Jurnal Reaksi (Journal of Science and Technology)
Jurusan Teknik Kimia Politeknik Negeri Lhokseumawe
Vol. 22 No.02, Desember 2024 ISSN 1693-248X

THE INFLUENCE OF YLANG-YLANG ESSENTIAL OIL (cananga odorata) AND VIRGIN COCONUT OIL (VCO) ON THE CHARACTERISTICS OF HAND & BODY LOTION

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ABSTRACT

This study aims to explore the influence of ylang-ylang essential oil (Cananga odorata) and virgin coconut oil (VCO) on antioxidant, antibacterial, and organoleptic properties in the production of hand & body lotion. Ylang-ylang oil is known for its various health benefits, including antioxidant and antibacterial properties, while VCO is increasingly popular as a functional food oil with anti-inflammatory and antimicrobial properties. The methods used include distillation to produce essential oil, followed by physical characteristic analysis and effectiveness testing. Lotion formulation was conducted with varying proportions of essential oil and VCO. Tests conducted include antioxidant testing using the DPPH method, bacterial testing to determine antibacterial effectiveness, and organoleptic testing to evaluate the fragrance and moisturizing properties of the lotion. The research results showed that lotion formulations with specific proportions of ylang-ylang essential oil and VCO produced significant antioxidant activity, with IC50 values indicating strong antioxidant potential. In addition, bacterial tests showed that the lotion was effective in reducing bacterial colony counts, meeting microbial contamination standards according to SNI. Organoleptic test results showed a positive preference from panelists for the fragrance and moisturizing properties of the lotion, with some samples receiving excellent ratings.

Keywords: Essential Oil, Ylang-Ylang Flower, Virgin Coconut Oil (VCO), Hand & Body Lotion, Antioxidant, Antibacterial, and Organoleptic Testing.

1. INTRODUCTION

Ylang-ylang flowers originating from Indonesia, especially Bali, specifically the Cananga odorata forma macrophylla species, can produce ylang-ylang oil (Luqman & Rahmayanti, 1994). Ylang-ylang oil is an essential oil with a distinctive floral aroma and a color ranging from light to dark yellow. Typically, ylang-ylang essential oil is obtained by isolating the flowers through steam distillation. The largest production center for ylang-ylang plants is located in the Purwodadi district, covering an area of more than 220 hectares. In this production center, there are processing units that utilize ylang-ylang flowers to produce essential oil. Ylang-ylang essential oil contains compounds believed to have effects such as linalool, geraniol, and eugenol (Sudraji, Prijadi, & Austin, 2007). Ylang-ylang oil, obtained from the flowers of Cananga odorata forma macrophylla, offers various health and wellness benefits. Its distinctive aroma can relieve stress and provide a calming effect, which has been associated with aromatherapy (Luqman & Rahmayanti, 1994). Active compounds such as linalool and eugenol in ylang-ylang oil possess anti-inflammatory and antiseptic properties, making it a traditional remedy in some cultures for headaches, stomachaches, and

respiratory issues (Sudraji, Prijadi, & Austin, 2007).

Ylang-ylang oil also offers skin care benefits, with its ability to moisturize the skin, reduce inflammation, and support the healing process (Cahyadi, 2010). Additionally, ylang-ylang oil has antiseptic and antioxidant properties, providing skin protection from infections and combating free radicals (Sudraji et al., 2007). In the context of aromatherapy, ylang-ylang oil is known for its aphrodisiac properties, which can enhance intimacy and attraction (Sudraji et al., 2007). Moreover, ylang-ylang oil has been recognized as a natural mosquito repellent, offering protection against mosquito bites and other insects (Luqman & Rahmayanti, 1994).

Virgin Coconut Oil (VCO) is increasingly popular as a functional food oil due to its various health benefits and medicinal properties. VCO is extracted from fresh coconuts, not copra, and is produced through a process that does not involve direct heating, preserving its chemical composition and nutritional value (Handayani et al., 2008). Furthermore, VCO has been shown to have anti-inflammatory, analgesic, and antipyretic activity, making it a potential natural remedy for various inflammatory conditions (Intahphuak et al., 2009).

Body lotion has significant benefits in caring for and maintaining human skin health. It is a skincare product specifically designed to provide extra moisture to the skin, addressing dryness and maintaining elasticity. Body lotion can also help smooth and nourish the skin, making it feel softer and healthier. Research by Oyetakin-White et al. (2010) noted that regular use of body lotion can improve skin moisture and help maintain skin integrity. The study also showed that the use of body lotion can play an important role in improving comfort and quality of life, especially for individuals with dry or sensitive skin problems.

The background of this study is supported by previous research conducted by Putu Ayudina Asti Puspita, Ni Luh Arpiwi, and Ni Wayan Sudatri in 2022. Their research focused on exploring the protective effects of ylang-ylang essential oil (Cananga odorata) in lotion preparations. The results showed that the yield of ylang-ylang essential oil reached 0.63%, while a lotion formulation with a 5% concentration provided the highest protection. This formulation was not only effective in protection but also favored by test subjects, with a high preference for the lotion containing 5% ylang-ylang essential oil. This preference might have been influenced by the fragrance or unique characteristics imparted by the essential oil in the lotion.

