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DEVELOPMENT OF PRACTICUM GUIDELINE ACTIVE COMPOUND ISOLATION BASE ON MEDICAL PLANT IN SASAMBO SOCIETY, INDONESIA

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Abstract: The people of NTB have many distinctive cultures and cuisines. The use of plants is traditional medicine. This study aims to develop practical guidelines based on the medicinal plant sasambo, NTB. Development design is Research & Development with a 4D model (define, design, develop, and disseminate). The results of laboratory experiments are outlined in practicum guidelines for student activities. Chemistry lecturers in chemistry and natural product chemistry constructively validate the procedures. The analytical method uses Aiken's V formula and percentage agreement. The results of the expert validation show that the practicum guidelines meet very valid criteria with an Aiken value of 0.86. The guidelines also received positive responses from students and expert validators with an average practicality level of 88.6% with very practical criteria. Guidelines can be applied to learning with a percentage agreement of 100%. The cultural richness applied to learning can increase motivation learning and encourage students to be creative in developing products from the Sasambo milk medicinal plant.

Keyword: *Practiucm Guidline, Active Compound, Isolation, Medical Plant, Sasambo Society*

INTRODUCTION

West Nusa Tenggara is rich in special foods and traditional medicines derived from spices. The treatment utilizes the ability of plants to produce active substances in the form of metabolites [1]. Using plants as medicine is a cultural property of the Indonesian nation that must be maintained [2]. Medicinal plants are very attached to daily activities in people's lives. Scientifically, a medicinal plant's efficacy is related to its chemical compounds' content as a defense mechanism against various predators such as insects or microorganisms [3-4]. The chemical compounds that give medicinal plants their properties include secondary metabolites, including terpenoids, steroids, polyketides, phenylpropanoids, flavonoids, and alkaloids [5]. This compound has a role according to the class of compounds from different types of plants. All plants have active substances from roots, stems, and leaves. Plants or spices with a distinctive and fragrant smell from aromatic compounds are widely used as food seasonings in the NTB area. The typical food of Sumbawa, "seat," uses monte Sumbawa oranges as a food flavoring. This plant also has many benefits for the immune system. Kencur is a scrub for babies and toddlers in the Lombok community. The material for scrubbing for the Mbojo community uses ingredients from cloves which are called "Lo'i bore." Culture and plants can be studied further in science learning in universities.

Learning science is learning that cannot be separated from research activities [6]. Research is carried out to strengthen the theory obtained in the learning process. The theory is applied in the laboratory to meet the needs of active ingredients in various fields of science. Science learning at the higher education unit level emphasizes innovation in producing factory-scale products such as active compounds and essential oils in medicine and health. Laboratory activities must be carried out following established standard operating procedures. One way is to use practical instructions.

Practicum instructions are learning support, especially in science learning [7]. Science itself cannot be separated from laboratory activities. The presence of practicum instructions will prevent mistakes in laboratory activities. Laboratory activities related to the use of tools and materials. Improper instructions will increase the need for tools and materials. This process occurs as a result of wrong procedures. Most reference procedures come from journals and websites that are not necessarily in actual conditions. Students experience many misconceptions and need help determining experimental procedures from various journals. One journal has a different procedure from another journal. More than scientific article literacy is needed to make students easily understand a procedure.

Innovation in developing standard and valid practicum instructions can help students learn science. The active compounds in medicinal plants are outlined in practical instructions with isolation procedures based on direct research results from researchers. Isolation procedures for compounds and essential oils have been simplified. The instructions are also equipped with the design of a steam distillation toolset to produce essential oils on a

production scale that are safe for the body. Innovation practical instructions help students develop local products and can apply them in classroom learning. Instructions for development practicum can stimulate students to improve their HOTS ability to innovate in everyday life.

RESEARCH METHODS

This research is a Research and Development (R&D) based on 4D (define, design, develop, and disseminate). The focus of the research is on the process of isolating the active compounds in the medicinal plant sasambo, NTB. The guideline development experiment was carried out at the Chemistry Laboratory of FKIP University of Mataram. The procedure outlined in the guideline is a procedure that has passed the product test process in isolating the active compounds and essential oils of medicinal plants. The practical guideline development defines, designs, develops, and disseminates.

