Ethnobotanical survey of medicinal plants used in the treatment of infectious diseases in Central Maluku, Indonesia

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Research

Abstract

Background: Infectious diseases remain a major health issue in Central Maluku, where communities depend on medicinal plants for treating infection-related conditions. Despite being culturally embedded, this knowledge is poorly documented, and previous ethnobotanical studies have lacked botanical indices to assess its consistency and reliability. This study documents medicinal plants used for infectious diseases in Central Maluku and examines their potential chemical constituents and antimicrobial properties based on available scientific evidence.

Methods: Information was gathered through questionnaires, interviews, and observations involving 43 traditional healers. Several ethnobotanical indices—including the informant consensus factor (ICF), fidelity level (FL), use value (UV), and frequency of citation (FC)—were analyzed to evaluate agreement among informants and highlight species of particular therapeutic interest.

Results: A total of 74 medicinal plants from 43 families were recorded as treatments for 18 infectious diseases. Several species showed strong associations with specific conditions, including *Curcuma longa* for purulent navel, *Tinospora crispa* for malaria, and *Curcuma zanthorrhiza* for abdominal pain. Endemic plants such as *Myristica fragrans* and *Syzygium aromaticum* were commonly used for postpartum infections, and prior studies indicate that both contain antimicrobial compounds. Plants with high index values and distinctive uses included *Flagellaria indica* for hernia. Meanwhile, species with lower consensus but noteworthy applications included *Catharanthus roseus*, *Ceiba pentandra*, and *Hibiscus × rosa-sinensis* for pneumonia.

Conclusions: Overall, the findings demonstrate the therapeutic relevance of medicinal plants in Central Maluku and highlight key species that warrant further phytochemical and antimicrobial investigation to support their traditional uses scientifically.

Keywords: Ethnomedicine, Herbal medicine, Infections, Informant consensus factor, Fidelity level, Use value.

Background

The use of medicinal plants to treat diseases dates back 100,000 years and is a fundamental aspect of traditional medicine (Shuaib *et al.* 2023, Singh *et al*. 2025). The proximity of forests and human settlements prompted the use of plants as therapeutic ingredients. Medicinal plant use is not limited to rural areas but is also increasingly being used in urban areas of developed and developing nations (Ralte *et al*. 2024, Singh *et al*. 2025). According to the 2025 WHO report, 90% members of the WHO use traditional medicine to treat various illnesses (WHO 2025). Different cultures worldwide have developed herbal medicines based on local plants, and the knowledge has been accumulated and passed down across generations. Medicinal plants contain biologically active compounds, and thus, these plants have been continuously explored for new drug development (Chaachouay *et al*. 2019, Chihomvu *et al.* 2024).

Central Maluku is a regency in Maluku province, Indonesia, with a history of medicinal plant use to treat various diseases (Astuty *et al*. 2024, Daro *et al.* 2020). The practice of medicinal plant-based healing in Central Maluku is not merely a form of treatment but also reflects the transfer of cultural information vertically, and non-parentally (Akhmar *et al*. 2023, Reyes-Garcia 2010). In addition, various combinations of methods involving rituals and spiritual dimensions are performed either before sample collection or in conjunction with healing practices. Such practices are also found in other cultural contexts across different countries, although in diverse forms, such as chanting and offerings (Temple of The Way of Light 2025, Miki *et al*. 2024). These cultural and spiritual dimensions are preserved and transmitted across generations, alongside empirical knowledge of medicinal plant use. The Central Maluku Bureau of Statistics has confirmed the potential medicinal plants, including rhizome and non-rhizome types (Central Maluku Bureau of Statistics Office 2024). This report is supported by previous research on several ethnic groups in Maluku, such as the Asilulu (Jokopriyambodo *et al.* 2017), Waai (Daro *et al*. 2020), and Kailolo (Usemahu *et al.* 2014), which highlights the potential of medicinal plants to treat both infectious and noninfectious diseases. The practice of medicinal plant-based healing in Central Maluku is not merely a form of treatment but also reflects the vertical, horizontal, and non-parental transmission of cultural information (Akhmar *et al*. 2023, Reyes-García 2010). In addition, various combinations of methods involving rituals and spiritual dimensions are performed either before sample collection or in conjunction with healing practices. Such practices are also found in other cultural contexts across different countries, although in diverse forms such as chanting and offerings (Temple of The Way of Light 2025, Miki *et al*. 2024). These cultural and spiritual dimensions are preserved and transmitted across generations, alongside empirical knowledge of medicinal plant use.

Infectious diseases can be defined as diseases that arise due to pathogenic microorganisms, such as viruses, bacteria, fungi, and parasites, which can be transmitted from an infected person, animal, or contaminated object to a vulnerable host (Baker *et al*. 2022, Soni *et al*. 2024, Van Seventer & Hochberg 2017). According to the 2024 WHO report, infectious diseases are one of the leading causes of death in Indonesia, attributed to COVID-19 and tuberculosis (WHO 2024). In line with this, infectious diseases occupy the top 10 most common diseases in districts throughout Indonesia, including Maluku. The Maluku Provincial Health Office (2020) reported flu, acute respiratory tract infection, and malaria among the top 10 diseases with the highest number of cases (Health Office of Maluku Province 2020). Studies have been conducted on a few ethnicities in the Central Maluku Regency, which revealed the use of medicinal plants such as kunyit (*Curcuma longa*), sambiloto (*Andrographis paniculata*), pule (*Alstonia scholaris*), and beluntas (*Graptophyllum pictum*) to overcome infectious diseases (Astuty *et al*. 2024, Daro *et al*. 2020, Nusaly *et al*. 2023). However, these studies did not employ qualitative indices, making it impossible to assess the level of usage and preference for using certain plants for particular diseases. To date, no ethnomedicine study has comprehensively covered the use of medicinal plants for infectious diseases in Central Maluku Regency. Ethnomedicine studies play a critical role in preserving indigenous medicinal knowledge in an area, especially in areas where the knowledge is passed down orally through generations without written documentation, such as in Central Maluku.

This study aimed to gather and document information on the medicinal plants used for infectious diseases by traditional medicine. The study also sought to analyze the transfer of medicinal knowledge and its impact on the sustainability of medicinal plant-based healing practices. To ensure the extensiveness of the study, the scope of the research included the parts of the plant used, medicinal plant use, modes of preparation and application of the plants, and the uniformity of the plant usage for certain diseases based on the informant consensus factor (ICF). Furthermore, the presentation of medicinal plants based on fidelity level (FL), use value (UV), and frequency of citation (FC) values was documented. In addition to preserving the local medicinal knowledge in Central Maluku, the documentation of this knowledge serves as the foundation for future phytochemical and pharmacological evaluations in antimicrobial drug development.

Materials and Methods

Study area

Central Maluku Regency is a regency in the Maluku province, which is located in the eastern area of the Republic of Indonesia, and is located between the East Seram Regency on the east and the West Seram Regency on the west (2°30'-7°30' S and 250°-132°30' E) (Central Maluku Regency Government 2024). The mainland of the regency mostly lies on Seram Island, while the rest is on other islands, namely the Ambon, Lease (including Haruku, Saparua, and Nusa Laut Islands), and Banda Islands (Fig. 1). Central Maluku is the largest regency among the Malukan regencies, with an area of approximately 275.907 km^2, consisting of a sea area of 264,311.43 km^2 and a land area of 11,595.57 km^2. As the area is surrounded by a vast sea, the area has tropical maritime and monsoon climates (Central Maluku Office of Communication and Information 2024). The study was conducted on several islands, including the Banda, Seram, Ambon, Haruku, and Saparua Islands.

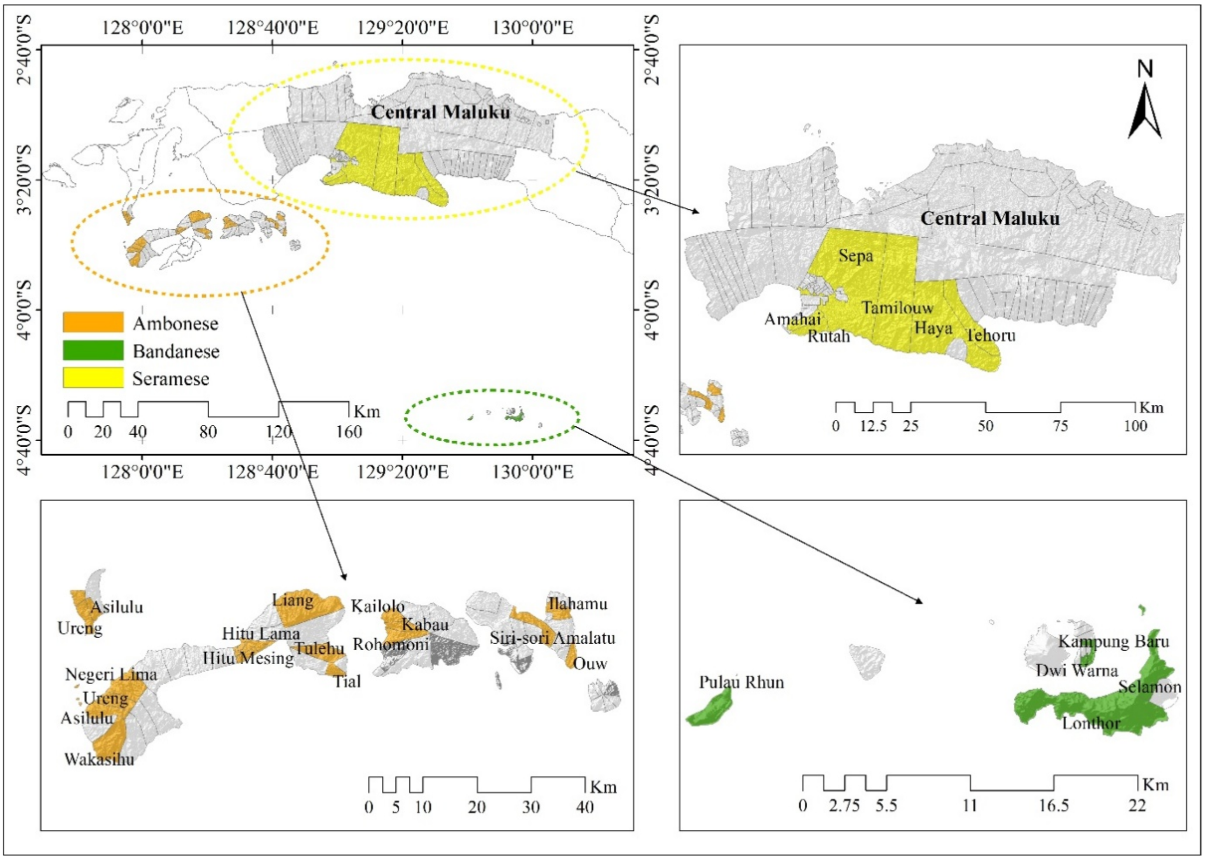


Figure 1. Map of the research area: Central Maluku Regency, Maluku Province, Indonesia. (Source: Global Administrative Areas Database, 2025, Generated with ArcGIS Pro 3.4.0.)

Data collection and plant identification

The field study was conducted from August to December 2024. Data were collected via questionnaires, interviews, and observation. A total of 43 local traditional medicine practitioners, locally known as *Batra* (tukang barobat), were involved in this study. Before the study, the protocol was reviewed and approved by the Ethics Committee of the Faculty of Medicine, Universitas Pattimura, Ambon, Indonesia (No. 133/FK-KOM.ETIK/VIII/2024). All informants provided their consent to participate by signing an informed consent form. Informants were selected based on the administrative village divisions of Central Maluku Regency, which encompass several distinct ethnic groups. These include the Seram ethnic group, community inhabiting the southern coastal areas of Seram Island (e.g., Sepa and Rohua); the Banda ethnic group, residing on Banda Island; and the Ambonese ethnic group, distributed across the eastern, central-eastern, and northern coastal areas of Ambon Island (Fig. 1). While each etnic group maintains its own local language, in everyday interactions, communities generally use two languages: their respective local languages and Ambonese Malay, which serves as a lingua franca in the area (Ulfah 2024). However, medicinal plants were generally referred to in Ambonese Malay terms. These informants were recruited through purposive sampling, initially from information provided by the local government. The number of informants varied across different locations (Table 1). For additional data, snowball sampling was conducted by asking each informant about other *Batra* that were not included in the government-provided lists. This process continued until all relevant informants were identified and no new information emerged, indicating that data saturation had been reached. No restrictions on age or gender were applied, considering the limited number of *Batra*.

Table 1. The number of informants based on ethnic group

Ethnic group	Number of Informants
Banda	7
Ambonese	23
Seram	13

The data collection was intended to obtain information about the informants' demographics, medical knowledge, treatment process, spiritual practices, and knowledge transfer. Before conducting the research, the research purpose was explained to the informants, and consent was obtained from them. The interview was conducted using the Ambon Melayu language. In detail, the informants were asked to explain the source of treatment knowledge, intergenerational learning, treatment documentation, spiritual practices, medicinal plants used for infectious diseases, local names of the plants, the parts used, and how the plants were prepared and used. At the end of the interview, the informants were also asked to demonstrate the traditional medicine preparation. The interviews and preparation of the traditional medicine were documented using an audio recorder and a camera. The researchers engaged with community leaders to explain the potential commercial implications of this research. Any future development arising from this knowledge will be pursued in accordance with the principles of the Nagoya Protocol, ensuring fair and equitable benefit-sharing with the source communities. Medicinal plant specimens were identified by a botanist from the Faculty of Pharmacy, Universitas Gadjah Mada (UGM), and voucher numbers were assigned (number: UGM-FA-01/L1-1/080924/R to UGM-FA-01/L1-1/080971/R). The specimens were deposited in the Department of Pharmaceutical Biology, Faculty of Pharmacy, Universitas Gadjah Mada.

Data Analysis

Descriptive analysis was performed to summarize the demographic and ethnomedicinal data. The ethnobotanical index values determined in this study were as follows:

Informant consensus factor

The ICF was used to evaluate the consistency of the informants' knowledge in treating certain disease categories. The ICF was calculated using the following equation:

$$ICF = (Nur - Nt) / (Nur - 1),$$

where Nur is the number of citations for each disease category, and Nt is the number of plants used to treat certain diseases (Benamar *et al*. 2023, Hosseini *et al.* 2022).

Fidelity level

The FL was employed to determine a plant's level of usability for a particular disease. The value was calculated using the following equation:

$$FL (\%) = (Np/N) \times 100,$$

where Np refers to the number of informants who indicate that they use the plant for the treatment of a certain disease, and N is the total number of informants who indicate that they use the plant for the treatment of any disease (Ralte *et al*. 2024, Semenya & Maroyi 2019, Wali *et al.* 2022).

Use value

The UV was used to determine the level of usefulness of the medicinal plants for the treatment of all diseases. The UV value was calculated using the following equation:

$$UV = \sum Ui/n,$$

where Ui refers to the number of uses stated by the informants for a particular medicinal plant, and N refers to the total number of informants participating in the study. Plant species with high UVs indicate many reports of their use, whereas plants with lower UVs indicate fewer reports of their use by informants (Ralte *et al.* 2024, Semenya & Maroyi 2019, Wali *et al.* 2022).

Frequency of citation

The FC was calculated by dividing the number of informants citing a particular type of plant by the number of informants interviewed, as shown below:

$$FC (\%) = (n/N) \times 100,$$

where n is the number of informants who mentioned a particular plant species, and N is the total number of informants interviewed in the study (Lu *et al.* 2022, Ralte *et al.* 2024).

Correlation evaluation

Further statistical analysis was conducted to determine the correlation between FL, FC, and UV at the species level (Soni *et al.* 2024) using JASP (software version 0.19, JASP, The Netherlands). The highest percentage of informant agreement per species was used for FL to represent the plant's specific use, while FC was further calculated as the absolute FC, *i.e*., the total number of use-reports for each species across all diseases. Lastly, UV was measured per species (Ahmad *et al*. 2017, Islam *et al*. 2022, Soni *et al*. 2024). The data normality of FL max, UV/species, and absolute FC was evaluated using the Shapiro-Wilk test, while the correlation was tested using Spearman's rank correlation test.

Results and Discussion

Demographics of the informants

The demographics of the 43 informants who participated in this study are presented in Table 2. The majority of the informants were older than 50 years, making up a total of 83.7%. This result aligns with the years of medicinal knowledge that they had, where most of the informants had 5-20 years of experience (86.1%). The originality of the informants' knowledge was maintained and passed down from one generation to the next. However, the *Batra* have no written documentation of their knowledge, as they memorized everything. Moreover, the knowledge transfer was limited to their children or relatives. The younger informants, aged 31-50 years, were fewer in number (16.3%), which may indicate that the younger generation is not familiar with traditional medicine practices. This coincides with the limited knowledge transferred by *Batra*. The smaller proportion of younger informants is in agreement with previous ethnomedicinal research in Indonesia, which revealed that the elder community members possess the majority of the ethnomedical knowledge, and its dissemination to the younger generation is relatively slow and challenging because of modernization and a lack of interest (Febriyanti *et al*. 2024, Taek *et al.* 2019). These factors, combined with limited knowledge transfer within the *Batra's* family, may result in the loss of local knowledge.

The informants were all native, and there was only a slight percentage difference in terms of gender (Table 2). Gender balance during the recruitment process was not considered in this study due to the limited number of informants. The research focused on individuals actively practicing traditional medicine, regardless of their gender. The insignificant percentage difference between men and women was also reported by Chaachouay *et al.* (2019) and Taek *et al.* (2019). However, several studies previously reported a higher percentage of men (59.5-70%) than women (Hosseini *et al*. 2022, Shrestha *et al*. 2024, Tuasha *et al.* 2018). The majority of the informants completed their formal education (completed primary, secondary, or tertiary education), and in addition to being traditional medicine practitioners, most of the informants were farmers (79.1%).

Plant parts used for treatment and their modes of preparation and application

A total of 74 medicinal plants were recorded to treat infectious diseases from 43 different families (Table 3). The most represented families were Zingiberaceae with seven medicinal plant species, followed by Lamiaceae (six species) and Malvaceae (five species). The most commonly used parts of plants were primarily leaves (51%), followed by the rhizomes (12%) (Fig. 2A). The high use of leaves is consistent with previous studies (Tugume *et al.* 2016, Wali *et al.* 2022). Leaves are frequently preferred because they are easy to harvest, their collection has minimal impact on plant sustainability, they are available almost year-round, possess rapid regeneration capacity, and are rich in bioactive compounds. In addition, leaves are the main photosynthetic organs and are therefore known to contain a wide range of chemical compounds with potential as active ingredients in traditional medicine (Adeniyi *et al*. 2018, Budiarti *et al*. 2020, Hareru *et al*. 2024, Ralte & Singh 2024, Wondimnew *et al*. 2025). The other parts of the plant that were used are the stem bark (8%), stem (5%), whole plants (4%), tubers (3%), roots (3%), fruits (2%), and seeds (1%) (Fig. 2A).

