OPTIMIZATION OF Ca(OH)$_2$ PRETREATMENT AND HYDROLYSIS OF PLANTAIN (MUSA PARADISICA) STEM FOR THE PRODUCTION OF BIOETHANOL USING CELLULASE FROM SNAIL (ACHATINA MARGINATA)

Oseki O. Peter and Egwim C. Evans

Department of Biochemistry, Federal University of Technology, P.M.B. 65, Minna, Niger State, Nigeria.

ABSTRACT

Plantain stem was pretreated with 1N & 5N Ca(OH)$_2$ for 10, 20 and 30mins and there-after, hydrolysed with cellulase from the haemolph of giant African Snail (Achatina marginata). The enzyme (5.1x$10^{-3}$ ± 2.0mg/g/sec) was used to hydrolyse the plantain stem biomass at 30, 40 and 50°C for 30, 60, 120 and 180mins. The result showed that, 1N Ca(OH)$_2$ at 30mins pretreatment yielded the highest glucose level from 63±0.02mg/g (untreated) to 197±0.01mg/g (pretreated). Hydrolysis with Snail Cellulase increased the glucose yield to 355±0.22mg/g after 180mins at 30°C. Ethanol yield after 72hours of fermentation with Saccharomyces cerevisae was 0.85 g/g of the total sugar. The work concludes that, 1N Ca(OH)$_2$ @ 30mins pretreatment would be a good pretreatment option, Snail Cellulase a potent hydrolytic enzyme and Plantain Stem a cheap and alternative means for the production of bioethanol.

Keywords: Optimization, Plantain Stem biomass, Snail Cellulase, Bioethanol, Lignocellulose.

*Corresponding Author: Oseki_001@yahoo.com, +2347031842352