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FORMULATION AND EVALUATION OF *Jasminum sambac* Ait. EXTRACT DEODORANT SPRAY PREPARATION WITH A VARIETY OF ALUM

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ABSTRACT

Heavy daily activities often trigger body odor problems, especially in the underarm area, which can reduce comfort and confidence. Body odor arises when Staphylococcus epidermidis breaks down sweat into volatile fatty acid compounds, such as isovaleric acid, which causes an unpleasant odor. This study aims to formulate and evaluate natural deodorant spray preparations containing jasmine flower extract with variations in alum concentration, as well as test the effect of alum variations on the physical quality of preparations. Jasmine flower extract is obtained by maceration method with 70% ethanol for 5 days. Four deodorant spray formulas were prepared with variations in alum concentration (0% as control, 5%, 15%, and 20%). Evaluation of the physical quality of the preparation, including pH, homogeneity, organoleptic, spray pattern, drying time, and effect on fabric, was carried out on days 0, 7, and 14. pH data, spray pattern and dry time were analyzed using One-Way ANOVA and LSD. All formulas show good physical quality, the pH of the preparation meets the pH standard of a good deodorant (3.00-7.5), homogeneous, has a suitable spray pattern (diameter 5-7 cm), a quick drying time (<5 minutes), and does not damage the fabric. Organoleptically speaking, all formulas are liquid in texture and scented with menthol. However, there is a color difference as the concentration of alum increases, the controls are yellowish-orange, F1 is clear yellow, F2 and F3 are solid yellow. Statistical analysis showed that variations in alum concentration had a significant influence on the results of spray patterns ($p < 0.05$) and drying time ($p < 0.05$). The physical quality of the deodorant spray, which was tested including pH, homogeneity, organoleptic, spray pattern, drying time and effect on the fabric met the quality standards. However, differences in alum concentrations affect their spray patterns, drying time, and organoleptic, where the concentration of 5% is clear yellow, while 15 and 20% are deep yellow.

Key words: Alum, deodorant spray, formulation, *Jasminum sambac* Ait, Physical quality evaluation.

INTRODUCTION

Heavy daily activities often trigger body odor problems, especially in the armpit area, which can reduce comfort and confidence (Kurniawan et al., 2024). Body odor arises when *Staphylococcus epidermidis* breaks down sweat into volatile fatty acid

compounds, such as isovaleric acid, which causes an unpleasant odor (Purnama et al., 2022). Therefore, the need for products that effectively address this problem is crucial (Afriansyah et al., 2023).

Deodorant is a common product designed to mask body odor in the armpits. Conventional deodorants often contain synthetic chemicals such as triclosan and synthetic perfumes, which work by killing or inhibiting the growth of odor-causing bacteria (Ummah, 2019). However, long-term use of these ingredients has been linked to potential side effects such as skin irritation, hormonal disorders, and cancer risk (Yolanda, 2024).

Increasing public awareness of the negative impacts of synthetic chemicals encourages the search for natural alternatives (Purwanto et al., 2023). Indonesia is rich in medicinal plants that have long been used in traditional medicine and natural cosmetics, with the advantages of accessibility, affordable prices, and minimal side effects. One of the promising plants is *Jasminum sambac* Ait. (Hidayah et al., 2020). Jasmine flowers are known to have antibacterial properties and contain secondary metabolite compounds such as alkaloids, flavonoids, saponins, steroids/terpenoids, and tannins (Hidayah et al., 2019). Other studies have shown that it specifically demonstrates the antibacterial activity of jasmine flower extract against *Staphylococcus epidermidis*, making it an effective candidate for preventing body odor.

In addition to jasmine flower extract, alum is another natural ingredient that is effective in deodorant formulations, acting as an antiperspirant agent (Kurniawan et al., 2024). Alum works by temporarily clogging the pores of the sweat glands, reducing excess sweat production (Susanti et al., 2017). The advantages of alum include its ability to reduce sweating, its safety for sensitive skin because it comes from natural minerals, as well as its multifunctional properties which include deodorizing, small wound stoppers, and skin cleansing (Masrijal et al., 2022).

Based on this background, this study aims to formulate and evaluate natural deodorant spray preparations using *Jasminum sambac* Ait extract. combined with variations in alum concentration *Alum*. The form of spray preparation was chosen because of its practicality and ease of use. Product evaluation will include pH test, homogeneity, organoleptic, spray pattern, drying time, and effect on fabric to ensure the quality and effectiveness of the preparation as standard.

