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Medicinal Plant Species in Lakuan Buol Village, Lakea District, Buol Regency, as Learning Media

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Abstract: This study aims to identify medicinal plant species, describe the plant parts used and their processing methods, and develop learning media in the form of a pocket book and flipbook in Lakuan Village, Lakea Sub-district, Buol Regency. This research used a descriptive qualitative approach through field observations, interviews with key informants (traditional healers) and supporting informants (medicinal plant users), as well as documentation. Data were analyzed descriptively by grouping plant species, used parts, and processing techniques, supported by literature review. The results showed 32 species from 24 families, with specific plant parts used, namely leaves for fever and wounds due to their ease of processing, roots for internal diseases, rhizomes as anti-inflammatory and antibacterial agents, stems for relaxation, fruits for digestion and immunity, and flowers for cough treatment. The pocket book and flipbook media were chosen because they are practical, concise, and interactive, making it easier for students to understand the material. The feasibility test results indicated that the media was categorized as highly feasible as a context-based learning resource.

Keywords: Medicinal plants; ethnobotany; flipbook; pocket book; learning media

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INTRODUCTION

Medicinal plants constitute an important component of natural resources used by communities to maintain and improve health. Their relevance is closely associated with the presence of bioactive compounds in various plant parts, including leaves, stems, fruits, rhizomes, and roots, which may contribute to preventive and therapeutic functions (Jamshidi-Kia et al., 2018; Newman & Cragg, 2020). The World Health Organization (WHO) recognizes the growing role of traditional medicine and emphasizes the need to strengthen evidence, safety, regulation, and integration of traditional, complementary, and integrative medicine into health systems (WHO, 2025).

In recent years, public interest in adopting a “back to nature” lifestyle has increased, leading to renewed attention to natural materials as alternatives for maintaining health and reducing the side effects associated with modern medical drugs (Amalia, 2020). In addition, medicinal plants are considered more economical and relatively safer than modern chemically based medicines (Rubianti et al., 2022; Adiyasa & Meiyanti, 2021). The use of medicinal plants has become part of local knowledge passed down through generations in various areas of Buol Regency, particularly in Lakuan Buol Village, Lakea District, an area with substantial potential for medicinal plant utilization (Bappeda Kabupaten Buol, 2024). Its varied topography, fertile soil, and good drainage systems support the growth of diverse medicinal plant species (Fatiha et al., 2024; Suri et al., 2023).

The community of Lakuan Buol Village continues to use medicinal plants regularly in daily life; however, this practice has not been accompanied by systematic written records. Knowledge of medicinal plant use is generally transmitted orally from one generation to the next and is not supported by organized archives or documentation. This condition is concerning because traditional medicinal plant knowledge is vulnerable to erosion when it remains dependent on oral transmission and is not systematically recorded (Jamshidi-Kia et al., 2018; Agize et al., 2022).

As a result, this valuable information may be lost over time due to the absence of proper documentation. Preliminary observations through interviews with a local traditional healer revealed that the community uses various medicinal plants, including pomegranate (*Punica granatum*) for treating diarrhea, cat's whiskers (*Orthosiphon aristatus*) to facilitate urination, mayana (*Coleus atropurpureus*) for cough, physic nut (*Jatropha curcas*) for reducing fever, and turmeric (*Curcuma longa*) for relieving GERD or gastric complaints. Because structured written data are not yet available, this information remains difficult to access and apply beyond the local knowledge system. Similar problems in other areas have been addressed through the identification and documentation of medicinal plants as an effort to preserve traditional knowledge from being lost over time. For example, Anjani (2024) successfully identified 36 medicinal plant species from 24 families in Toaya Village and developed them as learning media.

A clear gap exists between the community's practice of using medicinal plants and the availability of systematic written data documenting such practices. The knowledge held by the people of Lakuan Village, Buol Regency, remains largely oral and has not yet been organized as structured scientific data; therefore, it has not been optimally utilized as a source of information and learning. Ethnobotanical documentation commonly involves field observations, interviews with key informants, guided field walks, plant identification, and verification of plant use, preparation methods, and modes of application (Agize et al., 2022; Teshome et al., 2023).

This process is important because it transforms oral knowledge into systematic scientific data that can be accessed for education, research, and knowledge preservation. This is consistent with the findings of Masyita et al. (2024) in Mamosalato District, Morowali, who documented 35 medicinal plant species and demonstrated that such documentation is not only systematic but also educationally valuable, thereby emphasizing the importance of documentation in preserving community knowledge. Therefore, systematic identification and description of medicinal plants are needed, including local names, scientific names, plant parts used, and methods of utilization, so that the information is no longer limited to oral transmission but can be accessed, studied, developed, and presented in the form of pocket books and flipbooks as learning media.

