

Validating a network rewiring approach to overcoming product and feedback inhibitions in syngas fermentation

AIMS:

This project aimed to implement and validate a new synthetic biology approach to improving the tolerance of the gas fermentation microorganism *Clostridium autoethanogenum* to certain inhibitory factors relevant to industrial GF reactors.

OUTCOMES:

The project plan was successfully undertaken. Large libraries of *C. autoethanogenum* strains were generated, validated, and screened; and strains were identified with improved performance for each of several stress tolerance characteristics. These 'hits' were validated by re-testing, and DNA sequencing was used to identify and begin to understand them.

OUTPUT:

This successful proof of concept is significant, giving the academic and industrial project partners the confidence to invest further time, effort and funding to pursue this approach. We will continue to collaborate to investigate, develop and apply this work, in the first instance seeking further research funding. Ultimately this work may improve the performance of GF, decreasing emissions as part of the transition to sustainable circular economies with crucial environmental and economic benefits.