Table 2. Demographics of the informants

Demographics	N	%
Age		
31-40	1	2.3
41-50	6	14
51-60	13	30.2
61-70	14	32.6
>70	9	20.9
Gender		
Male	23	53.5
Female	20	46.5
Population		
Nativeethni	43	100
Immigrant	0	0
Medicinal Experience		
<5 years	6	14
5-10 years	15	34.9
11-15 years	12	27.9
16-20 years	10	23.3
>20 years	0	0
Education		
Uneducated	3	7.0
Did not graduate from primary school	8	18.6
Elementary school graduate	10	23.3
Junior high school graduate	7	16.3
High school graduate	13	30.2
University graduate	2	4.7
Occupation		
Farmers	34	79.1
Herbalist	4	9.3
Government employees	2	4.7
Merchant	2	4.7
Private employees	1	2.3

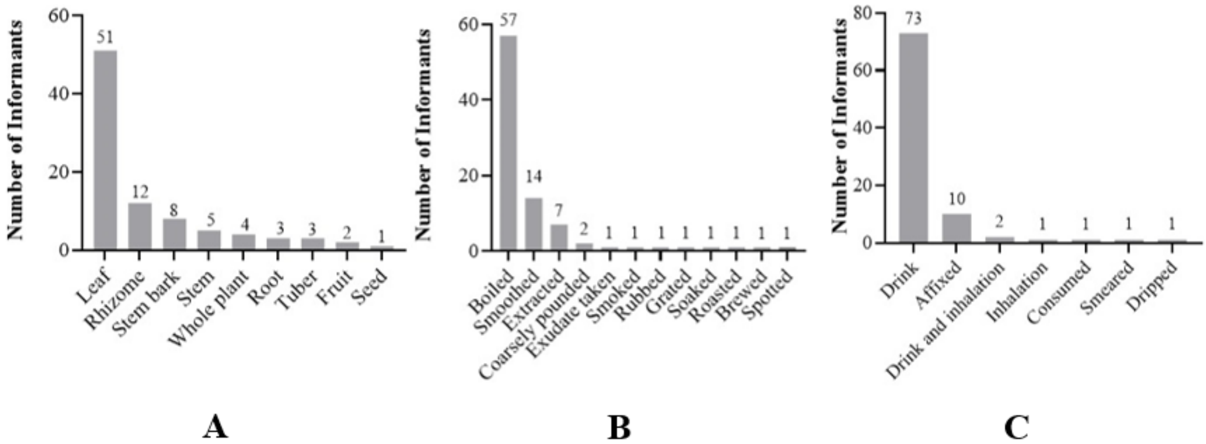
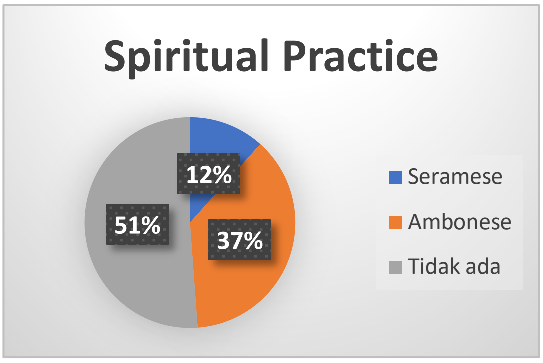


Figure 2. Plant parts used for traditional medicine and their modes of preparation and application. A. Plant parts used, B. Mode of preparation, C. Mode of application

In this study, medicinal plants were prepared in 12 different ways, with the most predominant mode of preparation being boiling (57%), followed by smoothing (14%) (Fig. 2B). Boiling is relatively simple, fast, and does not require much equipment

(Semenya & Maroyi 2019). It is also considered effective in extracting bioactive compounds, especially those that are water-soluble, and allows the combination of multiple medicinal plants to achieve synergistic effects. (Valentin *et al.* 2023, Ghafouri *et al* .2025, Semenya & Maroyi 2019, Tadesse *et al*. 2025). Grinding of the dry materials, one of the methods employed for smoothing, is deemed practical as the medicine can be taken home by patients and is suitable for long-term use. The other modes included extracted (7%), coarsely pounded (2%), smoked (1%), rubbed (1%), grated (1%), roasted (1%), and brewed (1%) (Fig. 2B).



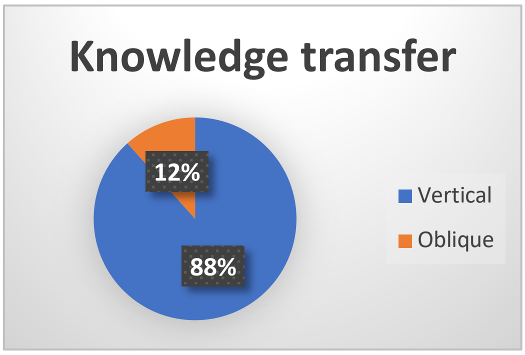


Figure 3. Spiritual practice and knowledge transfer in Central Maluku. A. Spiritual practice; B. Knowledge transfer

Traditional medicine practices in Central Maluku are not limited to the use of medicinal plants but are also accompanied by cultural transmission through spiritual practices and knowledge transfer. Healing practices that integrate spirituality and culture, and that connect individuals with their beliefs, are considered essential for maintaining balance and emotional well-being (Santosa & Adnyeswari 2024). Spiritual practices performed during the collection of medicinal plants include a variety of rituals. This study found that 49% of informants engaged in such practices, particularly among the Seram and Ambon ethnic groups, while the Banda ethnic group reported no specific spiritual practices related to plant collection (Fig. 3A). Ritual similarities were observed more strongly along religious rather than ethnic lines. Muslim informants typically performed greetings, prayers to God, recitations of shalawat, and salutations to Syekh Lukman Hakim, who is believed to be the guardian of nature. Christian informants, in contrast, tend to offer prayers to God. Both Muslim and Christian informants sometimes placed coins under the tree or plant as a sign of respect. Comparable practices are also reported globally, such as in Nigeria, where incantations are recited during plant preparation and healing processes, and in Ukraine, where rituals are performed according to specific calendars believed to bring blessings to the plants (Mafimisebi & Oguntade 2010, Stryamets *et al*. 2021). Despite these variations, the primary purpose remains the same, i.e., seeking the patient's recovery through the collected plants. These ritual practices are closely tied to the transmission of medicinal plant knowledge, which is typically passed down to children or family members as a means of safeguarding cultural continuity. The findings revealed that knowledge transfer occurs predominantly in a vertical manner to children (88%), by involving them in healing practices such as plant preparation, and obliquely to nephews or younger siblings (22%) who show interest in learning. Similar transmission patterns have been reported in other areas of Indonesia, such as Lampung (Sihotang 2020). While vertical transfer is often described as the dominant mode in countries such as India and Ethiopia, this study found that knowledge inheritance in Central Maluku does not discriminate by gender, in contrast to patriarchal traditions that prioritize male heirs (Gitima *et al.* 2025, Rao 2024). However, offspring generally do not yet practice independently, instead participating mainly in the preparation and processing stages of medicinal plants.

Beyond its cultural heritage, some informants also treat traditional healing as an economic practice. Herbal products in the form of plants, simplisia, or herbal concoctions are sold to neighboring areas through home-based, order-driven marketing systems. This method is preferred for its convenience and is also observed among traditional healers in the Goba district of Ethiopia (Gitima *et al.* 2025). This indicates that traditional healing is not only about knowledge of medicinal plants but also reflects the interconnection between spiritual practice, cultural heritage, and family economic resilience. Nevertheless, strategic efforts are needed to ensure sustainability. Among 43 informants, only two possessed written records of medicinal recipes, which were not shared during the study. The availability of modern and chemical medicines has further contributed to a decline in intergenerational knowledge transfer (Sutrisno *et al.* 2020). The dominance of older informants aged 50-70 years also indicates limited interest among younger generations in continuing traditional healing practices. Without active continuation, both the knowledge and the cultural practices associated with conventional medicine risk extinction.

Table 3. Medicinal plants used by local communities in the Central Maluku Regency

Voucher ID	Scientific Name	Family	Local Name	Indonesia Name	Habitus	Medicinal Uses	Part Used	Mode of Preparation	Mode of Application	Frequency of use	FC Absolut	FC (%)	UV	FL (%)/ disease)
56/B2-3/250924/R	*Allium cepa* L.	Amaryllidaceae	Bawang merah	Bawang merah	H	Postpartum infection	Tb	Boiled	Oral/drink	2	2	4.65	0.02	100
13/L1-11/120924/R	*Allium sativum* L.	Amaryllidaceae	Bawang putih	Bawang putih	H	Postpartum infection	Tb	Boiled	Oral/drink	3	4	9.30	0.05	75
						Malaria		Extracted	Oral/drink	1		0.00	0.00	25
46/B1-5/210924/R	*Alpinia galanga* (L.) Willd.	Zingiberaceae	Lengkuas	Lengkuas/ Laos	H	Fever	Rz	Boiled	Oral/drink	2	2	4.65	0.02	100
40/S3-20/200924/J	*Alstonia scholaris* (L.) R. Br.	Apocynaceae	Pule	Pulai/Pule	T	Postpartum infection	SB	Boiled	Oral/drink	26	26	60.47	0.02	100
25/S3-5/170924/R	*Andrographis paniculata* (Burm.f.) Wall. ex Nees	Acanthaceae	Sambiloto	Sambiloto	H	Postpartum infection	L	Boiled	Oral/drink	4	4	9.30	0.02	100
45/B1-4/200924/R	*Anredera cordifolia* (Ten.) Steenis	Basellaceae	Pinahong	Binahong	Ln	Furuncle	L	Pounded	Topical/ affixed	1	1	2.33	0.02	100
69/SR1-1/021124/J	*Boesenbergia rotunda* (L.) Mansf.	Zingiberaceae	Tumbu kunci	Temu kunci	Rz	Coughs	Rz	Boiled	Oral/drink	3	3	6.98	0.02	100
08/L1-8/090924/J	*Calophyllum inophyllum* L.	Calophyllaceae	Bintanggor	Nyamplung	T	Eye pain	L	Soaked	Oral/drink	5	5	11.63	0.02	100
30/S3-10/180924/R	*Carica papaya* L.	Caricaceae	Pepaya	Papaya	T	Postpartum infection	L	Smoothed	Oral/drink	2	9	20.93	0.05	22.22
						Malaria		Extracted	Oral/drink	7				77.78
39/S3-19/200924/J	*Catharanthus roseus* (L.) G. Don	Apocynaceae	Bunga putih ungu	Tapak dara	Sh	Pneumonia	L	Smoothed	Oral/drink	1	1	2.33	0.02	100
50/B1-9/220924/R	*Ceiba pentandra* (L.) Gaertn.	Malvaceae	Kapok	Kapuk	T	Pneumonia	L	Smoothed	Oral/drink	1	1	2.33	0.02	100
66/SP1-1/101024/J	*Centella asiatica* (L.) Urb.	Apiaceae	Kaki kuda	Pegagan	H	Internal sore	L	Boiled	Oral/drink	3	3	6.98	0.02	100

Voucher ID	Scientific Name	Family	Local Name	Indonesia Name	Habitus	Medicinal Uses	Part Used	Mode of Preparation	Mode of Application	Frequency of use	FC Absolut	FC (%)	UV	FL (%)/ disease)
43/B1-2/200924/R	*Chromolaena odorata* (L.) R.M. King & H. Rob.	Asteraceae	Kumba-kumba	Tekelan	Sh	Internal sore	L		Topical/ affixed	2	2	4.65	0.02	100
24/S3-4/160924/R	*Cinnamomum verum* J.Presl	Lauraceae	Kayu manis	Kayu manis	T	Postpartum infection	L	Boiled	Oral/drink	5	5	11.63	0.02	100
18/LB1-4/120924/R	*Clerodendrum quadriloculare* (Blanco) Merr.	Lamiaceae	Siri laka	Bintang jatuh	Sh	Coughs	L	Boiled	Oral/drink	1	1	2.33	0.02	100
17/LB1-3/120924/J	*Clinacanthus nutans* (Burm.f.) Lindau	Acanthaceae	Sarang burung	Gendis/Ki tajam	Sh	Postpartum infection	L	Boiled	Oral/drink	1	1	2.33	0.02	100
52/B1-11/230924/R	*Cocos nucifera* L.	Arecaceae	Kelapa	Kelapa/nyiur	T	Eye pain	R	Boiled	Oral/drink	2	2	4.65	0.02	100
61/H1-2/051024/J	*Coleus scutellarioides* (L.) Benth.	Lamiaceae	Biana	Miana	Sh	Postpartum infection	L	Boiled	Oral/drink	6	8	18.60	0.05	75
						Tuberculosis				2				25
01/L1-1/080924/R	*Curcuma longa* L.	Zingiberaceae	kunyit	Kunyit	H	Postpartum	Rz	Boiled	Oral/drink	8	30	69.77	0.09	26.67
						Malaria		Pounded and strained	Topical/smeared	8				26.67
						Navel infection		Grated	Oral/drink	2				6.67
						Coughs		Smoothed	Oral/drink	12				40.00
48/B1-7/210924/R	*Curcuma zanthorrhiza* Roxb.	Zingiberaceae	Temulawak	Temulawak	H	Postpartum infection	Rz	Boiled	Oral/drink	7	34	79.07	0.05	20.59
						Abdominal pain		Boiled	Oral/drink	27				79.41
28/S3-8/170924/R	*Curcuma zedoaria* (Christm.) Roscoe	Zingiberaceae	Kuning putih	Temu putih	H	Postpartum infection	Rz	Boiled	Oral/drink	9	17	39.53	0.05	52.94

Voucher ID	Scientific Name	Family	Local Name	Indonesia Name	Habitus	Medicinal Uses	Part Used	Mode of Preparation	Mode of Application	Frequency of use	FC Absolut	FC (%)	UV	FL (%)/ disease)
						Tuberculosis		Smoothed	Oral/drink	8			0.00	47.06
51/B1-10/220924/R	*Cyathula prostrata* (L.) Blume	Amaranthaceae	Isi kenari	Bayam pasir	H	Abdominal pain	WP	Boiled	Oral/drink	1	1	2.33	0.02	100
19/LB2-1/120924/R	*Cymbopogon citratus* (DC.) Stapf	Poaceae	Sareh putih	Serai dapur	H	Fever	S	Boiled	Oral/drink	2	9	20.93	0.05	22.22
						Postpartum infection				7				77.78
62/H1-3/051024/J	*Dioscorea hispida* Dennst.	Convolvulaceae	Ubi hutan merah	Gadung	Ln	Internal sore	L	Smoothed	Topical/ affixed	1	1	2.33	0.02	100
53/B1-12/230924/R	*Drynaria quercifolia* (L.) J.Sm.	Polypodiaceae	Dayang layang	Daun kepala tupai	E	Hernia infection	L	Extracted	Oral/drink	1	1	2.33	0.02	100
34/S3-14/180924/J	*Durio zibethinus* L.	Malvaceae	Durian	Durian/Duren	T	Postpartum infection	Sb	Boiled	Oral/drink	5	5	11.63	0.02	100
09/L1-9/090924/J	*Emilia sonchifolia* (L.) DC.	Asteraceae	Bunga ungu putih	Tempuh wiyang	H	Tuberculosis	WP	Smoothed	Oral/drink	2	2	4.65	0.02	100
36/S3-16/190924/J	*Epipremnum pinnatum* (L.) Engl.	Araceae	Janda bolong	Ekor naga	Ln	Postpartum infection	R	Boiled	Oral/drink	1	1	2.33	0.02	100
12/L2-3/120924/R	*Heritiera littoralis* Aiton	Moraceae	Buah pohon Kalot kambing	Dungun laut	T	Diarrhea	Sd	Brewed	Oral/drink	1	1	2.33	0.02	100
20/S2-1/150924/R	*Ficus septica* Burm. f.	Moraceae	Sirih popol	Awar-awar	T	Coughs	L	Boiled	Oral/drink	2	2	4.65	0.02	100
71/SR2-1/021124/R	*Flagellaria indica* L.	Flagellariaceae	Wareyan	Owar/Rotan Tikus	Ln	Hernia infection	S	Boiled	Oral/drink	10	10	23.26	0.02	100
33/S3-13/180924/J	*Graptophyllum pictum* (L.) Griff.	Acanthaceae	Alifuru	Daun ungu	Sh	Postpartum infection	L	Boiled	Oral/drink	2	2	4.65	0.02	100
72/SR2-2/021124/R	*Hibiscus × rosa-sinensis* L.	Malvaceae	Kembang sepatu	Kembang sepatu	Sh	Pneumonia	L	Smoothed	Oral/drink	1	1	2.33	0.02	100

