



Ethnobotanical Study on the Utilization of Traditional Medicinal Plants by the Community of Nagari Empat Koto Pulau Punjung, Dharmasraya Regency, West Sumatra, Indonesia

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Abstract

This study aimed to document the diversity of medicinal plants utilized by the community of Nagari Empat Koto Pulau Punjung, Dharmasraya Regency, West Sumatra, Indonesia, including the plant parts used, preparation methods, and acquisition sources. The research employed a qualitative descriptive approach using purposive and snowball sampling methods involving 20 respondents, consisting of traditional healers and local community members. Data were collected through semi-structured interviews, direct observation, and documentation. A total of 20 medicinal plant species belonging to 16 families were identified. The most frequently utilized plant family was Zingiberaceae, while herbaceous plants represented the dominant growth habit category. Leaves were the most commonly used plant part, accounting for 55% of total utilization. Medicinal plants were predominantly obtained from home gardens (45%), followed by wild plants (35%) and purchased plants (20%). Decoction was identified as the primary preparation method practiced by the local community. Several documented plant species, including *Psidium guajava*, *Orthosiphon aristatus*, and *Phyllanthus niruri*, have been scientifically reported to possess pharmacological activities supporting their traditional medicinal uses. The findings indicate that traditional ethnobotanical knowledge remains actively preserved and continues to play an important role in community healthcare practices. This study highlights the importance of documenting traditional medicinal knowledge to support biodiversity conservation and future pharmacological research on medicinal plants.

Keywords: Decoction, Ethnobotany, Medicinal Plants, Nagari Empat Koto Pulau Punjung, Traditional Knowledge

1. Introduction

Indonesia is recognized as one of the world's megabiodiversity countries, possessing an exceptionally rich diversity of flora. Fertile soil conditions and diverse ecological environments support the growth of a wide variety of plant species (Cahyaningsih et al., 2021). West Sumatra is among the regions with high biodiversity, characterized by tropical rainforest ecosystems that promote the growth of numerous plant species. This floral diversity has long been utilized by the Minangkabau community in their daily lives, including the use of various plants such as bananas. The local community possesses extensive traditional knowledge regarding plant utilization, which has been transmitted from generation to generation and continues to play an important role in their cultural practices and daily life (Khairiah et al., 2017).

Nagari Empat Koto Pulau Punjung, located in Dharmasraya Regency, West Sumatra, is a rural area where traditional ecological knowledge is still actively maintained and practiced in everyday life. For generations, the local community has utilized the surrounding biodiversity as traditional medicine to treat

various ailments, ranging from digestive disorders to metabolic diseases. Dharmasraya Regency, situated in the eastern part of West Sumatra Province, occupies a strategic geographical position as a transitional zone between lowland ecosystems and major river systems. These environmental conditions contribute to the high diversity of flora found in the area. Furthermore, the people of Dharmasraya, who strongly uphold local traditions and cultural values, possess extensive knowledge regarding the utilization of plants, which has been inherited across generations (Retno et al., 2022).

Ethnobotany is a scientific discipline that examines the relationship between humans and plants. This field also explores the traditional uses of plants, including their application as medicinal resources. Ethnobotanical studies are important for understanding the knowledge systems of traditional communities that have long relied on various plant species to support their daily lives (Navia et al., 2021). Ethnobotany encompasses inherited life experiences, local knowledge, and traditional wisdom related to plant utilization that have been passed down through generations. In addition, ethnobotanical studies are closely associated with human dependence on plants, both directly and indirectly, to fulfill various aspects of life necessities (Utami et al., 2019; Nuraeni et al., 2022).

However, modernization and changing lifestyles have gradually contributed to the decline of traditional knowledge related to medicinal plant utilization. The increasing dominance of modern medicine has reduced younger generations' familiarity with traditional medicinal plants and their preparation methods. Without proper documentation, this inherited local wisdom is at risk of disappearing over time (Navia et al., 2021). Therefore, ethnobotanical research is essential not only to document the medicinal plants utilized by local communities, but also to support the preservation of traditional knowledge and the conservation of local medicinal plant resources. Furthermore, the findings of ethnobotanical studies may provide a scientific basis for the development of herbal medicines and future pharmacological research concerning the bioactive compounds and therapeutic potential of medicinal plants (Bhagawan et al., 2023).

