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Ethnobotanical Study and Conservation of Medicinal Plants Among Communities in Blang Pegayon, Gayo Lues Regency

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Abstrak: Kecamatan Blang Pegayon, Kabupaten Gayo Lues merupakan salah satu wilayah dengan keanekaragaman hayati tinggi dan terkenal memiliki khasiat dalam pengobatan tradisional. Penelitian bertujuan untuk mengetahui spesies tumbuhan obat yang digunakan oleh masyarakat, bagian tumbuhan yang dimanfaatkan, metode pengolahan, dan strategi konservasi yang diterapkan. Populasi penelitian adalah masyarakat di Kecamatan Blang Pegayon Kabupaten Gayo Lues menggunakan metode purposive sampling sebanyak 48 responden yang diambil dari 6 Desa berdasarkan adanya penggunaan tumbuhan obat tradisional, adanya informan kunci dan informan non kunci dari 6 Desa yang ada di Kecamatan Blang Pegayon, Kabupaten Gayo Lues. Teknik pengumpulan data melalui wawancara semi terstruktur, observasi, identifikasi tumbuhan dengan menggunakan aplikasi picture this dan website Plant of the World Online (POWO) dan dokumentasi. Data dianalisis secara deskriptif. Hasil penelitian diperoleh terdapat 51 spesies tumbuhan yang berasal dari 29 familia yang dimanfaatkan sebagai obat tradisional. Organ tumbuhan yang paling banyak dimanfaatkan sebagai obat adalah daun (58%). Cara pengolahan yang paling sering digunakan adalah ditumbuk (26%). Konservasi tumbuhan obat dilakukan melalui budidaya di pekarangan rumah (40%), penanaman di ladang atau kebun (40%), dan pemanfaatan tumbuhan liar di lingkungan sekitar (20%). Hasil penelitian diharapkan menjadi informasi dalam pengembangan riset bekelanjutan.
Kata kunci: etnobotani; konservasi; tradisional; tumbuhan obat.

Abstract: Blang Pegayon Subdistrict, Gayo Lues Regency, is one of the regions with high biodiversity and is renowned for its significant contributions to traditional medicine. This study aimed to identify the medicinal plant species used by local communities, the plant parts utilised, processing methods, and conservation strategies applied. The research population consisted of residents of Blang Pegayon Subdistrict, Gayo Lues Regency, with purposive sampling involving 48 respondents from six villages based on the presence of traditional medicinal plant use, including both key and non-key informants. Data were collected through semi-structured interviews, observation, plant identification using the Picture This application and the Plants of the World Online (POWO) database, as well as documentation. The data were analysed descriptively. The findings revealed 51 medicinal plant species belonging to 29 families. The leaf was the most frequently used plant part (58%), while the most common processing method was pounding (26%).

Conservation efforts were carried out through cultivation in home gardens (40%), planting in fields or farms (40%), and the use of wild plants from surrounding environments (20%). The results of this study are expected to provide valuable information for the development of future sustainable research.
Keyword: etnobotany; conservation; traditional; medicine plant.

1. Introduction

Indonesia is an archipelagic country with a tropical climate located along the equator, making it one of the regions with high biodiversity and abundant natural resources. One aspect of this biodiversity is the diversity of medicinal plants. More than 20,000 medicinal plant species have been identified; however, only about 1,000 species have been documented, and approximately 300 species have been utilised in traditional medicine [1]. The use of plants in medicine represents one of the most significant forms of biological resource utilisation, encompassing both cultivated species and those growing wild in nature. One of the major applications of plants is their use in traditional medicine [2]. The reliance on medicinal plants is expected to continue, thereby necessitating the conservation of these species through preservation efforts to prevent habitat degradation and species extinction. For example, candlenut (*Aleurites moluccanus*), which is traditionally used to treat mouth ulcers, along with many other species employed in various forms of traditional medicine, requires sustainable management and conservation [3].

The utilisation of plants as medicine has long been an integral part of tradition, where various plant species naturally growing in the surrounding environment, including home gardens, have been employed in healing practices. According to local beliefs, these plants are believed to possess medicinal properties that can help treat a wide range of ailments [4]. In the modern era, however, the use of plants as medicine has become increasingly rare, leading to a gradual decline in community knowledge regarding the identification and application of beneficial medicinal plants. Therefore, it is essential to revitalise and further develop traditional knowledge related to the utilisation of medicinal plants found within local environments [5].

