

Extractive fermentation for recovery of Bacteriocin-Like inhibitory substances derived from *Lactococcus lactis* Gh1 using PEG2000/Dextran T500 aqueous two-phase system

ABSTRACT

This work aimed to optimize the parameters affecting partitioning of a bacteriocin-like inhibitory substances (BLIS) from *Lactococcus lactis* Gh1 in extractive fermentation using polyethylene glycol (PEG)/dextran aqueous two-phase system (ATPS). This system was developed for the simultaneous cell cultivation and downstream processing of BLIS. Results showed that the molecular weight of PEG, PEG concentration, and dextran T500 affect the partition coefficient (K), purification factor (PF), and yield of BLIS partitioning. ATPS composed of 10% (w/w) PEG2000 and 8% (w/w) dextran T500, provided the greatest conditions for the extractive BLIS production. The K (1.00 ± 0.16), PF (2.92 ± 0.37) and yield ($77.24 \pm 2.81\%$) were increased at selected orbital speed (200 rpm) and pH (pH 7). Sustainable growth of the cells in the bioreactor and repeated fermentation up to the eighth extractive batch were observed during the scale up process, ensuring a continuous production and purification of BLIS. Hence, the simplicity and effectiveness of ATPS in the purification of BLIS were proven in this study.

Keyword: Extractive fermentation; Bacteriocin; *Lactococcus lactis*; Aqueous two-phase system; Polyethylene glycol; Dextran