# Consortia based production of biochemicals

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One of the great challenges facing society is how to sustainably produce food, chemicals and other commodities required to maintain and develop our current life style. To compete with and ultimately replace existing petrochemical-based manufacturing processes, the development of innovative and effective solutions is needed. In this project we have explored the possibility of using designed consortiums for the covalorization of the main carbon sources in lignocellulosic biomass (xylose, glucose, arabinose, and acetic acid). In one study we have used pre-processing simulations, constraint-based modelling, and state-of-the art metabolic engineering tools to develop a consortium of cells capable of efficient valorization of synthetic hemicellulosic hydrolysate. Stable co-existence and effective covalorization was achieved through niche-differentiation, auxotrophy, and adaptive evolution. In another study, stable consortia based fermentation was achieved through niche partitioning, syntrophy (auxotrophy combined with removal of inhibitory side product), and CRISPRi mediated gene silencing. The achieved results demonstrate that consortium based approaches for valorizing complex biomass and waste related carbon sources can be an attractive alternative to the design of a so-called “superbug” and can thereby add significant value to biorefineries.