A pocket book was selected as a learning medium because it is practical, portable, and allows information to be presented concisely, making it easier for readers to understand (Hulu & Harefa, 2023; Simbolon et al., 2024; Juminah & Panjaitan, 2021). Its selection in this study was based on the need for a flexible medium that can be used in the field, particularly to assist community members and students in directly recognizing medicinal plant species. With its simple and systematic format, a pocket book facilitates user access to essential information, such as plant names, plant parts used, and methods of application.

This is supported by the findings of Elpina et al. (2022), who reported that the use of a pocket book as a biology learning medium had a high validity score of 3.67 and was considered practical by both teachers and students, indicating its effectiveness in supporting the learning process. In addition, a flipbook was selected because it offers

advantages in presenting information digitally, interactively, and attractively through a combination of text, images, and simple animations. This approach is consistent with multimedia learning theory, which emphasizes that learning can be enhanced when verbal and visual information are integrated in a structured manner (Mayer, 2009). These features can increase user interest and engagement while supporting accessibility because the medium can be used through electronic devices. Several studies have shown that flipbook media can improve student learning outcomes, with an N-Gain score of 0.43, categorized as moderate, and a very high student response rate of 81%. Thus, the use of pocket books and flipbooks is complementary, providing learning media that are practical, interactive, and aligned with user needs both in field contexts and classroom learning (Rahayu et al., 2021; Wahyuni & Lestari, 2023).

This study aims to identify the medicinal plant species used by the community of Lakuan Village, Buol Regency, and to describe their methods of utilization based on local knowledge developed within the community. The findings are expected to produce a structured scientific database that can serve as a reference for ethnobotanical studies and the development of biology learning, while also being processed into contextual learning resources for educators, students, and the wider community. The variables examined include medicinal plant species, plant parts used, and methods of utilization. This objective is in line with Dahniar et al. (2025), who emphasized the importance of documenting local knowledge in medicinal plant use as a basis for developing ethnobotanical studies. Accordingly, this research contributes to the provision of locally based scientific information to support the fields of biology and ethnobotany.

METHOD

This study employed a descriptive qualitative approach to describe the use of medicinal plants by the community of Lakuan Village, Lakea District, Buol Regency, based on the experiences and language of the research participants. This approach was selected because it allows an in-depth exploration of medicinal plant utilization from the community's perspective and is appropriate for understanding the phenomenon in its natural context. The study was conducted in Lakuan Village, covering Hamlets 1, 2, and 3, because the local community continues to actively use medicinal plants, while systematically documented scientific data on this practice remain unavailable. The research was carried out in September 2025.

The research participants were selected based on specific criteria, namely community members who possessed knowledge and experience in the use of medicinal plants. They consisted of key informants and non-key informants. The key informants were traditional healers who prepared medicinal plant formulations and served as community references, while the non-key informants were community members who used medicinal plants. Data were collected through observation, interviews with key and non-key informants, and literature review to obtain information on the types of medicinal plants, plant parts used, and processing methods. The geographical location of the study area is presented in the following map.

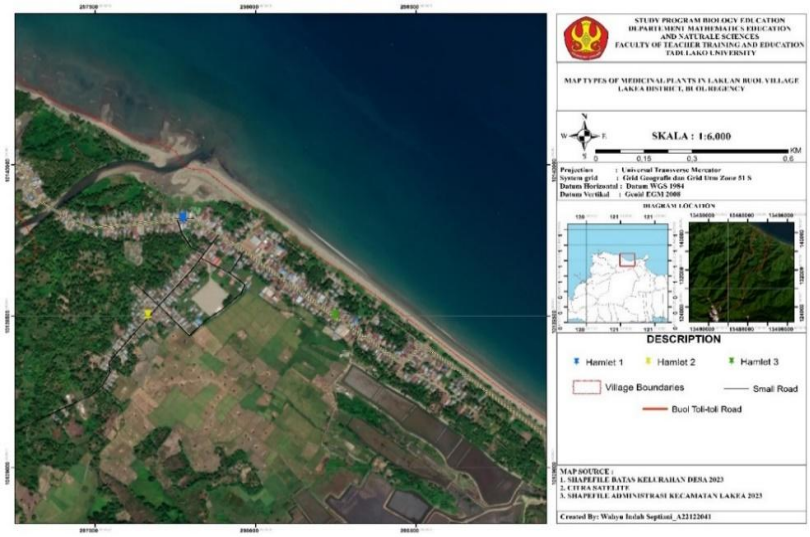


Figure 1. Research location

The subjects of this study were community members who used medicinal plants to maintain health and were selected based on their involvement in such practices. The informants consisted of key and non-key informants. The key informants were traditional healers with expertise in identifying, preparing, and using medicinal plants and who were recognized by the community as sources of reference. Three key informants were involved, each representing Hamlet 1, Hamlet 2, and Hamlet 3. The non-key informants were community members who knew and used medicinal plants for personal needs. A total of six non-key informants were selected, consisting of two individuals from each hamlet, to provide complementary information and strengthen the data obtained from the key informants.

