XYLANASE IMMOBILIZATION BY ENTRAPMENT TECHNIQUE FOR XYLOSE PRODUCTION

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ABSTRACT

Xylanase enzymes have been applied for the derivation of xylan in the production of xylose. In this study, entrapment immobilization technique has been studied by evaluating enzyme's activity and stability of free and immobilized xylanase. The values concentration of xylan substrate (5 mg/ml to 25 mg/ml) was used for immobilized enzymes to obtain their kinetics parameters by applying the Michaelis Menten equation. Free enzyme and immobilized enzyme was studied in term of their stability by evaluating their enzymes activity in the various pH and temperature used. The efficiency of immobilization was analysed by using Dinitrosalicyclic Acid (DNS) method and the amounts of xylose as a reducing sugar was determined by reading the absorbance of the sample using UV-VIS spectrophotometer at wavelength of 540 nm. After the entrapment technique has been applied, the stability of enzymes has been improved and the enzymes activity for immobilized xylanase enzymes was higher compare to free xylanase enzymes. The optimum pH for immobilized xylanase was at pH8 (170.56 U/mg protein) while for free was at pH 4 (53.93 U/mg protein). The optimum temperature for immobilized xylanase was at 60℃ (526.96 U/mg protein) while for free was at 70℃ (186.12 U/mg protein). The kinetic study of immobilized was achieved at concentration 20 mg/ml of xylan substrate. The Michelis Menten equation has proved that the rate of reaction enzymes become more effective when the Km value obtained was at 0.6842 mg/ml. As a result, the free enzyme must be replaced with immobilized enzymes. Thus, the immobilization of the xylanase enzyme will promote to enhance their stability and increase the enzyme's reusability in large-scale industrial applications.