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Medicinal leaf knowledge of the five Dayak Ethnic Groups in West Kalimantan, Indonesia

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Abstract. *Supiandi MI, Zubaidah S, Mahanal S. 2026. Medicinal leaf knowledge of the five Dayak Ethnic Groups in West Kalimantan, Indonesia. Biodiversitas 27 (2): d270215. https://doi.org/10.13057/biodiv/d270215*. The Dayak community in West Kalimantan, Indonesia, comprises 151 sub-ethnic groups, including the Iban, Tamambaloh, Jangkang, Limbai, and Linoh. These groups rely heavily on plant leaves for traditional medicine, transmitting their knowledge orally across generations. However, researchers have not adequately documented this knowledge in scientific literature. This study documents and analyzes the diversity of medicinal leaf species utilized by five Dayak Sub-ethnic Groups in West Kalimantan, Iban, Tamambaloh, Jangkang, Limbai, and Linoh, to preserve and promote their ethnobotanical heritage. Data were collected through structured interviews, participatory observation, and field documentation with local healers and community elders. The team identified plant species through an online platform, verified them with botanists, and organised the findings systematically in tables and figures. The analysis recorded 84 species belonging to 41 plant families. The Lamiaceae family contributed the highest number of species. Community members used these plants primarily to treat severe and chronic conditions, including cancer, diabetes mellitus, cardiovascular disorders, liver diseases, and kidney problems. The Iban, Tamambaloh, Jangkang, Limbai, and Linoh Dayak Sub-ethnic Groups actively preserve rich ethnobotanical knowledge centered on plant leaves. This study underscores the significance of integrating traditional medicinal knowledge into biodiversity conservation and sustainable development efforts, aligning with SDG 3 (Good Health and Well-being) and SDG 15 (Life on Land).

Keywords: Dayak, ethnobotany, folk medicine, medicinal leave, West Kalimantan

INTRODUCTION

The documentation of ethnobotanical knowledge, particularly using plant leaves as traditional medicine among the Dayak people in West Kalimantan, Indonesia, holds significant cultural and scientific value (Santoso et al. 2019; Julung et al. 2023). For the Dayak, such practices are closely intertwined with cultural identity (Wardhani et al. 2023), traditional ecological wisdom (Susanti and Zuhud 2019), and community health (Niko 2025). From a scientific perspective, this knowledge provides valuable insights for biodiversity conservation (Molnár et al. 2024), pharmacological research (Yao et al. 2021), and the sustainable use of plant resources (Chakravarty et al. 2024). However, modernization (Suwardi et al. 2025), cultural assimilation (Ndou et al. 2023), and the weakening of intergenerational transmission (Rajoo et al. 2025a) increasingly threaten this living heritage, raising concerns over the irreversible loss of knowledge that communities have maintained for centuries.

Previous ethnobotanical studies in Borneo and other regions of Indonesia have documented the use of medicinal plants among indigenous communities, emphasizing their role in primary healthcare and cultural preservation (Axelsson et al. 2024; Nikmatullah et al. 2024; Rajoo et al. 2025a). These studies demonstrate the richness of local knowledge and highlight its contribution to scientific discovery and conservation strategies (Yao et al. 2021; Bayen et al. 2024). Nevertheless, most research has provided only generalized accounts of Dayak ethnobotany without examining the diversity of practices within sub-ethnic groups (Qamariah et al. 2020; Az-Zahra et al. 2021; Lestariningsih et al. 2023; Rujehan et al. 2024; Hasanah et al. 2025). As a result, the fine-grained variations in plant use, cultural significance, and traditional knowledge systems across different Dayak communities remain underexplored.

This gap is particularly evident in the context of five Dayak Sub-ethnic Groups: Iban, Tamambaloh, Jangkang, Limbai, and Linoh. Despite their rich traditions and distinct ecological settings, systematic documentation of their leaf-based ethnomedicinal knowledge is still limited. Addressing this gap is crucial to safeguarding their unique cultural heritage and enriching scientific understanding of plant-based resources in a rapidly changing world. By focusing on these five sub-ethnic groups, this study aims to contribute both to the preservation of indigenous knowledge and to the advancement of ethnobotanical science.

In line with this research gap, it is important to highlight that in Indonesia, the use of leaves as traditional medicine has long been practiced, particularly by the Dayak community, to treat various diseases. In West Kalimantan alone, the Dayak consist of 151 sub-ethnic groups, including the five mentioned above (Azeharie et al. 2022). The biodiversity found in their environment is

optimally utilized, with leaves serving as the primary component in traditional healing practices. According to previous studies, leaves are the most frequently used plant in traditional medicine because they are essential in curing many ailments (Ege et al. 2021). This finding strengthens the evidence that local knowledge of leaf use has become integral to the Dayak traditional health system, including within the five sub-ethnic groups.

The preliminary findings further demonstrate why communities prioritize leaves in traditional medicine. First, they are easily accessible due to their abundance in the forest (Albar et al. 2025). Second, the preparation and processing procedures are simple (Nwafor and Manduna 2021). Third, harvesting leaves does not endanger plant populations (Nenungwi et al. 2025). Fourth, only small quantities are required for treatment (Ege et al. 2021). Fifth, the community believes leaves do not cause harmful side effects (van Wyk and Prinsloo 2020). Sixth, they are inexpensive to process (Albar et al. 2025), and finally, leaves are considered effective in curing diseases (Baruah et al. 2024). These reasons are consistent with earlier studies that emphasized the practicality, accessibility (Maiyo et al. 2024; Ojha and Bala 2025), and pharmacological potential of leaves as medicinal resources (Khumaidi et al. 2025). Nevertheless, despite the continuing use of leaves in traditional medicine, this knowledge faces degradation due to limited documentation, restricted transmission to selected individuals, reliance on traditional leaders and shamans, and the declining interest among younger generations. These challenges highlight the urgent need to systematically document ethnobotanical knowledge, particularly regarding plant leaves used in traditional medicine by the five Dayak Sub-ethnic Groups, before this knowledge is lost forever.