The research population comprised all medicinal plants used by the community of Lakuan Village, while the sample consisted of medicinal plant species found and documented during the study. Data were collected using observation sheets, semi-structured interview guides, documentation sheets, and media feasibility validation sheets for content experts, media experts, design experts, and students. Direct observation was conducted at the research site to identify medicinal plant species, including their morphological characteristics, habitats, and parts used. Interviews were conducted with both key and non-key informants to explore their experiences and knowledge, while also allowing clarification to deepen and validate the data. Documentation was carried out by photographing medicinal plants to support species identification, whereas literature review was used to verify the results of observations and interviews. The tools used in this study included a small knife for collecting samples, a ruler for measurement, stationery for recording data, a mobile phone camera for documentation, and books and scientific articles as references.

Data analysis was conducted systematically through data collection, data reduction, species identification, data presentation, and conclusion drawing. Data were collected through observation, interviews, and documentation. Data reduction was performed by grouping the information according to plant species, plant parts used, such as leaves, stems, roots, and rhizomes, and their medicinal benefits, supported by photographic documentation. Species identification was carried out by comparing field data with relevant literature to confirm local names, scientific names, and taxonomic classification.

Interview and observation data were analyzed using category-based qualitative analysis. Information was grouped thematically according to patterns of medicinal plant

use within the community, thereby enabling the identification of meaningful utilization patterns. Interview data were also used to strengthen the contextual understanding of how medicinal plants were used by local residents. The results were then presented descriptively in the form of narratives, tables, and figures, followed by the formulation of conclusions.

In addition, a media feasibility test was conducted using validation sheets. The content expert assessed the accuracy and relevance of the material, the media expert evaluated the presentation and ease of use, the design expert assessed the visual aspects, and students evaluated clarity, comprehensibility, and attractiveness. Media feasibility was calculated as a percentage score using the following formula:

$$x = \frac{Selected\ Score}{Total\ Score} x100\%$$

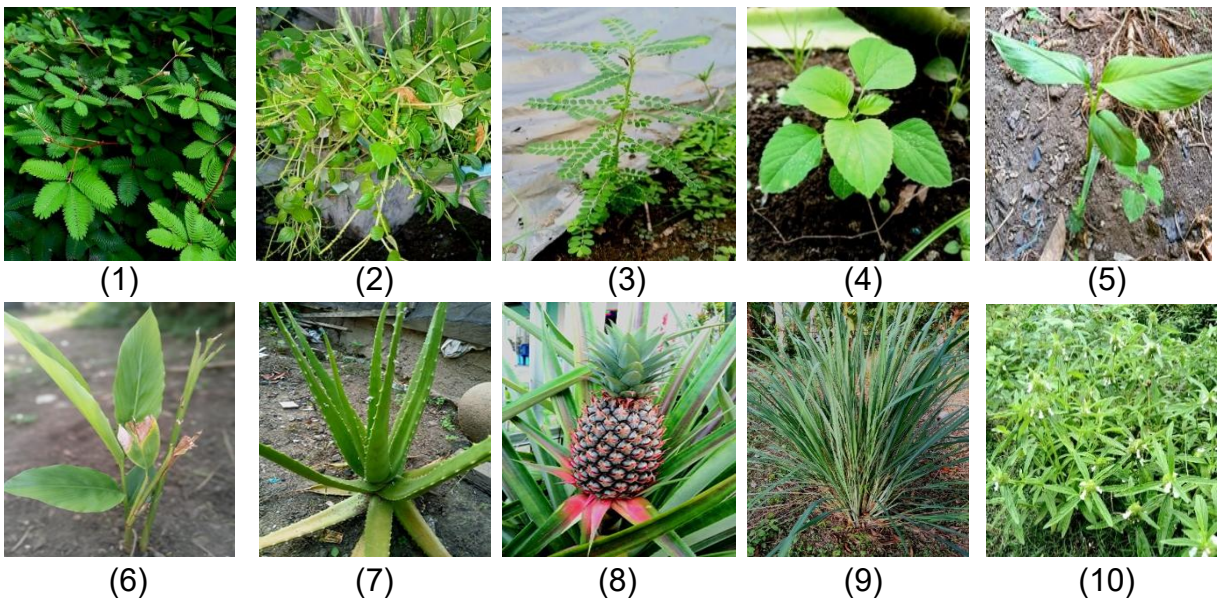
Table 1. Feasibility criteria for learning media

Percentage	Feasibility Category
81%–100%	Highly feasible
61%–80%	Feasible
41%–60%	Moderately feasible
21%–40%	Less feasible
0%–21%	Not feasible

Source: Arikunto & Jabar (2018)

RESULTS AND DISCUSSION

This study was conducted in Lakuan Buol Village, Lakean District, Buol Regency, covering three hamlets, namely Hamlet 1, Hamlet 2, and Hamlet 3. The results showed that the medicinal plants identified in the study area belonged to one division, Magnoliophyta; two classes, Magnoliopsida and Liliopsida; 17 orders; 24 families; 32 genera; and 32 species. Based on growth habit, the identified medicinal plants were dominated by herbs, comprising 12 species, followed by trees with 11 species, shrubs with 6 species, and lianas with 2 species. The medicinal plant species identified in this study are presented in Figure 2.



