

Development inducible gene expression system for *Methylobacterium alcaliphilum* 20Z

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Methane is a high potential feedstock for industrial biotechnology due to low cost and huge availability. However, until now, the development of biocatalyst using methane have been constrained by the low productivity and limited genetic tools for methanotrophs. In this study, we have developed inducible gene expression systems for *Methylobacterium alcaliphilum* 20Z to convert methane to high-value chemical compounds at low pressure and temperature. To compare promoter strength of various promoters in *M. alcaliphilum* 20Z, we constructed broad host range vectors, pSGM01, pSGM02, and pSGM03, by fusing the *plac*, *ptac*, and *pT5* with *dtomato* gene in the *IncP*-based MEV vector that can be replicated by *Methylobacterium* spp, respectively. In addition, we developed the IPTG inducible expression system not yet applied to methanotroph strains by insertion of *lac I* gene. These tools make *M. alcaliphilum* 20Z a promising model system for metabolic engineering for industrial biological conversion of methane.