

Improved production of ectoine from methane using *Methylomicrobium alcaliphilum* 20Z by deletion of inhibitory genes of ectoine production

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Ectoine is one of the compatible solute produced by halophilic and halotolerant microorganisms. It stabilizes the protein and cell structure of organisms and helps them survive in osmosis as osmolytes. Besides its primary function, the stabilizing properties on biological macromolecule confer ectoine attractive potentials in fields of skin care, food process, agriculture, and medical values. In this study, we have constructed mutant to enhance ectoine production by removing ectoine production inhibitory genes. First, *ectD* gene which catalyzes ectoine to hydroxyectoine as a final product was deleted in *Methylomicrobium alcaliphilum* 20ZDP. The hydroxyectoine was not produced and the ectoine production is increased as much as the production of hydroxyectoine. Second, *ectR* gene which regulates the operon genes related to the production of ectoine as concentration of NaCl was deleted in *Methylomicrobium alcaliphilum* 20ZDP Δ *ectD*. Finally, the double mutant strain produced up to 145.2 mg/L and 150.0 mg/DCW g, thus the yield of ectoine production increased 30.6% contrast to *Methylomicrobium alcaliphilum* 20ZDP.