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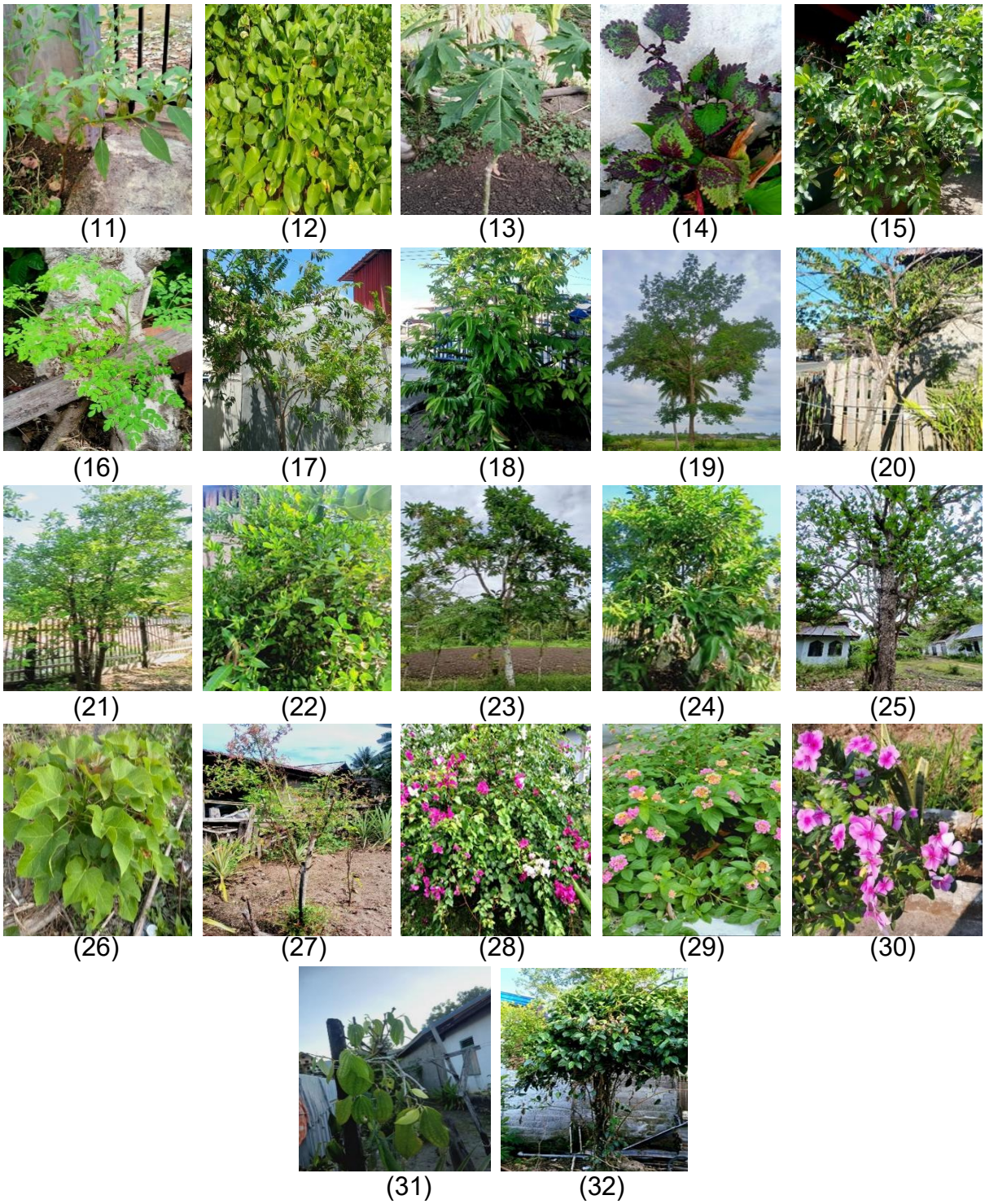