Ethnobotanical studies conducted in Nagari Empat Koto Pulau Punjung remain limited, particularly those focusing on medicinal plant species, plant parts used, preparation methods, and modes of utilization by the local community. This lack of scientific documentation highlights the need for further research to preserve traditional knowledge before it declines or disappears due to ongoing social and cultural changes. Therefore, this study aims to identify the medicinal plants utilized by the community of Nagari Empat Koto, determine the plant parts used along with their preparation and application methods, and document the traditional knowledge associated with medicinal plant utilization in the community's daily life.

2. Materials and Methods

2.1. Study Area

This study was conducted in Nagari Empat Koto, Pulau Punjung District, Dharmasraya Regency, West Sumatra, Indonesia. The study area is characterized as a rural region where traditional ecological knowledge remains an important part of the community's daily life. The selection of this location was based on the continued use of surrounding plant resources by local communities as primary traditional remedies for maintaining health.

2.2. Research Design

This study employed a qualitative descriptive approach to analyze and describe the utilization of medicinal plants by the community of Nagari Empat Koto Pulau Punjung. A total of 20 respondents participated in this study. The sampling process combined purposive sampling and snowball sampling techniques. Purposive sampling was used to select five key informants, consisting of local traditional healers (dukun), while snowball sampling was applied to identify supporting informants based on recommendations from previous key informants. Data were collected through semi-structured interviews, direct observation, and documentation. The interviews were conducted using a semi-structured approach based on a prepared interview guideline, although the questions could be further explored and rearranged

according to the flow of conversation. Interviews were supported using a mobile phone voice recorder. In addition, observation and documentation were conducted participatively through direct field observations in Nagari Empat Koto Pulau Punjung.

2.3. Data Analysis

The collected data were analyzed using descriptive analysis techniques consisting of three stages: data reduction, data presentation, and conclusion drawing. Data reduction was conducted by summarizing, coding, and categorizing the obtained data to ensure a more systematic and focused interpretation. Supporting quantitative data, such as the percentage of medicinal plant acquisition methods, were analyzed descriptively by calculating the frequency of each category and presenting the results in percentage diagrams. Conclusions were drawn through interpretation and verification by comparing the findings with relevant theories to ensure the credibility of the data (Jailani & Saksitha, 2024).

3. Results

Nagari Empat Koto Pulau Punjung is a rural area characterized by relatively well-preserved natural surroundings, predominantly consisting of home gardens and rice fields. The village is located in Pulau Punjung District, Dharmasraya Regency, West Sumatra Province, Indonesia. The local community continues to utilize plants growing in the surrounding environment as alternative remedies in their daily healthcare practices. Based on field observations and semi-structured interviews, a total of 20 medicinal plant species belonging to 16 different families were documented in this study (Table 1).

Table 1. Medicinal Plant Species Utilized by the Community of Nagari Empat Koto Pulau Punjung

