

ETHNOLINGUISTIC STUDY OF THE MEDICINAL PLANT LEXICON IN GAYO TRIBES ACEH PROVINCE

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Abstract

Gayo tribes inhabit central aceh, gayo lues, bener meriah, and surrounding regions, possessing a distinct language and traditions, including extensive knowledge of medicinal plants. Gayo language contains specialized lexicon related to flora (particularly medicinal plants), reflecting local wisdom and the intrinsic connection between language and environment. Therefore the purpose of the study is to inventory gayo language terms for medicinal plants, including their meanings, classifications, and applications in traditional medicine. The study employed qualitative ethnolinguistic approach combines among descriptive linguistics with ethnographic fieldwork. The sample involved 30 respondents from various of ages, profession, education levels and sex. The study focuses on semantic analysis, cultural context, and language-culture interrelations and data analysis used Fieldworks Language Explorer (Flex). The study discovered four major themes emerged from the thematic data analysis: (1) Discovery of 83 undocumented gayo plant names, (2) compound words dominate, (3) rituals context and (4) therapeutic used.

Keywords: ethnolinguistic, lexicon, medicinal plants, gayo, tribes

1. Introduction

Medicinal plants have historically been essential in human cultures, acting as both key health sources and cultural emblems through the ages (Halberstein, 2005). In numerous indigenous communities, knowledge of medicinal plants is maintained and shared orally, showcasing a deep connection among language, culture, and the natural world (Rexhepi & Bajrami, 2025). Ethnolinguistic studies offer an essential viewpoint in recording this connection, as plant names are not just lexical entities but also embody cultural significance, taxonomic categorizations, and traditional medicinal practices rooted in indigenous knowledge frameworks (Kasanova et al., 2024)

The province of Aceh contains between 2,000 and 2,500 species of medicinal plants, the majority of which thrive naturally in the forests (Susilowati et al., 2021). Aceh region with forest regions spanning approximately 4,130,000 hectares, or 74.56% of its total land area, is thought to contain numerous medicinal plant species that local communities have yet to investigate (Samek et al., 2022). Gayo tribes has historically engaged with their environment and employed different plant species for medicinal uses grounded in their indigenous understanding (Saudah et al., 2022). Nonetheless, the safeguarding of traditional knowledge

concerning medicinal plant usage has not been extensively investigated by the community to recognize the plants utilized by the Gayo tribes (Silalahi et al., 2015). Consequently, conventional healing methods and indigenous knowledge of natural resources and their applications continue to be restricted (Lama, 2021)

This research is significant as it seeks to catalog the vocabulary of plant names used in traditional medicine by gayo tribes in Aceh. Even with this extensive tradition, the safeguarding and sharing of local wisdom about medicinal plants in the gayo tribe encounter obstacles. swift modernization, cultural changes, and scarce documentation have led to a decrease in the utilization and acknowledgment of conventional healing methods. As a result, the vocabulary associated with medicinal plant encompassing not just linguistic importance but also ecological and cultural values faces the threat of being overlooked or diminished over time (Akmal & Lubis, 2022)

2. Literature Review

2.1. Gayo Tribes in Aceh

Gayo tribes are one of the oldest indigenous groups in Aceh, part of the Proto-Malay migration, and settled in the central highlands (Aceh Tengah, Bener Meriah, Gayo Lues). Gayo tribe is an ancient highland community in Aceh, descending from early Malay migrations. They transitioned from animism to Islam, contributed soldiers to the Aceh Sultanate, resisted Dutch colonialism, and are today known for their rich cultural traditions and world-famous coffee.

Gayo tribe's is one of the indigenous tribes in the central region of Aceh Province that inhabits the Gayo highlands, especially in Central Aceh, Bener Meriah, and Gayo Lues Regencies (Saputra et al., 2021). Gayo tribe's live side by side with nature that is rich in biodiversity, ranging from herbal plants, shrubs, to trees that thrive in the tropical rainforest environment of the mountains (Wibowo & Lubis, 2022).

