



Ethnomedicine of the Batak Community in Gelam Sei Serimah Village, Serdang Bedagai District, North Sumatra, Indonesia

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Abstract

Indonesia is recognized as one of the world's biodiversity hotspots, where many plant species have long been utilized in traditional medicine. Ethnomedicine represents an important component of local knowledge systems that are transmitted orally across generations. However, documentation of medicinal plant use among the Batak community in Gelam Sei Serimah Village, Serdang Bedagai District, North Sumatra, remains limited. This study aimed to (1) identify medicinal plant species utilized by the Batak community and document their modes of preparation and use, and (2) evaluate their relative cultural importance using quantitative ethnobotanical indices, namely Use Value (UV) and Index of Cultural Significance (ICS). Field research was conducted through semi-structured interviews and participatory observation involving 20 respondents, including key informants and general community members. Plant specimens were collected and taxonomically verified. Data were analyzed descriptively and quantitatively. A total of 41 medicinal plant species belonging to 39 genera and 26 families were recorded, used to treat 27 types of ailments. The families with the highest number of species were *Zingiberaceae*, *Asteraceae*, and *Lamiaceae*. Commonly treated ailments included stomachache, fever, wounds, and skin itching. UV values ranged from 0.27 to 3.62, while ICS values ranged from 4 to 90, indicating varying levels of cultural importance among species. Several species show high potential for further pharmacological investigation and possible commercial development. Comprehensive studies on their secondary metabolites and bioactivity are recommended to support conservation and sustainable utilization strategies.

Keywords: Batak community, Ethnomedicine, Index of Cultural Significance (ICS), Traditional knowledge, Use Value (UV)

1. Introduction

Indonesia has a high level of biodiversity, and numerous plant species have been utilized as medicinal plants (Kartawinata, 2004). Ethnic communities maintain local knowledge systems concerning the use of plants for food, housing materials, medicine, as well as ritual and social purposes. Traditional medicine in Indonesia constitutes an important component of the national cultural heritage. Its application in community health practices aims to promote healing and improve public health standards. This knowledge has been transmitted across generations in a continuous manner and remains inseparable from daily life, although some practices have not yet been fully validated through scientific testing (Silalahi, 2016). Knowledge regarding the utilization of medicinal plants represents a cultural legacy derived from accumulated experience and local wisdom passed down from one generation to the next. This long-standing tradition has contributed to the development of various high-quality herbal formulations. Medicinal plants are plant species recognized for their therapeutic properties in maintaining health and treating diseases. They play an active role in preserving physical condition, enhancing stamina, and supporting the healing process

(Guimbo, 2011). The use of medicinal plants is closely associated with traditional medicine, as most applications are still based on empirical experience rather than controlled clinical laboratory testing. Several factors underlie the continued use of traditional medicine, including the high cost of modern pharmaceuticals, the perception that traditional remedies have relatively fewer side effects, and the fact that many chemical compounds used in modern medicine originate from natural sources (Silalahi et al., 2019).

Ethnomedicine, a branch of ethnobotany, examines the use of herbal plants for therapeutic purposes that have been practiced for generations within communities (Sahada et al., 2022). It emphasizes the exploration and documentation of local knowledge within specific ethnic groups regarding the use of natural resources as medicine. Although Indonesia's cultural diversity contributes to the richness of traditional knowledge, access to such knowledge remains limited. Traditional knowledge is generally transmitted orally and is often highly specific, frequently preserved by customary leaders, village heads, elders, or traditional healers within particular communities (Praptantya, 2020).

The Batak people, one of the largest ethnic groups in North Sumatra, particularly the Toba Batak, have long utilized plants for medicinal purposes. These traditional remedies are obtained directly from nature and prepared in simple forms based on local knowledge and experience (Basuki et al., 2023). This traditional knowledge was inherited from the ancestors of the Toba Batak, who were familiar with traditional healing practices long before the introduction of modern medical systems. Studies related to medicinal plants in this region remain limited and have only covered certain villages or sub-districts within specific regencies.

Documentation of local knowledge regarding plant utilization can be conducted through an ethnobotanical approach. Data obtained from ethnobotanical research may be analyzed qualitatively and quantitatively. Quantitative analyses commonly applied in ethnobotanical studies include the Index of Cultural Significance and the Use Value, which serve to determine the relative importance of plant species within community life and to assess their potential for development and conservation (Ong & Kim, 2014). The quantitative values generated from such studies reflect the relative significance of each species based on community perception and the intensity of its utilization (Sujarwo & Cuneva, 2016).

