Induction of Expression of Phycocyanin Alpha Subunit Gene from Spirulina platensis in E.coli

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Background & Objectives: *Spirulina platensis* is an edible filamentous cyanobacterium and Phycocyanin pigment exceed to 20% of the total protein. Phycocyanin has various biology activities and is utilized in a number of applications in foods, cosmetics and pharmaceuticals. Hence it is a suitable option for industrial production. A lot of advantages of phycocyanin studied by many researchers however the scale-up Methods remain difficult and expensive. In the other hand the production of recombinant phycocyanin is more convenience and inexpensive to scale-up. The purpose of this study was to expression of phycocyanin alpha subunit gene in *E.coli* for industrial production purposes.

Methods: Phycocyanin alpha subunit gene was isolated using specific primers and cloned.The recombinant strain verified by sequencing. The gene expression was examined in E.coli containing pET43.1a+-CpcA vector while was inculcated to TB broth including 50µg/ml ampicilin. The induction was done by IPTG (1mM final concentration) as inducer. Samples were taken before and at 1, 2, 4, and 8 h intervals after induction and analyzed by 12.5%SDS-PAGE.

Results: The SDS-PAGE analysis showed a protein band in induced cells in comparison with non-induced cells and it was in the range of 20-25kDa of the protein size marker. Also the protein bands of 2 and 4 h post-induction were denser.

Conclusion: The molecular weight of alpha subunit phycocyanin with 6×His tag and HSV tag were estimated about 20.92 kDa. Regarding the absence of the protein band in this range in non-induced samples, we verified phycocyanin alpha subunit gene expression in E.coli recombinant strain. High expression of this gene in recombinant strain is because of T7 strong promoter and terminator in pET43.1a+ expression vector.

Keywords: Phycocyanin Beta Subunit Gene; Spirulina; Expression; PET 43.1a+