

FORMULATION AND PHYSICAL STABILITY TEST OF LIP BALM PREPARATION OF MANGOSTEEN PEEL EXTRACT (GARCINIA MANGOSTANA L.)

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ABSTRACT

The skin of mangosteen fruit (*Garcinia mangostana*) contains tannin and flavonoid compounds that are antioxidants and able to absorb UV rays. This study aims to determine the effect of lip balm *preparation formulation* on physical stability using mangosteen peel extract as a lip moisturizer.

The method used in this study is a laboratory experimental method which includes the extraction stage of mangosteen fruit peel with 96% ethanol solvent, with a concentration of 10%, 15% extract, 20% extract. Evaluation of lip balm preparations includes examination of stability, organoleptic, homogeneity, pH, adhesion, viscosity and melting point.

The results showed that *the preparation of lip balm mangosteen peel extract (Garcinia mangostana)* has a brown color, a distinctive citrus aroma, and a soft texture that is easy to smear. It has a melting point range of 50-70°C and a Ph range between 4.5-6.5. There are no changes in color, aroma, and texture on organoleptic tests during the storage period. Lip balm preparations also have a homogeneous composition. Based on the results of statistical tests, it can be concluded that there is an influence of extract concentration in formulations I, II, and III on the physical stability of the preparation. Based on the results obtained *in cycling tests both before and after cycling tests in F1, F2 and F3 have good and stable physical stability in accordance with existing libraries.*

Keywords: Mangosteen peel, Lip balm and lips

INTRODUCTION

Cosmetics is a word of Greek origin meaning 'to decorate' (the addition of something decorative to people or something). Cosmetics are defined as substances that come into contact with different parts of the human body such as skin, hair, nails, lips, teeth, and mucous membranes, etc. [2].

Cosmetics help in enhancing or altering the external appearance of the body and masking body odor. Cosmetics can protect the skin and keep it in good condition. In general, cosmetics are external preparations that are applied to the external parts of the

body. Classification of cosmetics based on ingredients and their use and for the purpose of product evaluation, cosmetics are divided into two groups, including group I cosmetics (cosmetics used for babies, cosmetics used around the eyes, oral cavity and other mucosa, cosmetics containing ingredients with content and marking requirements, and cosmetics containing ingredients and functions that are not yet common and have not known safety and usefulness) and group II cosmetics, namely cosmetics that do not belong to group I [6].

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Cosmetic preparations are available in several forms including solid mass (soap, stick deodorant), powder (tabor powder or compact, semi-solid powder (pomade), gel (hair gel), paste (toothpaste), liquid (body fragrance), thick liquid (shower gel), suspension (scrub, liquid powder, mangir), and cream (night cream, lip moisturizer) [6].

One type of lip moisturizing product that is packaged in semisolid form (semi-solid) is lip *balm* with the main ingredients of oil, fat, and wax. The fact is that the function of *lip balm* is to provide care for the skin of the lips that are considered to give attractive facial expressions. Because one part of the face whose appearance affects the beauty of the face is the skin of the lips. *Lip balm* is usually used to lip skin that needs protection, when the ambient air temperature is too cold or the air humidity decreases, to prevent the evaporation of moisture from the epithelial cells of the lip mucosa. The form of use of *semi-solid lip balm provides ease of use when applying it to the lips, as well as the size of the lip balm which is relatively easy to carry anywhere for the wearer* [22].

Lip balm only gives a slight wet and bright impression to the lips. *Lip balm* is indeed to protect and maintain lip moisture. The content contained in *lip balm* is a moisturizing agent and vitamins for the lips. Vitamins that are useful for moisturizing can be obtained naturally by utilizing waste as a lip moisturizer. *Lip balm* products can protect dryness, injury and chapping as well as cold and dry weather on the lip skin [24].

The skin of the lips has no hair follicles and no sweat glands that function to protect the lips from the outside environment. As a result of poor protective function, lips are very vulnerable to environmental influences as well as various other lip cosmetic products that can cause skin damage, namely

lips become dry, chapped, and dull color [25].

With the various benefits of *lip balm*, many studies have been conducted in Indonesia on making lip balm with natural moisturizing ingredients (Hafizhatul, 2020). Making cosmetics from natural ingredients is better than synthetic ingredients. Synthetic ingredients can cause side effects and can even damage the natural shape of the skin (Sahputri & Riski, 2019). Prevention of side effects due to the use of dangerous synthetic materials can be overcome by the use of natural ingredients as a substitute for synthetic ingredients. Natural ingredients are one of the alternatives that can be done to obtain *lip balm preparations* that are safe for the wearer [8].

