

ABSTRACT

Waste from oil palm plantations in the form of empty palm bunches has not been optimally utilized. Oil palm empty bunches are one of the biomasses that contain cellulose components 33.83 %-34.85 %, hemicellulose 17.07 %-18.05 %, and lignin 26.71 %-27.54 % which has the potential to be used as bioethanol feedstock. The purpose of the study was to determine the effect of yeast mass and fermentation time on the amount of bioethanol content produced and to determine the effect of their interaction on the amount of bioethanol content produced. In this study palm empty bunches as much as 1080 g were cut flat with a size of 0.5-1 cm, and dried using an oven for 3 hours at 80 °C. The oil palm empty bunches were pulverized and sieved, 40 g of oil palm empty fruit bunch powder was added with 4 % NaOH solution and heated using an autoclave at 121 °C, then the 4 % NaOH on the oil palm empty fruit bunch was discarded, after which the oil palm empty fruit bunch was added with 120 ml of H₂SO₄ 2 % and heated for 30 minutes at 121°C. The results of hydrolysis with pH 4 were put into a fermentation bottle and 4 g, 8 g, and 12 g of baker's yeast were added. Furthermore, fermentation was carried out for 3 days, 4 days, and 5 days. The distillation process is done by putting the fermentation solution into a distillation flask at 78°C. In this study also measured the yield, density and bioethanol viscosity and bioethanol content. The highest bioethanol yield value was 13.210 %, the highest bioethanol density was 0.989 gr/ml, the highest bioethanol viscosity was 1.176 cp and the highest bioethanol content was 97.69 %.

Keywords: Glucose, H₂SO₄, hydrolysis, NaOH, *Saccharomyces cerevisiae*