

**FORMULASI DAN UJI MUTU FISIK SEDIAAN MINYAK ANGIN
AROMATERAPI KOMBINASI MINYAK DAUN NILAM (*Pogostemon
cablin* Benth.) DENGAN DAUN PEPPERMINT (*Mentha piperita* L.)**

NASKAH PUBLIKASI

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**PROGRAM STUDI S1 FARMASI
FAKULTAS FARMASI
UNIVERSITAS MUHAMMADIYAH KALIMANTAN TIMUR
JANUARI 2024**

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Diajukan Sebagai Salah Satu Persyaratan
Untuk Memperoleh Gelar Sarjana Farmasi
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**Diajukan Oleh:
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LEMBAR PERSETUJUAN

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FORMULASI DAN UJI MUTU FISIK SEDIAAN MINYAK ANGIN AROMATERAPI KOMBINASI MINYAK DAUN NILAM (*Pogostemon cablin Benth.*) DENGAN DAUN PEPPERMINT (*Mentha piperita L.*)

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**Formulation and Physical Quality Testing of Aromatherapy Wind Oil Preparations
Combination of Patchouli Leaf Oil (*Pogostemon cablin* Benth.) With Peppermint Leaf
Oil (*Mentha piperita* L.)**

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Abstract

Background: Aromatherapy is an alternative treatment from plant materials, namely essential oils, one of which is aromatherapy wind oil. However, the use of wind oil is still closely associated with the impression of parents, so young people now rarely use wind oil. One of the natural ingredients used to make aromatherapy wind oil is a combination of patchouli leaf oil and peppermint leaf oil.

Objective: The object of this research is the formulation and physical quality test of aromatherapy wind oil preparations, a combination of patchouli leaf essential oil and peppermint leaf oil.

Methods: The research method is experimental.

Results: Organoleptic test research for each formula differs in color and odor, the homogeneity and clarity tests of all formulas are homogeneous and clear, and the pH test is in the range of 4.3-7.0, which meets the pH requirements for topical preparations, the spreadability test for all formulas in the 1st, 2nd and 3rd weeks they did not meet the spreadability requirements, while in the 4th week they met them because they were in the range of 5.0-5.3 cm and the hedonic test formula that was more preferred was F4 because it contains the highest concentration of active substances compared to F2 and F3.

Conclusion: A combination of patchouli leaf and peppermint leaf essential oils can be made into an aromatherapy wind oil preparation and variations in concentration can affect the physical properties of the wind oil preparation.

Keywords: Aromatherapy wind oil, Patchouli leaves, Peppermint leaves, Physical quality test

Introduction

Indonesia is a country with abundant biological natural resources which is known as an agricultural country. One of them is a plant that produces essential oils [1]. Indonesia is a country that produces 40-50 types of essential oil plants out of 80 types of essential oil plants traded in the world. The source of essential oils can come from plant parts such as fruit, flowers, leaves, stems, roots, and so on [2].

Essential oils are compounds that are generally in liquid form and can be obtained from plant parts such as flowers, seeds, fruit, leaves, stems, and bark, or from the roots by distilling using steam [3]. Essential oils are volatile at room temperature without decomposing, have a pungent (*bitter*) taste, and have an aroma that matches the plant that produces them. Essential oils are soluble in organic solvents and insoluble in water [4].

Aromatherapy is an alternative treatment using volatile plant materials, also known as essential oils. Aromatherapy can provide a calming, refreshing effect, stabilize the body and soul, and maintain beauty. Aromatherapy comes in various forms, such as perfume, wind oil, and candles [5].

There are many aromatherapy options on the market, one of which is in the form of aromatherapy wind oil. However, the use of wind oil is still closely associated with the impression of parents, so young people now rarely use wind oil [6]. Wind oil can act as a carminative or to expel wind, so it can eliminate complaints of colds such as bloating, nausea, and vomiting. Apart from that, wind oil also has activities that can make you comfortable or relaxed, so it can relieve dizziness and flu or nasal congestion [7].

The effect of inhaling aromatherapy wind oil is that the inhaled molecules are converted by the cilia into electrical impulses, which are sent to the brain via a system called the olfactory system. So all the smells will reach the limbic system in the brain which is the emotional and sensory center and will ultimately influence mood [7].

One of the natural ingredients used to make aromatherapy wind oil are patchouli leaves (*Pogostemon cablin* Benth.) and peppermint leaves (*Mentha piperita* L.). These two natural ingredients can be made into aromatherapy wind oil because they contain essential oils that can have a relaxing effect [8].