One of the communities that still preserves the tradition of utilizing natural resources as medicine is the community of Blang Pegayon Subdistrict, Gayo Lues Regency. Blang Pegayon Subdistrict consists of 12 villages: Gantung Geluni, Kutebukit, Bener Baru, Blang Bengkik, Kong, Ume Lah, Cinta Maju, Porang Ayu, Tetingi, Anak Reje, Rak Lintang, and Akang Siwah [5]. Previous studies have documented similar practices in other areas of Gayo Lues Regency. For instance, Nindi et al. (2023) reported 44 species of medicinal plants traditionally used in Puteri Betung Subdistrict [6]. In Terangun Subdistrict, Nurmaini et al. (2023) identified 88 species of medicinal plants employed for traditional healing [7], while Kasrin et al. (2020) recorded 72 medicinal plant species utilised by local communities in the tropical rainforests of Kedah, Gayo Lues Regency [8]. These findings highlight the distinctiveness of various regions in Gayo Lues in their utilisation of medicinal plants. However, many of these practices remain undocumented, including those in Blang Pegayon Subdistrict.

Based on this potential, it is necessary to research community knowledge regarding the use of plants in traditional medicine. Such information is expected to enhance public awareness of medicinal plant utilisation and encourage community participation in conserving natural resources. Therefore, this study aims to identify plant species utilised as traditional medicines by the local community in Blang Pegayon Subdistrict, Gayo Lues Regency.

2. Research Method

a. Research Location and Time

The research was conducted in Blang Pegayon Subdistrict, Gayo Lues Regency, across six villages: Akang Siwah, Anak Reje, Tetingi, Bener Baru, Kong, and Blang Bengkik (Figure 1). The study was carried out from August 2024 to May 2025.

