Enhancement of biohydrogen production in recombinant *Escherichia coli* expressing [NiFe]-hydrogenase 1 by increase of cell membrane targeting efficiency

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Producing hydrogen in biological way is very important as one of solutions for energy crisis. Previously, we demonstrated successful production of biohydrogen by expression of recombinant [NiFe]-hydrogenase 1 in *E. coli* culture. Although [NiFe]-hydrogenase 1 showed relatively high oxygen-tolerance compare to other hydrogenases, we observed that translocation efficiency to the membrane was very low which is important for proper maturation of functional hydrogenase. In the present work, we investigated effects of some factors including culture temperature, inducer concentration, and signal sequence. In results, we found that cell membrane targeting was significantly increased at lower culture temperature than 37℃, conventional temperature. As we expected, targeting efficiency of recombinant hydrogenase was directly related to *in vivo* hydrogen production. When changing the concentration of IPTG inducer, optimal IPTG inducing concentration was lower than 1 mM. Finally, we also investigated effect of signal sequence on targeting efficiency by changing Tat signal sequence.