Microbial upcycling of food wastes into novel carotenoids and bioplastics

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Abstract

Increasing demands on the carotenoids have focused attention on the need to develop industrially feasible bioprocess to make more things naturally and safely. Although many efforts have been devoted to developing efficient ways to increase carotenoid stability and productivity, noticeable progress has not yet been reported. Here we report the development of microbial production of carotenoids and bioplastics. First, the *E. coli* strain was engineered to produce phytoene through the introduction of phytoene biosynthetic pathway from *Deinococcus radiodurans* R1 strain. Next, the phytoene-producing *E. coli* strain was further engineered to co-produce bioplastics together with highly stabilized novel carotenoids. This method not only provides a way to produce high-value compounds in an environmentally friendly manner but can also be a promising platform technology for valorising food waste into high-value compounds. [This work was supported by the Ministry of Environment's waste resource energy recycling professional training project (YL-WE-22-001).

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