MATERIAL AND METHODS

Tools and materials

The tools used in this study are maserators, ovens (Memmert), filters, digital scales, analytical balances (Ohaus), magnetic stirrer, rotary evaporator (IKA), waterbath (Biobase), glass tools (Velp Scienifica), spray containers, pH meters (Hanna HI 98107), rulers, white cloth (cotton), glass and SPSS 22 software program.

The ingredient used is simplisia *Jasminum sambac* Ait. from Pejarakan-Randuagung-Lumajang, 70% ethanol, aluminum potassium sulfate, NaOH, propyl paraben, isopropyl alcohol, glycerin, propylene glycol, menthol, tween 80, and aquades.

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Extraction of Simplisia *Jasminum sambac* Ait Powder.

Extraction is carried out by the maceration method using a 70% ethanol solvent (1:10 ratio). A total of 100 g of simplicia powder is soaked in 1000 ml of 70% ethanol in a sealed vessel for 5 days, protected from light. On the 6th day, the filtrate is filtered, then evaporated using a rotary evaporator (60° C) and continued with a waterbath until a thick extract with constant weight is obtained (Kurniawan et al., 2024).

Secondary Metabolite Test of *Jasminum Samac* Ait Extract.

In this test, the examination of secondary metabolites includes 5 compounds, namely alkaloids, flavonoids, saponins, steroids/terpenoids and tannins.

The Alkaloid test is carried out by dissolving the extract in 2 ml of hydrochloric acid, heated for 5 minutes, and filtered. The obtained filtrate is plus 2-3 drops of the Dragendorff reagent. Jasmine flower extract is positive for alkaloids characterized by orange deposits (Ningsih et al., 2016).

The Flavonoid test was carried out by dissolving 2 ml of samples in 2 mL of methanol, then adding 5 drops of concentrated Mg powder and HCl. *Jasminum sambac* Ait extract is positive for flavonoids characterized by the formation of red color (Ningsih et al., 2016).

The Saponin test is carried out by adding 1 drop of HCl 2 N in an extract that has been dissolved in hot water. According to (Syafitri et al., 2014), saponins can be detected by foam test in hot water. A 10-minute stable foam that is not less than 1 cm and does not disappear with the addition of 1 drop of HCl 2 N indicates a positive saponin.

The steroid/terpenoid test is done with as much as 5 ml of extract put in a beaker, then chloroform is added and stirred. Next, a concentrated H2SO4 reagent is added. *Jasminum sambac* Ait extract contains steroids/terpenoids when red is formed (Agustina et al., 2016).

The tannin test was carried out with jasmine flower extract dripped with 10% gelatin. Tested positive for tannins if they form white deposits or change color to cloudy (Masitoh, 2011). *Jasminum sambac* Ait extract is positive for tannins characterized by the presence of white deposits.

Procedure for Making Deodorant Spray Preparations

The formulation of deodorant spray preparations is made based on table 1.

Deodorant spray preparations are made with three separate mixtures. Mixture A: 0.5 mg of jasmine flower extract is dispersed in 10 ml of propylene glycol, then 0.1 g of NaOH dissolved in 1 ml of aquades is added, stirred until homogeneous. Mixture B: 1 g of menthol is dissolved in 5 ml of isopropyl alcohol, then 2 ml of glycerin and 0.1 g of propyl parabens are added, stirred using a magnetic stirrer (60 rpm) until homogeneous. Mixture C: Alum is dissolved in hot water (ratio 1:10) at a temperature of 25°C, stirred using a magnetic stirrer until homogeneous (Kurniawan et al., 2024).

Next, mixture A is added to mixture B and stirred until homogeneous. Mixture C is added, stirring until homogeneous. Then, 4 ml of Tween 80 and aquaades up to 100 ml are added while continuously stirring using a magnetic stirrer until homogeneous. The prepared preparations that have been evenly dispersed are then put into sterilized spray bottles with 100°C water immersion for 15 minutes and dried (Kurniawan et al., 2024).

Physical Quality Test Evaluation of Deodorant Spray Preparations

Evaluation was carried out on day 0.7, and 14 storage at room temperature. pH test, pH preparation is measured using a calibrated pH meter. The pH value is expected to be in the armpit skin pH range (3.0-7.5 according to SNI 16-4951-1998).

The homogeneity test, homogeneity of preparations was visually checked by dripping the preparation on the preparation glass, leveled with other preparation glass, and observed the presence or absence of coarse particles or granules (Kurniawan et al., 2024).