Additionally, this study's background is enriched by earlier research conducted by J.J. Setia Budi, N.L. Yuli Damayanti, Y. Rama Dhani, and N.P. Antari Dewi in 2018. Their research focused on the extraction and characterization of ylang-ylang essential oil (Cananga Odorata) and its application in lotion and perfume formulations. This research also demonstrated that ylang-ylang essential oil, when applied to lotion at a 7.5% concentration and perfume at a 20% concentration, was effective in these formulations. Both formulations showed 100% effectiveness in achieving the desired outcomes. Therefore, the previous research findings provide evidence that ylang-ylang essential oil has potential as an effective active ingredient in lotion and perfume formulations. These findings provide a strong foundation for further exploration in product development involving ylang-ylang essential oil.

Based on the above description, in this study, distillation was carried out to produce ylang-ylang essential oil. The use of distillation is expected to isolate volatile components. To determine the quality of ylang-ylang essential oil, its physical properties were characterized according to

SNI 09-3949-1005, including color, odor, refractive index, and specific gravity. The composition of ylang-ylang essential oil was analyzed using GC-MS to identify its chemical compounds. The effectiveness of ylang-ylang essential oil was evaluated by applying it in the form of lotion.

RESEARCH METHOD

Material and Equipment

Body lotion can be made using the following ingredients: Cocoa butter: 5 g, Beeswax: 30 g, Virgin Coconut Oil (VCO): 25 mL, Polysorbate: 20 mL, Cetyl Alcohol Emulsifier: 3 mL, Methyl paraben: 0.2 mL, and Ylang-ylang oil: 25 mL. The equipment used in this study includes a glass beaker, 1 mL bottles, funnel, stirrer, electric heater with a stirrer, measuring glass, scale, pipette, volumetric pipette, density meter, dish, stand, Erlenmeyer flask, filter paper, viscometer, burette, 1 unit of steam distillation apparatus, and 1 unit of extraction apparatus.

Body Lotion Production

In the production of hand and body lotion, the main ingredient composition involves 5 grams of cocoa butter, 30 grams of beeswax, and 25 mL of Virgin Coconut Oil (VCO). The process begins by mixing these three ingredients and heating them at 50°C, followed by homogenization. All ingredients are stirred thoroughly to ensure uniformity in the resulting lotion. It is important to note that the given percentages may need to be recalculated to ensure formulation accuracy, and during production, safety and stability tests are recommended to ensure that the product meets applicable cosmetic safety standards (Yuniarti et al., 2021).

Testing

For the antioxidant test, the body lotion to be tested is prepared along with a positive control, such as vitamin E. The DPPH method is used to measure the lotion's ability to neutralize free radicals by mixing the lotion sample into a DPPH solution and measuring its absorbance. The results are compared to the positive control to assess the antioxidant effectiveness.

Next, a bacterial test is conducted by preparing nutrient agar media and testing the antibacterial ability of ylang-ylang. After sterilizing a cotton swab, bacteria are collected from the hands and applied to the agar media. The petri dishes with bacteria are then incubated to count the colonies that grow.

Lastly, the organoleptic test involves assessing the lotion's color, aroma, and texture by 25 panelists, with data collected through questionnaires to evaluate consumer acceptance of the product.

3. RESULT AND DISCUSSION

Effect of Ylang-Ylang Essential Oil Concentration on Virgin Coconut Oil in Bacterial Testing

Figure 1. Bacterial Test Analysis Results Before Using Hand Body Lotion Sample

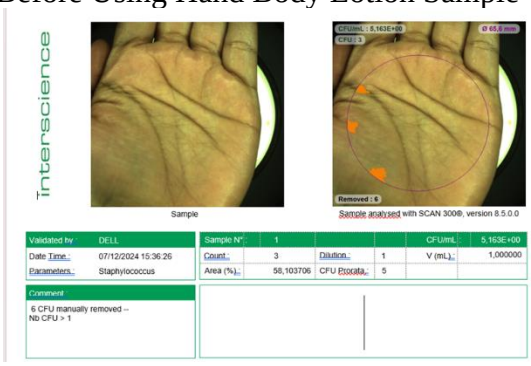

Figure 2. Colony Counter Analysis Results on 8 ml Sample of Essential Oil with 20% VCO

The bacterial test analysis results showed that the hand and body lotion sample with a combination of 8 mL essential oil and 20 mL VCO was the most effective.

Before application, the bacterial colony count reached 13 colonies CFU/gram, while after application, the colony count decreased to 3 colonies CFU/gram. This demonstrates the lotion's effectiveness in reducing bacteria, and the results meet the microbial contamination standards set by SNI, which establishes a maximum limit of 3 CFU/gram.

