Development of whole-cell biocatalyst for the production of (S) - styrene oxide

사라바난, 배종완, 신승희, 이선구, 박성훈*, 정용주[1]
부산대학교; [1]국민대학교
(parksh@pusan.ac.kr*)

The chiral (S)-styrene oxide is an important building block for pharmaceuticals and agrochemicals. Styrene monooxygenase (SMO), an efficient biocatalyst has gained its importance for the production of enantiopure styrene oxide from styrene. In order to develop various whole-cell biocatalysts for SMO reaction, styAB genes obtained from Pseudomonas putida SN1 was cloned to P. putida SN1 and Escherichia coli. With E. coli as a host, three types of recombinants were developed: pET system with strong promoter T7, pBAD system with arabinose promoter, and pET-chaperon co-expression system. With P. putida SN1, self-cloned recombinant with styAB was compared to a styC knockout mutant of SN1 that was devoid of the activity of the degradation of styrene oxide to phenyl acetaldehyde. Among the whole-cell biocatalysts developed, a pET-chaperon co-expression produced high specific activity of 180 U/g cdw. In the case of P. putida, the styC knockout mutant exhibited a higher activity than the self-cloned and a multicopy plasmid containing styAB genes under the control of their original promoter PstyA. However the activity of the former was lower than that of pET-chaperon co-expression E. coli system as 130 U/g cdw.