



Determination of Bleachability Index (DOBI) Olein Fraction Crude Palm Oil Using Spectrophotometer UV-VIS

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ABSTRACT

DOBI measurement research has been carried out on samples of the olein fraction from crude palm oil as a raw material for premium cooking oil. The results showed that the DOBI values of the five treated samples were in the range of 2.95-3.27. These results show that the quality of the dobi is very good and in accordance with the quality required in the trading industry

Keywords: DOBI, crude palm oil, olein fraction, spectrophotometer Uv-Vis

1. INTRODUCTION

Indonesia is one of the largest crude palm oil producing countries in the world. One of the important parameters in the world of crude palm oil trading is the DOBI value, where a high DOBI value indicates that the quality of the CPO produced is of good quality. This can be seen from the palm harvesting process, the maturity of the palm and the influence of transportation before processing which greatly influences the DOBI value. Therefore, apart from the factors mentioned above, the initial treatment of the CPO that will be processed will affect the dobi value which will have a direct impact on the quality of the premium cooking oil that will be produced. which indirectly has an impact on health and provides a sense of security for consumers regarding the effects of the formation of M3PDE and GE in the process of refining cooking oil. The DOBI value measurement is a power index bleaching of CPO used in the oil refining process which is useful in determining the amount of bleaching agent used in the cooking oil production process. Besides that, DOBI measurement is one of the parameters used in the process of measuring the level of oil damage caused by the oxidation process. The low DOBI value indicates an increase in the content of secondary oxidation products, joush et al., 2013).

Based on the results of research conducted by the Palm Oil Research Center (PPKS), the DOBI value for Indonesian CPO is relatively low, namely less than 2. Therefore, to increase the DOBI value for Indonesian CPO, it can be increased by improving the processing factors for fruit and CPO. Several things that cause low DOBI values for CPO include the quality of palm fruit, fruit maturity, fruit processing time, processing conditions, contamination, and fruit storage time (See and Gee, 2001). One of the considerations in increasing the dobi value is that the processing process that uses low temperatures has a big influence on the dobi value (Roila Awang and Nurul H Kasmin, 2019). In this research, processing using low temperature heating will minimize carotene damage so that it can increase the dobi value. Therefore, in this research, it will be treated first by fractionation to separate the olein and starin fractions from crude palm oil. So that the heating process that has been carried out using the sterilization process can be eliminated by. Therefore, in this study, the initial treatment process greatly influenced the DOBI value in the CPO olein fraction sample preparation. Considering the importance of measuring the DOBI value in CPO, it will provide information to the company in the oil refining process and with this data information, it will be known how many doses are needed in the oil bleaching process in making cooking oil. In this study, DOBI measurements were carried out using a UV Vis spectrophotometer to measure sample absorption at wavelengths of 446 nm and 269 nm.

2. MATERIALS AND METHODS

2.1 Tools and materials used

In this research, the raw material for FFB (Fresh Fruit Bunches) was taken in the Donggala area in several community gardens. The tools used include measuring flasks, analytical balances, glass beakers and UV-Vis spectrophotometers. Meanwhile, the materials used are ethanol and fractionated crude palm oil (CPO).

2.2 Methods

Sample Preparation From Fresh Fruit Bunches Into Crude Palm Oil

In the initial stage, the process of heating the palm fruit is carried out for approximately 1 hour at a controlled temperature of 60°C, then the results of the heating are pressed to produce crude palm oil.

Crude palm oil fractionation

In the initial stage, CPO samples (A,B,C,D, and E) were prepared to produce an olein fraction and a stearin fraction using a centrifuge at 4000 rpm for 30 minutes.

Determination of DOBI in CPO olein fraction

The CPO olein fraction of approximately 0.1 gram was weighed using an analytical balance, then the weighed sample was put into a measuring flask and dissolved with ethanol, up to the line. Then the mixture was put into a cuvette, then measured using a UV-Vis spectrophotometer for absorbance at $\lambda = 269$ nm and $\lambda = 446$ nm.

3. Results and Discussion

DOBI measurement results show the ability to bleach CPO based on the amount of carotene and secondary oxidation products present in oil. This greatly affects the quality of the palm oil produced. Therefore, measuring the DOBI value also shows the ease of the palm oil refining process and will have an influence on the storage process. Meanwhile, a low DOBI value indicates difficulties in the oil refining process, especially when using bleaching earth at the physical refining process stage (Augustin et al., 2015).

Tabel 1. DOBI Value Fraction Olein Crude Palm Oil Treated Heating At Temperature 60°C

No	Sample	DOBI
1	Fraction Olein (A)	2.95
2	Fraction Olein (B)	3.02
3	Fraction Olein (C)	3.27
4	Fraction Olein (D)	2.84
5	Fraction Olein (E)	3.11

The research results showed that the DOBI value that had been given heating treatment at a controlled temperature showed a DOBI value in the range of several samples belonging to the community. From this, it can be concluded that providing pretreatment will improve the DOBI value which will indirectly provide very useful benefits for cooking oil industry players, especially minimizing the use of bleaching earth in the cooking oil refining process. So it will provide a sense of security for public health regarding the issue of MP3D and GE effects that occur in the cooking oil processing process

4. Conclusion

The results of the research that has been carried out can be concluded that the use of controlled heating treatment at a temperature of 60 C can improve the DOBI value in the CPO olein fraction for several samples analyzed.

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References

- Jusoh, J. M., Rashid, N. A., & Omar, Z. (2013). Effect of sterilization process on deterioration of bleachability index (DOBI) of crude palm oil (CPO) extracted from different degree of oil palm ripeness. *International Journal of Bioscience, Biochemistry and Bioinformatics*, 3, 322-327.
- Augustin, G., Anne, M. N., Armand, A. B. and Moses M. C. (2015). Some Physicochemical Characteristics and Storage Stability of crude palm oils (*Elaeis guineensis* Jacq). *American Journal of Food Science and Technology* 3(4):97-102.
- Roila Awang and Nurul Hasimah Kasmin (2019). A Comparative Study on Deterioration of Bleachability Index (DOBI) of Crude Palm Oil (CPO) from Different Degrees of Oil Palm Ripeness, *Palm Oil Engineering Bulletin* No. 133
- W. L. Siew and P. T. Gee (2001), "Deterioration of bleachability index (DOBI)," *Inf. - Int. News Fats, Oils Relat. Mater.*, vol. 12, no. 12, p. 1183.