Figure 2. Medicinal plants found in Lakuan Buol Village

(1) *Mimosa pudica* L., (2) *Euphorbia hirta* L., (3) *Phyllanthus niruri* L., (4) *Acalypha indica* L., (5) *Curcuma longa* L., (6) *Alpinia galanga* L., (7) *Aloe vera* L., (8) *Ananas comosus*, (9) *Cymbopogon citratus* (DC.) Stapf., (10) *Leucas lavandulifolia* Smith., (11) *Physalis angulata* L., (12) *Ipomoea pes-caprae*, (13) *Carica papaya* L., (14) *Plectranthus scutellarioides*, (15) *Psidium guajava* L., (16) *Moringa oleifera* L., (17) *Annona squamosa* L., (18) *Annona muricata* L., (19) *Syzygium polyanthum*, (20) *Muntingia calabura* L., (21) *Citrus amblycarpa*, (22) *Citrus aurantiifolia*, (23) *Morinda citrifolia* L., (24) *Syzygium aqueum* (Burm.f.) Alston., (25) *Leucas lavandulifolia* Smith., (26) *Jatropha curcas* L., (27) *Punica granatum*, (28) *Bougainvillea glabra* L., (29) *Lantana camara* L., (30) *Catharanthus roseus* L., (31) *Piper retrofractum* Vahl., (32) *Piper betle* L.

Table 2. Medicinal plant species recorded in Lakuan Buol Village

No	Common name	Scientific name	Local name	Plant part used	Preparation method	Use
A	**Herbs**					
1	Sensitive plant	*Mimosa pudica* L.	Daun kaget-kaget	Leaves	Boiled and consumed	Digestive disorders
2	Sirih cina	*Euphorbia hirta* L.	Sirih sina	Leaves	Boiled and consumed	Cataracts/blurred vision
3	Meniran	*Phyllanthus niruri* L.	Pagampa	Stem and leaves	Boiled and consumed	Lower back pain
4	Anting-anting	*Acalypha indica* L.	Akar kucing	Leaves, stem, and roots	Boiled and consumed	Prostate disorders
5	Turmeric	*Curcuma longa* L.	Pagidon	Rhizome	Grated, boiled, and consumed	Anti-inflammatory
6	Greater galangal	*Alpinia galanga* L.	Lingguas	Rhizome	Boiled and consumed	Antibacterial
7	Aloe vera	*Aloe vera* L.	Dile bueya	Leaves	Gel extracted and applied	Hair growth
8	Pineapple	*Ananas comosus*	Nenas	Fruit	Prepared as juice	Pain relief
9	Lemongrass	*Cymbopogon citratus* (DC.) Stapf.	Simbane	Stem	Boiled and consumed	Relaxation
10	Lenglengan	*Leucas lavandulifolia* Smith.	Susuban	Leaves	Infused or boiled	Fever
11	Ciplukan	*Physalis angulata* L.	Titiupan	Leaves	Crushed and the extract consumed	Sore throat
12	Katang-katang	*Ipomoea pes-caprae*	Bolaring	Leaves	Boiled and consumed	Hemorrhoids
13	Papaya	*Carica papaya* L.	Kapeya	Leaves	Boiled and consumed	Digestive disorders
14	Miana	*Plectranthus scutellarioides*	Burak buo	Leaves	Crushed or boiled	Cough
B	**Trees**					
15	Guava	*Psidium guajava* L.	Beabat	Fruit	Grated and boiled	Diarrhea
16	Moringa	*Moringa oleifera* L.	Kelo	Leaves	Boiled as a vegetable or tea	Jaundice
17	Sugar apple	*Annona squamosa* L.	Sarikaya batu	Leaves	Chewed or decoction applied	Toothache
18	Soursop	*Annona muricata* L.	Anis	Leaves	Boiled and consumed	Headache
19	Indonesian bay leaf	*Syzygium polyanthum*	Laeng salam	Leaves	Infused and consumed	Digestive disorders
20	Jamaican cherry	*Muntingia calabura* L.	Gerseng	Leaves	Boiled and consumed	Fever
21	Limau citrus	*Citrus amblycarpa*	Lemo dedeng	Fruit	Squeezed and consumed	Cough
22	Lime	*Citrus aurantiifolia*	Lemo nipis	Fruit	Squeezed and consumed	Sore throat
23	Noni	*Morinda citrifolia* L.	Bongudu	Fruit	Ripened/fermented and consumed	Immunity
24	Water apple	*Syzygium aqueum* (Burm.f.) Alston	Konggomos	Leaves	Boiled and consumed	Diarrhea
25	Ketapang	*Leucas lavandulifolia* Smith.	Talise	Leaves	Dried, boiled, and consumed	Diarrhea
C	**Shrubs**					
26	Physic nut	*Jatropha curcas* L.	Bala cai	Leaves	Heated and applied topically	Flatulence
27	Pomegranate	*Punica granatum*	Dalima	Fruit and leaves	Grated, boiled, and consumed	Diarrhea
28	Paper flower	*Bougainvillea glabra* Choisy	Bungo kartas	Flowers	Boiled and consumed	Cough
29	Lantana	*Lantana camara* L.	Tahi ayam	Leaves	Pounded and applied directly	Wounds and boils
30	Madagascar periwinkle	*Catharanthus roseus* L.	Picah piring	Leaves	Boiled and consumed	Diabetes
D	**Lianas**					
31	Javanese long pepper	*Piper retrofractum* Vahl.	Marisa jawa	Fruit	Boiled and consumed	Fever relief
32	Betel	*Piper betle* L.	Biu	Leaves and fruit	Boiled, consumed, or applied	Antiseptic

