Effect of varying acid hydrolysis condition in Gracilaria sp. fermentation using sasad

Abstract

Macroalgae or seaweed is being considered as promising feedstock for bioalcohol production due to high polysaccharides content. Polysaccharides can be converted into fermentable sugar through acid hydrolysis pre-treatment. In this study, the potential of using carbohydrate-rich macroalgae, Gracilaria sp. as feedstock for bioalcohol production via various acid hydrolysis conditions prior to the fermentation process was investigated and evaluated. The seaweed used in this research was from the red algae group, using species of Gracilaria sp. which was collected from Sg. Petani Kedah, Malaysia. Pre-treatment of substrate was done using H₂SO₄ and HCl with molarity ranging from 0.2M to 0.8M. The pretreatment time were varied in the range of 15 to 30 minutes. Fermentation was conducted using *Sasad*, a local Sabahan fermentation agent as a starter culture. Alcohol extraction was done using a distillation unit. Reducing sugar analysis was done by Benedict test method. Alcohol content analysis was done using specific gravity test. After hydrolysis, it was found out that acid hydrolysis at 0.2M H₂SO₄ and pre-treated for 20 minutes at 121°C has shown the highest reducing sugar content which has yield (10.06 mg/g) of reducing sugar. It was followed by other samples hydrolysis using 0.4M HCl with 30 minutes pre-treatment and 0.2M H₂SO₄, 15 minutes pre-treatment with yield of 8.06 mg/g and 5.75 mg/g reducing sugar content respectively. In conclusion, acid hydrolysis of *Gracilaria sp.* can produce higher reducing sugar yield and thus it can further enhance the bioalcohol production yield. Hence, acid hydrolysis of Gracilaria sp. should be studied more as it is an important step in the bioalcohol production and upscaling process.