

Bite-sizing the challenge: A modular approach for the biotechnological valorization of CO₂

Fossil-decarbonisation of established chemical industries will help to cope with alarming megatrends including climate change and resource consumption. While plant derived renewable feedstocks have socio-economic and environmental implications and cannot be scaled to meet ever increasing demands, harnessing low-cost CO₂ as an abundant carbon source is solely restricted by the availability of renewable, cheap energy. Once available, especially bio-based CCU-technologies enable environmental-friendly and cost-competitive decoupling of growth from resource consumption in a circular economy framework. Along this line, we will introduce a modular CCU concept based on the combination of specialized and versatile microbial organisms – either naturally evolved or genetically engineered - to establish sustainable production routes to various chemicals and value added compounds inaccessible by a mono-species concept. We show that the biotechnological conversion of CO₂ to value added compounds built exclusively from CO₂ runs with high efficiency and productivity.