

Synthetic biology and Systems biology based engineering of microbes for high-value isoprenoids production

우한민*

KIST 청정에너지연구센터
(hmwoo@kist.re.kr*)

'Drop-in-Chemicals' in the biotechnology industry have gathered attentions to replace petro-based chemicals being used due to rising petroleum costs and environmental concerns. Recently microbial cell factories based on Synthetic Biology and System Biology have been developed to produce 'Drop-in-Chemicals' from renewable feedstocks. Isoprenoids, a large and diverse group of natural products with many functions in secondary metabolism, are being especially focused to biosynthesis target precursors in microbial systems i.e. pharmaceutical and herbal oil substances. Many challenging issues must be overcome in the functional expression of heterologous genes in a microbial host. Therefore, synthetic biology is highly demanded to design biological systems with standardized parts and genetic circuits to produce specific isoprenoids. In addition, systems biology plays a role to provide biological information for understanding and fine-tuning of the biological systems. Combined with catalytic chemical processes, development of fermentation of engineered strains will be needed to meet feasible guidelines of the chemical industry.