

FORMULATION AND PHYSICAL QUALITY TESTING OF CANDLES COMBINING ESSENTIAL OILS OF RED ROSES (*Rose hybrid*) AND WHITE ROSES (*Rose alba*) AS AROMATHERAPY

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ABSTRACT

Background: There are many aromatherapy options on the market, one of which is in the form of aromatherapy candles. Aromatherapy candles are made using several ingredients and use essential oils that have an aromatherapy scent, a combination of red rose and white rose essential oils. These essential oils are used not only for the treatment and prevention of disease, but also for their effects on mood, emotions, and a sense of well-being.

Method: In this experimental study, a comparative test was carried out between 5 concentration variations of red rose and white rose essential oils with F1 = 1%:5% ; F2= 2%:4% ; F3= 3%:3% ; F4= 4%:2% ; and F5= 5%:1% , using the same basis. Then an evaluation was carried out by testing the physical quality of the candle aromatherapy preparations which included organoleptic tests, melting point tests, burn time tests, and hedonic tests.

Result: The organoleptic test on formulas 1 and 5 produced an even color, no cracks and a characteristic odor, but in formulas 2,3 and 4 the color was uneven and there were depressions. In the melting point test, all formulas are within the standard candle time range, namely 540C, the average burn time test is not more than 2 hours and the preference test is on formula 5.

Conclusion: The final result is a formula that meets all testing standards, namely 5%:1% formula 5, in which the ratio of essential oils of red roses and white roses is and the ratio of paraffin and stearic acid is 54%:40%.

Keywords: Formulation, Wax, Essential oil, Aromatherapy

INTRODUCTION

Indonesia is an agricultural country and is one of the essential oil exporting countries. Essential oils are a large group of vegetable oils that are in the form of thick liquids, evaporate easily at room temperature, giving them a distinctive aroma (Dasar & Kimia, 2021).

Essential oils are natural oils taken from immunostimulant plants. A famous medical expert in India called Ayurveda, has also tried using various kinds of essential oils in his medical practice. A similar opinion was also expressed by Theophrastus, that the aromatic substances contained in plants apparently have a good response to the state of mind, feelings and bodily health (Rislianti et al., 2021).

Aromatherapy is an alternative treatment method derived from volatile plant materials, first known in the form of essential oils. Aromatherapy believes that essential oils can be used not only for the treatment and prevention of disease, but also for their effects on mood, emotions and a sense of health (Herawaty, 2021).

There are many aromatherapy options available on the market, one of which is available in the form of aromatherapy candles. Scented candles are not only used because of their fragrance, but also because they can change a person's mood for the better and have benefits including creating a comfortable atmosphere, increasing energy, increasing concentration, reducing stress, and controlling pain. So in the last few months production has

increased by using natural ingredients as an alternative complementary medicine whose popularity is increasing in the world of health (Herawaty, 2021).

Roses are one of the oldest ingredients in the world of perfume. Since ancient times, roses have been known for their fragrant smell. Of the 200 species, potential types as raw materials for essential oils include the red rose *Rosa damascene*. Other species are the rose *Rosa alba* and the pink rose *Rosa centifolia*. The first one has white flowers. Unfortunately, the oil content is lower than red roses (Dasar & Kimia, 2021).

Previously research on combination essential oil candles had been made by (Herawaty, 2021). The results obtained in this research were that the combined concentration of basil leaf essential oil (*Ocimum sanctum* L) and lemongrass essential oil (*Cymbopogon citratus*) had an effect on the physical properties of aromatherapy candles. Another research conducted by (Rusli & Rerung, 2018) stated that patchouli leaf essential oil combined with lime fruit essential oil could be formulated in aromatherapy candles as an anti-mosquito. And according to research (Kurniawati, 2019) the essential oil contained in rose flower extract can be used as a fragrance in cosmetic products, namely perfume. Based on the description of the problem above, the author is interested in conducting research on "Formulation And Physical Quality Testing Of Candles Combining Essential Oils Of Red Roses (*Rose hybrid*) And White Roses (*Rose alba*) As Aromatherapy".