Organoleptic test, including observation of the color, aroma, and texture of the preparation. The preparation is expected to not undergo discoloration during storage at room temperature and is protected from sunlight (Kurniawan et al., 2024).

The spray pattern test is carried out by spraying the preparation once at a distance of 5 cm above the glass, then measuring its diameter. The expected spray diameter is 5-7 cm (Kresnawati et al., 2022).

A dry time test, the preparation is sprayed once on the forearm, and the time it takes for the preparation to dry and form a stable film layer is recorded. The expected drying time is less than 5 minutes.

Test the effect on the fabric, the preparation is sprayed once on a plain white cotton fabric. Once dry, observed residues left behind and changes in the fabric.

The preparation is declared not to damage the fabric if there are no visible stains on the fabric, the strength of the fabric does not change (it is not brittle), it does not remove or change the color of the fabric (Kurniawan et al., 2024).

Analysis

The data analysis in this study used SPSS 22 with the One-Way ANOVA method. The data analyzed included pH, spray pattern, and dry time test. First, a normality test is carried out to ensure that the data is distributed normally. Then, a variance homogeneity test was carried out to ensure that the variant between groups was homogeneous. After that, a one-way analysis (ANOVA) was carried out to test whether there was a significant difference between the groups compared based on the difference in the concentration of jasmine flower extract. Then, further tests were carried out using LSD to find out where the difference lies.

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RESULT AND DISCUSSION

Extract and Secondary Metabolite Test of *Jasminum sambac* Ait.

This research began by making *Jasminum sambac* Ait extract obtained through the maceration extraction process. The extraction process of *Jasminum sambac* Ait. is carried out using the maceration method, in which the simplicia are soaked at room temperature with a suitable solvent for 3-5 days (Mutia & Sihotang, 2024). Periodic stirring during immersion is essential to speed up the maceration process, ensure a balanced state, and prevent saturation of the solution so that secondary metabolite compounds can be optimally extracted in the filter fluid (Lilis *et al*., 2018).

The choice of this maceration method is based on considerations to avoid damage to secondary metabolite compounds due to heating (Yulianti, 2021). The solvent used is 70% ethanol due to its effective ability to dissolve polar, semi-polar, and nonpolar substances, as well as safety considerations and ease of evaporation. 70% ethanol is used because it is more polar than 96% ethanol. The polarity of the ethanol mixture of 70% is a mixture of ethanol and water (30%), the addition of this water significantly changes the polarity of the solvent (Silva *et al*., 2025). The results of obtaining jasmine flower extract after the maceration extraction process can be seen in table 2. According to the Ministry of Health of the Republic of Indonesia (2008), extracts that are considered optimal have a yield above 10% b/b. The higher the yield of the extract, the higher the content of the attracted substances in the sample (Firdayani & Winarni, 2015).

After extraction, a secondary metabolite test was performed on jasmine flower extract which showed that jasmine flower was positive for containing 5 secondary metabolite compounds including, alkaloids, flavonoids, saponins, steroids/terpenoids, and tannins. The alkaloids, flavonoids, and tannins compounds in jasmine flowers are particularly relevant for the formulation of deodorant spray preparations. Alkaloids are known to interfere with the function of bacterial cells (Maisarah et al., 2023), flavonoids have strong antioxidant properties and can damage bacterial cell membranes (Keumala et al., 2022), while tannins are able to bind to bacterial proteins so that they inhibit their growth and activity (Poeloengan & Praptiwi, 2010). This antioxidant and antibacterial content makes *Jasminum sambac* Ait effective in brightening underarm skin, reducing inflammation, and eliminating body odor (Wicaksono et al., 2021).

Physical Quality of Deodorant Spray Preparation *Jasminum Sampa* Ait Extract. with Alum Variations Alum

pH Test

Evaluation of *the deodorant spray* preparation was carried out on each formula. Some of the evaluations carried out were pH test, homogeneity test, organoleptic test, spray pattern test, dry time test and effect test on fabric. The pH measurement of *deodorant spray* preparations is carried out using a device called a pH meter. The results of this pH measurement will provide information about the acidity or alkaline level of the *deodorant spray preparation.* The results of the pH test of *jasmine flower extract deodorant spray* preparations with alum variations can be shown in table 4.

