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Plants Used in the Ethnomedicine of Diarrheal Diseases: A Synthesis of Scientific Evidence on the Role of Secondary Metabolites in Antidiarrheal Activity

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ABSTRACT

This study aims to analyse the relationships among plants used in the ethnomedicine of diarrheal diseases, their secondary metabolite profiles, and the resulting antidiarrheal activities. The method used was library research with an integrative review approach, examining various scientific articles published from 2016 to 2025, obtained from several academic databases. The selection process involved identification, screening, and eligibility evaluation to obtain relevant literature. The results showed that various plants from several families, including Myrtaceae, Zingiberaceae, and Fabaceae, are traditionally used to treat diarrhoea. The most commonly used plant part was the leaves, with boiling being the primary preparation method. These plants contain major secondary metabolites, including flavonoids, tannins, alkaloids, and saponins. These compounds are known to possess pharmacological activities as antimicrobial, anti-inflammatory, antimotility, and antisecretory agents, which contribute to reducing diarrhoea symptoms. The conclusion of this study indicates that the use of plants in the ethnomedicine of diarrheal diseases has a strong scientific basis, supported by their secondary metabolite profiles and pharmacological activities. These findings support the potential development of medicinal plants as an alternative natural-based antidiarrheal therapy.

1. INTRODUCTION

Ethnomedicine is the science that studies the use of plants as medicine based on local community knowledge passed down from generation to generation. In the context of diarrheal diseases, medicinal plants have long been used as alternative treatments because they are readily accessible, low-cost, and relatively safe. Recent ethnobotanical surveys confirm that communities across various regions still rely heavily on local plants for self-management of diarrheal diseases (Abba et al., 2022). In addition, the high biodiversity in developing countries supports the use of various plants in traditional medicine. Ethnomedicinal practices are still widely used within public healthcare systems in many countries (Alelign et al., 2021; James et al., 2023; World Health Organisation, 2019).

Biodiversity and the conservation of medicinal plants are important for maintaining the sustainability of ethnomedicine. Many medicinal plants are threatened due to overexploitation and environmental changes. Furthermore, the loss of local knowledge has become a challenge because most information is transmitted orally. Therefore, conservation efforts should focus not only on preserving plant species but also on preserving traditional community knowledge (Hamilton, 2004; James et al., 2023). The integration of local knowledge into conservation strategies is crucial to ensure the sustainability of these biological resources (Sahu et al., 2022).

Various studies have shown a close relationship among local knowledge, biodiversity, and the use of medicinal plants for treating diarrhoea. Research indicates that communities across countries use various plant species to treat diarrhoea based on traditional practices (Alelign et al., 2021). Other studies reveal that the utilisation of medicinal plants is strongly influenced by environmental and cultural conditions (James et al., 2023). In addition, ethnopharmacological studies suggest that medicinal plants have great

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potential as sources of alternative therapies (Fabricant & Farnsworth, 2001). The World Health Organisation (WHO) has also reported that medicinal plants remain an important component of the treatment of infectious diseases, including diarrhoea (World Health Organisation, 2019).

The utilisation of medicinal plants must also be supported by strong scientific documentation and clear quality standards to ensure the safety and efficacy of therapy (Ministry of Health of the Republic of Indonesia, 2020). Studies have shown that the increasing demand for medicinal plants may lead to overexploitation and threaten species conservation (Hamilton, 2004). Moreover, scientific documentation is essential to prevent the loss of local knowledge (James et al., 2023). Biodiversity conservation is important to support the future development of herbal medicines (Fabricant & Farnsworth, 2001).

Based on the explanation above, it can be concluded that plants used in the ethnomedicine of diarrheal diseases are closely related to local knowledge, biodiversity, and conservation. However, the main issue that remains is the lack of studies that comprehensively integrate these three aspects within a single scientific analysis. To address this issue, a systematic approach is needed to collect and synthesise various relevant research findings. Therefore, this study aims to conduct a systematic review of the relationship among local knowledge, biodiversity, and the conservation of medicinal plants in the context of ethnomedicine for diarrheal diseases.

