Better together: synthetic microbial consortium for bioenergy production

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Although recent great advances of biotechnology, bioproduction still remains as a challenge because of their low productivity by using naturally evolved enzymes and pathways. In this aspects, synthetic biology allows to overcome the limitations from natural enzymes/pathways via anthropologically designed enzymes/pathways. Despite of many successes by enetically engineered single bacteria applying synthetic biology, microbial bioconversion in many cases is still short of industrial applications, especially in waste to value-added products conversion which requires the difficult and/or complex system. Here, we proposed the bioconversion using defined and engineered microbial consortium including multi-species for the conversion of glycerol and carbon monoxide, to bioelectricity and volatile fatty acids, respectively. The results presented that the construction of synthetic microbial consortium enables to allow the production of bioelectricity or volatile fatty acids, which the individual species does not achieve. Although co-culture system needs further optimization, this strategy and models are highly applicable for the bioconversion of refractory substrate for target product.