

BioHydrogen

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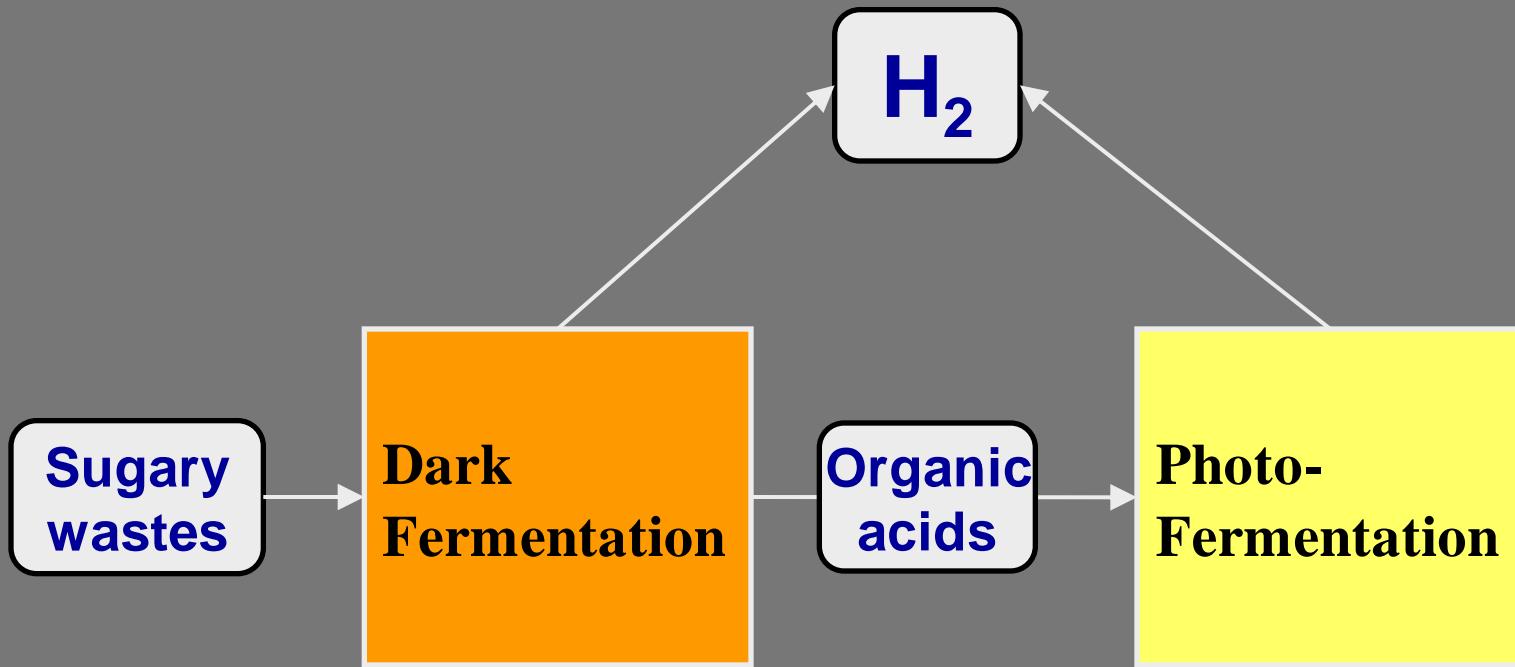
www.hydrogen-wm-scratch.info

SCRATCH workshop, 16th Sept 2009

Research area: Biohydrogen

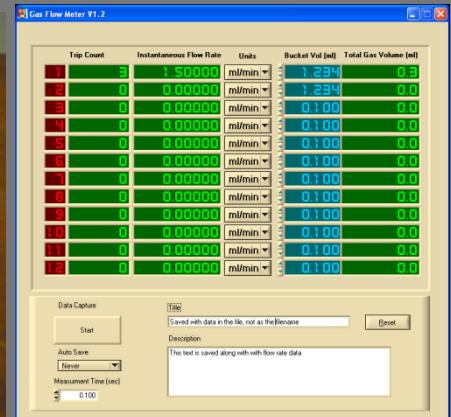
- Green hydrogen
- “Green” means clean and renewable
- Renewable – made from renewable energy sources like sun, wind, hydroelectric and biomass. Not from gas.
- Clean – without environmental pollutants
 - Hydrocarbons, CO₂, NO_x, SO_x, soot, smog
- Clean – inherently without key impurities
 - Carbon monoxide (CO)
 - Hydrogen sulphide (H₂S)