The life of the gayo tribes who have long interacted closely with nature, has given birth to forms of local knowledge, including in terms of the use of plants as traditional medicine (Rahmawati et al., 2022) Gayo tribe's ethnobotanical lexicon records local ecological knowledge rooted in daily life practices, including traditional medicine practices. However, over time and the development of modernization and the dominance of chemical medicine, the existence and use of the Gayo community's traditional medicinal plant lexicon has decreased (Martina & Lubis, 2022)

The younger generation who grew up in the influence of global culture and the dominance of the national language tend to be no longer familiar with local terms related to medicinal plants. This indicates a symptom of linguistic extinction that is closely related to ecological damage and the decay of cultural knowledge (Tarigan & Lubis, 2022)

This phenomenon can be seen as part of a broader threat to the sustainability of local languages and the ecological knowledge of indigenous peoples. Language reflects not only social reality, but also ecological reality, where the lexicon is the main medium in recording human relationships with their environment. Therefore, an ethnolinguistics approach is used in this study to understand the relationship between language, culture, and the environment of the gayo tribe's

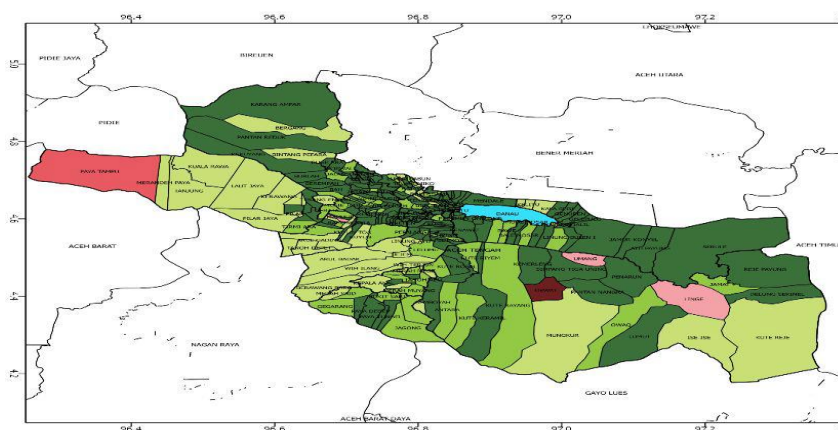


Figure 1. Map of Central Aceh District

The living of the gayo tribe's is inseparable from their ethnolinguistic lexicon of medicinal plants. This lexicon is not only a collection of plant names but also cultural system that reflects their ecological knowledge, healing practices, and worldview. Through it, the gayo tribe maintains a harmonious relationship with nature, pass down traditional medicine, and preserve their cultural identity. Traditional healers use this lexicon to prescribe treatments for illnesses, childbirth, spiritual cleansing, and maintaining health. Plants are categorized linguistically not only by their botanical traits but also by their therapeutic role (e.g., plants for fever, wounds, postpartum care, or spiritual protection) This knowledge is embedded in oral traditions, proverbs, and ritual chants, making the lexicon a bridge between language, culture, and medicine.

2.2. Ethnobotanical Knowledge Index of Gayo tribes

Gayo tribes have a high ethnobotanical knowledge index, reflected in their deep understanding of medicinal plants, sustainable forest use, and the integration of plant knowledge into cultural and spiritual life. This knowledge is not only vital for community health and identity but also contributes to biodiversity conservation and can support modern ethnopharmacological research (Reyes-García, 2010). Gayo tribe's is living in the highlands of Aceh (Aceh Tengah, Bener Meriah, Gayo Lues), possess extensive ethnobotanical knowledge due to their close relationship with forests, mountains, and agricultural landscapes. They use plants not only for traditional medicine, but also for rituals, food, dyes, construction, and cultural performances (Geng et al., 2017).

