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Research Article

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Lip balm formulation of onion dayak extract *(Eleutherine palmifolia l.)* and rosella flowers *(Hibiscus sabdariffa linn.)* as a antioxidant and lip color

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ABSTRACT

Plant extract contains active compounds beneficial for ultraviolet protection and skin health. No previous studies have formulated lip balm using Dayak onion and rosella flowers. The research aims to gain information on the best lipbalm formulation with parameters from panelists and preparation evaluation (pH test, homogeneity test, stability, smear test, and hedonic test). Experimental research method with completely randomized design (CRD), to identify the significant differences in the lip balm preparations using one-way ANOVA. Lip balm is formulated from an extract of dayak onion (0%,1%,3%,5%,7%) and rosella flower (0%,1%,3%,6%,9%) as a natural moisturizer and natural dye. The dayak onion bulbs and rosella flowers are extracted and tested for phytochemicals and DPPH antioxidants. The research results indicate that the extract of the dayak onion bulbs and rosella flowers are positive containing flavonoid, alkaloid, tannin, and triterpenoid compounds. The dayak onion bulbs have an IC50 value of 1,4366 ppm, whereas the IC50 for rosella flowers is 19,2135 ppm. The lipbalm preparation of F1, F2, F3, and F4 meet the requirements for pH testing, homogeneity test, smear test, and stability test. The results of the hedonic test on 35 panelists indicate that the most preferred color is in F3, texture in F1 and F3, and aroma in F1. The results of the one-way ANOVA test with a confidence level of 95% have a significance of 0,000 indicating a significant difference (P<0,05). The best extract formulation from dayak onion bulbs and rosella flowers in the lip balm innovative cosmetic herbal ingredients was in Formula 1 with extract concentration 1:1 and the best results of the color parameters according to the panelists were at F3.

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INTRODUCTION

Cosmetics are substances in a material or preparation commonly used by humans on external body parts, such as the epidermis of skin, hair, lips, nails, and the outer parts of the genital organs, teeth, and the mouth parts on the mucous membranes. The purpose is to remove body odor, cleanse, and perfume the body, and improve appearance or protect against environmental or external conditions or maintain the body in good condition (Barel, A. O., Paye, M., & Maibach, 2014; Shaikh et al., 2023, Sutaryono et al., 2018). Various plants are naturally available and have different benefits as cosmetic preparation materials for skin care. Cosmetics are used to maintain and improve skin beauty. For years, skin is subjected to a variety of environmental stressors, including pollution, UV rays, and lifestyle choices that may hasten aging, induce inflammation, and increase a person's risk of developing skin cancer (Meyer & Stockfleth, 2021).

All skin types can use herbal cosmetics, which are made from natural materials and have less negative effects. Because herbal cosmetics don't contain any synthetic chemicals that can hurt the skin, many prefer them to synthetic ones (Iraqui & Das, 2022). Plant herbal extract's phytochemical composition is beneficial for skin health and UV protection (Shubayr, 2023). The important roles of plant-originated antioxidants are related to the diversity and potential of phytochemical therapy found in medicinal plants. People currently have a life pattern that tends to utilize plants as cosmetics ingredients; therefore, herbal cosmetic demand in the world market is increasing (Shaikh et al., 2023). Cosmetics that use natural ingredients from plants have fewer side effects than synthetic chemicals since plants contain safe natural ingredients. The presence of hazardous synthetic elements in cosmetics is causing people to become more cautious; as a result, products must be made with organic components. A common beauty problem, particularly during inclement weather, is chapped or dry lips. Lips require additional moisture and protection throughout the day because they lack oil glands. Many people experience dry lips during the winter that continues in the summer season. In addition to lip problems, we often worry about lip skin problems. The use of lip balm with synthetic chemical ingredients often makes the skin dry and chapped lips; therefore, lip balm from natural plants is needed to avoid these risks.

