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Artikel

Characterization Crude Palm Oil (CPO) Olein Fraction As A Raw Material for Cooking Oil

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ABSTRACT: Research has been carried out on the characterization of crude palm oil olein fraction as a raw material for cooking oil. In the initial stage, crude palm oil is centrifuged at 4000 rpm for 30 minutes to separate the olein and stearin fractions from crude palm oil. Then the olein fraction is treated using rice husk ash to obtain an olein fraction that meets the standard raw materials for making cooking oil. Therefore, the olein fraction was characterized by measuring several parameters including water content, free fatty acid content, carotenoid content and peroxide value. The results of research on water content are in the range of 0.02 – 0.07% , free fatty acid content is in the range of 0.03 – 0.08%, and peroxide content is in the range of 0.14 – 0.16 meq/kg. Results of research on the characterization of the crude palm oil olein fraction shows parameters that are a reference in determining the quality of cooking oil raw materials that meet the required standards.

INTRODUCTION

The CPO processed through fresh fruit bunches (FFB) is a factor that really determines the quality of the cooking oil produced. By selecting optimal levels of maturity in fresh fruit bunches, accompanied by short waiting and transportation times, good quality CPO production will result [1]. To fulfill premium quality CPO as a guarantee of the safety of edible oil, premium CPO quality standards are required. Therefore, premium CPO quality standards and guidelines for producing quality palm oil are priorities for the Indonesian government to be realized immediately because palm oil is a strategic commodity and for the protection of public health [2]. Crude Palm Oil CPO) is palm oil that can be obtained through an extraction process from palm fruit flesh, where the crude palm oil still contains dissolved and insoluble impurities in the oil. Therefore, the process of refining palm oil is by converting crude palm oil into edible quality oil efficiently by removing unwanted impurities to an acceptable level [3] . Influence of humidity and inadequate storage results in poor CPO resulting in TAG damage and FFA release. As a result, FFA levels are increasing, where CPO content that exceeds 5% makes it unhealthy for humans consumption. Nonetheless, it is the quality of palm oil is influenced by its FFA content. Usually the FFA content in crude palm oil is of good quality should not exceed 5%. Because of that,crude palm oil (CPO) with an FFA percentage of less than 5% valuable for food or oleochemical applications [4].

Refining crude vegetable oil from undesirable substances adversely affects its quality and lipid retention (phospholipids, free fatty acids, sterols, waxes, oxidation products, water, aromatics compounds, pigments). Therefore, initial treatment is required before the oil is produced [5]. In this research, a fractionation stage was carried out to produce an olein fraction and a stearin fraction using the centrifugation method. The results of olein fractionation are purified using rice husk ash to obtain quality standards for CPO

production which is used as raw material in making cooking oil. The use of rice husk ash is very effective in the cooking oil processing process, especially in reducing water content, free fatty acid content and peroxide value. The results of research that have been published regarding the effectiveness of using rice husk ash in the oil refining process in the form of adding rice husk ash ranging from 10% to 25% are able to reduce the water and free fatty acid content of Mandar coconut oil to reach the quality standards required by SNI [6].

RESULT AND DISCUSSION

The results of the analysis of the quality of crude palm oil (CPO) olein fraction treated with rice husk ash gave quite significant results as presented in **Table 1**.

Table 1. Analysis Results and Characteristics of Crude Palm Oil Olein Fraction

Analysis/Characteristics	1	2	3	SNI
Water content (%)	0.07	0.05	0.02	5
Free Fatty Acid (%)	0.08	0.04	0.03	0.45
Peroxide Value (meq/kg)	0.16	0.14	0.15	1

One parameter that is often used in determining the quality of cooking oil is water content. In this case, the water content of the CPO olein fraction treated with the addition of rice husk ash will reduce the water content significantly along with the increase in the concentration of rice husk ash provided. This shows that the treatment with the addition of rice husk ash is effective in reducing water content. The analysis results show that the CPO olein fraction moisture content is in the range of 0.02-0.07%

Analysis of the free fatty acid content in CPO is often used as an important parameter in determining the quality of cooking oil to be produced. Based on table 1 above, it shows that there is a tendency to decrease free fatty acid levels as the treatment increases the concentration of rice husk ash. This shows that the use of rice husk ash is effective in reducing the free fatty acid content in the olein fraction of CPO. So that the quality requirements for good quality CPO are met and it is safe to use as raw material in the cooking oil industry.

Peroxide value is often used as the main indicator in determining the level of oil degradation. Where the peroxide number parameter is closely related to the ease with which the oil undergoes oxidation. In this study, the treatment of adding a concentration of rice husk ash to the olein fraction of CPO had a significant effect on reducing the peroxide value. The analysis results of the peroxide value are in the range of 0.14-0.16 meq O_2/kg.

CONCLUSION

The treatment of adding rice husk ash to the CPO olein fraction refining process is very effective in reducing water content, free fatty acid content and peroxide value. Where the water content is in the range of 0.02 - 0.07%, the free fatty acid content is in the range of 0.03 - 0.08%, while the peroxide value is in the range of 0.14 - 0.16 meqO_2/kg.

MATERIAL AND METHOD

The raw material used in this research is CPO taken in the Donggala area, for the purposes of analyzing the characteristics of the CPO Olein Fraction, including HCl, NaOH, KOH, PP, hexane, ethanol, CH_3COOH, $Na_2S_2O_3$, Whatman paper and distilled water. In the initial stage, CPO sample preparation was carried out to produce an olein fraction and a stearin fraction using a centrifuge at 4000 rpm for 30 minutes. The next stage, the CPO olein fraction was treated with the addition of rice husk ash at concentrations of 10% (1), 20% (2), and 30% (3). Next, the CPO olein fraction was characterized by measuring several parameters, including water content, free fatty acid content and peroxide value.

Characteristic of Crude Palm Oil Olein Fraction
Determination Water Content
Measurement of the water content contained in CPO was analyzed using the gravimetric method, namely in the first stage the porcelain cup was heated in the oven for 15 minutes at a temperature of 130^0C, then cooled in a desiccator, then the empty porcelain cup was weighed and the weight was recorded. A CPO sample of ±5 grams was weighed, then placed in the oven for 30 minutes at a temperature of 130^0C. In the next stage, the cup containing the CPO was cooled in a desiccator for 15 minutes, and weighed and the weight recorded.

Determination Free Fatty Acid Content
A 14 g CPO sample was weighed first, then put into a 250 mL Erlenmeyer glass, then 25 mL of 96% ethanol was added, followed by the addition of 2 mL of PP indicator. Titrate with 0.05 N NaOH until a pink solution is formed.

Determination Peroxide Number Content
A 5 g CPO sample was weighed, then put into a 250 ml Erlenmeyer glass, then 12 mL of chloroform and 18 mL of glacial acetic acid were added to the Erlenmeyer glass. The next stage is shaking the solution until it dissolves. After that, 0.5 mL of saturated KI solution was added. Then 30 ml of distilled water was added to the mixture. The next stage is a titration process using a 0.005 N $Na_2S_2O_3$ solution until the color changes to blue by adding 0.5 ml of 1% starch to the solution.

DECLARATION

In this study there is no conflict of interest of the authors

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