

Metabolic engineering for high-level astaxanthin production in *Escherichia coli*

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Astaxanthin is a powerful antioxidant categorized as keto-carotenoid. Because of its useful characteristics, it has been utilized in various industries such as health and cosmetics. In this study, *Escherichia coli* was used as a chassis strain for high-level astaxanthin production. After construction of the astaxanthin biosynthetic pathway, the performance of the bottleneck enzyme, trCrBKT, was improved by relocating it to the cell membrane and enhancing its stability. Astaxanthin production further increased by overexpressing target genes identified by in silico flux variability analysis. The ultimate strain was cultured in fed-batch fermenter and additional optimization of culture condition enhanced the astaxanthin production up to 432.82 mg/L. [This work was supported by the Technology Development Program to Solve Climate Changes on Systems Metabolic Engineering for Biorefineries from the Ministry of Science, ICT through the National Research Foundation (NRF) of Korea (NRF-2012M1A2A2026556 and NRF-2012M1A2A2026557).]