DESIGN, CONSTRUCTION AND APPLICATION OF *E. COLI* / *C. GLUTAMICUM* SYNTHETIC CONSORTIA

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In the biorefinery concept renewable feedstocks are converted to a multitude of value-added compounds irrespective of seasonal or other variations of the complex biomass substrates. On the one hand, this can be realized by specialized single microbial strains. Alternatively, consortia of several microorganisms or strains can be used. The latter approach allows for modularity, e.g. as various strains for substrate conversion can be combined with various strains for product formation.

We have used *E. coli* for access to carbon sources (Wendisch et al.) and *C. glutamicum* for production of value-added compounds () in order to address the construction of binary microbial consortia based on starch- and sucrose-based production of L-lysine and derived value-added compounds (Sgobba *et al.* 2018). A commensalism-based synthetic consortium for L-lysine production from sucrose was developed combining an L-lysine auxotrophic, naturally sucrose-negative *E. coli* strain with a *C. glutamicum* strain able to produce L-lysine that secretes fructose when grown with sucrose due to deletion of the fructose importer gene *ptsF*. Mutualistic synthetic consortia with an L-lysine auxotrophic, α-amylase secreting *E. coli* strain and naturally amylase-negative *C. glutamicum* strains was implemented for production of valuable fine chemicals from starch.

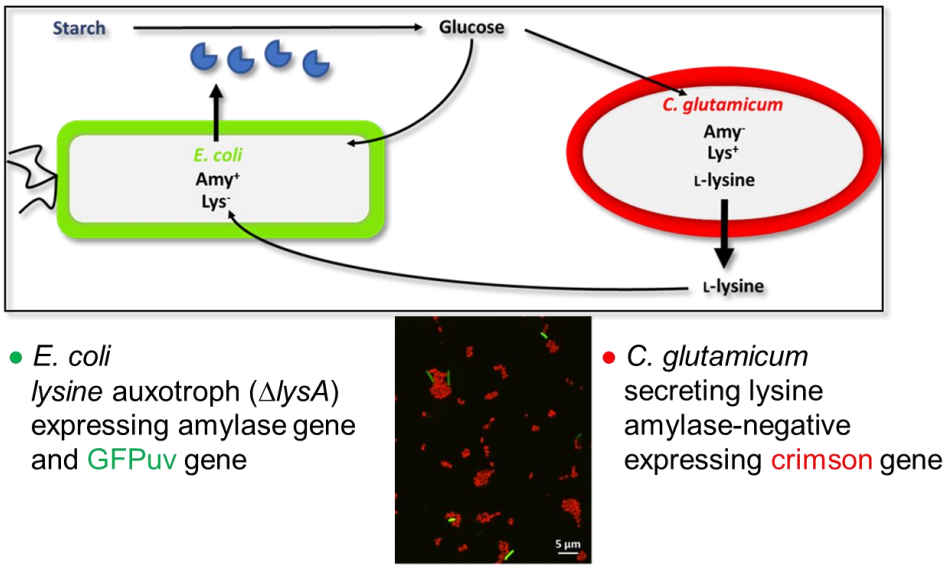

Figure 1 – Design of a mutualistic E. coli/C. glutamicum consortium for starch-based lysine production.

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