Many of these plants are linked with customary law and Islamic healing traditions, reflecting an integration of nature, culture, and spirituality. Gayo tribes maintain traditional forest management systems (e.g., restricting plant collection, respecting sacred groves), showing ecological awareness. The existence of ethnobotanical Knowledge Index (EKI) of the Gayo tribe is crucial for understanding the intersection of culture, health, and biodiversity in the highlands of Aceh Province (Ridwan et al., 2022)

Gayo tribe's possess extensive indigenous knowledge of medicinal plants that not only supports primary healthcare needs but also reflects a deep cultural integration of customary and Islamic traditions. Documenting and quantifying this knowledge through EKI provide an empirical basis for preserving oral traditions, safeguarding biodiversity in the leuser ecosystem, and identifying species of potential ethnopharmacological value (Pradhan et al., 2020) Moreover, assessing EKI highlights the role of traditional knowledge in sustaining

community resilience, ecological balance, and cultural identity, while offering valuable insights for policy, conservation, and the development of sustainable herbal medicine practices (Abid Ghafoor Chaudhry et al., 2014)

2.3. Medicinal Plant of Gayo Tribes

Gayo highlands represent a living repository of ethnobotanical knowledge, particularly regarding medicinal plants. Their practices combine biodiversity use, cultural rituals, and sustainable forest management, making them crucial not only for community healthcare but also for global discussions on traditional medicine and biodiversity conservation.

The medicinal plants of the Gayo tribe in Aceh are a rich reflection of the community's ethnobotanical knowledge and cultural identity refers with diversity and abundance due to gayo highlands are part of the Leuser Ecosystem, one of the richest biodiversity zones in Southeast Asia (Fajarini et al., 2016) Many medicinal plants grow naturally in the forests, gardens, and coffee plantations, making them accessible to local communities.

Gayo tribe classify and name plants using their own local language, which preserves unique lexicons of ethnomedicine. Their knowledge is transmitted orally through generations, often connected to rituals, beliefs, and healing practices (Quiroz et al., 2016). Gayo tribe gradually use medicinal plants to treat common ailments such as fever, cough, digestive problems, wounds, and postpartum recovery. Some plants also serve preventive and spiritual functions, showing a holistic view of health (body–mind–nature balance). Medicinal plants are part of Gayo identity, closely tied to their worldview, oral traditions, and symbolic meanings (Zumaidar et al., 2019)

3. Research Method

This study explores the characteristics of gayo tribes in using medicinal plants in preserving the traditional wisdom and relationship between language, culture, and the environment. Thus, this study employs the exploration method with the research sites located in two (2) subdistricts, namely: 1) Bebesan Sub-district and 2) Bukit Sub-district. All medicinal plant specimens found were collected, their local names recorded, and their pronunciation documented based on the lexicon of the plant's growing region The research includes the identification, classification, and characterization of medicinal plants based on morphology, habitat, and other characteristics; traditional knowledge and medical practices related to medicinal plants, including belief systems, rituals, and traditional healing practices involving medicinal plants; cultural understanding and local traditions, conservation of language and traditional knowledge as well as the structure and function of language

3.1. Participants of the Study

Data for this study were collected from February to April 2026 using a qualitative ethnobotanical approach integrated with linguistic analysis. A stratified purposive sampling method was employed to select 90 knowledgeable informants (45 men and 45 women), aged between 35 and 75 years, representing the twenty-four of bebesan sub district. Participants were chosen based on their recognized expertise in traditional medicinal practices within the community, following established ethnobotanical research protocols (Chekole, 2017)

Primary data were gathered through semi-structured interviews, free listing exercises, and participant observation. Semi-structured interviews explored vernacular plant names, plant parts used, preparation methods, and therapeutic applications, providing flexibility for informants to elaborate on cultural contexts (Pieroni et al., 2011). Free listing exercises

allowed informants to spontaneously list medicinal plants they knew, offering insight into the cognitive salience and perceived importance of species (De Sousa et al., 2016). Participant observation was conducted during traditional healing rituals and daily medicinal plant use to validate reported information and to observe practical applications (Haque et al., 2018)

