Metabolic engineering of bio-isoprene production from C1 compounds utilizing bacteria

김선원†
경상대학교
(1234@1234.com†)

Isoprene (2-methyl-1,3-butadiene) is an industrially important olefin compound for production of synthetic rubber, textile, adhesives, and etc. Currently, the production of isoprene is based on petroleum, which might not be feasible in future because of a high refining cost, an increasing price of crude oil, and an environmental pollution causing climate change. However, microbial production of isoprene (bioisoprene) via metabolic engineering is an alternative and sustainable way to meet a high global demand of isoprene. Bioisoprene is synthesized from dimethylallyl diphosphate (DMAPP), which is derived from mevalonate (MVA) pathway or 2-C-methyl-D-erythritol 4-phosphate (MEP) pathway, by isoprene synthase. Utilization of C1 compounds, which are cheap and abundant, as a fermentation substrate provides a great insight into the development of sustainable and cost-effective production of bioisoprene. In this study, production of isoprene from methanol was explored by using Methylobacterium organophilum transformed with plasmid containing isoprene synthase (IspS) gene from Populus trichocarpa, which was codon-optimized for the host.