



Development of an Ethnobotany Handbook of Aromatic Plants of Sambas Malay Tribe

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Received: July 11, 2025

Revised: September 08, 2025

Accepted: October 25, 2025

Published: October 31, 2025

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DOI: [10.29303/jppipa.v11i10.12114](https://doi.org/10.29303/jppipa.v11i10.12114)

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Abstract: This study aims to develop learning media in the form of an ethnobotanical pocket book of aromatic plants based on the local wisdom of the Sambas Malay community. The development was conducted using the ADDIE model which includes the stages of analysis, design, development, implementation, and evaluation. The results of the analysis showed a lack of learning media that is contextual and in accordance with the student's environment. The pocket book developed contains a description of the morphology, benefits, and utilisation of aromatic plants in the traditions of the Sambas Malay community. Expert validation showed that this pocket book was very feasible to use with a material expert validation score of 89%, linguist 88%, and media expert 99%. Implementation was carried out through small and large scale trials on grade X students at SMA Negeri 4 Sungai Raya. The trial results showed a very good response with a score of 95% on the small scale trial and 93% on the large scale. This pocket book is effective to be used as a contextual, informative, and supportive biology learning media for local culture preservation.

Keywords: Aromatic plants; Ethnobotany; Malay tribe

Introduction

Indonesia is one of the countries with the highest biodiversity in the world and is classified as a megadiverse country due to the richness of its biological resources (Susanti et al., 2020; Nuraeni et al., 2022; Sunarya et al., 2024). One of these valuable resources is plants, which not only help maintain ecosystem balance but are also utilised in various aspects of human life, such as food, shelter, clothing, medicine, handicrafts, as well as social and cultural needs (Amalia et al., 2023).

This local knowledge holds not only cultural value but also significant potential as a source for biology learning based on ethnobotany. Ethnobotany, which examines the relationship between humans and plants, can serve as an innovative approach to education by presenting material that is contextual, relevant, and closely linked to students' everyday lives (Rahmah et al., 2021). Sandi et al. (2024) identified at least 26 species of

aromatic plants that have the potential to be used as Biology teaching materials (Andayani et al., 2020; Aulianti et al., 2024).

However, the use of this potential in education remains very limited, particularly in West Kalimantan. Based on interviews with Biology teachers at SMAN 4 Sungai Raya, the teaching media currently in use consist mostly of videos and textbooks. The videos often feature plants that are not found in the students' local environment, making the material difficult to understand in a contextual manner. Meanwhile, textbooks tend to be bulky, impractical, and fail to reflect the local context, resulting in reduced student interest in learning. This situation indicates the need for the development of innovative teaching materials based on local wisdom that can bridge the gap between subject content and students' environment (Juan et al., 2025).

One relevant and efficient solution is the development of pocketbook media. Pocketbooks are

How to Cite:

Lostari, L., Rahayu, H. M., & Qurbaniah, M. (2025). Development of an Ethnobotany Handbook of Aromatic Plants of Sambas Malay Tribe. *Jurnal Penelitian Pendidikan IPA*, 11(10), 446–453. <https://doi.org/10.29303/jppipa.v11i10.12114>

considered practical due to their small size, light weight, portability, and ease of access for reading at any time (Nurlatifah et al., 2021; Pranata et al., 2025). Additionally, this medium can be designed to be aesthetically pleasing and interactive, thus increasing students’ motivation to learn (Herunanda et al., 2023). Previous studies have shown that pocketbooks developed through expert validation and trials with teachers and students have received highly positive responses (Windayani et al., 2018; Putra, 2019; Wijayanti, 2019; Aini et al., 2024).

The novelty of this study lies in the development of a pocketbook that specifically contains ethnobotanical information about aromatic plants used by the Malay community in Sambas, which has not previously been widely used as Biology teaching material. This book not only introduces local biodiversity but also instils values of cultural and environmental conservation. The content is aligned with the basic competencies of Biology related to Plantae material, namely classifying plants into divisions based on general characteristics, as well as linking their roles in life and their conservation (Fauzy & Asy’ari, 2020).

