Engineering *Corynebacterium glutamicum* for biotransformation of cyclohexanone derivatives

윤지영, 이정은, 박진병*
이화여자대학교 식품공학과
(jbpark06@ewha.ac.kr*)

Corynebacterium glutamicum was developed as a biocatalyst for biotransformation of cyclohexanone derivatives. *C. glutamicum* ATCC13032 was engineered to express *chnB* the gene of cyclohexanone monooxygenase of *Acinetobacter calcoaceticus* NCIMB 9871. The *chnB* gene was functionally expressed, enabling the whole-cell activity of the recombinant of over 70 U/g CDW. The high CHMO activity, high NADPH regeneration capacity, and high tolerance against organic solvents of the recombinant strains allowed to produce ε-caprolactone from cyclohexanone at the specific and volumetric productivity of 0.12 g/g dry cells/h and 2.3 g/L/h, respectively, resulting in a final product concentration of 16.0 g/L.
The recombinant *C. glutamicum* was further engineered to increase the reaction activity; the cell wall permeability toward lipophilic organic substrates was increased via modifying the structure of cell wall arabinogalactan and mycolate layers. The engineered *C. gltutamicum* cells showed the higher oxygenation activity of cyclohexanone derivatives (e.g., ethyl 2-cyclohexanoneacetate, 2-(2'-acetoxyethyl)cyclohexanone) as compared to the wild type based biocatalysts.