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Research Article

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Ethnobotanical analysis of medicinal and cosmetic plants using use value and informant consensus factor in Blitar

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ABSTRACT

Traditional medicinal and personal care plant use remains an important component of community health practices in rural Indonesia, yet integrated quantitative ethnobotanical documentation is still limited. This study aimed to identify plant species used for medicinal and cosmetic purposes, document their parts and preparation methods, and analyze their cultural importance using quantitative ethnobotanical indices. A qualitative descriptive ethnobotanical design was applied through semi-structured interviews and participatory field observations involving 30 informants across 20 sites in Talun and Doko, Blitar. Data were analyzed using Use Value (UV) and Informant Consensus Factor (ICF) to evaluate species importance and agreement levels among informants. A total of 25 plant species from 19 families were recorded, with leaves as the most frequently utilized plant part and internal medicine as the dominant use category. The highest UV values were found in Peperomia pellucida (0.87) and Physalis angulata (0.80). The highest consensus occurred in eye care (ICF = 1.00), followed by internal medicine and skin treatment (ICF = 0.83). These results indicate strong cultural reliance and shared knowledge patterns in local plant use. The findings provide quantitative support for prioritizing culturally important species and offer applied potential for biodiversity conservation and contextual biology education.

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INTRODUCTION

Ethnobotanical knowledge of medicinal and personal care plants plays an important role in supporting community-based health practices and biodiversity utilization in Indonesia (Constant & Tshisikhawe, 2018; Dean, 2024; Pei et al., 2020). Many rural communities continue to rely on plant resources for internal treatment and external body care, including skin therapy, wound healing, and hygiene purposes (Astuti et al., 2024; Batubara & Prastya, 2020; Kumar et al., 2024; Rathinasabapathy et al., 2022). Indonesia's high plant biodiversity provides extensive potential for traditional healthcare and personal care applications (Pei et al., 2020; Rahayu et al., 2024). However, existing scientific publications have predominantly emphasized internal medicinal uses, while ethnobotanical documentation of cosmetic and personal care applications remains relatively limited and fragmented (Astutik et al., 2019; Batubara & Prastya, 2020; Sari et al., 2024; Sofiyana et al., 2025). Strengthening systematic and research-based documentation is therefore essential to support biodiversity conservation, scientific validation, and contextual biological education based on local plant resources (Dean, 2024; Pei et al., 2020).

Across many Indonesian rural communities, plant resources continue to support both internal healthcare and external personal care practices. While many species are widely used for skin treatment, hair care, and wound healing, most scientific publications still prioritize internal medicinal applications, resulting in limited phytochemical and pharmacological validation for externally used plants (Astuti et al., 2024; Batubara & Prastya, 2020; Rahayu et al., 2024). At the same time, the intergenerational transmission of ethnobotanical knowledge is declining due to modernization and lifestyle change, reducing youth engagement with traditional plant practices and increasing the risk of knowledge loss (Koteswara, 2024). Without systematic and research-based documentation, orally transmitted knowledge may disappear within a generation. Strengthening ethnobotanical research and its integration into educational contexts is therefore essential to support biodiversity conservation, cultural continuity, and community-based learning (Pei et al., 2020).

Despite the increasing number of ethnobotanical studies in Indonesia, integrated documentation that simultaneously covers medicinal and personal care plant uses remains limited. Many studies focus on single use categories, provide only species lists, or omit preparation methods, phytochemical references, and cultural context. Quantitative approaches that evaluate cultural importance and informant agreement, such as Use Value (UV) and Informant Consensus Factor (ICF), are also not consistently applied in local ethnobotanical surveys. As a result, the multifunctional roles of plant species across medicinal and cosmetic domains are often underrepresented in scientific literature (Gamage et al., 2021; Sari et al., 2024; Sultan et al., 2024). A more integrative and quantitatively supported ethnobotanical approach is therefore needed at the community study level. This study addresses this gap by providing a combined qualitative–quantitative ethnobotanical analysis that integrates use documentation, preparation practices, and cultural importance indices within a local Indonesian community context.

This study was conducted to document ethnobotanical knowledge of medicinal and personal care plants used by local communities in Talun and Doko, Blitar. The documentation includes plant species identity, local names, utilized parts, preparation methods, and traditional functions. Both internal and external applications are recorded to capture the multifunctional roles of plant species in community practices. Field documentation is complemented with literature-based phytochemical information and visual plant records to support identification accuracy. The resulting dataset provides a structured basis for subsequent quantitative and applied analysis.

The objectives of this study are to (1) identify plant species used for medicinal and personal care purposes, (2) document the plant parts utilized, preparation methods, and traditional functions, and (3) analyze their cultural importance and informant agreement using Use Value (UV) and Informant Consensus Factor (ICF). The study focuses on commonly used plant species maintained in rural community practices and provides structured ethnobotanical data for quantitative interpretation and applied evaluation.