Antioxidant Test Analysis

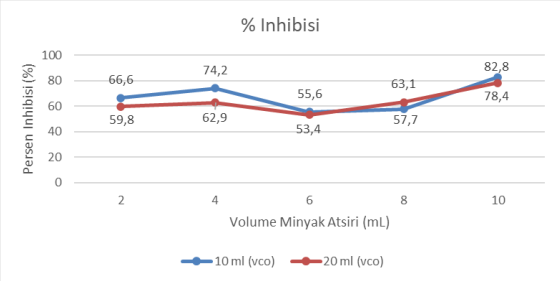

Figure 3. Analysis Results of % Inhibition in Antioxidant Test with 2, 4, 6, 8, 10 ml Essential Oil on 10 and 20 ml VCO in Hand Body Lotion Samples

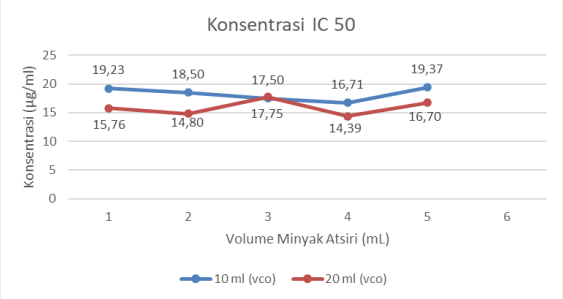

Figure 4. Analysis Results of IC50 Activity in Antioxidant Test with 2, 4, 6, 8, 10 ml Essential Oil on 10 and 20 ml VCO in Hand Body Lotion Samples.

Based on Table, it is known that as the concentration increases, the absorbance of the sample decreases, and the % inhibition increases. The percentage of inhibition increases as the concentration of the sample increases because more compounds in the sample inhibit DPPH free radicals. The percentage of inhibition (% antioxidant activity) is one of the parameters that indicate the ability of an antioxidant to inhibit free radicals.

The IC50 value represents the effective concentration of the extract required to reduce 50% of the total DPPH, so the value of 50 is substituted for the y value. After substituting the value of 50 for the y value, the x value is obtained as the IC50 value.

Based on, the IC50 values from all body lotion sample variations show IC50 values of less than 50. According to the IC50 parameter in Table 4.1, this indicates that the body lotion is a very strong antioxidant (IC50 value <50). For the 10 ml VCO variation, the 8 ml essential oil variation shows the best IC50 value of 16.71, and for the 20 ml VCO variation, the 8 ml essential oil variation shows the best IC50 value of 14.39.

A compound is considered a very strong antioxidant if the IC50 value is less than 50, strong (50-100), moderate (100-150), and weak (151-200). The smaller the IC50 value, the higher the antioxidant activity (Badarinath, 2010).

The difference in IC50 values may be due to the amount of antioxidants contained in the body lotion. In the 10 ml VCO variation with 8 ml essential oil, and the 20 ml VCO variation with 8 ml essential oil, there is a decrease in the IC50 value. This occurs due to the degradation of antioxidants in the extract, influenced by the extended contact time between the active compounds and the solvent, with the temperature increasing due to prolonged heating.

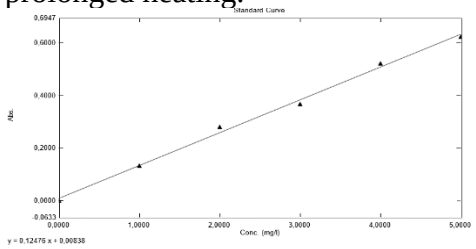

Figure 5. Standard Curve of IC50 Concentration in Antioxidant Test

The antioxidant test using the DPPH method showed that the higher the concentration of essential oil, the lower the absorbance and the higher the percentage of inhibition, indicating the lotion's ability to neutralize free radicals. The IC50 values of all tested samples were below 50, indicating that the

lotion has very strong antioxidant activity. The variation with 10 mL VCO and 8 mL essential oil showed the best IC50 value at 16.71, while the variation with 20 mL VCO also showed a good IC50 value at 14.39. The decrease in IC50 values may be influenced by antioxidant degradation due to prolonged contact with the solvent.

Organoleptic Test Results

The organoleptic test for aroma involved 30 panelists. The results showed that HBL 19 was the most preferred sample, with an average score of 4.5, while HBL 1 and HBL 2 had lower aroma preferences, with averages below 2.0. Panelists' aroma assessments provided important information for product development that aligns with consumer preferences.

Moisture tests were also conducted using the same parameters, and the results indicated that most panelists preferred products that provided good moisture, with average scores showing positive preferences. These results demonstrate the lotion's potential to meet consumer demands for a product that is not only functionally effective but also sensorially pleasing.

CONCLUSIONS

The conclusion from the analysis and testing results indicates that the formulation of hand and body lotion with 10 mL VCO and varying volumes of essential oil exhibited higher antioxidant effectiveness compared to the use of 20 mL VCO. This suggests that using a smaller amount of VCO can enhance the effectiveness of the essential oil in providing antioxidant effects, as a larger volume may dilute the active compounds.

Additionally, the organoleptic test revealed aroma preferences among the panelists, with some samples showing higher average scores, indicating that the aroma of those products was more favored. These findings highlight the importance of formulating aromas that align with consumer preferences in cosmetic product development, to increase the product's appeal and acceptance in the market.

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