Medicinal plant specimens cited by informants were collected, photographed, and pressed according to standard ethnobotanical procedures. Vernacular names of the medicinal plants were systematically documented and transcribed using the International Phonetic Alphabet (IPA) to preserve the phonological accuracy of local pronunciations (Chabi et al., 2018) Lexical forms were categorized into monomorphemic, polymorphemic, and phrasal structures following morphological analysis frameworks commonly applied in descriptive linguistics (Fedotov et al., 2016) This approach enabled an examination of linguistic strategies underlying plant naming practices, emphasizing morphology, function, habitat, and cultural significance (Silverstein, 2004)

The phonetic and morphological analyses revealed salient features of Gayonese linguistic tradition, such as the prevalence of open vowels and nasal consonants (Haruna, 2023). Observations also noted variations in lexical usage among different age groups and hamlets, suggesting ongoing processes of linguistic innovation and cultural adaptation within the community. These findings contribute to the understanding of how language encodes ecological knowledge and supports the preservation of biocultural heritage (Cheshire et al., 2013)

All interviews were conducted in Bahasa Gayo or Bahasa Indonesia according to informant preferences and were subsequently transcribed and translated into English for analysis. Secondary data regarding demographic, geographic, and environmental profiles were obtained from village administrative records and district statistical reports. Throughout the study, strict adherence to ethical research standards was maintained. Informed consent was obtained from all participants, with clear communication about the study's objectives, confidentiality assurance, and their voluntary participation, following the International Society of Ethnobiology Code of Ethics (Battiste, 2010)

3.2 Research Location

This study was conducted in Bebesan sub district Aceh province, Indonesia. The travel time from Aceh Tengah to Bebesan sub district is about one hour under normal road conditions. The sub district covers an area of approximately 47,12 km² and administratively consists of twenty four villages encompassing a total of 42,707 households. Bebesan sub district is situated within the extensive tropical highland forest ecosystems that characterize eastern Sumatra (Lin & Trianingsih, 2016) The area has elevations ranging from 50 to 150 meters above sea level and experiences a humid tropical climate, with average annual rainfall exceeding 2,500 mm and average temperatures between 16°C and 27°C. Such climatic and topographic conditions are highly favorable for sustaining high levels of biodiversity, particularly of medicinal plant species (Bhattarai & Subedi, 2023)

The landscape around Bebesan sub district comprises secondary highland rainforests, agroforestry gardens, coffee plantation and traditional home gardens maintained by residents. The rich plant diversity in both wild and cultivated ecosystems provides the community with abundant resources for traditional medicine and daily subsistence needs. Bebesan sub district is predominantly inhabited by members of the Gayo ethnic group, who have preserved a wealth of ethnobotanical knowledge and cultural practices associated with

the use of local flora (Constant & Tshisikhawe, 2018) Traditional ecological knowledge, particularly regarding medicinal plants, is transmitted orally across generations and remains central to community identity and resilience

3.3. Instrument and Data Analysis

The study of medicinal plants was conducted using semi-structured interviews with a total of 90 respondents, randomly selected, consisting of 30 respondents from each sub-district. The questionnaire comprised items on respondent identity, types of medicinal plants, lexical forms in practice, patterns of medicinal plant usage, and the transmission of traditional knowledge. Furthermore, the research examined the interrelationship between biodiversity and traditional knowledge, efforts toward medicinal plant conservation and biodiversity, intercultural interactions, and linguistic diversity through variations of words, phrases, and expressions. It also addressed the use of language in specific socio-cultural contexts, such as ritual ceremonies, customary traditions, and traditional healing practices, as well as the preservation of minority languages and cultures.

