

Analysis of Free Fatty Acid Contents (As Acid Laurat) Pure Coconut Oil (Virgin Coconut Oil /VCO) which Circulates in Kediri City

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ABSTRACT

Pure Coconut Oil (Virgin Coconut Oil / VCO) is a vegetable oil that contains medium chain saturated fatty acids. The medium-chain saturated fatty acid that has the highest content in virgin coconut oil is lauric acid. Lauric acid can be directly absorbed by the liver and used as an energy source. This study aims to determine the levels of free fatty acids (as lauric acid) in virgin coconut oil (Virgin Coconut Oil/VCO) according to SNI Standard 7381: 2008. The samples used in this study were pure coconut oil from various brands on the market in Indonesia. Kediri city. This study used an alkalimetry method to identify the free fatty acid levels in the sample. From the results of the analysis on 5 (five) brands of virgin coconut oil, it was found that all samples met the requirements of SNI 7381: 2008 which is a maximum of 0.2%. The results of the analysis of the levels of free fatty acids as lauric acid, the largest 0.1988% and the smallest 0.1643% according to the requirements of SNI.

Keywords: Free Fatty Acids, Pure Coconut Oil, SNI 7381 : 2008

INTRODUCTION

Oil is an ester of a glycerol molecule and three fatty acid molecules, by therefore it is also called triacyl glycerol or triglyceride. The fatty acids contained in Triglycerides have a big influence on the properties of oil and are determinants of physical properties and chemical properties of oil. Fats that contain fatty acids with low melting points usually liquid at room temperature, and fats containing high melting point fatty acids tends to be semi-solid or solid at room temperature. The fatty acids bound to form triglycerides which are usually straight chain organic acids There are between 16 and 24 carbon atoms per molecule. Based on whether or not The absence of carbon-carbon double bonds in fatty acids is known as unsaturated fatty acids and saturated fatty acids. Unsaturated fatty acids are fatty acids that have bonds carbon-carbon double, while saturated fatty acids are fatty acids that do not contains double bonds in the bonds between the carbon atoms that make up fatty acids (Darmoyuwono, 2006).

An oil that has quite strong antioxidant properties is coconut oil. Wrong One coconut oil product that is now gaining a wide market is coconut oil pure / Virgin Coconut Oil (VCO). Pure coconut oil, or better known as virgin coconut oil (VCO) is a modification of the process of making coconut oil so that it is produced product with low water content and free fatty acid content, clear color, odor fragrant, and has a long shelf life, namely more than 12 months acids - short and medium chain fatty acids (caprylic, capric and lauric) in oil This coconut is known to have certain biological functions for the human body. VCO oil is also able to ward off diseases caused by free radicals, anti-wrinkle and aging early, and for pharmaceutical purposes. In the pharmaceutical sector, usually pure coconut oil used for medicines and cosmetics. For example, in telon oil, handbody, and facial moisturizer. Apart from that, VCO is also able to improve the digestive system. This matter because the fatty acids in VCO are MCFA which can be directly absorbed through intestinal wall, without

having to undergo hydrolysis and enzymatic processes so that it is direct metabolized in the liver to be produced into energy (Darmoyuwono, 2006).

Free fatty acids are produced by hydrolysis and oxidation processes usually combines with neutral fats and at concentrations up to 15%, produces no taste which is not liked. Free fatty acids, even in small amounts resulting in an unpleasant taste. This applies to fats that contain fatty acids cannot evaporate, with a number of C atoms greater than 14. Free fatty acids are can evaporate, with the number of carbon atoms C4, C6, C8, and C10, producing a rancid odor and unpleasant taste in fatty foods (Irmawati, 2013).

METHODS

Tools

Analytical balance, minimum accuracy 0.1 ml, calibrated, Erlenmeyer 250 ml , Volumetric flask, Measuring cup, Volume Pipette, Goblet, Burette 10 ml or 50 ml, calibrated.

