

## **THE EFFECT OF MASERATION TIME VARIATION ON THE FORMULATION OF DEODORANT SPRAY FROM BASIL LEAVES (*Ocimum basilicum* L.)**

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### **ABSTRACT**

This study evaluated the effect of maceration time variation on the characteristics of basil leaf extract (*Ocimum basilicum* L.) and the performance of deodorant spray preparations containing the extract. Maceration was carried out using 96% ethanol for 2, 3, 4, 5, and 6 days. The extract was then formulated into a deodorant spray at concentrations of 5–25% (v/v). The parameters observed included yield, pH, antibacterial activity against *Staphylococcus epidermidis* (colony count/CFU method), and organoleptic testing (color, aroma, and after feel) by 25 panelists. The yield increased with maceration time from 8.64% (day 2) to 10.82% (day 6). The pH value of the preparation was 4.9–5.2, in accordance with SNI 16-4951-1998 and close to the physiological pH of the skin. Commercial deodorants reduced the number of bacterial colonies by 50%, while basil extract deodorants reduced it by 20% in the test concentration range. Organoleptically, the 15% concentration was most preferred by the panelists. These findings indicate that basil extract has potential as an active ingredient in natural spray deodorants; optimization of concentration, formulation base, and further statistical testing are recommended to enhance antibacterial efficacy.

**Keywords:** *Deodorant Spray, basil leaves, Ocimum basilicum L., maceration, antibacterial, organoleptic.*

## **1. INTRODUCTION**

### **1.1 Background**

Indonesia has a tropical climate with high temperatures and humidity, which triggers perspiration and increases the risk of body odor. Synthetic antiperspirants and deodorants are commonly used, but some consumers are concerned about the potential side effects of certain chemicals. Natural-based alternatives are attractive if they are safe, effective, and acceptable to users.

Basil (*Ocimum basilicum* L.) is known to contain essential oils (mainly linalool) and flavonoids that have been reported to have antibacterial activity against bacteria that cause body odor, including *Staphylococcus epidermidis*. However, the effectiveness of deodorant preparations made from basil extract is greatly influenced by the quality of the

extract, which is determined in part by the maceration time. Optimizing the maceration time is expected to increase the yield and content of active compounds, thereby improving the performance of the preparation.

Based on this potential, this study was conducted to formulate and test the antibacterial activity of a basil leaf extract-based deodorant spray preparation against *Staphylococcus epidermidis* as an alternative solution for controlling body odor.

## **2. RESEARCH METHODOLOGY**

### **Research methodology**

#### **2.1 Research Location**

The research was conducted at the Chemical Engineering Department Laboratory, Lhokseumawe State Polytechnic from February to June 2025. Activities included preparation of raw

materials, manufacture of Deodorant Spray preparations, testing, data processing, and report writing.

## 2.2 Tools and Materials

### 3.3.1 Constant Variables

1. Basil leaf extraction
  - a. Basil leaves : 500 gram
  - b. Ethanol 96% : 5 Liter
  
2. Deodorant spray preparation
  - a. Etanol 96% (ml) : 20 ml
  - b. Parfume (ml) : 1 ml
  - c. Propilenglikol (ml) : 5 ml
  - d. Gliserin (ml) : 1,5 ml

### 3.3.2 Independent Variables

1. Maceration time  
2 hari, 3 hari, 4 hari, 5 hari, 6 hari
2. Basil Leaf Extract  
5%, 10%, 15%, 20%, 25%

### 3.3.3. Dependent Variables

1. Basil leaf extraction results
  - a. Rendemen ekstrak
2. Deodorant Spray Preparation
  - b. pH Test
    - a. Antibacterial Test

## 2.3 Experimental Design

### 2.3.1 Constant variables

Amount of extraction material (500 g basil leaves with 5 L of 96% ethanol), and basic deodorant spray formulation (20 mL ethanol, 1 mL perfume, 5 mL propylene glycol, 1.5 mL glycerin).

### 2.3.2 Independent variables

Maceration time (2–6 days), basil leaf extract concentration (5%, 10%, 15%, 20%, 25%).

### 2.3.3 Dependent variables

Extract yield, pH, antibacterial activity, and organoleptic results.