Define

The people of NTB use plants as traditional medicines and are applied in various types of special food. Medicinal plants and typical herbs served in food are identified. Typical dishes using medicinal plants are prepared, tested, studied, and laboratory tested. It is the first step in the development of isolation guidelines.

Design

The development is designed in two stages, namely laboratory research and the development of practicum guidelines. Laboratory work included three experiments: isolation of EPMS compounds, isolation of Monte Sumbawa essential oil, and isolation of clove essential oil. Experiments were carried out to produce a product. The products in the experiment included EPMS compounds and essential oils. Procedures in the experiment were compiled and developed into a practicum guideline. The results of the development can be used by students at the undergraduate, master's, and doctoral levels in isolating active compounds as a start in conducting research in laboratory experiments.

Develop

The development of practical guidelines is based on medicinal plants in the NTB Sasambo tribe. The experimental results are outlined in the guide. The guidelines are compiled systematically, from the selection of samples of natural ingredients to the trial stage of the resulting experimental products. The practicum guide product, as a result of the development, is carried out by expert validation and effectiveness testing through student responses as development targets.

Expert Validation

Chemistry education lecturers in organic chemistry and natural materials studies carry out product validation. Content validation includes the suitability of the contents of the guideline with the expected target compound. Validation is also carried out on the ability of practicum guides to create creative laboratory learning. Students are encouraged to be creative in creating a product with the resulting compounds and essential oils. In the guide, students are also encouraged to be able to modify the procedures in the guide with the same level of success in producing products.

The validator's response was analyzed using Aiken's V method [8]. Product validity level can refer to the following criteria.

Table 1. Aiken's V Validation Criteria

Interval	Criteria
0 – 0.20	Very invalid
0.21 – 0.40	Invalid
0.41 – 0.60	Less valid
0.61 – 0.80	Quite valid
0.81 – 1.00	Very valid

Product development can be applied if it meets the minimum valid criteria in the range of 0.61-0.80. Practicum guidelines are also analyzed for the level of practicality with the criteria in Table 2 [9].

Table 2. Practicality level criteria

Value Range	Criteria
$80\% < x \leq 100\%$	Very Practical
$60\% < x \leq 80\%$	Practical
$40\% < x \leq 60\%$	Quite Practical
$20\% < x \leq 40\%$	Less Practical
$0\% < x \leq 20\%$	Not Practical

Student Response Validity

A development product is valid if the response percentage is more than 61% [10]. The following formula can obtain the percentage value of the validity of the response.

$$P = \frac{F}{N} x100\%$$

Information:
P : Percentage of response
F : Total score obtained
N : Total score

Reliability

Product reliability is seen from the percentage of approval from expert validators. Products in terms of content are reliable if the approval percentage reaches more than 75% [11].

Practical Guide Effectiveness

The effectiveness of practicum guidelines can be seen in the products produced. This manual provides three types of isolation procedures for medicinal plants. The guide is effective if each experiment obtains the sample's target compound and essential oil. Compounds and active substances are seen based on laboratory test results.

RESULTS AND DISCUSSION

The natural and cultural wealth is a great advantage in learning for the people of NTB. Various medicinal plants are used in traditional medicine and cultural specialties. Local wisdom-based learning makes learning more innovative and interactive in laboratory activities [12]. Student experiments grow a lot of cognitive and non-cognitive competencies. Try and error in the experiment fosters a critical, creative, and collaborative attitude in problem-solving. The development results are described in the development model applied, namely define, design, develop, and disseminate.

Define

The demands of 21st-century competence make the basis for innovation in developing Sasambo medicinal plants in classroom learning. Medicinal plant samples used in the development were Kencur, Monte Sumbawa, and cloves. The people of Sasambo, NTB, widely used these plant samples. Sampling was also based on differences in the characteristics of essential oils, which are active substances in plants.

Design

Innovation in developing practicum guidelines is equipped with brief and clear pictures and procedures. Students more easily understand the procedures that are equipped and pictures. Pictures of tools and results of isolation make chemistry learning more real. Abstract and microscopic nature can clarify the concept by visualizing the product images produced [13].

