

Formulation of Sunscreen Cream from Tengkwang Oil (*Shorea Sumatrana*)

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Abstract. Tengkwang oil is obtained from the seeds of *Shorea sumatrana* with traditional extraction of press or press. Tengkwang oil which is produced is yellow and freezes at room temperature. Sunscreen cream is a cosmetic product that serves to protect the skin from sun exposure and maintain skin moisture. In order to add tengkwang oil in a sunscreen cream formulation, look for a stable concentration as a cream formulation for sunscreen products from tengkwang oil 5%, 10% and 15%, with a variation of days from 0 days, 7 days, 14 days and 21 days, 28 days. The results of the research on the formulation of making sunscreen cream from tengkwang oil were physical observation with white color with pH 5 and viscosity 56.5 at a concentration of 0% Tengkwang oil, light yellow + at tengkwang oil concentration 5%, 10%, 15% , light yellow ++ at 5%, 10% and 15% tengkwang oil concentration. Light yellow color +++ at 5%, 10% and 15% tengkwang oil concentration. With a distinctive odor, high viscosity at a concentration of 15% tengkwang oil on day 28 (120 dPas) and the lowest viscosity at 5% tengkwang oil concentration on day 28 (56 dPas) with a distinctive odor and pH 5.

Keywords: tengkwang oil, *Shorea sumatrana*, sunscreen cream, viscosity, pH and odor

1 Introduction

Genus *shorea* 150 species are families of dipterocarpaceae, not all genera of *shorea* contain oil, only 16 species can produce oil. Of these 16 one is a species of *Shorea sumatrana* whose fruit can be extracted from oil. From the results of the analysis of the fat content of the *Shorea sumatrana* seeds at 88.87% (Yusnelti, 2018) and the results of the analysis of the fat content obtained saturated fatty acids namely stearic acid and palmitic acid, oleic acid, in ethyl pthalate which is predominantly contained in *Shorea sumatrana* seeds (Yusnelti, 2017). Yusnelti's (2017) research results in tengkwang oil as an antioxidant.

Tengkwang oil has a lot of uses, can be used as cosmetic basic ingredients such as solid and liquid facial soap, face moisturizer, foundation, lipstick, as the basic ingredient in making butter, preserving dry

and wet foods namely noodles and meatballs and can also preserve food is chili in the household (Yusnelti, 2018), and can preserve light snacks (Rickhy, 2017), contains antioxidant compounds, which are the results of tengkwang oil activity test with comparative compounds of vitamin C, which stands out as an antioxidant is tengkwang oil with LC₅₀ values 98,% while vitamin C LC₅₀ is 92%

The content of this tengkwang oil is high in stearic acid which in cosmetics is used as a moisturizer. The human body's organs are protected by the skin covered by the whole body by the skin, the function of the skin on the body to protect it from external influences, namely sunlight. Damage to the skin will interfere with human health and appearance (Purwaningsih, et al, 2014). The skin does not wrinkle and glow quickly, although the age of a person is no longer a teenager or is old is the dream of all human beings, especially for women who want to always look attractive with

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charming and radiant skin to their desires (Bogadenta, 2012).

To day the problem that often arises in humans is a symptom of early treatment, so skin needs to be protected and maintained. The process of skin damage is characterized by the appearance of wrinkles, dry scales, appearance of skin pigmentation, dull and cracked skin, causing uncomfortable appearance, resulting in chronic health of the skin, but has a tremendous psychological impact on everyone (Bogadenta, 2012) This is what causes free radicals is one of the external factors that can cause early detection of the skin. By humans, the way they do it is to overcome this early response, by using cosmetics namely sunscreen and hand body. Cosmetics that contain anti-oxidants are an effort often made to prevent early detection. Antioxidants are one of the compounds that can neutralize and reduce free radicals and inhibit oxidation of skin cells, thereby reducing cell damage, in the early stages. The point is made by a variety of cosmetics made from extracts and oils from plants that have a function as natural antioxidants that are in demand by the public, because of concerns about the side effects of cosmic use based on antioxidant active compounds from synthetic sunscreens.

Indonesia is a country with a tropical season, due to the relentless heat and throughout the year, the skin needs to be protected by ultraviolet light. This ultra violet light is very dangerous to our skin, due to global heat which causes the temperature to rise. As a result of global heat directly to the skin of the body, both facial skin, will cause black plaque and black face due to exposure to sunlight, negative consequences will cause skin cancer, due to skin not protected by a cream that is sunscreen cream. While the daylight is also needed for the skin, because sunlight contains vitamin D. On one side, sunlight is needed by humans and other living things as a source of energy and health for the skin and bones of the body. Vitamin D produced by sunlight is needed for bone, and prevents polio or rickets (Supriyana, et al, 2014).

