PHYSICAL EVALUATION OF ETHANOLIC EXTRACT SHAMPOO RED GALANGAL AND OLIVE OIL WITH VARIATION OF SLS

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ABSTRACT

One of the plants created by Allah SWT that has many benefits is the rhizome of red galangal. Red galangal rhizomes contain essential oils consisting of methyl-sinamat, sineol, eugenol, kamfer, galangin, flavonoids, saponins and tannins. In addition to red galangal rhizomes, a natural ingredient that has many benefits is olive oil. In olive oil there are phenolic compounds that serve to antifungi, antibacterial, antioxidants. To formulate both plants, shampoo preparation innovations are made. In formulaizing shampoo preparations it is necessary to pay attention to the selection of surfactants. Sodium Lauryl Sulfate is a surfactant that has a large washing power, provides a lot of foam and a relatively low irritant effect. Utilization of red galangal rhizomes and olive oil with SLS comparison in shampoo is an alternative source of safer shampoo preparations for people with scalp infections. The observed dosage evaluation parameters are organoleptic, pH, viscosity, homogeneity and storage stability analyzed using ANOVA. The results of shampoo preparation quality testing obtained that formulations 2.3 and 4 in accordance with SNI standards and obtained the results of shampoo preparations are light brown, strong flavor with a pH of 5.2-5.3 at H0 and 8.2-8.6 on H12, with viscosity of 945-1534 cP at H0 and 154-3145 cP in H12.

Keywords: olive oil, red galangal, shampoo, SLS

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INTRODUCTION

Indonesia is one of the countries with a diversity of plant species that has many benefits for living things, especially as a treatment. One of the plants that has a variety of benefits is the red galangal rhizome containing essential oils as antifungi (Irianto, 2014). In addition, another natural ingredient is olive oil which has phenolic compounds as antibacterial (Tripoli E, 2005).

To take advantage of both plants, innovations are made into shampoo preparations. In formulaizing shampoo preparations it is necessary to note the selection of appropriate surfactants. One of the surfactants that is often used in the manufacture of shampoos is SLS. SLS has advantages in cleaning, chemical stability and economical price. To produce the appropriate formula SNI combination of red galangal rhizome ethanol extract and olive oil with variations in SLS concentration is carried out physical evaluation tests such as organoleptis, pH, viscosity, homogenity and storage stability. This research will be done by creating variations in SLS concentration to get the best quality of shampoo with physical evaluation and content.

LITERATURE REVIEW

2.1 Galangal Plants

Galangal plant is a herb with longevity that is used for cooking spices and medicines, and belongs to the type of rhizome simplisia (Sinaga, 2000). Galangal plants come from tropical Asia. Some suspect it comes from China, some argue from Bengali. But it has long been used in China and Indonesia, especially on the island of Java. Now widespread in various tropical Asia, including Indonesia, Malaysia, Philippines, southern China, Hongkong, India, Bangladesh and Suriname (Sinaga, 2000).

Galangal grows a lot in forests and yards. Galangal can grow in fertile soil, loose, not waterlogged, sandy clay, contains humus and has good drainage. Galangal plants can also grow on open land until it is protected. Galangal grows at an altitude of 1200 m above sea level with rainfall of 1500-2400 mm (Wardana, 2002).

There are two types of galangal, namely red galangal and white galangal (Gholib, 2008). White galangal is usually used for food flavoring, while red galangal is widely used for medicine (Arisandi, 2008). Red galangal rhizomes contain essential oils, saponins, tannins, eugenol, seskuiterpen, pinen, metal sinamat, kaemferida, galangan, galangol and yellow crystals. In addition, it also contains flavonoid compounds kaempferol-3-rutinoside and kaempferol-3-3oliucronide. Galangal plants contain flavonoids, phenols and terpenoid compounds that can be used as the basic ingredients of modern medicine (Darwis, 2003).

2.2 Olives

The olive tree grows as a perennial perennial and begins to bear fruit at the age of five. At the age of 15-20 years the olive tree is able to produce fruit in full and is able to survive for hundreds or even thousands of years, so that the plant that was originally perdu can become a large tree. Young yellowish-green olives are often used by Mediterranean people as a flavoring, while ripe blackish purple olives are often extracted for their oil known as olive oil (Ghanbari R, 2012).

