METABOLIC DESIGN OF ESCHERICHIA COLI FOR MUCONIC ACID PRODUCTION

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Adipic acid(AA) is a versatile bulk chemical to be used for raw materials such as nylon 6,6. Currently, AA biosynthesis from bio-resources have received a lot of attention in recent years as environment-friendly and renewable AA production process.

Muconic acid(MA), also known as 2,4-hexadienedioic acid, is expected as a biosynthesis precursor of AA. There are Several studies on MA biosynthesis using *Escherichia coli* introduced foreign genes. In those studies, MA is synthesized from intermediate products of shikimate pathway. However, the production volume is not sufficient and it is a hindrance to industrialization.

In this study, we aimed to the high efficiency biosynthesis of MA using metabolic designed *Escherichia coli.* First, we designed the metabolism to increase the accumulation of phosphoenolpyruvic acid (PEP), which is one of the starting materials of the shikimate pathway. Next, we determined the optimal MA synthetic pathway branched from the shikimate pathway. Specifically, we examined three types of MA production pathway with PEP accumulation strain as parent and selected the pathway with the highest MA production. Finally, we examined efficient production of MA using fusion proteins. Shikimate pathway protein and MA production pathway protein were combined to direct carbon flux into MA production.