Herbal cosmetics (Anisfiani et al., 2014) and (Arlina et al., 2023) for lips and skin problem care formulated from plant ingredients are in demand. Formulation of plant ingredients in Kalimantan commonly used by people for medicinal and cosmetic ingredients include dayak onion bulb or tiwai onion (*Eleutherine palmifolia (L.) Merr*) when they are 3 to 4 months old, Dayak onion bulbs can be used if they have the characteristics of an oval shape, red color, length of around 5 cm. Dayak onion contains phytochemicals that provide a natural red color and when combined with ingredients in the making of lip balm cosmetics the color will turn orange (Refordayanti et al., 2021). If it is combined with rosella flowers (*Hibiscus sabdariffa Linn.)* will give a reddish-orange color (Sapariani et al., 2023). The novelty of this research is to use a formulation of two natural ingredients, namely rosella flowers as a natural dye and Dayak onion bulbs as an antioxidant to produce lip balm that is liked by the public with color and stability indicators and contains antioxidants that can provide protection for the lips. The aim of this research is to produce preparations for lip balm cosmetics as lip balm with plant ingredients can maintain and make lips moist so that they will not dry and chap easily. This becomes the basis reason in making an innovative formulation of cosmetic herbal preparations and will be evaluated to generate the best lip balm formulation with parameters from panelists. The preparation evaluation consists of a pH test, stability, homogeneity test, smear test, and hedonic test or panelists' level of preference for herbal lip balm products.

RESEARCH METHODS

Types of research was experimental, and research methode experimental laboratory research to make and test herbal cosmetics in the form of lip balm. The research design used was a completely randomized design (CRD) with a factorial design. There are 5 lip balm formulations with 5 repetitions. Lip balm is formulated from an extract of dayak onion (0%,1%,3%, 5%,7%) and rosella flower (0%,1%,3%,6%,9%). The parameters measured in this study include antioxidant activity using the DPPH method, visual color stability, pH testing using a pH meter, homogeneity of the preparation and smear test or texture of the preparation based on organoleptic assessment by panelists and an organoleptic test using a questionnaire sheet.

The stages consisted of making an extract of plant ingredients, testing of phytochemicals and DPPH antioxidants of natural ingredients at the UPT Herbal Laboratory of Materia Medica Batu Malang. The making of the extract was started by making simplicia. The dayak onion bulb and rosella flower simplicia or powder were each 1000. Dayak onion and rosella flowers were macerated for 3x24 hours using 96% ethanol for each solvent of 7.732,5 mL. The maceration results were evaporated using a rotary evaporator with a temperature of 500C until a thick extract of dayak onion bulbs and rosella flowers was obtained. The extract was then used as an ingredient for making herbal lip balm.

Making formulations, and evaluating preparations of lip balm formulations of dayak onion bulb and rosella flower extract with various concentrations as natural lip moisturizer and colorant. The basic formula for making lip balm in this research included beeswax, shea butter, and olive oil. The modification of herbal lip balm used in the research is presented in Table 1.

Table 1. Lip Balm Formulation Using Extract of Dayak Onion Bulbs and Rosella Flowers

Composition	F0	F1	F2	F3	F4	Utility
Dayak onion bulb extract (g)	0	10	30	50	70	Active Substance
Rosella flower extract (g)	0	10	30	60	90	Active Substance
Beeswax (g)	20	20	20	20	20	Basis/hardener
Shea butter (g)	20	20	20	20	20	humectant
Olive oil (ml)	15	15	15	15	15	Lubricant/emollient

Next, physical, chemical and organoleptic tests or of the hedonic test for preference level on 35 panelists. The results were tested using statistical tests of one-way ANOVA and post-hoc test were carried out to identify significant differences in the lip balm preparations to find out the best preparation. The making of the extract was started by making simplicia. The dayak onion bulb and rosella flower simplicia or powder were each 1000. Dayak onion and rosella flowers were macerated for 3x24 hours using 96% ethanol for each solvent of 7.732,5 mL. The maceration results were evaporated using a rotary evaporator with a temperature of 50^0C until a thick extract of dayak onion bulbs and rosella flowers was obtained. The extract was then used as an ingredient for making herbal lip balm.

