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Effect of Adding Packaged Cooking Oil on the Density of Red Fruit Oil (*Pandanus Conoideus L.*)

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ABSTRACT

Noise in the engine room of a ship is a significant problem that can affect the health and comfort of crew members. This study aimed to evaluate the potential of tofu dregs as a sound insulation material in the form of a composite of carbon black and talak duco. The research method included making composite specimens with variations in composition, followed by testing the sound absorption coefficient using the impedance tube method. The results showed that the specimen with 30% tofu dregs, 45% carbon black, and 25% talak duco produced the highest sound absorption coefficient of 0.24. These findings show that tofu dregs have potential as an environmentally friendly and economical sound insulation material and can be used to reduce noise in ship engine rooms. This study contributes to the development of natural fiber-based insulation materials in the maritime industry.

Keywords: Cooking oil; Red Fruit oil; Density.

1. Introduction

In the 2000s, red fruit oil, processed from the red fruit tree pandan (Pandanus Conideus L.), was one of Papua's original agricultural products with very high economic value. This was due to the results of research on the nutritional content of fruit oil juice. Red is very good for human health.

There are several articles about the uses of red fruit juice, including those that write about testimonies from several users of red fruit juice in curing the illnesses they suffered, including stroke sufferers who were able to walk again and those whose chronic headaches were cured [1]. Many studies attempt to determine the content of red fruit oil juice, including research on the physiochemical properties of red fruit oil, which provides information regarding water content, peroxide value, total carotenoids, tocopherols, fat content and solubility of red fruit oil juice [2].

Looking at the economic value of red fruit oil, several studies discuss the production of red fruit oil, including determining the costs required to build a red fruit oil processing factory with a production capacity of 70 tons of red fruit oil and other processed products from red fruit oil and paste. Red fruit provides information about the Break Even Point period of the red fruit oil business [3]. Research on the economic value of red fruit oil with efforts to eradicate poverty in areas where there is cultivation of red fruit trees and processing of red fruit oil, one of which is in Yiwika Village, Jayawijaya Regency, which has carried out socialization programs, Community Organization Management training on fruit processing and utilization. Red, which was carried out in September 2017 [4].

The prospects for red fruit oil are currently still promising; this can be seen from sales in marketplaces such as Shope, Tokopedia, Blibli, Lazada, and others, as well as through social media, including Facebook and TikTok. With a price range from Rp. 37,500,- to Rp. 930,000,-. From the data listed on sales at Market Place, several online shops have succeeded in selling red fruit oil products with more than 10,000 sales. Looking at this data means that the prospects for sellers of red fruit oil can still provide good prospects.

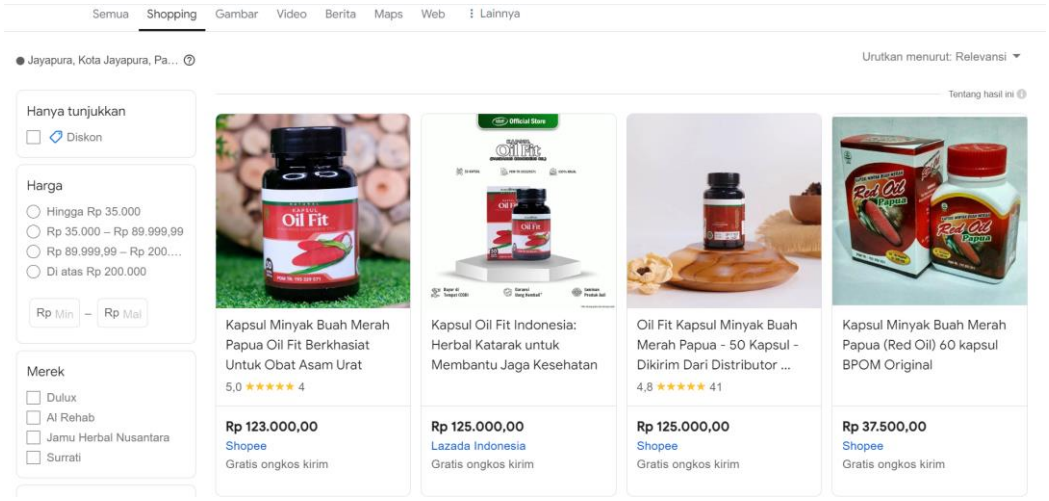

Figure 1. Red Fruit Oil Seller at Market Place

Looking at the content and properties of red fruit oil essence, or what is often called red fruit oil, red fruit oil is one of the agricultural commodities from most regions in Papua that has great economic value for both local, domestic, and international markets.