Olives are known as one of the many fruit crops (> 750 million olive trees) cultivated around the world. Approximately 99% of the world's total olive production belongs to countries throughout the Mediterranean and the Middle East. Olive oil is obtained through physical procedures, not only contains unsaturated fats, but also contains high amounts of antioxidants, especially phenolics and vitamin E (Fito M, 2007).

2.3 Extraction

Extraction is the process of separating a substance based on differences in certain properties, especially its solubility to two insoluble or different liquids. In general, extraction is done using solvents that are based on the solubility of components against other components, usually water and organic solvents. The material to be extracted in the form of dry material that has been destroyed or commonly called simplisia (Sembiring, 2006).

The selection of solvents and extraction methods will affect the yield of secondary metabolite compounds that can be extracted. The selection of extraction solvents generally uses the principle of like dissolves like, where polar compounds dissolve in polar solvents and non-polar compounds dissolve in non-polar solvents (Seidel, 2006).

Extraction is generally classified into two, namely liquid solid extraction and liquid-liquid extraction. In liquid-liquid extraction, separated compounds are contained in a mixture of liquids, while solid-liquid extraction is a method of transferring compounds from solids. The extraction method based on the existing or not heating process is divided into two kinds, namely the extraction of cold ways and the extraction of heat. In the extraction of cold means are not done heating during the extraction process is intended so that the desired compound is not damaged.

2.4 Shampoo

Shampoo is a preparation in the form of liquids, solids or powders containing certain active ingredients used to remove oils, impurities found on the surface of the scalp or hair. Shampoo is one of the cosmetic preparations used for shampooing. Shampoo is utilized to

remove oil, dust, skin flakes and other impurities from the hair. The scalp or hair will be clean, soft, manageable and shiny after shampooing with shampoo (Saraswati, 2017).

Shampoo also contains a solution, emulsion or dispersion of one or more surfactants mixed with some additional ingredients to enhance the appearance as well as the aesthetics of the product. Additional ingredients are used to give aroma, color, thickener, blur and give a certain impression. Including stabilizing materials, foam modifiers, preservatives, conditioning agents and anti dandruff materials (Barel A.O., 2009).

Shampoo is formulated to improve the function, structure, strength, softness of the hair for the purpose of improving the appearance. Shampoo is usually a viscous liquid, clear or opaque, containing 20-40% solids, a pH of about 5.5 and viscosity between 500-1500 cps (Limbani, 2009).

RESEARCH METHODS

3.1 Tools and Materials

Tools used are analytical scales, Rotary Evaporator, waterbath, Brookfield Viscometer, pH meter, oven, glass object, magnetic stirrer, hot plate, beaker glass, measuring cup, porcelain cup, stir bar, spatula, horn spoon, drop pipette.

The ingredients used are red galangal rhizomes (Alpinia galanga) obtained from Materia Medika Malang Upt, olive oil, ethanol 70%, Sodium Lauryl Sulfate (SLS), cocamidopropyl betaine, NaCl, dietanolamide, propilenglikol, perfume and aquadest.

3.2 Research Procedures

1. Simplisia Powder Extraction

Simplisia powder is extracted by maceration method using 70% ethanol solvent. The extraction process is carried out for 3 days with the remuneration of the 2nd day. After obtained liquid extract, it can be done the attachment of the extract using a rotary evaporator until it is extracted thickly.

2. Formulation of RLM Shampoo and Olive Oil

Materials	Concentration			
	F1	F2	F3	F4
Eks LM	1	1	1	1
MZ	25	25	25	25
DEA	3,5	3,5	3,5	3,5
SLS	**5**	**10**	**15**	**20**
CAPB	6	6	6	6
NaCl	6	6	6	6
PG	1	1	1	1
Parfum	1	1	1	1
Aquades	ad 100	ad 100	ad 100	ad 100

3. Making RLM Shampoo and Olive Oil

The formulation of shampoo is based on a formula according to Budiarti (2007). NaCl is dissolved in aquadest and added Sodium lairyl sulfate. Included dietanolamide and cocamidopropyl betaine. When the temperature of the mixture is 600C put olive oil. Inserted ethanol extract of red galangal that has been diluted with propilenglikol. When the temperature is 350C the deodorizer is inserted and added the rest of the aquadest.

