第 132 回定例研究会　資料 III

第16回世界水素エネルギー会議
ドイツ，エッセン

発酵水素生産関係 見聞報告

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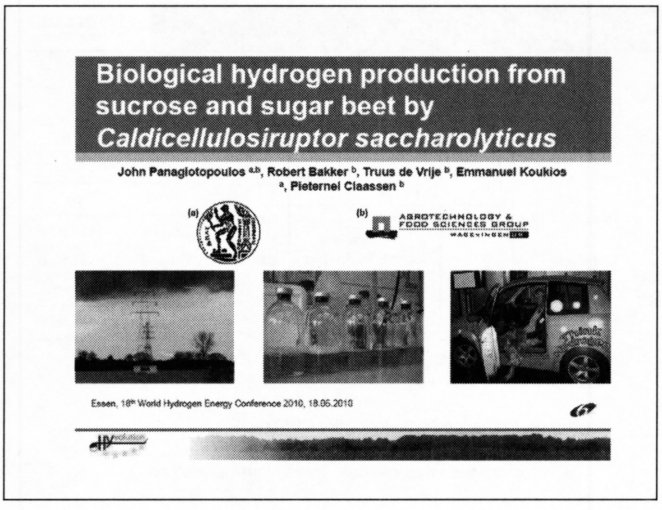
発酵水素生産関係口頭発表者一覧

国籍	機関	発表者	題名
日本	大分大学	Yutaka Amao, U. Sasaki, Y. Teshima	Visible-light operated biomass-oxygen biofuel cell
ドイツ	University Duisburg Essen	R. Brunstermann, R. Widmann	Development of a combined bio-hydrogen- and methane-production unit using dark fermentation
イギリス	Imperial College London	S.J. Burgess, P.J. Nixon	Investigating the link between fermentative metabolism and hydrogen production in the unicellular green alga Chlamidomonas reinhardtii
台湾	Feng Chia University 逢甲大学	Feng-Yuan, et al.	Hydrogen and methane production from condensed molasses fermentation soluble by a two-stage anaerobic process
台湾	National Cheng Kung University 国立成功大学	Sheng-Shung Cheng, et al.	Biohydrogen fermentation of mixed liquid of kitchen waste and napiergrass with anaerobic fluidized bed process
カナダ	University of Western Ontario	H. Hafez, G. Nakhla, H. Naggar	A noble biological hydrogen production system: impact of organic loading
カナダ	University of Montreal	P. Hallenbeck, et al.	Strategies for overcoming barriers to implementation of biological hydrogen production
アメリカ	Penn State University	B.E. Logan, P. Selembo, P.C. Maness	Microbial electrolysis cells for high-yield biohydrogen production from fermentable substrates
日本	東邦ガス㈱	Kohki Nagai, et al.	Operation of a two-stage continuous fermentation process producing hydrogen and methane from artificial food wastes

発酵水素生産関係ポスター発表者一覧

1	Poland	A. Mickiewicz University	Ewelina Wicher, M. Thiel, M. Laniecki	Hydrogen generation from waste glycerol in dark fermentation process
2	Taiwan	Industrial Technology Research Institute	Sheng-Shung Cheng,et al.	A Pilot Study of Nitrogen Composition and Effect on Biohydrogen Production
3	Taiwan	National Cheng Kung University	Sheng-Shung Cheng, et al.	Biochemical Hydrogen Potential Assessment with Anaerobic Batch Biodegradation of Organic Leachate from Aerobic Bio-leaching Bed Feeding Kitchen Waste and Napier Grass
4	Brazil	Federal University of São Carlos	Aruana R. Barros, et al.	Biohydrogen production with anaerobic sludge using granulated tire supported fluidized bed reactor
5	Brazil	University of São Paulo	E. L. C. Amorim, et al.	Effect of Alkalinity and Organic Loading Rate in the Fermentative H2 Production from an Anaerobic Fluidized Bed Reactor
6	The Nethe	Wageningen University	Servé Kengen, et al.	Analysis of the glycolytic pathways of the hydrogen producing Caldicellulosiruptor saccharolyticus
7	Taiwan	National Cheng Kung University	Chun-Yen Chen, et al.	Biohydrogen production from combined dark-photo fermentation under a high ammonia content in the dark fermentation effluent
8	Taiwan	National Cheng Kung University	Yung-Chung Lo, et al.	Using biomass of starch-rich transgenic Arabidopsis vacuolar as feedstock for fermentative hydrogen production
9	Taiwan	National Cheng Kung University	Yung-Chung Lo, et al.	Optimizing fermentation conditions for bioh2 production with Clostridium butyricum CGS2 using statistical experimental design
10	India	Manonmaniam Sundaranar University	A.G.Murugesan, et al.	Sequential Evolution of Bio-Hydrogen from Rubber Industrial Effluent and its Microbial Interaction to Fermentation Kinetics
11	UK	University of Leeds	Siddiqui, Z., et al.	Two-Phase Anaerobic Digestion of Mixed Waste Streams to Separate Generation of Bio-hydrogen and Bio-methane
12	Japan	Yokohama National University	Keigo Yasuda, et al.	Continuous Hydrogen Production from Starch by Fermentation
13	Australia	University of Queensland	Hang Zheng, et al.	A high yield, hydrogen producing, bacterial community enriched from anaerobic digester leachate



Conclusions

- Sugar beet may be instrumental in the middle-term in a sustainable hydrogen economy
- *C. saccharolyticus* is suitable for efficient hydrogen production from sugar beet. In particular, *C. saccharolyticus* appears to have a preference for sugar beet extract rather than for pure sucrose
- Uncontrolled fermentations: the production of hydrogen and organic acids from sugar beet extract was largely equal to or slightly higher than the production from sucrose
- Controlled fermentations: hydrogen yields of 2.9 and 3.0 mol/mol hexose were observed with sucrose and sugar beet extract
- In fermentations under controlled conditions lactate formation was prevented in favor of acetate and hydrogen production
- The fermentability experiment is a useful tool to rapidly determine the suitability of a raw material for hydrogen production