata		
		Curcuma zanthorrhiza	Rhizome.	
11.		*Allium Cepa*	Bulbs.	Prepare 1 *Allium Cepa*, and 2 sunti tamarinds and grind it; add 5-10 spoons of

	Shortness of breath			water and a little sugar. Then filtered and drink filtered water.
		Cyperus rotundus	Bulbs.	Wash 5 pieces of *Cyperus rotundus*, add ½ cup of water and grind it, add a little sugar, filter and drink the filtered water.
12.	Fever	*Imperata cylindrica*	Root.	Wash 1 handful of *Imperata Cylindrica* root, boil with liter of water using an aluminium pot until it boils. Once cool, filter and drink filtered water once a day.
		Nephelium lappaceum	The leaves are not too young and not too old.	Prepare 5-10 pieces of *Nephelium lappaceum* leaves, 5-10 pieces of *Durio zibethinus* leaves, 2 stalks of *Ceiba pentandra* leaves, then squeeze with 1 coconut water, drink the water 2-3 times a day and rub all over the body.
		Ceiba pentandra	Leaf shoots.	
		Durio zibethinus	The leaves are not too young and not too old.	
		Cocos nucifera	Fruit (coconut water)	
13.	Backache	*Garcinia mangostana*	The leaves are not too young and not too old.	Prepare 5-10 pieces of *Garcinia mangostana* leaves and boil them with 4 cups of water using an aluminium pot for 15 minutes. Once cool, filtered and drink the filtered water 2x a day.
14.	Colds	*Jatropha curcas*	The leaves are still red.	Wash 7 stalks of *Jatropha curcas* that are still red and then grind them with ½ cup of water. Then filtered and drunk the water once a day.
		Zingiber officinale	Rhizome.	Clean 1 medium-sized *Zingiber officinale* rhizome, then pounded. Add to taste Java sugar, 2 stalks of lemongrass that have been crushed, one cardamom seed, and 3 cm of cinnamon and then boil with 3 cups of water until it boils. Once cool, filtered and drank boiled water 1-2 times daily.
		Morinda citrifolia	Fruit with white skin.	Prepare 1 *Morinda citrifolia* fruit that is ripe usually has white skin but not mushy. Then washed, cut into small pieces and eaten.
15.	Rheumatism	*Imperata cylindrica*	Root.	Clean 1 handful of *Imperata cylindrica* roots, boil with liter of water using an aluminium pot until it boils. Once cool, filter and drink filtered water once a day.
16.	Stomach ache	*Tegetes ercta L.*	Leaf.	Prepare 5 handfuls of *Tegetes ercta L.* leaves, then crush and squeeze the water. Then drink little by little.
		Jatropha curcas	The leaves are still red.	Wash 7 stalks of *Jatropha curcas* that are still red and then grind them with ½ cup of water. Then filtered and drunk the water once a day.

17.	Dizzy	*Aleurites moluccanus*	Leaves are still green.	Prepare 7 pieces of *Aleurites moluccanus* leaves that are still green, then cut them into small pieces. Add 3 cups of water and squeeze, then drink the water once a day.

3. Medicinal Plant Processing

The use of plants as medicine is twofold: internal medicine (*oral*) and external medicine (*topical*). The community believes using drugs as internal medicine by eating or drinking is easier and more productive, and the perceived illness will recover quickly because the drug reaction is faster [16]. However, based on the results of the study, the processing of medicinal plants carried out by the Samadua community still uses traditional methods ranging from boiling, grinding, kneading, eating, making juice, or brewing, as shown in the Table 2.

Table 2. Methods of Processing Medicinal Plants by the Samadua Community

Processing Methods	Frequency	Percentage
Boiled	38	46,34%
Grinded	21	25,60%
Kneaded	12	14,63%
Eaten	8	9,75%
Blended	2	2,43%
Brewed	1	1,21%

The method of processing medicinal plants is mostly done by the people of Samadua District, namely by boiling at 46.34%, and the least by brewing, namely 1.21%.

4. Part of Medicinal Plants

Based on the results of research that have been carried out, the plant parts used as medicine by the people of Samadua District are leaves, fruit, flowers, roots, rhizomes, stems (skins), and tubers, as shown in the Table 3.

The most widely used part of the plant is the leaf, which is 63.30%, then the fruit is 11.40%, while the least used part is the flower at 1.26%. This is because leaves are the easiest to find, can be taken at any time and easy to grow back, and do not have a big impact on the plant if the part is taken. On the other hand, using bark, roots, rhizomes, or tubers greatly affects plant growth and can even be deadly [17].

Table 3. Parts of Plants used as Medicine by the Samadua Community

Parts of Plant	Frequency	Precentage
Leaves	51	61,44%
Fruits	9	17,64%
Rhizomes	7	13,72%
Stems	9	17,64%
Tubers	3	5,88%
Roots	3	5,88%
Flowers	1	1,96%

5. Ethnochemistry of Medicinal Plants

Based on the interviews, so far, the people of Samadua have used plants as medicine without knowing the scientific reasons behind their use. So that the types of plants used and in determining the amount of dosage to use only rely on experience alone. The knowledge possessed by the community in utilizing plants as medicine is obtained from the experience, traditions, and beliefs of the local community, which has been passed down from generation to generation.