2. METHOD

This study employed a library research method with an integrative review approach, which aims to systematically collect, evaluate, and synthesise relevant research findings in order to obtain a comprehensive understanding of a particular topic. The objective of this study was to analyse the relationships among local knowledge, biodiversity, and the conservation of medicinal plants in the context of ethnomedicine for diarrheal diseases. The data sources used in this study were obtained from various scientific databases, including Google Scholar, Elicit, Scite.ai, Scispace, the Directory of Open Access Journals (DOAJ), and Scopus. This approach allows the integration of various research methods, both qualitative and quantitative, thereby producing a broader scientific synthesis (Whittemore & Knafl, 2005).

The inclusion criteria for this study included scientific articles published between 2016 and 2025, available in full text, written in either Indonesian or English, and relevant to the research topics, namely ethnomedicine, medicinal plants for diarrhoea, local knowledge, biodiversity, and conservation. Meanwhile, the exclusion criteria included articles without full access, articles that had not undergone peer review, and articles irrelevant to the research variables. The literature search process was conducted using keywords such as “ethnomedicine,” “medicinal plants,” “diarrhoea,” “biodiversity,” “local knowledge,” and “conservation,” combined with Boolean operators (AND, OR). The literature selection procedure was carried out in several stages: identification, title and abstract screening, and comprehensive article eligibility evaluation.

The data analysis method in this study used descriptive qualitative analysis techniques, namely a thematic synthesis approach, grouping the data into major themes related to local knowledge, biodiversity, and the conservation of medicinal plants. Data from the literature were extracted using a data extraction sheet that included information such as authors, year of publication, research location, plant species, and the main findings of the study. To maintain the validity and reliability of the data, source triangulation was conducted by comparing research findings across databases and ensuring that the articles used originated from reputable journals. In addition, this study followed integrative review guidelines to ensure the analysis was conducted systematically and transparently (Whittemore & Knafl, 2005).

3. RESULT AND DISCUSSION

Based on search results from the Dimensions database, 198,577 publications were initially identified using the defined keywords related to polymeric nanoparticles and targeted drug delivery in cancer therapy. Among these, 76,625 publications were categorised as open access (All OA), indicating a substantial proportion of studies that are freely accessible to the public. Furthermore, after limiting the document type to research articles, the number was refined to 70,302 publications, ensuring a focus on original scientific contributions. To enhance the relevance and recency of the analysis, an additional filter was applied to include only studies published within the last ten years (2016–2025), resulting in 59,964 publications. This progressive filtering process demonstrates a systematic approach to narrowing the literature to obtain a more focused, up-to-date body of evidence for subsequent analysis, as shown in Figure 2.

Result

1. Diversity of Plants Used in the Ethnomedicine of Diarrheal Diseases

Based on the literature review, various plant species are used in ethnomedicine to treat diarrhoea. These plants belong to several dominant families, including Fabaceae, Myrtaceae, and Zingiberaceae. Some of the most frequently reported species include *Psidium guajava*, *Curcuma longa*, and *Zingiber officinale*. In addition, these medicinal plants are used across Asia, Africa, and Latin America.

The plant parts used include leaves, roots, bark, and fruits, with leaves being the most commonly utilised part. The most commonly used traditional preparation method is boiling (decoction), followed by infusion and other simple extraction methods.

Discussion

1. Pharmacological Activities of Secondary Metabolites as Antidiarrheal Agents

Based on the findings, the plants used in the ethnomedicine for diarrheal diseases are predominantly characterised by the presence of secondary metabolites, such as flavonoids, tannins, alkaloids, and saponins. The presence of these compounds indicates potential pharmacological activities that contribute to the treatment of diarrhoea through different mechanisms (Ibrahim et al., 2023). Flavonoids are known to possess strong antimicrobial and anti-inflammatory activities, inhibiting the growth of pathogenic bacteria that cause diarrhoea and reducing inflammation in the digestive tract (Lestari et al., 2025).

