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

FORMULATION AND CHARACTERISTICS OF SOLID PERFUME FROM LEMONGRASS OIL WITH VARIATION BEESWAX AND ESSENTIAL OIL

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ABSTRACT

The potential availability of abundant essential oil plants in Indonesia is very beneficial for the community. One of the essential oil plants that can be utilized for its potential is citronella. Citronella oil can be formulated into solid perfume as an innovation to replace liquid perfume. This study aims to formulate and characterize solid perfume from various variations of beeswax concentration (30%, 40%, 50%), citronella (1%, 3%, 5%) and several note parfume. The solid perfume was characterized by observing the density value, boiling point value, organoleptic test and functional group test. The results showed that the highest density value of 0.9786 gr/ml and the melting point value of 69°C were in the 50% beeswax formulation and 1% citronella oil concentration. The lowest solid perfume density value of 0.9350 gr/ml and melting point value of 61°C were in the 30% beeswax formulation with 5% citronella oil concentration. FT-IR testing results, the solid perfume produced has the same functional groups in the mixture of raw materials made. This indicates that no new compounds are formed. The results of organoleptic testing show that solid perfume with 40% beeswax composition and 1% concentration is the most preferred.

Keywords: *Solid Perfume, Citronella Oil, Beeswax, Density*

1. INTRODUCTION

Indonesia has various types of plants and herbs that can produce oils called vegetable oils. Essential oil is one type of vegetable oil that is multifunctional, both as a fragrance and as a medicine. Essential oils have characteristics in the form of liquids at room temperature, are volatile and have a distinctive aroma. (Anny, et al, 2019).

Citronella oil is one of the most prospective essential plant commodities among the 12 essential oils exported by Indonesia. Demand for citronella oil is increasing from year to year. The export growth of citronella oil is quite high ranging from 9-10%. Based on BPS export data shows that the contribution of citronella oil to essential oil export revenue is around 6.89%, the third largest after patchouli oil (60%) and vetiner oil (12.47%). Aceh Province ranks first as the main producer of citronella oil after West Java, Central Java with production of more than 95% of Indonesia's total production Citronella oil is obtained from distillation techniques because it is easy to operate. (Anny, et al, 2019).

The distillation technique used to obtain citronella oil is vacuum hydrodistillation. Hydrodistillation is a traditional method for producing essential oils. Water distillation or hydrodistillation is one of the oldest and easiest methods. It is used for essential oil extraction. Hydrodistillation is commonly used to isolate essential oils from aromatic and medicinal plants. The conventional method for essential oil extraction is hydrodistillation, in which the essential oil is evaporated by heating a mixture of water or other solvent and plant material followed by vapor liquefaction in a condenser.

Vacuum hydrodistillation is distillation at pressures below atmospheric. The use of the addition of a vacuum pump as a pressure maintainer and the boiling point of the distillation process so as not to exceed the boiling point temperature of water which is 1000C (Syafruddin, et al, 2022). The vacuum distillation method (according to Kirana, et al, 2017) is a separation technique based on differences in very high boiling points, the method used is to lower the pressure lower than 1 atm, so that the boiling point becomes low so that the temperature used to distill does not

need to be too high. The temperature variations used in the distillation process are 50°C, 75°C, and 100°C.

The abundant availability of citronella in the Aceh region can be utilized into derivative products such as perfume, lotion, cosmetics, etc. So that the abundance of citronella oil commodities in Aceh is not only sold in raw form at low prices by economic speculators in the export market.

Derivatives of solid perfume products can be one of the solid perfume derivative products. Solid perfume has been around for a long time, but solid perfume is not as popular as spray perfume, but in terms of smell it is just as good. Solid perfume is generally made from a mixture of fat and wax as a base. Solid perfume has its own advantages such as being made with natural ingredients, not using alcohol which can irritate the skin, more economical, not easy to spill, easy to carry, attractive appearance, easy to use (Anonymous, 2015).