Family	Local Name (Scientific Name)	Plant Part	Habitus	Medicinal Use	Preparation	Method of Acquisition
Euphorbia-ceae	Jarak (<i>Jatropha curcas</i>)	Leaves	Shrub	Fever	Warm compress	Home garden plants
	Betadin (<i>Jatropha multifida</i>)	Sap	Shrub	Wound	Applied topically	Home garden plants
Zingibera-ceae	Kunik (<i>Curcuma longa</i>)	Rhizome	Herb	Gastritis	Pounded	Purchased
	Sipadeh (<i>Zingiber officinale</i>)	Rhizome	Herb	Cough skin fungal infection	Decoction Applied topically	Purchased
Myrtaceae	Paraweh (<i>Psidium guajava</i>)	Leaves	Tree	Diarrhea	Decoction	Home garden plants
	Karamunting (<i>Rhodomyrtus tomentosa</i>)	Root	Shrub	Malaria	Decoction	Wild plants
Amaryllida-ceae	Bawang merah (<i>Allium cepa</i>)	Bulb	Herb	Common cold	Pounded	Purchased
Piperaceae	Siriah (<i>Piper betle</i>)	Leaves	Liana	Vaginal discharge	Decoction	Purchased
Lamiaceae	Kumis kucing (<i>Orthosiphon aristatus</i>)	Leaves	Herb	Kidney stones	Decoction	Home garden plants
Annonaceae	Durian balando (<i>Annona muricata</i>)	Leaves	Tree	Hypertension	Decoction	Home garden plants
Malvaceae	Kapuak (<i>Ceiba pentandra</i>)	Leaves	Tree	Sore throat	Squeezed	Wild plants
Acanthaceae	Keji beling (<i>Strobilanthes crispus</i>)	Leaves	Shrub	Diabetes	Decoction	Home garden plants
Sapindaceae	Rambutan (<i>Nephelium lappaceum</i>)	Leaves	Tree	Fever	Squeezed	Home garden plants
Asteraceae	Sidingin (<i>Gynura segetum</i>)	Leaves	Herb	Rheumatism Diabetes	Decoction	Home garden plants
	Sitawa (<i>Costus speciosus</i>)	Leaves	Herb	Toothache	Pounded	Wild plants
Poaceae	Ilalang (<i>Imperata cylindrica</i>)	Root	Grass	Sore throat	Decoction	Wild plants
Campanulaceae	Bungo katarak (<i>Isotoma longiflora</i>)	Flower	Herb	Blurred vision (eyes)	Soaked	Home garden plants
Solanaceae	Latuik-latuik (<i>Physalis angulata</i>)	Fruit	Shrub	Immunity	Consumed directly	Wild plants
Melastomaceae	Sikaduduak (<i>Melastoma malabathricum</i>)	Root	Shrub	Malaria	Decoction	Wild plants
Lauraceae	Sidukuang anak (<i>Phyllanthus niruri</i>)	Leaves	Herb	Hypertension	Decoction	Wild plants

3.1. Methods of Medicinal Plant Acquisition

The acquisition of medicinal plants was predominantly derived from home garden cultivation, accounting for 45% of the total species recorded, followed by wild plants at 35% and purchased plants at 20% (Figure 1).

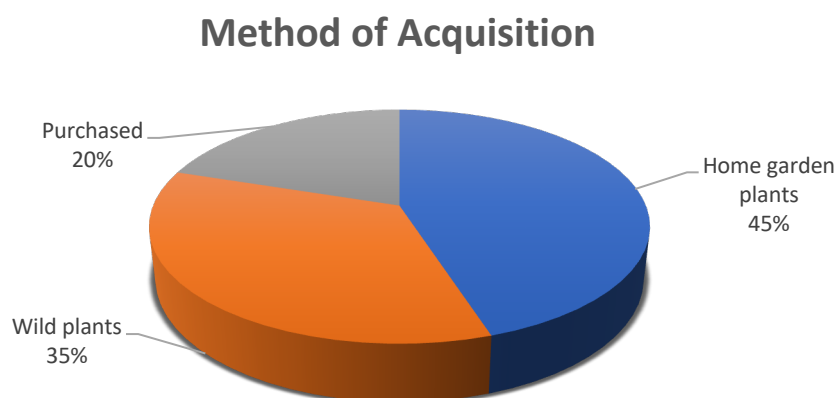


Figure 1. Percentage Distribution of Medicinal Plant Acquisition Sources Used by the Community of Nagari Empat Koto Pulau Punjung

3.2. Types of Medicinal Plants Utilized Based on Habitus

The medicinal plants utilized by the community were classified into five growth habit categories, namely herbs, lianas, shrubs, trees, and grasses, as presented in Figure 2. The utilization of medicinal plants by the community of Nagari Empat Koto Pulau Punjung was predominantly dominated by herbaceous plants, accounting for 40% of the recorded species.

