

Enhancement of Gene Expression in *Clostridium acetobutylicum* Using Synthetic Untranslated Regions

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Gene manipulation and overexpression is a simple yet powerful and effective strategy in controlling metabolic flux of microorganisms. In general, there has been less focus on controlling gene expression systems in *Clostridium* species due to their difficult nature of gene knockout and chromosomal manipulation. In this study, we found that short single-stranded 5' untranslated region (UTR) sequence which led to decrease gene expression in *Clostridium acetobutylicum*. Conversely, when a synthetic stem-loop was added at the 5' end of mRNA, the gene expression level was increased and thereby protein expression level shows 4.6-fold increase. It indicates that controlled gene expression cassettes can be rationally designed by taking the 5' UTR in to consideration. This understanding will be useful for developing more reliable and stable gene expression system for metabolic engineering of *Clostridium* species. [This work was supported by the Technology Development Program to Solve Climate Changes on Systems Metabolic Engineering for Biorefineries (NRF-2012M1A2A2026556 and NRF-2012M1A2A2026557) of the Ministry of Science, ICT and Future Planning (MSIP) of Korea.]