Solid perfume innovation can also be a substitute product for conventional perfumes that contain harmful synthetic chemicals. It turns out that there are more than 500 hazardous chemicals that are the basic ingredients for making fragrances in perfumes. Most come from synthetic chemicals obtained from petrochemicals, and have been shown to contain neurotoxins (toxins that can damage blood vessels or brain nerves). And there are also carcinogenic ingredients (ingredients that are considered to cause cancer). Chemicals contained in perfume or other fragrances are no less dangerous than the dangers of cigarette smoke (Iswara et al, 2014).

Therefore, there is a need for the latest breakthrough innovations in natural perfumes such as solid perfumes. Solid perfume itself has many advantages over conventional liquid perfume. Among them contain natural ingredients that are not toxic or carcinogenic, are biodegradable packaging, and are environmentally friendly because solid perfume products do not contain CFC (chlorofluorocarbon) substances which have an impact on depleting the ozone layer.

As expected, Sherwood Rowland and Mario Malino announced the results of their research on CFC and halon gases that cause damage to the ozone layer. The effect of ozone depletion causes the intensity of ultraviolet light from solar radiation that reaches the earth's surface to be greater (Widowati & Sutoyo, 2009).

2.RESEARCH OBJECTIVES, BENEFITS AND LIMITATIONS

This research focuses on making solid perfume based on the abundant availability of citronella essential oil raw materials in Aceh. This solid perfume will later become one of the first solid perfume breakthroughs in Aceh, especially the city of Lhokseumawe. The formulation of the problem achieved is how the effect of beeswax concentration and citronella oil on organoleptic testing, functional groups and melting point.

The purpose of this study was to determine the effect of beeswax concentration on the quality of perfume produced based on melting point parameters, functional groups and organoleptic testing including texture, aroma and color of the solid perfume produced.

3. RESEARCH METHODS

3.1 Materials

The materials used in this research are beeswax, VCO, shea butter and various other essential oils.

3.2 Methodology

3.2.1 Pembuatan Parfum Padat

Beeswax and vaseline album with various variations are heated in a glass beaker. Added VCO as much as 40% heated in a glass beaker. Melt until perfect. Add citronella oil according to the variation. Stir until well mixed. Next, add essential oil according to the variation of perfume note. Place in a stainless steel tin can and add a label.

3.3 Organoleptic Test

The favorability test of solid perfume preparations with regard to ease of use, texture and aroma by applying. The examination was carried out on the preparation made and applied to the wrist skin. The test was conducted on 30 panelists who referred to SNI 01-2346-2006 regarding organoleptic testing instructions. The

age of the panelists ranged from 15-30 years. The test scale has 5 scales, namely very like, like, quite like, dislike and very dislike.

3.4 Melt Point Test

Observation of melting point test of solid perfume used melting point apparatus. The solid perfume preparation was inserted in a glass capillary tube to form a column at the bottom of the tube with a height of 2.5 mm to 3.5 mm. Heat the tangas to a temperature approximately 10°C below the expected melting temperature, then increase the temperature at a rate of 1° ± 0.5° per minute. The capillary is inserted when the temperature reaches 5° below the lowest expected temperature, continue heating until complete melting. The melting distance is recorded. Beeswax has a melting point of 61-65°C (Rowe et al, 2009). The melting point of solid perfume can refer to SNI 16-4769-1998 which states that the melting point of lipstick ranges from 50-70°C. According to Vishwakarma, et al (2011) that a good lipstick has a melting point above 50°C.

3.5 Analysis of Fourier Transform Infra Red (FT-IR)

Analysis of functional groups carried out in the form of FT-IR (Fourier Transform Infrared) analysis. FT-IR is a test conducted on samples to determine their functional groups using an FT-IR Spectrophotometer. The sample is placed on a plate with a controlled ambient temperature. The analysis was made at a frequency of 4000-400 cm-1 with a resolution of 4 cm-1 and 32 cm-1 scanning. This analysis is done to see whether or not there are new functional groups that indicate the formation of new compounds from the solid perfume products produced.

4. RESULTS AND DISCUSSION

4.1 Analysis of Fourier Transform Infra Red (FT-IR)

Analysis of functional group absorption using a Shimadzu IR Presige-21 FTIR (Fourier Transform Infra Red) tool. The purpose of FT-IR analysis on solid perfume samples is to determine the wavelength and characteristic peaks in the sample and to find out whether the physical mixing of raw materials results in the formation of new compounds.

