

## **Extractive bioconversion of gamma-cyclodextrin and recycling of cyclodextrin glycosyltransferase in liquid biphasic system using thermo-separating polymer**

### **ABSTRACT**

An extractive bioconversion conducted on soluble starch with cyclodextrin glycosyltransferase (CGTase) enzyme in ethylene oxide-propylene oxide (EOPO)/potassium phosphates liquid biphasic system (LBS) to extract gamma-cyclodextrin ( $\gamma$ -CD) was examined. A range of EOPO (with potassium phosphates) molecular weights was screened to investigate the effect of the latter on the partitioning efficiency of CGTase and  $\gamma$ -CD. The results show that the optimal top phase  $\gamma$ -CD yield (74.4%) was reached in 35.0% (w/w) EOPO 970 and 10.0% (w/w) potassium phosphate with 2.0% (w/w) sodium chloride. A theoretical explanation for the effect of NaCl on  $\gamma$ -CD was also presented. After a 2 h bioconversion process, a total of 0.87 mg/mL concentration of  $\gamma$ -CD was produced in the EOPO/ phosphates LBS top phase. After the extraction of top phase from LBS, four continuous repetitive batches were successfully conducted with relative CGTase activity of 1.00, 0.86, 0.45, and 0.40 respectively.

**Keyword:** Liquid biphasic system; Ethylene oxide-propylene oxide; Extractive bioconversion; Cyclodextrin; Bacillus cereus