

Bioconversion of methane into valuable byproducts via a metabolically engineered methanotroph

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Methane is a major contributor to global warming and is the main component of the natural and shale gases that are considered next-generation carbon feedstock for biochemical production due to their low prices, which are equivalent to 20% of the price of glucose. The biological conversion of methane into valuable products by methanotrophs is potential eco-friendly methane oxidizing process. Recently, the existence of a complete MEP pathway of the novel methanotroph, *Methylomonas* sp. DH-1 was confirmed via genomic analysis. This strain is expected to be able to produce secondary metabolites from methane. In this study, we metabolically engineered *Methylomonas* sp. DH-1 to produce squalene, which is used as a functional health food, an ingredient in cosmetics, and pharmaceutical materials. Firstly, transformation and vector systems were developed to manipulate the genes of *Methylomonas* sp. DH-1, and a high transformation efficiency was obtained by developing electroporation technology suitable it. Metabolically engineered *Methylomonas* sp. DH-1 have three times higher squalene productivity than wild type.