



Physical Characteristics and Hedonic Value of Katako Butter, Using RBD Palm Oil Emulsifier with Coffee Extract Flavor

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ABSTRACT: *Biji tarok peanut butter (henceforth: Katako butter) is a food product which has high nutritive value and physical characteristic of butter. The addition of supplementary factorial RAL (complete design) consists of 3 factors with 2 repetitions: RBD PO (Refined Bleached and Deodorized Palm Oil) (R) with the composition of 0% (R0), 0.5% (R1), 1% (R2), and 1.5% (R3), coffee bean extract (K) with the composition of 0% (K0), 0.5% (K1), 1% (K2), and 1.5% (K3), and the duration of storage (T) of 0 week (T0), 2 weeks (T2), 4 weeks (T3), the 6th week (T4), the 8th week (T5), and the 10th week (T6). The observed parameters were yield value, viscosity, and hedonic test. The gathered data were analyzed, followed by Duncan Multiple Range Test (DMRT) when the result had significant disparity. The result of the research showed that RBD PO emulsifier and coffee bean extract, during the storage, had significant influence on the yield value of Katako butter and the addition of RBD PO ($p < 0.01$). Coffee bean extract during the storage had significant influence on the viscosity of Katako butter ($p < 0.01$). Katako butter is a food product which has high nutritive value, and its physical characteristic is similar to butter. The addition of supplementary ingredients in the process of making it is needed to increase the taste and to prolong the duration of its storage. This research used factorial RAL (complete design) consisted of 3 factors and 2 repetitions: RBD PO (R) with the composition of 0% (R0), 0.5% (R1), 1% (R2), and 1.5% (R3), coffee bean extract (K) with the composition of 0% (K0), 0.5% (K1), 1% (K2), and 1.5% (K3), length of storage (T) in 0 week (T0), 2 weeks (T2), 4 weeks (T3), the 6th week (T4), the 8th week (T5), and the 10th week (T6). The observed parameter was yield value, viscosity, and hedonic test. The gathered data were analyzed and followed by Duncan Multiple Range Test (DMRT) when the result had significant disparity. The result of the research showed that RBD PO emulsifier and coffee bean extract during the storage had significant influence ($p < 0.01$) on yield value of Katako butter, and the addition of RBD PO and coffee bean extract during the storage had significant influence ($p < 0.01$) on the viscosity of Katako butter. Flavor (Taste, Aroma, Texture).*

KEYWORDS: *Peanut, Tarok, Butter, RBD, Yield, Viscosity*

I. INTRODUCTION

Peanut butter is a food product which comes from Haiti. It uses roasted and refined peanuts as its basic ingredients. This product has its physical characteristic similar to butter and also has similar purpose in its use. Peanut is generally used for butter, and the latter is also frequently consumed as complimentary food product with bread for breakfast. The addition of supplement ingredients is needed to increase the taste in the process of making butter. One of the ingredients which is potential in increasing the taste and aroma of butter is coffee bean extract.

Coffee is a strategic plantation plant which is usually consumed in the form of fresh drink. At the beginning of its development, coffee is not widely produced and consumed in the Middle East countries like Saudi Arabia, but today it spreads widely to all over the world and many people consume it in Europe and the United States (Grigg, 2002). Before coffee is used, the process of roasting has been done. Coffee "flavor" yielded during the roasting process, depending on the types of coffee which will be used. The way the coffee beans are processed, roasting, grinding, and storing. In the industrial scale, the taste of coffee will be determined by the way it is processed in the mills. The roasting of coffee beans will chemically change the contents in coffee beans, followed by the decrease in its weight, the increase in its size, and the change in its color. After having been roasted, coffee beans will undergo chemical change to be delicious taste.

The use of *biji tarok* (*Artocarpus elasticus*) can also increase the taste and texture of peanut butter. Its stone is white, small, and can be consumed by roasting it. *Artocarpus elasticus* is potential to be used as medicine. The characteristics of *Artocarpus* genus are as follows: its plant is high, and it has



with gum of pulps containing many stones. Its fruit, roots, and leaves are often used as traditional medicines to cure heart cirrhosis, hypertension, and diabetes, for this genus is rich of phenolic secondary metabolism compound such as flavonoid, chalkon, and arylbenzofuran (Ramli, et. all., 2013). The stone of this fruit is known in its local name, *biji tarok*, which is commonly used by the Minangkabau community as food which has the taste similar to the taste of peanut.