METHODS

1. Types of research

This research uses an experimental research method, namely formulation. In this experimental research, a comparative test will be carried out between the concentrations of essential oils of red roses and white roses with

a ratio of 1%, 2%, 3%, 4% and 5% . Then an evaluation will be carried out by testing the physical quality of the aromatherapy candle preparation which includes organoleptic testing, melting point testing, burning time testing and hedonic testing.

2. Time and Place of Research

The research was carried out in February – June 2023. It was carried out in the pharmacognosy and chemistry laboratory of the Jambi Ministry of Health Polytechnic.

3. Tools and materials

The tools used in this research were analytical scales, metal spatula, beaker, stir bar, measuring pipette, horn spoon, porcelain cup, hot plate, watch glass, thermometer, candle wick, candle glass, tube clamp, dropper pipette, and lighter. fire.

The materials used in this research were Red and White Rose Essential Oils, Stearic Acid, and Paraffin Wax.

4. Ways of working

Making Essential Oils

Weigh 100 grams of sample then extract with 400 ml of ethanol solvent until the sample is submerged, leave for 3x24 hours, stirring periodically. Strain the soak to separate the filtrate and residue. Maceration of red roses and white roses is done separately and is done in the same way. The filtrate obtained is then distilled to separate the oil from the solvent (ethanol). The distillation process is carried out using a temperature of 78°C so that the oil does not evaporate along with the ethanol. This process lasts for ± 3 hours. After that, the resulting oil is evaporated again using an oven to remove any remaining solvent remaining in the oil at a temperature of 78°C. The aim of using this temperature is so that the solvent evaporates because the boiling point of ethanol is 78.4°C (Handayani & Nurcahyanti, 2015). Distillation of red roses and white roses is done separately and in the same way.

Making Aromatherapy Candle Bases

Make aromatherapy candle preparations from stearic acid and paraffin wax

formulations with a ratio of 60%:40% because research results (Rislianti et al., 2021) are the best basic results. And adding a combination of red rose essential oil and white rose essential oil in a ratio of 1%:5% (F1), 2%:4% (F2), 3%:3% (F3), 4%:2% (F4), 5%:1% (F5). According to (Rislianti et al., 2021) The way to make the base is to weigh 40 grams of paraffin wax and 54 grams of stearic acid. Put Paraffin wax and stearic acid into a porcelain cup according to the concentration that has been determined, then melt it completely on a hot plate at a temperature range of 65-84°C. After that, stir and homogenize using a stir stick, wait until the temperature drops to around 55°C, which is the temperature where the Stearic Acid starts to solidify again. then dripped in a combination of red rose oil and white rose oil according to the specified concentration, stirred and homogenized using a stirring rod. Put the liquid wax into a mold that has a candle wick installed in the center and wait until the wax solidifies into a candle.

Physical Properties Test

a. Organoleptic Test (Herawaty, 2021)

Take an aromatherapy candle preparation and observe the shape, color and smell of the preparation.

b. Melting Point Test (Herawaty, 2021)

Put the melted wax into the capillary tube and store it in the refrigerator at 4-10°C for 16 hours, then tie the capillary tube to a thermometer and put it in a 500 ml beaker filled with half water, heat the beaker glass and record the temperature when the wax first drips. from the capillary tube.

c. Burn Time Test (Herawaty, 2021)

Take the aromatherapy candle preparation then burn the candle wick and observe the burning time of the aromatherapy candle until the candle wick burns out. Candle burning time is the time interval that shows how long the candle can burn until it runs out. The burning time is obtained from the difference between the initial burning time and the time when the candle wick burns out (the flame goes out).

d. Hedonic Test (liking) (Herawaty, 2021)

Look for 10 respondents then burn the candle

wick to observe the smell of the wax produced. Testing was carried out in a room with each room containing 1 formula that the respondent did not know. Respondents filled out a questionnaire asking questions regarding their preference for the preparation of essential oil candles from a combination of red roses (Rose hybrid) and white roses (Rose alba) as aromatherapy.

