



## **BioBBB** - Biobutanol production via bioelectrochemical reduction of butyric acid

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<b>Related website</b>	<a href="http://www.anaerobicdigestionnet.com">www.anaerobicdigestionnet.com</a>

This proof-of-concept project focuses on diversification of anaerobic digestion (AD) into the field of industrial biotechnology through the conversion of one of its intermediate bulk chemicals, butyric acid, into butanol using a microbial electrochemical system (MES). Butanol has many industrial applications, and it has attracted great interest in its role as direct replacement for petrol or as fuel additive. Butanol is superior to ethanol in this regard because it has higher energy content, higher octane number, lower volatility, is less hydroscopic and less corrosive. Therefore it has value and an existing large-scale market.

This research will focus on demonstrating that selective butanol production from butyric acid can be achieved using MES, and that this MES can be integrated with the AD process for overall energy and material recovery efficiency. The operating parameters will be optimised for butanol production, and this will further contribute to recent advances in understanding the mechanisms that control MES. The overall performance of the MES for butanol production from butyric acid will be evaluated in terms of electron and energy utilisation, as well as long-term stability.

### **Objectives**

- To start up the MES reactors with different strains inoculated in the biocathode for biofilm development
- To optimise the butanol production using polarisation tests; conversion efficiency, butanol production rate and Coulombic efficiency to be used as evaluation criteria
- To carry out longer-term stability tests under optimised conditions to investigate the metabolic oscillation of solventogenesis
- To integrate the MES reactor with an anaerobic digester to improve the overall energy and material recovery
- To identify the electrochemically active bacteria in the MES reactors

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*Partners*



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