## 2.4 Experimental Procedures and Testing

### 2.4.1 Maceration

500 g basil powder (60/80 mesh) + 5 L ethanol (1:10 w/v), soaked for 2–6 days, stirred daily, filtered, solvent

evaporated with a rotary evaporator.

### 2.4.2 Yield

$\% = (\text{dry extract mass} / \text{dry herb mass}) \times 100.$

Example:

$$43.2 \text{ g}/500 \text{ g} \times 100 = 8.64\%.$$

### 2.4.3 Formulation

(batch 50 or 100 mL; write your total final volume): extract (according to %), 96% ethanol 20 mL, propylene glycol 5 mL, glycerin 1.5 mL, perfume 1 mL, distilled water ad 100 mL; homogenization.

### 2.4.4 pH

Measurement using a calibrated pH meter (pH buffers 4.01 and 7.00).

### 2.4.5 Antibacterial

*S. epidermidis* standard culture; colony count method (CFU/mL) pre- and post-exposure; uniform contact time (e.g., 5 minutes), controlled temperature and humidity

### 2.4.6 Organoleptic (25 panelists)

Hedonic scale 1–5 for color, aroma, aftertaste; panelist inclusion criteria  $\geq 20$  years old, healthy skin; ethics: informed consent.

## 3. RESULTS AND DISCUSSION

### 3.1 Extract Yield

Table 3.1 shows that the extract yield increased with the duration of maceration, from 8.64% (day 2) to 10.82% (day 6). The yield graph shows a positive linear trend. This indicates that the longer the solvent is in contact with the crude drug, the more active compounds are extracted. However, excessive maceration time has the potential to reduce the quality of the extract due to degradation of the active compounds.

Tabel 3.1 Data on Basil Leaf Extract Yield Results

Sampel	Maceration Time (Days)	Material Weight (g)	Extract Weight (g)	Yield (%)
1	2	500	43.2	8.64 %
2	3	500	46.7	9.34 %
3	4	500	49.5	9.90 %
4	5	500	51.8	10.36 %
5	6	500	54.1	10.82 %

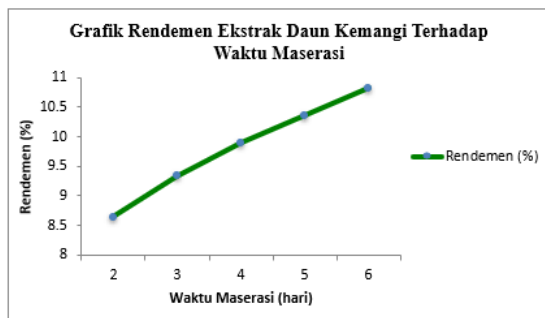


Figure 3.1 Graph of Basil Leaf Extract Yield Against Maceration Time

### 3.2 pH of Deodorant Spray

The pH value was in the range of 4.9–5.2, which is still within the safe standard according to SNI (3–7.5) and close to the physiological range of human skin (4.5–5.5). This indicates that the deodorant spray formulation is chemically stable and safe for topical application. Variations in maceration time and extract concentration did not have a significant effect on pH.

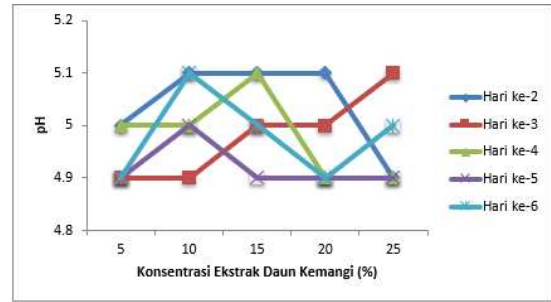


Figure 3.2 pH Testing of Basil Leaf Deodorant Spray Preparations

### 3.3 Antibacterial Activity

The test results show that basil leaf extract deodorant spray can reduce the number of bacterial colonies by up to 20%, while commercial deodorants can reduce it by up to 50%. Although the antibacterial activity of herbal deodorants is lower, these results prove the potential use of basil extract as a natural antibacterial agent. The relatively low effectiveness is likely due to the suboptimal concentration of the extract and the stability of the active compounds.