One of the natural ingredients that can be made an option in making *lip balm* preparations is the skin of the mangosteen fruit. Mangosteen peel is one of the fruits that contain xanthenes, which consist of different compounds: Mangostin, a and mangostin, mangostin b, epicatechin, mangostanol, mangosterol, mangostin A and B, gartanine B, trapezifolixanthone and tovophyllin B found that xanthone compounds are a class of compounds found in mangosteen peel. The body needs xanthenes to balance pro-oxidants, where prooxidants are the catalysts for oxidative stress [16].

In previous studies, *lip balm* preparations used mangosteen peel extract to help hydrate the skin, soften the skin, reduce the level of dryness of the skin, reduce skin evaporation so that the water content in the skin is transparent [1].

The importance of this study was carried out because of the many problems of lip dryness in both women and men, so researchers are interested in conducting

research on *lip balm preparations of mangosteen peel extract*. *Lip balm* itself is one of the cosmetic preparations that is used or functions as a lip moisturizer.

From the explanation above, it is necessary to conduct research on the formulation and physical stability test of *Lip Balm preparations of Mangosteen Peel Extract (Garcinia mangostana L.)*.

RESEARCH METHODS

The research approach used in this study is a quantitative approach where, quantitative data is a research method based on *positivistic* (concrete data), research data in the form of numbers that will be measured using statistics in calculation tests related to the problem to be studied to produce a conclusion.

Population is a generalized area consisting of: objects / subjects that have certain qualities and characteristics that are determined by researchers to be studied and then drawn conclusions. In this study, the population is the entire Mangosteen Skin that grows in Gorontalo City.

A sample is a partial taking of a part of the population, for example taken using certain methods. The samples used in this study are some mangosteen fruit skins in Gorontalo City.

1.1 Sample Sampling

The sample used in this study was Mangosteen Skin obtained from Gorontalo City.

1.2 Simplisia Processing Techniques

Simplisia processing techniques consist of sample processing, namely wet sorting, washing, draping, drying, dry sorting as well as packing and storage.

1.3 Sample Extraction Process

Extraction is a chemical separation technique to separate or withdraw compounds or components from a sample using appropriate solvents. Extraction of Mangosteen Skin samples is carried out by means of *simplisia* that has been pureed extracted using the maceration method (soaking), where the sample is soaked using 96% ethanol with a ratio of sample and solvent which is 1: 10 in a tightly closed container for 3x24 hours (for 3 days) with all stirring. After the sample is soaked for 3 days, filtering is carried out to obtain filtrate. The filtrate from the filtration is evaporated using an Evaporator device that is modified to produce a thick mangosteen peel extract [11].

1.4 Making Lip Balm Preparations

a. Lip Balm Formula Design

Table 1. Lip Balm formula design of Mangosteen Peel Extract

Material	F 1	F 2	F 3	Information
Mangosteen Peel Extract	0%	5%	0%	Active Substances
Alba Wax	1 5%	1 5%	1 5%	Moisturizer
Glycerine	8 %	8 %	8 %	Emulsifier
Propylparaben	0, 2%	0, 2%	0, 2%	Preservatives
Zn	1	1	1	Antioxidant

O	5 %	5 %	5 %	ti UV
BH	0,	0,	0,	An
T	05%	05%	05%	tioksi
				da
Or	0,	0,	0,	De
ange	2%	2%	2%	odoriz
Essen				er
ce				
Va	A	A	A	Ba
seline	D 20	D 20	D 20	se
album				

Ket: Modified from research, where all additives and concentrations used are the same only different in the type of sample and concentration [20].

b. Manufacture of Lip Balm preparations

Making Lip Balm preparations is done by means of cera alba and album vaseline melted in porcelain cups using a water bath temperature of 60-70 ° C. Once melted add propyl paraben, BHT, glycerin, and ZnO to the base mixture, stirring until homogeneous, lowering the temperature to 45°C. Added extract that has been dissolved with glycerin to the base, stirring until homogeny. Then add orange essence to the base, stirring until homogeneous. After that it is removed and when the temperature is not too hot. After that, the preparation is put into molds little by little and left at room temperature until it freezes.

c. Physical Evaluation of Lip Balm Preparations

1) Organoleptic Test

Organoleptical tests are performed by observing the shape, smell, taste (in the skin) and color of the preparation [23].