Gelam Sei Serimah Village, located in Bandar Khalipah Subdistrict, is one of the villages where the community continues to utilize plants as traditional medicine and where medicinal plant resources remain abundant; however, this practice has not yet been scientifically documented. Therefore, to address the need for comprehensive data on medicinal plants and traditional remedies used by the Toba Batak ethnic group in North Sumatra, it is necessary to conduct research on the utilization of medicinal plants by the community of Gelam Sei Serimah Village, Bandar Khalipah Subdistrict, Serdang Bedagai Regency. This study aims to: (1) identify plant species with medicinal properties and document their modes of use by the local community; and (2) analyze the Use Value and Index of Cultural Significance of these medicinal plants in order to determine their level of importance within the traditional medical system of the community.

2. Materials and Methods

2.1. Research Location and Respondents

This study was conducted in Gelam Sei Serimah Village, Bandar Khalipah Subdistrict, Serdang Bedagai Regency, North Sumatra, located at 03° 39' 65" N and 99° 15' 33" E (Figure 1). The village covers an area of 2,064 hectares. The population consists of Batak, Malay, and Javanese ethnic groups. The primary livelihoods of the local community are farming and fishing. A total of 20 respondents participated in this study, comprising 4 key informants and 16 general respondents, aged between 30 and 82 years. The key informants included the village head (1 person), the customary leader (1 person), and traditional healers (2 persons). General respondents were selected using purposive sampling and snowball sampling techniques. The criteria for selecting respondents were local community members who still utilize medicinal plants, are married, and are willing to be interviewed. Data were collected through semi-structured interviews and participatory observation, covering the types of medicinal plants used, plant parts utilized,

methods of preparation and use, and sources of acquisition. Field exploration was also conducted in home gardens and forest areas to collect voucher specimens of the medicinal plants used. Scientific name verification was conducted online through the website [www.The World Flora Online \(WFO\) Plantlist](http://www.TheWorldFloraOnline(WFO)Plantlist).



Figure 1. Research location of Gelam Sei Serimah Village, Bandar Khalipah Subdistrict, Serdang Bedagai Regency, North Sumatra

2.2. Analisis Data

Data were analyzed using both qualitative and quantitative approaches. Qualitative analysis was conducted descriptively to illustrate the local knowledge of the Batak ethnic group in utilizing medicinal plants, including plant species, plant parts used, methods of preparation, and their purposes in traditional medicine. Quantitative analysis was performed by calculating the Use Value (UV) and the Index of Cultural Significance (ICS). The Use Value (UV) for each species was calculated using the following formula:

$$UV = \sum U_i / N$$

Explanation: U_i : number of uses mentioned by each informant
 N : total number of informants

The Index of Cultural Significance (ICS) was calculated using the following formula:

$$ICS = \sum (q_i e_i) n_i$$

Explanation: q : quality value
 i : intensity value
 e : exclusivity value
 n : number of use categories

3. Results

The Batak community in Gelam Sei Serimah Village utilizes approximately 41 species of medicinal plants belonging to 39 genera and 26 families. The data can be seen in Table 1 and Figure 2.

Table 1. Medicinal plants utilized by the Batak ethnic group in Gelam Sei Serimah Village, North Sumatra.