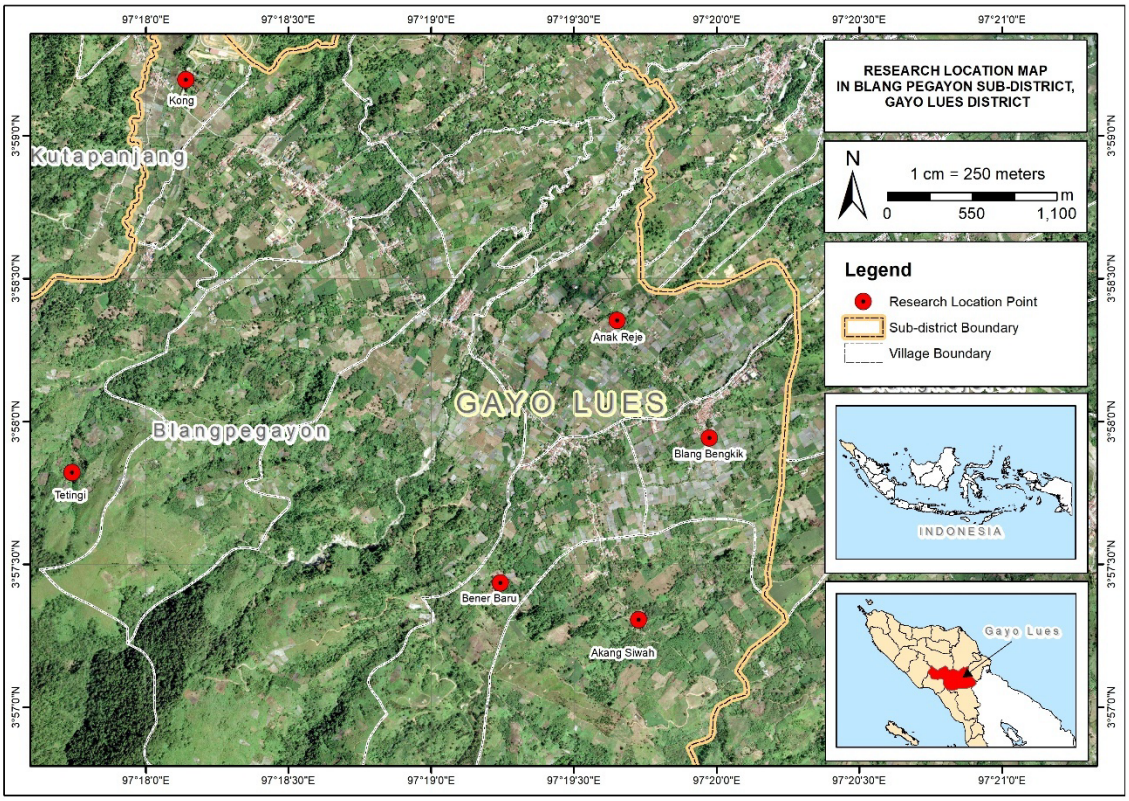

Figure 1. Research location map

b. Data Collection Techniques

Data collection was conducted through semi-structured interviews using an interview guide, as well as observational methods. Observations were conducted to document the plant species used, methods of preparation, and their medicinal properties. Plant identification was performed using the PictureThis application and the Plant of the World Online (POWO) website, in addition to photographic documentation.

Sampling was conducted using purposive sampling, based on the use of traditional medicinal plants in the area, the presence of key informants (traditional healers/shamans, and community elders), and non-key informants (individuals who had acquired knowledge of medicinal plants from key informants and had personally used them). The criteria for respondent selection included both male and female participants who possessed knowledge of medicinal plant utilisation and had experience using these plants to treat illnesses. A total of 48 respondents were selected from six villages: Akang Siwah, Anak Reje, Tetingi, Bener Baru, Kong, and Blang Bengkik.

3. Results and Discussion

a. Medicinal Plant Species Used by the Community in Blang Pegayon Subdistrict, Gayo Lues Regency

Based on the study results, 51 plant species belonging to 30 families were identified as being used as traditional medicine by the community in Blang Pegayon Subdistrict, Gayo Lues Regency, as presented in Table 1. It is known that Euphorbiaceae, Asteraceae, Fabaceae, and Zingiberaceae represent the families with the highest number of medicinal plant species, each contributing four species utilized by the local community. These four families are considered the most favoured by the community, which is assumed to be due to their familiarity with the species and the well-established reputation of their medicinal properties.

The utilisation of species from the Euphorbiaceae family is applied in the treatment of mouth ulcers. Commonly, *Aleurites moluccanus* (candlenut) is used for this purpose, particularly its seeds. The seeds are effective against mouth ulcers because they contain glycerides, linoleic acid, palmitic acid, stearic acid, myristic acid, fatty oils, proteins, vitamin B, and lipids [3]. One of the primary medicinal products derived from candlenut seeds is its oil, which is rich in bioactive compounds with anti-inflammatory and analgesic properties. Furthermore, candlenut oil has the potential to reduce cholesterol levels in the body. This effect is associated with its phytochemical content, which can inhibit the accumulation of harmful lipids in the bloodstream. Thus, the use of candlenut not only helps in alleviating inflammation but also contributes to cardiovascular health [9].

The utilisation of species from the Asteraceae family is applied in treating colds. The species commonly used for this condition is *Ageratum conyzoides* (goat weed), particularly its leaves. The leaves are traditionally employed in managing colds because they contain active compounds such as flavonoids, tannins, and alkaloids that play significant roles in their pharmacological activities. Additionally, extracts of *A. conyzoides* are known to inhibit the production of inflammatory mediators responsible for inflammation,

thereby serving as a natural alternative for treating inflammation-related diseases [10].

Asteraceae has been reported to possess remarkable popularity as a source of medicinal plants [17,18]. In the Kedah Rainforest tourism area, the Gayo community frequently utilises members of the Asteraceae family as herbal remedies. One species believed to have therapeutic properties is *A. conyzoides*, whose leaves are traditionally used to treat itching by being mashed and applied topically to the affected skin. In contrast, for gout treatment, the leaves are boiled, and the decoction is consumed orally. Furthermore, *G. procumbens* has been reported to exhibit antidiabetic activity, with its leaves commonly prepared by boiling and consuming the decoction [19].