FINDING AND DISCUSSION

The making of lip balm from the extract of dayak onion bulbs and rosella flowers used beeswax as the main basis. The lip balm formulation uses beeswax basis since it has a good binding property that helps in producing homogenous mass (Ambari et al., 2020). Olive oil was used in the making of lip balm since it functions as an emollient ingredient that can moisturize the skin so it looks smooth and soft and is safe to use for lips (Yesti et al., 2023).

The first step in the process of lip balm formulation was melting beeswax, shea butter, and olive oil at a temperature of 800C while stirring. After the melting process, the formulation of the extract of dayak onion bulbs and rosella flowers was added while continuing to stir until homogeneous. Mixing the extract was not carried out at the beginning when the temperature was high to prevent damage to the active substance of the extract.

Based on the phytochemical test, the dayak onion bulb samples tested positive for flavonoid, alkaloid, tannin, and triterpenoid compounds. This finding is strengthened by the research results from Isnindar (2014) that chemical compound components contained in the extract of dayak onion bulb ethanol consist of alkaloids, flavonoids, saponins, tannins, glycosides, and steroids. The results indicate that dayak onion bulb has antioxidant activities due to its positive results on the flavonoid, alkaloid, tannins, and saponins group tests.The phytochemical test on red rosella flowers indicated positive content of flavonoid, alkaloid, tannin, and triterpenoid compounds. The positive components of chemical compounds containing in the extract of red rosella flowers included terpenoid, anthocyanin, coumarins, tannin, saponin, quinone, flavonoid, cardioglocoside, glycoside, phenolic, and alkaloid compounds (Adinda et al., 2023). These results suggest that red rosella extract has antioxidant activities since it indicates positive results on the flavonoid, alkaloid, tannin, and triterpenoid group test.

The dayak onion bulb extract and lip balm formulation with the addition of active substances of the dayak onion bulb extract that has an anti-microbe property can help in preventing infection on chapped or injured lips. The dayak onion extract can function as a moisturizer, helping to maintain moisture and hydration of the lips to keep them soft and not dry. Dayak onions are rich in antioxidants, which are useful for protecting lip skin from damage caused by free radicals and environmental factors, such as pollution. In addition to its benefits in health, dayak onion extract can provide a natural color to lip balm making it more interesting. The DPPH (1,1-difenil-2-pikrilhidrazil) method was used to investigate the antioxidant activity of the extract of dayak onion bulb *(Eleutherine palmifolia L.)* and rosella flower *(Hibiscus sabdariffa Linn.)* because it is precise, efficient, and quantitative. Table 2 and Table 3 show the antioxidant activity results for the extracts of rosella flower *(Hibiscus sabdariffa Linn.)* and dayak onion bulb *(Eleutherine palmifolia L.).*

Table 2. Results Of Phytochemical and Antioxidant Tests on *Eleutherine Palmifolia* L.

Parameter Uji	Metode	Hasil	Keterangan
Flavonoid	Pewarnaan dan Pengendapan Harborne, J.B., 1996	(+) Positif	
Alkaloid	Pewarnaan dan Pengendapan Harborne, J.B., 1996	(+) Positif	
Tanin / Fenol	Pewarnaan dan Pengendapan Harborne, J.B., 1996	(+) Positif	
Steroid	Pewarnaan dan Pengendapan Harborne, J.B., 1996	(-) Negatif	
Triterpenoid	Pewarnaan dan Pengendapan Harborne, J.B., 1996	(+) Positif	
Saponin	Pewarnaan dan Pengendapan Harborne, J.B., 1996	(+) Positif	
Antioksidan (DPPH)	Spektrofotometri UV-Vis AOAC 16TH Edition,1995	1,4366 ppm	IC_{50}

The Eleutherine palmifolia L bulb samples were positive for containing compounds as listed in Table 2, indicating that the Dayak onion bulbs have positive results for tests on flavonoids, alkaloids, tannins, saponins, and antioxidant the IC50 value was 1,4366 ppm. The result indicates a smaller value than those obtained in the research by Mokoginta, et al (2020) on antioxidant activities in the extract of dayak onion bulb ethanol, which was 41,46 mg/L and by Kuntorini et al (2010) that the highest DPPH antioxidant was in the sample from Banjarbaru (IC50 = 25,3339 µg/ml) and Paring River Banjar Sub-district (IC50 = 86,9039 µg/ml). Therefore, stronger antioxidant activity is indicated by a smaller IC50 value. This suggests that the sample of dayak onion bulb extract in this research has strong antioxidant

activity. Next, the results of antioxidant activities from the extract of rosella flower (Hibiscus sabdariffa Linn.) are presented in Table 3.