RESEARCH METHODS

This research employed a qualitative descriptive ethnobotanical design to document and analyze traditional knowledge related to medicinal and personal care plant use. The study focused on community-based plant utilization practices, preparation methods, and functional categories of use. An ethnobotanical approach was applied to capture culturally transmitted knowledge through field-based investigation and informant interviews. This design is appropriate for systematically recording locally embedded plant knowledge and use practices.

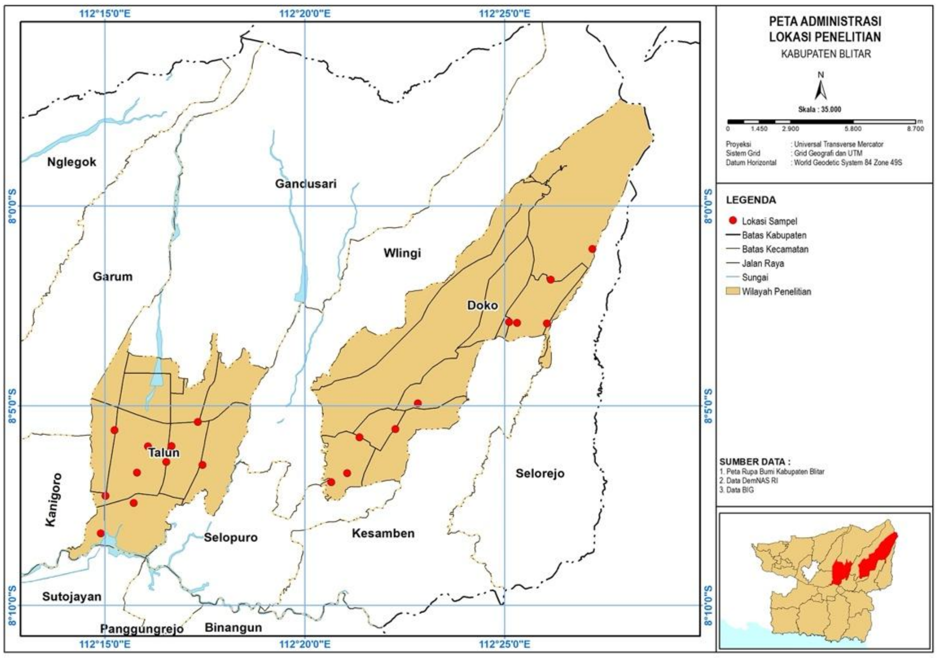

Figure 1. Research location map showing Doko and Talun sub-districts, Blitar Regency, East Java, Indonesia. These two areas were selected due to the active presence of traditional plant knowledge and accessibility to community informants. Field data collection was conducted at 10 purposively selected sites in each sub-district, covering diverse rural habitats where medicinal and personal care plants are traditionally used.
(Map created with QGIS 3.28, base map: GADM 2023, modified by authors.)

The research population consisted of community members possessing traditional knowledge related to medicinal and personal care plants. A total of 30 informants were selected using purposive and snowball sampling techniques to ensure the inclusion of knowledgeable individuals (Alexiades, 1996; Dean, 2024; Tongco, 2007). Informants included traditional healers, elderly community members, herbal users, and individuals recognized by local leaders as having ethnobotanical expertise. Informant eligibility was based on demonstrated experience in traditional plant use and willingness to participate in interviews. Sampling was continued until data saturation was reached, indicated by repeated information and the absence of new plant use reports. This approach ensured sufficient depth and reliability of the ethnobotanical dataset.

Data collection was conducted using multiple instruments, including semi-structured interview guides, observation sheets, audio recorders, field notebooks, and digital cameras. Semi-structured interviews were used to explore local plant knowledge while maintaining consistency across informants (Dean, 2024). Participatory field observation followed a "walk-in-the-woods" approach to enable direct identification of plant species and their traditional uses in natural settings (Sari et al., 2024). Recorded data included species name, local name, plant part used, preparation method, use category, and mode of application. Plant documentation was supported by photography, field notes, and specimen collection for taxonomic verification. All interviews were conducted in the local language with prior informed consent and followed established ethical guidelines for ethnobotanical research (Albuquerque et al., 2006; Gazzaneo et al., 2005).

Plant identification was conducted through field observation, photographic documentation, and specimen matching using regional floras and published taxonomic references. Scientific names were verified and standardized using accepted botanical databases and relevant literature sources to ensure taxonomic accuracy and naming consistency. When necessary, identification was cross-checked with authoritative taxonomic sources and comparison images.