4. Evaluate the physical stability of RLM shampoo and Olive Oil

a. Stability Test

Know the quality of shampoo preparations based on physical and chemical properties namely organoleptic, homogeneity, ph and viscosity. Preparation testing using freeze thaw method. Shampoo is placed in the fridge at 40C for 48 hours and the oven is 400C for 48 hours in 3 cycles (every 4-day cycle).

b. Organoleptic Testing

Includes testing of colors, aromas, textures. Color checking is carried out by observing the discoloration of shampoo preparations. Aroma checking is carried out by smelling changes in the aroma of shampoo preparations. Texture check by looking at the texture changes that shampoo preparations produce.

c. Homogeneity Testing

Applying shampoo preparations to the preparation glass is then observed.

d. pH Testing

Using pH meter electrodes. The pH meter tool is calibrated at pH 4 and ph 7. The tool is dipped in the sample and the values that appear are read. PH requirement for shampoo preparation between 5-9 (SNI, 1992).

e. Viscosity Testing

Using brookfield viscometer. Shampoo preparations are placed under the spindle, then the spindles are lowered little by little to the lower limit of the preparation container. It is then read and recorded the result of the reading. The data is displayed in centi poise (Cp) units. Viscosity requirements for shampoo preparations between 400-4000 Cp (SNI, 1992).

5. Data Analysis

Data in the form of pH and viscosity in each formula are analyzed using SPSS. Data significance tested using Kruskall-wallis. The value $p<0.05$ indicates significantly different data.

FINDINGS AND DISCUSSION

A. RLM Extract

The result of maceration of 400 grams of red galangal rhizome simplisia powder with ethanol solvent 70% produces a viscous extract of 51.30 grams. The yield obtained is 12.82 %. The result is more than the rendemen extraction results with ethanol solvents of 96% by 6.4% in Arini's research (2019). Rendemen extract describes the amount of material that can be extracted from red galangal rhizome powder. These materials can be flavor and color components, resins, fats, essential oils, alkaloids, organic acids, inorganic salts, glycosides and fats (Hazmela, 2006). The extract has characteristics in the form of a viscous extract, brown color, a characteristic smell of galangal.

B. Results of evaluation of physical stability of shampoo RLM and MZ

- Organoleptic test (Color)

The resulting color of each formulation produces a light brown color derived from the ethanol extract color of red galangal rhizomes. On the 0th to the 4th day the color of the shampoo still shows stable. On the 8th to the 12th day the color of the shampoo already shows fading. This is due to the temperature factor that causes the dosage color to fade slightly (Djajadisastra, 2004). Based on SNI (1992) shampoo preparations must have a flat and uniform color, this is in accordance with the results of red galangal extract shampoo which in the 12th day still shows a uniform color.

- Organoleptic test (Aroma)

The aroma test produced by each formulation is the green tea aroma, because there is an additional fragrance in each formula, and the resulting aroma is strong. On the 0th to the 4th day the resulting green tea aroma is strong. On the 8th to the 12th day the resulting aroma is weak. Aroma changes produced during storage are caused by external factors of the storage environment and the length of storage of preparations, so that over time greentea aroma storage is getting weaker (Haryanto, 2014).

- Organoleptic test (Texture)

The results of the observation of the texture of the shampoo formula from day 0 to day 12 still remain liquid. This is in accordance with the requirements of shampoo preparation in SNI (1992) that is liquid and there are no hard lumps.

- Homogenity test

Homogeneity test is carried out for 12 days and observations are carried out on the 0th and 12th days. Homogeneous shampoo preparations are produced. This is evidenced by the mixing of oils in water used in the manufacture of shampoos. SLS used has a function as a surfactant well and stable so that there is no separation of 2 layers of oil phase and water phase.

