




Microbiological and Hedonic Test of Lanolin Listick with the Addition of Rosella Flower (*Hibiscus sabdariffa L*) Extract Dye

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ABSTRACT

Lanolin fat is produced from processing sheep wool. Lanolin is one of the ingredient for processing lipstick. a solid bar-shaped cosmetic preparation, serves as a lip colorant in makeup. Lanolin lipstick, still in need of innovation, for example in colour. Organic colouring can use, among other things, colours from Rosella flowers (*Hibiscus sabdariffa L*). The purpose of this study is to look at the microbiological and sensory properties of lanolin lipstick that has different amounts of Rosella flower extract (*Hibiscus sabdariffa L*) added to it. This study used a completely randomized design (CRD) unidirectional pattern with four treatments, namely, 0%, 20%, 40%, and 60% levels of Rosella flower extract. The data obtained were analyzed by ANOVA (analysis of variance) to determine the effect of each treatment, and if the data showed differences with a significant level of 95%, then Tukey's multiple comparison test was carried out. The study found that adding different amounts of Rosella flower extract to lanolin lipstick did not have a significant effect ($P > 0.05$) on the total plate count (ALT) of lipstick during storage. However, it did have a significant effect ($P < 0.05$) on the hedonic test and hedonic quality of color parameters. In conclusion, the addition of 60% rosella flower extract to lanolin lipstick is able to suppress bacterial growth during the lipstick storage process. Rosella flower extract affects the colour of the lipstick which is getting redder, the aroma of the extract is stronger, the texture is smooth.

Keyword: lisptic lanolin, organoleptic, roselle flower extract, total plate count

1. Introduction

Sheep wool is a by-product in Indonesia that is rarely used and is mostly thrown away. This is due to a lack of knowledge about wool processing and the limited use of wool in Indonesia. However, the content of wool which is rich in lanolin fat is one of the potentials for processing sheep wool into cosmetic products that can be used in everyday life. During the growth period, wool fibres release and accumulate lanolin, a natural wool oil. Lanolin has excellent emulsifying properties, using lanolin fat can help to soften and soothe the skin [1]. Cosmetics are beauty products that aim to repair or care for the body, ensuring it remains in good condition. Cosmetic products often use lipstick as an ingredient to decorate and care for the lips [2]. A solid texture in the form of a stick, lipstick is a cosmetic product that aims to provide a colouring and moisturising effect on the lips

The use of lanolin in lipstick is expected to provide a moisturising effect as a substitute for oil. Another reason is that lanolin has the effect of softening and conditioning the skin [1]. Rosella flower extract serves as a natural colouring for lipstick. Rosella flowers contain anthocyanin, a strong natural dye that dissolves in water. The anthocyanin compound in rosella flowers is also useful as an antioxidant which can neutralise free radicals and protect skin cells from damage [3]. Rosella flowers also have antibacterial abilities, so they can replace the use of artificial preservatives. Making lipstick with lanolin fat and natural coloring in the form of rosella flower extract is expected to increase the moisture in the lips and prevent them from turning black. We also expect the use of rosella extract to extend the lipstick's shelf life, thereby reducing the need for artificial preservatives.

2. Method.

This research was carried out in January–March 2021 at the laboratory of Animal Husbandry, Bogor Agricultural University. This study used a completely randomized design (CRD) unidirectional pattern with four treatments, namely, 0%, 20%, 40%, and 60% levels of Rosella flower extract. The data obtained were analyzed by ANOVA (analysis of variance) to determine the effect of each treatment, and if the data showed differences with a significant level of 95%, then Tukey's multiple comparison test was carried out.

2.1 Extraction of lanolin from sheep

Sorting the wool from dirt, washing it in warm water at 40 °C, and then heating it in a water bath to 80 °C are the steps involved in lanolin extraction. The coarse lanolin fat present in wool evaporates on the surface. Separation of lanolin and water is carried out to obtain pure lanolin extraction.

2.2 Extraction of rosella flower

Rosella flower extraction was carried out using the Warnida method [4]. Rosella flower extract begins with drying the rosella flower petals, then washing them thoroughly with running water and then drying them at 50 °C for 36 hours. The dried rosella flowers were then crushed and weighed 500 g. Rosella flower powder was then macerated using 1.875 litres of 70% ethanol solvent, which was stored in a dark bottle and tightly closed. Maceration was carried out for 3 days and every 24 hours, the dregs and macerate were separated. The maceration results obtained were evaporated using a rotary evaporator at a speed of 90 rpm at a temperature of 60 °C to purify the solution.