The still large market share from the sale of red fruit oil also has positive and negative impacts namely the positive impact is providing income for farmers, processors and sellers of red fruit oil, and there is also a negative impact, namely the emergence of fraudulent businesses in the oil business. Red fruit includes efforts to mix edible oil or something similar into red fruit oil so that it will increase the volume of red fruit oil in the packaging but the quality of the red fruit oil decreases due to mixing edible oil into red fruit oil.

One effort that can be made to detect fraudulent attempts in the red fruit oil business is to know the physical properties of red fruit oil so that if there is a change in the physical properties of red fruit oil, it can be identified quickly. One of the physical properties that has been studied is the effect of adding edible oil to red fruit oil on the dielectric constant value [5]. Determining this value requires special equipment, so it isn't easy to do in general. One of the physical properties of red fruit oil that is measured is the density of red fruit oil.

2. Methods

This research was carried out experimentally at the Advanced Physics Laboratory, FMIPA, Cendevarasih University, using measuring glass equipment and a digital O'Hauss balance.

Fruit oil samples were obtained by purchasing directly from a well-known red fruit processor in Jayapura City, namely from the Pak Made production house. In contrast, edible oil was obtained from purchasing edible oil in Jayapura City.

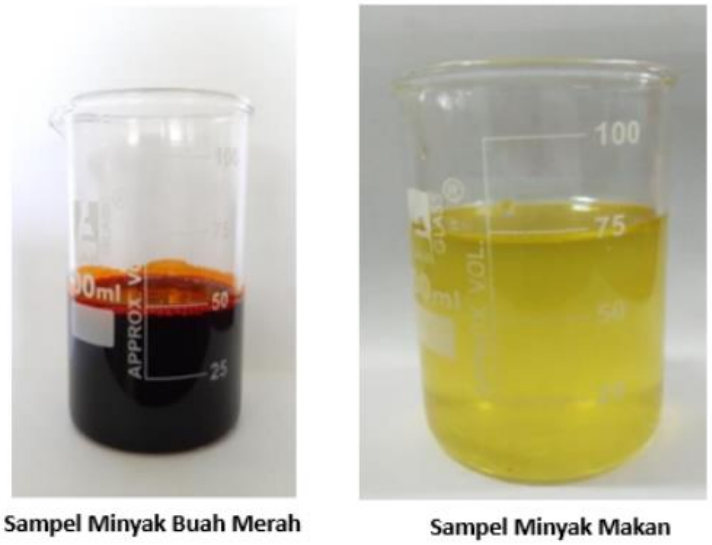

Figure 2. Samples of Red Fruit Oil and Cooking Oil

The initial step is to determine the density of the red fruit oil sample and the density of the cooking oil sample. Next, in the 20 mL sample of red fruit oil, 5 mL, 10 mL, 15 mL, 20 mL, 25 mL, to 30 mL of cooking oil samples were added successively. At each addition of cooking oil, the mass of the mixture of red fruit oil and cooking oil

was measured. From the mass data of the mixture, the density is calculated using the general density equation

$$\rho = \frac{m}{V} \quad (1)$$

where m is the mass of the sample in grams, and V is the sample volume in mL or cm^3.

3. Results and Discussion

The following table shows data from direct measurements of the sample mass and the results of calculating the sample's density.

