

Inducible Expression of the Carbonic Anhydrase Improves Carbon Dioxide Utilization In *Rhodobacter sphaeroides*박주용, 김양훈¹, 민지호*전북대학교 반도체화학공학과; ¹충북대학교 미생물학과

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Carbon dioxide is a major cause for the global warming. Purple non-sulfur bacteria (PNSB) can grow either heterotrophically under aerobic condition or phototrophically under anaerobic light conditions using bicarbonate or CO₂ as C_i source and hydrogen or organic compounds as electron donors. Carbonic anhydrase (CA; EC 4.2.1.1) is a zinc-containing metalloenzyme catalyzing the reversible hydration of CO₂. In PNSB, intracellular CA enhances the rate of CO₂ to HCO₃⁻ conversion, for fixation by phosphoenolpyruvate carboxylase. In this study, to highly express CA in PNSB, *Rhodobacter sphaeroides* was used as a recipient strain for transformation using the plasmid pBBR1mcse-2 fused with promoter *puc* and CA. This result showed that transformed *R. sphaeroides* used high concentration of CO₂ and enhanced the production of physiologically activating compounds. Therefore, the inducible expression of CA in *R. sphaeroides* is to accelerate the conversion of CO₂ to bicarbonate in the intracellular system. In addition, this study will suggest useful approach to improve CO₂ fixation and photosynthetic ability in this species for a variety of biotechnological applications.