Study on Enhancement of Ethanol Production by Immobilized Bacterial Beads

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ABSTRACT

The application of simultaneous saccharification and fermentation (SSF) or separate hydrolysis and fermentation for the conversion of lignocellulosics to alcohol would result in a more cost-effective process. In this study, the ability to production ethanol of strains from civet faeces were screened. One strain with high ethanol production capability was identified as Saccharomyces cerevisiae Wu-Y2 (Wu-Y2), according to its 16S rDNA gene sequences. To enhance this isolated srain fermentative ability, the cells of Saccharomyces cerevisiae Wu-Y2, were entrapped in PVA gel bead. Additionally, to study the effects of the fermentation parameters (such as beads loading volume, hydraulic retention time (HRT) and glucose concentration) on the ethanol production using immobilized-cell beads in fixed bed reactor. The maxium ethanol production was 19.8 g/L (47%) at HRT of 8h and beads loading of 3.34%. Otherwise, bacterial cellulose membrane (BCM) was used as a novel carrier for immobilization. Initial experiment shows this immobilized yeast cell is allowed better operational control and metabolic activities than those of the free yeast (9.2 g/L). On the other hand, we have designed a hanging type immobilized reactor for the conversion of Carboxymethyl cellulose (CMC) to fermentable glucose. Obserbation of structure and determine of mechanical strength of PVA-immobilized beads by Scanning Electron Microscopy (SEM) and Rheometer, respectively.

Keywords : Acid hydrolysis、Cellulose、Reducing sugar、Immobilized、Fixed-Bed Reactors、Ethanol production

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