Advanced Core for Energetics, Hiroshima University Vol. 25

HU-ACE NEWS LETTER

Vol.25
2019.1

Advanced Core for Energetics, Hiroshima University

Activities of the Core

Jan. 9, 2019	Workshop on secondary battery material
Jan. 15, 2019	The Symposium: Japanese forest and the frontiers of compact gasifier (co-organization)
Jan. 16-18, 2019	The 14th Conference on Biomass Science (co-organization)
Jan. 24, 2019	The 71st Hiroshima University Biomass Evening Seminar (co-organization)
Jan. 25, 2019	The 28th HU-ACE Steering Committee Meeting

Hydrogen Symposium ” Local Production and Consumption of Hydrogen and Business Model”

We organized the 10th HU-ACE symposium, “Local Production and Consumption of Hydrogen and Business Model” in Hiroshima City on Dec 19. We had opportunities to discuss technology, systems and economics to consumption of hydrogen. There were about 40 participants from inside and outside the Hiroshima area at the symposium, and active questions and answers were exchanged.

Issued by Advanced Core for Energetics, Hiroshima University

HU-ACE Secretariat, Research Planning Office, Hiroshima University,
1-3-2 Kagamiyama, Higashi-Hiroshima, 739-8511 Japan
http://home.hiroshima-u.ac.jp/hu-ace/en/

HU-ACE NEWS LETTER Advanced Core for Energetics, Hiroshima University Vol. 25 No. 4

Research Topics

Novel 'Gas-to-Lipids' bioprocess

Tsunehiro Aki
Professor, Department of Molecular Biotechnology, ADSM, HU-ACE, Hiroshima University
Research field: Molecular biotechnology, Applied microbiology
Keyword: Functional lipids, Microbial oils, Biofuel

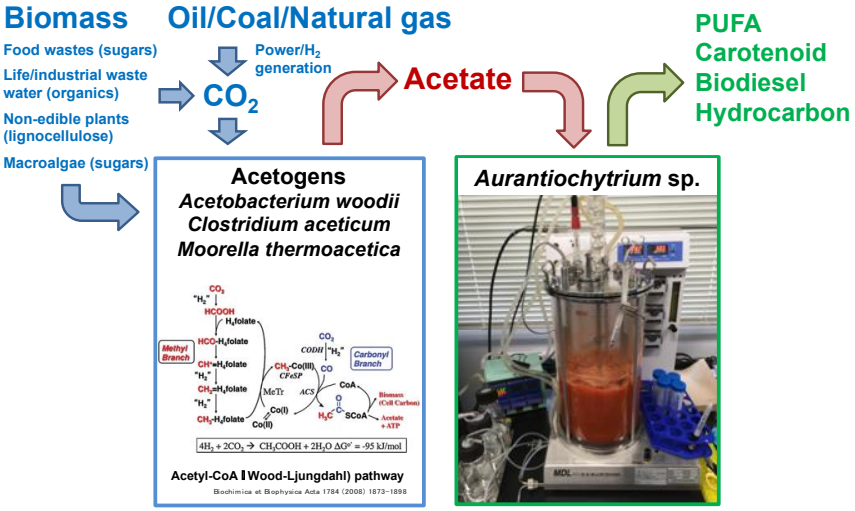
Abstract

Background Microbial oil is attracting attention as a new source of functional food ingredients, cosmetics, sanitary goods, pharmaceuticals, chemical products and fuels. Marine microorganism, the genus *Aurantiochytrium*, produces useful lipids such as fatty acids and hydrocarbons including carotenoids by assimilating sugars. However, considering costs and competition with food, development of sustainable raw material is desired.

Methods Focusing on marine macroalgae, we established a highly efficient two-step lipid fermentation system with a microorganism to convert algal carbohydrates into compounds that can be assimilated by *Aurantiochytrium*. We have also newly discovered the conditions under which *Aurantiochytrium* utilizes organic acids such as acetate for growth. Therefore, we aimed to investigate the combination of *Aurantiochytrium* with acetogens that produce acetate from CO_2 in addition to biomass.

Results *Aurantiochytrium* showed prominent cell growth and fatty acid production under specific conditions in a culture medium of *Acetobacterium* which produced acetate using CO_2 as a substrate. This new technology will contribute to realize the low carbon society and is extensible since acetogens can also utilize various biomass as a raw material. The genome editing technology is being applied for breeding of *Aurantiochytrium* (JST-OPERA project).

Integrated bioprocess for valuable lipid production from unutilized biomass and fossil fuel-derived gas



Reference
1) Aki T., et al., Jpn patent No. 6351328.
2) Aki T., et al., Jpn patent application No. 2017-085299.
3) Watanabe K. et al., *J. Oleo Sci.* 67, 571-578 (2018)