Based on the results of the above data, there was no variation in each test on days 0, 7, and 14. Physical quality testing of *deodorant spray preparations* was carried out on days 0, 7 and 14 including pH tests, homogeneity, organoleptic, spray

patterns, drying time, and effects on fabrics. The pH test is performed to determine the acidity or alkaline level of a solution (Pratama *et al*., 2022). pH stands for *the potential of hydrogen* or the strength of hydrogen ions (Arjani & Albari, 2021). pH testing is performed using a pH meter that has been calibrated. The pH value of the formulation is adjusted or maintained as close as possible to the pH value of the underarm skin, with a range of pH values of 3.0-7.5 (SNI 16-4951-1998).

The average results of the pH test on all formulas were normal and homogeneous with *a p-value* of > 0.05 according to the results of statistical analysis. Based on the results of the above data, there was no variation in each test on days 0, 7, and 14. So there is no difference test on the variation of data between formulas. The test results showed that the four *deodorant spray* formulas made met the requirements of good pH physical quality on the underarm skin. These results are in accordance with the results of a study (Kurniawan *et al*., 2024) which states that the more alum concentration in a preparation, the more acidic the preparation, which means the lower the pH value. This happens because when alum (which is an aluminum sulfate salt) is dissolved in water, the aluminum ions (*Al3+*) contained in it will undergo hydrolysis. This hydrolysis reaction releases hydrogen ions (*H+*) into the solution and forms sulfuric acid, which is a strong acid. This increase in the concentration of hydrogen ions is what causes an increase in the acidity of the solution as a whole.

Homogeneity test

The homogeneity test in this study used glass objects to observe the preparation of *deodorant spray*. If the preparation is homogeneous, then there are no rough grains in the observation through the glass of the object. The results of the homogeneity test can be seen in table 5. Homogeneity test is a test on *a deodorant spray* preparation that is used to check for the presence or absence of coarse particles or granules. The requirement for homogeneity is that it must not have rough and tactile materials (Kurniawan *et al*., 2024). In this homogeneity test, each deodorant preparation made from jasmine flower extract with the addition of alum was checked for homogeneity by visual means, namely observing the preparation by dripping the preparation on a glass preparation, then flattened by attaching it to another glass preparation and observed. The results of the homogeneity test at 0%, 5%, 15% and 20% obtained homogeneous results because there were no coarse grains in the preparation. The test results showed that the four *deodorant spray* formulas made met the requirements of good physical quality homogeneity.

Organoleptic test

Organoleptic tests are carried out to determine the texture, aroma and color based on the visuals of the preparation. The results of organoleptic tests performed in 21 days did not experience visual changes, can be seen in table 6. Organoleptic tests are carried out to determine the characteristics of the physical quality of *the deodorant spray preparation*. The organoleptic test is carried out by testing the human senses as a measuring tool for aroma, color and texture. In the organoleptic test of the formulation of *jasmine flower extract deodorant spray* preparations with alum variations, the observation results were obtained on days 0, 7, and 14 with a concentration of 0% resulting in a liquid texture, yellowish orange color with a menthol aroma. It can be seen that the results of each formula have a different color, especially at the

concentration of 0% because there is no alum in it. This is in accordance with the statement (Kurniawan *et al*., 2024) which states that the higher the concentration of alum, the color of the preparation that has been colored by the extract will fade. The discoloration is caused by the white alum and the higher concentration makes *the deodorant spray* that has been colored by the extract fade.

The storage process is carried out at room temperature and avoided from sunlight. This is in accordance with the statement of Iswari, et al. that cosmetics with natural dyes are better than synthetic materials, but the dyeing power is relatively weaker because they are not resistant to light. Light exposure can trigger various chemical changes in natural dyes, such as oxidation. These changes change the optical properties of the pigment, causing its color to fade (Fatjria *et., al*, 2023). In contrast to synthetic dyes that are designed with protective groups or have structures that are inherently more resistant to UV, natural dyes generally lack this built-in protection (Susanto, 2024). Therefore, the spray formula is placed in a non-clear container so that light does not hit the preparation directly which can decompose the dye in the ingredients in the preparation.

Spray Pattern Test

Testing the spray pattern was carried out by spraying the preparation at a distance of 5 cm in the glass and then measuring the diameter. The results of the spray pattern test of *deodorant spray preparations* are shown in table 7. Based on the results of the spray pattern test, the data that had the same superscript showed no significant difference. Spray pattern testing is a testing procedure that is carried out to evaluate how a product packaged in spray form is dispersed when it is removed from its packaging (Kresnawati *et al*., 2022). Testing the spray pattern was carried out by spraying the preparation as much as one spray with a distance of 5 cm above the glass and then measuring the diameter. The criterion parameter is 5-7 cm (Kurniawan *et al*., 2024).

