

## **Differences in Ecological Structure Between Hydrogen Producing and Anaerobic Digestion Consortia**

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### **ABSTRACT**

To date, high hydrogen yields by dark fermentation has been challenging because tight control of methanogenic microbial populations is needed and rarely achieved. This control is commonly achieved through aggressive pretreatments of the inocula (e.g. activated sludge, agricultural disposal). Despite this approach has been somewhat successful it is still unclear what are the effects of these pretreatments in the microbial communities composition and dynamics. Moreover, stability of production and up-scaling remain a challenge. We propose that a better, systemic description of microbial communities composition and modeling of their dynamics and interactions among members is key to a sustainable biohydrogen production. In this work we inferred the ecological (co-occurrence) networks of anaerobic digestion (methanogenic) and dark fermentation (/hydrogen production) prokaryotic communities based on published information from 100 experimental settings of each kind. We compared both networks in terms of their robustness, modularity and other topological aspects in order to unravel important interactions between populations of these communities and unknown roles of some groups. In addition, we performed multivariate and indicator species analyses to relate performance and culture conditions with key species in these communities.

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