

Effect of Strong Base Buffer on Crude Palm Oil Yield

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Abstract

Palm oil and its derivatives are widely used in food, oleo chemical and biodiesel industries. Thus, high yield of crude palm oil (CPO) is an important objective for palm oil producers, which is determined via the performance of extraction process or called oil extraction rate (OER). Breakdown of oil cell bearing of mesocarp may be enhanced by induction of NaOH while being digested. Metal corrosivity of NaOH can be controlled by using sodium silicate to form strong base buffer. In this study, the buffer was sprayed on palm mesocarp fiber after 130°C sterilization for 45 min and digestion. The concentration of NaOH onto 1 % sodium silicate and dosage of the buffer were applied at 0.8, 1.0 and 3.0 mol/L, and 1 L/ ton, 3 L/ ton and 5 L/ ton respectively according to factorial design. Pressing extraction was subsequently followed. The extracted liquid was further clarified by using a centrifuge and produced three layers: oil, water and non-oily solid (NOS). As an indicator to broken cells, concentration of glucose in a mixture of water and NOS was determined using UV-Vis spectroscopy. Oil after centrifuge (OAR) was also recorded. The mesocarp sample treated with the buffer showed improvement of maximum 6.3 wt% of OER and 53.5 wt% of glucose, respectively, and repeatability of the result was ensured from least significance difference analysis.

Keywords: Crude Palm Oil; Oil Extraction Rate; Oil Cell Bearing; Cellulose Hydrolysis