Table 1. Sample Density

No	Sample	Mass (gr)	Volume (cm^3)	Density (gr/cm^3)	Density (kg/m^3)
1.	Cooking oil	16,46	20	0,83	830
2.	Red Friut oil	17,12	20	0.86	860

From Table 1, it can be seen that the density of the red fruit oil samples and the density of cooking oil have almost the same value, namely only a 0.03 gram/cm^3 difference so that to the naked eye, there will be no significant difference when measuring the density of the samples. Red fruit oil with cooking oil if there is no colour difference between the two.

From Table 1, it can also be seen that the constant value of red fruit oil is greater than that of cooking oil; this can happen because the process of refining red fruit oil still uses conventional methods compared to cooking oil, which has gone through a production process that complies with applicable cooking oil management standards—namely PP No. 86 of 2019 [6].

By adding the cooking oil sample to the red fruit oil sample, the cooking oil sample's value will change towards its density value. Data regarding the effect of adding cooking oil to red fruit oil samples is presented in the following table.

Table 2. Density of Red Fruit Oil added to cooking oil

No.	**Cooking Oil Volume (cm^3)**	**Sample Volume (cm^3)**	Sample Mass ($gram$)	Sample Density ($gram/cm^3$)
1.	0	20	17,12	0,856
2.	5	25	21,20	0,848
3.	10	30	25,29	0,843
4.	15	35	29,37	0,839
5.	20	40	33.43	0,836
6.	25	45	37,52	0,834
7.	30	50	41,61	0,832

In Table 2, it can be seen that adding cooking oil to the red fruit oil sample changes its density value, which is smaller than the density value of the red fruit nim yak sample.

After adding 25 cm3 of cooking oil to the red fruit oil sample, the density value of the sample was at the density value of cooking oil, namely around 0.83 grams/cm3.

Graphically, the data in Table 2 is presented in the following figure.

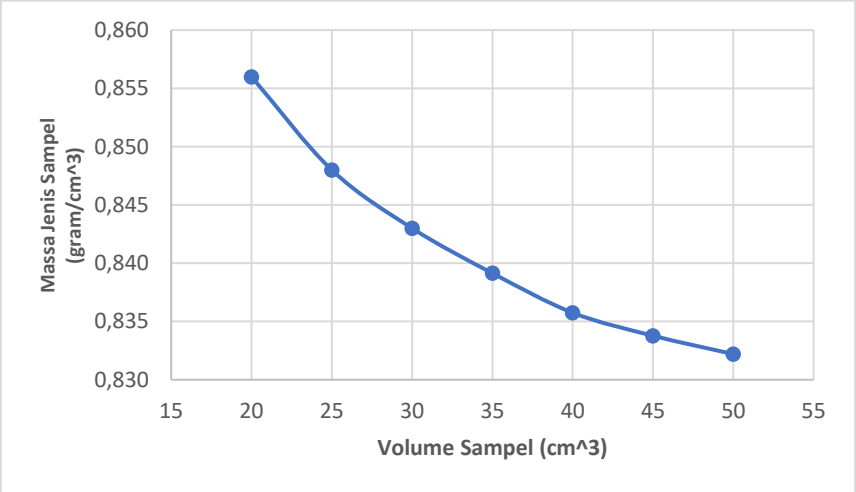

Figure 3. Graph of the relationship between sample volume and decrease in sample density

In Figure 3, the graph decreases towards a certain value. Namely, it will lead to the density value of the cooking oil sample or is an asymptote function. When adding cooking oil, the density value decreases quickly, but after a volume of 40 cm^3, the decrease in the density value of the sample begins to decrease.

From the sample density value, it can be seen that when less than 10 cm^3 of cooking oil is added to the red fruit oil sample, it gives a density value that is almost the same as the density of red fruit oil. If cooking oil is added to red fruit oil with a maximum ratio of 10:20 or 1:2, then the addition of cooking oil will not be detected when the colour of the red fruit oil does not change drastically.

4. Conclusion

Based on the research carried out, it was found that fruit oil samples have a density value that is almost the same as the density of cooking oil samples. If cooking oil is added to red fruit oil with a maximum ratio of 1 2, then no oil addition will be detected from the density measurement. Fry until the colour of the red fruit oil does not change drastically.

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