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Research on CV. Rena Soap Nut Detergent as Future Organic Detergent in Indonesia

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Abstract. Soap nut (especially Sapindus rarak De Candole, can also be S. mukorossi) or also known as rerek, lamuran or lerak is a plant that is known for traditional detergent. Batik is usually recommended to be washed soap nut because it is considered as the most suitable washing agent to maintain its quality (batik color). Soap nut seeds contain saponins, a toxic alkaloid, these saponins produce foam and function as a washing agent, and can also be used as a cleaner for various kitchen utensils, floors, and even bathe and clean pets. This research aims to compare the quality of CV Rena batik soap nut detergent with batik soap nut produced by other industries. In this experiment include color analysis, odor analysis, pH analysis, density analysis and viscosity analysis of tested batik soap nut detergent. The results of the five sensory organoleptic tests found that CV detergents were compared with three competitor manufacturers batik soap nut detergent (detergent A, detergent B and detergent C) has a homogeneous shape, distinctive color and distinctive odor. While for the pH test the CV Renault detergent results were pH = 3.2, detergent A pH = 3.8, detergent B pH = 5.9 and finally detergent C pH = 4.2. For the density test, the detergent density of CV Rena = 1.0386 gr / ml, detergent A = 1.0255 gr / ml, detergent B = 1.0554 gr / ml and detergent C = 1,0068 gr / ml. And for the viscosity test, the result of CV Renas detergent = 1.61 cp, detergent A = 1.45 cp, detergent B = 5.86 cp and detergent C = 1.15 cp. The trial results obtained in organoleptic tests such as color, odor and shape are in accordance with the Liquid Detergent Quality Requirements SNI 06-4075-1996, while the pH and density are not in accordance with the existing quality standards. Suggestions for this research are to use more soap nut extracts so that the density produced will be thicker and in accordance with the existing SNI and use natural ingredients which have not too acidic properties to conform to the established SNI.

1. Introduction

Batik is a pictorial fabric that is made specifically by writing or applying paraffin to the fabric, then the processing is processed in a certain way that has a specificity. Indonesian Batik, as a whole of techniques, technology, as well as the development of related motifs and culture, by UNESCO has been designated as a Humanitarian Heritage for Oral and Nonbendawi Culture (Masterpieces of the Oral and Intangible Heritage of Humanity) since October 2, 2009. Batik has a way of making that quite complicated and special care. One treatment that we must be cared is in washing. We should not



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use laundry soap because it can damage the color of the batik. One of the recommended detergents that are safe in the process of washing batik is detergent based on natural lerak fruit.

Lerak plants are tree shaped and on average have a height of 10m although they can reach 42 meters in diameter of 1 meter, therefore large lerak trees with wood quality that are equivalent to teak are cut down because they have economic value. The shape of the leaves is round-pointed spiky, flat-edged, short-stemmed and green. The seeds are wrapped in leather quite hard round like marbles, when they are ripe the color is blackish brown, the surface of the fruit is smooth and shiny.

Lerak is a plant that is known for its use of seeds which is used as a traditional detergent. Batik is usually recommended to be washed lerak because it is considered as the most suitable washing agent to maintain its quality (batik color). Lerak contains saponins, a toxic alkaloid, these saponins produce foam and function as a washing agent, and can also be used as a cleaner for various kitchen utensils, floors, and even bathe and clean pets. In this study the variable we will test is the five sensory organoleptic tests including shape, odor and color, the second is the density test, the third is the pH test and the fourth is the viscosity test which we will test against the detergent of CV Rena's batik lerak soap and competitors other batik lerak producers. This research was repeated 2 times from each of the variables tested in order to obtain optimal results.

2. Research method

In this study the material we used was lerak laundry soap produced by CV Rena, and then we took 3 samples of lerak washing soap from other industries, hereinafter referred to as detergent A, detergent B and detergent C. Other ingredients we used were aquadest. The tools we use are Ostwald viscometer, pycnometer, dropper pipette, 500 ml beaker, 50 ml measuring cup, pH meter and scales.

The first method used in this study is the analysis of odor, color and shape by means of an organoleptic test, which a test is using the five senses to determine the quality of the detergent that we analyze. The second method used is to calculate the pH of the detergent sample to be analyzed. The way it works is that the pH meter is calibrated using a pH buffer of 4, a buffer of pH 7 and a buffer of pH 10 and when the pH meter is finished it can only be used to determine the pH of the existing detergent. To measure the pH of the detergent using a pH meter, the method is to insert the pH meter into the detergent to be tested, then press read and wait until the pH is constant and the instrument goes off. After that the pH of the detergent can only be recorded.