RESULTS AND DISCUSSION

Extraction of red roses and white roses is done by cold method (maceration). The extraction process using the maceration technique is carried out by shaking or stirring several times at room temperature for 3x24 hours. The advantage of this method is that it is easy and does not require heating so there is little chance of the material being damaged or decomposed (Susanty & Bachmid, 2016). The use of 96% ethanol as a solvent is because 96% ethanol can act as a solvent and preservative so that the desired substance can be extracted and is long-lasting. and it is not easy for fungi to grow (Wullur et al., 2012).

After extraction, continue with extracting the essential oil using the distillation method for approximately 3 hours. Because the material is easily damaged by the heating process, in this study the suitable method for extracting rose essential oil was distillation. According to (Damayanti & Fitriana, 2012) this method is very suitable for flower materials, because the nature of the material is not resistant to high temperatures and also damages the oil if it is overheated.

After that, the resulting oil was evaporated again using an oven for 15 minutes to remove any remaining solvent remaining in the oil at a temperature of 78°C. The aim of using this temperature is so that the solvent evaporates because the boiling point of ethanol is 78.4°C.

Based on research carried out in the pharmacognosy laboratory and chemistry

laboratory at the Jambi Ministry of Health Polytechnic, Department of Pharmacy regarding "Formulation and Physical Quality Testing of Candles Combination of Red Rose (*Rose hybrid*) and White Rose (*Rose alba*) Essential Oils as Aromatherapy" the following observation results were obtained:

Table 1. Formulation of Aromatherapy Candle Preparations

| Active ingredients | Formula 1 | Formula 2 | Formula 3 | Formula 4 | Formula 5 |
|--------------------------|-----------|-----------|-----------|-----------|-----------|
| Red rose essential oil | 1% | 2% | 3% | 4% | 5% |
| White rose essential oil | 5% | 4% | 3% | 2% | 1% |
| Stearic acid | 54% | 54% | 54% | 54% | 54% |
| Paraffin wax | 40% | 40% | 40% | 40% | 40% |

Physical Quality Test

1. Organoleptic Test

This test is carried out with the aspect being tested in the form of the physical condition of the wax, which is the same color, not cracked, not deformed and not broken according to SNI 0386-1989-A/II 0348-1980 (Rislianti et al., 2021).

The observation results show that formula 1 and formula 5 comply with the parameters, shown by having a good wax appearance and even color, no defects, cracks and depressions in the wax. If a slight depression forms in the candle, this is normal when making candles. The depression can be overcome with special manufacturing techniques so that depressions do not form during the candle making process. By using the best base according to research (Rislianti et al., 2021) which states that the best base results have been obtained which is F4 where there is 40% paraffin wax and 60% stearic acid.

And for the uneven color of the wax due to the inhomogeneity of the wax base and rose oil, this is because the rose oil used still has residual solvent left behind, due to the limitations of the tools used during the solvent separation process. To homogenize the base and rose oil, an emulsifier can be added. Emulgator is a material that allows all ingredients to be mixed evenly. (Handayani & Nurcahyanti, 2015).

Table 2. Results of Organoleptic Observations on Candles

| Formula | Properties of Wax | Parameter |
|---------|--|--|
| 1 | The wax color is even, does not crack and has a distinctive smell | The color is evenly distributed, no cracks, no defects and no breaks |
| 2 | The color of the wax is uneven, there are no cracks, there are depressions and it has a distinctive smell | |
| 3 | The color of the wax is uneven, there are no cracks, there are slight depressions and it has a distinctive smell | |
| 4 | The wax color is uneven, does not crack and has a distinctive smell | |
| 5 | The wax color is even, does not crack and has a distinctive smell | |

2. Melting Point Test

This test was carried out with the aspect being tested in the form of determining the melting point of aromatherapy wax in accordance with SNI 0386-1989-A/SII 0348-1980 regarding the melting point of wax ranging from 50 to 58°C (Rislianti et al., 2021).