Therefore, this research is essential as it addresses the need for contextual learning media based on local wisdom and supports the preservation of traditional knowledge that is increasingly being eroded by modernisation.

Method

The method in this research is development research or Research and Development (R&D) developed by Reiser and Mollenda in the 1990s (Syahid et al., 2024). The model used in the research uses the ADDIE model. This model is used to develop the results of identification into biological learning media in the form of a pocket book of ethnobotany of aromatic plants of the Malay tribe of Sambas. The ADDIE instructional model is an instructional process consisting of five phases, namely analysis, design, development, implementation and dynamic evaluation (Maydiantoro, 2020).

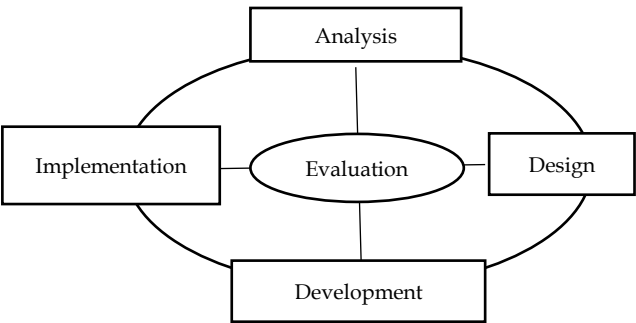


Figure 1. Development procedure chart

The subjects of this study were X grade students of SMA Negeri 4 Sungai Raya conducted limited trials in classroom learning, small-scale trials and large-scale trials of a total of 2 classes of 60 students in class X IPA 1 and IPA 2. The small-scale trial was conducted in class X IPA 1 SMA Negeri 4 Sungai Raya as much as 20% and the large-scale trial was conducted in class X IPA 2 SMA Negeri 4 Sungai as much as 50% (Fadillah, 2018). Analysis of validation questionnaire data used to measure the feasibility of learning media pocket book Aromatic Plants. The data analysis technique used in this study is description analysis, namely calculating the percentage of the value of the validation results. To determine the score collected from the validation sheet using a Likert scale (Muzzalifa & Oktaviani, 2021). More details can be seen in Table 1.

Table 1. Validation questionnaire score scale

Score	Description
1	Strongly Disagree
2	Disagree
3	Agree
4	Strongly Agree

Febrianti et al. (2024)

Analysis of the feasibility test of learning media is carried out to obtain data from the results of the assessment that has been carried out by media expert validators and material expert validators (Putri & Djulia, 2025). The data generated from the assessment is quantitative data. The data can be converted into qualitative data in the form of intervals using the following formula:

$$P = \frac{\sum x}{\sum x_i} \times 100 \tag{1}$$

Description:

- P = Percentage validation
 - Σ x = Total number of answers in the item
 - Σ x_i = Total number of ideal values in all items
 - 100 = Constant
- (Muhsan et al., 2022)

The assessment criteria for the feasibility of this ethnobotanical pocket book of aromatic plants of the Sambas Malay tribe are expressed in percentages and calculated using the percentage formula. The results of the calculation above the percentage score of the media feasibility assessment can be seen in Table 2.

Table 2. Media feasibility assessment percentage score

Percentage (%)	Rating Category
0-20	Very Inappropriate
21-40	Inappropriate
41-60	Adequate
61-80	Appropriate
81-100	Very Appropriate

Julianda et al.(2017)

Student response questionnaires will be carried out small-scale trials and large-scale trials to determine student responses to the learning media for the ethnobotany pocket book of aromatic plants of the Sambas Malay tribe using a questionnaire, which converts qualitative data into quantitative with a closed questionnaire addressed to students and student activity observers using a Guttman scale with the following information: score 1 represents a ‘yes’ statement; and score 0 represents a ‘no’ statement (Putri, 2014).

$$K = \frac{F}{N \times 1 \times R} \times 100\% \tag{2}$$

Description:
K = Percentage Rate
F = Total Respondent Answers
N= Highest score in the questionnaire
R = Number of respondents

The results of student responses regarding the learning media for the ethnobotany pocket book of aromatic plants of the Sambas Malay tribe developed were taken through a questionnaire based on the results of the analysis of the learning media student response questionnaire, the student response assessment criteria in Table 3.