Patchouli leaves (*Pogostemon cablin* Benth.) are a part of the patchouli plant that is often used because they contain essential oils, flavonoids, saponins, tannins, glycosides, terpenoids, and steroids [9]. Patchouli oil is one of the best quality essential oils in the world essential oil market and Indonesia controls 80-90% of the patchouli oil market [10]. Patchouli oil is widely used in the cosmetic, perfume, antiseptic, and other industries [11].

Peppermint leaves (*Mentha piperita* L.) are commonly used because they can produce essential oil or what is called peppermint oil. Peppermint leaves are known to be widely used, for example as a medicinal ingredient, a flavoring agent in food products, and as an additional ingredient in cosmetics [12].

Based on the introduction explained, the author is interested in research regarding the formulation and physical quality testing of aromatherapy wind oil preparations, a combination of essential oils from patchouli leaves (*Pogostemon cablin* Benth.) with peppermint leaves (*Mentha piperita* L.) which aims to utilize natural ingredients to make a preparation that has properties for the body.

Methods

Research design

The research method is experimental.

Population and sample

The sample in this study was the essential oil of Patchouli leaves (*Pogostemon cablin* Benth.) with Peppermint leaves (*Mentha piperita* L.) obtained from an *E-commerce* company with the *Darjeeling brand*.

Instrument

The tools in this research were aluminum foil, glass stopper Erlenmeyer, measuring cup, parchment paper, mortar and pestle, analytical scales, ruler, pH meter, dropper pipette, and wind oil packaging or bottles.

The ingredients in this research were patchouli leaf essential oil, peppermint leaf essential oil, camphor, methyl salicylate, alpha-tocopherol (*branded Natur-E*), and VCO.

Making Aromatherapy Wind Oil Preparations

Table 1. Formulation of Aromatherapy Wind Oil Preparations [13]

Material	Formulation				Standard (%)	Utility	Reference
	F1 (%)	F2 (%)	F3 (%)	F4 (%)			
Patchouli Leaf Essential Oil	-	2	4	6	2 – 6	Active substance	[14]
Peppermint Leaf Essential Oil	-	5	10	15	5 – 20	Active substance	[15]
Champora	3	3	3	3	3 – 11	Warmer	[16]
Methyl Salicylate	5	5	5	5	1 – 20	Warmer	[17]
Alpha Tocopherol	0,05	0,05	0,05	0,05	0,001 – 0,05	Antioxidant	[18]
VCO	Ad 10	Ad 10	Ad 10	Ad 10	-	Oil Base	-

The Aromatherapy Wind Oil preparation is made in 10 mL/bottle

F1: Aromatherapy wind oil formulation without patchouli and peppermint essential oils)

F2: Concentration of patchouli and peppermint essential oils in a ratio of 2: 5 or 0.2 mL: 0.5 mL.

F3: Concentration of patchouli and peppermint essential oils in a ratio of 4: 10 or 0.4 mL: 1 mL.

F4: Concentration of patchouli and peppermint essential oils in a ratio of 6: 15 or 0.6 mL: 1.5 mL.

Prepare all the tools and materials that will be used. Then the bottle of aromatherapy wind oil used as packaging is calibrated first. Next, weigh each ingredient used. After that, put the champora into the mortar and grind until smooth. Then put it in the Erlenmeyer. Then add methyl salicylate, and stir well until dissolved. After that, add alpha-tocopherol little by little. Next, essential oils are added according to the concentration in formulas F1, F2, and F3, and then VCO is added up to the limit mark. After everything is finished, the preparation is put into a calibrated wind oil bottle [13].

Analysis

According to research conducted by [12], physical quality tests that can be carried out on aromatherapy wind oil preparations are as follows:

Organoleptic Test

Organoleptic testing is carried out visually which includes observing changes in color, odor, and shape that occur in the formulation that has been made.

Homogeneity Test

Homogeneity testing was carried out by looking at the aromatherapy wind oil formulation from week 1 to week 4, namely by looking at whether the active substances of patchouli and peppermint essential oils were mixed with additional substances or not.

Clarity Test

Clarity testing can be obtained by viewing the aromatherapy preparation from a roll-on oil bottle using direct sunlight or lamp light shining on the bottle.

pH Test

The degree of acidity is measured using a pH meter. The pH meter has previously been calibrated with a standard buffer solution at pH 4 and 7. The pH value is then measured by immersing the pH meter electrode which has been washed with distilled water into the sample solution. Then observe the pH value displayed on the pH meter screen.