Besides its specific taste, peanut butter also has its good smearing nature favored by consumers; it can be identified objectively by determining its yield value. The quality of peanut butter is determined by its consistency, color, aroma, and taste (Woodroof, 1983). One of the problems which often arises is the incidence of the liquid phase separation caused by the movement of weightier particles or components and by leaving liquid phase on the upper part due to the flow nature of its fat. In this condition, peanut butter emulsion is unstable. Emulsion stability during the storage is influenced by the size of particles, the difference in the density of dispersed phase from continued phase, the continued phase viscosity from emulsion, and the amount and the type of emulsifier added during the storage.

One of the products domestically produced which has the stability is RBD PO (Refined Bleached and Deodorized Palm Oil) which will be used in the research.

II. RESEARCH METHOD

The research was conducted in the Growth Center Laboratory, Kopertis Wilayah I. The objects used in this research were peanuts of Gajah variety and *biji tarok* (*Artocarpus sp*). RBD PO was used as the stabilizing substance for making peanut butter, and coffee bean extract was used for aroma and color. The materials used in the research were oven, scales, grinder, spatula, plastic mugs, calibrated beaker, food scale, food plastic bowl, and sstoppered glass jar.

Selecting the Range of Emulsifier Content

The objective of the research was to determine the oil content of peanut and roasted *biji tarok* in order to estimate the emulsifier which can be added, to find out the simple way of making peanut butter, and to find out some factors which influenced the process of making it. Supplementary ingredients such as RBD PO and coffee extract were added in peanut butter, mixed with maximum speed in a very short time to get equally distributed result.

The Making of Peanut Butter

The process of making peanut butter began with the removal of peanuts from their shells. They were then roasted in the temperature of 150°C in 30 minutes and made them cold quickly. The husk was separated from its cotyledons which were smashed with rice pounder and refined them with grinder. The composition of the peanut butter was 70% of peanuts and 30% of *biji tarok*.

The Influence of Emulsifier Content on the Nature of Peanut Butter during the Storage

The formula composition of supplementary ingredients are as follows: the composition of RBD PO was 0% (R0), 0.5% (R1), 1% (R2) and 1.5% (R3), the composition of coffee bean extract was 0% (K0), 0.5% (K1), 1% (K2) and 1.5% (K3), the duration of storage was 0 week (T0), 2 weeks (T2), 4 weeks (T3), the 6th week (T4), the 8th week (T5), and the 10th week (T6).

Parameter of Observation

The parameter of the observed objects was yield value, viscosity, and hedonic test. The research used factorial RAL (complete design), consisted of 3 factors and 2 repetitions. The gathered data were analyzed and followed by Duncan Multiple Range Test (DMRT) when the result had significant disparity. Organoleptic test in this research was done to test the taste of the product in different formulas. Setyaningsih, et. al., (2010) point out that quantitative affective test was done to find out the response of consumers who were in big groups to their acceptance, favorites, sensory attributes, and so on. Organoleptic test or hedonic test was done to find out the attributes of color, aroma, taste, and texture. The assessment scale of hedonic test was 1-10. It was used to determine butter selected formula. In this test, selecting the best product was done by using the entire assessment which was the result of the combination of panelists' favorite of the parameter of color, texture, aroma, and taste. This was because each attribute had different value on panelists' favorite of the presented products.

III. RESULT AND DISCUSSION

Yield Value of Katako Butter

Based on the result of the research, it was found that RBD PO emulsion and coffee bean extract, during the storage, had significant influence ($p < 0.01$) on yield value of Katako butter while the interaction between RBD PO and coffee bean extract during the storage also had significant influence

($p < 0.05$) on the yield value of Katako butter. The addition of RBD PO to yield value of Katako butter had the decrease in its value, along with the increase in RBD PO concentration (Figure 1).

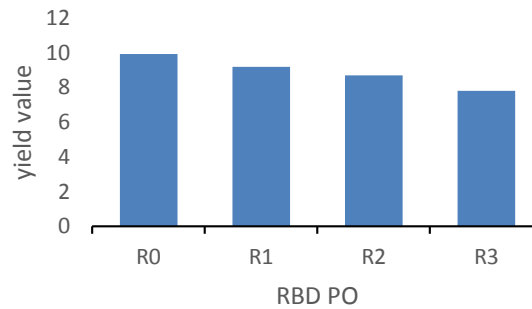


Figure 1. Mean yield value (dyne/cm²) among RBD PO emulsifiers

Animal fat found in RBD PO would function as the core in establishing three dimension nets in the process of making it cold while non-animal fat would fill the vacant spaces of the three dimension nets, and the existence of β fine crystal would support the stability of continued phase because solid particles spread equally in the continued phase so that fine, structured butter was yielded (Hind and Chinnan, 1994)

The addition of coffee bean extract to yield value of Katako butter which tended to decrease was in accordance with the increase in the addition of the content of coffee bean extract (Figure 2).

