Low-cost, high-efficiency production of CH_4 and H_2 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. CO_2 and H_2 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 CH_4 and H_2. Additionally, CO_2 and H_2 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

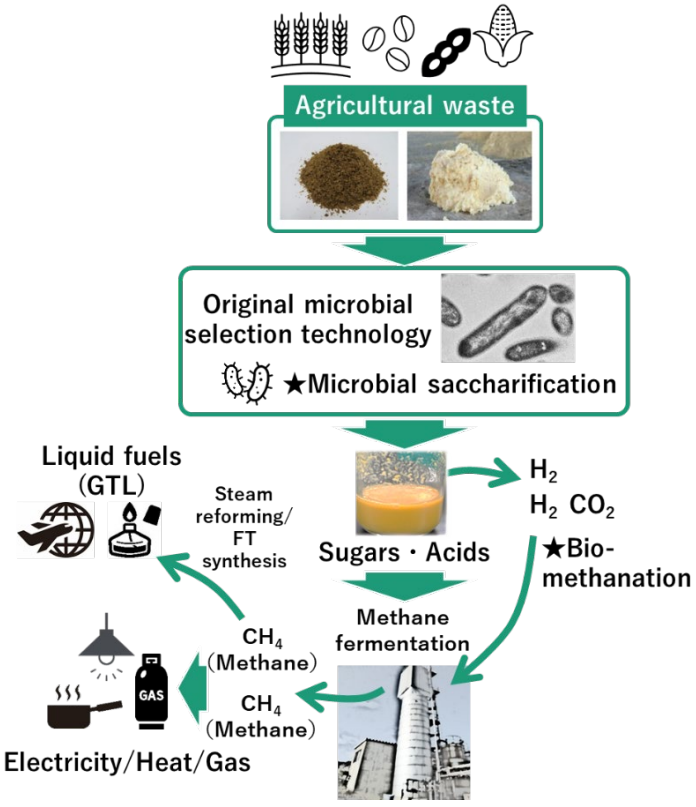

Fig. 2. Overview of low-cost, high-efficiency CH_4 and H_2 production technology through microbial saccharification and bio-methanation
GTL: Gas to Liquid

Technical details:

https://www.jircas.go.jp/en/publication/research_results/2020_c03
https://www.jircas.go.jp/en/publication/research_results/2014_c05

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