

# Development of Ethnobotany-Based Booklets as Learning Tools for Communities

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## ABSTRACT

Ethnopharmaceutical research-based booklets are teaching material that contains important information that is presented in a concise and interesting manner for the general public to study. This research aims to develop a booklet for ethnopharmaceutical research-based communities in the Bromo Tengger Semeru National Park area. This research method uses the development adopted from the ADDIE learning model. Data is collected through identification of plants in the field and group discussion forums with the Tengger community. While the booklet's eligibility data was validated by media experts and content material experts, as well as the effectiveness of the booklet being tested on community groups. The results of this study indicate that there are about 40 types of medicinal plants commonly used by the Tengger community. The results of media and content material validation obtained 88.95% and 80% results, which are included in the very valid and quite valid criteria and can be used. The results of the booklet trial on the community group including readability and practicality tests obtained 86.42% and 91.65% which were included in the criteria that were read well and were very practical. Booklet development from the results of research can be a learning media that is more easily understood in learning biology related to plant diversity and utilization.

**Keywords:** *booklet, Bromo Tengger Semeru National Park, ethnopharmacy*

## 1. INTRODUCTION

Plants have become the main source of active compounds in the field of pharmacology. Treatment using plant extracts has been widely used because of its diverse bioactive compounds and relatively low toxicity during treatment in various medical conditions [1], [2]. Indonesia has various types of plants that have the potential as natural candidates for treatment for various diseases [3], [4], which are widespread throughout Indonesia, including in the Bromo Tengger Semeru National Park. The Tengger tribal community has traditionally used medicinal plants in Bromo Tengger Semeru National Park to treat various diseases. Medicinal plants play an important role in the development of human culture in each different region. Each tribe has different local and traditional knowledge in utilizing medicinal plants, starting from the types of plants, the parts used and how to treat them.

Information about the existence and benefits of medicinal plants in the Bromo Tengger Semeru National Park area is still very limited to be known by the general public as well as in biology-related learning. Therefore, information and learning media are needed to educate the general public and the academic community about the potential of medicinal plants in Bromo Tengger Semeru National Park through

booklets. Research-based booklets can be a learning media that is relevant in the learning process. Booklet is a form of written information media that is presented effectively, communicatively, and attractively, with a unique design so that information is more easily accepted and remembered [5], [6]. This study aims to explore medicinal plants in Bromo Tengger Semeru National Park and develop booklets on the potential of medicinal plants and the use of medicinal plants in the region as a source of information for the community.

## 2. METHODS

### 2.1. Exploration of Medical Plants in the Bromo Tengger Semeru National Park

Exploration of medicinal plants is carried out using a purposive sampling method, following the division of districts, sub-districts and villages within the Bromo Tengger Semeru National Park. Medicinal plants found from exploration were identified by the Indonesian Institute of Sciences (LIPI) Purwodadi to determine the types and species. A literature study was conducted on the content of active compounds and the benefits of plants in the health

field. Verification of the results of exploration of medicinal plants is done through a group discussion forum (FGD) with the Tengger tribe community regarding the function of local plants as medicinal plants, and the method of utilization of plants in accordance with the habits of the Tengger tribe community.

## **2.2. Booklet Development**

Booklet on exploration of medicinal plants in the Bromo Tengger Semeru National Park area was developed using the ADDIE development model, through the stages of analyzing, design, develop, implement, and evaluate [7]. (1) The analysis phase serves to find out various information needs of the community regarding medicinal plants in Bromo Tengger Semeru National Park and their use, which are presented in booklet form. At the analysis stage, the objective of developing the booklet is to produce, test the validity and practicality of the research-based booklet. The target of developing booklets is the general public in the Malang City area. (2) The design phase serves to design research-based booklets. At the design stage, a list of topics that will be designed in the booklet based on research results, booklet object display, validation questionnaires, and readability and practicality questionnaires are carried out. (3) The development phase serves to develop the design of the booklet that was created at the design stage. Stages of development include designing content in the booklet, including research results. Booklets that have been developed are tested for validity by material experts, and media experts. After being declared valid by an expert validator, the booklet was tested on 15 people in Sukun housing area to represent the people of Malang City. (4) The evaluation stage serves to determine the deficiencies in the booklet as a basis for the improvement of the booklet. The evaluation phase is carried out at each stage of the previous ADDIE development (analysis, design, and development).