All interview and field data were tabulated prior to analysis. Data analysis combined qualitative categorization and quantitative ethnobotanical indices. Documented plant uses were grouped into functional categories, including internal medicine, skin treatment, cosmetic care, respiratory treatment, eye care, and other traditional uses. The cultural importance of each species was evaluated using the Use Value (UV) index, calculated as $UV = \Sigma U / n$, where ΣU represents the total number of use reports for a species and n is the total number of informants. Informant agreement within each use category was measured using the Informant Consensus Factor (ICF), calculated as $ICF = (Nur - Nt) / (Nur - 1)$, where Nur is the number of use reports in a category and Nt is the number of species used for that category. These indices are widely applied in quantitative ethnobotanical analysis to assess species importance and knowledge consensus (Heinrich et al., 2009; Tardío & Pardo-De-Santayana, 2008).

FINDING AND DISCUSSION

The study documented 25 plant species belonging to 19 families that are traditionally used for medicinal and personal care purposes in the Talun and Doko areas of Blitar. Detailed ethnobotanical information for each species—including scientific and local names, plant family, utilized parts, traditional functions, preparation methods, and reported phytochemical compounds—is presented in Table 1. Leaves were the most frequently used plant part, followed by rhizomes, fruits, roots, and flowers. Leaf dominance reflects their accessibility, regenerative capacity, and practical suitability for repeated harvesting. Most preparation methods were simple, primarily boiling, crushing, soaking, and direct application, which supports ease of knowledge transmission within the community. Similar dominance of leaf use and simple preparation techniques has been reported in other regional ethnobotanical studies (Ahmad et al., 2023; Heinrich et al., 2009).

The documented species were grouped into functional use categories based on their primary traditional applications (Figure 2). Most species were used for internal medicinal purposes (38.5%) and skin or external treatments (34.6%). Internal uses included hypertension, uric acid disorders, digestive problems, and kidney-related conditions, whereas external uses covered boils, eczema, acne, wounds, and fungal infections. A smaller proportion (11.5%) was associated with cosmetic and body care functions, including skin hydration, hair treatment, and odor control. Respiratory uses were mainly related to cough treatment, while eye care and reproductive health were represented by only a few species. This distribution confirms that internal and dermatological applications remain the dominant domains of traditional plant use, consistent with patterns reported in other ethnobotanical inventories (Yineger et al., 2008).

Table 1. Etnobotanical Data of Medicinal and Personal Care Plants Documented in Talun and Doko

No	Local Name	Scientific Name	Family	Plant Part Used	Traditional Use	Preparation Method	Phytochemical Compounds
1	Sirih Cina	*Peperomia pellucida*	Piperaceae	Whole plant	Uric acid, hypertension	Boiled and consumed	Peperomin A, B
2	Apokat	*Persea americana*	Lauraceae	Leaves	Uric acid, hypertension	Boiled and consumed	Persin, Avokatina B
3	Sirsak	*Annona muricata*	Annonaceae	Leaves	Uric acid, hypertension	Boiled and consumed	Annonacin, Acetogenins
4	Seledri	*Apium graveolens*	Apiaceae	Leaves, stems, roots	Uric acid, hypertension	Boiled and consumed	3-n-butylphthalide, Sedanenolide
5	Ciplukan	*Physalis angulata*	Solanaceae	Whole plant	Uric acid, hypertension	Boiled and consumed	Physalins
6	Labu Siam	*Sechium edule*	Cucurbitaceae	Fruit	Gastritis	Grated or juiced	Apigenin glycosides, Sechioside
7	Belimbing Wuluh*	*Averrhoa bilimbi*	Oxalidaceae	Flowers	Cough	Boiled and consumed	Averrhoidin
8	Binahong	*Anredera cordifolia*	Basellaceae	Leaves	Wounds	Crushed and applied	Anrederine
9	Kitolod	*Hippobrom a longiflora*	Campanulacea e	Flowers	Eye irritation	Soaked and applied	Lobelin, Hippobromin
10	Dadap Serep	*Erythrina variegata*	Fabaceae	Leaves	Boils, eczema	Boiled and bathed	Erycristagallin, Erythrin
11	Jambu Klutuk	*Psidium guajava*	Myrtaceae	Leaves	Skin diseases	Boiled and bathed	Guajaverin, Avicularin
12	Sirih	*Piper betle*	Piperaceae	Leaves	Skin fungal	Boiled and bathed	Hydroxychavicol, Chavicol
13	Belimbing Wuluh*	*Averrhoa bilimbi*	Oxalidaceae	Leaves	Acne	Crushed as mask	Oxalic acid, Averrhoidin
14	Jarak	*Jatropha curcas*	Euphorbiaceae	Leaves	Hair growth	Crushed and applied	Jatrophol, Curcin
15	Semanggi	*Marsilea crenata*	Marsileaceae	Leaves	Dark spots	Crushed and applied	Marsileagenin A, Marsiline
16	Suket Teki	*Cyperus rotundus*	Cyperaceae	Roots	Cooling powder	Dried and powdered	Cyperene, Cyperol
17	Pegagan	*Centella asiatica*	Apiaceae	Leaves	Acne	Boiled and applied	Asiaticoside, Madecassoside
18	Pegagan Air	*Hydrocotyle vulgaris*	Araliaceae	Leaves	Moisturizer	Soaked and sprayed	Vulgarin, Hydrocotyline
19	Kunyit	*Curcuma longa*	Zingiberaceae	Rhizome	Stomachach e, acne	Grated or boiled	Curcumin, Demethoxycurcumin
20	Jahe	*Zingiber officinale*	Zingiberaceae	Rhizome	Flatulence, cold	Boiled	Gingerol, Shogaol
21	Temulawak	*Curcuma xanthorrhiz a*	Zingiberaceae	Rhizome	Acne, liver tonic	Grated or boiled	Xanthorrhizol
22	Lidah Buaya	*Aloe vera*	Asphodelaceae	Leaves	Burns, hair	Applied directly	Aloin, Emodin
23	Lengkuas	*Alpinia galanga*	Zingiberaceae	Rhizome	Eczema	Crushed and applied	Galangin
24	Daun Salam	*Syzygium polyanthum*	Myrtaceae	Leaves	Hypertension	Boiled	Eugenol
25	Meniran	*Phyllanthus niruri*	Phyllanthaceae	Whole plant	Kidney stones	Boiled	Phyllanthin
26	Kemangi	*Ocimum basilicum*	Lamiaceae	Leaves	Body odor	Eaten raw/boiled	Eugenol, Linalool