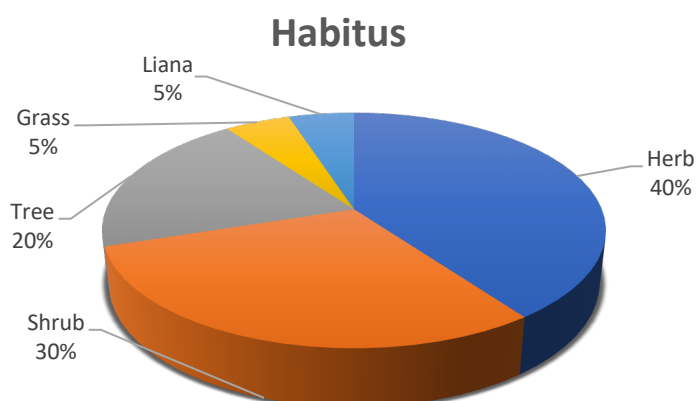


Figure 2. Percentage Distribution of Medicinal Plants Utilized by the Community Based on Growth Habit

3.3. Plant Parts Utilized

The plant parts utilized included leaves, rhizomes, roots, sap, flowers, bulbs, and fruits. As shown in Figure 3, the utilization of medicinal plants by the community of Nagari Empat Koto Pulau Punjung was predominantly focused on leaves, accounting for 55% of the total plant parts used.

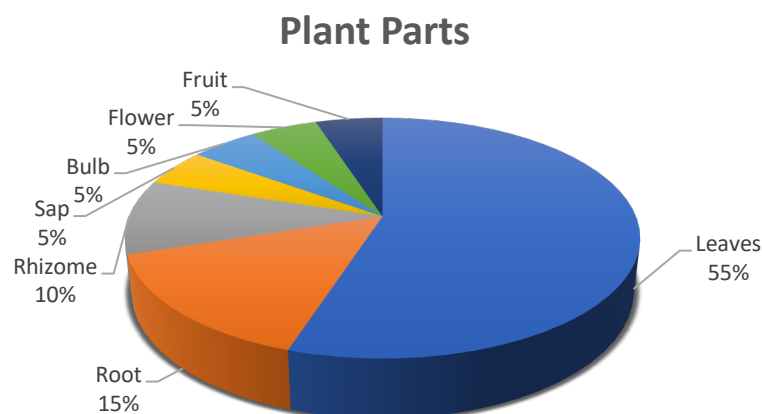


Figure 3. Percentage Distribution of Medicinal Plant Parts Utilized by the Community of Nagari Empat Koto Pulau Punjung

3.4 Medicinal Plant Preparation Methods

The preparation methods of medicinal plants included boiling, squeezing, pounding, soaking, direct consumption, and warm compress application. The community of Nagari Empat Koto Pulau Punjung predominantly processed medicinal plants by boiling them (Figure 4).

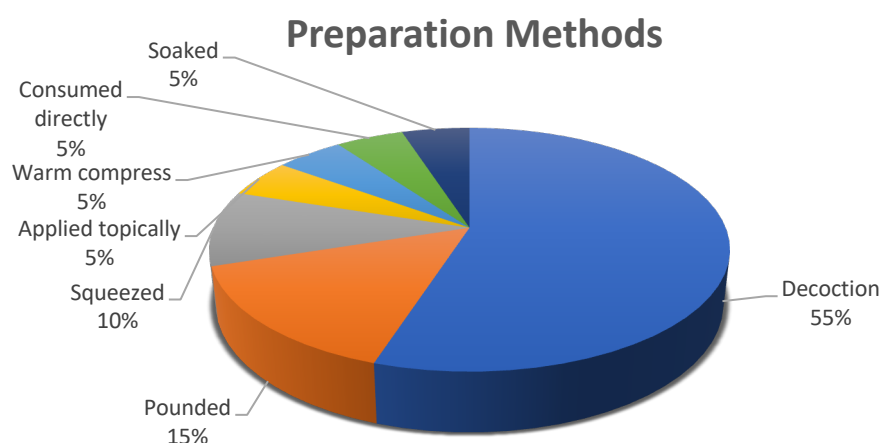


Figure 4. Percentage Distribution of Medicinal Plant Preparation Methods Used by the Community of Nagari Empat Koto Pulau Punjung

4. Discussion

Nagari Empat Koto Pulau Punjung is a rural area that still maintains relatively preserved natural conditions, enabling local communities to continue utilizing medicinal plants as part of their traditional healthcare practices. The present study documented 20 medicinal plant species belonging to 16 families, indicating that ethnobotanical knowledge remains actively preserved and transmitted across generations. The continued use of medicinal plants in rural communities is closely associated with their accessibility, affordability, and cultural acceptance as alternative remedies (WHO, 2013). According to Sofowora et al. (2013), medicinal plants continue to play an important role in disease prevention and primary healthcare systems, particularly in developing countries. Similar findings were also reported by Rahmawati et al. (2020), who documented extensive medicinal plant utilization among local communities in West Sumatra.