Develop

The development stage is producing prototypes from material analysis and research design results. Prototypes of practicum guidelines are arranged in a systematic, clear procedure, equipped with pictures of tools and isolated products. Students will more easily follow the procedure and avoid errors in the experiment. The prototype was validated for content suitability by an expert validator regarding the Sasambo concept, literature review, clarity of isolation procedures, and creative activity. The results of expert validation with Aiken's V analysis can be seen in Table 2.

1. Expert Validation (Construct Validity)

The concept of sasambo in practicum guidelines is to foster an attitude of preserving the surrounding culture. Sasambo medicinal plants in laboratory activities encourage student innovation in producing local products with high purchasing power. Essential oils are popular enough to be marketed on an industrial scale. Practicum guidelines provide a basic description of isolating oils and active substances from various medicinal plants. The results of the isolation can be utilized in various types of products. The concept of Sasambo medicinal plants makes learning more real and easy to understand.

Table 2. Results of Aiken's V analysis

Aspect	Nilai Aiken's V	Criteria
Design And Systematics	0.86	Very valid
Sasambo concept	0.79	Quite valid
Literature Research	0.83	Very valid
Clarity of Isolation Procedures	0.87	Very valid
Creative Activity	0.92	Very valid

Table 2 shows that all components of the practicum guideline aspect show an average value of Aiken's V of 0.86 with very valid criteria. In terms of construction, practicum guidelines can be applied and have accuracy in producing essential oil products.

The guidelines have valid isolation procedures to produce products with a low error rate. Guidelines are the results of research as outlined in practicum guidelines. Procedures are structured in language that is easy to understand and processes that are easy for students to follow. Students can develop their procedures by replacing medicinal plant materials from the surrounding environment. The procedure can be carried out by paying attention to the insulating material. Materials used in isolation have a distinctive odor (essential oils). Students can try various medicinal plants according to the needs and benefits of these materials. This activity can foster students' innovative attitudes in producing new products and can be developed in learning [14]. A creative attitude is very important as a capital for prospective teachers in implementing innovative learning in schools.

2. Practical practice guidelines

The results of the practicality analysis of experts show that practicum guidelines have a very practical level of practicality with a percentage of 90%. A high level of practicality makes it easier for students to carry out experiments with maximum results [15-16]. Attractive design, clear procedures, and encouraging activities make students more effective in laboratory activities. The practical level in each aspect can be seen in Table 3 below.

Table 3. Practicality Level Criteria

Aspect	Percentage (%)	Criteria
Design and writing systematics	90	Very practical
Sasambo society concept	90	Very practical
Literature review content	87	Very practical
Clarity of isolation procedures	89	Very practical
Encourages activity creative	93	Very practical

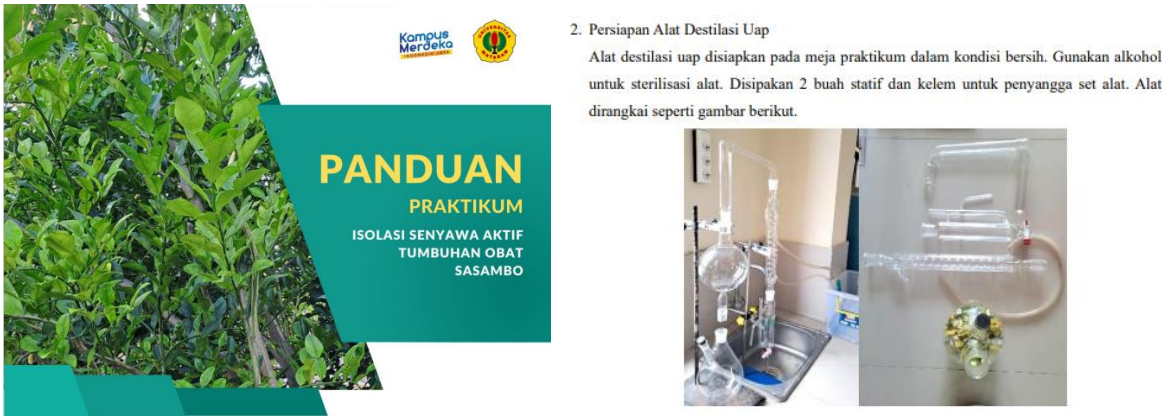

Figure 1. Display of the development of practicum guidelines

3. Student Response

The practical guidelines for sasambo medicinal plants received a positive response from chemistry education study program students. Students are enthusiastic about assembling tools to isolate essential oils from medicinal plants. Student responses to the practicum guidelines developed as a result can be seen in Figure 2. The average percentage of student responses is 86.9%. This study's results align with research which showed that student responses to all aspects were above 70% [17], meaning that aspects of learning devices were responded to positively by students (Figure 2).