One species may appear more than once when different plant parts and uses are recorded separately

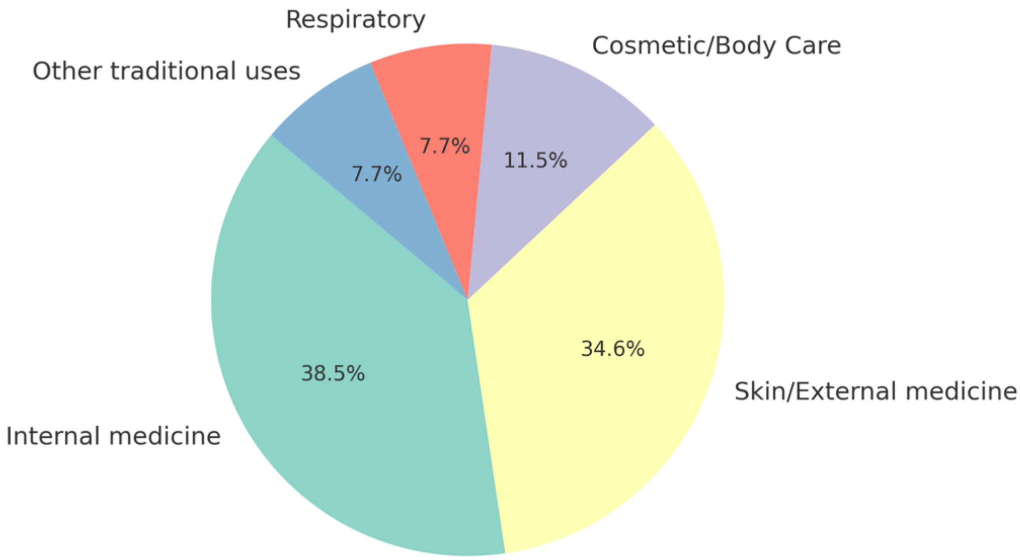

Figure 2. Distribution of plant use categories among the 25 documented species in Talun and Doko. Internal medicinal and skin-related uses were the dominant categories.

When critically compared with previous ethnobotanical studies, the dominance of internal medicinal and dermatological uses in this research indicates a consistent pattern across tropical communities. Studies conducted in Ethiopia and Nepal similarly reported that internal ailments and skin conditions represent the most frequently treated categories using medicinal plants (Uprety et al., 2012; Yineger et al., 2008). However, the proportion of cosmetic and personal care uses documented in this study is relatively higher than in many earlier reports, suggesting a contextual shift toward multifunctional plant use. This difference may be attributed to changing lifestyle needs, increased awareness of natural-based personal care, and the continued accessibility of plant resources in Talun and Doko. By situating the findings within this broader comparative framework, the study demonstrates both continuity and local specificity in ethnobotanical knowledge systems. Such contextual comparison strengthens the interpretive depth of the discussion and highlights the adaptive nature of traditional plant use.

Use Value (UV) was applied to quantify the relative cultural importance of each documented plant species based on informant citation frequency (Table 2). UV scores ranged from 0.30 to 0.87, indicating variation in recognition and use intensity among species. The highest UV was recorded for *Peperomia pellucida* (0.87), followed by *Physalis angulata* (0.80) and *Persea americana* (0.73), suggesting that these species are widely known, frequently utilized, and strongly embedded in local treatment practices. Species with lower UV values, such as *Sechium edule* and *Alpinia galanga*, were associated with more limited or specialized uses. Higher UV scores were generally linked to species with multiple therapeutic applications and high local accessibility. Similar patterns have been reported in other ethnobotanical studies, where UV effectively highlights culturally important and frequently utilized medicinal plants (Kayombo et al., 2012; Tardío & Pardo-De-Santayana, 2008). These findings confirm the usefulness of UV for identifying priority species in ethnobotanical documentation and conservation-oriented assessment.