MATERIALS AND METHODS

Study area

This study was conducted in five locations representing the Dayak Sub-ethnic Groups in West Kalimantan Province, Indonesia, namely Tekalong Hamlet (Iban Dayak), Temau Village (Tamambaloh Dayak), Kobang Hamlet (Jangkang Dayak), Batas Nangka Village (Limbai Dayak), and Nobal Village (Linoh Dayak) (Figure 1).

Procedures

We used a survey method to obtain data on the application of leaves as traditional medicine by community groups through in-depth interviews. We considered several key aspects in designing the interviews, including the questionnaire themes, interview duration, and the languages used. The questionnaire aimed to document knowledge and practices for using plant leaves in traditional medicine. Each interview lasted approximately 1-2 hours per respondent. Depending on the participants' linguistic background, we conducted interviews in the Dayak Iban, Tamambaloh, Jangkang, Limbai, or Linoh languages.

The respondents were community members in five customary areas: Tekalong Hamlet, Temau, Kobang Hamlet, Batas Nangka, and Nobal Village. Respondents had knowledge, experience, and skills in recognizing, utilizing, and collecting plant leaves as traditional medicine ingredients for treating various diseases in everyday life. This study comprised three types of respondents: primary, key, and recommended. The number of respondents in the Dayak Iban tribe was six people, in the Dayak Tamambaloh tribe five people, in the Dayak Jangkang tribe ten people, in the Dayak Limbai tribe six people, and in the Dayak Linoh tribe ten people, as shown in Table 1.

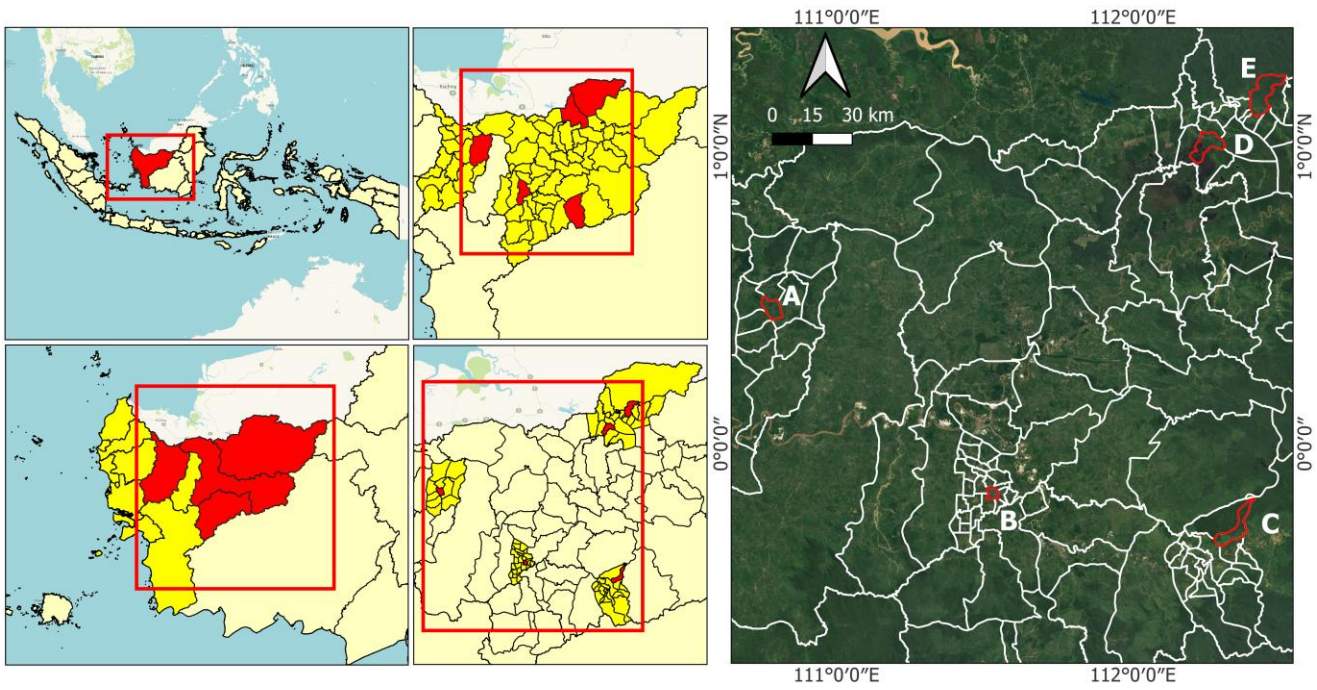

Figure 1. Map of West Kalimantan, Indonesia, showing the study locations for the five Dayak Sub-ethnic Groups. A. Kobang Hamlet, B. Nobal Village, C. Batas Nangka Village, D. Tekalong Hamlet, E. Temau Village

Table 1. Respondent data

Ethnic group	Respondent type	Role	Number
Iban Dayak	Primary respondent	Customary chief	1
	Key respondent	Traditional shaman	1
	Recommended respondent	Community members who have knowledge and experience in traditional medicine	4
Tamambaloh Dayak	Primary respondent	Customary chief	1
	Key respondent	Traditional shaman	2
	Recommended respondent	Community members who have knowledge and experience in traditional medicine	2
Jangkang Dayak	Primary respondent	Customary chief	1
	Key respondent	Traditional shaman	1
	Recommended respondent	Community members who have knowledge and experience in traditional medicine	8
Limbai Dayak	Primary respondent	Customary chief	1
	Key respondent	Traditional shaman	1
	Recommended respondent	Community members who have knowledge and experience in traditional medicine	4
Linoh Dayak	Primary respondent	Customary chief	1
	Key respondent	Traditional shaman	1
	Recommended respondent	Community members who have knowledge and experience in traditional medicine	8
Total respondents			37

The respondent selection technique used in this study was purposive sampling. This technique was selected because it was in accordance with obtaining respondents with knowledge and experience in using plant leaves as traditional medicine. The respondents selected were indigenous communities of the Iban, Tamambaloh, Jangkang, Limbai, and Linoh Dayak ethnic groups who fulfilled specific criteria. These criteria included (i) indigenous communities of the Iban, Tamambaloh, Jangkang, Limbai, and Linoh Dayak ethnic groups, (ii) past or current customary chiefs, and (iii) having knowledge, experience, and a direct role in the use and collection of plant leaves for traditional medicine.