Technical focus: A dual-bioreactor system for bio-H₂

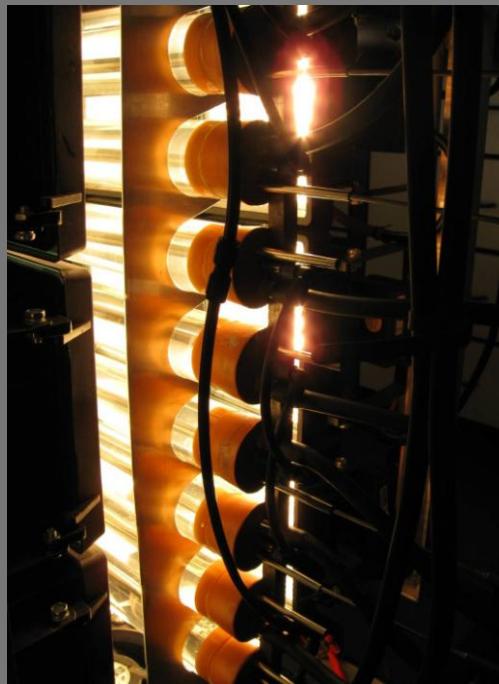


Results

- Built new equipment for low gas-flow monitoring



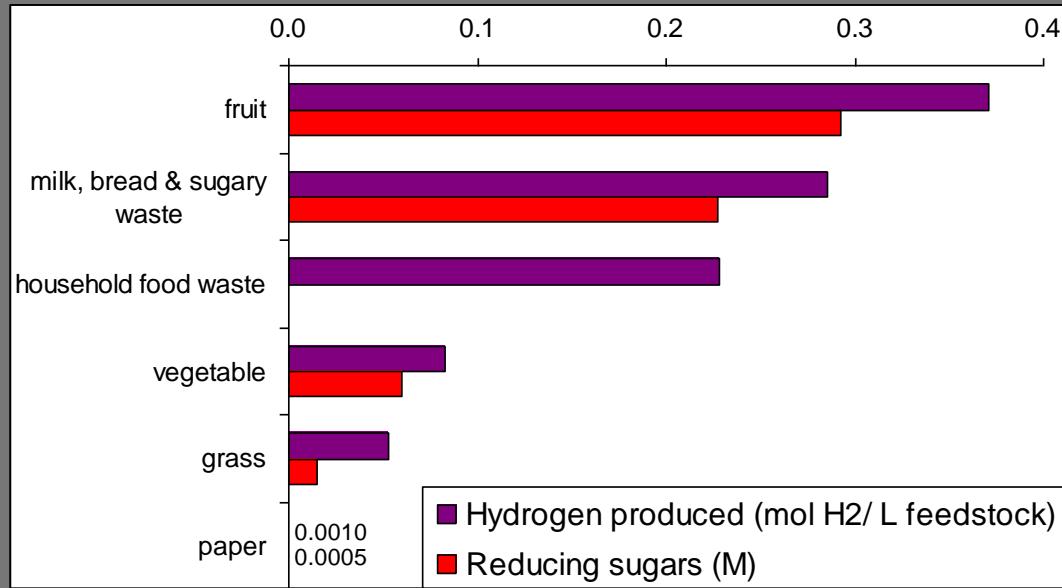
- Built new equipment for detailed study of solar biohydrogen