The medicinal plant species identified in this study were dominated by several families, including Zingiberaceae, Euphorbiaceae, Asteraceae, and Myrtaceae. Members of the Zingiberaceae family such as *Curcuma longa* and *Zingiber officinale* were commonly utilized for treating gastritis and cough, respectively. These species are known to contain bioactive compounds including flavonoids, essential oils, and curcuminoids with antioxidant, antimicrobial, and anti-inflammatory activities (Prasad & Aggarwal, 2011). According to Yuan et al. (2016), many medicinal plants traditionally used by local communities have scientifically proven pharmacological properties, supporting their integration into modern healthcare research.

Based on the acquisition methods, medicinal plants were predominantly obtained from home gardens (45%), followed by wild plants (35%) and purchased plants (20%). The dominance of home garden plants demonstrates the important role of household gardens in conserving medicinal plant diversity and supporting family healthcare. Kehlenbeck and Maass (2004) reported that home gardens in rural areas function not only as food production systems but also as reservoirs of medicinal plant biodiversity. The continued use of wild medicinal plants additionally reflects the strong interaction between local communities and surrounding ecosystems (Pieroni & Quave, 2014).

Herbaceous plants represented the most dominant habitus category, accounting for 40% of the total medicinal plant species recorded. Herbaceous plants are generally preferred because they are easy to cultivate, rapidly grow, and are readily available around settlements and agricultural lands. Similar observations were reported by Silalahi et al. (2015), who found that herbaceous medicinal plants were commonly utilized by local communities in Indonesia due to their accessibility and practical use. Furthermore, Aziz et al. (2018) emphasized that herbaceous species are frequently used in traditional medicine because they are easier to process and contain diverse secondary metabolites beneficial for treating various diseases.

Leaves were identified as the most frequently utilized plant part, accounting for 55% of the total usage. The preference for leaves may be associated with easier harvesting practices without causing severe damage to the plant. Leaves also contain abundant bioactive compounds such as alkaloids, tannins, flavonoids, and saponins, which contribute to their medicinal efficacy (Ghorbani, 2005). According to Upriyati et al. (2012), leaf harvesting is considered more sustainable compared to root or bark collection because it minimizes destructive impacts on plant survival. Similar findings were also documented by Rahayu et al. (2006) in their ethnobotanical study on traditional medicinal plants in Indonesia.

The predominant preparation method used by the community was decoction or boiling. Boiling is traditionally believed to enhance the extraction of water-soluble bioactive compounds and improve medicinal efficacy. Azwanida (2015) explained that boiling facilitates the extraction of secondary metabolites such as phenolics, flavonoids, and tannins, which are commonly associated with medicinal properties. Similar preparation practices have also been widely reported in ethnobotanical studies conducted in various indigenous communities worldwide (Kayani et al., 2014).

Several medicinal plants identified in this study have previously been scientifically reported to possess pharmacological activities. *Psidium guajava* leaves have been reported to exhibit antidiarrheal activity due to their tannin and flavonoid contents (Arima & Danno, 2002). *Orthosiphon aristatus* is widely recognized for its diuretic and antihypertensive effects (Ameer et al., 2012), while *Phyllanthus niruri* possesses immunomodulatory and antihypertensive properties associated with lignan and flavonoid compounds (Bagalkotkar et al., 2006). These findings demonstrate that the traditional medicinal knowledge maintained by the community of Nagari Empat Koto Pulau Punjung has strong scientific relevance and contributes to the preservation of ethnomedicinal heritage.