Voucher ID	Scientific Name	Family	Local Name	Indonesia Name	Habitus	Medicinal Uses	Part Used	Mode of Preparation	Mode of Application	Frequency of use	FC Absolut	FC (%)	UV	FL (%)/ disease)
05/L1-5/080924/J	*Ipomoea pes-caprae* (L.) R.Br.	Convolvulaceae	Katang-katang	Tapak kuda	Ln	Postpartum infection	L	Boiled	Oral/drink	4	4	9.30	0.02	100
68/SP3-2/111024/R	*Jasminum elongatum* (P.J.Bergius) Willd.	Oleaceae	Melati cina	Pancasuda/Gambir hutan	Sh	Coughs	L	Boiled	Oral/drink	1	1	2.33	0.02	100
55/B2-2/250924/R	*Justicia gendarussa* Burm.f.	Acanthaceae	Lidah rusa	Gandarusa	Sh	Postpartum infection	L	Boiled	Oral/drink	3	3	6.98	0.02	100
15/LB1-1/120924/J	*Kalanchoe pinnata* (Lam.) Pers.	Crassulaceae	Cocor bebek	Daun sejuk/sosor bebek	Sh	Fever	L	Spotted	Topical/ affixed	1	1	2.33	0.02	100
32/S3-12/180924/R	*Lansium domesticum* Corrêa	Meliaceae	Langsat merah	Langsat/duku	T	Postpartum	SB	Boiled	Oral/drink	1	6	13.95	0.05	16.67
						Malaria	L	Extracted	Oral/drink	5		0.00	0.00	83.33
31/S3-11/180924/R	*Macaranga tanarius* (L.) Müll.Arg.	Euphorbiaceae	Hanua	Hahuhun/Halumutu	T	Postpartum infection	L	Boiled	Oral/drink	2	2	4.65	0.02	100
49/B1-8/210924/R	*Mangifera foetida* Lour.	Anacardiaceae	Bacang	Bacang	T	Postpartum infection	SB	Boiled	Oral/drink	1	1	2.33	0.02	100
58/B1-1/200924/R	*Mangifera indica* L.	Anacardiaceae	Daun mangga muda	Mangga	T	Influenza	L	Rubbed	Inhalation	1	1	2.33	0.02	100
37/S3-17/190924/J	*Mangifera laurina* Blume	Anacardiaceae	Mangga air	Mangga Pari	T	Postpartum infection	Sb	Boiled	Oral/drink	2	2	4.65	0.02	100
23/S3-3/160924/R	*Melicope glabra* (Blume) T.G. Hartley	Rutaceae	Kayu timur	Empah/Empatung	T	Postpartum infection	SB	Boiled	Oral/drink	4	4	9.30	0.02	100
35/S3-15/160924/R	*Mentha × piperita* L.	Lamiaceae	Babau	Bijanggut pedas	H	Postpartum infection	L	Boiled	Oral/drink	1	1	2.33	0.02	100
07/L1-7/090924/J	*Moringa oleifera* Lam.	Moringaceae	Daun Kelor	Kelor	T	Malaria	L	Extracted	Oral/drink	2	2	4.65	0.02	100
03/SP2-1/101024/R	*Musa × paradisiaca* L.	Musaceae	Pisang abu-abu	Pisang kepok	H	Hematuria	F	Roasted	Oral/eaten	1	1	2.33	0.02	100

Voucher ID	Scientific Name	Family	Local Name	Indonesia Name	Habitus	Medicinal Uses	Part Used	Mode of Preparation	Mode of Application	Frequency of use	FC Absolut	FC (%)	UV	FL (%)/ disease)
16/LB1-2/120924/J	*Myristica fragrans* Houtt.	Myristicaceae	Pala	Pala	T	Postpartum infection	L	Boiled	Oral/drink and inhalation	8	8	18.60	0.02	100
47/B1-6/210924/R	*Ochroma pyramidale* (Cav. ex Lam.) Urb.	Malvaceae	Haleki	Balsa	T	Coughs	L	Boiled	Oral/drink	3	3	6.98	0.02	100
44/B1-3/200924/R	*Ocimum tenuiflorum* L.	Lamiaceae	Kamangi merah	Ruku-ruku/kemangi hutan	Sh	Coughs	L	Boiled	Oral/drink	1	1	2.33	0.02	100
74/SR4-1/021124/R	*Orthosiphon aristatus* (Blume) Miq.	lamiaceae	Kumis kucing	Kumis kucing	Sh	Postpartum	L	Boiled	Oral/drink	6	11	25.58	0.05	54.55
						Tuberculosis				5				45.45
04/L1-4/080924/R	*Peperomia pellucida* (L.) Kunth.	Piperaceae	Daun Mata Bulan	Suruhan/ketum pangan air	H	Furuncle	L	Pounded	Topical/ affixed	13	13	30.23	0.02	100
10/L1-10/090924/J	*Phyllanthus urinaria* L.	Phyllanthaceae	Karincang or maniram	Meniran	Sh	Postpartum infection	L	Boiled	Oral/drink	8	16	37.21	0.05	50
						Malaria		Extracted	Oral/dripped	8				50
59/H2-3/051024/R	*Piper betle* L.	Piperaceae	Sirih hutan	Sirih	Ln	Coughs	L	Boiled	Oral/drink	1	5	11.63	0.05	20
						Postpartum infection				4				80
14/L1-12/120924/R	*Pisonia grandis* R.Br.	Nyctaginaceae	Kol hutan	Kol Banda	T	Postpartum infection	L	Boiled	Oral/drink	2	2	4.65	0.02	100
41/S3-21/200924/J	*Pleurolobus gangeticus* (L.) J.St.-Hil. ex H. Ohashi & K. Ohashi	Fabaceae	Lidah anjing	Daun bulu ayam	Sh	Abdominal pain	WP	Boiled	Oral/drink	2	2	4.65	0.02	100
60/H1-1/051024/J	*Pluchea indica* (L.) Less.	Asteraceae	Beluntas	Beluntas	Sh	Postpartum infection	L	Boiled	Oral/drink	6	6	13.95	0.02	100

Voucher ID	Scientific Name	Family	Local Name	Indonesia Name	Habitus	Medicinal Uses	Part Used	Mode of Preparation	Mode of Application	Frequency of use	FC Absolut	FC (%)	UV	FL (%)/ disease)
57/H2-1/051024/R	*Pogostemon cablin* (Blanco) Benth.	Lamiaceae	Akar kuning	Nilam aceh	Sh	Coughs	L	Boiled	Oral/drink	1	1	2.33	0.02	100
22/S3-2/160924/R	*Psidium guajava* L.	Myrtaceae	Giawas	Jambu biji	Sh	Coughs	L	Boiled	Oral/drink	2	3	6.98	0.05	66.67
						Diarrhea				1				33.33
27/S3-2/160924/R	*Pterocarpus indicus* Willd.	Fabaceae	But angsana	Angsana	Sh	Postpartum	L	Boiled	Oral/drink	3	3	6.98	0.02	100
02/L1-2/080924/R	*Ricinus communis* L.	Euphorbiaceae	Daun jarak	Jarak kepyar	Sh	Toothache and mouth pain	S	Exudate taken	Topical/ affixed	2	24	55.81	0.05	8.33
						Fever		Smoked		22				91.67
38/S3-18/190924/J	*Rivina humilis* L.	Petiveriaceae	Rica hutan	Getih-getihan	H	Postpartum infection	L	Boiled	Oral/drink	1	1	2.33	0.02	100
54/B2-1/250924/R	*Scleria terrestris* (L.) Fassett	Cyperaceae	Daun Pisau	Sesayang	H	Postpartum infection	R	Boiled	Oral/drink	1	1	2.33	0.02	100
63/SP2-1/101024/R	*Selaginella willdenowii* (Desv.) Baker	Selaginellaceae	Rekrekan	Paku rane	Sh	Open wounds	L	Smoothed	Topical/ affixed	15	15	34.88	0.02	100
70/SR1-2/021124/J	*Senna alata* (L.) Roxb.	Fabaceae	Lagundi	Daun kupang	Sh	Mumps	L	Chewed	Oral/drink	1	1	2.33	0.02	100
21/S3-1/160924/R	*Stachytarpheta jamaicensis* (L.) Vahl	Verbenaceae	Parudang	Pecut kuda	Sh	Coughs	L	Smoothed	Oral/drink	1	1	2.33	0.02	100
73/SR2-3/021124/R	*Syzygium aromaticum* (L.) Merr. & L.M. Perry	Myrtaceae	Cengkeh	Cengkeh	T	Postpartum infection	L	Boiled	Oral/drink	6	6	13.95	0.02	100
06/L1-6/080924/J	*Syzygium malaccense* (L.) Merr. & L.M.Perry	Myrtaceae	Jambu merah	Jambo bol	T	Postpartum infection	Sb	Boiled	Oral/drink	2	2	4.65	0.02	100
26/S3-6/170924/R.	*Terminalia catappa* L.	Combretaceae	Katapang	Ketapang	T	Postpartum infection	Sb	Boiled	Oral/drink	3	3	6.98	0.02	100

Voucher ID	Scientific Name	Family	Local Name	Indonesia Name	Habitus	Medicinal Uses	Part Used	Mode of Preparation	Mode of Application	Frequency of use	FC Absolut	FC (%)	UV	FL (%)/ disease)
11/L4-1/120924/R	*Theobroma cacao* L.	Malvaceae	Buah coklat muda	Cokelat/kakao	T	Furuncle	F	Grated	Topical/ affixed	1	1	2.33	0.02	100
67/L2-9/220924/R	*Tinospora crispa* (L.) Hook.f. & Thomson	Menispermaceae	Antawali	Brotowali	Ln	Malaria	S	Boiled	Oral/drink	35	35	81.40	0.02	100
42/B1-1/200924/R	*Tridax procumbens* L.	Arecaceae	Rengkam	Gletang	H	Open wounds	L	Smoothed	Topical/ affixed	3	3	6.98	0.02	100
64/SP2-2/101024/R	*Urena lobata* L.	Malvaceae	Ka'I	Pulutan	Sh	Abdominal pain	WP	Boiled	Oral/drink	3	3	6.98	0.02	100
29/S3-9/170924/R	*Zingiber officinale* Roscoe	Zingiberaceae	Halia merah	Jahe	H	Postpartum infection	Rz	Boiled	Oral/drink	2	2	4.65	0.02	100
65/SP2-3/101024/R	*Ziziphus mauritiana* Lam.	Rhamnaceae	Belakang putih	Bidara/widara	T	Postpartum infection	L	Boiled	Oral/drink	1	1	2.33	0.02	100

The local name is in Ambonese Malay. T = Tree, Sh = Shrub, B = Bush, Ln = Liana, H = Herb; Plant parts used: L = Leaves, SB = Stem bark, S = Stem, Tb = Tuber, F = Fruit, Sd = Seed, R = Root, Rz = Rhizome, WP = Whole plant

Most of the prepared medicinal plants were taken orally, either through drinking (73%) or consumption (1%) (Fig. 2C). The high use of oral administration is due to its ease of application for patients. In addition, certain compounds, such as alkaloids, are known to be more easily absorbed via the oral route (Boado & Asase 2017, Chaachouay *et al*. 2019, Mekuria *et al.* 2025, Ralte & Singh 2024). The other modes of application were affixed (10%), a combination of drinking and inhalation (2%), inhalation (1%), smeared (1%), and dripped (1%) (Fig. 2C).

Ethnobotanical indexes

The results of this ethnomedicinal study revealed a pattern of medicinal plant use in treating diseases, and the consensus among the *Batra* indicates the potential for investigating a particular medicinal plant as a drug candidate. Thus, botanical indices were included in this study. There were 18 infectious diseases identified in this study (Table 4). These diseases were categorized based on their ICF values, where those with ICF values >0.7 were considered high categorical diseases, those with ICF values of 0.2-0.63 were considered moderate categorical diseases, and those with ICF values <0.2 were considered low categorical diseases (Pandikumar *et al.* 2011, Torres-León *et al.* 2023). High ICF values indicate high consensus among the informants about the medicinal plant uses for certain diseases, whereas low ICF values indicate disagreement. Navel infection and toothache, and mouthache had the highest ICF value of 1, followed by open wounds (0.94), malaria (0.91), abdominal pain (0.91), and hernia infection (0.9).

Table 4. Informant consensus factor

No	Disease	(Nr)	(Nt)	ICF
Disease with a high category				
1	Navel infection	2	1	1.00
2	Toothache and mouthache	2	1	1.00
3	Open wounds	18	2	0.94
4	Malaria	66	7	0.91
5	Abdominal pain	33	4	0.91
6	Hernia infection	11	2	0.90
7	Fever	27	4	0.88
8	Furuncle	15	3	0.86
9	Eye pain	7	2	0.83
10	Tuberculosis	17	4	0.81
11	Postpartum infection	159	37	0.77
Diseases in the moderate category				
1	Cough	28	11	0.63
2	Internal sore	6	3	0.60
Diseases with a low category				
1	Diarrhea	2	2	0.00
2	Pneumonia	3	3	0.00
3	Flu	1	1	0.00
4	Mumps	1	1	0.00
5	Hematuria	1	1	0.00

*Nr: Number of uses; Nt: Number of medicinal plants

Our results show that navel infection was treated using the topical application of *Curcuma longa*. *Curcuma longa* was the only plant reported to be used for this type of infection and had high FL, FC, and UV values of 100%, 1.89, and 0.81, respectively. This study supports previous ethnomedicinal research on the use of *Curcuma longa* for skin diseases and open wounds in Indonesia (Mujahid *et al.* 2019, Subositi & Wahyono 2019, Syafri *et al.* 2024). The antibacterial activities of *Curcuma longa* against *Staphylococcus aureus*, *Pseudomonas sp*., and *Bacillus subtilis* were reported in earlier studies because of its curcumin content (Adamczak *et al.* 2019, Hussain *et al*. 2021, Sari & Wicaksono 2016). The high antioxidant activity of the plant also promotes the wound-healing process by protecting the new tissue from free radical damage (Chuysinuan *et al.* 2023, Kumari *et al*. 2022). Although previous studies have reported the use of *Curcuma longa* for open wounds, *Batra* commonly used *Selaginella willdenowii* as the treatment of open wounds, which also had high FL and FC values of 100% and 0.81, respectively. This plant contains phytochemicals, such as flavonoids, alkaloids, phenols, and tannins, that have potential antimicrobial and antioxidant activities (Chai & Wong 2012, Neenu *et al*. 2024). The differences in medicinal plant use in Indonesia highlight the diversity of local wisdom and culture, as well as its rich biodiversity (Zubaidah *et al.* 2020).

The third disease with the highest ICF value was malaria, which is endemic in the Central Maluku Regency. The local community believes that, in addition to mosquitoes, fatigue and cold weather trigger the onset of malaria. They also believe that consuming bitter foods or plants, such as antawali (*Tinospora crispa*) and papaya (*Carica papaya)* leaves, can overcome malaria. The same belief is also embraced by the communities in Tetun, East Nusa Tenggara, who use bitter plants to treat malaria, especially sambiloto (*Andrographis paniculata*) (Taek *et al.* 2019). *Tinospora crispa* is frequently used by the local community for malaria treatment and is considered effective, as observed from the high FL, FC, and UV values of 100%, 1.89, and 0.81, respectively. This empirical finding aligns with numerous *in vitro* and *in vivo* studies, which have demonstrated its antiplasmodial activity (Chaudhary *et al.* 2023, Haque *et al.* 2023). Its extract was also found to have excellent antioxidant activity, indicating the plant's protective role against renal damage and hemolysis-induced oxidative stress that occurs during malaria infection (Nutham *et al*. 2015). The antimalarial activity is thought to be mediated by diterpenoids and 13-hydroperoxyoctadeca-9, 11-dienoic acid (Haque *et al.* 2023, Lee *et al.* 2020). This plant also contains magnoflorine, which can enhance the body's immunity (Ahmad *et al.* 2022).

Abdominal pain ranks fourth among the diseases with the highest ICF. Several medicinal plants have been used to treat abdominal pain: *Urena lobata*, *Pleurolobus gangeticus*, *Cyathula prostrata*, and *Curcuma zanthorrhiza*. Although these plants had an FL index of 100% for abdominal pain, *Curcuma zanthorrhiza* had the highest FC and UV of 1.89 and 0.81, respectively. *Curcuma zanthorrhiza.* has traditionally been used for gastrointestinal-related diseases, such as stomach illness, diarrhea, constipation, and dysentery, because of its anti-inflammatory, antibacterial, and antioxidant activities (Rahmat *et al.* 2021). A large body of literature has reported its antimicrobial activity against various microbes, including *Escherichia coli*, *Salmonella typhi*, *Staphylococcus aureus*, *Salmonella typhimurium*, *Mycobacterium tuberculosis*, *Klebsiella pneumoniae*, *Candida glabrata*, *Aspergillus flavus*, and *Spodoptera littoralis* (Mustarichie & Ramdhani 2022, Rahmat *et al*. 2021). These findings suggest that *Curcuma zanthorrhiza.* It can also be used for pulmonary, skin, and nail infections. The microbial activity is likely to be mediated by xanthorrhizol and curcuminoids, which can alter cell permeability, inhibit mitogen-activated protein kinase and nuclear factor kappa B (NF-kB) activity, and interfere with cytokinesis and bacterial cell proliferation (Adamczak *et al.* 2019, Hussain *et al.* 2021, Kumari *et al.* 2022). Furthermore, the antibiofilm activity of xanthorrhizol has been identified in several stages of biofilm formation (Suniarti *et al.* 2022). The fifth disease with the highest ICF was hernia infection. Two plants were used for their treatment, namely, *Drynaria quercifolia* and *Flagellaria indica*. Despite both having an FL of 100%, *Flagellaria indica* was more widely used for hernia than *Drynaria quercifolia,* as *Flagellaria indica* has higher values of FC (0.54) and UV (0.23). To the best of our knowledge, this is the first report of the traditional use of *Flagellaria indica* for hernia. Other studies have reported its traditional use for gastritis, asthma, shortness of breath, and fever (Iskandar *et al.* 2022, Karmakar *et al.* 2021). There were also diseases with an ICF value of 0, including toothache and mouthache, diarrhea, pneumonia, flu, and mumps. This value reflects disagreement among *Batra*, which can occur due to poor information exchange among *Batra* and differences in experience (Tuasha *et al.* 2018). In addition, the high number of citations for Postpartum infection complaints may indicate that this condition is prevalent in the study area, thus prompting *Batra* to develop treatments by investigating the therapeutic potential of various species, as shown by the high number of plants used (38) to treat it.

To prevent Postpartum infections, *Alstonia scholaris* is usually used (FC = 1.41) and is considered effective (FL 100% for Postpartum infection, UV = 0.60). Although there are many modern medicines available and modernly packaged herbs, the people in Central Maluku believe that medicinal plants are more effective for the healing process. Interestingly, the culture of mothers or in-laws accompanying their children after childbirth encourages the sharing of experiences in the use of medicinal plants to overcome Postpartum infection complaints. The use of *Alstonia scholaris* for Postpartum infection has been recorded in a few areas in Indonesia, as well as in the Philippines (Mulyanto *et al.* 2024, Santoso *et al.* 2019, Tiquio *et al.* 2024). Previous pharmacological studies have shown that the alkaloids in this plant are responsible for its antimicrobial and anti-inflammatory activities (Zhao *et al.* 2021). Furthermore, this study found that endemic plant species of Maluku, such as *Myristica fragrans* and *Syzygium aromaticum*, were used for Postpartum infection complaints. These plants are also spices that are commonly used as cooking ingredients.

