

Optimization of enzymatic saccharification of palm mill effluent solid and oil palm fruit fibre to fermentable sugars

ABSTRACT

The effect of enzyme dosage and initial substrate concentration on the performance of enzymatic saccharification of palm oil mill effluent (POME) solid and oil palm fruit fibre (OPFF) was carried out in reactions using shake flask and 2-litre stirred tank reactor. The highest production of total reducing sugar and glucose from saccharification of POME and OPFF obtained using Novozyme/Celluclast (N/C ratio) were 0.4 and 0.25 at a dosage of 1 ml/g and 2 ml/g substrate, respectively. At this optimal condition, the highest production of reducing sugar (12.25 g/litre) and glucose (6.70 g/litre) was obtained when 150 g/litre POME solid was used, which gave the overall productivity and yield of 1.53 g/litre/h and 0.08 g/g, respectively. On the other hand, the saccharification of OPFF was optimal at 50 g/litre which produced 30.26 g/litre reducing sugar and 16.73 g/litre glucose, which corresponding to overall productivity of 0.28 g/litre/h and yield of 0.61 g/g.

Keyword: Palm oil mill effluent; Oil palm fruit fibre; Cellulose; Cellulose materials; Enzymatic hydrolysis; Fermentable sugar