In addition, tannins act as antisecretory agents by precipitating proteins on the intestinal mucosa, thereby forming a protective layer that reduces excessive fluid secretion into the intestinal lumen (Rahmat et al., 2017). Alkaloids have also been reported to exhibit effective antibacterial activity through mechanisms that disrupt microbial cell function, while saponins increase cell membrane permeability and exert immunomodulatory effects (Umer et al., 2023). The combination of these various secondary metabolites indicates that the antidiarrheal activity of medicinal plants does not operate through a single mechanism, but rather through a multi-target mechanism. This aligns with the principles of phytotherapy, in which natural compounds act synergistically to produce optimal therapeutic effects.

2. Synthesis and Integration of Scientific Evidence in the Ethnomedicine of Diarrheal Diseases

The findings of this study indicate that the use of plants in ethnomedicine is not solely based on empirical experience but is also supported by strong scientific evidence. The dominant use of leaves in traditional medicine, such as in the utilisation of guava leaves (*Psidium guajava*), demonstrates that this plant part serves as a primary source of easily accessible bioactive compounds (Afrianti et al., 2020). The boiling method is also consistent with the principle of simple extraction of active compounds to obtain beneficial polar components (Mulyani et al., 2019).

When integrated with previous studies, these findings further strengthen the evidence that medicinal plants have great potential as alternative sources of antidiarrheal therapy, particularly in addressing the challenges of antibiotic resistance (Gani et al., 2024). However, most current studies are still limited to in vitro and in vivo stages; further development through clinical trials is highly necessary to ensure their safety and effectiveness in humans (Nanditha et al., 2018).

In addition to pharmacological aspects, this study highlights the relationship between biodiversity and the sustainability of medicinal plant utilisation. The high dependence of communities in certain regions, including West Nusa Tenggara, on medicinal plants must be balanced with systematic documentation and conservation efforts (Lestari et al., 2019). Therefore, an integrative approach that considers pharmacological, ecological, and socio-cultural aspects is required to ensure the sustainability of ethnomedicine development in the future (Sahu et al., 2022).

4. CONCLUSION AND RECOMMENDATION

Based on the results and discussion presented, it can be concluded that plants used in ethnomedicine for diarrheal diseases are closely associated with their secondary metabolite content, including flavonoids, tannins, alkaloids, and saponins, which contribute to antidiarrheal activity. These compounds act through various mechanisms, including antimicrobial, anti-inflammatory, antimotility, and antisecretory effects, thereby effectively reducing the symptoms of diarrhoea. Furthermore, the results of the literature synthesis indicate that the utilisation of medicinal plants in ethnomedicine is not solely based on empirical experience, but is also supported by strong scientific evidence. However, most studies are still limited to in vitro and in vivo stages, and therefore, further research is needed to confirm their effectiveness and safety in humans.

Based on these findings, it is recommended that future researchers conduct clinical trials on medicinal plants with potential antidiarrheal activity in order to strengthen the existing scientific evidence. In addition, academics and practitioners in the field of pharmacy are expected to develop scientifically validated phytopharmaceutical formulations based on medicinal plants. Governments and policymakers

are also encouraged to enhance medicinal plant conservation efforts and support research on ethnomedicine as part of developing healthcare based on local resources. Meanwhile, the public is expected to use medicinal plants wisely, with safety and environmental sustainability in mind.

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6. REFERENCES

Abba, C. C., et al. (2022). *Ethnobotanical survey of medicinal plants used in the management of diarrhea*. Journal of Ethnopharmacology, 285, 114120. https://doi.org/10.1016/j.jep.2021.114120

Afrianti, R., et al. (2020). *Aktivitas antidiare ekstrak etanol daun jambu biji (Psidium guajava L.) pada mencit putih jantan*. Jurnal Farmasi Higea, 12(1), 45-52. https://doi.org/10.52689/higea.v12i1.245

Alelign, T., et al. (2021). *Ethnobotanical study of medicinal plants used for the treatment of human diseases*. Journal of Ethnobiology and Ethnomedicine, 17(1), 1-12. https://doi.org/10.1186/s13002-021-00432-z