3.4 Formulation of Conservation Strategies for Medicinal Plants and Traditional Knowledge

The formulation of conservation strategies for medicinal plants and traditional knowledge aims to strengthen sustainable cultural practices within the local communities of Aceh Province. These strategies emphasize the integration of local knowledge systems with contemporary approaches to biodiversity management, thereby ensuring both ecological preservation and cultural continuity. The development of such strategies involves enhancing community-based knowledge, revitalizing traditional practices, and promoting awareness of the socio-cultural values embedded in the use of medicinal plants to identify the most effective approaches, a SWOT analysis will be employed. This analytical framework allows for a systematic assessment of internal and external factors that influence conservation efforts, thereby generating practical, culturally sensitive, and sustainable strategies for safeguarding medicinal plants and associated traditional knowledge.

4. Result and Discussion

4.1 Result

The result of this study is further described and elaborated in detail in this section. The findings in this study are the results from the thematic analysis on the dataset gathered from the semi-structured interviews conducted with the participants. The four major themes emerged from the analysis were diversity of medicinal plants and lexical characteristics, plant parts utilized and cultural preferences, transmission of traditional knowledge, functional classification of medicinal plants.

4.2. Discussion

4.2.1. Diversity of medicinal plants and lexical characteristics

A total of 83 medicinal plant species, belonging to 46 botanical families, were documented from the Gayo tribes at Bebesan sub district, Aceh Tengah District, Aceh Province, Indonesia. Lexical analysis revealed that 48,3% of the plant names were polymorphemic, 40,9% monomorphemic, and 10,8% phrasal. Polymorphemic lexicons, such as Daun Ulun Lasun (Ulun Lasun Leaf) and Bunge Cendol (Cendol Flower) dominate, indicating a linguistic tendency towards the compounding of meaningful units to describe both morphological traits and medicinal functions. Monomorphemic lexicons, such as Buah Pangoh

(Pangoh Fruit) and Buah Perie (Perie Fruit) and also phrasal lexicons such as Daun Seki Pulut Ruwi (Seki Pulut Ruwi Leaf) and Bunge Tanok Akang (Tanok Akang Flower) (Wincana et al., 2022). This reflects a sophisticated oral tradition where detailed plant knowledge is encoded in names to facilitate cultural transmission. The use of polymorphemic structures aligns with findings from other Austronesian-speaking communities, where complex lexicons serve not only descriptive functions but also act as mnemonic devices for ecological knowledge (Steady et al., 2022)

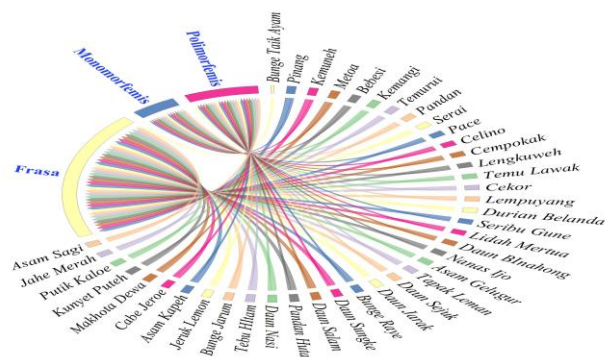


Figure 2. Lexical Character

Phonetic transcription using the International Phonetic Alphabet (IPA) revealed the preservation of distinctive Gayo phonological features, such as open vowels and nasalized consonants, which are characteristic of Austronesian languages (Gwizdzinski et al., 2023). These findings demonstrate that medicinal plant lexicons also serve as linguistic markers of ethnic identity, reinforcing the cultural distinctiveness of the Gayo tribe. The richness and structure of the lexicon further highlight the tight interrelationship between biodiversity, language, and traditional knowledge systems. According to (Fiorentino & Poeppel, 2007) such ethnolinguistic richness is often found in communities with strong biocultural traditions, suggesting that the Malay tribe maintains a resilient system of traditional ecological knowledge despite external pressures of modernization. When compared to neighboring ethnic groups such as the Minangkabau (Purwanto, 2021) and the Dayak communities (Gama & Agustina, 2022) the Gayo tribe of Bebesan exhibits a high degree of lexical conservation and innovation. This suggests that despite linguistic shifts and cultural changes elsewhere, the Bebesan community has successfully maintained traditional naming conventions, which are vital for the transmission of medicinal knowledge across generations.