The Informant Consensus Factor (ICF) was used to measure the level of agreement among informants regarding plant use within therapeutic categories (Figure 3). ICF values ranged from 0.75 to 1.00, indicating generally high consensus across use groups. The eye care category showed the highest agreement (ICF = 1.00), with all informants referring to the same species, *Hippobroma longiflora*. Internal medicine and skin treatment categories also demonstrated strong consensus (ICF = 0.83), reflecting well-established and widely shared knowledge. Respiratory and cosmetic uses showed moderately high agreement (ICF = 0.82 and 0.79), while reproductive health had the lowest but still substantial consensus (ICF = 0.75). High ICF values indicate concentrated and collectively validated knowledge within a community context and are commonly used to highlight priority therapeutic categories in ethnobotanical studies (Etkin, 2019; Heinrich et al., 2009).

Table 2. Use Value (UV) scores of documented ethnobotanical plant species in Talun and Doko, Blitar, Indonesia

No	Scientific Name	Local Name	Use Reports (U)	UV Value
1	*Peperomia pellucida*	Sirih Cina	26	0.87
2	*Physalis angulata*	Ciplukan	24	0.80
3	*Persea americana*	Apokat	22	0.73
4	*Annona muricata*	Sirsak	21	0.70
5	*Apium graveolens*	Seledri	20	0.67
6	*Psidium guajava*	Jambu Klutuk	19	0.63
7	*Piper betle*	Sirih	19	0.63
8	*Curcuma longa*	Kunyit	18	0.60
9	*Zingiber officinale*	Jahe	18	0.60
10	*Averrhoa bilimbi*	Belimbing Wuluh	17	0.57
11	*Curcuma xanthorrhiza*	Temulawak	16	0.53
12	*Aloe vera*	Lidah Buaya	16	0.53
13	*Phyllanthus niruri*	Meniran	15	0.50
14	*Ocimum basilicum*	Kemangi	15	0.50
15	*Anredera cordifolia*	Binahong	14	0.47
16	*Hydrocotyle vulgaris*	Pegagan Air	13	0.43
17	*Marsilea crenata*	Semanggi	12	0.40
18	*Syzygium polyanthum*	Daun Salam	12	0.40
19	*Centella asiatica*	Pegagan	12	0.40
20	*Erythrina variegata*	Dadap Serep	11	0.37
21	*Hippobroma longiflora*	Kitolod	11	0.37
22	*Cyperus rotundus*	Suket Teki	11	0.37
23	*Alpinia galanga*	Lengkuas	10	0.33
24	*Jatropha curcas*	Jarak	10	0.33
25	*Sechium edule*	Labu Siam	9	0.30

The combined interpretation of UV and ICF provides complementary evidence of cultural importance and shared trust in specific plant species. Species with high UV values, such as *Peperomia pellucida* and *Physalis angulata*, were also associated with high-consensus categories, particularly internal medicine. This overlap indicates that frequently cited species are also collectively endorsed across informants, suggesting stable and widely transmitted ethnomedical knowledge. Similar congruence between citation frequency and consensus level has been reported in other ethnobotanical regions, supporting the use of UV–ICF integration to identify priority species for further pharmacological and conservation-oriented research (Albuquerque et al., 2006; Gazzaneo et al., 2005).

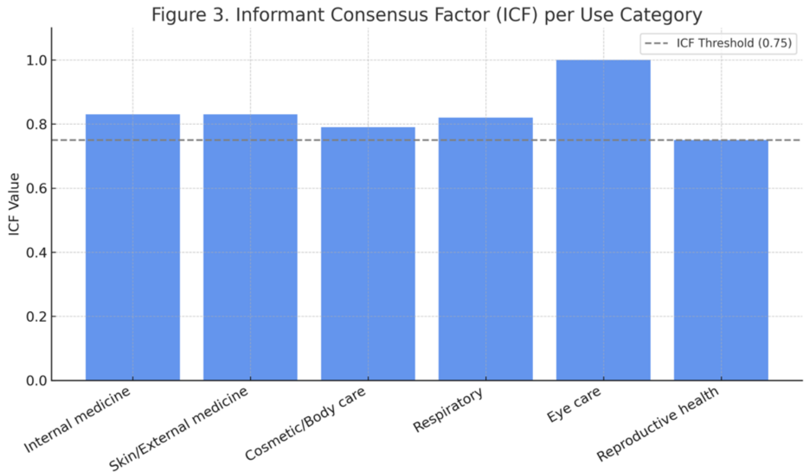

Figure 3. Informant Consensus Factor (ICF) per use category. The highest ICF was observed in the eye care category (ICF = 1.00), indicating complete consensus among informants. Internal medicine and skin-related applications also showed strong agreement (ICF = 0.83). The dashed gray line represents the consensus threshold (ICF = 0.75), above which categories are considered to have strong informant agreement.