Spreadability Test

Spreadability testing was carried out by pouring ± 0.20 grams of aromatherapy into the center of the glass. Then cover it with another glass that has been weighed and let it sit for one minute, then measure the diameter and increase the weight every minute, for example, 50 grams to 250 grams for 5 minutes, then measure the diameter of the spread using a ruler.

Hedonic Test

The hedonic test was carried out by involving 20 randomly selected respondents to fill out the questionnaire provided. This hedonic test is carried out to determine the properties of the finished formulation. The liking scale will be divided into 5 levels, namely: 1 (Strongly Dislike), 2 (Dislike), 3 (Neutral), 4 (Like), 5 (Very Like).

Results

Organoleptic Test

Table 2. Data on Organoleptic Test Results for Aromatherapy Wind Oil Preparations

Observation Results (Week)	Formulation	Organoleptic Parameters		
		Color	Smell	Form
1	F1	Clear	Typical Methyl Salicylate	Liquid
	F2	Turbid Slightly Yellow	Typical Mint Not Too Pungent	Liquid
	F3	A Bit Yellow	Typical Mint	Liquid
	F4	Deep Yellow	Typical Mint	Liquid
2	F1	Clear	Typical Methyl Salicylate	Liquid
	F2	Turbid Slightly Yellow	Typical Mint Not Too Pungent	Liquid
	F3	A Bit Yellow	Typical Mint	Liquid
	F4	Deep Yellow	Typical Mint	Liquid
3	F1	Clear Slightly Cloudy	Typical Combination of Methyl Salicylate and VCO	Liquid
	F2	Turbid Slightly Yellow	Typical Mint is less pungent	Liquid
	F3	A Bit Yellow	Typical Mint is less pungent	Liquid
	F4	Golden Yellow	Pungent Mint	Liquid
4	F1	Clear Slightly Cloudy	Typical Combination of Methyl Salicylate and VCO	Liquid
	F2	Turbid Slightly Yellow	Typical Mint is less pungent	Liquid
	F3	A Bit Yellow	Typical Mint is less pungent	Liquid
	F4	Golden Yellow	Pungent Mint	Liquid

Homogeneity Test

Table 3. Data on Homogeneity Test Results for Aromatherapy Wind Oil Preparations

Formulation	Homogeneity Test Observation Results (Week)			
	1	2	3	4
F1	Homogeneous	Homogeneous	Homogeneous	Homogeneous
F2	Homogeneous	Homogeneous	Homogeneous	Homogeneous
F3	Homogeneous	Homogeneous	Homogeneous	Homogeneous
F4	Homogeneous	Homogeneous	Homogeneous	Homogeneous

Clarity Test

Table 4. Data on Clarity Test Results of Aromatherapy Wind Oil Preparations

Formulation	Clarity Test Observation Results (Week)			
	1	2	3	4
F1	Clear	Clear	Clear	Clear
F2	Clear	Clear	Clear	Clear
F3	Clear	Clear	Clear	Clear
F4	Clear	Clear	Clear	Clear

pH Test

Table 5. Data from pH Test Results for Aromatherapy Wind Oil Preparations

Formulation	Average pH Test Result \pm SD (Week)			
	1	2	3	4
F1	6,6 \pm 0,3	6,7 \pm 0,2	7,0 \pm 0,2	6,9 \pm 0,2
F2	5,6 \pm 0,3	5,7 \pm 0,7	6,6 \pm 0,1	6,3 \pm 0,4
F3	4,9 \pm 0,4	5,3 \pm 0,8	6,4 \pm 0,5	6,1 \pm 0,1
F4	4,3 \pm 0,2	4,4 \pm 0,3	5,9 \pm 0,1	6,0 \pm 0,1