2) PH Test

pH testing is carried out using a pH meter (pH stick) by dipping the tip of the stick into a lip balm preparation and then matching it

to the color on the universal pH indicator to determine the pH of the preparation [10].

3) Adhesion Test

By applying the sample on a glass slab, then covered with another glass slab, then giving a load of 500 gr for 5 minutes, the load is lifted and the two attached glass plates are released while recording the release time of the two glass plates [18].

4) Viscosity Test

The viscosity test of the preparation is carried out using a brookfield viscometer by slipping the spindle on the viscometer in 100 grams of the preparation that has been inserted in a glass beker and at the appropriate speed [7].

5) Melting Point Test

The melting point test is carried out by preparing tools and materials and weighing approximately 5 grams in a porcelain dish, then set the temperature to 50oC for 15 minutes, observed the sample melts or not, then the temperature is increased by 1oC every 15 minutes. Observe and record at what temperature the preparation melts [9].

6) Cycling test

Cycling test is a method used to see the stability of a product. *Cycling test* is carried out as many as 6 cycles with a duration of 12 days where every 24 hours at 4 ° C and 24 hours at 40 ° C. A *cycling test* for 6 cycles was carried out to see the stability of the preparation within one year of storage [17].

RESEARCH RESULTS

3.1 Randemen Results of Mangosteen Peel Extract (*Garcinia mangostana*)

Table 1. Results of Manggsi Fruit Skin Extract Randement

Sam ple	Weig ht of extracte	Weight of viscous extract	R and eme
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	d simplisia (g)	obtained (g)	n (%)
Fruit Skin Mangos teen Skin	500	59,7	1 1,94

Ket : Good amendment > 10%

3.2 Organoleptic Test Results

The results of organoleptic evaluation of lip balm preparations of mangosteen peel extract (*Garcinia mangostana*) showed no organoleptic changes before and after the cycling test, which is seen in Table 2 below:

Table 2. Organoleptic Test Evaluation Results

Formula	Cycling test	Color	Shape	Scent
F1 (10%)	Before	Brownish yellow	Dense	Typical orange
	After	Brownish-yellow	Dense	Typical orange
F2 (15%)	Before	Light brown	Dense	Typical orange
	After	Light brown	Dense	Typical orange
F3	Before	Red	Dense	Typical
	After	Red	Dense	Typical

(20%)	Reddish brown	Dense	Typical orange
After	Reddish brown	Dense	Typical orange

Ket : F1 = Mangosteen Peel Extract 10%
F2 = Mangosteen Peel Extract 15%
F3 = 20% Mangosteen Peel Extract

3.3 Homogeneity Test Results

The results of adhesion evaluation of lip balm preparations of mangosteen peel extract (*Garcinia mangostana*) showed no change in homogeneity before and after the cycling test, which is seen in Table 3 below:

Table 3. Homogeneity Test Evaluation Results

Formula	Results Before Cycling Test	Results After Cycling Test
F1 (10%)	Homogeneous	Homogeneous
F2 (15%)	Homogeneous	Homogeneous
F3 (20%)	Homogeneous	Homogeneous

Ket : F1 = Mangosteen Peel Extract 10%
F2 = Mangosteen Peel Extract 15%
F3 = 20% Mangosteen Peel Extract

3.4 PH Test Results

The results of the pH test evaluation of the preparation of lip balm mangosteen peel extract (*Garcinia mangostana*) showed no change in pH test before and after the cycling test, which is seen in Table 4 below:

Table 4. Ph Test Evaluation Results

Repetition	Cycling test	PH	Information

F1 (10%)	Befo re	€	Qualify
	Afte r	€	Qualify
F2 (15%)	Befo re	€	Qualify
	Afte r	€	Qualify
F3 (20%)	Befo re	€	Qualify
	Afte r	€	Qualify

Ket : Ph Test Range 4.5-6.5

F1 = Mangosteen Peel Extract 10%

F2 = Mangosteen Peel Extract 15%

F3 = 20% Mangosteen Peel Extract

3.5 Adhesion Test Results

The results of adhesion evaluation of *lip balm* preparations of mangosteen peel extract (*Garcinia mangostana*) showed no change in adhesion before and after the *cycling test*, which can be seen in **Table 5** below:

Table 5. Stickiness Test Evaluation Results

Repet ition	Cyc ling test	Adhe sion	Inform ation
F1 (10%))	Bef ore	7.6	Qualif y
	Aft er	6.6	Qualif y
F2 (15%))	Bef ore	13.6	Qualif y
	Aft er	12	Qualif y
F3 (20%))	Bef ore	18.6	Qualif y
	Aft er	19.3	Qualif y

Ket : Adhesion Test Range >4 seconds

F1 = Mangosteen Peel Extract 10%

F2 = Mangosteen Peel Extract 15%

F3 = 20% Mangosteen Peel Extract

3.6 Viscosity Test Results

The results of viscosity test evaluation of *lip balm* preparation of mangosteen peel extract (*Garcinia mangostana*) showed no change in viscosity test before and after *cycling test*, which is seen in **Table 6** below:

Table 6. Viscosity Test Evaluation Results

Repet ition	Cyc ling test	Visc osity	Inform ation
F1 (10%))	Bef ore	2175 1,3	Qualify
	Aft er	2235 0,3	Qualify
F2 (15%))	Bef ore	2395 2	Qualify
	Aft er	2430 0	Qualify
F3 (20%))	Bef ore	2580 1	Qualify
	Aft er	2665 1,3	Qualify

Ket : Viscosity Test Range 20000 cps

F1 = Mangosteen Peel Extract 10%

F2 = Mangosteen Peel Extract 15%

F3 = 20% Mangosteen Peel Extract

The relationship between adhesion and viscosity is that adhesion is influenced by the viscosity of the base. Adhesion is related to viscosity. The higher viscosity is caused by a higher concentration of the preparation so that the adhesion time becomes longer.

3.7 Melting Point Test Results

The results of the melting point test evaluation of the *lip balm* preparation of mangosteen peel extract (*Garcinia mangostana*) showed no change in the melting point test before and after the *cycling test*, which is seen in **Table 7** below:

Table 7. Melting Point Test Evaluation Results

Repetition	Cycling test	Melting point	Information
F1 (10%)	Before	60	Qualify
	After	60	Qualify
F2 (15%)	Before	57	Qualify
	After	57	Qualify
F3 (20%)	Before	55	Qualify
	After	55	Qualify

Ket : Melting Point Test Range 50-70°C

F1 = Mangosteen Peel Extract 10%

F2 = Mangosteen Peel Extract 15%

F3 = 20% Mangosteen Peel Extract

DISCUSSION

Traditional *plants* found in Indonesia are very diverse, one of which is the skin of the mangosteen fruit (*Garcinia mangostana*). Mangosteen fruit plants are widely used leaves as vitamin C. People in general do not know that mangosteen leaves also have many benefits, such as medicinal ingredients to prevent cancer, as an immune system, high blood pressure, diarrheal disease drugs, free radical antidotes and reduce heatiness. Mangosteen peel has benefits as an antioxidant which exceeds vitamin E and vitamin C. Mangosteen peel can be formulated into a preparation, one of which is *lip balm* preparation [19].

Lip balm is a type of cosmetics whose manufacture uses the same basic ingredients as lipstick, but without color so that it looks

transparent. *Lip balm* is usually used to lip skin that needs protection, when the ambient air temperature is too cold or the air humidity decreases, to prevent the evaporation of moisture from the epithelial cells of the lip mucosa. *Lip balm* has a function to provide care for the skin of the lips which is considered to give an attractive facial expression [22].

In this study, *lip balm* preparation formulation was carried out using cera alba, glycerin, propyl paraben, ZnO, BHT, and album vaseline. The purpose of this study was to determine the formulation and physical stability test of *lip balm* preparations of mangosteen peel extract.

The maceration method is the method used in this study, using 96% ethanol solvent. The choice of maceration method is because the procedures and equipment used are simple and not heated so that natural materials do not become decomposed. The reason for choosing 96% ethanol solvent is because the solvent contains less moisture content so that the preparation will not be easily overgrown with mold. Ethanol is an organic solvent that can attract most of the bioactive compounds present in *simplisia*. The fiber obtained from the maceration process is obtained using a *Rotary Evaporator*, so that ethanol extract of mangosteen peel is obtained. The extract is then cooled and a thick colored extract is obtained [21].

In table 4.1, the calculation result of the mangosteen peel ration produced is 11.94%. The yield of the *randement* is said to be good if the value is more than 10% and the higher the *randement* value, the greater the extract produced [14].