The test results showed that the four *deodorant spray* formulas made met the physical quality requirements of a good spray pattern on the underarm skin. It can be seen in table 7. that the formulas F2 and F3 do not differ in meaning and do not experience a change in the spray pattern on days 0, 7 and 14. This indicates that the preparation is stable in storage at the parameters of the spray pattern. However, the results of the spray pattern test between F1 and F2 and F3 showed a significant difference. These results prove that the spray pattern test of *deodorant spray* preparations is influenced by differences in alum concentration.

Dry Time Test

Dry-time testing is carried out by spraying on the forearm. The results of the dry time test are in table 8. A dry time test is a test that is carried out to measure the time it takes for a preparation to dry and form a stable film layer after application to a surface. Dry-time testing is carried out by spraying the preparation as much as one spray on the forearm. The criteria parameter is less than 5 minutes (Kurniawan *et al*., 2024). The average results of the dry time test in the Control with a concentration of 5% on Day-0 were (2.21), the Day-7 Control was (2.19), and the Day-14 Control was (2.20). F1 with a concentration of 5% on Day-0 is (2.22), F1 Day-7 is (2.23), F1 Day-14 is (2.22). F2 with a concentration of 15% on Day-0 is (2.24), F2 Day-7 is (2.25), F2 Day-14 is (2.43).

F3 with a concentration of 20% on Day-0 is (2.09), F3 Day-7 is (2.12), F3 Day-14 is (3.04). The test results showed that the four *deodorant spray* formulas made met the requirements of good dry time physical quality on the underarm skin. Alum has astringent properties, which means it can cause tissues to contract or dry out surfaces (Haerani *et.al*, 2024).

Effect Test on Fabric

This test is performed to see for residues that have been left by the preparation on the fabric. This test is carried out by spraying the preparation on a white cotton cloth, then observing the residue left on the fabric. If the fabric does not undergo visual changes, then the *deodorant spray preparation* is declared not to damage the fabric. The results of the effect test on the fabric are shown in table 9.

An effect test on a fabric is a series of tests conducted to observe changes in the properties or performance of a fabric after interacting with certain chemical, physical, or environmental substances (Wijayono & Vidia, 2017). This test uses a plain white cotton cloth, then the preparation is sprayed once on the object, wait for it to dry and then observe the residue left on the fabric (Kurniawan *et al*., 2024). The results of the effect test on fabric, namely *deodorant spray* preparations that have been tested on fabrics for 14 days, were obtained results that did not damage the fabric because it met the requirements of a good effect test on fabric. The color produced in this *deodorant spray* preparation comes from the natural pigments present in jasmine flower extract. The test results showed that *the deodorant spray* did not damage or discolor the fabric, indicating that the ingredients in the *deodorant spray* preparation formula (especially propylene glycol, glycerin, isopropyl alcohol, menthol, and tween 80) were materials that were stable and not significantly reactive to fabric fibers or fabric dyes (Liana, 2024).

CONCLUSION

Jasmine flower extract with alum variations can be formulated into a deodorant spray that is stable and safe to use. Evaluation of the physical quality of the preparations which included the pH test, homogeneity test, organoleptic test, spray pattern test, dry time test, and effect test on fabric showed that the developed deodorant spray preparation met the set quality standards. Meanwhile, the difference in alum concentration affects the results of the pH test, spray pattern test, dry time test and organoleptic test with varying colors, namely 5% concentration of light yellow and concentration of 15% and 20% of solid yellow.

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TABLE AND FIGURE

Tabel 1. Formulasi sediaan deodorant spray

Bahan	Formula				Fungsi
	Kontrol	F1	F2	F3	
Jasminum sambac Ait extract	0,5 mg	0,5 mg	0,5 mg	0,5 mg	Zat Aktif
Alumunium potassium sulfate (alum)	-	5 ml	15 ml	20 ml	*Antiperspirant*
NaOH	0,1 g	0,1 g	0,1 g	0,1 g	*Alkalizing Agent*
Propil Paraben	0,1 g	0,1 g	0,1 g	0,1 g	Preservatives
Isopropil Alkohol	5 ml	5 ml	5 ml	5 ml	Pelarut
Glycerin	2 ml	2 ml	2 ml	2 ml	Solvents
Propilen glikol	10 ml	10 ml	10 ml	10 ml	Humectant
Mentol	1 g	1 g	1 g	1 g	Refresher
Tween 80	4 ml	4 ml	4 ml	4 ml	Surfactant
Aquadest	Ad 100 ml	Ad 100 ml	Ad 100 ml	Ad 100 ml	Solvents

Table 2. Data on the Yield Results of *Jasminum Sambac* Ait Extract.

