

Effect of chopping oil palm fruit spikelets on the free fatty acid content release rate and its mechanical properties

ABSTRACT

Crushed oil palm fruit bunches from the continuous sterilization system cause damages and bruising of the fruits, yielding high lipase enzyme reaction if no heating pre-treatment was carried out immediately. Thus, this study was proposed to acquire the free fatty acid content (FFA) release rate and to determine the mechanical properties of chopped oil palm fruit spikelets. The fruit spikelets were chopped by using two different methods, which were manually chopping using a knife blade and utilizing a fabricated chopper blade. Damages obtained from the manually chopped using the knife blade were classified into two categories, which were minor and major damage. The chopper blade was fixed on the Instron Machine to obtain its mechanical properties, such as rupture force, deformation at rupture, hardness and energy at the break of the fruit spikelets. The chopped fruit spikelets were stored at different storage periods ranging between 0hr to 2hr at room temperature. Extraction of palm oil was extracted using the Soxhlet extractor and the FFA content of the palm oil was determined through titration method. Results showed that the mean rupture force, deformation at rupture, hardness and energy at break required when chopping the fruit spikelets were 2781N, 45.53mm, 61.02 N/mm and 36.71J respectively. The development of FFA content was highly influenced by the damaged area of the fruits and the length of storage periods. This is due to the development of lipase enzyme activity that occurred in the damaged cells, therefore simultaneously increasing the rate of FFA content released.

Keyword: Oil palm fruit spikelets; Chopping methods; Mechanical properties; Storage periods; Free fatty acid content