Dosage stability is one of the critical and important attributes in product development

because it can affect the quality, efficacy and safety of a product or product in storage and its use must have properties and characteristics that are still the same as when the product was made. The purpose of stability of the preparation is so that the ability of the product to maintain properties and efficacy characteristics to be the same as those it had at the time of manufacture up to the limits set throughout the period of storage and use [15].

Table 4.2 shows organoleptic results, namely from each formula there are color differences because they have different extract concentrations. The higher the concentration of the extract, the more concentrated the resulting preparation. Results before and after *cycling tests* showed no change in color, shape and odor in all *lip balm* preparations. This shows that observations in this parameter, the preparation is said to be stable both before and after *cycling tests*, or the components in the preparation during storage do not experience reactions between one material and another, so there are no signs of reaction from changes in color, shape, and odor. Organoleptic testing is a test carried out by making observations using the five senses including smell, color and shape. Organoleptic test is an organoleptic observation of *lip balm preparations* carried out by observing in terms of color, odor and texture [11].

Evaluation of homogeneity tests on *lip balm preparations based on table 4.3 of all stable formulas on homogeneity parameters, both before and after cycling tests*. About the study of *lip balm* on tomatoes where there was no difference before and after *cycling test*. In the homogeneity parameter, this is due to the absence of solid particles contained in *lip balm*, as well as the

absence of lip balm formers that are still clumped or uneven in the preparation [17].

The results of the evaluation of the pH test of *lip balm* preparations in table 4.4 showed no change in pH from the three formulas before and after the *cycling test*. The pH produced by all formulas is stable because it is in the skin pH range of 4.5-6.5. The pH results produced in formulas I, II, and III get the same pH value before and after the *cycling test* [3].

The statistical test of the pH of *lip balm preparations in the Shapiro Wilk normality test* obtained the results of the data said to be abnormally distributed, in other words did not meet the standards for parametric tests, so that the statistical test used was a non-parametric test used, namely the *wallis crucial*, the significant value obtained was $1.0 < 0.05$, then the results showed that there was no significant difference in the pH value before and after *cycling test*. In *Duncan's post hoc* results, there was no effect of extract concentration on pH value.

The results of the adhesion test are seen in table 4.5, the results show that the three formulas can be attached after being applied to the preparation glass. From the results of the three formulas, there is a difference in the value of adhesion produced, the higher the concentration used, the higher the value of adhesion produced, and the lower the concentration used, the lower the value of adhesion produced. All three formulas meet the requirements before and after the *cycling test* because they can last more than 4 seconds. The inherent ability of the skin shows that *lip balm* can retain the active substances on the skin thereby increasing its effectiveness. So that the three formulas of *lip balm* preparations are said to be stable before and after *cycling tests* [5].

The statistical test of adhesion of lip balm preparations in the *Shapiro wilk normality test* obtained significant results of >0.05 , then the data was said to be normally distributed and homogeneously distributed. Because the normality and homogeneity tests are normally distributed and homogeneous, the data meet the requirements of the parametric test. The parametric test used is *the one way anova test* and gets results at a significant value of >0.793 or >0.05 , it can be concluded that there is no significant difference in the adhesion value before and after *the cycling test*. In the results of *post hoc duncan*, there is an influence of extract concentration on adhesion value.

Viscosity testing is carried out with the aim of determining the viscosity of a lip balm preparation so that it has a consistency that is in accordance with the requirements of lip balm. In table 4.6 the viscosity evaluation results in F1, F2, and F3 experienced an increase in viscosity results after *cycling tests*. This suggests that during storage lip balm preparations on this parameter meet the requirements. Good viscosity for lip balm preparations ranges from 20000 cps. So that the three formulas of lip balm preparations of lip balm preparations are said to be stable before and after *cycling tests* [4].

The statistical test of viscosity of lip balm preparations on the *Shapiro Wilk normality test* obtained significant results of <0.05 , then the data was said to be abnormally distributed, in other words did not meet the standards for parametric tests, so the statistical test used was a non-parametric test. Statistical testing of non-parametric tests used, namely *kruskal-wallis* significant values obtained is $0.233 > 0.05$, so the

results show that there is no significant difference in viscosity values before and after *cycling tests*. In the *post hoc duncan results*, there is an influence of extract concentration on viscosity value.

Melting point testing is carried out with the aim of determining the melting point of lip balm which will affect the storage of lip balm. This observation was made on the melting point of lip balm by melting lip balm on a waterbatt with a temperature of 50°C for 15 minutes, observed whether it melted or not so that it is easy to know at what temperature the lip balm began to melt [13].