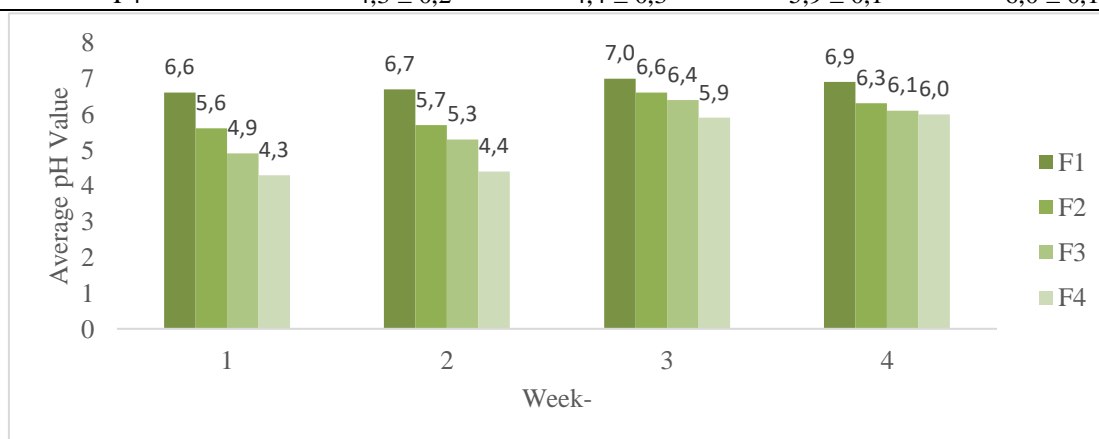


Figure 1. pH Test Chart for Aromatherapy Wind Oil Preparations

Spreadability Test

Table 6. Data on Spreadability Test Result of Aromatherapy Wind Oil Preparations

Formulation	Average Spreadability Test Result \pm SD (Week)			
	1	2	3	4
F1	2,6 \pm 0,5	3,0 \pm 0,3	2,7 \pm 0,2	4,7 \pm 1,1
F2	4,1 \pm 0,3	3,1 \pm 0,2	4,4 \pm 0,3	5,1 \pm 0,5
F3	3,9 \pm 0,6	3,5 \pm 0,3	4,5 \pm 0,2	5,0 \pm 0,8
F4	4,0 \pm 0,3	3,4 \pm 0,2	4,3 \pm 0,5	5,3 \pm 0,5

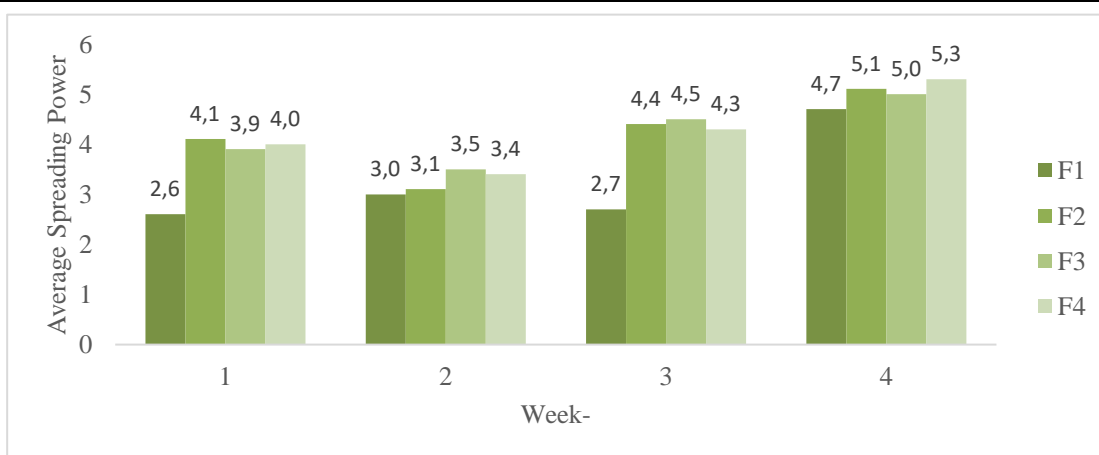


Figure 2. Graph of Spreadability Test for Aromatherapy Wind Oil Preparations

Hedonic Test

Table 7. Hedonic Test Results Data for Aromatherapy Wind Oil Preparations

Hedonic Test Parameters	Average Hedonic Test Result \pm SD (Formulation)			
	F1	F2	F3	F4
Color	3,6 \pm 0,7	3,8 \pm 0,8	3,9 \pm 1,0	4,1 \pm 1,0
Smell	3,4 \pm 0,8	3,7 \pm 0,7	3,7 \pm 0,9	4,5 \pm 0,6
Clarity	4,0 \pm 0,8	3,8 \pm 0,8	3,6 \pm 0,9	4,0 \pm 0,9

