

Astaxanthin production by metabolic engineering of Escherichia coli

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Among a plenty of carotenoids spreading in nature, astaxanthin is a remarkably strong antioxidant. It is responsible of a red-color of microalgae, yeast, and many other marine organisms. Because of its versatile properties including antitumor and anti-inflammatory, demand for astaxanthin in the global market has been continuously growing. In this study, in line with this market trend, we developed high-performance recombinant Escherichia coli strain capable of producing astaxanthin more efficiently than microalga which have been commercially used for astaxanthin production. After construction of astaxanthin biosynthetic pathway in E. coli, the bottleneck membrane protein trCrBKT was engineered for its more stable and soluble expression. In silico simulation was also carried out for further enhancing the metabolic flux in the astaxanthin pathway. Using the final strain, the culture condition was optimized, rising the astaxanthin titer up to 432.82mg/L. [This work was carried out with the support of "Cooperative Research Program for Agriculture Science & Technology Development (Project No. PJ01550602)" Rural Development Administration, Republic of Korea.]