

## MONOCHLOROACETIC ACID FOR IMPROVED ETHANOL PRODUCTION BY IMMOBILIZED YEAST CELLS

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*Saccharomyces cerevisiae* adsorbed on acid-washed glass beads produced  $5.4\text{g l}^{-1}$  ethanol at 96h in batch process. Precoating the acid treated glass beads with gelatin ( $25\text{g l}^{-1}$ ) before immobilization of the cells increased ethanol production to  $26.3\text{g l}^{-1}$  at 72h. Cell leakage into the medium was decreased when the immobilized cells were cross-linked with increasing concentrations of glutaraldehyde ( $0-100\text{g l}^{-1}$ ). Although monochloroacetic acid inhibited ethanol production and cell multiplication at concentrations greater than  $0.1\text{g l}^{-1}$ , at a concentration of  $0.01\text{g l}^{-1}$  it not only increased the ethanol production to  $52.1\text{g l}^{-1}$  but also shortened the ethanol production time to 48h. In semi-continuous batch process with the feed containing  $0.01\text{g l}^{-1}$  monochloroacetic acid, immobilized cells showed no significant change in ethanol-producing ability for 40 days when the immobilized cells were incubated with nutrient medium intermittently.

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