4. Reliability

Practical guidelines for sasambo medicinal plants can be applied based on a percentage *agreement* of 100%. The guidelines have fulfilled all aspects of the assessment. However, it is only necessary to add a flow chart to make it easier for students to understand the essential oil isolation procedure. Practicum guidelines are prepared based on the results of laboratory experiments. It is confirmed that the isolation procedure can produce the active compound ethyl p-methoxycinnamate (EPMS) from Kencur and essential oils from medicinal plants. Compound isolation in the guidelines only targets EPMS compounds from Kencur. Other medicinal plants do not apply. The essential oil isolation procedure can be applied to all medicinal plants with distinctive aromas.

Dissemination

Development practicum guidelines are applied to small groups of natural product chemistry courses. Guidelines make students more active and collaborate in working on isolation projects. Students are divided into three groups with different topics. The isolated samples are medicinal plants from the Sasambo tribe: Kencur, Monte Sumbawa, and cloves. The effectiveness of practicum guidelines can be seen in the results of laboratory activities. The results of the isolation of the active substance of essential oils can be seen in Figure 3.

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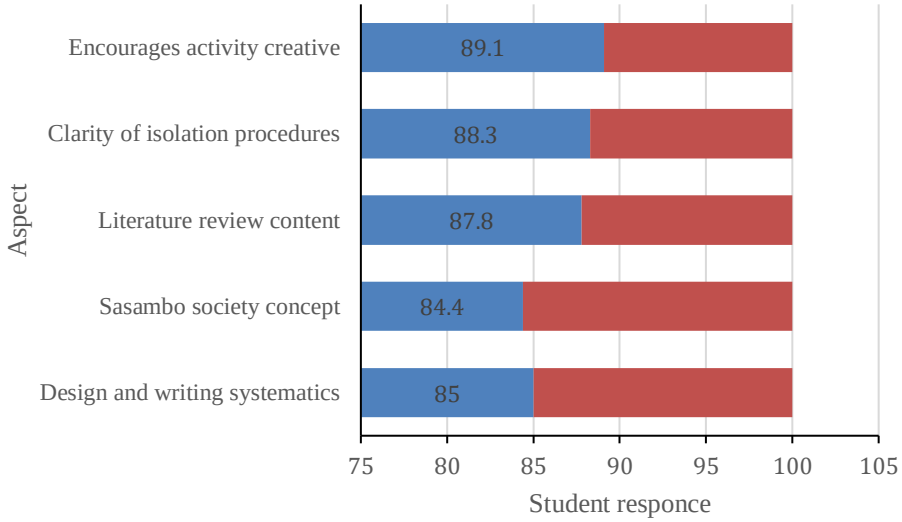

Figure 2. Student Responses

Figure 3. Product isolation of the essential oil of the Sasambo medicinal plant

Figure 3 shows that each group can produce essential oil products. The difference in the amount of essential oils depends on the content of essential oils in the samples of medicinal plants. Each sample contains oil with different capacities. The isolation of the cancer compound produced 10% crystals of the ethyl p-methoxycinnamate compound [18-20], monte sumbawa produced 5% essential oil, and cloves produced 12% clove oil. The resulting product shows that the guidelines developed are effective and can be applied on a wide scale in laboratory activities.

CONCLUSION

Developing practical guidelines for sasambo medicinal plants is based on experimental results data developed to become practicum guidelines. Based on laboratory results and development data analysis, practicum guidelines can be applied in laboratory learning with Aiken's V score in all aspects of 0.86, with a very valid category. The guidelines have a high level of practicality, with a percentage of 90% in the very practical category, and positive responses from students, with a percentage of 86.9%. Practical guidelines based on Sasambo medicinal plants can be a reference for students in isolating active compounds and essential oils. Students are encouraged to produce local medicinal plant products more actively and creatively.

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