

Bioconversion of methane to methanol through partial inhibition of methanol dehydrogenase using *Methylobacterium* sp. DH-1

한준희¹, 김유진¹, 김성일¹, 김현수¹, 하선영¹, 조숙형², 나정걸¹, 이진원^{1,2,†}
¹서강대학교; ²서강대학교 C1 가스 리파이너리 사업단
(jinwonlee1@gmail.com[†])

Previous studies have focused on the bioconversion of methane to methanol by supplementing sodium formate as a reducing power source, but sodium formate was too expensive to be used for methanol conversion. In this study, methanol accumulation was achieved only by partial inhibition of methanol dehydrogenase (MDH) and controlling of the NADH pool using whole-cell. To find efficient inhibitors of MDH, five different chemical inhibitors were tested, and EDTA was the most effective to inhibit the activity of MDH. In addition, We determined the optimal EDTA concentration to be 0.5mM because in stoichiometric calculation, about 31% MDH activity should be remained for methanol production. Also, the pH dependent MDH inhibition test was performed. As a result, methanol accumulation was significantly increased in partial inhibition of MDH (6.35mM) compared to that in the absence of MDH inhibitor (0.56mM) and complete inhibition of MDH activity (3.85mM). This notable result demonstrated the feasibility of bioconversion of methane to methanol without using external reducing power regeneration source.