

## Direct Interspecies Electron Transfer in advanced anaerobic digestion system for gaseous transport biofuel production

Anaerobic digestion (AD) has been widely applied to produce biogas through complex communities of syntrophic bacteria and methanogenic archaea. However, AD can suffer from the inefficiency of biogas production, which fundamentally arises from the low efficiency of mediated interspecies electron transfer (MIET) via hydrogen between bacteria and archaea.

This project proposes an advanced AD-based circular economy system by introducing conductive materials (such as biocompatible graphene nanomaterial and digestate derived pyrochar) for third generation gaseous transport biofuel production from algae feedstock. The proposal will particularly explore the mechanism of efficient direct interspecies electron transfer (DIET) between bacteria and methanogens in the presence of conductive materials.

The goal will be achieved by the following research objectives:

1. Theoretically compare the efficiencies of MIET and DIET in AD;
2. Develop optimal strategies to stimulate DIET and improve biogas production from algae;
3. Outline a future circular economy system by introducing pyrochar into AD.

### Quick Facts

**Start:** 2018

**End:** 2020

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