ENHANCEMENT OF ETHANOL PRODUCTION USING pH-AUXOSTAT BY Zymomonas mobilis

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A pH-auxostat continuous culture is a system employing growth-dependent pH changes to control rate of medium addition. It can be used for any bioprocess in which the cell metabolism affects the pH directly. Thus it allows possible cultivation of the microorganism at the maximum growth rate without the risk of washout. Aim to enhance the ethanol production, a comparative study between ethanol fermentation by Zymomonas mobilis using pH-auxostat and chemostat culture was investigated. Result suggested that the chemostat culture gave rise to higher overall maintenance energy than the pH-auxostat. The maximum ethanol productivity attained in pH-auxostat system and chemostat culture were 11.4 g/l h⁻¹ at dilution rate of 0.31 h⁻¹ and 6.7 g/l h⁻¹ at dilution rate of 0.30 h⁻¹, respectively. In addition, pH-auxostat system appeared to be more stable as it could be operated at higher dilution rate for more than 30 hours, whereas at a comparable dilution rate, the chemostat culture results in easily washout at only 10 hours after being started. Therefore, pH-auxostat was concluded to be a better system for improving ethanol productivity because it truly reflects changes in cell metabolism.