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Experimental Design of Lip Moisturizer as a Patchouli-Based Innovation Product

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Abstract

Patchouli oil, a type of essential oil, is one of Indonesian's non-oil and gas export commodities accounted for one of the sources of Indonesian foreign exchange. Patchouli alcohol is commonly used in the cosmetic and perfume industries as well as the fragrance ingredient in the household products, one of which is used in lip moisturizer product. Lip moisturizer is a cosmetic product that was created with the similar essence of lipstick saves for its colourless in nature hence the translucent appearance. As a moisturizer, lip moisturizer can be used to moisturize the lips to avoid dry and chapped lips. Producing lip moisturizer involves four steps of formulation, which are mixing the solid components, mixing the liquid components, mixing of both the solid and liquid components, and adding the active substances and the patchouli oil. The study conducted two times of experiment, and it can be concluded that the second experiment can be used for lip skin. The execution of the test was based on the stability and homogeneity tests that meet the terms and conditions that have been set.

Keywords: patchouli oil, lip moisturizer, stability test, homogeneity test, lip skin

1. INTRODUCTION

Indonesia has many different plant and animal natural resources, and one of which is the essential oil, which is one of the largest natural resources in Indonesia. There are about 80 types of essential oil traded in the world market, 40 of them are owned and traded by Indonesia. However only about 13 types of essential oil enter the world market, and they are patchouli oil, nutmeg oil, ylang oil, agarwood oil, vetiver oil, eucalyptus oil, citronella oil, clove oil, pepper oil, jasmine oil, ginger oil, cubeb oil and sandalwood oil.

Aceh is the second best patchouli-producing area in the world which still heavily relies on the food agriculture and plantation sectors, especially in the North Aceh and Lhokseumawe Districts. Cot Girek subdistrict is one of the districts in which the majority of its population is entrepreneur and farmer of patchouli cultivation (Dewi et al., 2020).

Patchouli oil, a type of essential oil, is one of Indonesian's non-oil and gas export commodities that accounted for one of the sources of Indonesian foreign exchange (Amrullah et al., 2017). Indonesia supplies about 90% of the world's patchouli oil needs. However, the patchouli oil that is produced by Indonesian farmers still has low quality. One of the most important factors in determining the quality of patchouli oil is the patchouli alcohol level. Patchouli alcohol acts as the fixative substance, where it can bind and prevent the scent from evaporation so that it can last longer (Mahanta et al., 2015). For this reason, the patchouli alcohol has become the commonly used substance in the cosmetic and perfume industries as well as the fragrance ingredient in the household products. The patchouli alcohol component in patchouli is increased with the fractional distillation method, in which the components of this compound are separated into fractions based on their boiling points (Amrullah et al., 2017). Since the patchouli oil can act as a binding and an anti-bacterial substance, it can be used as one of the components in the cosmetic products.

Skin is one of the senses that cover all parts of the human body which at the same time also act as a stimulus for the external influences. Naturally, the skin has the ability to protect itself from water loss due to the presence of fat layer on the surface of the skin as a barrier. Natural skin protection alone is not enough, since it can also be influenced by the internal factors such as age and health, as well as the external factors such as extreme sunlight. Therefore, the skin needs substances or components for protection, especially on the face and lip areas. Facial skin is quite sensitive to stimuli so it must be well treated from both the inside and outside. Health problems on facial skin are generally caused by dust, sunlight, alcoholic beverages, food, and fatigue (Suyoto, 2019). One of the main causes of

premature aging is free radicals that are scattered in the surrounding environment. The indications of skin health problems are usually related to dry skin, cracked skin, dullness, wrinkles, and black spots. It makes people aware of the importance of facial health care and subsequently it becomes a triggering factor for an increase in demand for various kinds of cosmetic products for facial care, including lip care.

Lips are a part of the face that displays the aesthetic perception of the face. The skin on the lips has no hair follicles and sweat glands to protect them against adverse environmental factors. Lip skin is very vulnerable to the environmental influences as well as various health care products, cosmetics, and others that cause skin damage such as dry lips, chapped lips, and dull colour. Antioxidants and exogen can be a solution to avoid these problem by delaying or inhibiting oxidation reactions by free radicals or neutralizing and destroying free radicals that can cause cell damage. Lip balm products can protect lips from canker sores, chapped, and dry. This product can be used by both men and women (Kokil et al., 2015).

One of the products recommended to overcome lips problems is lip balm. Lip balm is a cosmetic that is made with the same component as lipstick but is colourless hence it is transparent in colour. Lip balm as a moisturizer helps to moisturize the lips so they are not easily dry and chapped. Lip balms are usually used for lips that need protection, such as during the low humidity or cold temperature, to prevent water evaporation and the oral mucosal epithelial cells (Wahyuni, 2018). Lip balm is a product that can last a long time by containing a high proportion of wax and pigment ingredients. Patchouli oil has many benefits, one of which is to reduce dry and chapped skin, hence the reason the researchers use patchouli oil as a natural moisturizer to develop lip moisturizer product (Permatananda, 2021).