4.2.2. Plant parts utilized and cultural preferences

The traditional medicinal practices of the Gayo tribes in Bebesan Sub district demonstrate a distinctive pattern in the use of plant parts for therapeutic purposes. The parts predominantly utilized include fruits (30.7%), leaves (27%), roots (22.6%), tubers (16.1%), and flowers (4.6%) (Figure 2). These findings align with ethnobotanical patterns observed in various indigenous communities globally, where accessible and bioactive-rich plant parts are prioritized ((Ramadan Hassanien, 2023; Iweala et al., 2023)

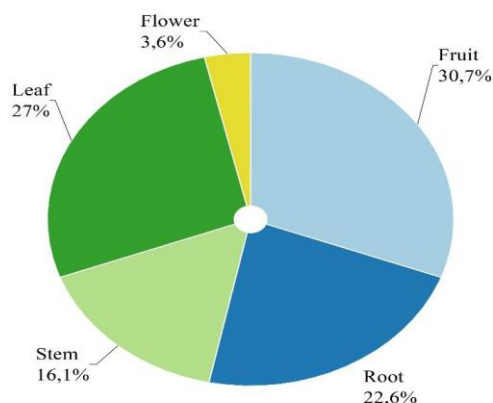


Figure 3. Plant Part Used

Fruits were the most commonly used part, reflecting their widespread availability and cultural significance in the Gayo community. Fruits are often rich in bioactive compounds such as flavonoids, alkaloids, and phenolic acids, which confer antioxidant, anti-inflammatory, and antimicrobial properties (DJORDJEVIĆ, 2023). The preference for fruits could also be attributed to their symbolic associations with vitality and abundance in local traditions (Rival, 2021). Leaves, the second most frequently utilized plant part, are prized for their ease of collection, renewability, and high concentrations of secondary metabolites such as tannins, saponins, and essential oils (Chiocchio et al., 2021). Leaf-based remedies are typically prepared as infusions, decoctions, or poultices, reflecting both practical and cultural adaptations to therapeutic needs (Ogwu & Osawaru, 2022). Roots and tubers, although slightly less utilized, are integral components in traditional pharmacopeias. Roots are often harvested for their potent medicinal compounds, including alkaloids, glycosides, and terpenoids, known for their efficacy in treating systemic ailments such as rheumatism, digestive disorders, and inflammation (Singh et al., 2020).

However, their collection is typically more labor-intensive and ecologically disruptive, which may explain their comparatively lower frequency of use (Cameron et al., 2022). Flowers, although the least utilized part, serve important roles in specific treatments, particularly for respiratory and dermatological conditions. Their limited use may reflect seasonal availability and lower yield of medicinal compounds compared to other plant parts (Dey et al., 2021). The selection of plant parts also mirrors deep-seated cultural preferences and ecological pragmatism. In many Gayo medicinal traditions, certain parts of plants are believed to embody specific energies or spiritual properties, which guide their use beyond purely pharmacological considerations (Pandarakalam, 2020;)

4.2.3. Transmission of Traditional Knowledge

The transmission of traditional knowledge related to medicinal plants within the Gayo tribes of Bebesan Sub district primarily occurs through oral traditions, with parents (20.2%) and neighbors (19.7%) being the dominant sources of information (Figure 4). Other sources include the internet (18.1%), healthcare professionals (17.6%), traditional healers (9.6%), family members (7.4%), and books (7.4%). These findings reflect a dynamic interaction between intergenerational knowledge transfer and contemporary influences.

