CRUDE PALM OIL CHARACTERISTICS DURING STORAGE AND CIRCULATION IN PIPELINE

Desir Detak Insani, Sugiyono, and Nur Wulandari
Department of Food Science and Technology, Faculty of Agricultural Engineering and Technology, Bogor Agricultural University, IPB Darmaga,
PO BOX 220, Bogor, West Java, Indonesia
Phone: +62 8522 345 8881, e-mail: insani90@yahoo.com

ABSTRACT

Crude palm oil (CPO) is one of Indonesia's main commodity. Nowadays, Indonesia is the largest CPO producer in the world. To increase the competitiveness of CPO in Indonesia, handling, storage, and transportation of CPO should be managed efficiently. The objective of this research was to obtain the basic data about the quality characteristics and rheological properties of CPO during storage and pipe flow transportation. The quality parameters of CPO that observed in this study were free fatty acids (FFA), iodine value, carotenoid content, and the deterioration of bleachability index (DOBI). The observed parameters of the rheological properties were flow behavior index (n) and consistency index (K). CPO that used in this research had 3.44% of FFA, 52.64 of iodine value, 816 ppm of carotenoid content, and 3.21 of DOBI. CPO was stored at the storage temperature of 20, 25, 30, 35, and 40 ^{o}C over 4 weeks. The results showed that during storage, FFA levels increased, while the carotenoid content and DOBI decreased. The higher storage temperature resulted in higher rate of decline in CPO quality. At each storage temperature, the longer storage resulted in decreased quality of CPO. Based on this research, the best storage temperature to maintain the quality of CPO was at 20 ^{o}C. At the room temperature, CPO was pseudoplastic ($0<n<1$ and $K>0$), but at the higher storage temperature, CPO had rheological properties that closer to Newtonian ($n=1$ and $K>0$). The analysis of rheological properties during storage showed that storage time had no effect on the rheological properties of CPO. Study on CPO flow by using circulated pipeline in isothermal conditions showed that melting temperature was the critical temperature for maintaining low viscosity to assure the flow of CPO. Flow of CPO in high temperature caused decreasing in quality of CPO significantly.

Keywords : CPO, quality, rheological properties, storage, pipeline.