2. MATERIALS AND METHODS

2.1 Materials and composition

The formulation process of lip moisturizer is basically done in four stages, which are mixing the solid components, mixing the liquid components, mixing of both the solid and liquid components, and adding the active substances and patchouli oil. Table 1 shows the ingredients used for the formulation of lip moisturizer products.

To formulate a 15gr lip moisturizer, it is necessary to balance the concentration of the solid phase composition, the liquid phase composition, and the active substances. The solid phase composition consists of 10% beeswax, 50% candelilla wax, and 4% carnauba wax, while the liquid phase composition consists of cetyl alcohol, wool fat, castor oil, ethanol G, isopropyl myristate, and milk. The mixing temperature is adjusted slowly and is kept at 70^{o}C. The formulation of the solid phase composition involves the mixing of all the solid phase ingredients using a container equipped with a stir and temperature regulation. The mixing temperature is increased slowly and is constantly kept at 70^{o}C. Once the liquid and solid phases reach 70^{o}C, the next step is to mix the two phases with the active substances and the patchouli oil. Both of the solid and liquid ingredients are heated at a maximum temperature of 80^{o}C in a glass container equipped with a stir and temperature control. Afterwards, allow the components to cool down and condense before it finally becomes a lip moisturizer product.

Table 1. Lip moisturizer formulation

Ingredients		***Master formula* (%w/w)**	***Working formula* (50 g)**
Solid	Beeswax	10	5
	Candelilla wax	5	2.5
	Carnauba wax	4	2
Liquid	Cetyl Alcohol	8	2.5
	Wool fat	5	2.5
	Castor oil	38.5	10.86
	Ethanol G	20	5
	Isopropyl myristate	4	1
	Susu	0.5	0.25
Active	Citrus extract	3	1.5
	Patchouli oil	0.5	2
	Vitamin E acetate	0.5	0.13

2.2 The Formulation Process

Lip moisturizer is formulated based on a predetermined formulation and the process as shown in Figure 1 as follow. The technique used to formulate lip moisturizer is started by separating three substances, namely the active substances, solid components and liquid components. The first step is to separate each ingredient which weights is followed the predetermined formulation. Subsequently, the material is melted at a maximum temperature of 80^{o}C from which the preparation is formed. The mixed components will then be mixed with the active substances in the form of patchouli oil, lemon and vitamin E. The patchouli oil serves to protect and moist the lips.

Figure 1. Preparation of lip moisturizer

Figure 2. Lip moisturizer product

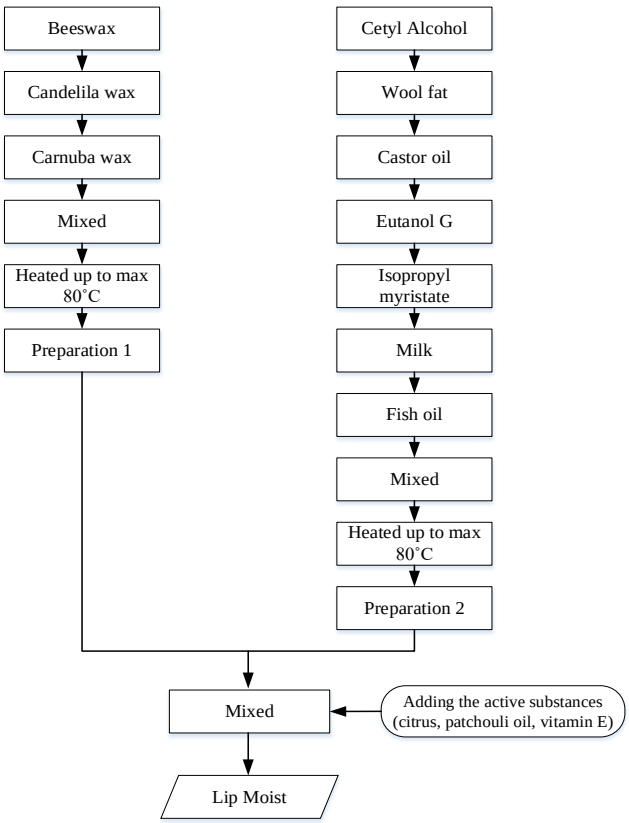

Figure 3. Working method of lip moisturizer formulation

3. RESULTS AND DISCUSSIONS

3.1 Stability Test

The stability test of preparation is carried out to determine whether the preparation of lip moisturizer formulated from the patchouli leaf extraction falls under the criteria of balance or imbalance. The stability is defined as the ability of a product to last for a certain period to ensure the identity, strength, and quality of the product. A balanced preparation is stable if a preparation is still in the same storage, use, properties and characteristics when the formulation process is carried out (Ambari et al., 2020).