5. Conclusions

This study documented 20 medicinal plant species belonging to 16 families utilized by the community of Nagari Empat Koto Pulau Punjung, Dharmasraya Regency, West Sumatra, Indonesia. The findings demonstrated that medicinal plant utilization remains an important component of traditional healthcare practices among local communities. Most medicinal plants were obtained from home gardens, highlighting

the important role of household cultivation in supporting medicinal plant conservation and family healthcare systems. Herbaceous plants were the dominant habitus category, while leaves were the most frequently utilized plant parts due to their accessibility and high content of bioactive compounds. Decoction was identified as the predominant preparation method practiced by the community. Several plant species documented in this study have also been scientifically reported to possess pharmacological activities, supporting the relevance of traditional ethnomedicinal knowledge. Overall, the results indicate that ethnobotanical knowledge in Nagari Empat Koto Pulau Punjung remains well preserved and has strong potential for further pharmacological and conservation studies.

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References

- Ameer, O. Z., Salman, I. M., Asmawi, M. Z., Ibraheem, Z. O., & Yam, M. F. (2012). *Orthosiphon stamineus*: Traditional uses, phytochemistry, pharmacology, and toxicology. *Journal of Medicinal Food*, 15(8), 678–690.
- Arima, H., & Danno, G. (2002). Isolation of antimicrobial compounds from guava (*Psidium guajava* L.) and their structural elucidation. *Bioscience, Biotechnology, and Biochemistry*, 66(8), 1727–1730.
- Astutik, S., Pretzsch, J., & Kimengsi, J. N. (2019). Asian medicinal plants' production and utilization potentials: A review. *Sustainability*, 11(19), 5483.
- Aziz, M. A., Khan, A. H., Adnan, M., & Ullah, H. (2018). Traditional uses of medicinal plants used by indigenous communities. *Evidence-Based Complementary and Alternative Medicine*, 2018, 1–20.
- Azwanida, N. N. (2015). A review on the extraction methods use in medicinal plants, principle, strength and limitation. *Medicinal & Aromatic Plants*, 4(3), 196.
- Bagalkotkar, G., Sagineedu, S. R., Saad, M. S., & Stanslas, J. (2006). Phytochemicals from *Phyllanthus niruri* Linn. and their pharmacological properties: A review. *Journal of Pharmacy and Pharmacology*, 58(12), 1559–1570.
- Bhagawan, W. S., Ekasari, W., & Agil, M. (2023). Ethnopharmacology of medicinal plants used by the Tenggerese community in Bromo Tengger Semeru National Park, Indonesia. *Biodiversitas*, 24(10), 5464–5477.
- Cahyaningsih, R., Phillips, J., Brehm, J. M., Gaisberger, H., & Maxted, N. (2021). Climate change impact on medicinal plants in Indonesia. *Global Ecology and Conservation*, 30, e01752.
- Dapar, M. L. G., Alejandro, G. J. D., & Meve, U. (2020). Ethnomedicinal plants used for the treatment of digestive system disorders by indigenous communities in Mindanao, Philippines. *Journal of Ethnopharmacology*, 249, 112413.
- Ghorbani, A. (2005). Studies on pharmaceutical ethnobotany in the region of Turkmen Sahra, north of Iran. *Journal of Ethnopharmacology*, 102(1), 58–68.
- Heinrich, M., Barnes, J., Gibbons, S., & Williamson, E. M. (2012). *Fundamentals of pharmacognosy and phytotherapy*. Elsevier, Edinburgh.
- Hidayat, S., & Hardiansyah, G. (2012). Studi etnobotani tumbuhan obat pada masyarakat Suku Dayak. *Jurnal Biologi Indonesia*, 8(2), 231–244.
- Kayani, S., Ahmad, M., Zafar, M., et al. (2014). Ethnobotanical uses of medicinal plants for respiratory disorders among the inhabitants of Gallies–Abbottabad, Pakistan. *Journal of Ethnopharmacology*, 156, 47–60.
- Kehlenbeck, K., & Maass, B. L. (2004). Crop diversity and classification of homegardens in Central Sulawesi, Indonesia. *Agroforestry Systems*, 63(1), 53–62.
- Khairiah, A., Nisyawati, & Silalahi, M. (2017). Biodiversity of medicinal plants by Minangkabau ethnic in Guguk Sarai, West Sumatera, Indonesia. *AIP Conference Proceedings*, 1862(1), 030109. <https://doi.org/10.1063/1.4991213>
- Lestari, D. A., & Santoso, B. B. (2011). Studi etnobotani tumbuhan obat di Desa Tembobor. *Jurnal Penelitian Hutan dan Konservasi Alam*, 8(2), 123–131.
- Martin, G. J. (2004). *Ethnobotany: A methods manual*. Earthscan, London.
- Navia, Z. I., Suwardi, A. B., & Baihaqi. (2021). Ethnobotanical study of medicinal plants used by local communities in Sekerak Subdistrict, Aceh Tamiang, Indonesia. *Biodiversitas*, 22(10), 4273–4281.
- Nuraeni, E., Yulianti, A. B., & Kurniawati, N. (2022). Ethnopharmacological study of medicinal plants in the Rawamerta Region, Karawang, West Java, Indonesia. *Open Access Macedonian Journal of Medical Sciences*, 10(E), 1–8.
- Phillips, O., & Gentry, A. H. (1993). The useful plants of Tambopata, Peru: I. Statistical hypotheses tests with a new quantitative technique. *Economic Botany*, 47(1), 15–32.