The statistical test melting point of lip balm preparations in the Shapiro wilk normality test gets significant results of <0.05 , then the data is said to be abnormally distributed, in other words it does not meet the standards for parametric tests, so the statistical test used is a non-parametric test. Statistical testing of non-parametric tests used, namely *kruskal-wallis*, the significant value obtained is $1,000 > 0.05$, so the results show that there is no significant difference in melting point values before and after *cycling test*.

CONCLUSION

Based on the results of the study, it can be concluded that

1. Based on the results of the study, it can be concluded that there is no difference in the physical stability of formulations I, II, and III. The results of statistical analysis showed that the significance value of $P > 0.05$ for pH test parameters ($1.0 > 0.05$), adhesion test ($0.793 > 0.05$), viscosity test ($0.233 > 0.05$), and melting point test ($1.000 > 0.05$).

2. Based on the results obtained in cycling tests both before and after cycling

tests in F1, F2 and F3 have good and stable physical stability of preparations.

3. Based on the results of the physical stability test, the best formula is known to be F3 with an extract concentration of 20% and is proven by the results of *the post hoc duncan* test which can be seen from the pH test values F1 7.17, F2 12.83 and F3 19.00, adhesion test values F1 7.17, F2 12.83 and F3 19.00 and viscosity test values F1 22050, F2 24126.00 and F3 26242.83.

REFERENCES

- [1] Abadi, H., Hanum, S. F., & Buulolo, I. A. (2020). Formulasi dan Uji Efektivitas Ekstrak Etanol Kulit Buah Manggis (*Garcinia mangostana L.*) sebagai Pelembab Bibir. *Jurnal Dunia Farmasi*.
- [2] Adikari, S. B., & Sharma, A. (2018). *Marketing Pattern Of Rubber Plantation In Tripura. International Journal Of Current Microbiology And Applied Sciences*.
- [3] Agustina, Y. D., & Herliningsih. (2019). Formulasi Sediaan Lip Balm Dari Minyak Zaitun (*Olive oil*) Sebagai Emolien Dan Penambahan Buah Ceri (*Prunus avium*) Sebagai Pewarna Alami. *Journal of Herbs and Pharmacological*.
- [4] Akib, N. I., Nafisah, A., Adjeng, T., Lakasa, R. P., Suryani, S., Halimahtussaddiyah, R., Sartina, A., Armadany, F. I., & Kendari, M., (2020). *Stabilitas Fisik Sediaan Tonik Rambut Kombinasi Ekstrak Etanol Rimpang Lengkuas (Alpinia galanga L.) dengan Filtrat Daun Lidah Buaya (Aloe vera L.) (Physical Stability of Hair Tonic Contain Ethanol Extract Galangal (Alpinia galanga L.) Rhizome and. Farmauho : Jurnal Farmasi, Sains, dan Kesehatan*.
- [5] Ambari Y, Nanda F, Hapsari D, Ningsih AW, Nurrosyidah IH, Sinaga B. *Studi Formulasi Sediaan Lip Balm Ekstrak Kayu Secang (Caesalpinia sappan L.) dengan Variasi Beeswax. J Islam Pharm* (2020).
- [6] BPOM, (2019), Peraturan Badan Pengawas Obat Dan Makanan Nomor 32 Tahun 2019 *Tentang Persyaratan Keamanan Dan Mutu Obat Tradisional Dengan Rahmat Tuhan Yang Maha Esa Kepala Badan Pengawas Obat Dan Makanan, BPOM, Jakarta*.
- [7] Dewi, Rosmala., Effionora Anwar., Yunita K S., (2014). *Uji Stabilitas Fisik Formula Krim yang Mengandung Ekstrak Kacang Kedelai (Glycine max)*. Fakultas Farmasi Universitas Indonesia, Depok.
- [8] Felisia, I., (2016). *Pengaruh Komposisi Minyak Jarak dan Lanolin sebagai Basis Terhadap Sifat Fisik dan Stabilitas Lipstik dengan Pewarna Ekstrak Kulit Buah Manggis (Garcinia mangostana L.)*.
- [9] Hidayah, Ratna. (2018). *Formulasi Dan Evaluasi Sifat Fisik Sediaan Lip Balm Dari Buah Pisang Raja (Musa sapientum)*. Program D-III Farmasi. Politeknik Harapan Bersama Tegal.
- [10] Jessica, Rijai L, Arifian H. *Optimalisasi Basis Untuk Formulasi Sediaan Lip Cream*. (2018).
- [11] Limanda, D., & dkk. (2019). *Formulasi dan Evaluasi Stabilitas Fisik Sediaan Lip Balm Minyak Almond (Prunus amygdalus dulcis)*. *Jurnal Mahasiswa Farmasi Fakultas Kedokteran UNTAN*.
- [12] Mardiana, G. N dan Safitri, C. I. N. H. (2020). *“Formulasi dan Uji Aktivitas Sediaan Gel Shampoo Antiketombe Ekstrak Daun Belimbing Wuluh (Averrhoa bilimbi L.) Terhadap*