Table 3. Results of phytochemical and antioxidant tests on *Hibiscus sabdariffa* Linn.

Parameter Uji	Metode	Hasil	Keterangan
Flavonoid	Pewarnaan dan Pengendapan Harborne, J.B., 1996	(+) Positif	
Alkaloid	Pewarnaan dan Pengendapan Harborne, J.B., 1996	(+) Positif	
Tanin / Fenol	Pewarnaan dan Pengendapan Harborne, J.B., 1996	(+) Positif	
Steroid	Pewarnaan dan Pengendapan Harborne, J.B., 1996	(-) Negatif	
Triterpenoid	Pewarnaan dan Pengendapan Harborne, J.B., 1996	(+) Positif	
Saponin	Pewarnaan dan Pengendapan Harborne, J.B., 1996	(+) Positif	
Antioksidan (DPPH)	Spektrofotometri UV-Vis AOAC 16TH Edition,1995	19,2135 ppm	IC_{50}

Table 3 shows that the IC50 value obtained was 19,2135 ppm. The results indicate a larger value than in the research by Fardani et al., (2023) on antioxidant activity test in a rosella flower extract with the DPPH method where the parameter of IC50 value resulted in 1.01 µg/mL and by Agustiarini & Wijaya (2022) that generated IC50 value of the rosella flower ethanol extract of 43Âµg/ml, which includes in a very strong antioxidant. Thus, the current research indicates that rosella flower extract has a very strong antioxidant activity.

The antioxidant activity test on the natural ingredients used is to observe the presence of antioxidants. Antioxidant activity measurement using the DPPH method in lip balm preparation is pivotal to maintaining the stability of the lip balm product formulation that is made and protect from free radicals. Lip balm has antioxidant content that can help improve and protect lips from damage. Inhibition illustrates the reduction in absorbance compared to the control, which does not contain the inhibitor. The higher the inhibition, the better the antioxidant capacity of the samples. The percentage of inhibition indicates the effectiveness of free radical reduction by samples. The percentage of inhibition that indicates a high value, such as 77.77% at a concentration of 6,2500 ppm suggests that the sample has good potential as an antioxidant. Overall, the results indicate that the tested samples have significant antioxidant activity. The higher the % of inhibition and the lower the IC50 value, the better the capacity of the sample to neutralize free radicals. This means that the substances have the potential to be used in various applications including foods, cosmetics, or health.

The making of lip balm with various concentrations of extract of dayak onion bulbs and rosella flowers produces texture, color, and aroma. Evaluation of the lip balm preparations of dayak onion bulbs and rosella flowers consisted of pH test, homogeneity test, smear test, stability, and hedonic test or panelists' preference level for the herbal lip balm products.

Using a pH meter, the lip balm preparation's pH value was examined in order to determine its acidity level. As the lip balm of dayak onion bulb and rosella flower extract fell between 3, 8, and 4, 7, the pH test findings were deemed safe.The acidity of a good lip balm product is between 3.8 and 4.7, which is the physiological pH of lip skin. A pH value that is too high results in dry skin, while one that is too low will create irritated and itchy lip skin (Wati et al., 2023).