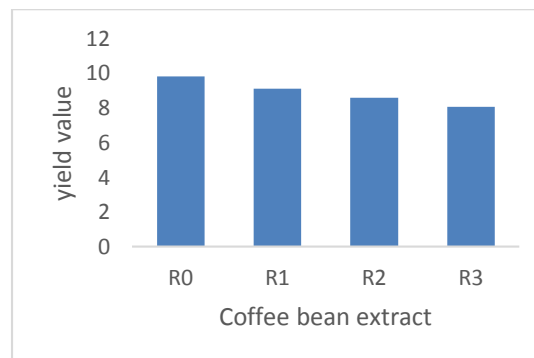


Figure 2. Mean yield value (dyne/cm²) in the content coffee bean extract

The decrease in yield value of Katako butter which was in accordance with the increase in the addition of coffee bean extract could cause the addition of the decrease in surface pressure so that solid particles as the phase were dispersed equally in the continued phase. RBD PO is rich of palmitic acid and oleic acid in the form of semi-solidity, and it will firm solidity in the temperature of 20°C so that it can be used to improve the quality of the butter softness (Tarigan, 2005).

The increase occurred in yield value of Katako butter with the increase in the duration of storage. Until the limit time, the increase in yield value of Katako butter might stabilize the emulsion which is in accordance with its activity (Figure 3).

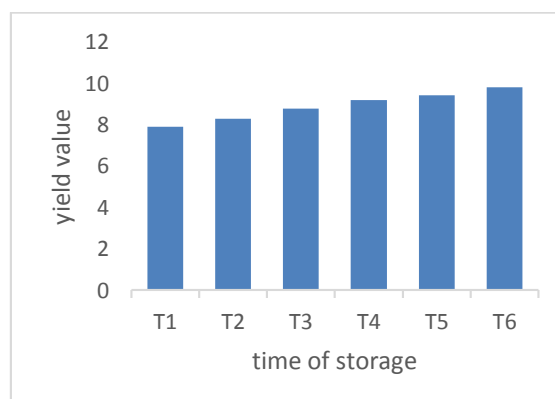


Figure 3. Mean yield value (dyne/cm²) during the time of storage

The increase in the yield value of Katako butter, along with the increase in its duration of storage was caused by the interaction of functional cluster styles from various substances which arrange Katako butter.

Animal fats found in RBD PO would function as the core in establishing three dimension nets in the process of making it cold while non-animal fats would search for vacant spaces of the three dimension nets, and the existence of β fine crystal would support the stability of continued phase because solid particles spread equally in the continued phase so that fine, structured butter was yielded (Hind and Chinnan, 1994)

Viscosity of Katako Butter

Based on the result of the research, it was found that the addition of RBD PO and coffee bean extract during the storage had significant influence ($p < 0.01$) on the viscosity of Katako butter. The addition of RBD PO would increase the viscosity of continued phase so that the density of continued phase was dispersed not so far, the phase was dispersed and the continued phase would be equally distributed which caused the viscosity of the emulsion to be lower than that of unstable emulsion (Figure 4)

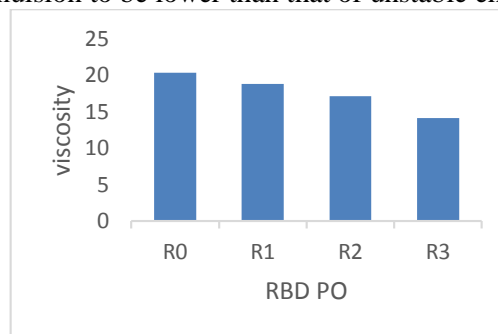


Figure 4. Mean viscosity (poise) in the treatment of RBD PO emulsifier

The addition of coffee bean extract to the viscosity of Katako butter would cause the viscosity to become decreasing, along with the increase in the addition of the content of coffee bean extract (Figure 5). This was because butter had physical characteristic oily mass of soft wax like porridge so that when it was in a big amount it caused viscosity to increase and capacity to disperse decreased (Juntawong et. al., 2010; Christopher et. al., 1993; Oyedeji et. al., 2010).