Family	Latin Name	Local Name	Used Parts	Benefits	ICS	UV
Amaryllidaceae	<i>Crinum asiaticum</i>	Ompu-ompu	Tubers	Antibacteria, sprain	12	1.51
Araceae	<i>Colocasia sp.</i>	Suhat	Stem	Itching	90	0.38
Arecaceae	<i>Areca catechu</i>	Pinang	Fruit	Wound, sprain, Itching	27	1.97
	<i>Cocos nucifera</i>	Kelapa	Fruit	Fever, heatiness	84	2.81
Asteraceae	<i>Ageratumconyzoides</i>	Gorat-gorat	Leaves	Wound, boils	45	1.34
	<i>Bidens chinensis</i>	Lesi	Leaves	Anti inflammation, cough, fever	21	0.85
	<i>Blumea chinensis</i>	Sembung	Leaves	sore throat, fever	44	1.27
Caricaceae	<i>Carica papaya</i>	Botik	Sap, Leaves	Itching, stomachache	63	2.01
Campanulaceae	<i>Isotoma longiflora</i>	Daun tetes mata	Leaves	Eye infection	13	0.65
Crassulaceae	<i>Kalanchoe pinnata</i>	Cocor bebek	Leaves sap	Boils	46	1.15
Cucurbitaceae	<i>Cucumis sativus</i>	Timun	Fruit	Hypertension	43	1.25
	<i>Sechium edule</i> (Jacq.) Sw.	Jipang	Fruit	Hypertension	39	1.17
Euphorbiaceae	<i>Manihot esculenta</i>	Gadong	Leaves	Itching	75	1.56
Fabaceae	<i>Phyllanthus niruri</i>	Pedem	Leaves	Treat kidney stones	41	1.56
	<i>Leucaena leucocephala</i>	Pote	Leaves, Fruit	Stomachache	4	0.43
	<i>Ocimum americanum</i>	Kemangi	Leaves	Stomachache, anti inflammation	39	1.20
Lamiaceae	<i>Coleus barbatus</i>	Bangun-bangun	Leaves	Lactation	66	1.43
	<i>Orthosiphon stamineus</i>	Kumis kucing	Leaves	Treat kidney stones	18	1.55
Lauraceae	<i>Persea americana</i>	Pokat	Leaves	Hypertension, Diabetes	13	1.45
Liliaceae	<i>Allium sativum</i>	Bawang putih	Tubers	Wound, sprain	61	2.13
	<i>Allium cepa</i>	Bawang merah	Tubers	Sprain, body warmers	69	2.03
Melastomataceae	<i>Clidemia hirta</i>	Sampula	Leaves	Wound, itching	17	1.32
Moraceae	<i>Artocarpus heterophyllus</i>	Nangka	Leaves	Stomachache	27	1.05
	<i>Artocarpus altilis</i>	Sukun	Leaves	Diabetes	57	1.81
Myrtaceae	<i>Eugenia aromatic</i>	Cengkeh	Leaves, fruit	Rheumatic	39	0.54
	<i>Psidium guajava</i>	Antajau	Leaves	Stomachache	65	2.72
Musaceae	<i>Musa acuminata</i> var. red dacca	Pisang merah	Fruit	Diabetes	36	1.27
Pandanaceae	<i>Pandanus amaryllifolius</i>	Pandan	Leaves	Hypertension	27	1.43
Poaceae	<i>Cymbopogon citratus</i>	Sereh	Stem	Lower cholesterol	66	1.07
Polypodiaceae	<i>Platyserium coronarium</i>	Tanduk rusa	Leaves	Asthma	8	0.27
Plassifloraceae	<i>Passiflora edulis</i>	Markisa	Leaves	Malaria	13	0.32
Rubiaceae	<i>Uncaria gambir</i>	Gambir	Sap	Diabetes, stomach ulcer	24	0.46
Rutaceae	<i>Citrus hystrix</i>	Pangir	Fruit, Leaves	Fever, asthma	45	1.65
	<i>Zanthoxylum acanthopodium</i>	Andaliman	Fruit	Rheumatic	30	1.15
Sapindaceae	<i>Nephelium lappaceum</i>	Rambutan	Leaves	Diabetes	18	0.52
Solanaceae	<i>Physalis angulata</i>	Hultop-hultop	Fruit	Hypertension	9	1.26
	<i>Solanum torvum</i>	Rimbang	Fruit	Maintain eye health	18	1.22
Zingiberaceae	<i>Alpinia galangal</i>	Rias	Rhizom	Asthma	42	1.89
	<i>Curcuma zanthorrhiza</i>	Temulawak	Rhizom	Liver disorder, maintain stamina, appetite stimulant	84	3.62
	<i>Kaempferia galangal</i>	Kencur	Rhizom	Stomach ulcer, Rheumatic, Stomachache	68	2.39
	<i>Zingiber officinale</i>	Jahe	Rhizom	Body warmers, asthma	78	2.98

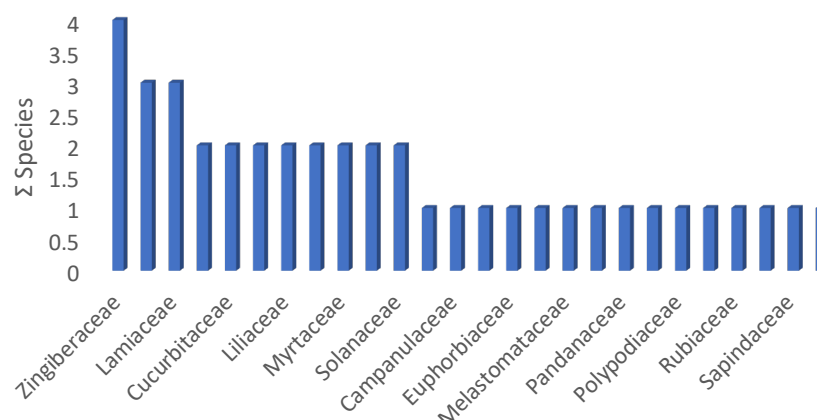


Figure 2 Families of medicinal plants with the highest number of species utilized by the Batak ethnic group in Gelam Sei Serimah Village, North Sumatra.