The results of homogeneity and texture tests indicate that all lip balm preparations are homogeneous. Preparations are homogeneous if no coarse grains are found when they are applied to transparent glass. The results on F1 and F2 colors produced a homogenous composition, whereas F3 and F4 show uneven color. Lipbalm preparations of F1 and F2 have a yellow and a brownish-yellow color, respectively. The lip balm preparation of F3 with a concentration of extract 5:6 has a lip balm preparation color of light brick red. The more extract of dayak onion bulbs and rosella flowers added, the color intensity

is getting redder; however, F4 with the highest concentration of extract, making the color redder yet does not blend.The results of the lip balm preparation examination suggest that lip balm preparations have good spreadability if they are even and homogeneous when applied. The results of the smear test on the lip balm preparations of the extract of dayak onion bulbs and rosella flowers by applying the lip balm on hand are displayed in Figure 1.All lip balm preparations of dayak onion and rosella flower extract in Figure 1 have good spreadability. The smear test by applying lip balm on hand skin shows homogenous application and provides an even color. This result suggests that lip balm preparations have good spreadability and the extract is well dispersed in the lip balm formula.

Figure 1. Smear Test Of Lip Balm Of Dayak Onion Bulb And Rosella Flower Extract

Preparation evaluation with stability observation on the lip balm preparations of the extract of dayak onion bulbs and rosella flowers was conducted for 25 days of storage at a room temperature. The results of the stability observation of the lip balm preparation are in Table 4.

Table 4. Results Of Stability Observation On Lip Balm Preparations Of The Extract Of Dayak Onion Bulb And Rosella Flower

Formulation	Parameter	Day 1	Day 5	Day 10	Day 15	Day 20	Day 25
F1	Aroma	-	-	-	-	-	-
	Texture	-	-	-	-	-	-
	Color	-	-	-	-	-	-
F2	Aroma	-	-	-	-	-	-
	Texture	-	-	-	-	-	-
	Color	-	-	-	-	-	-
F3	Aroma	-	-	-	-	-	-
	Texture	-	-	-	-	-	-
	Color	-	-	-	-	-	-
F4	Aroma	-	-	-	-	-	-
	Texture	-	-	-	-	-	-
	Color	-	-	-	-	-	-

Note: (-) no change
(+) there is a change

Parameters of the preparation stability evaluation included organoleptic observation (texture, aroma, and odor), and whether changes occurred during storage at room temperature (Ridhani & Nurul Hidayah, 2022) . During the storage of the lip balm preparations of dayak onion bulb and rosella flower extract, no changes occurred in color, texture, and odor. This means that the preparations have good stability. Evaluation of the lip balm preparations continued with the test of the panelists' preference levels.

Table 5. Hedonic Test Results of the Lip Balm Preparations of Dayak Onion Bulb and Rosella Flower Extract (Preference Level)

Formula	Type of Test	Really Like	Like	Quite Like	Don't Like	Really Don't Like	Total Value	Final Satisfaction Value
F1	Color	8	9	16	1	1	127	3,6
	Texture	32	3	0	0	0	172	4,9
	Aroma	33	2	0	0	0	173	4,9
F2	Color	1	7	12	14	1	98	2,8
	Texture	29	6	0	0	0	169	4,8
	Aroma	31	1	3	0	0	168	4,8
F3	Color	10	12	8	3	2	130	3,7
	Texture	33	0	2	0	0	171	4,9
	Aroma	28	3	0	4	0	160	4,6
F4	Color	2	9	11	10	3	102	2,9
	Texture	18	12	5	0	0	153	4,4
	Aroma	17	8	0	4	6	131	3,7

Table 6 shows the results of the characteristic test of the lipbalm preparations of the dayak onion bulb and rosella flower extract. The table indicates that lip balm preparation of F1 was selected as the best formula. The F1 formula was selected because it met the requirements from the SNI 16-4769-1998 in the pH test, preparation homogeneity, stability test, and smear test and it has the highest preference level from the panelists. Table 7 the result ANOVA test.