All data collection procedures have obtained ethical approval from the Research Ethics Committee (KEP) of Universitas Negeri Malang, Indonesia, through a decree numbered 30.01.01/UN32.14.2.8/LT/2025. In addition, verbal informed consent was also obtained from each respondent from the five Dayak Sub-ethnic Groups. This step was taken to respect cultural rights and protect the community's traditional knowledge.

We collected data using in-depth interviews and field observation sheets. In-depth interviews employed open-ended questions to capture detailed responses, while field observations served to verify and complement the reported uses of plants. We scheduled interviews and observations with respondents, conducted the interviews, and then observed the preparation and application of medicinal plants. In four Dayak Sub-ethnic Groups, customary chiefs assisted the process, whereas in the Limbai group, a traditional healer facilitated the observations. This strategy allowed us to cross-check information through direct evidence, thereby strengthening the reliability of the ethnobotanical data.

Data analysis

Data processing started with the identification of the scientific name of the plant, which was carried out by using several online portals, namely (i) The Virtual Field Herbarium (http://herbaria.plants.ox.ac.uk/VFH/), (ii) International Plant Names Index (https://www.ipni.org), (iii) Plants of the World Online (https://powo.science.kew.org), and (iv) The Global Biodiversity Information Facility (https://www.gbif.org). The identification process was then consulted with a botanist from Universitas Negeri Malang, who showed photos of specimens obtained in the field to ensure the validity of species determination. The data were then classified based on family, common name, scientific name, method of use, and application in traditional medicine. Using plant leaves as traditional medicine was analyzed using a qualitative descriptive approach (Mezmir 2020).

RESULTS AND DISCUSSION

Plant species used as traditional medicine by five Dayak Sub-ethnic Groups in West Kalimantan

Based on in-depth interviews and field observations with the Iban, Tamambaloh, Jangkang, Limbai, and Linoh Dayak ethnic groups, plant species whose leaves are used as traditional medicine are shown in Table 2. The analysis revealed that the family Lamiaceae, comprising six species, dominated the local pharmacopoeia. In addition, several species specifically used their leaves to treat serious diseases, such as breast cancer, diabetes, kidney stones, tumors, hepatitis, liver disorders, heart disease, and high cholesterol levels.

Patterns of medicinal plant use among the Dayak Sub-ethnic Groups revealed notable similarities. The Iban, Jangkang, Linoh, and Tamambaloh used *Carica papaya* L. leaves to treat malaria fever by boiling and drinking the decoction. Similarly, the Iban, Limbai, and Tamambaloh used *Psidium guajava* L. leaves with the same preparation method to treat diarrhea, dysentery, gastroenteritis, and dengue fever. The Iban and Tamambaloh also used *Annona muricata* L. leaves to manage hypertension; the leaves were boiled and drunk as a herbal infusion.

Table 2. Use of plant leaves by the Iban, Tamambaloh, Jangkang, Limbai, and Linoh Dayak Sub-ethnic Groups in West Kalimantan, Indonesia