Based on the results presented in Figure 2 and Table 2, a total of 32 medicinal plant species were identified as being used by the community of Lakuan Buol Village.

These species represent different growth habits, including herbs, trees, shrubs, and lianas. The following description presents the medicinal plant species and their respective patterns of preparation and use by the local community.

Among the herbaceous plants, sensitive plant (*Mimosa pudica* L.) is prepared by collecting 10 leaf stalks, washing them thoroughly, and boiling them in two glasses of water until one glass remains. The decoction is then filtered and consumed once or twice daily. Sirih cina (*Peperomia pellucida* (L.) Kunth) is prepared in a similar way by collecting 10 leaves, washing them thoroughly, and boiling them in two glasses of water until one glass remains; the filtered decoction is consumed once daily. Meniran (*Phyllanthus niruri* L.) is prepared by collecting two stems, washing them, and boiling them in one glass of water until boiling, after which the decoction is consumed once daily. Anting-anting (*Acalypha indica* L.) is processed by collecting the plant parts, washing them thoroughly, and boiling them in one glass of water, with the resulting decoction consumed once daily.

Turmeric (*Curcuma longa* L.) is prepared by taking 10–15 g of rhizome, washing it thoroughly, grating or pounding it, and then boiling or infusing it; the preparation is consumed once daily. Greater galangal (*Alpinia galanga* (L.) Willd.) is processed by taking 15 g of rhizome, washing it thoroughly, grating or pounding it, and boiling it in one glass of water, with the decoction consumed once daily. Aloe vera (*Aloe vera* L.) is prepared by taking one leaf, washing it thoroughly, splitting it open, extracting the gel, and applying the gel to the scalp twice a week. Pineapple (*Ananas comosus* (L.) Merr.) is used by taking one ripe fruit, peeling and cutting it, and consuming it directly or processing it into juice once daily.

Lemongrass (*Cymbopogon citratus* (DC.) Stapf.) is prepared by taking two stems, crushing them slightly, and boiling them in one glass of water; the decoction is consumed once daily. Lenglengan (*Leucas lavandulifolia* Smith.) is prepared by collecting three leaves, washing them thoroughly, and boiling them in one glass of water, with the decoction consumed once daily. Ciplukan (*Physalis angulata* L.) is prepared by collecting five leaves, washing them thoroughly, and boiling them in one glass of water; the decoction is consumed once daily. Katang-katang (*Ipomoea pes-caprae*), a creeping herbaceous plant, is prepared by collecting five leaves, washing them thoroughly, boiling them, and then crushing and applying them to the affected area. Papaya (*Carica papaya* L.) is prepared by collecting three leaves, washing them thoroughly, and boiling them in one glass of water, while miana (*Plectranthus scutellarioides*) is prepared by collecting six leaves, washing them thoroughly, and boiling them in one glass of water. The decoctions of both species are consumed once daily.

Several tree species were also used as medicinal plants by the community. Guava (*Psidium guajava* L.) is prepared by grating one young fruit and boiling it in two glasses of water until one glass remains; the decoction is consumed once daily. Moringa (*Moringa oleifera* L.) is prepared by collecting 20 leaves, washing them thoroughly, and boiling them in two glasses of water until one glass remains, after which the decoction is consumed once daily. Sugar apple (*Annona squamosa* L.) is prepared by collecting seven leaves, pounding them, and applying the preparation to the affected tooth for five minutes. Soursop (*Annona muricata* L.) is prepared by collecting four leaves, washing them thoroughly, and boiling them in one glass of water, with the decoction consumed once daily.

Indonesian bay leaf (*Syzygium polyanthum* (Wight) Walp.) is prepared by collecting four leaves, washing them thoroughly, and boiling them in one glass of water; the decoction is consumed once daily. Jamaican cherry (*Muntingia calabura* L.) is prepared by collecting 10 leaves and boiling them in one glass of water, and the

decoction is consumed once daily. Limau citrus (*Citrus amblycarpa*) is prepared by squeezing two fruits, mixing the juice with water or honey, and consuming it twice daily. Lime (*Citrus aurantiifolia*) is prepared by squeezing one fruit, mixing the juice with warm water or honey, and consuming it once daily. Noni (*Morinda citrifolia* L.) is prepared by squeezing one ripe fruit, filtering the extract, and consuming it twice a week. Water apple (*Syzygium aqueum* (Burm.f.) Alston) is used by consuming the fresh fruit directly or processing it into juice for regular consumption. Ketapang (*Terminalia catappa* L.) is prepared by collecting two leaves, washing them thoroughly, and boiling them in one glass of water; the decoction is consumed once daily.