Table 6. Characteristics of Lip Balm Preparations of the Dayak Onion Bulb and Rosella Flower Extract

Parameter	F1	F2	F3	F4	SNI
pH	**3,9**	**4,6**	**4,7**	**3,8**	**3,8-4,7**
Smear test	**yellow, even**	**brown,even**	**brick red, even**	**brownish red, even**	**Even**
Homogeneity test	**Homogeneous**	**Homogeneous**	**Homogeneous**	**Homogeneous**	**Homogeneous**
25 days stability	**Color, odor, shape remains**	**Color, odor, shape remains**	**Color, odor, shape remains**	**Color, odor, shape remains**	**Color, odor, shape remains**
Preference in color	3,6	2,8	3,7	2,9	
Preference in texture	4,9	4,8	4,9	4,4	
Preference in aroma	4,9	4,8	4,6	3,7	

Table 7. The Results ANOVA Test

ANOVA test	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	135,450	3	45,150	18,979	,000
Within Groups	323,543	136	2,379		
Total	458,993	139			

The characteristics of lip balm evaluation in the research referred to the BPOM (2015), BPOM RI (2021), BSN-302 (2006), BSN (1998) SNI 16-4769- 1998 and the hedonic or preference level test of the panelists for the lip balm was carried out by having the panelists directly apply the lip balms to their wrist and smelled their aroma. The panelists then filled out the questionnaires.

Lip balm products in the research had a melting point, pH, and homogeneity test that are considered safe since they are within the range set by the SNI 16-4769-1998. Based on the hedonic test results, the best lip balm product containing the extract of dayak onion bulb and rosella flower was in the formula F1 with extract concentration 1:1. The formula has pH 3.9, homogenous texture, and the highest preference level test compared to other formulas, namely F2, F3, and F4. A good lip balm product should have an acidity level close to the physiological pH of the lip skin, which ranges from 3.8 to 4,7. If the pH value is too low, it may cause irritation and discomfort to the lips, while a pH that is too high can lead to dryness of the lip skin (Wati, H., et al., 2023).

The hedonic or preference test is one of the visual acceptance tests of a product. The lip balm products were given to 35 untrained panelists. They were asked to give opinions on their likes and dislikes. Each panelist was asked to apply the lip balm preparation formula on their wrist (Dahmer et al., 2023). Then, they were requested to give their personal opinion on the lip balm preference levels. The preference level ranged from really like (5), like (4), quite like (3), don't like (2), and really don't like (1). The hedonic scale can be changed into a numeric scale to allow parametric data analysis. The hedonic or preference test was carried out to obtain the most preferable lip balm preparation product. The parameters of the lip balm preparations in this research consisted of texture, color, and aroma. Table 5 lists the hedonic test results for panelists regarding their preference levels for lip balm preparations of dayak onion bulb and rosella flower extract. Based on Table 5, the results of the hedonic test, the most preferable lip balm preparations of dayak onion bulb and rosella flower extract among the panelists in the color category was formula 3 (F3) with a satisfaction value of 3.7. In the texture category, the most preferable was in Formula 1 (F1) and Formula 3 (F3) both with a satisfaction value of 4.9. The most preferable aroma was F1 with a satisfaction value of 4.9. F1 was the most preferable aroma due to its distinctive beeswax aroma. Formula F4 was the least preferable since it has a dayak onion extract aroma.

Table 5 indicates that formula F1 has the highest assessment scale. Formula F1 with a concentration of dayak onion bulb and rosella flower extract 1:1 has the highest average of the panelist assessment scale in the three categories, namely 4.5 for color, 3.6 for texture, and 4.9 for aroma. The average assessment scale for F3, F2, and F4 were 4.4, 4.1, and 3.7, respectively. Changes in the concentration of the dayak onion bulb and rosella flower extract can lead to a redder preparation color and a stronger distinctive aroma of dayak onion bulb. This causes the panelists to prefer the F1 sample that has a beeswax texture and aroma. The most preferable color was Formula F3 with a light brick red color. In the formula F4, the color was darker and the texture and distinctive aroma of dayak onion was so noticeable that the panelists did not like it.

Texture is used as an essential parameter in cosmetic preparation since emulsion indicates the level of smoothness produced. The smoother the texture of the preparation, the better the lip balm produced since the texture is a parameter for mixing the oil and water components (Hendrawati, 2022). The results of the panelist preference for lip balm texture in Table 5 on the lip balm preparations of dayak onion bulbs and rosella flower extract was ranged between 4.4 and 4.9 indicating that the panelists assessed from like to really like. The highest preference level given by panelists was for Formula F1 and the lowest was for Formula F4.