Scientific name	Common name	Family	How to use	Application	Dayak ethnic group				
					I	J	L1	L2	T
Strobilanthes crispa (L.) Blume	*Daun ginjal*	Acanthaceae	Boiled, drunk	Back pain	-	√	-	-	-
Andrographis paniculata (Burm.fil.) Nees	*Sambiloto*	Acanthaceae	Boiled, drunk	Hypertension	-	-	-	√	-
Clinacanthus nutans (Burm.fil.) Lindau.	*Tebak paku*	Acanthaceae	Pounded, applied	Wounds remedy	√	-	-	-	-
Crinum asiaticum L.	*Batak/Jungka*	Amaryllidaceae	Boiled, drunk	Fever remedy	-	-	-	-	√
		Amaryllidaceae	Pounded, applied	Liver disorder	-	-	√	-	-
Mangifera indica L.	*Mangga*	Anacardiaceae	Boiled, drunk	Heart disease	-	-	√	-	-
Annona muricata L.	*Durian belanda*	Annonaceae	Boiled, drunk	Hypertension	√	-	-	-	√
Annona muricata L.	*Nangka belanda*	Annonaceae	Boiled, drunk	Cholesterol	-	√	-	-	-
Annona muricata L.	*Nangka belanda*	Annonaceae	Pounded, applied	Pancreatic disorders	-	-	-	√	-
Annona muricata L.	*Nangkok belando*	Annonaceae	Boiled, drunk	Rheumatism	-	-	√	-	-
Alstonia scholaris (L.) R.Br.	*Jita/Pelaik*	Apocynaceae	Pounded decoction	Diarrhea remedy	-	√	-	-	-
		Apocynaceae	Rubbed sap	Boil remedy	-	-	-	√	-
Areca catechu L.	*Pinong*	Arecaceae	Warm poultice	Liver disorder	-	-	√	-	-
Homalomena occulta (Lour.) Schott	*Tungun*	Araceae	Leaf paste	Poison bite	-	√	-	-	-
Blumea balsamifera (L.) DC.	*Kasembung*	Asteraceae	Warm poultice	Fever remedy	-	-	-	√	-
Elephantopus scaber L.	*Lidah kambing*	Asteraceae	Boiled, drunk	Malaria fever	-	√	-	-	-
Blumea balsamifera (L.) DC.	*Mambung*	Asteraceae	Boiled, steam taken	Postpartum care	√	-	-	-	-
Ageratum conyzoides L.	*Rimput mamata/ babadotan*	Asteraceae	Wilted leaf	Wounds remedy	-	-	-	-	√
		Asteraceae	Leaf paste	Skin abrasion	-	-	-	√	-
Gynura procumbens (Lour.) Merr.	*Sambung nyawa*	Asteraceae	Boiled, drunk	Hypertension	√	-	-	-	-
Impatiens balsamina L.	*Encerenggak*	Balsaminaceae	Mixed paste	Nail care	√	-	-	-	-
Begonia samhaensis M. Hughes & A.G.Mill.	*Riang*	Begoniaceae	Leaf extract	Infection	√	-	-	-	-
Blechnum orientale L.	*Kelindang*	Blechnaceae	Pounded, applied	Boil remedy	√	-	-	-	-
Blechnum discolor (G.Forst.) Keyserl.	*Pakuk keruk*	Blechnaceae	Cooked vegetable	Lactation aid	√	-	-	-	-
Stenochlaena palustris (Burm.fil.) Bedd.	*Kakas dadara*	Blechnaceae	Cooked vegetable	Anemia remedy	-	-	-	-	√
Stenochlaena palustris (Burm.fil.) Bedd.	*Pakuk nait*	Blechnaceae	Cooked vegetable	Anemia remedy	-	-	√	-	-
Carica papaya L.	*Pepaya*	Caricaceae	Boiled, drunk	Hypertension	-	-	√	-	-
Carica papaya L.	*Unti kayu/Stela/Rungan*	Caricaceae	Boiled, drunk	Malaria fever	√	√	-	√	√
Garcinia xanthochymus Hook.fil. ex J.Anderson	*Asam kandis*	Clusiaceae	Mixed paste	Swollen feet	-	-	-	√	-
Ipomoea aquatica Forssk.	*Kankong*	Convolvulaceae	Rubbed paste	Nausea relief	√	-	-	-	-
Ipomoea batatas (L.) Lam.	*Kidong/pelok rampuk*	Convolvulaceae	Leaf paste	Burn remedy	-	√	-	-	-
		Convolvulaceae	Mixed paste	Breast cancer	-	-	√	-	-
Kalanchoe pinnata (Lam.) Pers.	*Lilum*	Crassulaceae	Mixed paste	Headaches	-	-	√	-	-
Cyperus longus L.	*Siet*	Cyperaceae	Leaf paste	Minor wound	-	√	-	-	-
Dillenia suffruticosa (Griff.) Martelli	*Pangan*	Dilleniaceae	Boiled, drunk	Lactation aid	-	√	-	-	-
	Simpo	Dilleniaceae	Mixed paste	Toothache	-	-	√	-	-
Shorea beccariana Burck	*Engkabang*	Dipterocarpaceae	Boiled, drunk	Jaundice	-	-	√	-	-
Nephrolepis biserrata (Sw.) Desv.	*Bekoruk*	Dryopteridaceae	Cooked vegetable	Lactation aid	-	-	-	√	-
	Papaku	Dryopteridaceae	Heated leaf	Skin itch	-	-	-	-	√
Clerodendrum sp.	*Empait*	Euphorbiaceae	Rubbed paste	Smallpox	√	-	-	-	-
Excoecaria cochinchinensis Lour.	*Kayu dadara*	Euphorbiaceae	Boiled, drunk	Dysentery	-	-	-	-	√
Manihot esculenta Crantz	*Pelok*	Euphorbiaceae	Cooked, eaten	Anemia remedy	-	-	√	-	-
Codiaeum variegatum (L.) Rumph. ex A.Juss.	*Puring merah*	Euphorbiaceae	Mixed paste	Breast cancer	-	-	√	-	-
Excoecaria cochinchinensis Lour.	*Sembulung darah*	Euphorbiaceae	Boiled, drunk	Bloody vomit	-	-	-	√	-
Senna alata (L.) Roxb.	*Golinggang*	Fabaceae	Leaf paste	Skin diseases	-	√	-	-	-
Mimosa pudica L.	*Putri malu*	Fabaceae	Boiled, drunk	Rheumatism	-	-	√	-	-
Cassia alata L.	*Serugan*	Fabaceae	Mixed paste	Fungal infection	√	-	-	-	-
Derris elliptica (Wall.) Benth.	*Tubai*	Fabaceae	Rubbed paste	Fever remedy	√	-	-	-	-
Plectranthus scutellarioides (L.) R.Br.	*Ati-ati*	Lamiaceae	Mixed paste	Bleeding stop	-	-	√	-	-