Table 3. Percentage criteria for student response questionnaires

Interval Criteria (%)	Rating Category
0 < P < 25	Poor
25 ≤ P < 50	Fair
50 ≤ P < 75	Good
75 ≤ P ≤ 100	Very Good

Budi et al. (2021)

Result and Discussion

Analysis Stage

The initial stage in this development is the analysis stage, which includes needs analysis and curriculum analysis. Based on the results of interviews with biology teachers at SMAN 4 Sungai Raya, it is known that the dominant teaching materials used are textbooks or LKS, so that teachers have difficulty in delivering material related to the local potential of the region.

Findings from observations show that biodiversity material is one of the main challenges for class X

students because the material is quite complex and has not been associated with local potential, especially aromatic plants and their use in everyday life. The material presented in textbooks tends to be in the form of long narrative texts without being accompanied by interesting visuals, so students are less motivated to read and understand the material.

Design Stage

After the needs analysis stage, the next stage is the design stage which aims to design an ethnobotanical pocket book of aromatic plants used as learning media. This pocket book product design is made using Canva. Canva has various advantages that can produce attractive designs and facilitate the process of making learning media practically and time efficiently (Marsa et al., 2024). The content of this pocket book comes from the identification of aromatic plants based on the ethnobotany of the Sambas Malay community obtained through interviews with informants from the local community. The developed pocket book consists of three main parts, namely introduction, content, and closing. The initial part includes the cover component, preface, table of contents, introduction, and instructions for use.

The content in this pocket book consists of morphological characteristics of plants, plant descriptions, and the use of plants as aromatic materials. This pocket book is also equipped with aromatics in the daily life of the Sambas Malay community, as well as a reference section, glossary, and author profile. Students who learn the introduction of plants through the ethnobotany pocket book of aromatic plants will gain a stronger understanding of the concept of plants. The utilisation of this pocket book as learning media is considered effective because it is easily accessible, and contains information arranged systematically in the form of a list of topics accompanied by definitions, background, and biographical data. Another advantage of this pocket book is the presentation of information arranged alphabetically, making it easier for students to find the information needed. In addition, this pocket book is also equipped with pictures of aromatic plants, so that it can increase students' interest in learning. This learning experience helps students remember the concepts that have been taught. This pocket book is arranged in accordance with ISO standards with a size of 13 x 9.5 cm. The visualisation of the pocket book design can be seen in Table 4.

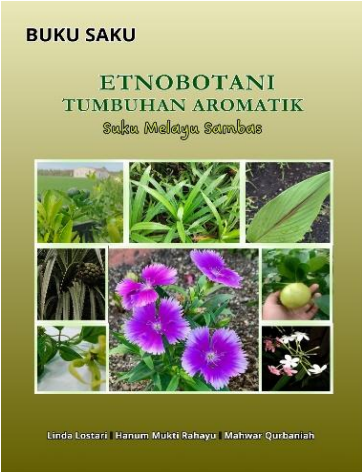


Development Stages

The validation process was carried out with the aim of obtaining evaluation and input used as a basis for improving the pocket book of aromatic plant ethnobotany, so that a more optimal product was

produced (Prawati et al., 2024). Validation was conducted by three groups of experts, namely material experts, media experts, and linguists. A total of 9 validators were involved in this process, consisting of 3 material experts (2 lecturers and 1 teacher), 3 media experts (2 lecturers and 1 teacher), and 3 linguists (1 lecturer and 2 teachers). Feedback and suggestions from each expert became the basis for making initial revisions

to the pocket book design before proceeding to the trial stage. The revision resulted in an initial product that had gone through the validation stage. In order for this initial product to be declared feasible as a learning media for students, it is necessary to test the subjects that have been determined at the testing stage. The results of the validators' assessment of the pocket book are presented in Table 4.

