Summary

Production of ethanol from Sorghum grains using baker’s yeast of *Saccharomyces cerevisiae* in a batch culture was conducted. The purpose of this experiment was to study the effects of enzyme of α-amylase and glucoamylase addition to produce glucose and a variety of glucose concentration as substrate converted to ethanol. The experiments were carried out in several steps, i.e. in liquefaction, sorghum flour in a 2000 ml slurry at concentration of 10%-30% (w/v) and supplemented with CaCl₂ 0.15 g/l was hydrolysed using a variety concentration of α-amylase (0.1, 0.2, 0.3, and 0.4%) at 100°C and pH 4.5-5 for 2 h. Afterwards, glucoamylase at a different concentration (0.1, 0.2, 0.3, and 0.4%) was added and temperature was kept at 65°C and pH 5-5.5 for 72 h. Glucose obtained from enzymatic hydrolysis was then fermented using baker’s yeast of *Saccharomyces cerevisiae* to produce ethanol and CO₂. This fermentation was conducted in a 2000-ml Erlenmeyer flask. To the flash, a variety of glucose concentration (100, 145, 250 and 275 g/l) and baker’s yeast 0.2%, urea 0.5%, and KH₂PO₄ 0.5% weight from glucose were added. This media was incubated statically at a room temperature 28-30°C for 72 h.

Samples were withdrawn twice a day. The results showed that for liquefaction, the production of glucose increased with increasing the amount of α-amylase added. Using a variety of concentration of sorghum flour for hydrolysis (10%, 20%, dan 30%), maximum yield of glucose obtained was 94.87% (w/w) with a concentration of sorghum flour 10%, afterwards, it was followed by sorghum flour of 20% and 30% with a yield of glucose of 93.56% and 92.01%, respectively. The maximum ethanol obtained was 11.08 % (v/v) using glucose concentration of 275 g/l. Yield of ethanol obtained from sorghum grains was approximately 38.72% (v/w). It concluded that sorghum grain had good potential as a raw material for ethanol production in future as a renewable fuels.

**Keywords:** α-amylase; baker’s yeast; ethanol; enzymatic hydrolysis; fermentation; glucoamylase; glucose; liquefaction; saccharification; *Saccharomyces cerevisiae*; sorghum.