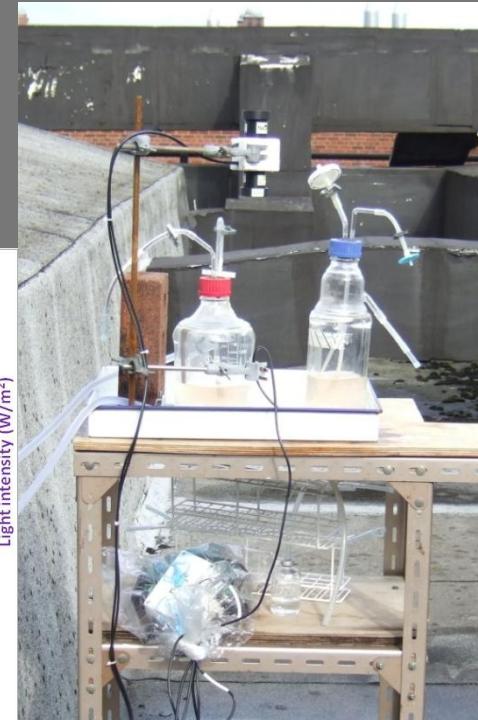
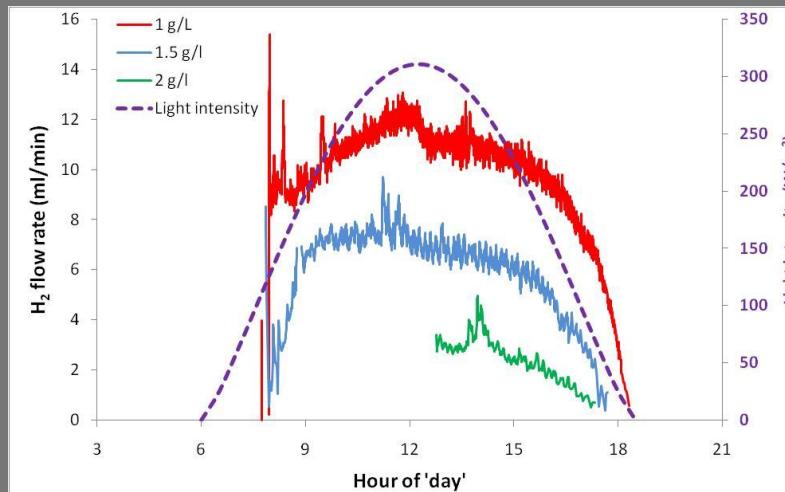
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Results

□ Shown
fermentation of
waste (ongoing
APOC)



□ Shown solar
biohydrogen
production in
Birmingham



Research papers published (wrt SCRATCH)

- The challenge of combining dark fermentation and photofermentation
- The roles of hydrogenases during hydrogen production by *E. coli*
- Review on the microbiology of biohydrogen production

Research papers planned

- Towards an integrated system for bio-energy: Hydrogen production by *E. coli* and use of palladium coated waste cells for electricity generation in a fuel cell (Collaboration with UoDundee)
- Efficient BioH₂ production from NH₄-rich feed using extractive fermentation
- Hydrogen production from food wastes by *E. coli* strain HD701 (DW Penfold's experiments)
- Local factors affecting hydrogen production and yield prediction from solar intensity data (collaboration with Bw2E).
- Integration of a biohydrogen reactor with a solid-state H-store (Collaboration with A. Bevan and D. Book)
- Comparison of learning curves for future hydrogen production technologies (Collaboration with R. Green and H. Hu).

Conference talks (wrt SCRATCH)

- Society for General Microbiology AGM, Edinburgh. Sept 2009.
- Bacteriology in Birmingham, Sept 2009.
- Institute for Energy Research and Policy, Birmingham, Jan 2009
- Solar & Bioenergy Symposium, Glasgow, Sept 2008
- Anaerobic Treatment Conference, Birmingham Institute, May 2008

Completed Business Assistance

- Formed in early 2008 with investment from ModernWaste and IP from UoB, and EKB Technology Ltd (Oxford).
- Aim to commercialise a process to generate clean energy from organic waste.
- Currently seeking partners and funding for pilot-scale operations.



Ongoing Business Assistance

- Manufacturers and suppliers of Endothermic roofs
- The roof harvests solar energy to provide heating and hot water
- Fundamental concept study on an “endothermic photobioreactor (endo-PBR)”
- Opportunity to incorporate hydrogen generation



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