## **3. RESULT AND DISCUSSION**

### **3.1. Diversity of Medicinal Plant in Bromo Tengger Semeru National Park**

The results of exploration of medicinal plants found about 28 types of medicinal plants commonly used to cure various diseases, including *Oxalis corniculata*, *Foeniculum vulgare*, *Melastoma malabathricum*, *Artemisia vulgaris*, *Imperata cylindrica*, *Chenopodium anthelminthicum*, *Rubus niveus*, *Anredera cordifolia*, *Melastoma malabathricum*, *Artemisia vulgaris*, *Imperata cylindrica*, *Chenopodium anthelminthicum*, *Rubus niveus*, *Anredera cordifolia*, *Taraxacum officia* *Eucalyptus sp*, *Plantago lanceolata*, *Digitalis purpurea*, *Psidium guajava*, *Physalis angulata*, *Solanum nigrum*, *Achyranthes sp.*, *Jatropha gossypifolia*, *Capsicum annum*, *Bidens pilosa*, *Acacia decurrens*, *Dodonaea aviscosa*, *Cestrum parqui*,

*Acholaranticus sp. septica*, *Rubus rosifolius*, *Tithonia diversifolia*. Table 1 shows the results of plant exploration in Bromo Tengger Semeru National Park and their benefits in the health field, and has been validated by the Tengger tribal community through FGD.

Utilization of plants by local residents as materials for treatment evolved into knowledge passed down from generation to generation. Each tribe has different local and traditional knowledge in utilizing medicinal plants, starting from the types of plants, the parts used and how to treat them. From all types of medicinal plants utilized by the Tengger tribe there are 3 superior plant species with high efficacy as medicines namely, *Rubus rosifolius* (Calingan), *Physalis angulata* (Ciplukan Gunung), and *Foeniculum vulgare* (Adas). *Rubus rosifolius*, known locally as Calingan, is often used as a remedy for stomachaches and mouth ulcers. *Rubus rosifolius* contains active compounds from phenol derivatives in the form of elagic acid, galik acid, and chlorogenic acid which have antioxidant, anti-bacterial, anti-thrombotic, and various diseases caused by free radicals [8].

*Physalis angulata* is known locally as Ciplukan gunung, the fruit is usually consumed to cure thrush, while the boiled water is used for the treatment of heart disease, lung disease, and lowering high blood pressure. *Physalis angulata* contains active compounds of physalins, secosteroids, and derivatives of flavonoids that function as anti-inflammatory, anti-diuretic, anti-microbial, and are involved in immunomodulation [9].

*Foeniculum vulgare*, known locally as Fennel, is beneficial for reducing blood pressure, inflammation and infection. *Foeniculum vulgare* has many benefits as an antioxidant, antitumor, antibacterial, antifungal, antiviral, chemopreventive, cytoprotective, hepatoprotective, hypoglycemic, and oestrogenic, because of the many active compounds including flavonoid aglycons, acacetin, kaempferol, uercetin, and rosmarinic acid [10].

### **3.2. Effectiveness of Booklets as Community Learning Materials in Diversity of Medicinal Plant in Bromo Tengger Semeru National Park**

A booklet is an intermittent publication that can consist of one to a small number of pages, is not related to other publications, and is finished in one issue. The booklet as a learning medium contains a brief explanation of the booklet material presented in an attractive appearance in the form of colored writing and accompanied by pictures [11]. The booklet (Figure 1) is composed of 30 pages consisting of several sections including: introduction of Bromo Tengger Semeru National Park, description of medicinal plants found in Bromo Tengger Semeru National Park, description of methods of using plants as medicine by the Tengger tribe community, and a description of the potential and content of active compounds superior medicinal plants in Bromo Tengger Semeru National Park.