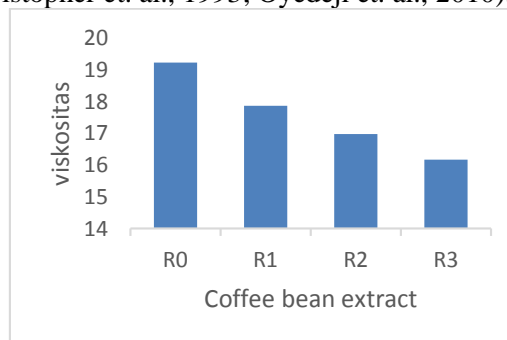


Figure 5. Mean viscosity (poise) in the treatment of coffee bean extract content

The increase in the viscosity of Katako butter occurred along with the increase in the duration of storage as the result of the interaction of functional cluster styles from various substances which established emulsion such as the interaction between protein and the other protein and between protein and fat (Figure 6)

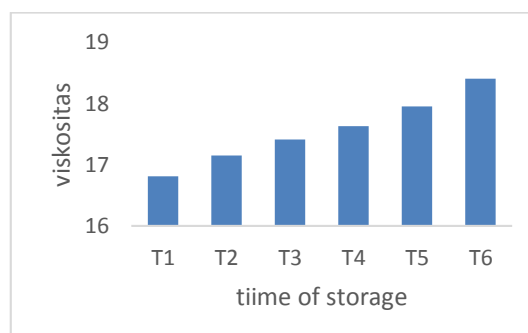


Figure 6. Mean viscosity (poise) in the treatment of storage time

Hedonic Test

Based on hedonic test, it was found that the highest rate of the taste test was 7.5 with the addition of coffee bean extract of 1%. The highest rate of the aroma test was 8.5 with the addition of coffee bean extract of 0.5%. The highest rate of the color test was 7.25 with the addition of RBD PO emulsifier of 1%. The highest rate of the texture test was 7.38 with the addition of coffee bean extract of 1%. These results could be seen in Figure 7 below.

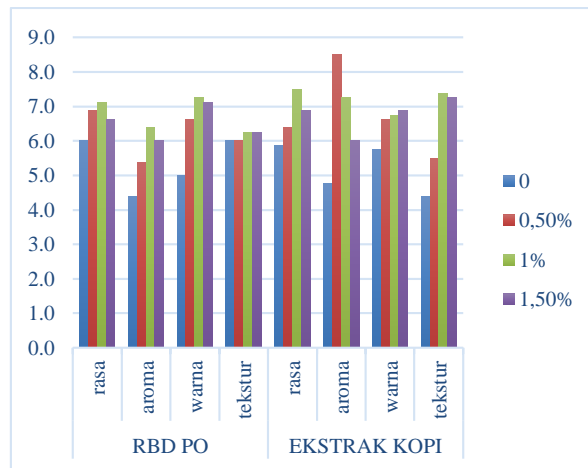


Figure 7. Hedonic value test of Katakko butter by the addition of RBD PO and coffee bean extract

Based on the result of hedonic test, it was found that the highest rate was 7.5 with the addition of coffee bean extract of 1%. Taste is one of the very important elements in the acceptance of a certain food product. Good taste can provide high acceptance of a product and can become the characteristic of that product (Winarno, 2008). Delicious taste of Katakko butter cannot be competed by the taste of coffee which tends to be a little bit bitter and strong so that the addition of up to 1% of coffee bean extract has been sufficient to make the taste of coffee in the Katakko butter.

The highest rate of the aroma test was 8.5 with the addition of coffee bean extract of 0.5%. Katakko butter had had specific aroma from the peanut and *biji tarok* so that the addition of only 0.5% of coffee extracts which tasted strong did not compete with the original aroma of the Katakko butter. The highest rate of the color test was 7.25 with the addition of RBD PO emulsifier of 1% made the color of Katakko butter shiny. Color is an important attribute used for organoleptic test of a peanut product (Shakerardekani et. al., 2013).

The highest rate of the texture test was 7.38 with the addition of coffee bean extract of 1%. Texture is also one of sensory attributes of food which plays an important role in consumers' acceptance, decision to buy, and consumption in certain time. This is evident that texture is one of the dominant attributes of consumers' preference to a certain food product (Rohm, 1990). Setyaningsih, et. al., (2010) point out that a food product will be accepted when the number of consumers who reject the product is less than 50% and consumers can consume it.

IV. CONCLUSION

It could be concluded that RBD PO emulsifier and coffee bean extract, during the storage, had significant influence ($p < 0.01$) on the yield value of Katakko butter, and the addition of RBD PO and coffee bean extract during the storage had significant influence ($p < 0.01$) on the viscosity of Katakko butter. The longer it was stored, the more increasing the yield value and viscosity of Katakko butter. Based on hedonic test, the addition of coffee bean extract of 1% would increase the taste and the texture of Katakko butter. The best aroma of Katakko butter was with the addition of 0.5% of coffee extract, and the best color of Katakko butter was the addition of 1% of RBD PO.

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