Table 4. Description of the display of Sambas Malay community aromatic plants pocket book

Picture	Description
	Pocket book cover
	Instructions for use
	Table of contents

[illegible]**Table 5.** Validator assessment results

Expert Verification	Percentage (%)	Rating Category
Material Expert	89	Very Feasible
Language Expert	88	Very Feasible
Media Expert	99	Very Feasible

Based on the results of validation by material experts, a percentage of 89% was obtained. This

assessment shows that the pocket book developed is very feasible in terms of material coverage, accuracy of data and facts, sophistication of information, and strengthening of local wisdom. The material expert assessed that the information presented was able to provide new knowledge and illustrate a good concept formation process. In addition, the pocket book is

considered very relevant to local potential and is able to broaden students' insights into the types of aromatic plants that develop in the Sambas Malay community.

Furthermore, the validation results from linguists showed a percentage of 88%. This shows that the language used in the pocket book is very feasible to be understood by high school students. The sentence structure, sentence effectiveness, terminology, and grammar are well structured and in accordance with EYD rules. The delivery of information is communicative, ethical, and able to encourage students to think critically. The language used is also considered appropriate to the development and cognitive abilities of students.

Finally, validation from media experts with a percentage of 99%. This assessment shows that in terms of visual presentation, this pocket book has a very good appearance. The pocket book is arranged systematically and attractively with the selection of colours, images, and text layout that support the learning process. The presentation is able to attract students' interest in independent and interactive learning. The clarity of the pictures, the completeness of the parts of the book such as the preface, glossary, and bibliography are also an added value that makes this book very suitable for use.

Implementation Stage

The implementation stage aims to determine the response of students to the learning media developed, namely the aromatic plant ethnobotany pocket book which contains information about aromatic plant species and their use by the Malay community in Sambas Regency. The response was obtained through small-scale and large-scale trials, which were conducted after the product was validated by material experts, media experts, and linguists. The large-scale trial was conducted to assess the effectiveness of the pocket book on a wider range of students.

Some aspects that were analysed in both stages of the trial included the suitability of the material content, the clarity of language use, the usefulness of the media, and the quality of information presentation. The small-scale trial involved 15 students, while the large-scale trial involved 30 students. The results of the small-scale trial showed a score of 95% (very good category), and the results of the large-scale trial obtained a score of 93% (very good category) as shown in Table 6.

Table 6. Response of SMA Negeri 4 Sungai Raya students

Experiment	Percentage (%)	Category
Small Scale	95	Very Good
Large Scale	93	Very Good

Evaluation Stages

At the evaluation stage, researchers applied formative and summative evaluation. Formative evaluation was conducted throughout the development process with the aim of refining or revising the pocket book of aromatic plant ethnobotany based on feedback obtained during the validation process. The revisions referred to the feedback from the validators consisting of content, language, and media experts.

Furthermore, summative evaluation was carried out by analysing student response questionnaires to assess the extent to which the use of aromatic plant ethnobotany pocketbooks affected the learning experience of students, especially in understanding the use of aromatic plants by the Sambas Malay community.

Conclusion

Based on the results of the research conducted, it can be concluded that the development of an ethnobotanical pocket book of Sambas Malay aromatic plants as a biology learning media proved to be very feasible. This pocket book successfully integrates local wealth in contextualised learning, making the material closer to students' lives. Expert validation showed high feasibility in terms of content, language, and media design. The implementation of the pocket book showed a positive response from students, which can be seen from the high percentage value in the small-scale trial of 95% and the large-scale trial of 93%. This media not only improves students' understanding of biodiversity material, but also raises their awareness of the importance of preserving culture and the environment. This pocket book can be a learning innovation that combines the scientific approach with the preservation of local wisdom, and can be recommended for wider use in biology learning in schools.

Acknowledgments

The author would like to express sincere gratitude to the teachers and students of SMAN 4 Sungai Raya for giving the researcher the opportunity to conduct the study, which made it possible to write this article.

Author Contributions

Conceptualisation, L.L., H.M.R., and M.Q.; methodology, L.L. and M.Q.; validation, H.M.R.; resources, original draft writing, L.L. All authors have read and agreed to the published version of the manuscript.

Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

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