

Enhancement of heterologous protein expression in *Escherichia coli* by co-expression of nonspecific DNA-binding stress protein, Dps

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요약문

Generally, cells undergo stresses not only by temperature, oxygen radical, nutrient depletion, toxic chemicals, but also by overproduction of foreign proteins. This over-expression imposes metabolic burden on host strains and subsequently, reduces cell growth and even yield of target heterologous protein. Therefore, to reduce cellular stress by over-expression of heterologous protein and to enhance product yield in *Escherichia coli* expression system, we investigated effect of co-expression of nonspecific DNA-binding protein Dps that is one of abundant stress proteins against oxidative damage and nutrient starvation. Co-expression of recombinant Dps reduced the growth rate in minimal M9 medium. On the contrary, Dps had positive effect on cell growth in rich LB medium. While Dps showed different effects on cell growth according to medium type, it had huge impact on enhancement of specific production of insoluble target foreign protein, baculoviral polyhedrin (Polh) and green fluorescent protein (GFP) fusion, in both media; demonstrates that co-expression of Dps has general positive effects on foreign protein production regardless of medium types. Even though the mechanism of Dps on foreign protein production is unclear yet, this ability on significant enhancement of target protein production (46% (1.7-fold increase) of target protein amount fraction in total cellular protein amount and about 2.5-fold increase in product yield) can be successfully applied in practical culture process.

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