The utilisation of species from the Fabaceae family is applied in the treatment of itching. The species commonly used is *Senna alata* (also known as ringworm bush). The leaves of *S. alata* exhibit antibacterial activity by inhibiting the action of topoisomerase enzymes and forming chelates with DNA. Furthermore, alkaloids in the plant inhibit bacterial cell wall synthesis, leading to bacterial cell lysis, which makes it effective in managing itching, swelling, and toothaches. The plant contains anthraquinones, which possess antimicrobial and anti-inflammatory properties, supporting its role in traditional medicine [11].

The utilisation of species from the Zingiberaceae family is applied in the treatment of gastric disorders. The species widely used is *Curcuma longa* (turmeric). Turmeric has long been used as a traditional remedy for gastric ailments. It contains bioactive compounds, including curcuminoids and essential oils. Curcuminoids include curcumin, desmethoxycurcumin, and bisdemethoxycurcumin, while the essential oils consist of sesquiterpene ketones, turmerone, tumeone, zingiberene, phellandrene, sabinene, borneol, and cineole [13].

Table 1. Plant Species Recorded in Blang Pegayon Subdistrict

No	Local Name	Scientific Name	Family	Plant Organ	Uses
1	Ubi kayu	*Manihot utilissima*	Euphorbiaceae	Root	hypertension
2	Kemiri	*Aleurites moluccana*	Euphorbiaceae	Seed	mouth ulcers, sprains, swelling
3	Patikan kabo	*Euphorbia hirta*	Euphorbiaceae	Leaf	gout, cholesterol
4	Jarak pagar	*Jatropha curcas*	Euphorbiaceae	Leaf, sap	hypotension, mouth ulcers, gout, cholesterol
5	Bandotan	*Ageratum conyzoides*	Asteraceae	Leaf	common cold
6	Sambung nyawa	*Gynura procumbens*	Asteraceae	Leaf	hypertension
7	Jatang	*Adenostemma lavenia*	Asteraceae	Leaf	itching
8	Sembung	*Blumea balsamifera*	Asteraceae	Leaf	stomach disorder
9	Ketepeng cina	*Cassia alata*	Fabaceae	Leaf	itching
10	Petai	*Leucaena leucocephala*	Fabaceae	Leaf	swelling
11	Kacang panjang	*Vigna unguiculata*	Fabaceae	Leaf	toothache
12	Johar	*Senna Siamea*	Fabaceae	Leaf	itching
13	Temu putih	*Curcuma zedoaria*	Zingiberaceae	Rhizome	stomach disorder
14	Kunyit	*Curcuma domestica*	Zingiberaceae	Rhizome	stomach disorder
15	Kecombrang	*Etlingera elatior*	Zingiberaceae	Rhizome	sprains, swelling
16	Lempuyang	*Zingiber zerumbet*	Zingiberaceae	Seed, fruit	sprains, swelling
17	Takokan	*Solanum torvum*	Solanaceae	Fruit	headache
18	Ciplukan	*Physalis angulata*	Solanaceae	Leaf	hypertension
19	Tomat	*Solanum lycopersicum*	Solanaceae	Leaf	earache
20	Labu kuning	*Cucurbita moschata*	Cucurbitaceae	Fruit	gastritis
21	Kundur	*Benincasa hispida*	Cucurbitaceae	Fruit	female fertility
22	Mentimun	*Cucumis sativus*	Cucucrbitaceae	Fruit	hypertension
23	Pulutan	*Urena lobata*	Malvaceae	Flower	measles
24	Sidaguri	*Sida rhombifolia*	Malvaceae	Flower	measles
25	Rumput Israel	*Asystasia gangetica*	Acanthaceae	Leaf	asthma
26	Gandarusa	*Justicia gendarussa*	Acanthaceae	Leaf	measles, fever
27	Seledri	*Apium graveolens*	Apiaceae	Leaf	hypertension
28	Pegagan	*Centella asiatica*	Apiaceae	Leaf	gout, cholesterol, cough
29	Kemangi	*Ocimum basilicum*	Lamiaceae	Leaf	headache
30	Bangun-bangun	*Coleus amboinicus*	Lamiaceae	Leaf	diarrhea
31	Meniran	*Phyllanthus niruri*	Phyllanthaceae	Leaf	gout, cholesterol
32	Pelopo	*Bischofia javanica Blume*	Phyllanthaceae	Stem	stomach disorder
33	Jeruk nipis	*Citrus aurantifolia*	Rutaceae	Fruit	cough
34	Jeruk Purut	*Citrus hystrix*	Rutaceae	Fruit	paralysis
35	Alang-alang	*Imperata clyndrica*	Poaceae	Root	hypertension
36	Pinang	*Areca catechu*	Arecaceae	Fruit, frond	mouth ulcers, wounds, itching
37	Pisang	*Musa parasidiaca*	Musaceae	Fruit, frond	gastritis, fever, stomachache
38	Sirih	*Piper betle*	Piperaceae	Leaf	leg pain, itching
39	Paku sayur	*Diplazium esculentum*	Aspleniaceae	Leaf, stem	diarrhea
40	Pepaya	*Carica papaya*	Caricaceae	Leaf	diabetes, appetite stimulant
41	Cocor bebek	*Kalanchoe ceratophylla*	Crassulaceae	Leaf	fever, measles
42	Tahi ayam	*Lantana camara*	Verbenaceae	Leaf	worm infection
43	Jambu biji	*Psidium guajava*	Myrtaceae	Leaf	stomachache
44	Bidara	*Ziziphus mauritiana*	Rhamnaceae	Leaf	itching
45	Bawang merah	*Allium cepa*	Amaryllidaceae	Tuber	wounds, infertility, paralysis