Medicinal shrubs recorded in this study included physic nut, pomegranate, paper flower, lantana, and Madagascar periwinkle. Physic nut (*Jatropha curcas* L.) is prepared by collecting two leaves, washing them thoroughly, and applying them to the forehead twice daily. Pomegranate (*Punica granatum* L.) is prepared by grating two fruits and boiling them in one glass of water, with the decoction consumed once daily. Paper flower (*Bougainvillea glabra* Choisy) is prepared by collecting five leaves and boiling them in one glass of water; the decoction is consumed once daily. Lantana (*Lantana camara* L.) is prepared by collecting eight leaves, pounding them, and applying the preparation directly to wounds. Madagascar periwinkle (*Catharanthus roseus* L.) is prepared by collecting five leaves and boiling them in two glasses of water until one glass remains, after which the decoction is consumed once daily.

The liana species used by the community were Javanese long pepper and betel. Javanese long pepper (*Piper retrofractum* Vahl.) is prepared by collecting 10 fruits, washing them thoroughly, drying or boiling them, and consuming the preparation once daily. Betel (*Piper betle* L.) is prepared by collecting three leaves, washing them thoroughly, and boiling them in one glass of water. The resulting decoction may be used for gargling, washing wounds, or drinking as needed.

The feasibility of the learning media was assessed through expert validation and student evaluation. The results are presented in Tables 3 and 4.

Table 3. Validation results of the learning media by content, media, and design experts

No	Expert	Name	Pocket book (%)	Flipbook (%)	Category
1	Content	Aan Febriawan, S.Pd., M.Pd.	80.00	80.00	Feasible
2	Media	Dr. Lestari M.P. Alibasyah, M.P.	85.45	85.45	Highly feasible
3	Design	Dra. Hj. Musdalifah, M.Si.	86.00	86.00	Highly feasible

Table 4. Student questionnaire assessment results for the pocket book and flipbook

No	Respondent	Pocket book (%)	Flipbook (%)	Category
1	Students	92.67	91.18	Highly feasible

The findings indicate that the community of Lakuan Buol Village uses 32 medicinal plant species belonging to one division, Magnoliophyta; two classes, Magnoliopsida and Liliopsida; 17 orders; 24 families; and 32 genera. This number suggests that the area has relatively high medicinal plant diversity. These findings also reflect the strong local knowledge of the community in recognizing and using various plant species as part of traditional medicinal practices that continue to be preserved.

The recorded plants represent several growth habits, with herbs being the most dominant. This dominance may be attributed to the ability of herbaceous plants to grow easily, develop rapidly, and require minimal maintenance. In addition, most medicinal plants can be found in home gardens and community farms, making them readily

accessible when needed. This indicates that the use of medicinal plants has become an integral part of the community's daily practices.

In practice, the community processes medicinal plants using various methods, including boiling, pounding, grating, squeezing, infusing, and direct application. Boiling was the most commonly used method because it is considered practical, easy to perform, and consistent with inherited community practices for processing natural materials. Moreover, boiling is believed to facilitate the release of active compounds from plant materials into water, making them easier to consume. This is supported by studies showing that heat-assisted extraction can increase the release of bioactive compounds from natural materials (Mahreni et al., 2024) and facilitate the identification and utilization of active plant compounds (Rumanti & Saragih, 2023; Hamidah & Milanda, 2025).

Environmental conditions, including a tropical climate, adequate rainfall, and fertile soil, also strongly support the growth of these plants. In addition, knowledge inherited across generations influences the types of plants used and the methods of preparation in traditional medicine. This knowledge is generally acquired through direct experience, interaction among family members, and healing practices carried out by local figures such as traditional healers. The transmission of this knowledge occurs orally from one generation to the next, allowing it to persist to the present day. Nevertheless, such knowledge has also undergone adaptation over time due to the influence of modern information and environmental changes that affect the availability of medicinal plants. This demonstrates that local knowledge is not static; rather, it continues to develop and plays an important role in the sustainable conservation and use of medicinal plants.

The findings of this study are supported by previous research indicating that medicinal plant diversity is influenced by environmental conditions and community knowledge. Arshad et al. (2024) explained that climate, humidity, and soil fertility strongly affect the growth and distribution of medicinal plants. Fadilah (2025) also showed that communities in other regions use medicinal plants, although the number of species recorded was lower, at approximately 20 species. The similarity lies in the continued use of plants as traditional medicine by local communities, whereas differences in the number of species indicate variation in the richness of medicinal plants used.