The FL is an important parameter to assess a plant's usability level for a particular disease. An FL value of 100% indicates that all reports stated the use of the plant for the same disease (Ralte *et al.* 2024, Wali *et al.* 2022). FL values found in this study varied, ranging from 8.33 to 100%. There were 60 plant species with an FL value of 100%, and a particular disease could be treated using more than one species with an FL value of 100%. For instance, a cough could be treated using *Ficus septica,* *Piper betle, Clerodendrum quadriloculare, Stachytarpheta jamaicensis, Curcuma longa, Ochroma pyramidale, Jasminum elongatum,* and *Psidium guajava,* all of which had an FL value of 100%. However, there were plants with low FL values. For example, *Ricinus communis* had an FL value of 8.33% for toothache and mouthache (Table 3). The UV index facilitates the assessment of the relative importance of each plant by considering its relative use among informants, whereas the FC determines the most common medicinal plants used in the local area for various diseases (Shuaib *et al.* 2023). Both the UV and FC values varied among species, with the UV index ranging from 0.02 to 0.81 and the FC ranging from 0.05 to 4.65 (Table 3). The most commonly used medicinal plants can be identified from the FC value, where the higher the FC, the more commonly the plant is used (Lu *et al.* 2022, Ralte *et al.* 2024).

Relationship between the FL, FC, and UV indexes

Following the Shapiro-Wilk test, p-values for FL_{max}, UV per species, and absolute FC were all < 0.01, indicating that the data were not normally distributed. Spearman's rank correlation revealed a significant negative correlation between FL and FC ($\rho = -0.548$, $p < 0.05$), as well as between FL and UV ($\rho = -0.548$, $p < 0.05$). In contrast, FC and UV showed a very strong positive correlation ($\rho = 1.0$, $p < 0.01$).

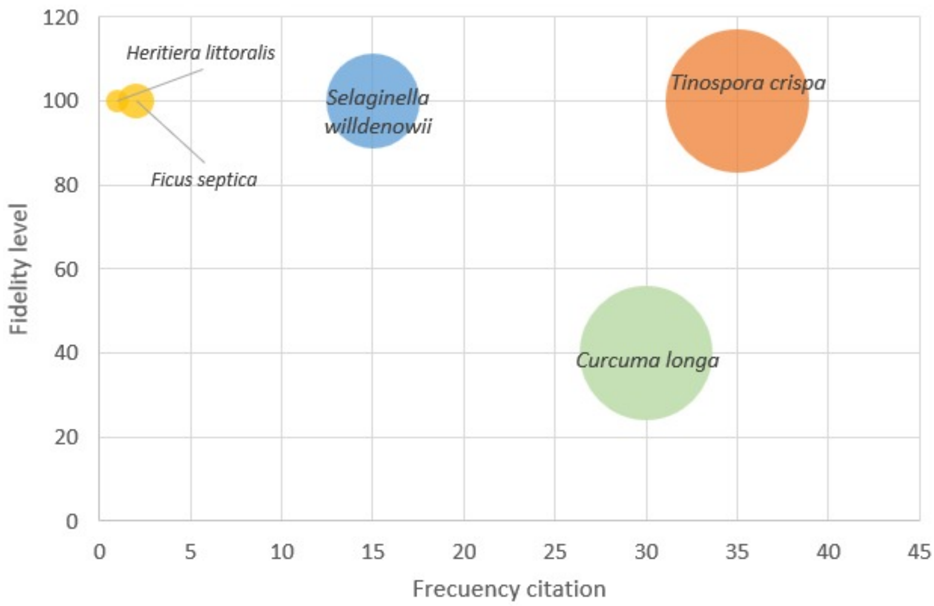


Figure 4. Correlation between Fidelity Level (FL), Citation Frequency (FC), and Use Value (UV) in Selected Medicinal Plants.

The visualization of index relationships revealed variation in the patterns of medicinal plant use (Fig.4). The negative correlation between *Frequency of Citation* (FC) and *Fidelity Level* (FL) in this study indicates that species such as *Curcuma longa* are frequently mentioned by traditional healers and are widely recognized for treating multiple ailments. These plants represent a generalist pattern of use, where a single species is employed for several different conditions. In contrast, certain plants are used specifically for one disease, such as *Ficus septica* and *Heritiera littoralis*. This pattern reflects specialized and narrowly transmitted knowledge that is often confined to a limited group of informants. Mathez-Stiefel and Vandebroek (2012) reported that such specific uses are typically shaped by vertically transmitted knowledge systems, where medicinal plant information is passed down within families or among a few individuals—a pattern similar to that observed in this study. Conversely, generalist plants tend to be highly popular because their knowledge is widely shared within communities, supported by their broad availability and accessibility (Paiva et al., 2021). This study also identified species that are not frequently cited but are consistently used for certain disease categories, such as *Selaginella willdenowii*. Moreover, the positive relationship among the three indices (FC, FL, and Use Value / UV) suggests that *Tinospora crispa* is both popular and versatile, being widely cited and used for multiple health conditions, reflecting a shared perception of their efficacy among healers. Overall, these index relationships illustrate the diversity of perception and practice in traditional medicine, highlighting patterns of consensus among healers, which are further elaborated in the following subsection.

Comparative Analysis with Previous Ethnobotanical Studies

The comparative dataset comprising 74 medicinal plant species and their associated diseases—compiled from this study alongside previous ethnomedicinal research conducted in Indonesia and other countries—together with detailed information on their chemical constituents and related bioactive compounds, is presented in the Appendix Table. The comparative results reveal both concordances and divergences among ethnic groups, reflecting variations in ethnobotanical knowledge and practices. Traditional healers (*batra*) belonging to the Ambonese ethnic group were found to possess broader and more diverse knowledge of medicinal plants than the other two groups. Some overlaps were observed in the use of specific plants for treating certain ailments, indicating shared traditional knowledge transmitted across generations. Nevertheless, distinct differences emerged, particularly when comparing the Ambonese and Banda groups, especially in the selection and application of medicinal species. These variations appear to be influenced by multiple factors, most notably geographical setting and ecological accessibility. The Ambonese and Seramese communities, living in proximity, tend to share similar medicinal plant knowledge due to frequent interaction and exchange of resources. Hou *et al*. (2024) reported that geographic closeness can shape the alignment in the use and conservation of medicinal plants. In contrast, the Banda community—geographically isolated, surrounded by the sea, and historically renowned for its spice trade—shows a distinctive ethnobotanical profile. The people of Banda primarily focus their livelihood and ecological knowledge on marine resources, tourism, and spice-based agroforestry, particularly *Myristica fragrans* (nutmeg), and its derivatives. This orientation likely influences their familiarity and utilization of specific medicinal species. As Fernández *et al*. (2023) noted, geographic and cultural isolation can shape not only plant taxonomy but also patterns of ethnomedicinal application, while cultural factors further determine how plants are perceived and used to treat illness.

Although few studies have directly compared the ethnomedicinal practices of these three ethnic groups, Teurupun *et al*. (2020) reported that, in the treatment of neuromuscular disorders, communities in the Banda Island cluster exhibited the lowest rate of medicinal plant use compared with those in Ambon and Seram. This finding supports the view that ecological constraints and spatial isolation contribute to variations in traditional healing practices. This study identified 23 plant species that were used consistently across ethnic groups in Central Maluku and among other Indonesian communities. These species are commonly employed to treat postpartum disorders, malaria, fever, cough, abdominal pain, diarrhea, and wound infections. Such consistencies indicate a shared core of traditional knowledge, likely maintained through vertical transmission within families, and reinforced by the high availability and ease of use of certain popular species. Conversely, 51 species documented in this study were applied differently from those reported in earlier works. In Central Maluku, several of these plants were used inconsistently to treat infectious diseases such as tuberculosis, malaria, diarrhea, postpartum complications, and furuncles. Notably, *Musa × paradisiaca* was used to treat hematuria, while *Drynaria quercifolia* and *Flagellaria indica*. were empirically applied for hernia uses not previously recorded in other studies. These findings highlight the presence of localized innovation and empirical adaptation in response to the community's available natural resources and lived experience. Furthermore, the observed pattern of vertical knowledge transmission from parents to offspring indicates that the ethnomedicinal knowledge within these communities remains largely original and resilient to external influence. This may explain why the patterns of medicinal plant use differ from those of other ethnic groups in Indonesia or elsewhere, even under similar ecological conditions. The scientific rationale supporting both the aligned and non-aligned uses of medicinal plants, along with discussions of their pharmacological activities and bioactive compounds, is presented in detail in the sub-section *Potential Medicinal Plants for Antimicrobial Drug Development*.

Potential medicinal plants for antimicrobial drug development

This study identified several medicinal plants with potential as antimicrobial agents and as sources for new drugs to treat infectious diseases. The plants were selected based on the following criteria:

High indeks Tier: New use

Several medicinal species demonstrated high ethnobotanical index values in this study, including *Tinospora crispa*, *Curcuma zanthorrhiza*, *Selaginella willdenowii*, and *Flagellaria indica*. Among these, *Flagellaria indica* presents a fascinating case due to its distinctive ethnomedical application compared to other ethnic groups. In this community, the plant is traditionally used to treat hernia, a condition rarely addressed in other ethnomedicinal reports. Previous studies have identified constipation and collagen abnormalities as key contributing factors in hernia development (Kumar *et al*. 2022). Severe constipation increases intra-abdominal pressure, thereby aggravating hernial protrusion, while collagen dysfunction weakens muscular and connective tissue integrity (Chang *et al*. 2022, Venmathi *et al*. 2022). The laxative properties of *Flagellaria indica* (Karmakar *et al*. 2023) may therefore offer physiological support in relieving constipation, potentially mitigating one of the predisposing factors of hernia. In addition, *Flagellaria indica* contains a rich array of bioactive compounds—including flavonoids, tannins, saponins, steroids, triterpenoids, and alkaloids—which collectively contribute to its antioxidant capacity (Gnanaraj & Shah 2015, Venmathi *et al*. 2022). Antioxidants play a crucial role in reducing oxidative stress, which is closely associated with tissue degradation and impaired collagen stability. By alleviating oxidative damage, these compounds may help strengthen the connective structures that maintain abdominal wall integrity (Chaudhary *et al*. 2023). Hence, the community's use of *Flagellaria indica* for hernia treatment appears to be scientifically plausible, aligning traditional therapeutic practice with modern biomedical understanding. This finding highlights the species as a top-tier plant—one that not only possesses a high ethnobotanical index but also represents a novel and biologically rationalized use within the areal medicinal knowledge system.

Validation Tier: Generally Validated Plants

Plants with high ethnobotanical index values have often been identified as priority species for new drug discovery initiatives (Ullah *et al*. 2025). Among them, *Tinospora crispa* stands out as a culturally and pharmacologically significant medicinal plant, traditionally used for treating malaria across various areas in Indonesia. The widespread belief that plants with a bitter taste possess strong healing properties—particularly against malaria—has contributed to the frequent use of *Tinospora crispa* in traditional medicine. A similar perception is observed among several Papuan ethnic groups, where bitter plants such as *Alstonia scholaris* (pule) and *Carica papaya* are also employed to manage malaria (Budiarti *et al*. 2020). In Bengkulu, *Tinospora crispa* is likewise recognized by local communities for the same therapeutic purpose (Susanti *et al*. 2024). These patterns reflect a shared interethnic consensus regarding the medicinal value of *Tinospora crispa* as an antimalarial remedy. Beyond its use against malaria, *Tinospora crispa* is traditionally employed to treat various infectious and inflammatory conditions, including postpartum disorders, fever, and skin infections. Phytochemical investigations have revealed that this species contains alkaloids, flavonoids, terpenoids, and phenolic compounds, which underpin a wide range of biological activities such as anti-inflammatory, antioxidant, immunomodulatory, cytotoxic, antimalarial, cardioprotective, antidiabetic, and antiparasitic effects (Haque *et al*. 2023). Experimental studies further support its antimicrobial potential, with extracts from leaves and roots demonstrating inhibitory effects against *Escherichia coli* and *Candida albicans* (Mohammed *et al*. 2012, Shree & Krishnaveni 2023). Additionally, *Tinospora crispa* has been shown to suppress the growth of *Plasmodium falciparum* parasites at concentrations of 10 µg/mL (Dewi *et al*. 2024). Several active compounds—including *borapetosides A-E, columbin, tinosporaside, magnoflorine,* and *tinosporine*—are believed to contribute to these effects (Haque *et al*. 2023). Among them, borapetoside D was reported to inhibit heme polymerization (Sulastri, 2018), a process directly associated with malaria severity (Dalko *et al*. 2015). These findings scientifically validate the ethnopharmacological knowledge surrounding the traditional use of *Tinospora crispa* in malaria treatment.

Despite this, *Tinospora crispa* from Central Maluku remains largely unexplored in terms of its phytochemical composition and biological potential. Considering the area's distinct geography and ecological diversity compared to other parts of Indonesia, further investigation is warranted. Environmental parameters such as nutrient availability, temperature, altitude, and seasonal variation are known to influence the biosynthesis of plant secondary metabolites (de Souza *et al*. 2021, Kushram & Mir 2019, Mugwanya *et al*. 2025, Vinayak & Praveen 2021). For example, Öner & Yeşil (2023) demonstrated that in *Origanum majorana*, linalool concentration—the principal constituent of its essential oil—was highest at 766 m (79.84%), while compounds such as borneol, linalool oxide, and germacrene-D peaked at 890 m. Likewise, α-terpineol and carvacrol showed higher concentrations at 1,180-1,387 m. Similarly, a comparative study on *Andrographis paniculata* collected from twelve locations across Java revealed substantial variation in andrographolide content (0.29-4.44%), emphasizing the environmental impact on secondary metabolite profiles (Royani *et al*. 2014). Hence, the exploration of *Tinospora crispa* originating from Central Maluku could yield valuable insights into the geographic variation of phytochemical constituents and biological activity, strengthening its position within the validation tier of high-index medicinal plants. Such an approach not only bridges traditional wisdom with modern scientific validation but also supports the sustainable utilization of Indonesia's rich ethnomedicinal resources.

Exploratory Tier: Low-Consensus but High-Fidelity Plants

Previous ethnomedicinal research has recommended several medicinal plants with low informant consensus values but high-fidelity levels, highlighting their potential for further exploration of chemical constituents and biological activities (Dagni *et al.* 2023). Although a low consensus value may suggest limited shared knowledge, this can also result from erosion of traditional knowledge due to poor documentation practices or the absence of intergenerational knowledge transfer (Liu *et al*. 2023, Maiyo *et al.* 2024). In the present study, several medicinal species were identified with low consensus yet high-fidelity levels in the treatment of specific ailments, indicating their strong perceived efficacy despite limited communal awareness.

Pneumonia

Three plant species were recorded with high fidelity values despite their low consensus index: *Catharanthus roseus*, *Ceiba pentandra*, and *Hibiscus × rosa-sinensis. Catharanthus roseus,* locally known as "ungu putih," contains more than 70 distinct alkaloids (Singh et al., 2018) and has demonstrated broad-spectrum antimicrobial and antiviral properties (Patil & Ghosh 2010, Samiyarsih *et al.* 2020, Singh *et al*. 2018). The flower extract has shown significant inhibitory activity gainst two key pneumonia-causing pathogens, *Streptococcus pneumoniae* and *Klebsiella pneumoniae* (Alhijrah *et al*.2024, Khairani *et al*. 2022, Sultana *et al*. 2024). *Ceiba pentandra* has been traditionally used for various infectious diseases, including malaria, diarrhea, and skin infections (Silva *et al*. 2023). Previous studies demonstrated that bark and seed extracts are antibacterial against *Staphylococcus aureus* and *Pseudomonas aeruginosa* (Julien *et al*. 2015, Parulekar 2017). Similarly, *Hibiscus × rosa-sinensis* contains phenolic compounds, flavonoids, and quinones, which contribute to its bacteriostatic effects against *Staphylococcus aureus, Staphylococcus epidermidis*, *Klebsiella pneumoniae*, and *Escherichia coli* (Abate & Belay 2022). Moreover, its essential oils have demonstrated strong antimicrobial efficacy, with Minimum Inhibitory Concentrations (MICs) of 18.5, 11.5, and 23.0 µg/mL against *Klebsiella* sp., *Pseudomonas aeruginosa*, and *Fusarium oxysporum*, respectively (Sidhu *et al*. 2023). Collectively, these findings underscore that plants with low consensus, but high-fidelity levels may represent undervalued reservoirs of therapeutic potential, warranting further phytochemical and pharmacological investigations.

Diarrhea

Heritiera littoralis is one of the plant species traditionally employed for the treatment of diarrheal disorders. Its seeds, fruits, and bark contain a wide spectrum of bioactive compounds—including saponins, phenolics, flavonoids, and steroids—that exhibit antioxidant, anti-inflammatory, and antibacterial activities (Bibi *et al.* 2019, Kadir *et al*. 2019, Karim *et al*. 2020, Tarigan, 2025). The leaves have also been reported to contain triterpenoids (Ren *et al.* 2024), a class of compounds widely recognized for their modulatory effects on gastrointestinal function. Although few studies have directly explored the use of *Heritiera littoralis* in diarrhea management, Lin *et al.* (2020) demonstrated that the fruit extract of this species could ameliorate ulcerative colitis by improving overall disease condition, preventing colon shortening, and restoring histopathological integrity of the colonic mucosa. These findings suggest that the plant may contribute to mucosal healing, a critical physiological process that reduces fluid and electrolyte loss responsible for diarrheal manifestations in colitis (Anbazhagan *et al*. 2018, Liang *et al*, 2024). Furthermore, phytochemical constituents such as flavonoids, saponins, tannins, and triterpenoids have been shown to regulate intestinal motility and secretion, and to inhibit chloride ion hypersecretion, thereby helping to normalize stool consistency and decrease bowel frequency (Plaatjie *et al*. 2024). Taken together, although the direct antidysenteric or antidiarrheal activity of *Heritiera littoralis* has not been extensively studied, the evidence supporting its anti-inflammatory, mucosal-protective, and secretion-modulating properties provides a strong pharmacological rationale for its traditional use in the treatment of diarrhea, particularly in conditions associated with mucosal damage such as ulcerative colitis.