No	Local Name	Scientific Name	Family	Plant Organ	Uses
46	Pala	*Myristica fragrans*	Myristicaceae	Seed	sprains, swelling, paralysis
47	Sirsak	*Annona muricata*	Annonaceae	Leaf	cholesterol
48	Sawo	*Manilkara zapota*	Sapotaceae	Fruit	vomiting
49	Nanas	*Ananas comosus*	Bromeliaceae	Fruit	kidney stones
50	Jeringau	*Acorus calamus*	Acoraceae	Leaf	female fertility
51	Rumbai cina	*Loropetalum chinense*	Hamamelidaceae	Leaf	stomachache

b. Plant Organs Used as Medicine

The utilisation of plant species as medicine by the community in Blang Pegayon Sub-district, Gayo Lues Regency, involves the use of various plant organs, as presented in Figure 2. Based on Figure 2, it is evident that the most frequently used plant organ is the leaf (58%), followed by the fruit (15%); stems, seeds, and rhizomes (5% each); flowers (4%); and roots, leaf sheaths, tubers, and sap (2% each).

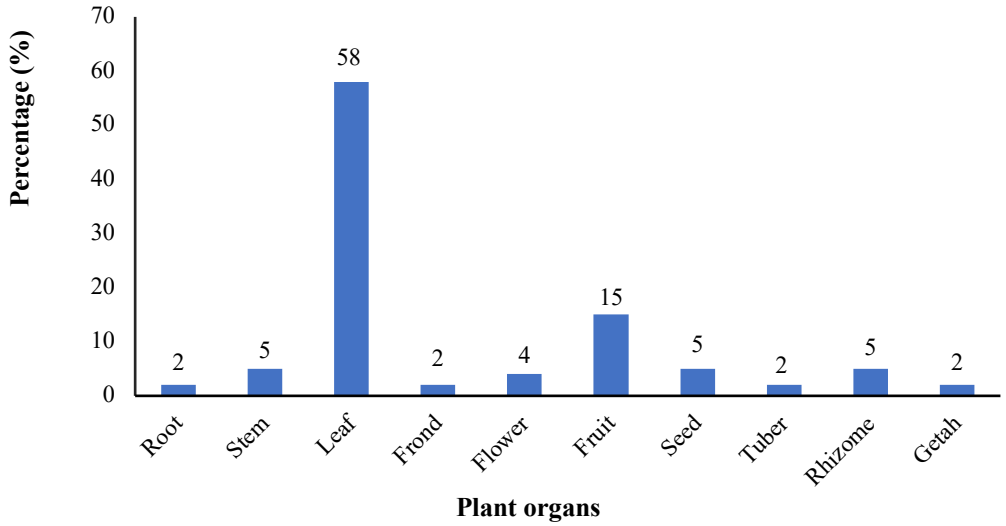

Figure 2. Plant Organs Used as Medicine by the Community in Blang Pegayon Sub-district, Gayo Lues Regency

Leaves are commonly used in species such as *J. curcas*, *E. hirta*, *P. angulata*, *P. betle*, *G. procumbens*, *C. asiatica*, *A. graveolens*, *C. papaya*, *O. basilicum*, and others. Leaves are among the most frequently utilised plant parts in traditional medicine. This is due to their soft texture, which results from their relatively high water content (approximately 70–80%). Moreover, leaves serve

as the primary site of photosynthesis, enabling them to accumulate organic compounds that play an essential role in the treatment of various diseases [10].