Traditional medicine carried out by the Samadua community using plants in the surrounding environment involves chemical processes that are important to know. Ethnochemistry is a combination of the study

of chemistry with cultural anthropology in the form of a study of the application of cultural technology in a particular community group that has been passed down from generation to generation and has become a standard concept in that society [18]. Ethnochemistry combines public opinion with science regarding the effectiveness of these plants, which are considered useful as medicine and as food based on the chemical compounds contained therein.

Plants can be used as drugs because they contain certain active substances produced from second metabolites/secondary metabolites [19]. Secondary metabolites in plants protect plants from pathogenic microorganisms, repel insects, and give plants a bad taste [20]. Humans utilize certain secondary metabolites as antioxidants or medicinal raw materials [21]. The chemical constituents of these medicinal plants include flavonoids, alkaloids, saponins, tannins, terpenoids, phenolic compounds, glycosides, vitamins, steroids, and essential oils. Each chemical substance found in plants has a specific name and chemical formula. Chemical naming and chemical formulas can be integrated into chemistry learning, namely class XI nomenclature material for carbon compounds.

The following are the types of medicinal plants used by the people of Samadua District to treat diseases and their chemical content:

a. *Peperomia pellucida*

Ancestors have used the use of plants as medicine for generations. One of the plants used is suruhan leaf (*Peperomia pellucida*), which has anti-inflammatory, antipyretic, antioxidant, antihyperglycemic, gout, antihyperuricemia and others [22]. The people of Samadua use the leaves to treat diabetes and gout. Chemical content contained in the leaves of suruhan are flavonoids, alkaloids, saponins, polyphenols, saponins, calcium oxalate, glycosides, steroids, triterpenoids, and essential oils [23]. The flavonoid compounds in suruhan leaves can reduce pancreatic cell damage by regenerating the surrounding pancreatic cells, thereby increasing insulin release [24]. In addition, the content of flavonoids and saponins in suruhan leaves can inhibit the activity of xanthine oxidase [25].

b. *Phyllanthus niruri*

Meniran (*Phyllanthus niruri*) scientifically has activity as antioxidant, antimalarial, antihyperuricemic, hepatoprotective, and hypolipemic. The chemical constituents of meniran are flavonoids, alkaloids, terpenoids, lignin, polyphenols, tannins, coumarins, and saponins [26]. The people of Samadua use meniran plants to treat diabetes. The flavonoid content of quercetin plays a role in increasing insulin secretion by pancreatic -cells through a mechanism in maintaining functioning beta cells and improving the work of the pancreas [27].

c. *Blumea balsamifera*

Sembung leaves (*Blumea balsamifera*) are used by the community to treat coughs and diabetes. Sembung leaves contain active compounds belonging to the group of alkaloids, steroids, flavonoids,

saponins, phenolics, and essential oils (cineol, borneol, landerol, and camphor) [28]. The borneol essential oil in sembung leaves acts as an expectorant and can remove excess mucus by increasing bronchial secretions to facilitate mucus discharge through coughing [29]. In addition, the flavonoid content in sembung leaves has antidiabetic activity. Flavonoids act as antioxidants that bind free radicals and turn them into stable compounds [30].

d. *Lansium domesticum*

Langsat plants contain alkaloids, saponins, flavonoids, and polyphenols. These secondary metabolites indicate that langsat plants have pharmacological effects and the potential to be used as medicinal ingredients. The presence of alkaloids, flavonoids and other polyphenols in langsat plants is considered to have antihyperglycemic potential, and Langsat bark can improve the condition of hyperglycemia through antioxidant enzymes reduce the amount of free radical products. Antioxidants also protect the metabolism of enzymes in cells so that they can achieve a state of homeostasis [31].

e. *Phaleria macrocarpa*

The community uses sphalerite macrocarpa to treat diabetes. The effect of decreasing blood glucose levels from the Mahkota Dewa plant is inseparable from the presence of active chemical compounds contained in the Mahkota Dewa plant, such as flavonoids, tannins, polyphenols, alkaloids, and saponins. The content of saponins and tannins is efficacious as antidiabetic because it acts as an inhibitor of the -glucosidase enzyme.

The ability of alkaloids, flavonoids and vincristine (polyphenols) as antioxidants can capture hydroxy radicals and superoxide and then neutralize free radicals to protect cells and maintain the integrity of the cell and tissue structures/regenerate the pancreas against unwanted reactions [32]. The antioxidant activity of the Mahkota Dewa fruit is due to the content of phenols and flavonoids (kaempferol, myricetin, naringin, quercetin, and rutin) [33].

CONCLUSION

Based on the results of research that has been carried out, there are 54 types of plants that are used by the community to treat various diseases such as diabetes, high blood pressure, cough, uric acid, cholesterol, heartburn, diarrhea, malaria, fever, medicines ready to give birth, rheumatism, dizziness, colds, Stomachache, ulcers, shortness of breath, and backache. Medicinal plants are processed by boiling, grinding, kneading, eating, making juice, or brewing. The most processing method is by boiling, which is 46.34%, while the least is by brewing at 1.21%. In addition, plants are used as drugs because they contain chemical compounds produced from secondary metabolites/secondary metabolites. The chemical constituents of these medicinal plants include flavonoids, alkaloids, saponins, tannins, terpenoids, phenolic compounds, glycosides, vitamins, steroids, and essential oils.

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