Shedding light on dark fermentation for biofuel production

Anna Detman
Daniel Laubitz
Aleksandra Chojnacka
Pawel R. Kiela
Agnieszka Salamon
Albert Barberan
Yongjian Chen
Fei Yang
Mieczysław K. Blaszczyk
Anna Sikora

Video Byte

Keywords: dark fermentation, lactic acid bacteria, microbial communities, nutritional interactions, lactate, acetate, butyrate, Microbiome, biofuel, biohydrogen

Posted Date: October 13th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-966204/v1>

License: This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Dark fermentation is one of the most attractive experimental methods for generating clean biofuel. In dark fermentation, bacteria convert carbohydrates into hydrogen gas and other energy-rich small molecules. The problem is that this process tends to produce relatively small amounts of biohydrogen. To find ways to boost efficiency, researchers recently examined the cast of microbial characters that participate in dark fermentation. The team discovered two distinct patterns of fermentation. At low pH (4.0 and lower), lactate and ethanol were the main fermentation products, with most of the work carried out by bacteria belonging to the groups *Lactobacillus*, *Bifidobacterium*, *Leuconostoc*, and *Fructobacillus*. At slightly higher pH (5.0 – 6.0), butyrate was the dominant product, generated largely by bacteria from the groups *Clostridium*, *Lactobacillus*, *Bifidobacterium*, and *Prevotella*. This butyrate pathway is believed to be more favorable for generating hydrogen and was found to involve a more diverse community of bacteria. These findings could help scientists better understand the processes inside bioreactors and lead to more efficient methods of producing biofuel from waste.