Another plant organ widely used is the fruit, such as pumpkin (*Cucurbita moschata*), wax gourd (*Benincasa hispida*), and sapodilla (*Manilkara zapota*). Fruits function as storage organs for nutritional reserves and contain essential nutrients such as provitamins, carbohydrates, and proteins required by the human body [12].

Rhizomes are also extensively utilised, as seen in plants such as *C. zedoaria*, *C. longa*, and *Z. zerumbet*. Rhizomes are modified stems that grow horizontally beneath the soil surface and are capable of producing new shoots and roots. They are rich in essential oils and alkaloids, which are frequently used in traditional remedies. Enlarged rhizomes also function as storage organs, typically accumulating starch, and are thus also classified as tubers. Examples include turmeric (*C. longa*), *C. zedoaria*, *Z. zerumbet*, and torch ginger (*E. elatior*). Rhizomes contain various bioactive compounds, including flavonoids, phenols, terpenoids, and essential oils, which produce secondary metabolites. These compounds are known for their ability to inhibit or eliminate pathogens that may harm the human body [13]. *E. elatior* fruit has been reported to possess potential antioxidant and antibacterial compounds [23].

Other plant organs used include stems, as in *Pelopo* species; seeds, such as those of nutmeg (*Myristica fragrans*), candlenut (*Aleurites moluccanus*), and areca nut (*Areca catechu*); and flowers, as in *Urena lobata* and *Sida rhombifolia*. Less frequently utilised organs include roots, as in *Imperata cylindrica*; leaf sheaths, as in banana (*Musa* spp.); tubers, as in shallot (*Allium cepa var. aggregatum*); and sap, as in *Jatropha curcas*. Roots are essential plant organs that function primarily to absorb nutrients and minerals from the soil.

c. Methods of Processing Medicinal Plants

The processing of plant species utilised as medicine by the community in Blang Pegayon Sub-district, Gayo Lues Regency, involves various plant organs that are prepared into medicinal formulations. The percentage

distribution of traditional medicine processing methods is presented in Figure 3. Based on Figure 3, it is shown that the local community employs ten processing techniques in the preparation of traditional remedies, namely pounding, chewing, squeezing, boiling, grinding, grating, bathing (herbal bathing), juicing, pressing, and dripping. The most frequently applied method is pounding (26%), followed by boiling (24%), squeezing (21%), grating and bathing (7%), chewing (6%), grinding and pressing (3%), and juicing and dripping (2%).

