

## **Acetone–butanol–ethanol production by *Clostridium acetobutylicum* ATCC 824 using sago pith residues hydrolysate**

### **ABSTRACT**

Sago pith residues (58 % starch, 23 % cellulose, 9.2 % hemicellulose, and 4 % lignin) are one of the abundant lignocellulosic residues generated after starch extraction process in sago mill. In this study, fermentable sugars from enzymatic hydrolysis of sago pith residues were converted to acetone–butanol–ethanol (ABE) by *Clostridium acetobutylicum* ATCC 824. With an initial concentration of 30 g/L of concentrated sago pith residues hydrolysate containing 23 g/L of glucose and 4.58 g/L of cellobiose,  $4.22 \pm 0.17$  g/L of ABE were produced after 72 h of fermentation with yield and productivity of 0.20 g/g glucose and 0.06 g/L/h, respectively. Results are in agreement when synthetic glucose was used as a carbon source. Increasing sago pith residue hydrolysate to 50 g/L (containing 40 g/L glucose) and supplementing with 0.5 g/L yeast extract, approximately  $8.84 \pm 0.20$  g/L of ABE ( $5.41 \pm 0.10$  g/L of butanol) were produced with productivity and yield of 0.12 g/L/h and 0.30 g/g glucose respectively, providing a 52 % improvement.

**Keyword:** Acetone-butanol-ethanol; *Clostridium acetobutylicum* ATCC 824; Fermentable sugar; Sago pith residues hydrolysate