Table 2. Data of Preparation Stability Test Results

Parameter	Preparation	Observation Time (Week)			
		1	4	8	12
Colour	F_0	LC	LC	LC	M
	F_1	LC	LC	LC	LC
	F_2	LC	LC	LC	LC
Form	F_0	G	G	G	NG
	F_1	G	G	G	G
	F_2	G	G	G	G
Smell	F_0	PS	PS	PS	BS
	F_1	PS	PS	PS	PS
	F_2	PS	PS	PS	PS

Description :
BS : Bad Smell, F0 : BHT-free Lip Balm, Formula with 10% Beeswax, F1 : BHT-free Lip Balm Formula with 8% Beeswax, F2 : Lip Balm Formula with BHT, G : Good, LC : Lemon Chiffon, M : Mouldy, NG : Not Good, PS : Patchouli Scent

3.2 Homogeneity test

The homogeneity test aims to determine whether the mixed ingredients in the lip moisturizer formulation are evenly distributed or not, which is distinguished based on the homogeneity of lip moisturizer preparations or the grainy texture. Homogeneity is one of the factors that affects the quality of lip moisturizer. The results of the homogeneity test before the stability test conducted showed that the particle in the first experiment is homogeneous. The first preparation is said to be homogeneous if there are no gritty textures that can be felt in the lip moisturizer (Haryantio, 2020).

Based on the results of the first experiment it can be concluded that there was a failure when the stability test was carried out, namely a change in the texture of the lip moisturizer. It was indicated by the presence of microorganisms or fungus which prevents the product from being used on the lips. The homogeneity test in the first experiment leaved some spaces when it was put in the package.

The results of the second experiment showed that there was an increase in the resulting product. It was indicated from the stability test of preparation of the traits and the characteristics which was in accordance with the specified period. The homogeneity test in the second experiment was homogeneous because there were no grainy textures that could be felt in the lip moisturizer.

The results of the third experiment showed that the stability test and homogeneity test increased compared to the first and second experiments. The results of the third experiment also showed that the stability test and homogeneity test increased compared to the first and second experiments. It confirms that lip moisturizer products can be used on the lips skin.

Figure 4. Homogeneity Test Results

4. CONCLUSIONS

The study conducted two types of test to measure the success of lip moisturizer products. The first test was the stability test of preparation which was carried out to determine the balance, guarantee the identity, strength, and the quality of the lip moisturizer. The second one was the homogeneity test which was carried out to ensure that every ingredient was equally distributed in use during the formulation process. In the first experiment, the failure was marked by the presence of microorganisms or fungus, thus the lip moisturizers were not safe for use. The results of the second experiment showed an increase in the product where there were no microorganisms or grainy particles in the lip moisturizer texture. Based on the third experiment, it can be

concluded that the product was quite good and suitable for use on the lips.

REFERENCES

Ambari, Y., Hapsari, F. N. D., Ningsih, A. W., Nurrosyidah, I. H., & Sinaga, B. (2020). Studi Formulasi Sediaan Lip Balm Ekstrak Kayu Secang (Caesalpinia sappan L.) dengan Variasi Beeswax. Journal of Islamic Pharmacy, 5(2), 36–45. https://doi.org/10.18860/jip.v5i2.10434

Amrullah, R., Nurjanah, S., Widyasanti, A., Muhaemin, M., Raya, J., & Sumedang, B. (2017). Kajian PEngaruh RAsio REfluks TErhadap KArakteristik MInyak NIlam HAsil Study on Effect of Reflux Ratios on Patchouli Oil Properties Produced by Fractional Distillation Alumnus Departemen Teknik Pertanian dan Biosistem, Universitas Padjadjaran S. 11(2).

Dewi, R., Nurwaida, C., Kimia, J. T., Teknik, F., Malikussaleh, U., & Sedangkan, C. (2020). Jurnal Teknologi Kimia Unimal. 1(November), 46–57.

Haryantio, S. (2020). Formulasi dan Evaluasi Sediaan Lip balm berbentuk stick dengan minyak almond (Almond oil) sebagai pelembab bibir.

Kokil, S., Kadu, M., Vishwasrao, S., & Singh, S. (2015). Review on Natural Lip Balm. International Journal of Research in Cosmetic Science, 5(1), 1–7.

Mahanta, C., Enmark, G., Nordborg, D., Sracek, O., Nath, B., Nickson, R. T., Herbert, R., Jacks, G., Mukherjee, A., Ramanathan, A. L., Choudhury, R., & Bhattacharya, P. (2015). Hydrogeochemical controls on mobilization of arsenic in groundwater of a part of Brahmaputra river floodplain, India. Journal of Hydrology: Regional Studies, 4(June), 154–171. https://doi.org/10.1016/j.ejrh.2015.03.002

Permatananda, P. A. N. K. (2021). Lip Balm Formulation Based on Balinese Grape seed Oil (Vitis vinifera l. Var Alphonso Lavallee). International Journal of Current Science Research and Review, 04(07), 633–639. https://doi.org/10.47191/ijcsrr/v4-i7-03

Suyoto, F. (2019). Fitrah Nurul Latifa Suyoto D121181702 WSBM.

Wahyuni, M. (2018). Formulasi Sediaan Lip balm Ekstrak Kulit Buah Delima (Punica granatum L). Universitas Sumatera Utara, 1–82.