

Low-cost, high-efficiency production of CH₄ and H₂ from agricultural residues through microbial saccharification and bio-methanation

Procurement

Demonstration

Item: Agricultural residues

GHG emission reduction
Biomass utilization

Outline

Microbial saccharification technology enables the efficient production of biogas and biohydrogen from agricultural residues. CO₂ and H₂ generated from microbial saccharification by saccharifying bacteria (Fig. 1) and methane fermentation can facilitate energy recycling of unused agricultural residues without greenhouse gas (GHG) emissions.

Background/effect/note

Agricultural waste generated from food and agricultural industries is difficult to decompose and is a source of GHG emissions. Microbial saccharification (Fig. 2) is a novel enzyme-free saccharification method that can saccharify and solubilize agricultural residues using only microorganisms without cellulolytic enzymes. In this method, agricultural residues are efficiently decomposed into sugars and organic acids and can be converted into CH₄ and H₂. Additionally, CO₂ and H₂ generated through microbial saccharification and methane fermentation can produce methane again through the bio-methanation process to facilitate energy recycling of unused agricultural residues without GHG emissions.



Fig. 1. Electron micrograph of saccharifying bacteria

Technical details:



https://www.jircas.go.jp/en/publication/research_results/2020_c03

https://www.jircas.go.jp/en/publication/research_results/2014_c05

Contact

info-greenasia@jircas.affrc.go.jp

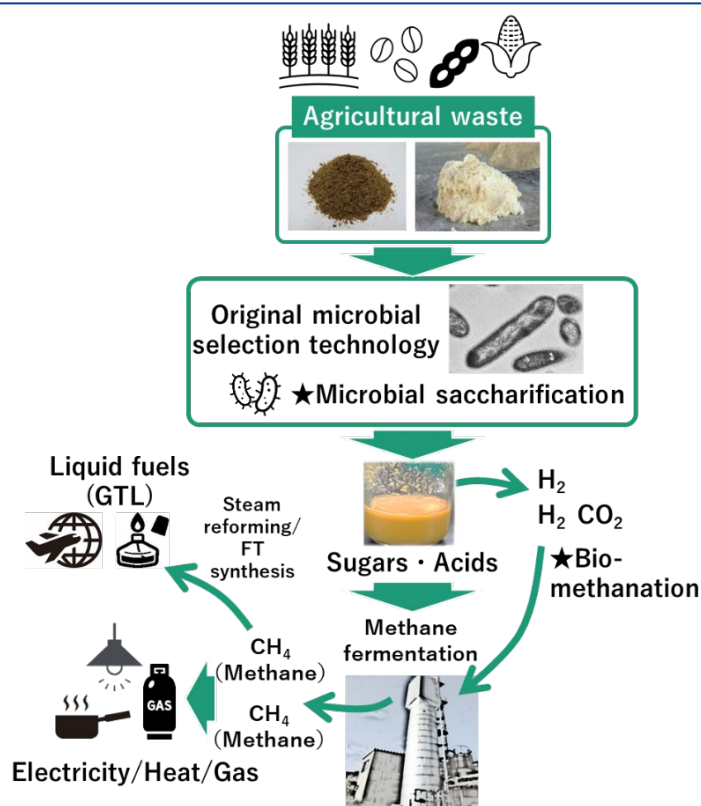


Fig. 2. Overview of low-cost, high-efficiency CH₄ and H₂ production technology through microbial saccharification and bio-methanation

GTL: Gas to Liquid

Japan International Research
Center for Agricultural Sciences

