

Thanawat Boontip 2014: Sequencing, Characterization and Expression Analysis of *Lycopene β -cyclase* Gene in *Dunaliella* sp.. Master of Science (Genetic Engineering), Major Field: Genetic Engineering, Interdisciplinary Graduate Program. Thesis Advisor: Associate Professor Niran Juntawong, Dr.rer.nat. 102 pages.

Currently, β -carotene is used as food coloring agent, cosmetics and drugs. It is found in all photosynthetic organisms including green microalgae *Dunaliella* with massive amounts of β -carotene accumulation. Lycopene β -cyclase (*Lcy β*) is an enzyme which is responsible for β -carotene biosynthesis in photosynthetic organisms. To approach a large-scale β -carotene production, information about suitable condition for growth and β -carotene accumulation relating to *Lcy β* expression is important. The aim of this study is to report full-length sequence and expression of *Lcy β* in *Dunaliella* sp. M22 under different salt concentrations. The full-length sequence of *Lcy β* cDNA contains 193 nucleotides of 5' untranslated region (UTR), 569 nucleotides of 3' UTR and 1392 bp open reading frame (ORF) encoding for 463 amino acid protein. Phylogenetic analysis revealed that the *Dunaliella* sp. M22 *Lcy β* grouped with the *Dunaliella salina* *Lcy β* gene. It showed an overall amino acid identity of 77%. In this study, high salinity reduced growth of the algae population whereas β -carotene content in the cell was increased. The expression analysis revealed that an increase of salinity concentration at exponential phase could elevate *Lcy β* transcript level and β -carotene content, but the *Lcy β* transcript level at senescence phase was not correlated with salinity concentration. The *Lcy β* transcript levels at senescence phase might be regulated by other factors, in particular by nutrient starvation.

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