

INDIE: Production of aromatic compounds in *Corynebacterium glutamicum*

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Aromatic amino-acid derived compounds have a variety of industrial uses from flavour molecules, pharmaceutical compounds to building blocks for biomaterials. The INDIE project will employ microorganisms (fermentation) and enzymes (biocatalysts) to convert sustainable raw materials into high-value, high-purity, renewable chemicals. Production of aromatic compounds will be established in GRAS organism *Corynebacterium glutamicum*, by exploiting and extending the native amino acid biosynthesis capacities of this species. The approach will be based on the principle of design-build-test-learn-cycle inherent to systems and synthetic biology approaches.

Key aspects addressed by INDIE are:

- model-driven engineering of metabolic pathways and transport systems for aromatic compound production
- regulatory circuitry design for optimal aromatic compound production
- modular design of biosynthetic and regulatory building bricks which can be used for several aromatic products
- systems biology analysis of the production organism to identify regulatory bottlenecks and unintended side products
- transfer of the production process to industry and establishment of pilot scale fermentation and DSP optimization

We unite the complementary know-how and expertise of European research groups from three different countries to accomplish our goal. The industrial partner of INDIE will actively participate by transferring the envisaged process into application. More broadly, the computational models and biosynthetic and regulatory building bricks generated in INDIE will be recruited to build a systems and synthetic biology framework for corynebacteria that will be easily extendable thereby strengthening the potential of these bacteria for sustainable aromatic compound production.