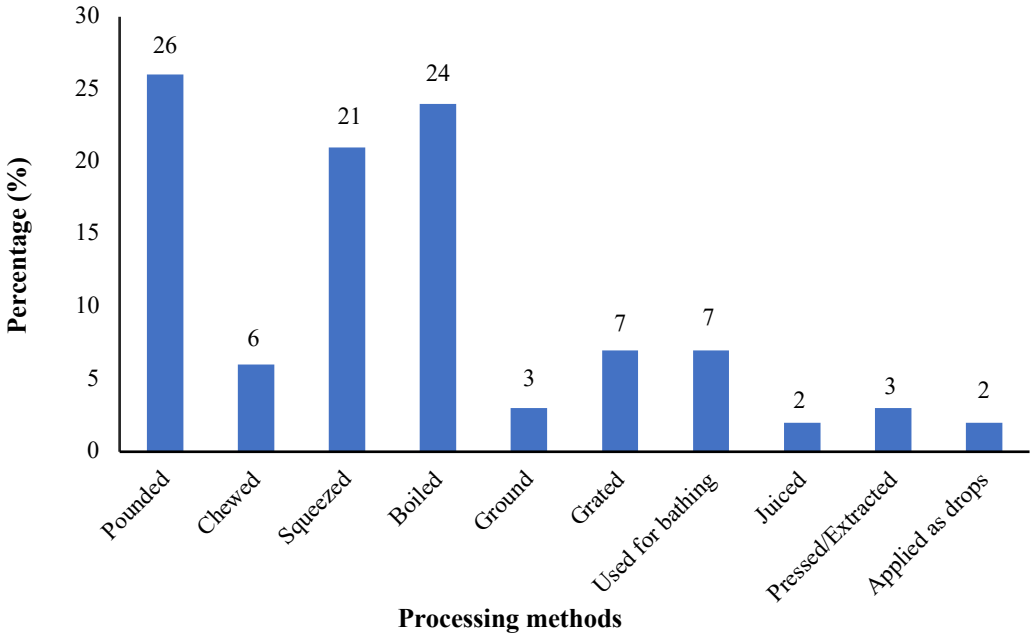

Figure 3. Processing Methods of Medicinal Plants Used by the Community in Blang Pegayon Sub-district, Gayo Lues Regency

The most commonly employed processing method is pounding. This technique is used to crush and soften the plant parts while preserving their natural therapeutic properties. Typically, the pounded material is applied topically, attached to the affected area, or consumed orally. For conditions such as wounds, bruises, swelling, and itching, the preparation is typically applied directly to the affected area of the body. However, when consumed orally, it is commonly used to treat ailments such as stomach disorders.

Another frequently practised method is boiling, which is often applied in the treatment of gastritis, stomach disorders, and hypertension. Boiling

medicinal plants not only reduces their bitter and astringent taste compared to direct consumption but also ensures greater hygienic quality by eliminating pathogenic microbes. Furthermore, the decoction process aids in the release of bioactive compounds, thereby enhancing the therapeutic effect and providing faster relief when administered [14].

d. Conservation of Medicinal Plants Utilised by the Community in Blang Pegayon Sub-district, Gayo Lues Regency

Based on the research findings, the conservation practices of medicinal plants utilised by the community in Blang Pegayon Sub-district, Gayo Lues Regency, are presented in Table 2. As shown in Table 2, the community predominantly conserves medicinal plants through cultivation in home gardens and planting in fields or farms. This indicates that medicinal plants are still widely used in daily life, and their sustainability is maintained through approaches that are easily accessible.

Table 2. Conservation of Medicinal Plants Utilised by the Community in the Sub-district

No	Conservation of medicinal plants	Percentage (%)
1	Cultivation in the yard of the house	40%
2	Planting in a field or garden	40%
3	Others (Wildlife)	20%

The community in Blang Pegayon Sub-district, Gayo Lues Regency, conserves medicinal plants through cultivation around home gardens, with a proportion of 40%. Planting medicinal herbs in home gardens not only serves as a source of traditional remedies but can also be aesthetically arranged to enhance the beauty of the yard. In this way, the home environment appears more attractive while simultaneously providing residents with easy access to natural medicinal resources for maintaining health [15]. The medicinal plants selected are generally species useful for first aid or treating minor health disorders, such as reducing fever and alleviating cough. The presence of medicinal plants around the home is significant for families with limited access to medical facilities such as clinics, community health centers, or hospitals [16].

The utilisation of plants as medicine is highly important, as cases of drug resistance have become increasingly common, thereby necessitating further exploration of natural resources as potential sources of pharmaceuticals. Euphorbiaceae, Piperaceae, and Phyllanthaceae have been reported to contain secondary metabolites with medicinal properties [20]. Several species, such as *A. conyzoides*, are categorised as invasive, highlighting the need for conservation measures to safeguard the surrounding species diversity [21]. Therefore, while the ecological potential of these plants should not be overlooked, conservation efforts must also be undertaken to protect species with promising medicinal value from extinction in the wild due to overexploitation.

4. Conclusion

A total of 51 plant species belonging to 29 families were identified as being used as medicinal resources by the community in Blang Pegayon Subdistrict, Gayo Lues Regency. The plant organ most frequently utilised was the leaf (58%). The most common method of preparation was pounding (26%). Conservation of medicinal plants was carried out through cultivation in home gardens (40%), planting in fields or farms (40%), and utilisation of wild plants from the surrounding environment (20%).

5. Acknowledgments

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