

ABSTRACT:

A thorough investigation of sucrose hydrolysis by invertase immobilized in recently developed PVA–alginate beads was performed. The developed PVA–alginate bead is distinguished by the treatment with sodium sulfate solution. The performance of invertase immobilized in PVA–alginate matrix beads in terms of leakage, reusability, ideal temperature and pH and kinetic parameters K_m and V_{max} was investigated. Results revealed that the ideal temperature and pH for the immobilized invertase are 50 °C and 4 respectively. The apparent K_m of each bead is relatively lower than that of the free enzyme with the value of 4.7×10^{-5} mM and 2.849×10^{-5} mM for 12PVA–5BA and 12PVA–7BA, respectively. An increase in V_{max} was also observed with the value of 2281.02 U mg⁻¹ enzyme and 2281.02 U mg⁻¹ enzyme for 12PVA–5BA and 12PVA–7BA, respectively. The reusability of the beads and its storage period were also investigated and were found to be 14 cycles and 60 days, respectively. Finally, the beads with the best performance (12PVA–5BA) were used to hydrolyze liquid pineapple waste. The production yield of glucose was about 745% in 3 h in the hydrolysis of the liquid pineapple waste.