

APEC

Advanced Biohydrogen and Green Growth Newsletter

APEC Meetings and Events

§ APEC Russia 2012- Main Events §

May 28 – June 1, 2012

Kazan, RUSSIA

The food security, climate change, energy security, interlinked challenges, and green growth for the APEC region.

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The APEC 2012 meeting will be organized and hosted by Russian government. The major topics that will be covered in this discussion will be following:

- A. Investment in trade and liberalization,
- B. Economic integration between the APEC regions
- C. Food security development and sustainability
- D. Innovative growth by making intensive cooperation between the countries

The chairmanship in APEC of Russia in 2012 will promote the domestic economy organic integration into the system of economic ties in the Asia Pacific Region (APR) in the interests of modernization- and innovation-driven economic development, primarily in Siberia and the Russian Far East. Russia has joined APEC in 1998. Since 1999, it has constantly participated in annual APEC Economic Leaders' Meetings (AELM).

As APEC chair, Russia intends to make an important contribution to achieving the forum's objectives, which are mentioned above. Russia also plans to propose that its partners focus on such practical issues as bolstering food security, improving transport and logistics systems, and cooperating in the interests of modernization.

The main events of this Russia APEC-2012 are as follows:

Date	Event
June 25, 2012	Transcript of the APEC Energy Ministerial Meeting
June 27, 2012	<ul style="list-style-type: none"> • Transcript of the Meeting of Ministers Responsible for Mining • APEC Mining Ministers: Supply of raw materials is crucial to the region's sustainable development
June 30, 2012	Transcript of the Women and the Economy Forum
July 9, 2012	Transcript of the APEC Conference: Shaping Education within APEC
July 13, 2012	Russian delegation for APEC Youth Forum
July 16-18, 2012	Meeting of Ministers Responsible for Environment
July 17, 2012	<ul style="list-style-type: none"> • APEC experts share experience of air and water monitoring • Russia develops plan to increase agricultural production
August 3, 2012	<ul style="list-style-type: none"> • APEC tourism ministers to meet in Khabarovsk • APEC Tourism Working Group concludes meeting in Khabarovsk



Trade mark of APEC Russia 2012



APEC Energy, Mining Ministers to meet in St.Petersburg (June 22, 2012)



Meeting of Ministers Responsible for Environment (July 16-18, 2012)



APEC tourism ministers to meet in Khabarovsk (July 22, 2012)

Adapted from: <http://www.apec.org/> ; <http://www.apec2012.ru/calendar/20120716/462324408.html>

Research Note

§ Ethanol Production with co-fermentation of Glucose and Xylose §

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The cheap substrate can improve competitiveness for dark fermentative hydrogen production. In order to develop the pilot technology of hydrogen production from non-grain feedstock, this study explored the hydrogen production from desizing wastewater (DW) and condensed molasses fermentation soluble (CMS) using 60 and 400 L pilot-scale fermentors, respectively. It is expected that experiment results obtain several related parameters for scale up and further connect with commercial processes. In addition, the microbial community structure in systems was analyzed by using molecular biological techniques.

DW was initially conducted the experiments of environmental factors and operation strategies with a lab-scale continuous flow stirred tank reactor (CSTR). The results showed that combination substrate preheating

(60°C, 1 h) and HRT (hydraulic retention time) 12 h could inhibit the activity of non-hydrogen-producing bacteria and improve the stability of system operation. The optimum pH value was 5.5, but the CSTR reactor could not be operated steady at a HRT of 8 h. DW via saccharification pretreatment could improve this problem, obtaining a H₂ production rate (HPR), H₂ yield (HY) and overall H₂ production efficiency (HPE) of 15.2 m³/m³/d, 9.77 mmol-H₂/g-hexose and 37.5%, respectively, at a HRT of 8 h. If the pretreatment processes combined saccharification with alkali (pH 10.0-10.5) treatment, it could further improve the hydrogen yield.

Unfortunately, the 60 L pilot-scale reactor could not be started up by feeding variously pretreated DW. However, the waste concentrated beverage added 0-10% (total sugar ratio) DW could be successfully operated at

HRT 6 h, getting a HPR, HY and HPE of 20.2 m³/m³/d, 8.7 mmol-H₂/g-hexose and 37.2%, respectively. The analytical results of microbial community structure showed that hydrogen-producing *Clostridium* sp. existed in the reactor for three stages of addition of 0-10% DW, and *C. butyricum* was the predominant H₂-producing bacterium in the system. However, hydrogen production decreased to near zero when the addition of DW was increased to 20%. The analytical results of microbial community structure showed that *C. butyricum* still presented in the reactor. Accordingly, the main cause of stopping hydrogen production should not result from propagation of non-H₂-producing bacteria in the fermentor. It is highly probable that chemical substances of hydrogen inhibition existed in desizing water.