4. Discussion

The families *Zingiberaceae*, *Asteraceae*, and *Lamiaceae* represented the highest number of species, comprising four, three, and three species, respectively (Figure 2). The number of plant species utilized as medicinal plants in this study differs from those previously reported by Silalahi et al. (2018) among the Batak Phakpak subethnic group in West Phakpak Regency and by Purba et al. (2016) among the Batak Karo subethnic group in Tapanuli Tengah Regency. The utilization of medicinal plants by local communities is influenced by various factors, including plant availability, language, social relationships, cultural history, level of local knowledge, intended use, as well as local beliefs and traditions (Leonti & Casu, 2013).

Most of the medicinal plants used by the Batak ethnic group in the study area are widely recognized species, such as *Zingiber officinale*, *Curcuma zanthorrhiza*, *Curcuma longa*, and *Psidium guajava*. In this study, certain plant species were used as ritual complements in the healing process. These species are believed to address all types of illnesses and function primarily as ritual media. For example, *Citrus hystrix* is considered an essential plant in healing rituals among the Batak community, particularly in treatments believed to be associated with supernatural causes (Silalahi et al., 2015).

Leaves were the most frequently utilized plant part, recorded in 27 species, followed by tubers, stems, sap, and fruits (Table 1). Leaves are generally the most accessible plant organs and are therefore the most commonly used, particularly in tropical regions. In contrast, tubers and flowers were the least utilized plant parts. This pattern is associated with the fact that most plant species produce flowers only during specific periods (Silalahi et al., 2018).

The medicinal plants documented in this study were used to treat 25 types of ailments. Stomachache, fever, wounds, and itching were the ailments treated with the highest number of plant species. Local communities tend to use bitter-tasting plants to treat stomachache. Additionally, plants with a bitter taste and cooling effect are commonly used to reduce fever. Plants utilized for fever treatment generally exhibit antimicrobial activity, such as *Bidens chinensis* and *Blumea chinensis*.

The Use Value (UV) of medicinal plants utilized by the Batak ethnic group ranged from 0.27 to 3.62 (Table 1). The highest UV was recorded for *Cocos nucifera* (2.81), followed by *Psidium guajava* (2.72) and *Allium sativum* (2.13). Species with high UV values are those with multiple therapeutic uses and are recognized by the majority of respondents. These three species are also easily found in the surrounding environment and commonly used as culinary spices (Silalahi et al., 2018). In contrast, the lowest UV values were recorded for *Platyserium coronarium* (0.27), *Passiflora edulis* (0.32), and *Colocasia* sp. (0.38). Species with low UV values generally have limited medicinal applications or are less recognized by respondents. These findings differ from those reported by Silalahi et al. (2018) among the Batak Phakpak community in Surung Mersada Village, where *Psidium guajava* was reported to have a low UV value. Such

differences may be attributed to variations in geographical conditions, availability of natural resources, and local knowledge systems.

The Index of Cultural Significance (ICS) of medicinal plants utilized by the Batak ethnic group ranged from 4 to 90 (Table 1). The highest ICS values were recorded for *Colocasiasp.* (90), *Cocos nucifera* (84), and *Curcuma zanthorrhiza* (84). These high values indicate that these species hold substantial cultural importance within the Batak community of Gelam Sei Serimah Village. The elevated ICS values suggest that these plants are widely recognized by informants, possess high-quality medicinal benefits, are intensively used, and may have a high degree of exclusivity in certain treatments. In general, the higher the ICS value, the greater the role of a species within the traditional medical system and daily life of the local community (Sujarwo & Caneva, 2016). Conversely, the lowest ICS values were recorded for *Leucaena leucocephala* (4), *Platycerium coronarium* (8), and *Physalis angulata* (9). The low ICS values of these species indicate their relatively limited role in the traditional medicinal system. This may be due to fewer use categories, low intensity of use, or the presence of other more dominant species frequently used for the same ailments.

5. Conclusions

The Batak ethnic group in Gelam Sei Serimah Village utilizes approximately 41 species of medicinal plants belonging to 39 genera and 26 families to treat 27 types of ailments. The Use Value (UV) of the medicinal plants ranges from 0.27 to 3.62, while the Index of Cultural Significance (ICS) ranges from 4 to 90. Several of these plant species show potential for commercial development; therefore, further studies on their secondary metabolites and bioassay activities are required.

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