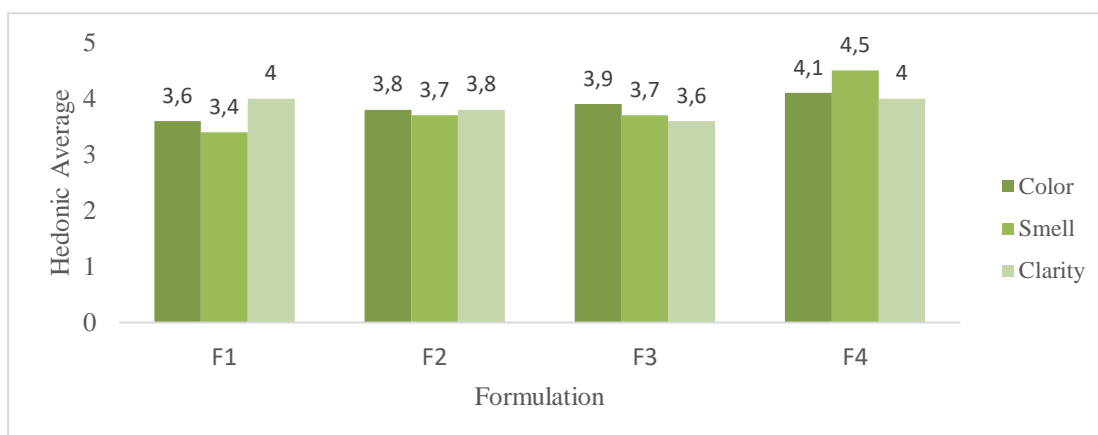


Figure 3. Hedonic Test Graph of Aromatherapy Wind Oil Preparations

Discussions

The results obtained from the organoleptic test showed that in the 1st week to the 2nd week for all formulas there was no change. Meanwhile, in the 3rd week and 4th weeks, changes occurred, where in F1 the color was clear, slightly cloudy, F2 was cloudy, slightly yellow, F3 was slightly yellow and F4 was golden yellow. For the smell of the F1 formula, is a typical combination of methyl salicylate and VCO, F2 is typical of mint which is less pungent, F3 is typical of mint less pungent, and F4 is pungent mint. The forms F1, F2, F3 and F4 are all liquid. Changes in the color of each aromatherapy wind oil formula can be caused by instability in temperature, storage location, and concentration level of the essential oil used, because the higher the concentration of the essential oil used, the yellower the color of the aromatherapy wind oil [19]. Based on research conducted by [20] adding more and more concentrations of essential oils will have a big effect so that the resulting color will be more intense yellow.

The homogeneity test showed that all preparations from F1, F2, F3, and F4 in the 1st to 4th week of observation, the results were homogeneous, that is, all the aromatherapy wind oil preparations did not contain any particles or coarse grains that were visible during the test [21]. This is in line with the research conducted [22], that preparation must show a homogeneous composition and no visible coarse grains.

The clarity test shows that F1, F2, F3, and F4 have the same preparation results, namely all formulations are clear and there are no floating particles so they can be applied to the skin well. This shows that the mixing of each ingredient in each formula has been mixed well so that the aromatherapy preparation made is clear [23]. This is in line with research conducted by [24] that the aromatherapy wind oil preparation in a formula will be distributed evenly.

The pH test results showed F1, F2, F3, and F4 in 3 tests over 4 weeks. It was found that the average pH value of aromatherapy wind oil ranged from 4.3 to 7.0. Aromatherapy wind oil preparations during storage experienced an increase in the pH value but it was still within the normal range. The pH requirements for topical preparations that match the natural pH of the skin are 4.2 – 6.5 [25]. This is by research conducted by [26] that changes in the pH of the preparation during storage indicate that the preparation is less stable. This can damage the preparation during storage.

The spreadability test showed that in the 1st, 2nd, and 3rd weeks both F1, F2, F3, and F4 still did not meet the requirements for good spreadability because they were in the average range of 2.6 – 4.0 cm. Meanwhile, in the 4th week formulas F2, F3, and F4 met the requirements for good spreadability, namely in the average range of 5.0 – 5.3 cm. The spreadability test was carried out to see how the aromatherapy wind oil preparation spreads on

the skin and a good spread is around 5 – 7 cm [27]. During storage, the aromatherapy wind oil preparation experienced an increase in the spreadability value during testing [28].

The hedonic test results showed that the aromatherapy wind oil preparation formulation with the addition of patchouli leaf and peppermint leaf essential oil samples in the hedonic test average for the most preferred color parameters was from formula 4, namely 4.1. Then for the aroma parameter also from formula 4, namely 4.5, and from the clarity parameter, namely formula 1 and formula 4, which both have an average value of 4. This is by research conducted by [12] that the higher the concentration added to a preparation, the more preferred the preparation is.

Conclusions

This research concludes that a combination of patchouli leaf and peppermint leaf essential oils can be made into an aromatherapy wind oil preparation and variations in concentration can affect the physical properties of the wind oil preparation.

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Conflict of Interest

The authors declare no conflict of interest.

Author contributions

Hendra Wahyudi: Research coordinator, validation of methods and results across all tests, and article writing. **Hasyrul Hamzah:** Data analysis and article writing. **Indra Yudhawan:** Data analysis and article writing.



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