Materials:

Materials used : pure coconut oil (VCO) various brands, Oxalic Acid pa Neutral 95% alcohol solution Isopropanol or 95% ethanol is heated on a hot plate until it boils. Add approximately 0.5 ml of phenolphthalein indicator, then titrate with the solution 0.1 N NaOH until a stable pink color appears (SNI 01-2901-2006). Phenolphthalein (PP) indicator 0.5 , Dissolve 0.5 grams of phenolphthalein in 100 ml of 95% ethanol (MOH RI, 1995), 0.1 N NaOH solution, Dissolve a sufficient amount of 4.001 g of sodium hydroxide to make 1000 ml (Ministry of Health of the Republic of Indonesia, 1995).

Standardization of 0.1 N NaOH solution with 0.05 N Oxalic Acid

1. Preparation of 100 ml of 0.5 N Oxalic Acid Standard solution
 - a. Weighed 0.3151 g of Oxalic Acid
 - b. Dissolve with CO₂ free distilled water in a 100 ml volumetric flask
 - c. Add distilled water to the mark line and shake until homogeneous
2. Make 500 ml of 0.1 N NaOH solution
 - a. Weighed ..g Oxalic Acid
 - b. Dissolve with CO₂ free distilled water in a 100 ml volumetric flask
 - c. Add distilled water to the mark line and shake until homogeneous
3. Standardize the NaOH solution with a standard solution of 0.05 N Oxalic Acid
 - a. Pipette 10 ml of standard oxalic acid solution and put it in an Erlenmeyer flask
 - b. Add 10 ml of CO₂ free distilled water
 - c. Add 1-2 drops of PP indicator
 - d. Titrate with NaOH until a constant pink color
- B. Determination of free fatty acid levels
 1. Weigh 30 grams of sample and put it in an Erlenmeyer
 2. Add 50 ml of 95% neutral ethanol
 3. Add 3-5 drops of PP indicator
 4. Titrate with 0.1 N NaOH solution until the pink color remains constant
 5. Calculate the free fatty acid content in the sample (SNI, 2008)

RESULTS

Results of analysis of free fatty acid levels as lauric acid in oil samples Pure Coconut (VCO) of various brands is shown in table 4. Average acid content free fat in the five samples was the smallest in sample no. 2 with a moderate level of 0.1643% The largest was in sample No. 5 with a content of 0.1988%. The five samples meet SNI requirements 7381 : 2008, namely a maximum of 0.2%..The VCO oil samples that have been tested have an ALB that does not meet the requirements SNI can be caused by storage time before the coconut is processed, conditions selection of raw materials to be made into VCO, and the method

chosen during manufacture VCO. There is a change in water content during storage because the coconut is still carry out metabolic activities while still being a living structure. This reaction accelerated by bases, acids, and enzymes such as the lipase enzyme found in oil. Research results (Mulyadi, 2011) state that planting location and delay time before the coconut processing process affects the water content, free fatty acid number, peroxide value and yield of oil produced. The lowest free fatty acids are found at a delay of one week and the highest free fatty acids were found at a delay of three Sunday. The longer the delay before processing, the lower the levels water and free fatty acids contained in oil.

DISCUSSION

This is due to the water content increased and the presence of the lipase enzyme which plays a role in the process of forming fatty acids free. The Blitar planting location which is at an altitude of <200 above sea level has an oil yield which is larger and has less water content than the Lumajang and planting locations Malang is located at an altitude of > 250 above sea level.

The occurrence of changes in free fatty acids during the delay time before the process caused by hydrolysis events, both enzymatic and non-enzymatic, of fat conceived. The hydrolysis process of fat or oil can produce fatty acids free is caused by the presence of water in food tissues that contain fat or oil (Buckle, 1987). Therefore, process delays must be taken into account resulting in damage. In this case, VCO, namely the increase in free fatty acid levels, can be avoided.

CONCLUSION

The average free fatty acid content of VCO samples was found to be at least 0.1643% and the largest is 0.1988%. Results of determining free fatty acid levels in 5 (five) VCO samples circulating in Indonesia Kediri city with different brands found that the five samples met requirements of SNI 7381: 2008.

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