**Table 1 Medical Plants in Bromo Tengger Semeru National Park**

No	The name of plants	Benefits of plants
1.	<i>Oxalis corniculata</i> <b>(Semanggi)</b>	To reduce blood glucose levels
2.	<i>Foeniculum vulgare</i> <b>(Adas)</b>	- For lowering blood pressure - To treat inflammation and infection - as a cough medicine
3.	<i>Melastoma malabathricum</i> <b>(Senggani)</b>	Medicine for itching
4.	<i>Artemisia vulgaris</i> <b>(Gajan)</b>	To treat nosebleeds
5.	<i>Imperata cylindrical</i> <b>(Alang-alang)</b>	- For toothache medicine - For diarrhea medicine - For heat-lowering - For lowering blood pressure
6.	<i>Chenopodium anthelminthicum</i> <b>(Lampes)</b>	- To treat intestinal worms - As a cough medicine
7.	<i>Rubus niveus</i> <b>(Glunggung duri)</b>	Medicine for diarrhea
8.	<i>Anredera cordifolia</i> <b>(Binahong)</b>	To treat inflammation and infection
9.	<i>Taraxacum officinale</i> <b>(Gayungan)</b>	Medicine for diabetes
10.	<i>Brugmansia suaveolens</i> <b>(Kecubung Gunung)</b>	Eye medicine
11.	<i>Eucalyptus sp</i> <b>(Kaliptus)</b>	Medicine for nausea
12.	<i>Plantago lanceolata</i> <b>(Suripandak)</b>	Medicine for itching
13.	<i>Digitalis purpurea</i> <b>(Bunga Kepompong)</b>	Medicine for diabetes
14.	<i>Psidium guajava</i> <b>(Jambu Batu)</b>	Medicine for diarrhea
15.	<i>Physalis angulata</i> <b>(Ciplukan Gunung)</b>	- Medication for thrush - Herbal medicine for cancer - Medicines for lowering cholesterol - Medicine for lowering blood pressure
16.	<i>Solanum nigrum</i> <b>(Ranti)</b>	Facilitate breast milk
17.	<i>Achyranthes sp.</i> <b>(Ranggitan)</b>	Medication for removing boils
18.	<i>Jatropha gossypifolia</i> <b>(Jarak Merah)</b>	Medicine for nausea
19.	<i>Bidens pilosa</i> <b>(Jaringan)</b>	Medication for thrush
20.	<i>Dodonaea viscosa</i> <b>(Kesek)</b>	Treat irritation to the skin
21.	<i>Brugmansia candida</i> <b>(Kecubung)</b>	Eye medicine
22.	<i>Cestrum parqui</i> <b>(Trabasan)</b>	Remove scars
23.	<i>Chromolaena odoata</i> <b>(Krinyuh)</b>	- Medicine for itching - Protect from mosquito bites
24.	<i>Curculigo orchio</i>	Treat bee stings

	(Tlotok)	
25.	<i>Ageratum conyzoides</i> (Wedusan)	- Facilitate breast milk - Stop bleeding on the wound
26.	<i>Ficus septica</i> (Awar-awar)	- Medication for removing boils - Medicine for earaches
27.	<i>Rubus rosifolius</i> (Calingan)	- Medicines for stomach pain - Medication for thrush
28.	<i>Tithonia diversifolia</i> (Paitan)	Medicine for diabetes

Booklets are arranged in a concise and communicative language so it is easy for the reader to understand. The description presented is accompanied by interesting drawings and documentation from the results of the research. Booklets can assist in understanding learning material through exploration of diversity and local potential as research-based learning resources as expected by the curriculum concept 2013. The curriculum concept 2013 emphasizes teachers to be creative and professional through scientific research that can be realized in the form of books as learning materials that are appropriate to the characteristics of the social environment [12].