2.3 Making lipstick

The lipstick was made using the Nurany method [5], with modifications to the mixture of ingredients. In a separate place, lanolin and beeswax were mixed using a porcelain cup heated in a water bath at 80 °C until they became homogeneous and cetyl alcohol was added slowly to reduce the tension. Once homogenized, slowly add the beeswax and lanolin to the rosella flower extraction until it becomes homogenous. While it's still liquid, add 2-3 drops of oleum rosae. The ingredients that are still liquid are immediately poured into the mould container. The container is then closed and left to cool in the freezer until it solidifies completely.

2.4 Microbiology Test

The microbiological test on lanolin lipstick was carried out using the ALT test. Microbiological tests were carried out on the second and seventh days of storage at a temperature of 37°C. We weighed, dissolved, and homogenized 1 g of the sample using a physiological solution (physiological NaCl). The dilution was carried out to 10⁻⁴. A total of 1 mL of the diluted sample was inoculated into a cup using the pour-plate method. The medium used is plate count agar (PCA), which is poured into a petri dish as much as 10–15 mL. The petri dish containing the sample and PCA media was then homogenized by moving it in a figure 8 shape and left to stand until it solidified. The petri dish was then incubated at 37 °C for 48 hours in an inverted position.

2.5 Sensory analysis

The organoleptic test was carried out on 25 panelists with the condition that the panelists were trained and had good sensitivity, had previously carried out organoleptic tests, and were female, aged 20–21. The organoleptic tests analyzed consisted of hedonic tests and hedonic quality tests. The hedonic test was carried out to assess the panelists' level of preference for color, aroma, and texture parameters. Each panelist was asked to apply all the formulas to the skin of the back of their hand, and then the panelists chose which lipstick they liked best by filling out a questionnaire sheet. The hedonic quality test is carried out on a numerical scale of 1–5 to see the panelists' sensitivity to the color, aroma, and texture of the lipstick that has been made.

3. Discussion

3.1 Total Plate Count

The results of the research showed that the addition of rosella flower extract to the manufacture of rosella lipstick had a significantly different effect on the total bacterial plate number during the 7-day storage period. The results of the ALT analysis can be seen in Table 1.

Table 1. Total plate count of lanolin lipstick during storage

Days	Total plate count (log CFU g ⁻¹)			
	P0	P1	P2	P3
2	2,11 ± 0,02 ^a	2,02 ± 0,02 ^b	2,01 ± 0,03 ^c	1,39 ± 0,03 ^d
7	2,95 ± 0,02 ^c	2,92 ± 0,01 ^c	2,80 ± 0,01 ^b	1,97 ± 0,02 ^a

Numbers with different superscripts indicate significant differences ($p < 0.05$). P0: 0%, P2: 20%, P3: 40%, P3: 60% rosella flower extract.

The ALT test on cosmetic products is one of the important factors that must be carried out to check for microorganism contamination that can damage the product and affect the shelf life of cosmetics. The quality requirement for ALT microbial contamination based on BSN [7] on lipstick preparations is a maximum of 2 log CFU g⁻¹ or if calculated equal to 2. The total plate number is a number that shows the number of mesophyll bacteria in each 1 ml or 1 gram of sample tested [8]. According to the study's findings, there was a significant difference in each lipstick when different amounts of rosella extract were added. At 2 and 7 days of storage, there was a significant difference between each lipstick with the addition of rosella flowers. Table 1 demonstrates that adding more rosella flowers reduces the total plate number of bacteria produced. Lipstick with the addition of 0%, 20%, and 40% rosella flowers showed results that exceeded the maximum limit of microbial contamination. While lipstick with the treatment of giving 60% rosella flower extract showed results that were below the SNI quality requirements of 2 log CFU g⁻¹ for 7 days of storage. According to Yustika's research [9], the use of ethanol extracts can significantly inhibit the growth of *Staphylococcus aureus* bacteria. This is also in accordance with previous research [10], which states that rosella flowers can be used as preservatives because of their antioxidant and antibacterial content.