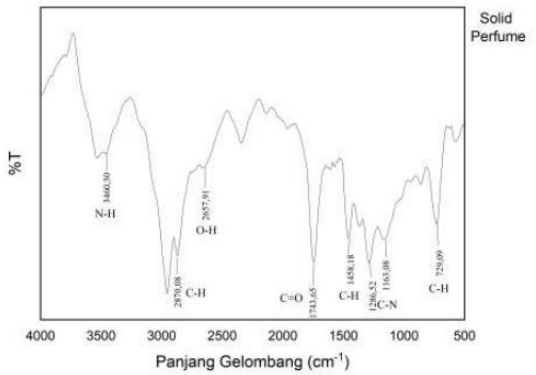


Figure 4.1 Beeswax Function Group Analysis Chart

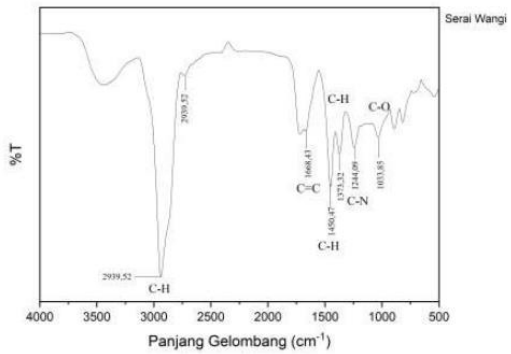
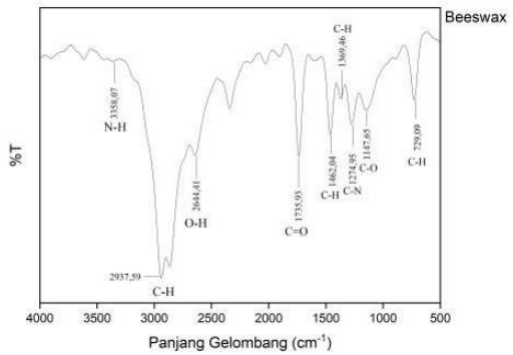


Figure 4.2 Citronella Function Analysis Chart



Fgure 4.3 Solid Perfume Function Analysis Chart

Figure 4.5 shows a graph of the analysis of functional groups of beeswax samples with a wavelength range of 4000-500 cm-1. The N-H functional group, on beeswax, is found at an absorption of 3358.07 cm-1, on solid perfume there is an absorption of 3460.30 cm-1, on

citronella there is an absorption of 2939.52 cm-1. There is a C-H Alkane group shown at an absorption of 2937.59 cm-1 in the beeswax sample, in solid perfume there is an absorption of 2870.08cm-1, in citronella there is an absorption of 2939.52cm-1. The next absorption of O-H hydrogen bonds, on beeswax there is an absorption of 2644.41 cm-1, on solid perfume there is an absorption of 2657.91 cm -1.

The next absorption of C=O aldehyde, on beeswax is found at 1735.93 cm-1, on solid perfume is found at 1743.65 cm-1. In the C-H number absorption, the beeswax is found at an absorption of 1462.04 cm-1, in solid perfume there is an absorption of 1458.18 cm-1, in citronella there is an absorption of 1450.47 cm-1. In the C-N absorption, the beeswax is found at 1274.95 cm-1, the solid perfume is found at 1286.52 cm-1, the citronella is found at 1033.85 cm-1.

Based on the explanation above, the functional groups contained in solid perfume can be seen to be the same as the functional groups contained in beeswax and citronella. It can be concluded that the solid perfumes produced from various raw materials are made by physical mixing, where there are no new functional groups that indicate the formation of new compounds. The functional groups contained in the raw materials have the same results but have different intensities.

4.2 Melt Point Test

Melting point test is one of the solid perfume tests carried out to determine and analyze the appearance of the physical properties of the sample and determine the resistance of solid perfume to temperature. The goal is to know the conditions and temperature of the storage room for solid perfume products. The temperature (obtained) indicates the maximum storage temperature obtained so that the preparation is safe during the process of making, packaging, transporting and storing the preparation (Hilda et al., 2019). The results of the melting point analysis of solid perfume were taken on the preparation of 9 solid perfumes based on different concentrations of beeswax and citronella oil. The melting point value can be seen in the graph below.

