



Effectiveness of Avocado Seed Extract on the Detergent Production Process

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Abstract – This study aims to determine the effectiveness of avocado seed oil as a substitute for SLS which can be used to make environmentally friendly detergents. The method used in this research is mixing. The results obtained in this study are in the density test samples that meet the requirements are sample 1, sample 2, sample 5, and sample 6. In the viscosity test, high viscosity results were shown in sample 6. In the overall results of the pH test, the sample obtained a pH of 11 which did not meet SNI standards. If the pH of a detergent is more than 8-10 it will risk causing irritation to the skin and environmental pollution. In the saponin test, avocado seed extract contains saponin compounds because saponin compounds are known to form foam due to the combination of constituent compound structures. In the foam stability test, the foam produced must last around 60-70% of the initial volume and in the observation there are 4 samples that meet these requirements, namely sample 1, sample 3, sample 6, and sample 7 respectively 72%, 81%, 72%, and 81%. It can be concluded that sample 6 is better than the other samples.

Keywords: Detergent, Oil Seed Avocado, and Saponin

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INTRODUCTION

Detergent is material shaped liquid (liquid) or the powder that is formed from various material compiler (Nani., 2017). Generally detergent used for cleans and provides a fragrant aroma to clothes. On manufacture detergent generally There are two processes, namely the hydrogenization process and the saponification process. Detergent considered own power wash moregood compared to with soap, besides That no affected by water hardness.

Currently, there are many detergent products on the market, with various claims that these products do not cause skin irritation, are able to clean stubborn stains, and so on (Sembodo et al., 2021). In this study, our group was inspired to make a detergent with one of the mixed ingredients using avocado seed oil. The

addition of experience materials is needed because it can minimize the use of many chemicals, so as to reduce the reactive impact on the skin and the environment.

In this study, we made detergent with raw materials such as Methyl Ester Sulfonate, avocado seed oil, hydrogen peroxide, distilled water, perfume, sodium tripolyphosphate, dextrin, and sodium lauryl sulfate. The purpose of the practicum is to find out whether avocado seed oil can be used as an alternative as an environmentally friendly detergent and used as a reference to increase our knowledge in utilizing plants in the surrounding environment. The previous study had the same objectives as our.

METHODOLOGY

Materials and Equipment

The equipment used in this study comprises a mixer, pH meter, pycnometer, and Ostwald viscometer. The components used include MES, dextrin, STPP, fragrance, and hydrogen.

Making Detergent

Following membrane used in this research were made using the formulation in this table below.

Table 1. Experimental Design

Material	Concentration (%w/w)					
	Contro	Formulation				
	I	I	II	III	IV	V
MES (gr)	13	13	13	13	13	13
Oil Seed						
Avocado (mL)	0	23	28	33	38	43
Dextrin (gr)	2	2	2	2	2	2
STPP (gr)	10	10	10	10	10	10
Fragrance (mL)	2	2	2	2	2	2
Hydrogen Peroxide (mL)	1	1	1	1	1	1
Aquadest (mL)	63	68	63	58	53	48
Dye (mL)	2	2	2	2	2	2
SLS (gr)	28	0	0	0	0	0
Total	121	121	121	121	121	121

Initial steps taken in making detergent liquid that is dextrin and water are stirred until homogeneous (preparation A). Extract seed fruit avocado (0, 23, 28, 33, 38) added with SLS, STPP, and H₂O₂, then stirred until homogeneous (preparation B). Preparation A and preparation B are combined and stirred until homogeneous Then added fragrance and coloring

pH Analysis

In this process take sample and place it in the container, then measure the pH with a pH indicator Then pH value will read. Based on SNI (06-0475-1996) standard pH value of detergent liquid namely 6-8 at a temperature of 25°C, (Febriani & Andiani, 2020).

Viscosity Analysis

How to do a viscosity test i.e. 120 ml of the test sample is measured use Ostwald viscometer, where step First that is clean tool viscometer ostwald moreover first and enter it sample with a pipette, then attach the suction ball and press until sample cross the limit, release the suction ball simultaneously with turn on the stopwatch if sample Already cross the upper limit and turn off the stopwatch when sample has cross the lower limit and note it down the result. Count results with formula:

$$\mu_x = \frac{t_x \cdot d_x}{t_0 \cdot d_0} \times \mu_0$$

(Anggraini et al., 2022)

Foam Stability Analysis

For measure stability foam that is with dissolve test sample to in water. A total of 5 mL of test formula was added to in tube thread 10 mL, then shaken until foam formed. Foam formed then measured the height foam with count comparison between tall foam and high overall (solution dan foam). Stability foam calculated with see how long does the foam last formed (minutes), (Damayanti et al., 2015).

Density Analysis

Weigh the pycnometer empty and closed Then note result, enter sample on a pycnometer Then weigh pycnometer contents and lid Then note. Then count density with method, (Yuliyanti et al., 2019).

$$\rho = \frac{\text{pycnometer contents} - \text{empty pycnometer}}{\text{volume of pycnometer}}$$

Saponin Analysis

Saponin test was carried out with take 2 ml of oil avocado and put in to in tube reaction, then added distilled water until sample submerged, sample bring to a boil for 2-3 minutes and cooled, then shake as strong possible. Stable foam shows positive results, (Robinson, 2018).

