

## Extractive bioconversion of cyclodextrins by *Bacillus cereus* cyclodextrin glycosyltransferase in aqueous two-phase system

### ABSTRACT

An extractive bioconversion with *Bacillus cereus* cyclodextrin glycosyltransferase (CGTase, EC 2.4.1.19) in aqueous two-phase system (ATPS) was investigated for the synthesis and recovery of cyclodextrins (CDs). Optimum condition for the extractive bioconversion of CDs was achieved in ATPS consisted of 7.7% (w/w) polyethylene glycol (PEG) 20,000 and 10.3% (w/w) dextran T500 with volume ratio (VR) of 4.0. Enzymatic conversion of starch occurred mainly in dextran-rich bottom phase whereas the product, CDs was transferred to top phase and a higher partition coefficient of CDs was achieved. Repetitive batch of CDs synthesis was employed by replenishment of the top phase components and addition of starch every 8 h. An average total CDs concentration of 13.7 mg/mL, (4.77 mg/mL  $\alpha$ -CD, 5.02 mg/mL  $\beta$ -CD and 3.91 mg/mL  $\gamma$ -CD) was recovered in the top phase of PEG 20,000/dextran T500 ATPS. This study showed the effectiveness of ATPS application in extractive bioconversion of CDs synthesis with *B. cereus* CGTase.

**Keyword:** Aqueous two-phase system; Extractive bioconversion; Cyclodextrin; *Bacillus cereus*; Cyclodextrin glycosyltransferase