

## ABSTRACT

Delignified sugarcane bagasse from sugar industry was used as a carrier for *Saccharomyces cerevisiae* SC90 immobilization. The proficiency of the cell immobilization of *S. cerevisiae* SC90 on delignified sugarcane bagasse was determined through the ratio of dry weight of immobilized cells and dry weight of carrier (g/g) together with scanned electron microscope (SEM). *S. cerevisiae* SC90 demonstrated the highest immobilization on day 1 when diluted molasses (231 g/L total sugar concentration) was used as a substrate. The efficiency of ethanol production by the immobilized cells was compared with the suspended cells in the repeated batch process under the shake flask. The immobilized cell represented a higher ethanol production than suspended system in all 5 consecutive batches. The maximum ethanol yield ( $Y_{P/S}$ ) of the immobilized cells was  $0.42 \pm 0.02$  g/g (82.48% theoretical yield) in 3 L packed bed bioreactor. With 3L bioreactor, the ethanol production efficiency could be maintained for 5 consecutive batches. The composition of spent yeast cells on delignified sugarcane bagasse was analyzed and compared with the non-delignified sugarcane bagasse. The result represented higher protein content in spent yeast cells on delignified than non-delignified sugarcane bagasse while yeast added up protein content to be served as an animal feed.

Keywords: Ethanol; Sugarcane bagasse; Molasses; Immobilization; *Saccharomyces cerevisiae*