Premna cordifolia Roxb.	*Berbuas*	Lamiaceae	Boiled, drunk	Body odor	-	٧	-	-	-
Coleus scutellarioides (L.) Benth.	*Kalinsang*	Lamiaceae	Rubbed leaf	Skin itch	-	-	-	-	٧
Vitex pinnata L.	*Kulit papa*	Lamiaceae	Herbal bath	Jaundice	-	-	-	-	٧
Orthosiphon aristatus (Blume) Miq.	*Kumis kucing*	Lamiaceae	Boiled, drunk	Kidney stones and diabetes	-	-	-	-	٧
		Lamiaceae		Kidneys diorder	٧	٧	-	-	-
Vitex pinnata L.	*Loban*	Lamiaceae	Heated leaf	Liver disorder	-	-	-	٧	-
Plectranthus scutellarioides (L.) R.Br.	*Mata tiung*	Lamiaceae	Pounded, applied	Wounds remedy	٧	-	-	-	-
Vitex pinnata L.	*Ngarut*	Lamiaceae	Leaf paste	Headaches	-	٧	-	-	-
Ocimum basilicum L.	*Selasih*	Lamiaceae	Leaf paste	Skin diseases	-	٧	-	-	-
Ocimum basilicum L.	*Takin*	Lamiaceae	Rubbed leaf	Fungal infection	-	-	-	-	٧
Eusideroxylon zwageri Teijsm. & Binn.	*Tebelian*	Lauraceae	Pounded, applied	Penis disorder	-	-	٧	-	-
Cassia alata L.	*Gelinggam*	Leguminosae	Pounded, drunk	Ulcers remedy	-	-	٧	-	-
		Leguminosae	Pounded, applied	Fungal infection	-	-	٧	-	-
Loranthus sp.	*Benalu*	Loranthaceae	Pounded, applied	Stomach ache	-	-	٧	-	-
Lygodium flexuosum (L.) Sw.	*Pakuk enturuk halus*	Lygodiaceae	Boiled, drunk	Respiratory disease	-	-	٧	-	-
Ceiba pentandra (L.) Gaertn.	*Kabu-kabu*	Malvaceae	Leaf paste	Boil remedy	-	-	-	٧	-
Hibiscus rosa-sinensis L.	*Bunga tungsung*	Malvaceae	Leaf paste	Boil remedy	-	-	-	٧	-
Abelmoschus manihot (L.) Medik.	*Jabang lender*	Malvaceae	Sauteed, consumed	Cholesterol	٧	-	-	-	-
Ceiba pentandra (L.) Gaertn.	*Kakabu/Kabu*	Malvaceae	Leaf paste	Fever remedy	٧	-	٧	-	٧
Hibiscus rosa-sinensis L.	*Kembang sepatu*	Malvaceae	Mixed paste	Fever remedy	٧	-	٧	-	-
Sida rhombifolia L.	*Pota pongayoh*	Malvaceae	Leaf paste	Sprain relief	-	٧	-	-	-
Sida rhombifolia L.	*Singa puri*	Malvaceae	Leaf paste	Boils remedy	-	-	-	٧	-
Donax canniformis (G.Forst.) K.Schum.	*Bomban*	Marantaceae	Eye drops	Eye disease	-	-	٧	-	-
Melastoma affine D.Don.	*Kemunting*	Melastomataceae	Pounded, applied to wounds	Wounds remedy	٧	-	-	-	-
Clidemia hirta (L.) D. Don.	*Pasok matohari*	Melastomataceae	Pounded, applied	Headaches	-	-	٧	-	-
Melastoma malabathricum L.	*Risak*	Melastomataceae	Leaf paste	Wounds remedy	-	٧	-	-	-
Ficus fistulosa Reinw. ex Blume	*Ara*	Moraceae	Cooked vegetable	Lactation aid	-	-	-	-	٧
Artocarpus elasticus Reinw. ex Blume	*Kepuak*	Moraceae	Pounded, applied	Paralysis	-	-	٧	-	-
Ficus variegata Blume	*Konong*	Moraceae	Cooked, eaten	Lactation aid	-	-	٧	-	-
Artocarpus heterophyllus Lam.	*Nangkok*	Moraceae	Ash paste	Skin abrasion	-	-	٧	-	-
Artocarpus altilis (Parkinson) Fosberg	*Sukun*	Moraceae	Boiled, drunk	Cholesterol	٧	-	-	-	-
Moringa oleifera Lam.	*Kelor*	Moringaceae	Leaf extract	Eye disease	-	-	-	-	٧
Musa paradisiaca L.	*Pisong*	Musaceae	Boiled, drunk	Heart disease	-	-	٧	-	-
Syzygium polyanthum (Wight.) Walp.	*Bungkang*	Myrtaceae	Boiled, consumed	Hypertension	٧	-	-	-	-
		Myrtaceae	Herbal bath	Chickenpox	-	-	-	٧	-
		Myrtaceae	Leaf extract	Skin disease	-	٧	-	-	-
		Myrtaceae	Boiled, drunk	Stroke symptom	-	-	-	-	٧
Psidium guajava L.	*Jambu biji*	Myrtaceae	Boiled, drunk	Intestinal disease	٧	-	٧	-	٧
Rhodomyrtus tomentosa (Aiton) Hassk.	*Kemuntin*	Myrtaceae	Leaf paste	Bleeding stop	-	-	-	٧	-
Polypodium verrucosum Hook.	*Paku korok*	Nephrolepidaceae	Pounded, applied	Bleeding stop	-	-	٧	-	-
Averrhoa bilimbi L.	*Belimbing tunjuk*	Oxalidaceae	Boiled, drunk	Heart disease	-	-	٧	-	-
Averrhoa carambola L.	*Umbing tunjuk*	Oxalidaceae	Boiled, drunk	Hypertension and migraines	-	-	-	-	٧
Sauropus androgynus (L.) Merr.	*Cangkok*	Phyllanthaceae	Leaf paste	Oral lesion	-	٧	-	-	-
Sauropus androgynus (L.) Merr.	*Katuk*	Phyllanthaceae	Leaf paste	Nipple wound	-	-	-	٧	-
Phyllanthus urinaria L.	*Rumput mirah*	Phyllanthaceae	Boiled gargle	Toothache	٧	-	-	-	-
Phyllanthus urinaria L.	*Rumput ngamenanok*	Phyllanthaceae	Pounded, applied	Fever remedy	-	-	٧	-	-
Piper crocatum Ruiz & Pav.	*Boik remaung/Sireh merah*	Piperaceae	Leaf paste, boiled, and drunk	Liver disorder	-	٧	-	-	-
		Piperaceae	Warm soak	Body detox	٧	-	-	-	-
Piper betle L.	*Baulu*	Piperaceae	Herbal bath	Vaginal odor	-	-	-	-	٧
Piper betle L.	*Boik*	Piperaceae	Steam therapy	Eye disease	-	٧	-	-	-
Piper betle L.	*Sireh*	Piperaceae	Warm poultice	Internal injuries	٧	-	-	-	-
		Piperaceae	Boiled, drunk	Vaginal discharge	٧	-	-	-	-
		Piperaceae	Chewed mix	Toothache	٧	-	-	-	-
Piper betle L.	*Sirih*	Piperaceae	Bath therapy	Skin itch	-	-	٧	-	-
		Piperaceae	Chewed leaf	Stomach ache	-	-	-	٧	-
Paspalum conjugatum var. *pubescens* Döll	*Rumput sapi*	Poaceae	Leaf paste	Burns remedy	-	-	٧	-	-