Overcome the bad effects of ultra violet rays or sunlight, one of which is using a sunscreen. This sunscreen is a cosmetic ingredient that physically and real or chemically can inhibit and penetrate UV light into the skin. Oil derived from *Shorea sumatrana* seeds because they contain stearic acid compounds, ethyl phtalate, palmitic acid and oleic acid (Yusnelti, 2017). These compounds are generally used in cosmetic ingredients and from search results by library no one has made sunscreen from the basic ingredients of *Shorea sumatrana* seed oil with a stable formulation of the basic ingredients of tengkawang oil. Based on the description above, it is done to make tengkawang oil-based sunscreen physical stability testing is organoleptic testing, odor test, pH test and viscosity test

Tengkawang oil made in the form of cream is a half-solid form of emulsion and contains less than 60% water. Which is meant by external use dispersed in the carrier liquid, stabilized with emulsifying or flaking agents that match the sample (Director General of POM 1979). Until now there has been no one who makes tengkawang oil as a sunscreen. This tengkawang oil is a plant that has not been maximally utilized by the people in the countryside

2 Methodology

2.1 Materials and Tools

The tools used in the study are grind, erlenmeyer, goblet, distillation, rotary, analytic scales, porcelain, electric stoves, drop pipettes, funnels, thermometers, measuring flasks. Sunscreen container, filter paper.

The ingredients in the study were tengkawang oil taken in Seling village, methyl paraben, emulgin, cutina, glycerin, propyl paraben, paraffin, aquadest all ingredients from Brataco.

2.2 Extraction

Extraction of tengkawang seeds is dried and mashed with grind, then we 250 g soxhletation using 96% ethanol. The obtained filtrate from ethanol was removed by the solvent with rotary evaporator (40-50°C) obtained by extracting tengkawang oil ethanol obtained by tengkawang oil 218, 50 gr.

2.3 Creation Phase Creams

Phase oil is made by melting mixtures of supporting ingredients such as: liquid paraffin, emulgin, glycerin, cutina. Then added propyl paraben and heated at 70 ° C until the emulsion is formed. then the water phase is made by dissolving methyl paraben in a volume of 100 ml in hot distilled water, and adding glycerin with a fixed temperature of 70 0C. The cream is made by mixing the oil phase and the water phase together into the mortar while being crushed continuously so that the cream is formed. Then added tengkawang oil extract and stirred until homogeneous

2.3 Formulation of sunscreen cream with tengkawang oil

Extracts from oil known as tengkawang oil using ethanol solvents, the selection of these solvents is the fruit / seeds containing saturated fatty acid compounds of stearic acid, palmitat acid, oleic acid and etyl phalate and phenolic and flavonoids, because the saturated fat content is 88.69% is used as a solvent for soxhletation using ethanol solvents. determined formulations that are stable in making sunscreens that can be used to overcome sunlight, namely ultra violet rays

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Fig 1. Formulation of sunscreen cream from tengkawang oil

Table 1. Formulation of sunscreen cream with Tengkawang oil

Material	FTSO	FTS 1	FTS2	FTS3
Cutina%	15	15	15	15
Emulgin%	5	5	5	5
Gliserin%	5	5	5	5
Methyl paraben	0.1	0.1	0.1	0.1
Propyl paraben	0.1	0.1	0.1	0.1
Oil Tengkawang%0	0	5	10	15
Paraffin%	20	20	20	20
Aquadest (%)	Ad100	100	100	100

Table 2. Results of physical evaluation of sunscreen cream with tengkawang oil

Formula	Color	Smell	pH	Viscosity (dPas)
Days to- 0				
FTS 0	White	Typical	5	56.5
FTS 1	Light yellow +	Typical	5	58.5
FTS 2	Light yellow ++	Typical	5	60
FTS 3	Light yellow +++	Typical	5	68
Days to -7				
FTS 0	White	Typical	5	56.5
FTS 1	Light yellow +	Typical	5	59
FTS 2	Light yellow ++	Typical	5	60
FTS 3	Light yellow +++	Typical	5	70
Day to -14				
FTS 0	White	Typical	5	56.5
FTS 1	Light yellow +	Typical	5	65
FTS 2	Light yellow ++	Typical	5	80
FTS 3	Light yellow +++	Typical	5	88
Days to -21				
FTS 0	White	Typical	5	56
FTS 1	Light yellow +	Typical	5	68.5
FTS 2	Light yellow ++	Typical	5	88
FTS 3	Light yellow +++	Typical	5	90
Days to -28				
FTS 0	White	Typical	5	56
FTS 1	Light yellow +	Typical	5	80
FTS 2	Light yellow ++	Typical	5	100
FTS 3	Light yellow +++	Typical	5	120

From the formulations which are carried out to obtain a sunscreen product in various combinations, a formulation can be considered stable at stable concentration. In order to make sunscreen from the basic ingredients of tengkawang oil so that the face can be protected from ultra violet rays, so that the face without being younger, slows fine wrinkles under the eyes, smooths the skin.

3 Results and discussion

Shorea sumatrana seeds are pureed with grind, then 500 grams of *Shorea sumatrana* are disoxhletized using n-hexane solvent, 400 grams of white oil are obtained. Oil solidifies at room temperature. Tengkawang oil content was obtained containing active compounds as sunscreen. Namely stearic acid, palmitic acid, ethyl ptalate, and oleic acid. The results of organoleptic observations on the extract of *Shorea sumatrana* oil showed that the extract was white as milk, had a distinctive aroma.