Hematuria

Hematuria, commonly known as bloody urine, is traditionally treated with the plant *Musa* × *paradisiaca*. Knowledge of this species and its medicinal applications remains limited, primarily based on ancestral experience and the empirical practices of traditional healers, without a direct connection to the pathophysiological mechanisms of hematuria. According to Leslie e*t al.* (2025), hematuria can be classified into two main types: gross hematuria and microscopic hematuria. Gross hematuria refers to the visible presence of blood in urine. In contrast, microscopic hematuria indicates the existence of red blood cells detected under microscopic examination without visual discoloration of the urine. The type of hematuria referred to in this study corresponds to *gross hematuria*. Empirically, *Musa × paradisiaca* has been utilized across various areas of Indonesia. In Central Java, local communities use it to treat scorpion stings, whereas in West Java, it is applied for wound healing. Beyond Indonesia, ethnomedical records from Ethiopia and Nigeria report the use of this species to manage infectious diseases such as malaria, diarrhea, and typhoid fever (Asuquo & Udobi 2016, Begashaw *et al*. 2023, Cahyanto *et al*. 2020, Kanedi *et al*. 2024, Wahidah *et al*. 2025). Phytochemical analyses of the *Musa* genus have revealed the presence of diverse bioactive compounds, including ascorbic acid, β-carotene, lycopene, saponins, alkaloids, flavonoids, tannins, polyphenols, phenolic acids, terpenoids, anthocyanins, dienoic acids, and dicarboxylic acids. These compounds contribute to a wide range of biological properties such as antioxidant, wound-healing, antidiabetic, anticholesterol, anti-inflammatory, antitumor, hematopoietic, antiatherosclerotic, estrogenic, androgenic, and anti-aspartate aminotransferase activities (Kanedi *et al*. 2024). Although its hematopoietic potential has been reported, specific studies addressing the role of *Musa × paradisiaca*. in managing hematuria remains scarce. Nevertheless, Vitamia & Nuryanti (2023) demonstrated that the plant's latex effectively shortens bleeding time, indicating possible hemostatic properties. Moreover, the presence of flavonoids and their derivatives may provide additional pharmacological support. While limited evidence exists regarding specific flavonoid subclasses, such as flavanol monomers and oligomers (MOF), a study by Semen *et al*. (2020) reported that these compounds could significantly reduce the incidence of hematuria through antioxidant and microvascular-protective mechanisms. Therefore, *Musa × paradisiaca*. represents a promising candidate for further exploration, particularly in identifying its specific flavonoid constituents, such as MOF, and evaluating their potential roles in the prevention and management of hematuria.

Conclusions

This study provides new insights into the potential of medicinal plants used by communities in Central Maluku for treating infectious diseases. The findings demonstrate that plant-based traditional healing practices remain deeply embedded within the local culture. The therapeutic benefits derived from these medicinal plants are also consistent with pharmacological evidence that has been scientifically validated. Nevertheless, this knowledge is at risk of being lost due to limited documentation and the declining interest of younger generations in continuing traditional healing practices. The information generated from this study offers a valuable scientific foundation for further exploration of the chemical constituents and antimicrobial properties of these medicinal plants, and it also provides a basis for the development of future therapeutic agents.

Declarations

Ethics approval and consent to participate: Ethical clearance was obtained from the Ethical Committee of the Faculty of Medicine, Pattimura University, Ambon, Indonesia (No. 133/FK-KOM.ETIK/VIII/2024). All participants provided their consent for inclusion in the research.

Consent for publication: Not applicable.

Availability of data and materials: Data will be provided by the corresponding author upon request.

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Authors' contributions: Risman Tunny (designing the study, conducting experiments, analyzing data, writing the paper), Hasyrul Hamzah (designing the study, editing the manuscript), Djoko Santosa (designing the study, analyzing data), Nanang Fakhrudin (designing the study, analyzing data, editing the manuscript).

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Literature cited

Abate TA, Belay AN. 2022. Assessment of antibacterial and antioxidant activity of aqueous crude flower, leaf, and bark extracts of Ethiopian *Hibiscus rosa-sinensis* Linn: Geographical effects and CO_2 Res_2 /Glassy carbon electrode. International Journal of Food Properties 25:1-1875-1889. doi: 10.1080/10942912.2022.2112598

Adamczak A, Ożarowski M, Karpiński TM. 2019. Antibacterial activity of some flavonoids and organic acids widely distributed in plants. Journal of Clinical Medicine 9(1):1-17. doi: 10.3390/jcm9010109

Adeniyi A, Asase A, Ekpe PK, Asitoakor BK, Adu-Gyamfi A, Avekor PY. 2018. Ethnobotanical study of medicinal plants from Ghana; confirmation of ethnobotanical uses, and review of biological and toxicological studies on medicinal plants used in Apra Hills Sacred Grove. Journal of Herbal Medicine 14: 76-87. doi: 10.1016/j.hermed.2018.02.001

Ahmad KS, Hamid A, Nawaz F, Hameed M, Ahmad F, Deng J, Akhtar N, Wazarat A, Mahroof S. 2017. Ethnopharmacological studies of indigenous plants in Kel village, Neelum Valley, Azad Kashmir, Pakistan. Journal of Ethnobiology and Ethnomedicine, 13:68-1-16. doi: 10.1186/s13002-017-0196-1

Ahmad W, Jantan I, Haque MdA, Arsyad L. 2022. Magnoflorine from *Tinospora crispa* upregulates innate and adaptive immune responses in Balb/c mice. International Immunopharmacology 111-1-10. doi: 10.1016/j.intimp.2022.109081

Akhmar AM, Rahman, F, Supratman, Hasyim H, Nawir M. 2023. The cultural transmission of traditional ecological knowledge in Cerekang, South Sulawesi, Indonesia. Sage Open, 13:4-1-17. doi: 10.1177/21582440231194160.

Alhijrah Y, Naid T, Nuryanti S. 2024. Evaluation of ethanol extract tapak dara leaf (*Catharanthus roseus L*) for antibacterial activity against skin pathogens. Journal Microbiology Science 4:1 74-81. doi: 10.56711/jms.v4i1.1006

Anbazhagan AN, Priyamvada S, Alrefai WA, Dudeja PK. 2018. Pathophysiology of IBD-associated diarrhea. Tissue Barriers 6:2. doi: 10.1080/21688370.2018.1463897

Astuty E, Luhulima VD, Ariwicaksono SC. 2024. Antibacterial potential of endemic medicinal plants of the Maluku Islands, Indonesia, against urinary tract infection pathogens. Folia Medica Indonesiana. 60:240-248. doi: 10.20473/fmi.v60i3.61366.

Asuquo EG, Udobi CE. 2016. Antibacterial and toxicity studies of the ethanol extract of *Musa paradisiaca* leaf. Cogent Biology, 2-1-10. doi: 10.1080/23312025.2016.1219248

Baker RE, Mahmud A S, Miller IF, Rajeev M, Rasambainarivo F, Rice B L, Takahashi S, Tatem A J, Wagner CE, Wang LF, Wesolowski A, Metcalf C J E. 2022. Infectious disease in an era of global change. Nature Reviews Microbiology 20:4-193-205. doi: 10.1038/s41579-021-00639-z

Begashaw T, Dagne A, Yibeltal D.2023. Review on phytochemistry, medicinal properties, and toxicities of the genus *Musa*. Traditional Medicine 4:2. doi: 10.35702/trad.10017

Benamar K, Koraichi SI, Benamar S, Fikri-Benbrahim K. 2023. Ethnobotanical study of medicinal plants used by the population of Ain Chkef (North Central Morocco). Ethnobotany Research and Applications 26:1-23. doi: 10.32859/era.26.4.1-23

Bibi NS, Fawzi MM, Gokhan Z, Rajesh J, Nadeem N, Kannan RRR, Albuquerque RDDG, and Pandian SK. 2019. Ethnopharmacology, phytochemistry, and global distribution of mangroves: A comprehensive review. Marine Drugs 17:4-231. doi: 10.3390/md17040231

Boado A, Asase A. 2017. Documentation of herbal medicines used for the treatment and management of human diseases by some communities in Southern Ghana. Evidence-Based Complementary and Alternative Medicine. 1-12. doi: 10.1155/2017/3043061

Budiarti M, Maruzy A, Mujahid R., Sari A.N, Jokopriyambodo W, Widayat T, Wahyono S. 2020. The use of antimalarial plants as traditional treatment in Papua Island, Indonesia. Heliyon, 6:12-1-10. doi: 10.1016/j.heliyon.2020.e05562

Cahyanto T, Anugrah R, Nisa NK., Rosma T, Islamiati, Y. 2020. Ethnobotany study of banana plant sap (*Musa* sp.) as an incision remedy (Vulnus scissum). Biosfer, 13:1-28-41. doi: 10.21009/10.21009/biosferjpb.v13n1.28-41

Central Maluku Bureau of Statistics Office. Production of biopharmaceutical plants by type in Central Maluku Regency 2024. https://malukutengahkab.bps.go.id. (Accessed 10/4/ 2025).

Central Maluku Office of Communication and Information. 2024. Geografis Kabupaten Maluku Tengah. https://web.maltengkab.go.id/profil-pemda/geografis/. (Accessed 10/4/ 2025).

Chaachouay N, Benkhnigue O, Fadli M, El Ibaoui H, Zidane L. 2019. Ethnobotanical and ethnopharmacological studies of medicinal and aromatic plants used in the treatment of metabolic diseases in the Moroccan Rif. Heliyon 5:1-9. doi: 10.1016/j.heliyon.2019.e02191

Chai TT & Wong C. 2012. Antioxidant properties of aqueous extracts of *Selaginella willdenowii*. Journal of Medicinal Plants Research 6:7-1289-296. doi: 10.5897/jmpr11.1378

Chang HH, Juan, YS., Li CC., Lee HY, Chen JH. 2022. Congenital collagenopathies increased the risk of inguinal hernia developing and repair: Analysis from a nationwide population-based cohort study. Scientific Reports, 12:2360-1-7. doi: 10.1038/s41598-022-06367-5

Chaudhary P, Janmeda P, Docea AO, Yeskaliyeva B, Abdull RAF, Modu B, Calina D, Sharifi-Rad J. 2023. Oxidative stress, free radicals and antioxidants: Potential crosstalk in the pathophysiology of human diseases. Frontiers in Chemistry 11-1-24. doi: 10.3389/fchem.2023.1158198

Chihomvu P, Ganesan A, Gibbons S, Woollard K, Hayes MA. 2024. Phytochemicals in Drug Discovery—A Confluence of Tradition and Innovation. International Journal of Molecular Sciences 25:1-23. doi: 10.3390/ijms25168792

Chuysinuan P, Pengsuk C, Lirdprapamongkol K, Thanyacharoen T, Techasakul S, Svasti J, Nooeaid, P. 2023. Turmeric herb extract-incorporated biopolymer dressings with beneficial antibacterial, antioxidant, and anti-inflammatory properties for wound healing. Polymers 15:5-1-20. doi: 10.3390/polym15051090

Dagni A, Suharoschi R, Hegheș SC, Vârban R, Lelia Pop O, Vultura R, Fodor A, Cozma A, Soukri A, El Khalfi B. 2023. Ethnobotanical Survey on Plants Used to Manage Febrile Illnesses among Herbalists in Casablanca, Morocco. Diversity, 15:7-879. doi: 10.3390/d15070879

Dalko E, Das B, Herbert F, Fesel C, Pathak S, Tripathy R., Cazenave PA, Ravindran B, Sharma S, Pied S. 2015. Multifaceted Role of Heme during Severe Plasmodium falciparum Infections in India. Infection and Immunity 83:10- 3793-3799. doi: 10.1128/iai.00531-15

Daro P, Hiariej A, Nindatu M. 2020. Traditional Medicine plants of Waai village communities, Maluku Province. Rumphius Pattimura Biological Journal. 2:2-60-65. doi: 10.30598/rumphiusv2i2p060-065

Febriyanti RM, Saefullah K, Susanti RD, Lestari K. 2024. Knowledge, attitude, and utilization of traditional medicine within the plural medical system in West Java, Indonesia. BMC Complementary Medicine and Therapies, 24:64-1-13. doi: 10.21203/rs.3.rs-3261430/v1

Fernández DD, Gadiya Y, Mubeen S, Bollerman TJ, Healy MD, Chanana S, Sadovsky RG, Healey D, Colluru V. 2023. Modern drug discovery using ethnobotany: A large-scale cross-cultural analysis of traditional medicine reveals common therapeutic uses. iScience 26:9-1-14. doi: 10.1016/j.isci.2023.107729

Ghafouri S, Safaeian R, Ghanbarian G, Lautenschläger T, Ghafouri E. 2025. Medicinal plants used by local communities in southern Fars Province, Iran. Scientific Reports 15:1-1-19. doi: 10.1038/s41598-025-88341-5

Gitima G, Gebre A, Berhanu Y, Wato T. 2025. Exploring indigenous wisdom: Ethnobotanical documentation and conservation of medicinal plants in Goba District, Southwest Ethiopia. Scientific African 27:1-30. doi: 10.1016/j.sciaf.2025.e02571

Haque E, Bari Md S, Khandokar L, Anjum J, Jantan I, Seidel V, Haque MdA. 2023. An updated and comprehensive review on the ethnomedicinal uses, phytochemistry, pharmacological activity, and toxicological profile of *Tinospora crispa* (L.) Hook. F. & Thomson. Phytochemistry Reviews, 22:1-211-273. doi: 10.1007/s11101-022-09843-y

Hareru AA, Gudesho G, Getachew S, Awoke A, Tesfa E. 2024. Ethnobotanical study of medicinal plants used to treat human diseases in Nono-Sele District, Illubabor Zone, Oromia Areaal State, Ethiopia. American Journal of Plant Biology 9:3-75-99. doi: 10.11648/j.ajpb.20240903.14

Health Office of Maluku Province 2020. The ten leading infectious diseases. https://dinkes.malukuprov.go.id/pusdatin/. (Accessed 10/4/2025).

Hosseini SH, Sadeghi Z, Hosseini SV, Bussmann RW. 2022. Ethnopharmacological study of medicinal plants in Sarvabad, Kurdistan province, Iran. Journal of Ethnopharmacology 288:1-16. doi: 10.1016/j.jep.2022.114985.

Hussain A, Chau HV, Bang H, Meyer L, Islam M. 2021. Performance of pharmacy students in a communications course delivered online during the COVID-19 pandemic. American Journal of Pharmaceutical Education 85:10-1066-1074.doi: 10.5688/ajpe8617

Iskandar D, Widodo N, Warsito W, Masruri M, Rollando R. 2022. A review on ethno-medicinal plants used in West Kalimantan. International Journal of Agricultural Sciences, 6:1- 27-41. doi: 10.25077/ijasc.6.1.27-40.2022

Islam ATMR, Hasan MdM, Islam MdT, Tanaka N. 2022. Ethnobotanical study of plants used by the Munda ethnic group living around the Sundarbans, the world's largest mangrove forest in Southwestern Bangladesh. Journal of Ethnopharmacology. 285:1-30. doi: 10.1016/j.jep.2021.114853

Julien G, Sorho S, Yaya S, Nathalie G, Mireille D, Joseph D. 2015. Phytochemical study and antimicrobial activity of bark extracts of *Ceiba pentandra* (L.) Gaertn. (Bombacaceae) from Côte d'Ivoire on antibiotic-resistant Staphylococcus aureus and Pseudomonas aeruginosa. British Microbiology Research Journal 9:1- 1-7. doi: 10.9734/bmrj/2015/18103

Kadir MA, Wibowo ES, Abubakar S, Akbar N. (2019). Manfaat mangrove bagi peruntukan sediaan farmasitika di desa mamuya kecamatan galela timur kabupaten halmahera timur (tinjauan etnofarmakologis). Jurnal enggano 4:1-12-25. doi: 10.31186/jenggano.4.1.12-25

Kanedi M, Handayani K, Ernawiati E, Abdullah W. 2024. Phytochemical content and pharmacological value of banana plants (Musa spp.) revealed in Indonesia. International Journal of Pharmaceutical Research and Applications, 9:4- 586-592.

Karim Md. A, Islam Md.A, Rahman, Md. S, Sultana S, Biswas S, Hosen MJ, Mazumder K, Rahman Md.M, Hasan Md.N. 2020. Evaluation of antioxidant, anti-hemolytic, cytotoxic effects, and anti-bacterial activity of selected mangrove plants (*Bruguiera gymnorrhiza* and *Heritiera littoralis*) in Bangladesh. Clinical Phytoscience, 6-1-8. doi: 10.1186/s40816-020-0152-9

Karmakar U, Paul A, Bokshi B. 2021. Investigation of antidiarrheal, analgesic, antidiabetic, and cytotoxic activities of the aerial parts of *Flagellaria indica* (Flagellariaceae). Tropical Journal of Natural Product Research, 5, 281-286.

