TAILORING *CORYNEBACTERIUM GLUTAMICUM* TOWARDS EFFICIENT PRODUCTION OF PLANT POLYPHENOLS

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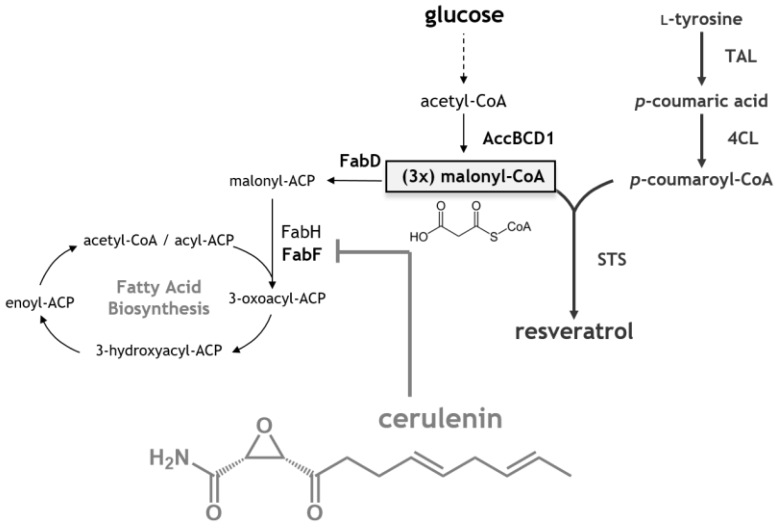
Corynebacterium glutamicum is an important organism in industrial biotechnology for the microbial production of bulk chemicals, in particular amino acids. Functional integration of plant-derived biosynthetic pathways also allows for the microbial synthesis of various plant polyphenols such as flavonoids or stilbenes either from supplemented phenylpropanoid precursor molecules or directly from glucose.

However, similar to other microorganisms engineered for plant polyphenol synthesis, insufficient malonyl-CoA supply is also limiting polyphenol production with *C. glutamicum*. To date, the antibiotic cerulenin inhibiting fatty acid synthesis is added during microbial cultivations to improve malonyl-CoA availability for product formation at lab-scale. Unfortunately, supplementation of cerulenin is very costly, which prohibits large-scale microbial polyphenol production.



We extensively engineered the central carbon metabolism of *C. glutamicum* with a focus on the TCA-cycle and the fatty acid metabolism to increase malonyl-CoA availability for polyphenol synthesis. In the context of this work, rational metabolic engineering strategies and FACS-based high-throughput screenings using transcriptional biosensors were successfully combined, yielding strain variants accumulating high polyphenol concentrations without supplementation of cerulenin.

We believe that, availability of these new *C. glutamicum* platform strains opens the door towards microbial production of plant polyphenols as well as other high-value aromatic compounds from cheap carbon sources at larger scale.

References:

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