Compared with previous ethnobotanical studies in Indonesia, this research applies a more integrative approach by combining medicinal and personal care uses with quantitative indices. Earlier surveys often reported species lists without UV or ICF analysis, limiting cross-species cultural importance assessment (Soemarwoto & Iskandar, 2021; Wahyuni et al., 2023). The inclusion of quantitative indices in the present study strengthens interpretive reliability and supports prioritization of culturally significant species for follow-up research and conservation planning.

Family-level patterns were also observed, with Piperaceae and Solanaceae species showing relatively high UV values, indicating frequent and culturally important use. This trend is consistent with Southeast Asian ethnobotanical reports highlighting the prominence of Piperaceae in household medicinal practices (Zhang et al., 2021). In contrast, families such as Cyperaceae and Araliaceae were associated with lower UV scores and more specialized uses. Recognizing family-level patterns can support targeted phytochemical and conservation prioritization.

The patterns observed in this study are consistent with ethnobotanical findings from other regions of Indonesia and Asia, where medicinal plants are predominantly used for internal and dermatological treatments and leaves are the most frequently utilized plant parts (Uprety et al., 2012). Several species identified here—such as *Centella asiatica*, *Zingiber officinale*, and *Psidium guajava*—are widely reported across Southeast Asian ethnobotanical literature due to their accessibility and broad therapeutic roles (Lim, 2012). Cross-regional similarity in dominant species and preparation methods suggests shared practical selection criteria and long-standing regional plant-use traditions, supporting the external validity of the present findings.

In addition to use documentation, selected species were morphologically recorded to support field identification accuracy. Figure 4 presents diagnostic features of *Hippobroma longiflora*, including fibrous roots, lanceolate serrated leaves, and distinctive white tubular flowers. Morphological documentation strengthens taxonomic reliability and supports reproducibility in future field verification. Visual plant records are widely recognized as useful complements in ethnobotanical reporting and species validation.

The findings also indicate potential sustainability concerns related to harvesting practices. Several high-UV species, including *Peperomia pellucida* and *Physalis angulata*, are primarily collected from wild habitats rather than cultivated sources. While leaf harvesting is generally less destructive, root extraction and whole-plant removal can reduce regeneration capacity and threaten local populations. Previous studies have similarly identified unsustainable harvesting as a risk factor for medicinal plant decline (Shaheen et al., 2023; Ssenku et al., 2022). Integrating conservation awareness and small-scale cultivation is therefore important to maintain long-term availability of culturally important species.

(a) (b) (c)

Figure 4. Morphological characteristics of *Hippobroma longiflora* showing root, leaf, and flower structures used for field identification (personal documentation).

The documented ethnobotanical data also have potential applications in contextual biodiversity education. Local plant knowledge can be incorporated into learning materials and field-based activities to support place-based science learning (Sofiyana et al., 2025; Sumarni et al., 2022). Such integration may enhance student engagement while promoting awareness of local biological resources.

CONCLUSION

This study documented 25 medicinal and personal care plant species traditionally used by communities in Talun and Doko, Blitar, with leaves identified as the most frequently utilized plant part. Quantitative ethnobotanical analysis showed that *Peperomia pellucida* had the highest Use Value (UV = 0.87), followed by *Physalis angulata* (UV = 0.80), indicating high cultural importance. Informant Consensus Factor (ICF) analysis revealed complete agreement in the eye care category (ICF = 1.00) and strong agreement in internal medicine and skin-related uses (ICF = 0.83). The combined UV and ICF results indicate that local plant use practices are culturally consistent and analytically robust, providing a reliable basis for further ethnobotanical, pharmacological, and conservation-oriented research.

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REFERENCES

Ahmad, I., Hikmawan, B. D., Sulistiarini, R., & Mun'im, A. (2023). Peperomia pellucida (L.) Kunth herbs: A comprehensive review on phytochemical, pharmacological, extraction engineering development, and economic promising perspectives. *Journal of Applied Pharmaceutical Science*, *13*(1), 1–9. https://dx.doi.org/10.7324/JAPS.2023.130201

Albuquerque, U. P., Lucena, R. F. P., Monteiro, J. M., Florentino, A. T. N., & Almeida, C. F. C. B. R. (2006). Evaluating two quantitative ethnobotanical techniques. *Ethnobotany Research and Applications*, *4*, 51–60. https://ethnobotanyjournal.org/index.php/era/article/view/101/87

Alexiades, M. N. (1996). Collecting Ethnobotanical Data: An Introduction to Basic Concepts and Techniques . *The New York Botanical Garden*. https://www.jstor.org/stable/43927611