RESULTS AND DISCUSSION

Deterge Mixing

Making detergent done with mixing MES, dextrin, STPP, fragrance, hydrogen peroxide, distilled water, dye, and also SLS for variable control while in the formulation test done with Mix MES, oil seed avocado, dextrin, STPP, hydrogen peroxide, distilled water, fragrance and coloring. MES as surfactant anionic (Genta Pertiby Kaban, 2022). Oil seed avocado as saponin producer (Marlinda, 2012). Dextrin as thickener, STPP as material emulsifier, hydrogen peroxide for remove stain (Riyadi and Utami, 2009). Aquadest as solvent, fragrance for provides aroma and coloring for give color in detergent (Megantara et al., 2017).

Mixing all over material will be done in accordance with the variable. Election variable length of time used moment stirring and quantity addition extract oil seed avocado to know the effectiveness time stirring and adding optimum extract.

Testing Detergent

After Samples were carried out 12 times detergent, 12 products were obtained for testing viscosity, density, saponin test, pH test and stability test foam. Following This is results obtained:

Table 2. Testing Detergent

Saponins	Variable	Sample	Density Test (gr/ml)	Viscosity Test (Cp)	Test pH	Stability Test
Extract Oil Seed Avocado	23 ml 10 minutes	1	1.0384	115.2624	11	72
	28 ml 10 minutes	2	1.08	127.44	11	18
	33 ml 10 minutes	3	0.95	99.75	11	81
	38 ml 10 minutes	4	0.9408	89,376	11	50
	23 ml 15 minutes	5	1.0532	123.2244	11	72
	28 ml 15 minutes	6	1.0884	130,608	11	45
	33 ml 15 minutes	7	0.9676	104.5008	11	81
	38 ml 15 minutes	8	0.9512	92.2664	11	54

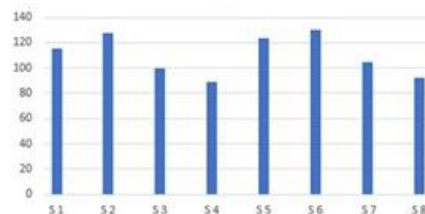
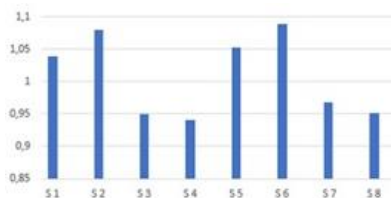


Figure 2. Viscosity Test

On results pH testing, every sample taken necessary Then will be measured using a pH indicator, the pH value will be matched with indicator located in place indicator pH. Got it for all sample got a pH of 11. This Not yet in accordance with SNI 06-0475-1996 where the pH range for detergent liquid is 6-8 (BSN, 1996). Reason sample Can reaches a pH of 11 because exists additional STPP in nature base. If the pH is more from 8 can cause irritation to the skin and not can be tolerated by the environment (Setiyoko & Yuliani, 2021).

Testing Density

Testing density use pycnometer 25 ml, each sample will enter in pycnometer empty and weighed its weight as pycnometer fill. Result of testing density for become heavy type from every sample is sample the own heavy the light kind or later weight will influential to Power spread on the skin (Deniansyah, 2021).



Graph 1. Density Test

From the results testing get heavy pycnometer blank namely 21.50 gr/ml, while for sample. According to SNI, density detergent liquid ranges from 1.0 to 1.3 gr/ml.

Viscosity Test

Based on results testing viscosity, the value obtained that is fluctuating. The more tall mark viscosity of the sample, shows the more thick characteristics of detergent liquid. That matter in accordance with circumstances observed detergent in a way direct. According to June Xie (2023), generally big viscosity detergent liquid for sale on the market ranges from 500-1200 Cp. However, on the results testing not yet in accordance theory the because exists difference materials and treatments used.

Saponin Test

Research result show that extract seed avocado contains saponin compounds. This result consistent with study Zuhrotun (2007) and Marlinda et al. (2012) who stated that in extract ethanol seed avocado there is alkaloid saponin compounds, triterpenoids, tannins and flavonoids. Saponin compounds have is known can form foam Because exists combination structure compound its constituents, namely nonpolar sapogenin chains and chains soluble polar side in water. Saponin has a bitter, foamy taste in water, have characteristic good detergent (Robinson, 1995).

Foam Stability Test

Stability test foam aim for now measured stability with tall foam in time certain. Stability foam stated as resilience something bubbles during time that has been determined that is for five minutes. For five minutes that, foam must endure range from 60-70% of the initial volume (Dragon et al., 1969). From observations, there were 4 samples that met condition the that is sample 1, sample 3, sample 6, and sample 7 respectively respectively 72%, 81%, 72%, and 81%.

CONCLUSION

From the results study detergent liquid, each variable for oil volume avocado seed in a way sequentially namely 23 ml, 28 ml, 33 ml, and 38 ml with length of time stirring 10 minutes and 15 minutes. Methods used in research that is with how to mix using a mixer. There are five tests used namely density test , viscosity test , pH test, saponin test, and stability test foam . In the density test sample that meets condition that is sample 1, sample 2, sample 5, and sample 6. In the viscosity test, results viscosity tall shown in sample 6. In the results overall sample pH test obtained a pH of 11 which is not yet fulfil SNI standards. If the pH is

a detergent more from 8-10 then will riskily cause skin irritation and contamination environment. In the saponin extract test seed avocado contain saponin compounds because saponin compounds have is known can form foam caused by existence combination structure compound its compiler. In the stability test foam, the foam produced must endure range from 60-70% of initial volume and on observation There are 4 samples that meet condition the that is sample 1, sample 3, sample 6, and sample 7 respectively respectively 72%, 81%, 72%, and 81%. Can concluded that sample of 6 more Good compared to sample other. Because it is proven in the density test results; viscosity; pH; saponin; and stability foam.

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