3.1 Sunscreen Cream Formulation.

The cream formulation of *Shorea sumatrana* oil from n-hexane extract from *Shorea sumatrana* seed was carried out in accordance with the standard method that was in force, with soxhletation.

Cream formulation of oil from *Shorea sumatrana* seeds using additional ingredients such as: cutina, stearic acid, methyl paraben, propyl paraben, glycerin, emulgin and distilled water. According to Supriyana (2014) emulgin at a concentration of 2-5% can function as an emulsifying agent is also a material that is stable against acids and bases and used in cosmetics. Tropical pharmaceutical cream as a stiffening agent, cetyl alcohol in 1-20% concentration will produce a more stable emulsion so in this formula.

Stearic acid was chosen to provide maximum results, propylene glycol as humectant at a concentration of 15% according to Purwaningsih (2014) cutina made from phosphatidilkolin and phosphatidilethanolamine is amphiphilic because it has a molecule consisting of hydrophobic and hydrophilic parts and is widely used as dispersing agent, emulsifier and stabilizer agent so that in this formula emulgin is used as an emulsifier because of its amphiphilic properties. Emulgin as a viscosity enhancer in this cream formula the emulsion concentration is not based on standards from the library but based on the preformulation test. Glycerin is used because of the humectant and emollient properties of this material. Glycerin is also used as a solvent (cosolvent) auxiliary in various creams and emulsions (Purwaningsih et al, 2014). Tengkawang oil as a preservative because it contains high antioxidants, and aquades for water phase carriers. From the results of the formulation on day 28 which has a viscosity of 120, this is a good formulation obtained with a typical odor, pH 5 and color remain stable.

3.2 Physical quality of the preparation

3.2.1 Color.

The results of observations on a variety of colors from 7-28 days there were no changes in color in some formulated sunscreens.

3.2.2. Smell.

From the results of the study the smell of sunscreen also did not change from the beginning until the 28th day did not experience a change in odor from the formulation while sunscreen with a distinctive odor. In table 2 above, it can be seen that the formula has the same odor that is typical. this is caused by all formulas containing tengkawang oil which smells typical. (Yusnelti, 2017). There is no tengkawang oil-based product yet, in this research tengkawang oil will be developed as a cosmetic base material that is safe for the skin. in general, products based on tengkawang oil which are obtained traditionally are press or oil press will be yellow, but in a chemical way tengkawang oil is white and freezes at room temperature. Tengkawang oil formulation results of research (F0, F1, F2, F3) light yellow, but all formulas remain light yellow. also color remains no change. Homogeneity testing is also conducted, where all formulas that are well formed with type m / a show the absence of granules on the glass object, so it can be said that all the resulting sunscreens are homogeneous.

3.2.3 pH Test.

The results of the measurement of the pH of the sunscreen cream obtained from 7-28 pH still does not occur changes, namely 5. The degree of acidity (pH) is one indicator of the stability of a sedian. sunscreen cream has at least a pH according to the pH of the skin which is 4.5 to 8.0 because the cream has a pH that is too alkaline, it can cause the skin to become scaly, while the pH is too acidic, causing skin irritation (Setiawan, 2010). From the results of the study, the more the amount of tengkawang pH oil, the pH of the sunscreen will continue to be no change. pH value of formulation is still included in the range of pH values according to SNI 16-4399-1996 about the amount of sunscreen which is 4.5-8.0. This means that a number of sunscreen creams from tengkawang oil are eligible and are safe to use for the skin.

3.2.4 Viscosity Test.

Viscosity is an illustration of the stage of a liquid object to flow. This property is very important in the formulation of liquid and semi-solid preparation because this property determines the nature of preparation. In the case of mixture and flow properties both at the time of production, put into the packaging, as well as important properties when using, such as consistency, dispersion, and humidity. The viscosity of a preparation will also affect the physical stability of its

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biological life. The viscosity of the emulsion that does not change with time is considered ideal even though most systems are still acceptable for stability when showing a slight increase in viscosity in the time between 0.04 and 400 days. The viscosity of the cream from tengkawang oil ranges from 3.00 to 12,000 centipoises (cp) (Supriyana et al,2014). The results of the viscosity test can be seen in table 2. Based on the data obtained, tengkawang oil contained in a number of sunscreen creams affects the viscosity of preparation. Increasing the concentration of tengkawang oil in sediaan will increase the viscosity of the preparation. The acceptable viscosity for a number of sunscreen creams according to SNI 16-4399-1996 is 2000-50000cP. In addition, viscosity can be affected by water evaporation (SNI, 1996)

Conclusion.

Formulation studies of a number of sunscreen creams were obtained at 15% extract concentration in formula III light yellow +++, typical odor, and pH 5 viscosity 120, the color remained stable and characteristic odor, pH 5 was preparation for cosmetics. *Shorea sumatrana* fruit or seeds produce vegetable oil at freezing temperatures in white known as tengkawang oil or tengkawang oil

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