Astuti, I. P., Cahyaningsih, R., Hidayat, R. S., Juhaeti, T., Husaini, I. P., Suhaendah, E., Garvita, R. V., Maharani, D., Wawangningrum, H., Solihah, S. M., & Rusmanto. (2024). Assessment of the medicinal flora for treating skin disorders in Indonesia. Ethnopharmacology and OMICS Advances in Medicinal Plants: Uncovering Diversity and Ethnopharmacological Aspects, *1*, 17–55. https://doi.org/10.1007/978-981-97-2367-6_2

Astutik, S., Pretzsch, J., & Kimengsi, J. N. (2019). Asian medicinal plants' production and utilization potentials: A Review. *Sustainability*, *11*(19), 5483. https://doi.org/10.3390/su11195483

Batubara, I., & Prastya, M. E. (2020). Potential use of Indonesian medicinal plants for cosmetic and oral health: A review. *Jurnal Kimia Valensi, 6*(1), 118–132. https://doi.org/10.15408/JKV.V6I1.16252

Constant, N. L., & Tshisikhawe, M. P. (2018). Hierarchies of knowledge: Ethnobotanical knowledge, practices and beliefs of the Vhavenda in South Africa for biodiversity conservation. *Journal of Ethnobiology and Ethnomedicine, 14*(1), 1–28. https://doi.org/10.1186/s13002-018-0255-2

Dean, M. (2024). Exploring ethnobotanical knowledge: qualitative insights into the therapeutic potential of medicinal plants. *Golden Ratio of Data in Summary, 4*(2), 154–166. https://doi.org/10.52970/GRDIS.V4I2.491

Etkin, N. L. (2019). Plants and Indigenous Medicine and Diet. In Plants and Indigenous Medicine and Diet: Biobehavioral Approaches. Taylor and Francis Inc. https://doi.org/10.4324/9781315060385/plants-indigenous-medicine-diet-nina-etkin/rights-and-permissions

Gamage, D. G. N. D., Dharmadasa, R. M., Abeysinghe, D. C., Wijesekara, R. G. S., Prathapasinghe, G. A., & Someya, T. (2021). Ethnopharmacological survey on medicinal plants used for cosmetic treatments in traditional and Ayurveda systems of medicine in Sri Lanka. Evidence-Based Complementary and Alternative Medicine : ECAM, 2021, 5599654. https://doi.org/10.1155/2021/5599654

Gazzaneo, L. R. S., Paiva de Lucena, R. F., & de Albuquerque, U. P. (2005). Knowledge and use of medicinal plants by local specialists in an region of Atlantic Forest in the state of Pernambuco (Northeastern Brazil). *Journal of Ethnobiology and Ethnomedicine, 1*(1), 1–8. https://doi.org/10.1186/1746-4269-1-9/TABLES/1

Heinrich, M., Edwards, S., Moerman, D. E., & Leonti, M. (2009). Ethnopharmacological field studies: A critical assessment of their conceptual basis and methods. *Journal of Ethnopharmacology, 124*(1), 1–17. https://doi.org/10.1016/j.jep.2009.03.043

Kayombo, E. J., Uiso, F. C., & Mahunnah, R. L. A. (2012). Experience on healthcare utilization in seven administrative regions of Tanzania. *Journal of Ethnobiology and Ethnomedicine, 8*(1), 1–8. https://doi.org/10.1186/1746-4269-8-5

Koteswara, R. K. (2024). Cultural constraints on knowledge transmission and knowledge erosion: An indigenous community in India. *Asian Journal of Social Science, 52*(4), 23–30. https://doi.org/10.1016/J.AJSS.2024.10.001

Kumar, M. R., Maletha, A., Singh, R., Bhatt, G., Agarwal, S., Dhyani, S., Nautiyal, S., Prakash, Phondani, C., Lakhpat, Priyanka Badoni, ·, Laxman, ·, Kandari, S., Srivastava, A., Maikhuri, R., Bhagwati, ·, Chamola, P., Rajeev, ·, Semwal, L., … Maikhuri, K. (2024). Traditional health care systems and