Such variation is influenced not only by environmental conditions and area size but also by geographical characteristics, local biodiversity, community access to natural environments, and the level of knowledge and experience in identifying medicinal plants. Sociocultural factors, such as trust in traditional medicine, practices inherited across generations, and the role of local figures such as traditional healers, also influence the number of plant species used. This is consistent with Torimbanu et al. (2025), who stated that the use of medicinal plants is influenced by community access to the natural environment, ecosystem conditions, and sociocultural practices within the community. Similarly, Rahmawati et al. (2022) emphasized that inherited local knowledge strongly determines the types of plants used and their preparation methods.

At the international level, Kumar et al. (2021) reported that rural communities in India use more than 100 medicinal plant species, while Sherpa et al. (2022) found that mountain communities in Nepal are highly dependent on wild plants for traditional medicine. Compared with these findings, the number of species recorded in Lakuan Buol Village is lower; however, the pattern of use is similar, as it depends on natural availability and local knowledge transmitted across generations. Thus, this study demonstrates that medicinal plant use results from the interaction of ecological, social, and cultural factors in community life.

The success of this study is also reflected in the development of the research findings into learning media in the form of a pocket book and a flipbook based on local wisdom. Both media were validated by content, media, and design experts and were tested with students, with the results indicating that they were highly feasible for use. More specifically, the trial results showed that students responded positively, particularly in terms of attractive visual appearance, ease of use, and engagement in the learning process. Students reported that the material was easier to understand because it was presented concisely, supported by relevant images, and written in simple language. This is in line with studies on digital learning media showing that interactive media can significantly improve student motivation and understanding (Hidayat & Lestari, 2023; Nuraini et al., 2022).

The aspect most appreciated by students in the flipbook was its interactive visual display and user-friendly navigation, whereas the pocket book was considered more practical because it could be carried and read at any time. The validation process assessed several aspects, including the clarity and accuracy of the material by the content expert, the quality of the display and ease of use by the media expert, and the attractiveness of the visual design by the design expert.

The developed flipbook not only presents material in digital form but also includes interactive features such as page navigation buttons, simple animations, supporting images, and reflective questions in each subtopic to assess students' understanding. In addition, short quizzes allow students to evaluate their own understanding, thereby encouraging active participation in learning. These features make the flipbook more effective in promoting interactivity than the more static pocket book. This is consistent with multimedia learning theory, which states that interactive digital media can enhance students' cognitive engagement through the integration of text, visuals, and responsive activities (Fitriani et al., 2022). Therefore, the use of a flipbook provides a more dynamic learning experience that is not solely text-based.

The pocket book and flipbook developed in this study function not only as media for information delivery but also as effective learning tools for improving students' understanding. Because the materials are derived from the surrounding environment, they are more contextual and easier to understand, while also helping to reintroduce knowledge of medicinal plants to the younger generation. In comparison, the pocket book is superior in terms of practicality, whereas the flipbook is superior in terms of interactivity and student engagement in the learning process. These findings indicate that this study contributes not only scientific data on medicinal plants but also practical outputs in the development of local wisdom-based learning media that are more engaging, meaningful, and aligned with current developments in educational technology.

CONCLUSION

This study demonstrates that the community continues to maintain traditional medicinal practices through the utilization of 32 medicinal plant species. Leaves were the most commonly used plant part, while boiling, brewing, and pounding were the dominant preparation methods. These patterns indicate that medicinal plant use is closely related to plant accessibility, practical modes of preparation, and the continuity of local knowledge transmitted across generations. The findings also highlight the important role of community-based knowledge in sustaining traditional medicine and preserving ethnobotanical heritage.

The study further shows that medicinal plants have strong potential to be integrated into biology education as environment-based learning resources. By linking

local biodiversity and traditional knowledge with classroom learning, this research contributes not only to the development of contextual biology learning but also to the preservation of local wisdom. In addition, the pocketbook and flipbook developed in this study were found to be highly feasible as learning media. The validation results from content, media, and design experts, together with positive student responses, indicate that these media are valid, practical, and appropriate for supporting a more engaging, meaningful, and contextually relevant learning process.

RECOMMENDATION

Future studies are recommended to expand the research area and increase the number of informants to obtain more comprehensive data on medicinal plants. In addition, scientific investigations of the chemical constituents and therapeutic properties of these plants should be conducted to strengthen their empirical and practical application. The limitations of this study included variations in informants' knowledge, declining interest among younger generations, and seasonal factors affecting plant availability. Therefore, documentation, education, and community involvement are needed to preserve medicinal plants and local knowledge.

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