

BIOREACTOR FOR PRODUCTION OF GLUCOSE SYRUP USING CASSAVA SP. STARCH

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This work describes a bioreactor with α -amylase and glucoamylase from *Aspergillus niger* immobilized into glutaraldehyde modified polyaniline (PANIG) and the production of glucose syrup using starch from *Cassava sp.* Two designs of bioreactors were tested: serial and combined. For both serial and combined bioreactors we immobilized α -amylase and glucoamylase separately in PANIG. In serial, the hydrolysis was performed first with α -amylase-PANIG followed by glucoamylase-PANIG treatment. In combined bioreactor we mix first α -amylase-PANIG and glucoamylase-PANIG (1:1 w/w of polymer) and then performed the hydrolysis. We also tried to immobilize α -amylase and glucoamylase in the same polymer but results were not satisfactory. In both bioreactors, the time necessary to total starch hydrolysis was established in 20 min, with $6.93 \mu\text{mol.mL}^{-1}$ of glucose in serial and $4.60 \mu\text{mol.mL}^{-1}$ in combined reactor. Both reactors showed high stability during repeated use; serial reactor retained 71% of initial activity after ten cycles of use ($4.94 \mu\text{mol.mL}^{-1}$ of glucose) and combined reactor maintained 100% of its activity from first to tenth use. Similar performance was observed during long term storage tests, with serial reactor losing activity after each cycle of storage/use and combined maintaining 100% stable. Both reactor presented similar pattern of hydrolysis for starch, as showed by TLC analysis.

Key words: α -amylase; glucoamylase; immobilization; polyaniline; bioreactor.