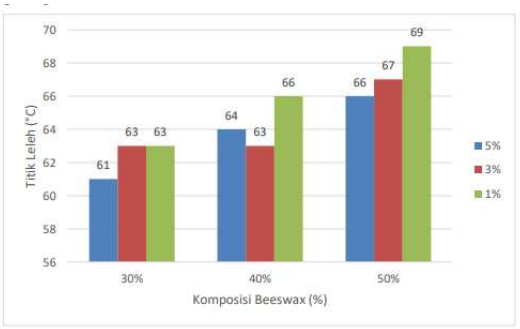


Figure 4.4 Diagram of Effect of Variation of Beeswax and Citronella Oil on Melting Point

4.3 Organoleptic Test

The samples presented for organoleptic testing consisted of 27 solid perfume formulations with various variations in beeswax composition, citronella oil concentration and note parfume. Organoleptic test or commonly called sensory test is a testing method using the five human senses as the main tool for measuring the acceptance of the product. The selection of the best formulation in this study was carried out by panelists based on organoleptic parameters. The organoleptic test involved 15 panelists giving their responses to the solid perfume.

The organoleptic test method was carried out by applying solid perfume on the wrist. Furthermore, panelists were asked to fill out organoleptic evaluation form that has been given by assessing the aroma, texture and color of the solid perfume preparation. In the organoleptic test process, coffee beans are provided to neutralize the sense of smell. After using the product given by applying it to the hand, the assessment is carried out by giving a check mark on the choice of very like, like, somewhat like, less like and dislike.

Parfum Padat	Uji Organoleptik		
	Tekstur	Warna	Aroma
A1	3	3,2	3,2
A2	3,2	3,5	3,2
A3	3	3,6	3,5
A4	2,9	3,6	3,8
A5	3,5	3,6	3,6
A6	2,9	3	3,5
A7	2,8	3,2	3,4
A8	2,7	3,5	3,2
A9	3,2	3,4	3,4
B1	3,1	3,2	3,6
B2	3,2	3,2	3,6
B3	3	3	3,6
B4	3,9	3	3,2
B5	3,6	4,6	3
B6	3,4	3,4	2,8
B7	3,5	2,8	3,4
B8	3,4	2,7	3,2
B9	3,2	3,2	3,2
C1	3,3	2,7	3
C2	3,5	2,7	3,2
C3	3,6	2,7	3,4
C4	3,2	2,2	2,9
C5	3,6	2,5	2,8
C6	3	2,5	2,7
C7	3,2	2,3	3,5
C8	2,8	2,3	2,9
C9	2,9	2,4	2,8

Figure 4.5 Observation Data of Average Value of Solid Perfume Organoleptic Test

In figure 4.5, the results of organoleptic testing on 27 solid perfume preparations were observed based on texture, color and aroma. The most preferred texture average value was obtained in the solid perfume preparation in code B4 with 40% beeswax composition and 1% citronella oil. Panelists stated that the solid perfume preparation produced had the characteristics of a soft solid perfume (smooth).

Observation of color obtained the most preferred color by panelists in solid perfume preparations with code B5 with a composition of 40% beeswax and 3% citronella oil. The characteristics of perfume color stated by panelists in solid perfume preparation code B5 have a milky white color.

Observation of aroma obtained the most preferred aroma by panelists in solid perfume preparations in code A4 with 40% beeswax composition and 1% citronella oil. The characteristics of perfume aroma stated by panelists in solid perfume preparation code A4 have a sweet and soft aroma. Perfume note code A4 uses base note vanilla, middle note chery and top note rose.

CONCLUSION

Based on the results of the study, it can be concluded that the concentration of beeswax is directly proportional to the melting point. Where the higher the concentration of beeswax, the higher the melting point value of the solid perfume produced. The higher the concentration of citronella oil, the smaller the melting point value produced.

The solid perfume produced has the same functional groups in the mixture of raw materials made. This indicates that no new compounds are formed.

In organoleptic testing which includes texture, color and aroma, consecutively interested in codes B4, B5 and A4 are at 40% beeswax composition.

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