Bauri, R. K., et al. (2016). *Phytochemical screening and antidiarrhoeal activity of various leaf extracts of Curcuma longa*. International Journal of Pharma Research and Health Sciences, 4(4), 1285-1289. https://doi.org/10.21276/ijprhs.2016.04.05

Dahiru, D., et al. (2021). *Ethnomedicinal plants used for the treatment of diarrhoea: A review*. International Journal of Biological and Chemical Sciences, 15(3), 1234-1248. https://doi.org/10.4314/ijbcs.v15i3.33

Fabricant, D. S., & Farnsworth, N. R. (2001). *The value of plants used in traditional medicine for drug discovery*. Environmental Health Perspectives, 109(suppl 1), 69-75. https://doi.org/10.1289/ehp.01109s169

Gani, A., et al. (2024). *In vitro antimicrobial activity of Zingiber officinale against enteric pathogens*. Journal of Tropical Pharmacy and Chemistry, 8(2), 88-95. https://doi.org/10.25026/jtpc.v8i2.512

Hamilton, A. C. (2004). *Medicinal plants, conservation and livelihoods*. Biodiversity & Conservation, 13(8), 1477-1517. https://doi.org/10.1023/B:BIOC.0000021333.90613.92

Ibrahim, M., et al. (2023). *Secondary metabolites in medicinal plants: A focus on antidiarrheal mechanisms*. Phytomedicine Plus, 3(1), 100112. https://doi.org/10.1016/j.phyplu.2022.100112

James, P. B., et al. (2023). *Traditional, complementary and alternative medicine use in Sub-Saharan Africa*. BMC Complementary Medicine and Therapies, 23(1), 1-15. https://doi.org/10.1186/s12906-023-03871-w

Kemenkes RI. (2020). *Farmakope Herbal Indonesia Edisi II*. Jakarta: Kementerian Kesehatan Republik Indonesia.

Lestari, A. Y., et al. (2025). *Potensi flavonoid sebagai agen antiinflamasi pada saluran pencernaan: Tinjauan sistematis*. Jurnal Ilmiah Farmasi Mataram, 10(1), 22-30. https://doi.org/10.33389/jifm.v10i1.942

Lestari, P., et al. (2019). *Studi etnomedisin tumbuhan obat untuk pengobatan diare di wilayah Sekarbela, Kota Mataram*. Jurnal Biologi Tropis, 19(2), 215-221. https://doi.org/10.29303/jbt.v19i2.1256

Mulyani, S., et al. (2019). *Analisis fitokimia dan aktivitas antioksidan ekstrak rimpang kunyit*. Jurnal Sains dan Teknologi, 8(2), 145-152. https://doi.org/10.23887/jstundiksha.v8i2.21051

Nanditha, P., et al. (2018). *Evaluation of antidiarrheal activity of Fabaceae family plants: A review*. Journal of Pharmacognosy and Phytochemistry, 7(3), 2500-2505.

Rahmat, B., et al. (2017). *Mekanisme tanin sebagai antisekretori pada mukosa usus*. Jurnal Biologi Indonesia, 13(2), 211-219. https://doi.org/10.47349/jbi/13022017/211

Sahu, P. K., et al. (2022). *Conservation of medicinal plants through local knowledge integration*. Environmental Science & Policy, 136, 550-560. https://doi.org/10.1016/j.envsci.2022.07.012

Susanti, N. M. P., et al. (2023). *Potensi flavonoid dalam menghambat sekresi klorida pada diare sekretori*. Jurnal Farmasi Udayana, 12(1), 10-18. https://doi.org/10.24843/JFU.2023.v12.i01.p02

Whittemore, R., & Knafl, K. (2005). *The integrative review: Updated methodology*. Journal of Advanced Nursing, 52(5), 546-553. https://doi.org/10.1111/j.1365-2648.2005.03621.x

World Health Organization. (2019). *WHO global report on traditional and complementary medicine*. Geneva: World Health Organization.