

ABSTRACT

Paper waste is a lignocellulosic substrate manufactured from naturally resources. It is a cheap source of cellulose. Its pretreatments and saccharification can result in significant release of reducing sugar. The main objective of this study is to produce bioethanol after pretreatment and saccharification of paper waste via acids and commercial cellulase enzyme accordingly on fermentation through *Saccharomyces cerevisiae*. When paper waste was reacted with 0.5% H₂SO₄ it about 58% cellulase content was increased. Also 51.2% delignification of paper was achieved on pretreating with acid. It was found that saccharification can be performed best at pH 5.0, enzyme concentration 1.5%, incubation time 48h and temperature 55°C. Under optimum conditions 24.28mg/ml and 30.12% of total sugar was produced. It was revealed that microorganism used in fermentation can tolerate 10% ethanol concentration and 40°C temperature under optimized fermentation conditions. The hydrolysate was supplemented with MgSO₄ 0.05%, ZnSO₄ 0.025%, FeSO₄ 0.05%, CaCl₂ 1.0%, KH₂PO₄ 1.5%, nitrogen source 5% and 2% optimized glucose. Using *Saccharomyces cerevisiae* bioethanol 3.28% (v/v) was produced at optimum pH 5.5, temperature 35°C and incubation period 48h under anaerobic conditions after 24h of aerobic conditions.