3.2 Organoleptic

The hedonic test shows the panelists' favorite response to the sample. The liking test was conducted to determine the level of panelist preference for color, aroma, and adhesion of preparations that have met organoleptic requirements, while the hedonic quality test is a test of panelist responses to the quality properties of specific organoleptic test parameters. The results of the hedonic test and the hedonic quality of Rosella flower extract lipstick are presented in Table 2.

Table 2. Organoleptic test results of lanolin lipstick

Testing	Treatment			
	P0	P1	P2	P3
Hedonic				
Color	4,15 ± 1,43	4,12 ± 1,04	3,90 ± 1,05	3,87 ± 1,04
Aroma	4,06 ± 1,19	4,16 ± 1,13	4,40 ± 0,97	4,46 ± 1,10
Texture	4,06 ± 1,19	4,15 ± 1,13	4,40 ± 0,97	4,46 ± 1,10
Hedonic quality				
Color	1,84 ± 0,36 ^b	3,18 ± 0,84 ^a	3,30 ± 0,84 ^a	3,12 ± 1,02 ^a
Aroma	3,24 ± 1,75	3,54 ± 1,48	3,84 ± 1,06	4,03 ± 1,23
Texture	5,00 ± 0,82 ^a	4,51 ± 0,87 ^{ab}	4,06 ± 0,99 ^b	4,48 ± 1,03 ^{ab}

Numbers with different superscripts indicate significant differences ($p < 0.05$) Hedonic scale: (1) strongly dislike, (2) dislike, (3) somewhat like, (4) like, and (5) strongly like. Hedonic quality scale: Color = (1) dark yellow, (2) yellow, (3) reddish yellow, (4) pink, and (5) red. Aroma = (1) very lanolin-scented, (2) lanolin-scented, (3) not lanolin-scented, (4) somewhat Rosella-scented,

and (5) Rosella extract-scented Texture = (1) very rough, (2) rough, (3) somewhat smooth, (4) smooth, and (5) very smooth.

Color parameters are important in the selection of lipstick, which must be tested in order to find the best color results. The results showed no significant difference between treatments ($P < 0.05$), with the results of the hedonic test ranging from 3.87 to 4.15, which indicates the level of panelist liking in the range of "somewhat like" to "like." The addition of rosella flower extract showed a significant difference ($P < 0.05$) in lipstick color through the hedonic quality test. Rosella is red to blue in color [11]. Formula P0 has an average hedonic quality of 1.84 (dark yellow), while formulas P1, P2, and P3 have an average hedonic quality of 3.12–3.30 (reddish yellow). The higher the concentration of Rosella flower extract added, the stronger the color intensity. Lanolin [12] is responsible for the yellow color in this lipstick preparation.

The average results of the hedonic test of lipstick aroma parameters showed no significant difference between treatments ($P < 0.05$). The lipsticks tested had an average of 4.06–4.46, which means on a hedonic scale of "like" to "really like." The results of the hedonic quality assessment of lipstick aroma by panelists showed no significant difference between treatments ($P < 0.05$). Formulas P0, P1, P2, and P3 have an average hedonic quality score of 3.24 - 4.03 (no lanolin aroma), but with the addition of Rosella flower extract to the lipstick, the aroma of Rosella flower extract is heightened. Each formula adds the same percentage of oleum rossae essential oil to mask the distinctive aroma of Rosella flower extract. The aroma produced is also determined by the addition of essential oil [13]. Oleum rosae produces a particularly pleasing scent. According to Tayupanta's statement [14], the distinctive aromatics of plant extracts, such as derivatives of fatty acids and aromatic compounds of physicochemical groups, contribute to the lipstick aroma that panelists enjoy.

The texture parameter of the lipstick produced showed a value that was not significantly different ($P > 0.05$) with an average hedonic test score ranging from 4.06 to 4.46, which indicated "like" with the texture of the lipstick with the addition of Rosella flower extract. The addition of Rosella flower extract did not change the panelists' liking for the lipstick texture. The results of the hedonic quality test on lipstick texture are significantly different ($P < 0.05$), with an average hedonic quality test score of 4.06–5.00, which means that the hedonic quality score is "smooth" to "very smooth."

4. Conclusion

Lanolin lipstick with the addition of 60% rosella flower extract can suppress microbial growth (ALT) during storage. The addition of rosella flower extract to lanolin lipstick affects the lipstick's color, which is increasingly red; the extract's aroma is stronger; and the lipstick's texture is affected.

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