Drymoglossum piloselloides (L.) C.Presl	*Sisit nago*	Polypodiaceae	Leaf paste	Stomach ache	-	-	٧	-	-
Eichhornia crassipes (Mart.) Solms	*Eceng gondok*	Pontederiaceae	Leaf paste	Breast disorder	-	-	٧	-	-
Psychotria viridiflora Reiwn. ex Blume	*Engkerbai*	Rubiaceae	Boiled, drunk	Ulcers remedy	٧	-	-	-	-
Psychotria viridiflora Reiwn. ex Blume	*Engkerebang*	Rubiaceae	Leaf paste	Burns remedy	-	-	٧	-	-
Morinda citrifolia L.	*Engkudu*	Rubiaceae	Boiled, drunk	Hypertension	٧	-	٧	-	-
		Rubiaceae	Boiled, drunk	Heart disease	-	-	-	٧	-
		Rubiaceae	Boiled, drunk	Jaundice	-	٧	-	-	-
		Rubiaceae	Chewed leaf	Tumors, cancer	-	-	-	-	٧
Nauclea speciosa (Korth.) Miq.	*Kelopuk*	Rubiaceae	Cooked, eaten	Lactation aid	-	-	٧	-	-
Psychotria nervosa Sw.	*Ngingo*	Rubiaceae	Pounded, applied	Burn remedy	-	-	٧	-	-
Premna serratifolia L.	*Buas*	Verbenaceae	Rubbed paste	Body swelling	-	-	-	٧	-

Note: I: Iban, J: Jangkang, L1: Limbai, L2: Linoh, T: Tamambaloh,٧ : Present, -: Absent

The Iban and Limbau employed *M. citrifolia* leaves to control high blood pressure by steaming them in banana leaves or boiling them before consumption. Likewise, the Iban, Limbai, and Tamambaloh applied leaves of *C. pentandra* to reduce fever by pounding them and placing them on the forehead. At the same time, the Iban and Limbai used *H. rosa-sinensis* leaves for a similar purpose. In addition, the Iban and Jangkang prepared *O. aristatus* leaves as a decoction to treat kidney disorders

Dayak Sub-ethnic Groups primarily prepare medicinal leaves by boiling and drinking them, making leaf paste, or pounding and applying the paste. They use the boiling method to treat systemic ailments such as hypertension, digestive disorders, and fever. They apply leaf paste or pounded preparations topically to heal wounds, reduce swelling, and treat various skin conditions. In addition, they consume several species as food-based remedies to support lactation and maintain nutritional health within their community.

Discussion

This discussion interprets the findings by examining the dominance of Lamiaceae, the therapeutic role of medicinal plant leaves in serious diseases, and the shared practices across Dayak Sub-ethnic Groups.

Dominance of Lamiaceae in Dayak traditional medicine

This study found that the Lamiaceae species were the most frequently used by the Dayak community in West Kalimantan. Both ecological and cultural factors can explain the prominence of this family. Members of Lamiaceae are abundant (Rawat 2023), easily recognized through their aromatic characteristics (Damour et al. 2025), and widely accessible for daily use (Abdelhalim and Hanrahan 2021). In addition, their richness in secondary metabolites such as essential oils and flavonoids (Assaf et al. 2022) is consistent with their reputation for treating infectious (Himaniarwati et al. 2020) and inflammatory conditions (Kamal and Kumar 2025), which makes them reliable within local health traditions (Hosseini et al. 2021; Wang et al. 2021).

Within this family, six species (Figure 2) were identified with diverse medicinal applications, ranging from skin-related problems (*O. basilicum*, *C. scutellarioides*) and wound healing (*P. scutellarioides*) to metabolic and organ-related disorders such as diabetes, kidney dysfunction (*O. aristatus*), and liver ailments (*V. pinnata*). In addition, *P. cordifolia* is culturally valued for addressing body odor, reflecting the integration of medicinal plants into daily health practices. This breadth of therapeutic roles highlights not only the pharmacological potential of Lamiaceae but also its embeddedness in both preventive and curative aspects of Dayak traditional medicine.

The dominance of Lamiaceae is not unique to this community. Ethnobotanical research in Java, Malaysia, and India has similarly documented frequent use of genera such as *Ocimum*, *Vitex*, and *Premna* (Joshi et al. 2022; Kamal et al. 2022; Alfinandah et al. 2025). This regional consistency suggests that the Dayak practices reflect broader Southeast Asian patterns of medicinal plant use (Panjaitan et al. 2025). Previous studies further support the pharmacological plausibility of these findings: *O. basilicum* has been shown to inhibit cancer progression in experimental models (Okelola et al. 2025), *V. pinnata* is traditionally employed in Nias for treating kidney disorders and fever (Zebua et al. 2024), and *O. aristatus* is widely recognized across the region for managing diabetes (Rajoo et al. 2025b). These correspondences indicate that Dayak uses of Lamiaceae species align with regional ethnomedicinal practices and documented pharmacological activities, reinforcing the empirical validity of local knowledge without requiring an exhaustive review of each species.

Beyond their therapeutic value, these plants hold cultural significance (Prinsloo et al. 2023). Communities transmit knowledge of their preparation and use orally across generations (Nguanchoo et al. 2022), embedding it in household health care (Pradhan et al. 2022) and local rituals (González et al. 2022). However, modernization, land-use change, and declining intergenerational transfer increasingly undermine this knowledge transmission system (Constant and Tshisikhawe 2018; Ouma 2022; Shaheen et al. 2023). These pressures threaten the continuity of ethnobotanical knowledge and the sustainable use of plant resources (Hariyadi et al. 2024; Devkota and Hanemann 2025). Therefore, documenting and revitalizing this knowledge is crucial in biodiversity conservation (Gitima et al. 2025) and cultural preservation (Pangeni et al. 2020).

