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In bio-based fermentation, the overall bioprocess efficiency is significantly affected by the metabolic burden associated with the expression of complete biosynthetic pathway as well as precursor and cofactor generating enzymes into a single microbial cell. To attenuate such burden by compartmentalizing the enzyme expression, recently synthetic biologists have used coculture or poly-culture techniques for biomolecules synthesis. In this paper, coculture system of two metabolically engineered Escherichia coli populations were employed which comprises upstream module expressing two enzymes converting para-coumaric acid into resveratrol and the downstream module expressing glucosyltransferase to convert the resveratrol into its glucosidated forms; polydatin and resveratroloside. Upon optimization of the initial inoculum ratio of two E. coli populations, 92 mg resveratrol glucosides/L (236 µM) was produced i.e. achieving 84% bioconversion from 280 µM of p-coumaric acid in 60 h by 3 L fed batch fermentor. This is the report of applying coculture system to produce resveratrol glucosides by expressing the aglycone formation pathway and sugar dependent pathway into two different cells.

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