

## Abstract

Xylanases are hemicellulases that hydrolyze or degrade the linear polysaccharide, xylan, into xylose. A sample was collected from a dustbin at a wet market in Penang. A culture was isolated and identified by biochemical tests and polymerase chain reaction (PCR) for the detection of 16s rRNA. The culture was identified as *Klebsiella pneumoniae* from pomelo skin.

Experimental design to investigate the various factors was divided into 2 parts. 3 chosen factors were selected in order to investigate the ranges of optimal conditions. The factors were concentration of pomelo skin 0-3% (w/v), pH of 3-5 and temperature of 30-50°C. Based on optimal ranges, Plackett Burman experimental design was set. The ranges of factors such as concentration of pomelo skin, xylan and glucose of 0% and 3% (w/v); peptone, ammonium nitrate, and monopotassium phosphate of 1 and 4 (mg/ml); pH 3 and 5 of sodium acetate buffer; incubation temperature of 40 and 60°C; 24 and 48 hours of incubation period; concentration of metal ion, iron (II) sulphate heptahydrate and calcium chloride of 1 and 10 (mM) were investigated for xylanase activity.

Statistical analysis of multiple regression was used to analyse the xylanase activity. The analysis showed that the model was significant in predicting the xylanase activity at  $\alpha=0.05$ . The concentration of pomelo skin, glucose, pH of sodium acetate buffer, incubation temperature, incubation period, concentration of iron (II) sulphate heptahydrate and calcium chloride was significant to predict xylanase activity but not concentration of xylan, peptone, ammonium nitrate and monopotassium phosphate.

In order to enhance xylanase activity induction through UV mutation was investigated from 0 sec to 180s of time exposure. Stability of enzyme of wild and mutant strain was investigated in the pH ranges of 2-12 and temperature of 25°C-50°C. Mutation through UV light shows the xylanase activity was induced at 180 seconds. Xylanases from both the wild and mutant strains were stable at temperature of 35 to 45°C and pH of 4-8.