Department of Further Education, Employment, Science & Technology and the Future Fuels Consortium ™

jointly presents a public seminar on

'Microalgae Biofuels' by Dr John Benemann

3.00 pm Wednesday 21 January
SARDI Aquatic Sciences Centre Lecture Theatre,
2 Hamra Ave, West Beach.

Program

3.00 - 3.15 pm: Dr Ian Chessell, Chief Scientist of South Australia to introduce the speaker
3.15 - 4.15 pm: Dr John Benemann's public seminar on 'Microalgae biofuels'
4.30 - 6.30 pm: Drinks, nibbles and networking
6.30 - 9.30 pm: Dinner at Evida, 269 Seaview Road, Henley Beach (bookings essential)
*To attend dinner at Evida please **RSVP** to Dr Sasi Nayar Tel: 8207 5321 or email nayar.sasi@saugov.sa.gov.au by Friday 16 January. Two course dinner $30.

Dr John Benemann's Abstract

Microalgae mass cultures can produce biomass suitable for conversion to renewable biofuels (methane, ethanol, biodiesel and hydrogen) and nitrogen fertilizers. Microalgae cultures must be supplied with CO_2, such as from power plant flue gases, biogas or ethanol plants and similar sources. They can abate greenhouse gases by producing renewable biofuels that substitute for fossil fuels and by providing environmental services that reduce greenhouse gas emissions, specifically wastewater treatment and nutrient recycling.

Currently microalgae are cultivated commercially mainly in shallow (~ 30 cm deep), raceway-type, paddle wheel mixed, open ponds to produce high value food supplements. Large, unmixed and undivided ponds, some over one hundred hectares in size, are also used in municipal wastewater treatment and, in Australia, for beta-carotene production. However these production systems are currently too expensive for production of biofuels.

Engineering cost analyses project sufficiently low capital and operating costs for large (several hundred hectares) raceway, mixed, open-pond cultivation systems, if current algal biomass productivities could be increased to about 100 metric tons/hectare-year of biomass with a high content of extractable vegetable oils (triglycerides) or fermentable starches. Co-products and co-processes could improve the economics of such systems. One such co-process could be municipal and other wastewater treatment. The algal cultures must be stably cultivated and cheaply harvested. Achieving these goals of high culture will require a combination of long-term applied and fundamental R&D in algal physiology, genetics, photosynthesis, control of grazers and 'weed' algae, as well as of technologies for low-cost harvesting and processing of the biomass, along with many ancillary processes.

The global potential of microalgae biofuels, as that of other biofuels and renewable energy sources generally, will be limited by many constraints; in this case the requirements for simultaneous availability of water, CO_2, suitable soil, flat land and favorable climates. Such renewable energy sources, including microalgae biofuels, must be developed to allow for the long-term sustainability of our economies, ecosystems and societies.

John Benemann received a B.S. in Chemistry and a Ph.D. in Biochemistry both from the University of California Berkeley. After a couple of years at UC San Diego, he rejoined UC Berkeley at the Sanitary Engineering Research Laboratory, where, as an independent investigator, he worked on microalgae for wastewater treatment, biofuels and fertilizer production, supervising the Ph.D. thesis work of students in Civil Engineering, Biophysics and Plant Physiology. After starting a small biotechnology company and a few years at Georgia Institute of Technology as an Associate Professor in Applied Biology, he returned to California where for the past twenty years he has been a full time consultant in biofuels, microalgae biotechnology, bioreactor landfills, and greenhouse gas abatement.

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