Initial Weight (g)	Final Weight (g)	Procurement (%)
100	36,874	36,874

Table 3. Results of Secondary Metabolites Test of *Jasminum Sambac* Ait Extract

Metabolite seconds	Results	Indicator	Image

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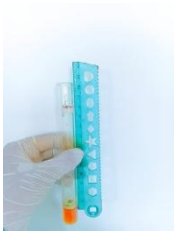
Metabolite seconds	Results	Indicator	Image
Alkaloid	+	Formation of orange deposits after the addition of the Dragendorff reagent	
Flavanoid	+	The formation of a red color after the addition of concentrated Mg and HCL powder	
Saponin	+	The formation of a stable foam for 10 minutes is not less than 1 cm and does not disappear with the addition of 1 drop of HCL 2 N	
Steroid/Terpenoid	+	A red color is formed after the addition of chloroform and concentrated H2SO4	
Tanin	+	White deposits are formed after 10% gelatin is dripped in.	

Remarks: (+) = contains secondary metabolite compounds, (-) = does not contain secondary metabolite compounds

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Table 4. pH Test Results

Formula	Average pH ± SD*		
	Day-0	Day-7	Day-14
Control	4,8 ± 0,0	4,7 ± 0,0	4,8 ± 0,0
F1	4,7 ± 0,0	4,7 ± 0,0	4,7 ± 0,0
F2	3,8 ± 0,0	3,8 ± 0,0	3,9 ± 0,0
F3	3,6 ± 0,0	3,8 ± 0,0	3,9 ± 0,0

*: The data is presented as an average (n=3)

Table 5. Homogeneity Test Results

Formula	Day		
	D-0	D-7	D-14
Control	Homogeneous	Homogeneous	Homogeneous
F1	Homogeneous	Homogeneous	Homogeneous
F2	Homogeneous	Homogeneous	Homogeneous
F3	Homogeneous	Homogeneous	Homogeneous

Table 6. Organoleptic Test Results

Formula		Day		
		D-0	D-7	D-14
Control	T	Liquid	Liquid	Liquid
	A	Menthol	Menthol	Menthol
	C	Yellowish Orange	Yellowish Orange	Yellowish Orange
F1	T	Liquid	Liquid	Liquid
	A	Menthol	Menthol	Menthol
	C	Clear yellow	Clear yellow	Clear yellow

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Formula		Day		
		D-0	D-7	D-14
F2	T	Liquid	Liquid	Liquid
	A	Menthol	Menthol	Menthol
	C	Solid yellow	Solid yellow	Solid yellow
F3	T	Liquid	Liquid	Liquid
	A	Menthol	Menthol	Menthol
	C	Solid yellow	Solid yellow	Solid yellow

Remarks: T= Tekstur, A= Aroma, C= Color

Table 7. Spray Pattern Test Results

Formula	Average Spray Pattern ± SD*		
	D-0	D-7	D-14
Control	5,5 ± 0,00 [a]	5,5 ± 0,00 [a]	6,1 ± 0,28
F1	5,5 ± 0,00 [a]	5,5 ± 0,00 [a]	5,5 ± 0,00 [a]
F2	5,0 ± 0,00 [b]	5,0 ± 0,00 [b]	5,1 ± 0,15 [b]
F3	5,0 ± 0,00 [b]	5,0 ± 0,00 [b]	5,0 ± 0,00 [b]

*: The data is presented as an average (n=3)

Table 8. Dry Time Test Results

Formula	Average Dry Time ± SD (min)		
	D-0	D-7	D-14
Control	2,21 ± 0,01[a]	2,19 ± 0,01[a]	2,20 ± 0,00 [a]
F1	2,22 ± 0,01[ab]	2,23 ± 0,01[ab]	2,22 ± 0,00 [ab]
F2	2,24 ± 0,01[b]	2,25 ± 0,02 [b]	2,43 ± 0,01
F3	2,09 ± 0,01[c]	2,12 ± 0,02 [c]	3,04 ± 0,04

*: The data is presented as an average (n=3)

Table 9. Effect Test Results on Fabric

Formula	Day		
	D-0	D-7	D-14

Control	No	No	No
F1	No	No	No
F2	No	No	No
F3	No	No	No

Keterangan: No= Does not damage the fabric, Yes= Damaging the Fabric