Karmakar UK, Paul A, Kundu P, Paul PP. 2023. Exploration of anthelmintic, blood coagulant, diuretic, and laxative activities of different solvent fractions of Flagellaria indica leaves. Jordan Journal of Pharmaceutical Sciences, 16:3-655-670. doi: 10.35516/jjps.v16i3.976

Khairani TN, Fitri K, Novilla L, Shufyani F, Fiska L.2022. Uji aktivitas antibakteri ekstrak metanol bunga tapak dara (*Catharanthus roseus*) terhadap bakteri *Streptococcus pneumoniae* dan Bakteri *Klebsiella pneumoniae*. Journal of Pharmaceutical and Sciences, 5:2-438-450. doi: 10.36490/journal-jps.com.v5i2.162

Kumar M, Shankar M, Joshi R, Prasad SK. 2022. To Identify the risk factors associated with development of anterior abdominal wall Hernia. Medical Journal of Babylon 19:2-19-226. doi: 10.4103/mjbl.mjbl_2_22

Kumari A, Raina N, Wahi A, Goh KW, Sharma P, Nagpal R., Jain A, Ming LC, Gupta M. 2022. Wound-Healing effects of curcumin and Its nanoformulations: A comprehensive review. Pharmaceutics 14:11-1-24. doi: 10.3390/pharmaceutics14112288

Kushram A, Mir SA. 2019. Study of andrographolide content in *Andrographis paniculata* from different forest types of Madhya Pradesh, India. International Research Journal of Pharmacy 10:3- 88-90. doi: 10.7897/2230-8407.100385

Lee W, Mahmud R., Perumal S, Ismail S, Basir R. 2020. In vivo antimalarial potential of *Tinospora crispa* Miers in mice and identification of the bioactive compound. Pharmacognosy Magazine, 16:6-7- 76. doi: 10.4103/pm.pm_10_19

Leslie SW, Hamawy K, Saleem MO. 2025. Gross and Microscopic Hematuria. In StatPearls. StatPearls Publishing. Treasure Island, Florida (FL), United States of America

Liang Y, Li Y, Lee C, Yu, Z, Chen C, Liang C. 2024. Ulcerative colitis: Molecular insights and intervention therapy. Molecular Biomedicine 5:1-42. doi: 10.1186/s43556-024-00207-w

Lin G, Li M, Xu N, Wu X, Liu J, Wu Y, Zhang Q, Cai J, Gao C, Su Z. 2020. Anti-Inflammatory Effects of *Heritiera littoralis* fruits on extran Sulfate Sodium- (DSS-) induced ulcerative colitis in mice by Regulating Gut Microbiota and Suppressing NF- κ B Pathway. Biomed Research International 1-20. doi: 10.1155/2020/8893621

Liu F, Peng J, Feng Y, Ma Y, Ren Y, Sun P, Zhao Y, Liu S, Wu F, Xie J. 2023. An ethnobotanical study on the medicinal herb practices of the gelao ethnic minority in North Guizhou, China: An exploration of traditional knowledge. Frontiers in Pharmacology 14-1-14. doi: 10.3389/fphar.2023.1217599

Lu Z, Chen H, Lin C, Ou G, Li J, Xu W. 2022. Ethnobotany of medicinal plants used by the Yao people in Gongcheng County, Guangxi, China. Journal of Ethnobiology and Ethnomedicine, 18:49-1-37. doi: 10.21203/rs.3.rs-1566438/v1

Mafimisebi TE, Oguntade AE. 2010. Preparation and use of plant medicines for farmers' health in Southwest Nigeria: Socio-cultural, magico-religious and economic aspects. Journal of Ethnobiology and Ethnomedicine 6:1-1-9.doi: 10.1186/1746-4269-6-1

Maiyo ZC, Njeru SN, Toroitich FJ, Indieka SA, Obonyo M A. 2024. Ethnobotanical study of medicinal plants used by the people of Mosop, Nandi County in Kenya. Frontiers in Pharmacology 14-1-25. doi: 10.3389/fphar.2023.1328903

Mathez-Stiefel SL, Vandebroek I. 2012. Distribution and transmission of medicinal plant knowledge in the Andean highlands: a case study from Peru and Bolivia. Evidence-Based Complementary and Alternative Medicine, 1-18. doi: 10.1155/2012/959285

Mekuria T, Zemede J, Melese B, Hu GW. 2025. Ethnobotanical study of traditional medicinal plants used by the Sidama people to treat human ailments in the Bensa district of Sidama area, Ethiopia. Scientific African 27:1-16. doi: 10.2139/ssrn.5007259

Miki KO, Donatianus BSEP, Batuallo ID. 2024. Tradisi babore dalam pengobatan tradisional basanggar pada suku Dayak Ahe di Desa Sekabuk Kecamatan Sadingan Kabupaten Mempawah. Jurnal Antropologi. 5:1-65-76. doi: 10.1016/j.sciaf.2025.e02541

Mugwanya M, Kimera F, Dawood MA O, Ali OS, Reda A, Shoeib T, Sewilam H .2025. Comparative analysis of plant morphometric traits, essential oil yield, and quality of Origanum majorana L. cultivated under diverse sustainable organic nutrient management strategies. Scientific Reports, 15:32934-1-12. doi: 10.1038/s41598-025-20751-x

Mujahid R, Wahyono S, Priyambodo WJ, Subositi D. 2019. Studi etnomedicine pengobatan luka terbuka dan sakit kulit pada beberapa etnis di provinsi Kalimantan Timur. Kartika Jurnal Ilmiah Farmasi, 7:1-27-34. doi: 10.26874/kjif.v7i1.178

Mulyanto D, Gunawan R., Zakaria S, Iskandar J, Noviyanti AR, Iskandar BS. 2024. Short Communication: Utilization of wild plants in medicinal foods for maternal postpartum recovery among the Kasepuhan in rural West Java, Indonesia. Biodiversitas Journal of Biological Diversity 25:2-465-473. doi: 10.13057/biodiv/d250204

Mustarichie R, Ramdhani D. 2022. In-silico study of compounds of *Curcuma xanthorriza* against enzyme tyrosinase sac and α-MSH. Asian Journal of Pharmaceutical Research and Development, 10:3-1-5. doi: 10.22270/ajprd.v10i3.1135

Neenu RS, Prakash G, Praveen, Dhar T, Biju C, Brijithlal. 2024. Antioxidant, antimicrobial, and phytochemical analysis of four species of *Selaginella* P. Beauv. International Journal of Plant and Environment, 10:3- 102-109. doi: 10.18811/ijpen.v10i03.11

Nusaly WN, Watuguly T, Pattiasina E, Wael S. 2023. Identification of medicinal plants and benefits in the village of Negeri Lima, Maluku district. *BIOPENDIX:* Jurnal Biologi, Pendidikan Dan Terapan, 10: 156-170. doi: 10.30598/biopendixvol10issue1page156-170

Nutham N, Sakulmettatham S, Klongthalay S, Chutoam P, Somsak V. 2015. Protective effects of *Tinospora Crispa* stem extract on renal damage and hemolysis during Plasmodium berghei Infection in Mice. Journal of Pathogens 1-5. doi: 10.1155/2015/738608

Öner EK., Yeşil M. 2023. Effects of altitudes on secondary metabolite contents of *Origanum majoran*a L. Scientific Reports, 13:10765-1-7. doi: 10.1038/s41598-023-37909-0

Paiva MAC, Da Costa FE. Marques DLC, Dos Santos SA, Dias DCD, Farias PDR. 2021. Comparing ethnobotanical knowledge of medicinal plants between community health workers and local experts in the "Mata da Paraíba" zone, northeastern Brazil. Biodiversitas Journal of Biological Diversity 22:12. doi: 10.13057/biodiv/d221257

Pandikumar P, Chellappandian M, Mutheeswaran S, Ignacimuthu S. 2011. Consensus of local knowledge on medicinal plants among traditional healers in Mayiladumparai block of Theni District, Tamil Nadu, India. Journal of Ethnopharmacology 134:2, 354-362. doi: 10.1016/j.jep.2010.12.027

Parulekart G. 2017. Antibacterial and phytochemical analysis of *Ceiba pentandra* (L.) Seed extracts. Journal of Pharmacognosy and Phytochemistry 6:3-586-589.

Patil PJ, Ghosh JS. 2010. Antimicrobial activity of Catharanthus *roseus*. A detailed study. British Journal of Pharmacology and Toxicology 1:1-40-44.

Plaatjie MTA, Onyiche TE, Ramatla T, Bezuidenhout JJ, Legoabe L., Nyembe NI, Thekisoe O. 2024. A scoping review on efficacy and safety of medicinal plants used for the treatment of diarrhea in sub-Saharan Africa. Tropical Medicine and Health, 52:1-6. doi: 10.1186/s41182-023-00569-x

Rahmat E, Lee J, Kang Y. 2021. Javanese Turmeric (*Curcuma zanthorrhiza*. Roxb.): Ethnobotany, Phytochemistry, Biotechnology, and Pharmacological Activities. Evidence-Based Complementary and Alternative Medicine 1-15. doi: 10.1155/2021/9960813

Ralte L, Sailo H, Singh YT. 2024. Ethnobotanical study of medicinal plants used by the indigenous community of the western area of Mizoram, India. Journal of Ethnobiology and Ethnomedicine 20:1- 26. doi: 10.1186/s13002-023-00642-z

Ralte L, Singh YT. 2024. Ethnobotanical survey of medicinal plants used by various ethnic tribes of Mizoram, India. Plos one, 19:5-1-26. doi: 10.1371/journal.pone.0302792

Rao K. 2024. Cultural constraints on knowledge transmission and knowledge erosion: An indigenous community in India. Asian Journal of Social Science 52:4-23-30. doi: 10.1016/j.ajss.2024.10.001

Ren C, Liang X, Pi R, Xin J, Yang B, Zheng Q, Li Y, Li J, Zhang, Y. 2024. New Triterpenoids from the Leaves of *Heritiera littoralis* and Their Anti-Inflammatory Activity. Molecules 30:1- 131. doi: 10.3390/molecules30010131

Reyes-García V. 2010. The relevance of traditional knowledge systems for ethnopharmacological research: Theoretical and methodological contributions. Journal Of Ethnobiology and Ethnomedicine 6:32,1-12. doi: 10.1201/b16611-7

Royani JI, Hardianto D, Wahyuni S 2014. Analisa kandungan andrographolide pada tanaman sambiloto (*Andrographis paniculata*) dari 12 lokasi di pulau Jawa. Jurnal Bioteknologi & Biosains Indonesia (JBBI) 1:1- 15. doi: 10.29122/jbbi.v1i1.547

Samiyarsih S, Nur Fitrianto, Elly P, Juwarno, Juni SM, 2020. Phytochemical diversity and antimicrobial properties of methanol extract of several cultivars of *Catharanthus roseus* using GC-MS. Biodiversitas Journal of Biological Diversity 21:4-1332-1344 doi: 10.13057/biodiv/d210409

Santosa IGNPE, Adnyeswari IGAAI. 2024. Integration of Ethnomedicine in Basic Medicine: A Literature Review and its potential for Medical Practice. International Journal of Scientific Advances, 5:4-730-734. doi: 10.51542/ijscia.v5i4.13

Santoso E A, Jumari J, Utami S. 2019. Inventory of medicinal plants for pregnant and postpartum women in Dayak Tomun of The Lopus Village, Lamandau Regency of Central Kalimantan. Biosaintifika: Journal of Biology & Biology Education 11:1 25-31. doi: 10.15294/biosaintifika.v11i1.17917

Sari P, Wicaksono I. 2016. Artikel review: uji aktivitas antibakteri ekstrak, fraksi dan isolat rimpang Curcuma sp. Terhadap beberapa bakteri pathogen. Farmaka.. 14:1- 175-183. doi: 10.24198/jf.v14i1.10721

Semen KO, Weseler AR, Janssen MJW, Drittij-Reijnders MJ, Le Noble JLML, Bast A. 2020. Effects of monomeric and oligomeric flavanols on kidney function, inflammation, and oxidative stress in runners: a randomized double-blind pilot study. Nutrients 12:6- 1634. doi: 10.3390/nu12061634

Semenya SS, Maroyi A. 2019. Ethnobotanical survey of plants used by Bapedi traditional healers to treat tuberculosis and its opportunistic infections in the Limpopo Province, South Africa. South African Journal of Botany 122: 126-132. doi: 10.1016/j.sajb.2018.10.010

Shree JA, Krishnaveni C. 2023. Phytochemical Screening, Antioxidant and antimicrobial activity of the ethanolic leaf extract of *Tinospora crispa* (L.) Miers [Menispermaceae]. Asian Journal of Biological and Life Sciences, 11:3- 712-718. doi: 10.5530/ajbls.2022.11.94

Shrestha S, Iqbal A, Teoh SL, Khanal S, Gan S H, Lee SWH, Paudyal V. 2024. Impact of pharmacist-delivered interventions on pain-related outcomes: An umbrella review of systematic reviews and meta-analyses. Research in Social and Administrative Pharmacy 20:6-34-51. doi: 10.1016/j.sapharm.2024.03.005

Shuaib M, Hussain F, Rauf A, Jan F, Romman M, Parvez R. Zeb A, Ali S, Abidullah S, Bahadur S, Shah A A, Azam N, Dilbar S, Begum K, Khan H, Sajjad S, Muhammad I, Shah NA. 2023. Traditional knowledge about medicinal plant in the remote areas of Wari Tehsil, Dir Upper, Pakistan. Brazilian Journal of Biology 83:1-28. doi: 10.1590/1519-6984.246803

Sidhu R, Kaushal S, Kaur V, Sharma P. 2023. Chemical composition, synergistic antimicrobial, and antioxidant potential of *Hibiscus rosa-sinensis* L. leaves essential oil and its major compound. Journal of Essential Oil-Bearing Plants 26:2-469-485. doi: 10.1080/0972060x.2023.2189529

Sihotang VBL. 2020. Traditional medicine knowledge in Sebesi Island Community, South Lampung. International Conference on Indonesia Culture (ICONIC), Connectivity and Sustainability: Fostering Cultural Commons in Indonesia. 460-470. doi: 10.1088/1755-1315/917/1/012023.

Silva VM, Silva AP, Cunha, R., Oliveira JR., Bezerra LF, Lima V. 2023. Genus *Ceiba* Mill. in Brazil: A comprehensive review on its ethnopharmacology, phytochemistry, and bioactivities. Natural Resources for Human Health 3:2-259-276. doi: 10.53365/nrfhh/160949

Singh SS, Ralte L, Sailo H, Pinokiyo A, Devi MR., Khomdram SD, Singh YT. 2025. Ethnobotanical study of medicinal plants used by Lois Community of Kakching district, Manipur, India. Trees, Forests and People 19:1-13. doi: 10.1016/j.tfp.2024.100765

Singh, R., Pathak, J., & Dubey, P. (2018). *Catharanthus roseus*: a pharmaceutical resource for human diseases. International Journal of Research and Analytical Reviews *5*:41-24.

Soni J, Sinha S, Pandey R. 2024. Understanding bacterial pathogenicity: A closer look at the journey of harmful microbes. Frontiers in Microbiology 15:1-14. doi: 10.3389/fmicb.2024.1370818

Stryamets N, Fontefrancesco MF, Mattalia G, Prakofjewa J, Pieroni A, Kalle R., Stryamets G, Sõukand R. 2021. Just beautiful green herbs: use of plants in cultural practices in Bukovina and Roztochya, Western Ukraine. Journal of Ethnobiology and Ethnomedicine 17: 12-1-25. doi: 10.1186/s13002-021-00439-y

Subositi D, Wahyono S. 2019. Study of the genus *Curcuma* in Indonesia used as traditional herbal medicines. Biodiversitas Journal of Biological Diversity 20:5-1356-1361. doi: 10.13057/biodiv/d200527

Sulastri L, Syamsudin, Simanjuntak P. 2018. Karakterisasi senyawa penghambat polimerisasi heme dari batang brotowali (*Tinospora crispa* (L)). Biopropal Industri 9:2-79-86.

Sultana S, Ashwini BS, Ansari MA, Alomary MN., Jamous YF, Ravikiran T, Niranjana SR, Begum MY, Siddiqua A, Lakshmeesha TR. 2024. *Catharanthus roseus*-assisted bio-fabricated zinc oxide nanoparticles for promising antibacterial potential against *Klebsiella pneumoniae*. Bioprocess and Biosystems Engineering, 47:8- 1259-1269. doi: 10.1007/s00449-024-03001-8

Suniarti D, Puspitawati R, Yanuar RR, Herdiantoputri R. 2022. *Curcuma zanthorrhiza*. roxb. An Indonesian native medicinal plant with potential anti-oral biofilm effect. In T. Das (Ed.), Focus on Bacterial Biofilms. IntechOpen. London.Pp 1-16. doi: 10.5772/intechopen 104521

Susanti D, Putra ADP, Safrina D, Wijaya NR, Adi MB S, Mujahid R, Rukmana R M, Subositi D, Haryanti S, Siswanto U, Widiyastuti Y. 2024. Antimalarial medicinal plants used by traditional healers in Bengkulu Province of Indonesia. Biotropia, 31:3-402-421. doi: 10.11598/btb.2024.31.3.2318

Sutrisno IH, Akob B, Navia ZI, Nuraini, Suwardi AB. 2020. Documentation of ritual plants used among the Aceh tribe in Peureulak, East Aceh District, Indonesia. Biodiversitas 21:11- 4990-4998. doi: 10.13057/biodiv/d21110

Syafri S, Putri RS, Jaswir I, Yusof F, Alen Y, Syofyan S, Hamidi D. 2024. Analysis of turmeric (*Curcuma longa* Linn.) Essential oil from different growing locations using FTIR/GC-MS spectroscopy coupled to chemometrics and its wound healing activities. International Journal of Applied Pharmaceutics 6:1.152-159. doi: 10.22159/ijap.2024.v16s1.33

Tadesse D, Lulekal E, Masresha G. 2025. Ethnopharmacological study of traditional medicinal plants used by the people in Metema district, Northwestern Ethiopia. Frontiers in Pharmacology 16:1-15. doi: 10.3389/fphar.2025.1535822

Taek MM, Banilodu L, Neonbasu G, Watu YV, Prajogo BEW, Agil, M. 2019. Ethnomedicine of Tetun ethnic people in West Timor, Indonesia: Philosophy and practice in the treatment of malaria. Integrative Medicine Research. 8:139-144. doi: 10.1016/j.imr.2019.05.005

Tarigan L. 2025. Evaluation of antioxidant and anti-inflammatory activities of seed extract of *Heritiera littoralis*. Journal of Hunan University Natural Sciences 52:3. doi: 10.55463/issn.1674-2974.52.3.1

Temple of The Way of Light. 2025. The sacred healing plant songs of the Amazon. https://templeofthewayoflight.org/resources/ikaros-songs-of-the-plants/. (Accessed 14/8/2025)

Tiquio LA, Cordero C, Nievales MF, Alejandro GJ. 2024. Medicinal plants used for postpartum recuperation in an Upland Community in Leon, Iloilo, the Philippines. Philippine Journal of Science 153:3-973-1003. doi: 10.56899/153.03.20

Torres-León C, Rebolledo Ramírez F., Aguirre-Joya JA., Ramírez-Moreno A, Chávez-González ML, Aguillón-Gutierrez DR., Camacho-Guerra L, Ramírez-Guzmán N, Hernández Vélez S, Aguilar CN. 2023. Medicinal plants used by rural communities in the arid zone of Viesca and Parras, Coahuila in northeast Mexico. Saudi Pharmaceutical Journal, 31:1-21-28. doi: 10.1016/j.jsps.2022.11.003

Tuasha N, Petros B, Asfaw Z. 2018. Medicinal plants used by traditional healers to treat malignancies and other human ailments in Dalle District, Sidama Zone, Ethiopia. Journal of Ethnobiology and Ethnomedicine 14:15-1-21. doi: 10.1186/s13002-018-0213-z

Tugume P, Kakudidi EK, Buyinza M., Namaalwa J, Kamatenesi M, Mucunguzi P, Kalema J. 2016. Ethnobotanical survey of medicinal plant species used by communities around Mabira Central Forest Reserve, Uganda. Journal of Ethnobiology and Ethnomedicine 12:5-1-28. doi: 10.1186/s13002-015-0077-4

Ulfah, Z. 2024. Pinamou: A Tradition that Helps Preserve the continuity of local languages. Maluku Provincial Language Office. https://balaibahasaprovinsimaluku.kemdikbud.go.id (Accessed 30/8/2025)

Ullah I, Akhtar S, Adnan M, Nawab J, Ullah S, Abdullah-Al-Wadud M. 202. Ethnobotanical knowledge and ethnomedicinal uses of plant resources by urban communities of Khyber Pakhtunkhwa, Pakistan: A novel urban ethnobotanical approach. Journal of Ethnobiology and Ethnomedicine 21:13-1-27. doi: 10.1186/s13002-025-00766-4

Usemahu KM., Rachman WA., Natsir S. 2014. Perilaku penggunaan obat tradisional pada ibu pasca melahirkan. CORE Repository. Retrieved from https://core.ac.uk/outputs/25495427

Valentin BC, Ndjolo Philippe O, Mboni Henry M, Mushagalusa Kasali, F. 2023. Ethnomedicinal knowledge of plants used in nonconventional medicine in the management of diabetes mellitus in Kinshasa (Democratic Republic of the Congo). Hindawi Evidence-Based Complementary and Alternative Medicine. 1:1-20.doi: 10.1155/2023/4621883

Van Seventer JM, Hochberg NS. 2017. Principles of Infectious Diseases : Transmission, Diagnosis, Prevention, and Control. In International Encyclopedia of Public Health, Elsevier, Belanda, Pp. 22-39. doi: 10.1016/b978-0-12-803678-5.00516-6

Venmathi MBA, Iqbal M, Gangadaran P, Ahn BC, Rao P V, Shah MD. 2022. Hepatoprotective Potential of Malaysian Medicinal Plants: A Review on Phytochemicals, Oxidative Stress, and Antioxidant Mechanisms. Molecules 27:5-1-19. doi: 10.3390/molecules27051533

Vinayak G, Praveen N. 2021. Variations in Andrographolide Content, Phytochemical Constituents, and Antioxidant Activity of Leaves of Andrographis paniculata (L.) Nees collected from different locations of Southern India. Asian Journal of Chemistry, 33:2- 399-403. doi: 10.14233/ajchem.2021.23020

Vitamia C, Nuryanti AN.2023. Local hemostatic activity of several varieties of banana (*Musa Paradisiaca*) pseudo-stem sap in Swiss Webster Mice. Indonesian Journal of Pharmaceutical Science and Technology 5:2-183-187.