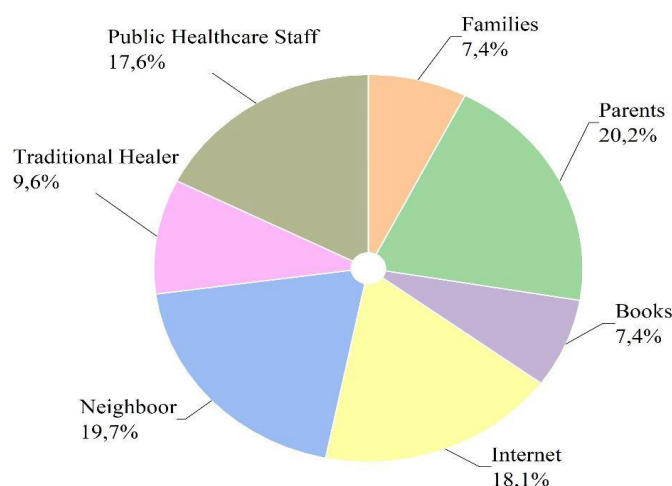


Figure 4. Transmission of traditional knowledge

The predominance of parents as knowledge transmitters is consistent with patterns observed in traditional societies worldwide, where familial oral transmission serves as the primary mechanism for safeguarding ethnobotanical knowledge (Atkinson et al., 2022). The critical role of parental teaching ensures the maintenance of cultural identity and continuity of local medicinal practices, which are often closely tied to daily life and survival (Jadid et al., 2020). The notable role of neighbors as a knowledge source highlights the communal nature of traditional medicine among the Gayo people, emphasizing collective learning and social reinforcement (Julung et al., 2023).

Informal exchanges of plant knowledge within community settings strengthen the resilience of traditional medical systems and promote widespread accessibility to health solutions (Hashimoto et al., 2020). The internet and public healthcare staff have also emerged as significant secondary sources, reflecting the community's increasing exposure to modern technology and formal health systems. While such developments can enhance access to information, they may also pose a risk of diluting traditional knowledge if not properly integrated with indigenous epistemologies (Onyancha, 2024). Traditional healers, despite accounting for only 9.6% of knowledge transmission, remain crucial figures in preserving more complex or sacred aspects of ethnomedical knowledge, often involving ritualistic practices or specific formulations that are not widely disseminated (Gietaneh et al., 2023).

The relatively low reliance on books (7.4%) further illustrates that the Gayo community still heavily depends on oral and experiential knowledge pathways rather than formalized written sources, a feature common in oral-based traditional societies (Hämäläinen & Karhu, 2023). The coexistence of traditional and modern channels for knowledge acquisition suggests an ongoing process of hybridization, where ancient knowledge systems are adapting to new socio-cultural realities (Fernández-Larragueta et al., 2023). While modern information sources can serve as valuable supplements, they should be harmonized carefully to prevent erosion or misinterpretation of traditional plant uses (Oyelude, 2023).

5. Conclusion

Overall, the medicinal plant knowledge of the Gayo tribes in Bebesan Sub district reflects a deeply integrated biocultural system, encompassing remarkable diversity,

sophisticated ethnolinguistic expressions, and functional medical applications. Sixty-eight plant species from 46 families were documented, with Zingiberaceae being the most represented. Lexical analysis revealed a predominance of polymorphemic structures, encoding rich ecological and functional information, and phonetic transcriptions preserved distinct Gayo phonological traits. The community primarily utilized fruits, leaves, and roots, favoring accessible and bioactive-rich plant parts, while the transmission of knowledge remained strongly oral, though increasingly influenced by modern sources such as the internet. Functionally, the plants addressed a broad spectrum of health conditions, particularly chronic diseases like hyperlipidemia, rheumatism, and diabetes, indicating a resilient traditional medical system adapting to contemporary health challenges. These findings underscore the importance of preserving both the biological and linguistic heritage of the Gayo tribes amidst ongoing socio-environmental transformations

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