The third method used is determination of density using a pycnometer. The way it works is to weigh the weight of the empty pycnometer (m0), then weigh the pycnometer + aquadest (m1), then we can find out the weight of the aquadest (m0-m1) and after that we can find out the aquadest density in the density vs temperature table and we can calibrate the pycnometer volume (V). The next step is to do the same thing with the detergent sample that we are going to test. The first is to weigh the weight of the empty pycnometer (m0), then weigh the pycnometer + detergent (m1), and then we can find out the weight of the detergent (m1-m0). After knowing the detergent weight we can calculate the detergent density using the formula:

$$\rho = \frac{m1 - m0}{V} \tag{1}$$

The fourth method used is to determine the viscosity using the Ostwald viscometer. With a water base and detergent we use 10 ml each. Then the liquid is put into the viscometer using a volume pipette, after that the liquid in the pump uses a bulb to go up to the upper line on the Ostwald viscometer, after that the time taken by the liquid both detergent and water to pass through the path is limited by the upper and lower lines on the viscometer.

3. Result and discussion

Examining Organoleptic Test Results on various liquid detergent samples with natural ingredients of lerak fruit.

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Table 1. The result of organoleptic analysist					
Sample	Shaped Analysist	Odor	Color		
Detergent CV Rena	Homogenous	Specific	Specific		
Detergent A	Homogenous	Specific	Specific		
Detergent B	Homogenous	Specific	Specific		
Detergent C	Homogenous	Specific	Specific		

From the above results, we can conclude that CV Rena's detergent, detergent A, detergent B and detergent C have the same homogeneous shape, have a distinctive odor and have a distinctive color from each detergent. So when compared with the SNI Detergent Liquid Quality Requirements 06-4075-1996, it can be stated that the four detergents above are in accordance with the liquid detergent quality requirements. Review the pH test results of each detergent sample

Table 2. The result of pH analysist				
Sample	pH1	pH2		
Detergent CV Rena	3.2	3.2		
Detergent A	3.8	3.8		
Detergent B	5.9	5.9		
Detergent C	4.2	4.2		

From the results above, we can see that the most acidic CV Rena detergent with a pH value of 3.2, while detergent B has the pH value that is closest to neutral, 5.9. When referring to SNI Detergent Liquid Quality Requirements 06-4075-1996 with permitted pH ranging from 10-12 for laundry detergents. The results obtained are not in accordance with the existing SNI, this is because the detergent that we use as a sample is a natural detergent without using any chemicals, while detergents that are on the market use chemicals such as NaOH must be alkaline because NaOH is a strong base. Reviewing Density Test Results for various liquid detergent samples

Table 3. The result of defisitas analysist				
Sample	Density1 (gr/ml)	Density2 (gr/ml)		
Detergent CV Rena	1,0386	1,0386		
Detergent A	1,0225	1,0225		
Detergent B	1,0554	1,0554		
Detergent C	1,0068	1,0068		

Table 3. The result of densitas analysist

From the results above we can see that detergent B has the highest density while detergent C has the lowest density. Density or density or density is a measurement of the mass of each unit volume of an object. The higher the density of an object, the greater the mass of each volume. The average density of each object is the total mass divided by the total volume. So the greater the density, the thicker the liquid. So that when compared with the SNI 06-4075-1996 Liquid Detergent Quality Requirements with a density requirement of 1.1 - 1.3 gr / ml, the three samples above are not in accordance with the existing SNI. This can occur because the four detergents that we use do not use chemicals such as thickener and other chemicals so that the density of the sample that we test has a smaller density or we can say it is thinner than the existing SNI. Examine the relationship of the viscosity of each detergent sample to the density

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Table 4 . The result of viscosity analysist				
Sample	Viscosity 1 (cp)	Viscosity 2 (cp)		
Detergent CV Rena	1.61	1.61		
Detergent A	1.45	1.45		
Detergent B	5.86	5.86		
Detergent C	1.15	1.15		

From the results of the above viscosity we can conclude that detergent B has the greatest viscosity and detergent C has the smallest viscosity. When viewed from the results above are in accordance with the results of existing densities. Because viscosity is directly proportional to density. So it can be concluded that the greater the viscosity the greater the density because the viscosity is directly proportional to the density as in the equation below so that it is in accordance with the existing theory:

$$\eta = \eta_0 \, \frac{t \, . \, \rho}{to \, . \, \rho o} \tag{2}$$

4. Conclusion

The result of the organoleptic test for each detergent from the four detergents having homogeneous shape, distinctive color and distinctive liquid. So when compared with the SNI Detergent Liquid Quality Requirements 06-4075-1996, it can be concluded that the four detergents are in accordance with the quality requirements. The pH test for each detergent was found that the four detergents were not in accordance with the SNI Detergent Liquid Quality Requirements 06-4075-1996 i.e. 10-12, this could occur because all four samples were pure natural detergents from extracts from lerak fruit itself, without using any chemicals.

The density of each detergent was found that the four detergents were not in accordance with the SNI 06-4075-1996 Liquid Detergent Quality Requirement, namely 1.1-1.3. This can occur because the four pure detergents are only the result of extracting lerak fruit with water without the addition of chemicals such as thickeners and other chemicals so that it has a density that is smaller than the specified quality requirements.

The relationship between viscosity and density shows that the greater the density, the greater the viscosity, this can occur because viscosity is directly proportional to density. So the results obtained are in accordance with existing theories. Suggestions for this research are to use more lerak extracts so that the density produced will be thicker and in accordance with the existing SNI and use natural ingredients which have not too acidic properties to conform to the established SNI.

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