- Candida albicans*". Seminar Nasional Pendidikan Biologi dan Saintek (SNPBS).
- [13] Nurfitriyana, Yulikasari, D., Fajar. I.R.F., Hardiyanti, L. (2023). Formulasi sediaan Lipbalm Ekstrak Daun Tin (*Vicus carica L.*) dan Ubi Jalar Ungu (*Ipomoea batatas L.lam*). *ISTA online Technologi Journal*.
- [14] Nurhasnawati, H., Sukarmi., Handayani, F. (2017). *Perbandingan Metode Ekstraksi Maserasi dan Sokhletasi Terhadap Aktivitas Antioksidan Ekstrak Etanol Daun Jambu Bol (Syzygium malaccense L.)*. *Jurnal Ilmiah Manuntung*.
- [15] Nursetiani A, Halimah E. *Identifikasi Persentase Kelengkapan Resep Di Salah Satu Rumah Sakit Di Kota Bandung*. Farmaka. (2020).
- [16] Priyanti, Nadyana, H. E., Daniya, A. A., Partuti, T., Amalina, N. N., Rahmiaty, D., Yanti, W. F., & Annisa, N. (2021). Ekstrak Etanol Kulit Manggis Sebagai Masker Gel Peel Off Berantioksidan. *Jurnal Kimia Mulawarman*.
- [17] Puspita, Weni., Puspasari, Heny., Shabrina, Ayu. (2021). *Formulation and PHYSICAL Stability Test Spray Gel of Extract of Buas-buas Leaf (Premna aerratifolia L.)*. *Jurnal Farmasi Indonesia*.
- [18] Puspitasari, A. D. (2019.). Evaluasi Karakteristik Fisika Kimia dan Nilai SPF Sediaan Gel Tabir Surya Ekstrak Etanol Daun Kersen (*Muntingia caabura L.*). *Jurnal Pharmascience*.
- [19] Rai R, Shanmuga S, Srinivas C. *Update on photoprotection*. *Indian J Dermatol*. (2012).
- [20] Rasyadi, Y., Fendi, S.T.J., Permatasari, S. (2022). Formulasi Sediaan Lip Balm Dari Ekstrak Kulit Buah Melinjo (*Gnetum gnemon L.*). Parapemikir : *Jurnal Ilmiah Farmasi*.
- [21] Rinaldi, R., Fauziah, F., Adriani, A., Silviana, E., Ritazahara, R. (2020). *Studi Formulasi Gel Ekstrak Etanol Daun Nangka (Artocarpus heteropyllus Lam. L) dengan Basis Na-CMC dan Karbopol*. *Jurnal Dunia Farmasi*.
- [22] Sahputri, D., & Riski. (2019). *Formulasi Sediaan Lip Balm Ekstrak Lidah Buaya (Aloe vera.L)*.
- [23] Sona, F.R., (2018). *Formulasi Haer Tonic Ekstrak Lidah Buaya (Aloe Vera L) Dan Uji Aktivitas Pertumbuhan Rambut Pada Tikus Putih Jantan*. Jurusan Farmasi. Fakultas Kedokteran dan Ilmu Kesehatan. Universitas Islam Neferi Maulana Malik Ibrahim. Malang.
- [24] Wahyuni, E. D. (2018). *Asuhan Kebidanan Nifas dan Menyusui*. Jakarta: Kementrian Kesehatan RI.
- [25] Yusuf, N.A., Hardianti, B., Lestari, I.A., Sapra, A. (2019). *Formulasi dan Evaluasi Lip balm Liofilisat Buah Tomat (Solanum lycopersicum L.) sebagai Pelembap Bibi*