immunity boosting: exploring plant based indigenous knowledge systems amidst the COVID-19 pandemic. *Discover Plants 2024, 1*(1), 1–13. https://doi.org/10.1007/S44372-024-00005-2
Lim, T. (2012). Edible Medicinal and Non-medicinal Plants: Volume 3, fruit. *Springer Science & Business Media.*
Pei, S., Alan, H., & Wang, Y. (2020). Vital roles for ethnobotany in conservation and sustainable development. *Plant Diversity, 42*(6), 399. https://doi.org/10.1016/J.PLD.2020.12.001
Rahayu, Y. Y. S., Sujarwo, W., Irsyam, A. S. D., Dwiartama, A., & Rosleine, D. (2024). Exploring unconventional food plants used by local communities in a rural area of West Java, Indonesia: ethnobotanical assessment, use trends, and potential for improved nutrition. *Journal of Ethnobiology and Ethnomedicine, 20*(1), 1–23. https://doi.org/10.1186/S13002-024-00710-Y
Rathinasabapathy, T., Sakthivel, L. P., & Komarnytsky, S. (2022). Plant-based support of respiratory health during viral outbreaks. *Journal of Agricultural and Food Chemistry, 70*(7), 2064–2076. https://doi.org/10.1021/acs.jafc.1c06227
Sari, L. C. S., Lovadi, I., Wardoyo, E. R. P., & Randi, A. (2024). Ethnobotanical study on traditional cosmetics practiced by the Dayak Kayong of West Kalimantan, Indonesia. *Biodiversitas Journal of Biological Diversity, 25*(7), 2937–2944. https://doi.org/10.13057/BIODIV/D250715
Shaheen, S., Harun, N., Ijaz, R., Mukhtar, N., Ashfaq, M., Bibi, F., Ali, M., Abbas, Z., & Khalid, Z. (2023). Sustainability issues in conservation of traditional medicinal herbs and their associated knowledge: A case study of District Lahore, Punjab, Pakistan. *Sustainability, 15*(9), 7343. https://doi.org/10.3390/SU15097343
Soemarwoto, R., & Iskandar, J. (2021). Plant knowledge richness in the Sundanese upland village: A case study in Sindangsari, West Java, Indonesia. *Biodiversitas Journal of Biological Diversity, 22*(9), 3722–3735. https://doi.org/10.13057/BIODIV/D220916
Sofiyana, M. S., Amarlita, D. M., & Ningrum, P. M. (2025). Ethnobotanical data needs and their application in biology learning. *JOSAR (Journal of Students Academic Research), 10*(2), 130–140. https://doi.org/10.35457/ETSTNW87
Ssenku, J. E., Okurut, S. A., Namuli, A., Kudamba, A., Tugume, P., Matovu, P., Wasige, G., Kafeero, H. M., & Walusansa, A. (2022). Medicinal plant use, conservation, and the associated traditional knowledge in rural communities in Eastern Uganda. *Tropical Medicine and Health, 50*(1), 1–10. https://doi.org/10.1186/S41182-022-00428-1/FIGURES/3
Sultan, S., Telila, H., & Kumsa, L. (2024). Ethnobotany of traditional cosmetics among the Oromo women in Madda Walabu District, Bale Zone, Southeastern Ethiopia. *Journal of Ethnobiology and Ethnomedicine, 20*(1), 1–21. https://doi.org/10.1186/S13002-024-00673-0/TABLES/13
Sumarni, W., Sudarmin, S., Sumarti, S. S., & Kadarwati, S. (2022). Indigenous knowledge of Indonesian traditional medicines in science teaching and learning using a science–technology–engineering–mathematics (STEM) approach. *Cultural Studies of Science Education, 17*(2), 467–510. https://doi.org/10.1007/S11422-021-10067-3/METRICS
Tardío, J., & Pardo-De-Santayana, M. (2008). Cultural importance indices: A comparative analysis based on the useful wild plants of southern Cantabria (northern Spain). *Economic Botany, 62*(1), 24–39. https://doi.org/10.1007/S12231-007-9004-5/METRICS
Tongco, M. D. C. (2007). Purposive Sampling as a Tool for Informant Selection. *Ethnobotany Research & Applications, 5,* 147–158. http://hdl.handle.net/10125/227
Uprety, Y., Poudel, R. C., Shrestha, K. K., Rajbhandary, S., Tiwari, N. N., Shrestha, U. B., & Asselin, H. (2012). Diversity of use and local knowledge of wild edible plant resources in Nepal. *Journal of Ethnobiology and Ethnomedicine, 8*(1), 1–15. https://doi.org/10.1186/1746-4269-8-16/TABLES/6
Wahyuni, F., Bustami y, & Ege B. (2023). Inventory of potential spice plants as care cosmetics. *JPBIO (Jurnal Pendidikan Biologi), 8(*1), 170–177. https://doi.org/10.31932/JPBIO.V8I1.2337
Yineger, H., Kelbessa, E., Bekele, T., & Lulekal, E. (2008). Plants used in traditional management of human ailments at Bale Mountains National Park, Southeastern Ethiopia. *In Journal of Medicinal Plants Research, 2*(6). http://www.academicjournals.org/JMPR

Zhang, Y., Yao, Y., Fu, Y., Yuan, Z., Wu, X., Wang, T., Hong, Z., Yang, Y., & Wu, H. (2021). Inhibition effect of oxyepiberberine isolated from Coptis chinensis franch. On non-small cell lung cancer based on a network pharmacology approach and experimental validation. *Journal of Ethnopharmacology, 278*, 114267. https://doi.org/10.1016/j.jep.2021.114267