The results obtained from research show a melting of 54°C. This melting point is still within the range of wax melting points based on SNI.

The main raw material for making candles is paraffin. When making candles, using a lot of stearic acid can increase the amount of oleic acid. The greater the amount of oleic acid, the wax formed will have a lower melting point. Adding stearic acid to paraffin wax will lower the melting point of the wax. Continuing with the burning time test, it was carried out by calculating the length of time the candle burned when burned, and the result was that the more stearic acid you eat, the longer the candle will burn. This can also be influenced by the quality of the candle wick, whether it is straight or not straight. However, these observations are in accordance with the theory that stearic acid is used to increase the durability and consistency of the candle flame. The melting point is influenced by the melting point of the wax base used, where the melting point of stearic acid according to Pharmacopoeia III edition is 54°C, while the melting point of paraffin according to Bennet

(1963) is around 42-60°C. (Al Fatina et al., 2021).

Table 3. Melting Point Test Results on Wax

| Formula | Results | Information | Parameter |
|---------|---------|-----------------------|---|
| 1 | 54°C | Meet the requirements | Est the melting point of the wax |
| 2 | 54°C | Meet the requirements | Well said |
| 3 | 54°C | Meet the requirements | if, SNI 06-0386 -1989 range between 50-58°C |
| 4 | 54°C | Meet the requirements | |
| 5 | 54°C | Meet the requirements | |

3. Burn Time Test

This test is carried out with the aspect being tested in the form of The longer the burning time, it shows that the longer it takes for the candle to burn out, the longer the burning time required, the better the quality of the candle (Fatimah, 2016) (Herawaty et al., 2021).

Research results showed that the burning time ranged from 1 hour 55 minutes to 2 hours. The candle with the longest burn time is the candle with formula 3, and the candle with the fastest burn time is the candle with formula 2. However, the difference in burn time between formulas is not that big.

In this study, formula 1 shows a time of around 1 hour 57 minutes, formula 2 shows a time of around 1 hour 55 minutes, formula 3 shows a time of around 2 hours, formula 4 shows a time of around 1 hour 59 minutes and formula 5 shows a time of around 1 hour 57 minutes.

Table 4. Burn Time Test Results on Candles

| Formula | Results | Parameter |
|---------|-------------------|--|
| 1 | 1 hour 57 minutes | Burn time is obtained from the difference between the start time |
| 2 | 1 hour 55 minutes | burnt and time when wicking |
| 3 | 2 hours | The candle burns out (fire goes out) |
| 4 | 1 hour 59 minutes | |
| 5 | 1 hour 57 minutes | |

4. Test Likeability

This test was carried out with the aspect being tested in the form of the panelists' level of preference for the aroma of the candle when it was burned. (Rislianti et al., 2021).

In hedonic testing (likes), a questionnaire was created where the test criteria in the questionnaire contained 4 points, namely; don't like, don't like, like and really like. After testing preferences and continuing with filling in the questionnaire, we obtained a recapitulation of the results most frequently

chosen by respondents, so that was the final result.

The research results showed that the formula that was very liked was formula 5, the formula that was liked was formula 3 and 4, the formula that was less liked was formula 2 and the formula that was not liked was formula 1.

Table 4. Hedonic Test Results (liking)

| Formula | Test Criteria | | Favorite | | Results |
|---------|---------------|------|---------------------|-------------|---------------------|
| | Really like | Like | Do not like it much | Do not like | |
| 1 | 3 | 2 | 1 | 4 | Do not like |
| 2 | 2 | 2 | 4 | 2 | Do not like it much |
| 3 | 2 | 5 | 3 | 1 | Like |
| 4 | 2 | 6 | 2 | 0 | Like |
| 5 | 5 | 3 | 2 | 0 | Really like |

CONCLUSION

There were 4 physical quality tests carried out on aromatherapy candles, namely organoleptic tests on formulas 1 and 5, the candles produced an even color, no cracks and a distinctive smell, but on formulas 2, 3 and 4 the color was less even and there were depressions. In the melting point test all formulas were within the standard candle time range, namely 54°C, the average burn time test was no more than 2 hours and the preference test was for formula 5.