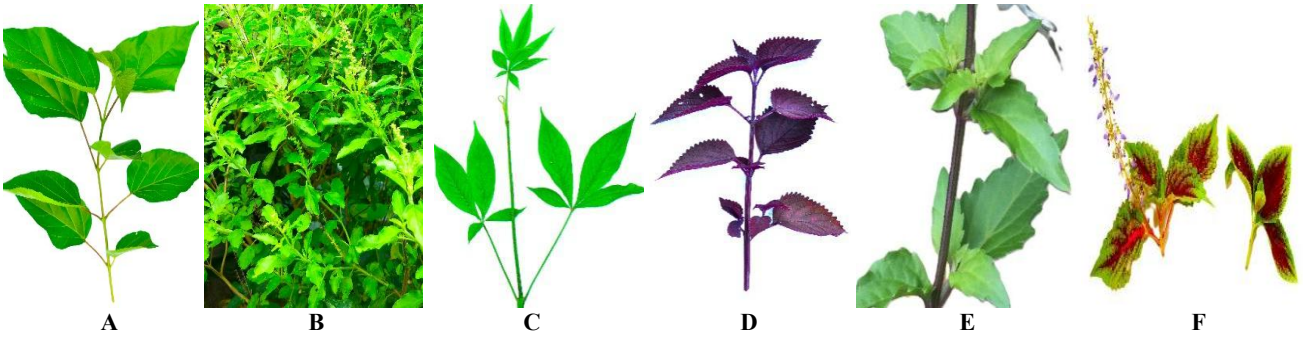

Figure 2. Use of leaves from the Lamiaceae family as traditional medicine. A. *Premna cordifolia* Roxb., B. *Ocimum basilicum* L., C. *Vitex pinnata* L., D. *Coleus scutellarioides* (L.) Benth., E. *Orthosiphon aristatus* (Blume.) Miq., F. *Plectranthus scutellarioides* (L.) R. Br.

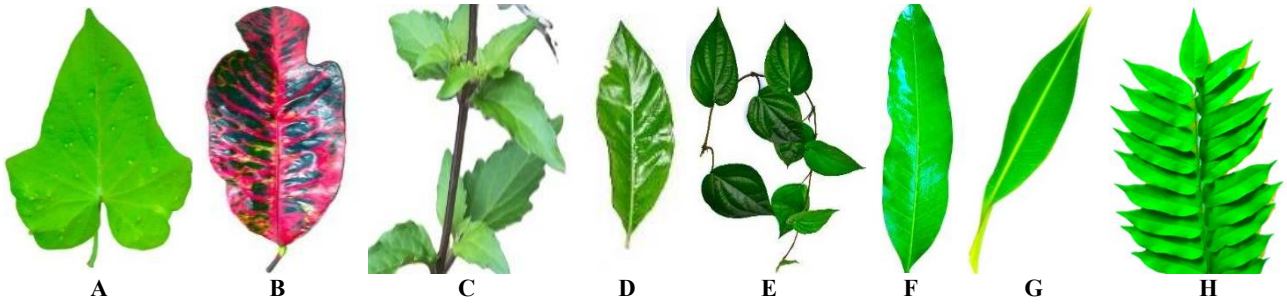

Figure 3. Use of medicinal plant leaves for serious diseases. A. *Ipomoea batatas* (L.) Lam., B. *Codiaeum variegatum* A. Juss., C. *Orthosiphon aristatus* (Blume.) Miq., D. *Morinda citrifolia* L., E. *Piper betle* L., F. *Mangifera indica* L., G. *Musa paradisiaca* L., H. *Averrhoa bilimbi* L.

Medicinal plant leaves as remedies for serious diseases

The Dayak communities, particularly the Iban, Tamambaloh, Jangkang, Limbai, and Linoh sub-ethnic groups, actively use medicinal plant leaves to treat serious ailments such as breast cancer, diabetes, kidney stones, tumors, hepatitis, liver disorders, heart disease, and high cholesterol (Figure 3). Similar reliance on leaves for critical illnesses has also been documented among other Indonesian and Southeast Asian communities, including the Bali, Gorontalo, central Sulawesi, North Sumatra, central Java, east Java, Thailand, and Malay (Rohman et al. 2019; Faruq et al. 2021; Andila et al. 2023; Gani et al. 2024; Rahim et al. 2024; Torimbanu et al. 2024; Ekasari et al. 2025; Junsongduang et al. 2025; Pitopang et al. 2025), reflecting a shared cultural strategy of using the most sustainable and accessible plant parts for urgent health needs.

Pharmacological evidence broadly supports these practices. Plants like *I. batatas*, *C. variegatum*, and *M. citrifolia* exhibit anticancer potential through antioxidant activities (Suphiratwanich et al. 2023; Wang 2024; Nowak et al. 2025). Species such as *O. aristatus* show antidiabetic and renoprotective properties (Maulana et al. 2022; Satriawan et al. 2025), while *P. betle* demonstrates anti-inflammatory and antimicrobial effects relevant to liver disorders (Teanpaisan et al. 2017; Lister et al. 2020). Leaves of *M. indica*, *M. paradisiaca*, and *A. bilimbi* provide cardioprotective and lipid-lowering benefits (Adekiya et al. 2018; dos Santos et al. 2018; Ahmed et al. 2021; Liu et al. 2023; Khan et al. 2024). Rather than isolated cases, these examples illustrate a consistent overlap between traditional use and biomedical validation, underscoring the pharmacological promise of Dayak ethnomedicine.