- Pieroni, A., & Quave, C. L. (2014). Ethnopharmacology and biodiversity conservation. *Journal of Ethnopharmacology*, 152(1), 1–4.
- Prasad, S., & Aggarwal, B. B. (2011). Turmeric, the golden spice: From traditional medicine to modern medicine. In *Herbal medicine: Biomolecular and clinical aspects* (pp. 263–288). CRC Press, Boca Raton.
- Rahayu, M., Sunarti, S., Sulistiarini, D., & Prawiroatmodjo, S. (2006). Pemanfaatan tumbuhan obat secara tradisional oleh masyarakat lokal di Pulau Wawonii. *Biodiversitas*, 7(3), 245–250.
- Rahmawati, D., Zuhud, E. A. M., & Hikmat, A. (2020). Ethnobotanical study of medicinal plants used by local communities in West Sumatra. *Biodiversitas*, 21(6), 2455–2466.
- Retno, W. (2022). Ethnomedical study of plants as traditional medicine in Indonesia. *Universitas Muhammadiyah Purwokerto Repository*.
- Silalahi, M., Nisyawati, & Walujo, E. B. (2015). Local knowledge of medicinal plants in sub-ethnic Batak Simalungun, North Sumatra, Indonesia. *Biodiversitas*, 16(1), 44–54.
- Sofowora, A., Ogunbodede, E., & Onayade, A. (2013). The role and place of medicinal plants in the strategies for disease prevention. *African Journal of Traditional, Complementary and Alternative Medicines*, 10(5), 210–229.
- Sujarwo, W., & Caneva, G. (2016). Using quantitative indices to evaluate ethnobotanical knowledge in Bali, Indonesia. *Journal of Ethnobiology and Ethnomedicine*, 12, 59.
- Trotter, R. T., & Logan, M. H. (1986). Informant consensus: A new approach for identifying potentially effective medicinal plants. *Journal of Ethnopharmacology*, 16(1), 91–112.
- Upriyati, Y., Asselin, H., Dhakal, A., & Julien, N. (2012). Traditional use of medicinal plants in the boreal forest of Canada. *Journal of Ethnobiology and Ethnomedicine*, 8, 7.
- Utami, R. D., Zuhud, E. A. M., & Hikmat, A. (2019). Medicinal ethnobotany and potential of medicine plants of Anak Rawa ethnic at The Penyengat Village Sungai Apit Siak Riau. *Media Konservasi*, 24(1), 40–51. <https://doi.org/10.29244/medkon.24.1.40-51>
- World Health Organization. (2013). WHO traditional medicine strategy 2014–2023. World Health Organization, Geneva.
- Yuan, H., Ma, Q., Ye, L., & Piao, G. (2016). The traditional medicine and modern medicine from natural products. *Molecules*, 21(5), 559.