Booklet based on research results validated by content material experts and media experts to find out weaknesses in the booklet and is used as a basis for making

improvements to the booklet (Belawati, 2003). Expert validation of the booklet based on the results of the study consists of three major components, namely the aspects of the feasibility of the content, the feasibility of presenting the content, and the feasibility of the language. The validity value of the content eligibility aspect which included 12 items of 80% assessment was very valid. The value of the validity of the feasibility aspect of the presentation of content which includes 10 grading points is 84.5% validity with a fairly valid category. The validity value of the aspect of language eligibility which includes 9 items of assessment is 75.5% with a quite valid category. The overall validation results of the material expert validator were 80% with quite valid criteria.

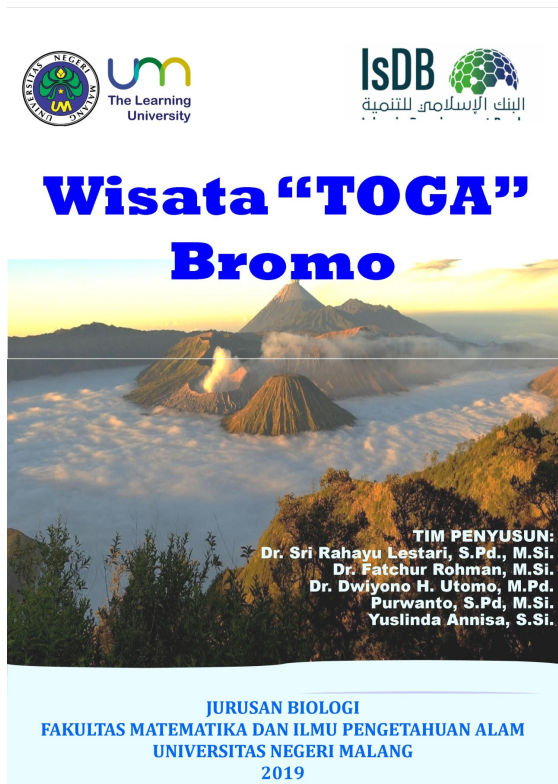


Figure 1. Display an overview of the contents of the booklet.

The validity of the booklet media expert consists of four major components namely the graphic aspect, the presentation aspect, the linguistic aspect, the booklet aspect. The validity value of the graphic aspects which included 10 items was 88% with a very valid category. The validity value of the presentation aspects which included 6 items of assessment was 81.2% with a quite valid category. The validity value of linguistic aspects which includes 6 items of assessment is 96.6% with a very valid category. The validity value of the booklet aspect which includes 12 grading items is 90% with a very valid category. The results of the overall validation of the media expert validator were 88.95% with very valid criteria. Various kinds of learning media are present in everything that makes learning easier and more interesting for all people. The ability to search, select, collect, store and convey knowledge in the form of representation is needed so that information can be more easily learned. Booklet is a form of media literacy that is designed from a combination of various skills needed to search, choose, analyze, evaluate, and communicate [13].

#### 4. CONCLUSION

The results of exploration of medicinal plants found about 28 types of medicinal plants commonly used to cure various diseases, including *Oxalis corniculata*, *Foeniculum vulgare*, *Melastoma malabathricum*, *Artemisia vulgaris*, *Imperata cylindrica*, *Chenopodium anthelminthicum*. Booklet based on research results about the exploration of medicinal plants in Bromo Tengger Semeru National Park has the potential to be an appropriate learning media for the community to add information about medicinal plants. The results of the validation test of media and material experts produce 80% and 88% .95 which means that it is quite valid and very valid, or can already be used. The results of the readability and practicality trial resulted in a value of 86.42% and 91.65% which means it is very practical, or can already be used.

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