Beyond biomedical aspects, these findings carry important cultural and conservation implications. The reliance on leaves not only provides accessible treatments but also supports sustainable harvesting, preserving the plant for continued use (Ssenku et al. 2022; Gitima et al. 2025). Thus, documenting these practices strengthens the case for integrating cultural preservation and conservation strategies with public health initiatives. By linking local knowledge with global frameworks, this study contributes to SDG 3 (good health and well-being) by recognizing traditional healthcare and SDG 15 (life on land) by emphasizing the importance of conserving medicinal plant diversity.

This finding also paves the way for future pharmacological research. Ethnobotanical studies can prioritize species most commonly used to combat serious diseases to investigate their bioactive compounds and therapeutic mechanisms. Furthermore, bioprospecting programs can integrate traditional Dayak medicine with modern biomedical research to develop safe and effective

treatments. At the same time, indigenous community-based conservation strategies remain essential for protecting plant species and cultural knowledge, ensuring that traditional wisdom contributes to innovation without eroding cultural integrity.

Documentation of Dayak ethnomedicine has broad practical and biocultural implications. From a practical standpoint, interdisciplinary research is highly recommended to integrate ethnobotany with cultural anthropology and health policy (Danladi et al. 2025). In addition, strengthening ethnobotany in formal education is important so that the ancestral knowledge of indigenous peoples can be seen and recognized (Rosero-Toro et al. 2024). This effort will also increase the resilience of traditional practices and ensure their relevance in facing contemporary health and sustainability challenges. From a biocultural perspective, recognizing medicinal leaves as both a biological resource and a cultural asset ensures that conservation strategies protect plant diversity and preserve the heritage embedded in Dayak traditions.

Similarities in the use of medicinal plant leaves between Dayak Sub-ethnic Groups

The data analysis showed that the Iban, Tamambaloh, Jangkang, Limbai, and Linoh Dayak Sub-ethnic Groups in West Kalimantan share similarities in their use of plant leaves. Several plant species serve similar purposes across more than one sub-ethnic group. The Iban, Jangkang, Linoh, and Tamambaloh Dayak use *C. papaya* leaves to treat malaria fever by boiling the leaves and drinking the decoction. The Iban, Limbai, and Tamambaloh Dayak use *P. guajava* leaves to treat diarrhea, dysentery, gastroenteritis, and dengue fever by boiling the leaves and drinking the decoction. The Iban and Limbai Dayak use *M. citrifolia* leaves to lower high blood pressure through the *pepes* (steaming in banana leaves) method, direct consumption, or boiling followed by decoction.

Furthermore, the Iban, Limbai, and Tamambaloh Dayak use *C. pentandra* leaves to reduce heat and relieve fever by pounding them until smooth and applying the paste to the forehead. The Iban and Limbai Dayak use *H. rosa-sinensis* leaves to reduce heat by pounding them, mixing the paste with water, and applying it to the forehead. The Iban and Jangkang Dayak use *O. aristatus* leaves to treat kidney disorders by boiling them and drinking the decoction.

Several factors explain the similarities in the plant types, methods of use, and benefits across the various Dayak Sub-ethnic Groups in traditional medicine. First, geographical proximity exposes ethnic groups to similar environmental conditions and flora, encouraging them to use the same medicinal plants (Teka et al. 2020). Second, historical interactions and cultural exchanges between neighboring ethnic groups facilitate the spread of knowledge about medicinal plant use (Zhou et al. 2023). Third, similarities in ecological zones provide access to the same plant species, enabling each group to use them in their respective environments (Saslis-Lagoudakis et al. 2014). Fourth, shared ancestry and cultural heritage shape and sustain standard practices in traditional medicine across ethnic groups (Pasa et al. 2019). Fifth, the proven effectiveness of certain medicinal plants in treating common diseases prompts multiple groups to adopt and maintain their use (Tamene et al. 2023).

Although this study provides a comprehensive analysis, it focuses on only five Dayak Sub-ethnic Groups, which limits the generalizability of its findings to all Dayak communities in Kalimantan. Botanists verified the species identification; however, relying on online databases may introduce minor classification uncertainties. The sample size, while sufficient for qualitative inquiry, may not fully represent the diversity of ethnobotanical knowledge across communities. Moreover, the study did not quantitatively evaluate the pharmacological efficacy or dosage accuracy of the documented species. Future research should broaden its scope to include additional Dayak groups, conduct biochemical assays, and integrate community-based conservation frameworks to validate and preserve traditional knowledge systems.

Beyond these limitations, it is equally important to consider the ethical implications of documenting traditional medicinal knowledge and its impact on community well-being. Researchers can achieve a holistic health approach by synergizing traditional practices and modern medicine, ensuring both complement each other while respecting the cultural heritage of the Dayak communities. In this study, the documentation process directly involved community members to protect traditional knowledge from potential exploitation and to uphold cultural integrity. Moreover, this study highlights the importance of equitable benefit-sharing, ensuring that local communities gain fair recognition and tangible benefits from the use and dissemination of their ethnobotanical knowledge. The active participation of the Dayak people at every stage of the research process reinforces cultural integrity and prevents the misuse of indigenous knowledge and natural resources.

In conclusion, this study documents 84 medicinal plant species that the Iban, Tamambaloh, Jangkang, Limbai, and Linoh Dayak Sub-ethnic Groups in West Kalimantan, Indonesia, actively use, with leaves serving as the primary plant part. The findings highlight how these communities maintain rich traditional knowledge and stress the need to document and conserve this heritage to preserve culture and protect biodiversity. Leaves are the most frequently used plant part, reflecting sustainable harvesting practices and long-standing adaptation to local ecosystems. Despite shared ethnomedicinal patterns across the groups, variations in species use indicate localized ecological and cultural influences. The results highlight the importance of preserving ethnobotanical knowledge as a vital component of both cultural identity and biodiversity conservation. Documentation and validation of these traditional practices can inform modern pharmacological studies, support equitable benefit-sharing, and strengthen sustainable resource management. Integrating community-based knowledge systems into conservation and health policies will not only safeguard biological diversity but also empower indigenous communities as key partners in achieving Sustainable Development Goals (SDGs) 3 and 15.

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