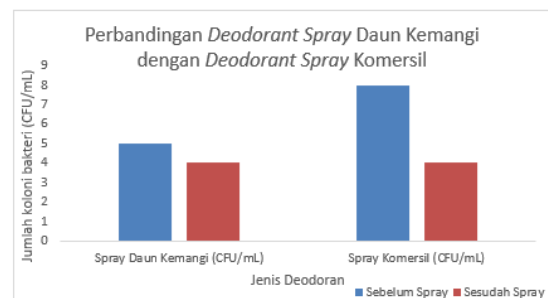


Figure 3.3 Comparison of Basil Leaf Deodorant Spray with Commercial Deodorant Spray

### 3.4 Organoleptic Test

a. Color The panelists preferred the formulation with an extract concentration of 10–15% (21–22%), because it produced an attractive color without being too intense. High concentrations (20–25%) produced a darker color that was less preferred.

#### 4. Conclusion

Based on the results of research on the formulation and testing of Deodorant Spray made from basil leaf extract (*Ocimum basilicum* L.), the following conclusions can be drawn:

1. Effect of Maceration Time on Deodorant Spray Variations in maceration time of 2–6 days showed that the longer the maceration time, the higher the yield of basil leaf extract produced. The highest yield was obtained at a maceration time of 6 days, which was 10.82%. Extending the maceration time did not significantly affect the pH of the preparation, which remained within the safe range (4.9–5.2), but had the potential to increase the content of active compounds that could contribute to the effectiveness of the Deodorant Spray.

2. The Effect of Variations in Basil Leaf Extract Concentration on Deodorant Spray Variations in basil leaf extract concentration (5–25%) affect the sensory characteristics and antibacterial activity of Deodorant Spray. A concentration of 15% provided the best balance between aroma, color, and After Feel, which was most preferred by the panelists, and produced fairly good antibacterial activity with a

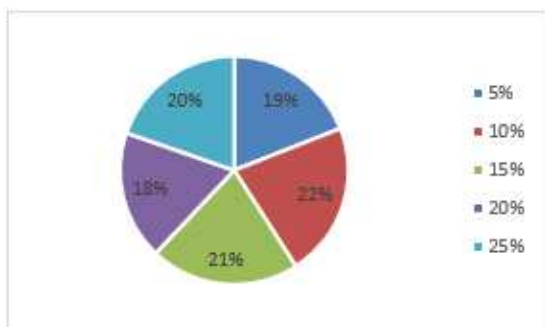


Figure 3.4 Pie Chart of Organoleptic Test Results for Deodorant Spray Color by Panelists

b. Aroma The most preferred aroma was found at an extract concentration of 15% (22%). Low concentrations (5–10%) were considered too weak, while high concentrations (20–25%) produced a pungent aroma.

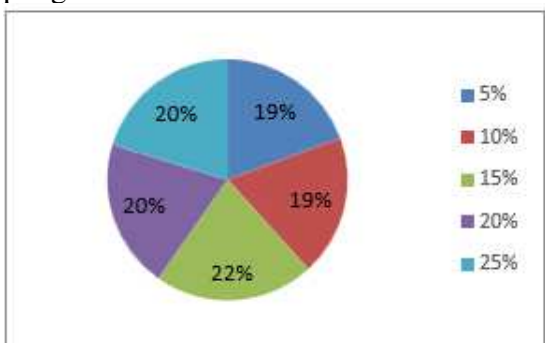


Figure 3.5 Pie Chart of Organoleptic Test Results for Deodorant Spray Fragrance by Panelists

c. After Feel The test results show that the majority of panelists felt a fresh sensation, quick drying, and non-sticky at a concentration of 15%, so this formulation is considered the most comfortable to use.

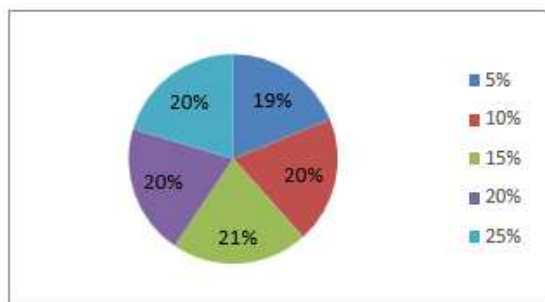


Figure 3.6 Pie Chart of Organoleptic Test Results for After-Feel Deodorant Spray by Panelists

20% reduction in bacterial colonies. All formulations remained physically stable and met SNI pH standards, making them safe for use on the skin.

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