Metabolic engineering of *Escherichia coli* for the biosynthetic production of cinnamaldehyde

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Nematodes, plant-parasitic organisms, are harmful to agricultural crops or many plants, causing severe yield losses and death. To eliminate these organisms, chemical pesticides called nematicides have been developed and widely used. However, the use of chemically-synthesized pesticides has been dramatically restricted. In this reason, novel strategies for the production of pesticides have been required. Cinnamaldehyde, which is a volatile and yellow liquid, has been considered as an alternative, because of several reasons including: (i) it is nature-driven compound, and (ii) it shows high nematicidal activity. In this study, synthetic pathway for the production of cinnamaldehyde in *Escherichia coli* was developed. At first, three kinds of enzymes were used for the construction of basic production system, and then the biosynthesis of cinnamaldehyde was demonstrated. In addition, to increase the production yield of cinnamaldehyde, other enzymes from different organisms were examined. With the production system developed, strain engineering was also performed by systems metabolic engineering strategy for high-level production of phenylalanine which is used as a precursor. Using engineered strain, we could obtain the increased cinnamaldehyde titer.