A one-way ANOVA approach with a 95% in Table 7 confidence level was used to assess the preference test data, yielding a significance value of 0.000. When dayak onion bulb and rosella flower extract were added to the lip balm formulation, the resulting texture showed a significant difference ($P<0.05$), according to the significance value. This suggests that panelists have varied preference levels for the lip balm texture produced and the highest formulation chosen was F1.

Color parameter is an important assessment component that can be seen directly by the panelists and is essential in determining the quality and acceptance level of a product and innovation. Lip balm products that are usually only used as moisturizers can also be used as a natural lip color. The results of the panelists' preference for the color parameter of the lip balm of dayak onion bulb and rosella flower extract in Table 5 was between 2.8 and 3.7 indicating that the panelists provided a quite like and like assessments. The color of a product is affected by the ingredients (Hapsari, 2010). Lip balms without the addition of extract of dayak onion bulb and sappanwood will have a light yellow color since the beeswax base used has a yellow color. Whereas, lip balms with the addition of extract of dayak onion bulb and rosella flowers have a brownish red or brick red color. F3 lip balm preparations with red brick color were most preferred by panelists with a score of 3.7 and F2 received the lowest score. Sensorially, the lip balms looked colorful in the four lip balm preparations and left color when applied on the wrist.

The addition of the extract of dayak onion bulbs and rosella flowers to the lip balm formulation resulted in a significant difference ($P<0.05$) in the colors produced, according to the results of the statistical test of one-way ANOVA with a 95% confidence level in Table 5. The results imply that panelists have varying levels of preference for the resulting lip balm color and the highest formulation chosen was F3.
Next was the aroma parameter which was measured using the sense of smell and as one of the sensory parameters inherent in a product. The lip balm aroma from basic ingredients was used to cover the smell of the extract used so that the smell remains nice and fresh (Wang et al., 2021). The results of the hedonic test or panelists' preference levels for the aroma parameter of the lip balm of dayak onion bulb and rosella flower extract are presented in Table 5. The preference levels of the panelists for the lip balm preparations of the extract of dayak onion bulb and rosella flower had a score ranging between 3.7 and 4.9. These scores indicate that the panelists provided an assessment of like and really like. The highest preference level for the lip balm was given for F1 preparation, which was 4.9, whereas the lowest was for F4 preparation, which was 3.7. The highest preference level was in F1 since the aroma produced was without the distinctive odor of the extract. The addition of more extract will cause the distinctive odor of the extract to become more dominant and thus less preferable, which was in the F4.

The results of the statistical test of one-way ANOVA with a confidence level of 95% in Table 7 have a significance value of 0.000 indicating a significant influence ($P<0,05$) of the extract of dayak onion bulbs and rosella flowers in the lip balm formulation on the aroma produced. The results suggest that the panelists have varied preference levels for the lip balm aroma produced and the highest formulation selected was F1.

CONCLUSION

Based on the research findings, conclusions can be drawn that the active substances contained in the extract of dayak onion bulb (*Eleutherine palmifolia* (L.) Merr) and rosella flowers (*Hibiscus sabdariffa Linn.)* positively contain flavonoid, alkaloid, tannin or phenol, and triterpenoid. The antioxidant activity (DPPH) IC50 in the extract of dayak onion bulb was 1,4366 ppm and in the rosella flower extract was 19,2135 ppm. Evaluation from the formulations of the extract of dayak onion bulbs and rosella flowers in the herbal lip balm preparations of F1, F2, F3, and F4 met the requirements of the pH test, homogeneity test, smear test, and stability test. The most preferable formula for each parameter based on the hedonic test results was in F3 for color, whereas for texture was in F1 and F3, and aroma was in F1. The best extract formulation from dayak onion bulbs and rosella flowers in the lip balm innovative cosmetic herbal ingredients was in Formula 1 with extract concentration 1:1. According to test requirements, lip balm products are safe for use by the public. A recommendation for future research is to use essential oils from

plants as moisturizers and plant extracts containing anthocyanins, which are potent natural coloring agents.

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