Yield and physicochemical properties of mechanically exytacted crude Jatropha curcas L. oil

Abstract

Knowledge on physical properties and their dependence on moisture content of Jatropha curcas L seeds are essential to improve the design of equipment for harvesting, processing and storage of the seeds. The objective of this experiment is to find the effect of mechanical extraction method to the physicochemical properties of the extracted oil. The result is expected to be valuable as basic data for designing the equipments and process related to the extraction of oil from the seed of Jatropha. The oil extraction was performed using a specially designed laboratory scale mechanical extractor, and the yield was calibrated with soxhlet apparatus using hexane as the solvent to obtain its extraction efficiency. The experiment was conducted in factorial arrangement, with four types of sample (seeds,kernel, crushed seeds, and crushed kernel), four extraction temperature (ambient, 50 C, 60 C and 80 C), and three preheating time (600 s, 1200 s, and 2400 s), and analyzed with Duncan Multiple Range Test (DMRT). The results show that crushing the kernel of Jatropha before extracting the oil mechanically will give higher oil yield and higher extraction efficiency. Higher temperature and longer preheating time also increase the oil yield. However, the maximum applicable temperature for mechanical extraction is 60 C, since the viscosity and free fatty acid content of the extracted oil will increase if the extraction temperature increased above the temperature.