The 400 L pilot - scale bioreactor could successfully start up by feeding CMS at HRT 6 h ($C_s = 40$ g COD/L).

Keywords: fermentative hydrogen production, pilot scale, desizing wastewater, condensed molasses fermentation soluble, PCR-DGGE

However, the performance of hydrogen production became periodic fluctuation situation. This problem could be improved by substrate preheating (60 °C, 1 h), obtaining a HPR and HY of 17.8 m³/m³/d and 9.1 mol H₂/g-hexose, respectively, at HRT 4 h and substrate concentration 70 g COD/L (total sugar concentration 17.7 g/L). The analytical results of microbial community structure showed that *Corynebacterium glutamicum* presented in the system became non-predominant bacterium by substrate preheating, resulting in the shift from lactate fermentation into butyrate fermentation. In addition, the *Megasphaera* sp., which can decompose carbohydrates and lactate to produce hydrogen, was found that existed in the system of substrate preheating. According to the degrees of lactate content in soluble metabolites, there was speculation that *Megasphaera* sp. gave some contribution to hydrogen production.

Special Column

Announce of 2012 APEC Steering Committee Meeting on Green Growth, 2012 APEC Short-term Training Course on Green Technology, International Workshop on Kitchen Waste-Based Bioenergy and Call for The 8th International Workshop on Innovative Anaerobic Technology

“2012 APEC Steering Committee Meeting on Green Growth” will be held at Feng Chia University, Taichung, Chinese Taipei, on August 27, 2012. This meeting will provide an opportunity for interested scientists and researchers in the world to present the latest results in the field of **Green Growth and Clean Energy**. ~~This time we will invite 1 keynote speaker from Japan, and 13 invited speakers from APEC members and Germany.~~

The topic of the meeting focuses on the “Green Growth” and this session is to be open to the all attendees. All participants will share the latest ideas and

experimental results from different countries.

“2012 APEC Short-term Training Course on Green Technology” will be held at Feng Chia University, Taichung, Chinese Taipei, on August 27-29, 2012. On August 27-28, we will invite professors and researchers from Japan, Korea, China and Singapore and give lectures in different fields to participants. On August 29, we will arrange the technical tour in Taichung City.

“International Workshop on Kitchen Waste-Based Bio-Energy” will be held during **August 28th-29th, 2012** in Taichung, Chinese Taipei. This workshop is organized by Taichung City Government and

Feng Chia University. The workshop will provide a very good platform for scientists and researcher all over the world to share knowledge and expertise on current themes in kitchen waste to bioenergy all around world.

Kitchen waste management and reuse is an international environmental issue. However, recent advances in the bioenergy technologies have dramatically reduced the problem of kitchen waste management and are able to convert kitchen waste to motor gasoline. The process is environmental friendly and fits to the low carbon green policy. Taichung City was the low-carbon model city in central Taiwan. Six Strategies to realize the low-carbon visions, including recycling with zero waste, green building incorporating, and Smart transportation etc.,. At the international workshop on kitchen-based bioenergy, recent research findings and projects on these topics will be presented and discussed. That will also provide significant contribution to the development the sustainable future. The lectures in the workshop will present by distinguish researchers, and wish you participate with us!



“Call for the 8th International Workshop on Innovative Anaerobic Technology”, International Conference on Environmental Anaerobic Technology and Bioenergy is established in 2003. This conference has been sharing the latest information related to anaerobic and bioenergy technologies and being held in Japan, Korea, Hong Kong, Chinese Taipei and China.

The 8th International Workshop on Innovative Anaerobic Technology is to bring together senior and young researchers. Young researchers are highly encouraged to present their ideas and experimental results.

Feng Chia University in Chinese Taipei would like to warmly welcome you to the Workshop on August 27-29, 2012 in Taichung, Taiwan. Topics of interest for submission include, but are not limited to:

- **Advanced anaerobic technology for wastewater treatment and full-scale applications**
- **Sludge and solid waste treatment technologies and full-scale applications**
- **Bioenergy technologies (bio-methane, bio-hydrogen, MFC etc.)**
- **Modeling and simulation for anaerobic treatment processes**
- **Anaerobic biotechnologies**

Important Dates

Abstract submission deadline: **July 20, 2012**

Authors' notification: **July 25, 2012**

Final manuscript due: **August 20, 2012**

Abstract Submission

1. Abstract should be written in English. Electronic files should be sent to secretary's office via yalliu@fcu.edu.tw by **July 20, 2012**.
2. Author will be notified of the acceptance within 1 week from submission. Author should indicate his/her preference for oral or poster session but the final assignment is by the consent of scientific committee.
3. All oral presenters are required to submit the full manuscript by August 20, 2012. Poster presenters are encouraged to submit the full manuscript.