- pH Test

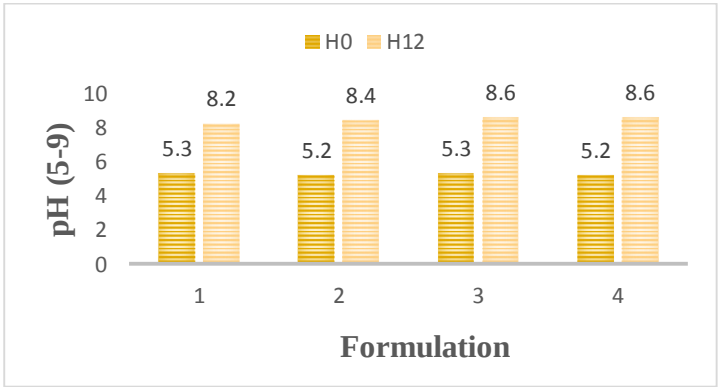

Figure 1. Test of pH

Obtained pH results from the four formula 5.2-8.6. From the four preparations, it can be concluded that all formulas have fulfilled SNI ranging from 5-9. Based on these results, there is an increase in all formulas from day 0 to day 12. This is due to environmental factors such as temperature, poor storage, galangal rhizome extract that is less stable in preparation due to oxidation (Wathoni, 2015). The addition of dietanolamide that has alkaline properties, so as to increase the alkaline properties of the shampoo preparation (Hambali, 2002).

Data analysis from pH test results done with Shapiro-Wilk test for normality test, then testing using *Kruskall Wallis* obtained value of 0.79>0.05 can be concluded that the pH of the four formulations there is no significant difference.

- Viscosity Test

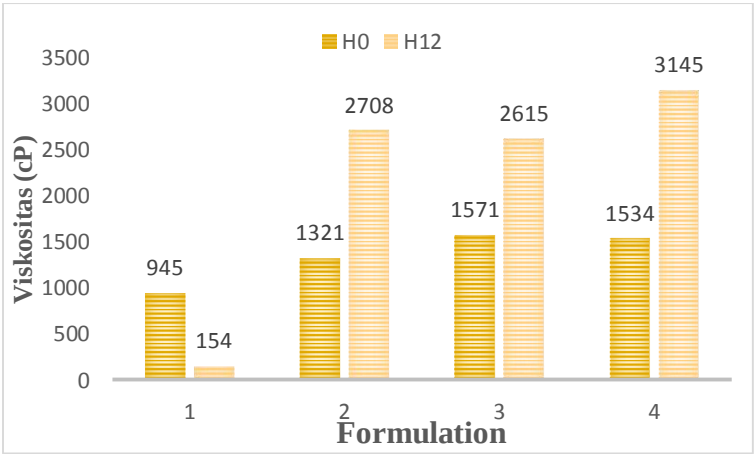

Figure 2. Test of Viscosity

Obtained the value of shampoo viscosity from the four formulas, namely 945-1534 Cp. From the four preparations can be concluded that all formulas have met the SNI ranging from 400-4000 Cp, except formula 1 after stability test with the value obtained 154 Cp. Decreased viscosity of shampoo is caused by the influence of the temperature given so that it makes the preparation more diluted at the time of storage (400C). Moisture from high temperatures is able to interact with preparations that make the volume of water in the preparation increase which causes the viscosity value to get smaller (Zulkarnain, 2013). The increase in shampoo viscosity is caused by a reduction in the moisture content of the shampoo during storage and the occurrence of a reaction between the surfactant mixture (SLS) and

electrolytes (NaCl) as well as essential oil from red galangal extract (Budiarti, 2007). With the increasing concentration of SLS added, the amount of water added will be reduced so that the water content will be lower. Low moisture content can cause the shampoo to get thicker (Langingi, 2012).

Data analysis conducted with ANOVA test, obtained value 0.001<0.05 can be concluded that the viscosity of the four formulations there is a significant difference. The difference is due to the concentration of SLS which has a considerable range, namely 5 gr, 10 gr, 15 gr, and 20 gr.

CONCLUSION

1. Formulations 2.3 and 4 ethanol extracts of red galangal rhizomes (Alpinia purpurata) and olive oil (Olea europaea) with variations in SLS concentration as shampoo preparations have met SNI standards from organoleptic, pH, homogeneity and viscosity test results.
2. Results of physical evaluation test of shampoo preparations ethanol extract red galangal rhizomes (Alpinia Purpurata) and olive oil (Olea europaea) with a variation in SLS concentration obtained the results of shampoo preparations light brown, strongly scented, with a pH of 5.2-5.3 at H0 and 8.2-8.6 on H12, with a viscosity of 945-1534 cP at H0 and 154-3145 cP on H12.

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