The formula that was very liked was formula 5, whose organoleptic test was in accordance with the standard, the melting point test was still within the standard range, the burn time test was 1 hour 57 minutes and the preference test was very popular with respondents.

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CONFLICT OF INTEREST

There is no conflict of interest.

REFERENCES

- Al Fatina, A., Alifia Rochma, N., Salsabilah, N., Fauzy Eprilyanto, A., Sandy Siswanto, A., Eko Prabowo, E., Iriyanto, F., Rofiqotul Ulfa, L., Aulia, R., Fauziyah, N., Rahmad Rahim, A., & Program Studi Teknologi Pangan, M. (2021). Pembuatan Minyak Sereh Dan Lilin Aromaterapi Sebagai Anti Nyamuk. *DedikasiMU: Journal of Community Service*, 3(2), 837–847.
- Damayanti, A., & Fitriana, E. A. (2012). Pemungutan Minyak Atsiri Mawar (Rose Oil) Dengan Metode Maserasi. *Jurnal Bahan Alam Terbarukan*, 1(2), 8.
- Dasar, F., & Kimia, D. A. N. (2021). Universitas Islam Indonesia Universitas Islam Indonesia. *Ethos : Jurnal Penelitian Dan Pengabdian Kepada Masyarakat*, Vol 7, No., 190–199.
- Handayani, P. A., & Nurcahyanti, H. (2015). Ekstraksi Minyak Atsiri Daun Zodia (*Evodia Suaveolens*) Dengan Metode Maserasi dan Distilasi Air. *Jbat*, 4(1), 1–7.
- Herawaty, N. (2021). Formulasi dan Uji Sifat Fisik Lilin Aromaterapi Kombinasi Minyak Atsiri Daun Kemangi (*Ocimum sanctum* L) dan Sereh (*Cymbopogon citratus*). *Jurnal Ilmiah Farmasi*, 1(1), 1–9.
- Herawaty, N., Prabandari, S., & Susiyarti. (2021). *Minyak atsiri daun kemangi, Minyak atsiri sereh, Lilin aromaterapi, Uji sifat fisik sediaan*. 1(1), 1–9.
- Kurniawati, A. (2019). Pengaruh Jenis Pelarut Pada Proses Ekstraksi Bunga Mawar Dengan Metode Maserasi Sebagai Aroma Parfum. *Journal of Creativity Student*, 2(2), 74–83.
- Rislianti, V. A., Rijai, L., & Aryati, F. (2021). Formulasi Lilin Aromaterapi Berbahan Aktif Minyak Atsiri Sereh Wangi (*Cymbopogon winterianus*) dan Jeruk Lemon (*Citrus limon*). *Proceeding of Mulawarman Pharmaceuticals Conferences*, 14, 312–318.
- Rusli, N., & Rerung, Y. W. R. (2018). Formulasi Sediaan Lilin Aromaterapi Sebagai Anti Nyamuk Dari Minyak Atsiri Daun Nilam (*Pogostemon cablin* Benth) Kombinasi Minyak Atsiri Buah Jeruk Nipis (*Citrus auratifolia* Swingle). *Jurnal Mandala Pharmacon Indonesia*, 4(1), 68–73.
- Susanty, S., & Bachmid, F. (2016). Perbandingan Metode Ekstraksi Maserasi Dan Refluks Terhadap Kadar Fenolik Dari Ekstrak Tongkol Jagung (*Zea mays* L.). *Jurnal Konversi*, 5(2), 87.
- Wullur, A., Schadu, J., & Wardhani, A. (2012). Identifikasi Alkaloid Pada Daun Sirsak (*Annona muricata* L.). *Jurnal Ilmiah Farmasi Poltekkes Manado*, 3(2), 96483.