Wahidah BF, Husain F, Mulyanah W, Khasanah R. 2025. Ethnobotanical study of local wisdom in the utilization and conservation of medicinal plants for children’s health around Mount Muria, Central Java. Komunitas: International Journal of Indonesian Society and Culture, 17:1-1-13. doi: 10.15294/komunitas.v17i1.21122

Wahyono S, Jokopriyambodo W, Mustofa FI, Rahmawati N, Sari AN, Maruzy A, Mujahid R, Widowati L, Widiyastuti Y, Subositi D, Budiarti M, Haryanti S, Junediyono. 2017. Project Report: Eksplorasi pengetahuan lokal etnomedisin dan tumbuhan obat berbasis komunitas di Indonesia (Ristoja). Lembaga Penerbitan Badan Penelitian dan Pengembangan Kesehatan. Balai Besar Penelitian dan Pengembangan Tanaman Obat dan Obat Tradisional. Kementerian Kesehatan Republik Indonesia.

Wali R, Khan MF, Mahmood A, Mahmood M, Qureshi R, Ahmad KS, Mashwani ZR. 2022. Ethnomedicinal appraisal of plants used for the treatment of gastrointestinal complaints by tribal communities living in Diamir district, Western Himalayas, Pakistan. PLOS ONE, 17:6-1-21. doi: 10.1371/journal.pone.0269445

Wondimnew A, Yiblet Y, Getachew A, Muche T, Amsalu H. 2025. Ethnobotanical study of traditional medicinal plants used by the Local People in Mekdela Woreda, South Wollo Zone, Ethiopia. Scientifica 1-20. doi: 10.1155/sci5/8875307

World Health Organization. 2024. Health data overview for the Republic of Indonesia. https://data.who.int/countries/360 (Accessed 10/04/2025).

Zhao YL, Pu SB, Qi Y, Wu BF, Shang JH, Liu YP, Hu D, Luo XD. 2021. Pharmacological effects of indole alkaloids from *Alstonia scholaris* (L.) R. Br. On pulmonary fibrosis in vivo. Journal of Ethnopharmacology 267-1-11. doi: 10.1016/j.jep.2020.113506

Zubaidah S, Suhartini A, Mahanal S, Batoro J, Sumitro SB. 2020. Local knowledge of traditional medicinal plants use and education system on their young of Ammatoa Kajang tribe in South Sulawesi, Indonesia. Biodiversitas Journal of Biological Diversity 21:9- 3989-4002. doi: 10.13057/biodiv/d210909.

Appendix Table

Scientific Name	Medicinal use by ethnic group			Studies conducted in Indonesia	Studies conducted abroad	Group of compounds	Bioactive compounds	References
	Ambonese	Seramese	Bandanese					
Allium cepa L.	Postpartum	Postpartum	Not reported	Immunomodulatory effect, abdominal pain, fever, flu, and cough	Fever, headache, sinusitis, skin infection	Flavonoids, organosulfur compounds (OSCs), phenols, saponins, and alkaloids	Methiin, s-alk(en)yl-l-cysteine derivatives, isoalliin, alliin, deoxyalliin, cycloalliin, n-(γ-glutamyl)-s-(2-propenyl)-l-cysteine, n-(γ-glutamyl)-s-methyl-l-cysteine, n-(γ-glutamyl)-s-(2-propenyl)-l-cysteine sulfoxide, n-(γ-glutamyl)-s-(e-propenyl)-l-cysteine (glu-pec), and s-(2-carboxypropyl) glutathione	Baikov (2024), Bhagawan *et al* (2025), Chakraborty *et al,* (2022), Ekasari *et al* (2025), Kumar *et al* (2022), Lefrioui *et al* (2024), Misganaw & Yiblet (2024), Singarimbun *et al,* (2024).
Allium sativum L.	Postpartum infection and malaria	Malaria	Not reported	Flu, immunomodulatory effect, prevention of cancer, cholesterol, coronary diseases, diabetes, and skin infection	Flu and cough, liver cancer, liver disease, hepatitis, respiratory tract infections (RTI), sinusitis, laryngeal infections, tonsillitis, and allergic rhinitis, oral infection	Alkaloids, terpenoids, saponins, phenols, tannins, flavonoids	Allicin, diallyl disulfide (dads), vinyldithiins, ajoenes (e-ajoene, z-ajoene), diallyl trisulfide (dats), micronutrient selenium (se)	Nahdi & Kurniawan (2019), Fathir *et al* (2021), Odebunmi *et al* (2022), Bencheikh *et al* (2024), Tudu *et al* (2022), Tsao *et al,* (2007), Dubale *et al* (2023), Baikov (2024), Chakraborty *et al* (2022), Kumar *et al* (2022), Hasan Khan, (2024), Oyaluna *et al* (2024).
Alpinia galanga (L.) Willd.	Fever	Not reported	Not reported	Joint inflammation, digestive disorders,	Ear infection and digestive disorders; dysuria,	Phenols, flavonoids, and terpenoids	1,8-cineole (44.2-61.7%), β-farnesene (7.0-14.6%), β-bisabolene (0.1-0.8%), trans-α-	Alang *et al* (2023), Gani *et al* (2024), Nurcahyo *et al* (2024), Saudah & Ernilasari (2023), Bhattacharjya *et al* (2023), Inta

Scientific Name	**Medicinal use by ethnic group**			**Studies conducted in Indonesia**	**Studies conducted abroad**	**Group of compounds**	**Bioactive compounds**	**References**
	Ambonese	Seramese	Bandanese					
				flatulence and ulcers, gout and arthritis, uric acid-related disorders, fever, body warming, skin infections, and body endurance. Common cold and minor wound	ringworm (tinea), muscle pain (myalgia)		bergamotene (0.1-0.3%), and β-pinene (0.3-0.9%	*et al* (2025), Moo *et al* (2021), Nascimento *et al* (2007), Silva *et al* (2012), Simsek & Duman (2017), Himaniarwati *et al* (2020), Aziz *et al* (2024), Priyono *et al* (2024), Ragsasilp *et al* (2022), Zhang *et al* (2021)
Alstonia scholaris (L.) R. Br.	Postpartum	Postpartum	Not reported	Appetite stimulant, promoting general well-being, fever, flu, malaria, teeth and mouth disease, and postpartum.	Dysentery, stomach ulcer, hypertension, fever, leucorrhoea, asthma, echema, constipation, spider bite	Terpenoid, flavonoid, phenolic, iridoids, coumarins, steroid/sterol, saponin, and volatile oils.	Lupeol, (2) betulin, (3) 3-hydroxy-11-uslen-28,13-olide, (4) betulinic acid, (5) oleanolic acid, (6) ursolic acid, monoterpenoid indole alkaloids (mias), alstoscholarisine k	Ukratalo (2025), Hidayat *et al* (2020), Bhandary (2020), Ralte and Singh (2024), Wang *et al* (2016), Nascimento *et al* (2007), Yu *et al* (2021), Bagheri *et al* (2020), De et al (2024) Xu *et al* (2023)
Andrographis paniculata (Burm.f.) Wall. ex Nees	Postpartum	Not reported	Not reported	Flu, batuk, diabetes, malaria, metabolik disorder	Deworming, snakebites, bronchitis, and fever	Phenols, flavonoids, and terpenoids	3-o-β-d-glucopyranosylandrographolide, 3,14-dideoxyandrographolide, 3-o-β-d-glucopyranosyl,14,19-, 8,17-epoxy-14-deoxyandrographolide,2’	Ammar *et al* (2021), Harfiani *et al* (2025), Budiarti *et al* (2020), Singh *et al* (2024), Singh *et al* (2013), Narayanaperumal *et al* (2018), Kumar *et al* (2021) Mishra *et al* (2013), Tahongako

Scientific Name	Medicinal use by ethnic group			Studies conducted in Indonesia	Studies conducted abroad	Group of compounds	Bioactive compounds	References
	Ambonese	Seramese	Bandanese					
							-hydroxy-2,3,4' -trimethoxychalcone	(2024), Chutimanukul *et al* (2022), Rafi *et al* (2020).
Anredera cordifolia (Ten.) Steenis	Not reported	Furuncle	Not reported	Heals wounds, abdominal pain, hypertension, diabetes, flu, cholesterol, lung detoxing, heart, ulcer, gout, anticancer, anemia, and diabetes flatulence	Bruises, pain relief, postpartum	Flavonoid, glycoside, tannin, saponin, and terpenoid	Butylated hydroxytoluene (BHT), hexanedioic acid bis (2-ethylhexyl) ester, diisooctyl adipate, dimethylpyrroline, cyclohexane, and 1-ethyl-1-methylcyclohexane.	Pratami *et al* (2024) Santhyami *et al* (2024), Ammar *et al* (2021), Bhagawan *et al* (2023), Ammar *et al* (2021), Siahaan *et al* (2022), Panyadee *et al*, 2024), Dadiono *et al* (2025).
Boesenbergia rotunda (L.) Mansf.	Coughs	Not reported	Not reported	Postpartum, cough, digestion, diarrhea, wound	Urinary tract disorders, reproductive health	Flavonoid phenolic	Panduratin a, pinostrobin, cardamonin, pinocembrin, isopanduratin	Bhagawan *et al* (2023), Ammar *et al* (2021), Saensouk *et al* (2025), Rosdianto *et al* (2020), Mardanarian *et al* (2020), Rosdianto *et al* (2020), Thadtapong *et al* (2024).
Calophyllum inophyllum L.	Eye pain	Not reported	Not reported	Wound and skin infection	Scurvy, cough	Flavonoids, coumarins, fatty acids, and xanthones	Palmitic acid, stearic acid, oleic acid and linoleic acid, phytol, eugenol, caryophyllene oxide, α-copaene, α-murolene, β-caryophyllene, β-amysin, farnesol, palmitic acid, and cadinene derivatives.4- (3-methylazetidin-1-yl) pentan-2-	Ferdosh (2024), Lawal *et al* (2022), Nguyen *et al* (2017), Saki *et al* (2022)

Scientific Name	**Medicinal use by ethnic group**			**Studies conducted in Indonesia**	**Studies conducted abroad**	**Group of compounds**	**Bioactive compounds**	**References**
	Ambonese	Seramese	Bandanese					
							ol, apetalic acid, isoapetalic acid, calolongic acid, palmitic, stearic, oleic acid, linoleic acid, phytol, volatile terpenoid (eugenol, caryophyllene oxide, α-copaene, α-murolene, β-caryophyllene, β-amysin, farnesol, cadinene derivatives), 4-(3-methylazetidin-1-yl) pentan-2-ol, apetalic acid, isoapetalic acid, calolongic acid, pinetoric acid, 2,3-cis calolongic acid, isopinetoric acid, xanthone derivates (inoxanthone, caloxanthones a & b, macluraxanthone, 1,5-dihydroxyxanthone, calophynic, brasiliensic, inophylloidic acid), lactone triterpenoids (friedelan-3-one, calaustralin, calophyllolide, inophyllums c & e)	
Carica papaya L.	Malaria and postpartum	Malaria	Not reported	Low breast milk production, postpartum, diabetes, malaria, vaginal infections	Hemorrhoids, ip, elephantiasis, herpes simplex, other viral skin infections, dengue, hypertension,	Flavonoid, fenol, karotenoid, terpenoid	Isoquercetin, methyl gallate, loliolide, clitorin, nicotiflorin, isorhamnetin-3-o-β-d-glucopyranoside	Bhagawan *et al* (2023), Ammar *et al* (2021), Dubale *et al* (2023), Andalan *et al* (2024), Himaniarwati *et al* (2020), Budiarti *et al* (2020), Chassagne *et al* (2022), Hamed *et al* (2022)

Scientific Name	Medicinal use by ethnic group			Studies conducted in Indonesia	Studies conducted abroad	Group of compounds	Bioactive compounds	References
	Ambonese	Seramese	Bandanese					
					liver disorders, diabetes, gout, anthelminthic			
Catharanthus roseus (L.) G. Don	Not reported	Pneumonia	Not reported	Wound infection	Not reported	Indole alkaloid	Vindoline	Mishra J *et al* (2020)
Ceiba pentandra (L.) Gaertn.	Not reported	Pneumonia	Not reported	Chickenpox, eye irritation, **malaria, diarrhea, and skin infections**	fever, abscess, paronychia, mental illness, conjunctivitis, dizziness, headache	Anthraquinones, alkaloids, saponins, tannins, glycosides, and phenolics.	Not reported	Himaniarwati *et al* (2020), Julien *et al*. (2015), Parulekar (2017), Silva *et al* (2023).
Centella asiatica (L.) Urb.	Internal sore	Not reported	Not reported	Cough, kidney stones, skin diseases, wounds, headaches, ulcers	Abdominal pain, diarrhea, tinea, cough, headache, allergy, and leprosy	Triterpenoid, saponin, flavonoids, phytosterols, and phenolic acids	Asiaticoside, madecassoside, asiatic acid, madecassic acid	Xiao *et al* (2025), Diniz *et al* (2023)
Chromolaena odorata (L.) R.M. King & H. Rob.	Internal sore	Not reported	Not reported	Wound infection	Malaria, cough, toothache, and wound infection	Flavonoids, phenolics, and terpenoids	B-caryophyllene, germacrene d, α/β-pinene; quercetin	Lawal *et al* (2022), Yanis *et al* (2024)
Cinnamomum verum J.Presl	Postpartum infection	Not reported	Not reported	Cough	Cold and cough	Cinnamaldehyde, cinnamic acid, cinnamyl acetate, serta	Not reported	Ulmillah & Widiani (2025), Gautan & Adhikari (2023), Singh *et al* (2021)

Scientific Name	Medicinal use by ethnic group			Studies conducted in Indonesia	Studies conducted abroad	Group of compounds	Bioactive compounds	References
	Ambonese	Seramese	Bandanese					
						polifenol dan flavonoid		
Clerodendrum quadriloculare (Blanco) Merr.	Coughs	Not reported	Not reported	Not reported	Abdominal pain, wound, and ulcer	Flavonoids, steroids, triterpenes, coumarins, tannins, phenolics, and alkaloids	Not reported	Ann *et al* (2015), Ceburon *et al* (2018)
Clinacanthus nutans (Burm.f.) Lindau	Postpartum	Not reported	Not reported	Fever, hives	Skin infection	C-glycosyl flavones	Schaftoside, isoschaftoside, vitexin	Saudah & Ernilasari (2023), Tu *et al* (2014)
Cocos nucifera L.	Not reported	Eye pain	Not reported	Wound, skin infection	Not reported	Fatty acid	Lauric acid, monolaurin	Carpo *et al* (2007)
Coleus scutellarioides (L.) Benth.	Postpartum infection and tuberculosis	Tuberculosis	Not reported	Furuncle, skin infection	Not reported	Fenolik, diterpenoid	Rosmarinic acid, coleon u	Abu-Gharbieh *et al* (2013)
Curcuma longa L	Postpartum and malaria	Navel infection, postpartum, and coughs	Not reported	Fever, headache, menstrual pain, postpartum, coronary, diabetes, wound, and skin infection	Gastric ulcers, bites(non-venomous), itching, skin infection	Curcuminoid (diarylheptanoid)	Curcumin	Ragsasilp *et al* (2022), Fuloria *et al* (2022)
Curcuma zanthorrhiza Roxb.	Postpartum infection and abdominal pain	Abdominal pain	Not reported	Erectile dysfunction, hepatitis, low immune system,	Not reported	Seskuiterpenoid, phenolic	Xanthorrhizol	Ammar *et al* (2021), Bhagawan *et al* (2023), Gani *et al* (2024), Khalid *et al* (2021)

Scientific Name	Medicinal use by ethnic group			Studies conducted in Indonesia	Studies conducted abroad	Group of compounds	Bioactive compounds	References
	Ambonese	Seramese	Bandanese					
				menstrual pain, postpartum, supplement, weight gain, stomach ache, flatulence, facilitating breastfeeding, itchy skin, aching rheumatic pain, abdominal pain for children, gout, back pain, bruises on the body, fever				
Curcuma zedoaria (Christm.) Roscoe	Postpartum infection and tbc	Tbc	Not reported	Gastrointestinal infection	Gastric ulcers, stomach ache, and dislocations	Sesquiterpenoid, curcuminoid minor	Curzerenone, furanodiene, zedoarone	Ragsasilp *et al* (2022), Gounder *et al* (2021)
Cyathula prostrata (L.) Blume	Abdominal pain	Not reported	Not reported	Cough, diarrhea	Pimples	Saponin, flavonoid, and phenolic	Not reported	Lawal *et al* (2022), Patrick *et al* (2022)
Cymbopogon citratus (DC.) Stapf	Fever and postpartum	Fever and postpartum	Not reported	Diarrhea, postpartum, cough, flu	Pimples	Monoterpenoid	Citral (geranial + neral), limonene	Lawal *et al* (2022), Shah *et al* (2011)

Scientific Name	Medicinal use by ethnic group			Studies conducted in Indonesia	Studies conducted abroad	Group of compounds	Bioactive compounds	References
	Ambonese	Seramese	Bandanese					
Dioscorea hispida Dennst.	Not reported	Internal sore	Not reported	Diarrhea, postpartum	Not reported	Steroidal saponin; alkaloid toksik	Dioscorine, diosgenin	Estiasih *et al* (2022)
Drynaria quercifolia (L.) J.Sm.	Hernia infection	Not reported	Not reported	Wound	Not reported	Flavonoid, triterpenoid	Not reported	Arunachalam *et al* (2012)
Durio zibethinus L.	Postpartum infection	Not reported	Not reported	Wound	Not reported	tanin, flavonoid, fenolik	Catechin	Arjunan *et al* (2020)
Emilia sonchifolia (L.) DC.	Not reported	Not reported	Tuberculosis	Cough, wound	Not reported	Flavonoid, triterpenoid	Quercetin, kaempferol	Jo *et al* (2016)
Epipremnum pinnatum (L.) Engl.	Postpartum infection	Not reported	Not reported	Wound healing	Wound healing	Flavonoid, fenolik, saponin	C13 megastigmane glycosides gusanlungionoside C and citroside A, the phenylalkyl glycoside phenylmethyl-2-O-(6-O-rhamnosyl)-β-D-galactopyranoside, additional megastigmane glycosides, and several aglycones—β-damascenone, megastigmatrienone, 3-hydroxy-β-damascenone, and 3-oxo-7,8-dihydro-α-ionol	Abe & Ohtani (2013), Pan *et al* (2019), Sukandar *et al* (2013)
Heritiera littoralis Aiton	Diarrhea	Not reported	Not reported	Pasca persalinan	Diarrhea, dysentery, hematuria	**saponins, phenolics, flavonoids, and steroids**	Not reported	Bibi *et al* (2019), Kadir *et al* (2019), Karim *et al*. (2020), Tarigan (2025)
Ficus septica Burm. f.	Coughs	Not reported	Not reported	Wound, furuncle	Not reported	Alkaloid	Ficuseptine, tryptamine derivative	Chang *et al* (2021)
Flagellaria indica L.	Hernia infection	Not reported	Not reported	Furuncle, skin infection, gastritis,	Not reported	Flavonoids, tannins, saponins, steroids,	Not reported	Gnanaraj & Shah 2015, Iskandar *et al.* (2022), Karmakar *et al.* (2021), Venmathi *et al*. (2022)

Scientific Name	Medicinal use by ethnic group			Studies conducted in Indonesia	Studies conducted abroad	Group of compounds	Bioactive compounds	References
	Ambonese	Seramese	Bandanese					
				asthma, shortness of breath, and fever		triterpenoids, and alkaloids		
Graptophyllum pictum (L.) Griff.	Postpartum infection	Not reported	Not reported	Wound	Not reported	Flavonoid, iridoid	Acacetin, luteolin	Pratiwi *et al* (2021)
Hibiscus × rosa-sinensis L.	Not reported	Pneumonia	Not reported	Furuncle, wound	Not reported	Anthocyanin, flavonoid	Quercetin, cyanidin-3-glucoside	Sikarwar *et al* (2021)
Ipomoea pes-caprae (L.) R.Br.	Postpartum infection	Not reported	Not reported	Wound, itching	Not reported	Diterpenoid, flavanoid	B-amyrin, quercetin	Silva *et al* (2018)
Jasminum elongatum (P.J.Bergius) Willd.	Not reported	Coughs	Not reported	Not reported	Analgesic and antidiarrhea	Alkaloids, flavonoids, phenols, saponins, triterpenoids	Not reported	Syed & Namdeo (2021), Qiu *et al* (2023)
Justicia gendarussa Burm.f.	Postpartum infection	Not reported	Not reported	male contraceptiv e	Not reported	Alkaloids, flavonoids, saponins, fatty acids, essential oils	Quericitine, gendarusine, Benzyl alcohol, oleic acid	Indrawati *et al* (2022), Jain *et al* (2024)
Kalanchoe pinnata (Lam.) Pers.	Not reported	Fever	Not reported	Furuncle, wound	Not reported	Bufadienolide, flavonoid	Quercetin, bryophyllin a	Ojewole *et al* (2010)
Lansium domesticum Corrêa	Malaria and postpartum	Malaria	Malaria	Diarrhea	Antimalarial, antifeedant, anti-aging, wound healing, antioxidant, cytotoxic, analgesic, antibacterial, antimutageni	Triterpenoids, onoceranoid-type onoceradiendi one, limonoids, glycoside	Lansioside (limonoid), onoceranoid triterpenes, and sesquiterpenoids	Abdallah *et al* (2022), Sinaga *et al* (2022)

Scientific Name	Medicinal use by ethnic group			Studies conducted in Indonesia	Studies conducted abroad	Group of compounds	Bioactive compounds	References
	Ambonese	Seramese	Bandanese					
					c, insecticidal, and larvicidal			
Macaranga tanarius (L.) Müll.Arg.	Postpartum infection	Not reported	Not reported	Not reported	anti-inflammatory and anti-cancer	Flavanoid	Nymphaeol C, solophenol D, nymphaeol A, dan nymphaeol B	Chien *et al* (2022), Maliana *et al* (2019)
Mangifera foetida Lour.	Postpartum infection	Not reported	Not reported	Not reported	Not reported	mangiferin, phenolic, flavonoids, and essential oils	Not reported	alifiyah *et al* (2025)
Mangifera indica L.		Not reported	Flu	Not reported	Fever	xanthones, phenolic acids, fatty acids, flavonoids, and amino acids.	Not reported	Angamuthu *et al* (2021), Lawal *et al* (2022)
Mangifera laurina Blume	Postpartum infection	Not reported	Not reported	Not reported	Not reported	Phenols, flavonoids, and amino acids	4-Methoxy-2-(2-methyl-2-propanyl) phenol, Serylthreonylphenylalanyllysin, N-(1,5-Dimethyl-3-oxo-2-phenyl-2,3-dihydro1H-pyrazol-4-yl)-4-oxo-4-(1piperidinyl) butanamide	Fitmawati *et al* (2021)
Melicope glabra (Blume) T.G. Hartley	Postpartum infection	Not reported	Not reported	Not reported	Fever, colds, cramps, and inflammation.	Flavonoid	7-hydroxy-2-(4'-hydroxy-3'-methoxy-phenyl)-3,5-dimethoxy-chromen-4-one.	Ahmed *et al* (2023), Zaini *et al* (2019)
Mentha × piperita L.	Postpartum infection	Not reported	Not reported	Flu and cough	Not reported	Monoterpenoid	Not reported	McKay *et al* (2020)

Scientific Name	Medicinal use by ethnic group			Studies conducted in Indonesia	Studies conducted abroad	Group of compounds	Bioactive compounds	References
	Ambonese	Seramese	Bandanese					
Moringa oleifera Lam.	Malaria	Not reported	Not reported	Not reported	Cough	Alkaloids, flavonoids, anthraquinones, vitamins, glycosides, and terpenes	Hidrocarbono, hexacosane, pentacosane e heptacosane.	Lawal *et al* (2022), Marrufo *et al* (2013), Pareek *et al* (2023)
Musa × paradisiaca L.	Hematuria	Not reported	Not reported	Wound and furuncle	Not reported	polifenol, flavonoid, lektin	Leucocyanidin, lectins	Imam & Akter (2011)
Myristica fragrans Houtt.	Postpartum infection	Postpartum infection	Postpartum infection	Flatulence, stomach ulcers, gout, back pain, fever, and bruises on the body	Not reported	Fenilpropanoid	Eugenol, myristicin	Gani *et al* (2024), Shafiei *et al* (2012)
Ochroma pyramidale (Cav. ex Lam.) Urb.	Coughs	Not reported	Not reported	Not reported	Emetic	Triterpenoid, stigmasterol, and oleonolic acid	Lupeol, oleanolic acid, stigmasterol, β-sitosterol, β-sitosteryl-β-D-glucopyranoside, catechin, epicatechin, dan 8-C-β-D-glucopyranosyl-apigenin (vitexin)	Marenco *et al* (2001), Vázquez *et al* (2001)
Ocimum tenuiflorum L.	Coughs	Not reported	Not reported	Cough	Oral infection	Fenilpropanoid, triterpenoid	Eugenol, ursolic acid	Paidi *et al* (2021)
Orthosiphon aristatus (Blume) Miq.	Tuberculosis	Postpartum	Not reported	Urinary tract infection	Ulcer	Polifenol, flafanoid	Rosmarinic acid, sinensetin	Abdullah *et al* (2020)
Peperomia pellucida (L.) Kunth.	Not reported	Furuncle	Not reported	Cholesterol	Hypertension	Alkaloids, flavonoids, saponins, steroids, terpenoids, tannins,	2',4',5'-trihydroxybutyrophenone velutin, dehydroretrofractamide C, dan retrofractamide B.	Garcia *et al* (20180, Gomes *et al* (2022)

Scientific Name	Medicinal use by ethnic group			Studies conducted in Indonesia	Studies conducted abroad	Group of compounds	Bioactive compounds	References
	Ambonese	Seramese	Bandanese					
						phenols, and carbohydrates		
Phyllanthus urinaria L.	Malaria and postpartum	Postpartum infection	Not reported	Flatulence	Hypertension, hepatitis, wounds, and diabetes	Tannin, flavonoids, phenols, and terpenoids	Not reported	Despandhe (2023), Gani *et al* (2024)
Piper betle L.	Postpartum infection and coughs	Not reported	Not reported	Erectile dysfunction, flatulence, menstrual pain, postpartum, wound infection, and oral infections	Not reported	Fenilpropanoid (minyak atsiri), flavonoid, tanin	Eugenol, chavibetol (hydroxychavicol)	Bhagawan et al (2023), Nawangsari *et al* (2025), Yang *et al* (2024)
Pisonia grandis R.Br.	Postpartum infection	Not reported	Not reported	Skin infection	Not reported	Flavonoid, fenolik	Not reported	Prabu *et al* (2008)
Pleurolobus gangeticus (L.) J.St.-Hil. ex H. Ohashi & K. Ohashi	Abdominal pain	Not reported	Not reported	Fever, malaria	Not reported	alkaloid indol, isoflavonoid	Not reported	Kamble *et al* (2011)
Pluchea indica (L.) Less.	Postpartum infection	Not reported	Not reported	Postpartum, diarrhea	Not reported	flavonoid, sesquiterpenoid	β-caryophyllene, quercetin	Bhagawan *et al* (2023), Hanh *et al* 2011
Pogostemon cablin (Blanco) Benth.	Coughs	Not reported	Not reported	Not reported	Not reported	Sesquiterpenoid	Not reported	Li Y *et al* (2021)
Psidium guajava L.	Coughs	Diarrhea	Not reported	Diarrhea, hemorrhoids, cough	Skin infection, wounds and skin disease,	Flavonoid, tannin, triterpenoid	Quercetin, guajaverin, catechin	Bhagawan *et al* (2023), Dubale *et al* (2023), Andalan *et al* (2024), Himaniarwati *et al*, (2020) Lawal *et al* (2022),

Scientific Name	**Medicinal use by ethnic group**			**Studies conducted in Indonesia**	**Studies conducted abroad**	**Group of compounds**	**Bioactive compounds**	**References**
	Ambonese	Seramese	Bandanese					
					stomachache, malaria			Heppy *et al* (2023), Liu *et al* (2024)
Pterocarpus indicus Willd.	Postpartum	Not reported	Not reported	Wound, skin infectioun	Not reported	Flavonoid, triterpenoid	Not reported	Khan *et al* (2003)
Ricinus communis L.	Toothache and mouth pain	Fever	Not reported	Skin infection	Rabies infection, snake poison, ip, hemorrhoids, constipation, std, rheumatic pain and goitre, black coated tongue	Not reported	Ricinoleic acid	Dubale *et al* (2023), Bhattacharjya *et al* (2023), Lawal *et al* (2022), Pereira *et al* (2020)
Rivina humilis L.	Not reported	Postpartum infection	Wounds	Not reported	Not reported	mineral content, fatty acid composition, phenolics, flavonoids	Not reported	Raghava *et al* (2020) Riya *et al* (2023), UAD (2024)
Scleria terrestris (L.) Fassett	Not reported	Postpartum infection	Not reported	Not reported	Not reported	Not reported	Carvomenthol, α-terpenol, 1,2,3-trimethylbenzene, 1,2-benzenedicarboxylic acid bis(2-methylpropyl) ester, 4,7-dimethylundecane, dan methyl-9-octadecenoate.	Ogontoye *et al* (2018)
Selaginella willdenowii (Desv.) Baker	Open wounds	Not reported	Not reported	Heal wounds, bloody stools,	Not reported	Biflavonoid, tervenoid, and Stigmasterols	Amentoflavone, robustaflavone,2,6,10-Trimethyl, 14-Ethylene-14-Pentadecne, Stigmasterol,	Chai TT & Wong C (2012), Hwang *et al* (2013), Susilo & Wardhani (2023), Setyawan (2008)

Scientific Name	Medicinal use by ethnic group			Studies conducted in Indonesia	Studies conducted abroad	Group of compounds	Bioactive compounds	References
	Ambonese	Seramese	Bandanese					
				internal hemorrhoid bleeding, menstrual and uterine disorders, blood expulsion, and enhance body endurance			Hexadecanoic, and acid methyl ester	
Senna alata (L.) Roxb.	Mumps	Not reported	Not reported	Tinea versicolo	Wound, skin, and respiratory tract infection, burns, diarrhoea, and constipation	Tannins, alkaloids, flavonoids, terpenes, anthraquinone, saponins, phenolics, cannabinoid alkaloids	Chrysophanol, emodin, 1,8-cineole, caryophyllene, limonene, α-selinene, β-caryophyllene, germacrene D, cinnamic acid, pyrazol-5-ol, methaqualone, isoquinoline, quinones, reducing sugars, steroids, and volatile oils	Oladeji *et al* (2020)
Stachytarpheta jamaicensis (L.) Vahl	Coughs	Not reported	Not reported	acid reflux, ulcers, constipation, dyspepsia, slow digestion, allergy, asthma, cold, flu, bronchitis, cough, and hepatitis.	Not reported	Tannins, alkaloids, flavonoids, saponins, and phenolics.	Luvangetin and xanthyletin	Liew & Yong (2016), Utami *et al* (2022)

Scientific Name	Medicinal use by ethnic group			Studies conducted in Indonesia	Studies conducted abroad	Group of compounds	Bioactive compounds	References
	Ambonese	Seramese	Bandanese					
Syzygium aromaticum (L.) Merr. & L.M. Perry	Postpartum infection	Postpartum infection	Postpartum infection	Mouth and tooth infection	Not reported	Fenilpropanoid	Eugenol	Maggini *et al* (2024)
Syzygium malaccense (L.) Merr. & L.M. Perry	Postpartum infection	Postpartum infection	Not reported	Immunities	Not reported	Phenols and flavonoids	Gallic acid, catechin, rutin, and quercetin.	Rizkia *et al* (2024), Savi *et al* (2020)
Terminalia catappa L.	Postpartum infection	Postpartum infection	Not reported	Mouth and skin infection, and diarrhea	Not reported	flavonoid, ellagitannin	ellagic acid, punicalagin	Chyau CC *et al* (2021)
Theobroma cacao L.	Furuncle	Not reported	Not reported	Not reported	Not reported	Alkaloids, coumarins, and triterpenoids	2-Butenedioic acid, butanedioic acid, erythritol, L-aspartic acid, L-threonic acid, tetronic acid, glutamic acid, D-arabinonic acid gamma-lactone, L-(+)-tartaric acid, β-D(−)-lyxopyranose, xylitol, rubrolide C, L-ascorbic acid, D-gluconic acid, galacturonic acid, galactofuranoside, inositol, maltose, β-gentiobiose, dan α-D-glucopyranoside.	Balladares (2016)
Tinospora crispa (L.) Hook.f. & Thomson	Malaria	Not reported	Not reported	Postpartum, hypertension, fever, malaria, and skin infection	Hypertension	Alkaloid, flavonoid, glikosida flavon, triterpen, diterpen, diterpen glikosida, furanoditerpe	Tinosporaside, columbin	Salleh *et al* (2021), Ahmad *et al* (2016)

Scientific Name	**Medicinal use by ethnic group**			**Studies conducted in Indonesia**	**Studies conducted abroad**	**Group of compounds**	**Bioactive compounds**	**References**
	Ambonese	Seramese	Bandanese					
						noid tipe cis clerodane		
Tridax procumbens L.	Open wounds	Not reported	Not reported	Wound	Ulcer, hypertension, malaria, wound infection	Flavonoid, tannin, terpenoid	Quercetin, luteolin	Lawal *et al* (2022)
Urena lobata L.	Abdominal pain	Not reported	Not reported	Wound and furuncle	Birth control, rheumatism, wound, diarrhoea, stomachache	Flavonoid, terpenoid	β-sitosterol, kaempferol	Lawal *et al* (2022) Kumar *et al* (2011)
Zingiber officinale Roscoe	Postpartum infection	Postpartum infection	Postpartum infection	Cough, leucorrhea, menstrual pain, postpartum	Tonsillitis, laryngitis, and RTI, flu, cough	Phenols	6-gingerol, 8-gingerol, and 10-gingerol, β-bisabolene, α-curcumene, zingiberene, α-farnesene, and β-sesquiphellandrene,	Dubale *et al* (2023), Lawal *et al* (2022), Mao *et al* (2019)
Ziziphus mauritiana Lam.	Postpartum infection	Not reported	Not reported	Skin infection and wound	Not reported	Saponin, flavonoid	Betulinic acid, quercetin	Abubakar *et al* (2017)