

HYDROGEN PRODUCTION FROM A WHEAT INDUSTRY CO-PRODUCT

LEAD ORGANISATION

University of Glamorgan
School of Applied Sciences
Llantwit Rd
Treforest
Pontypridd
RCT, Wales
CF37 1DL
Contact: Dr Alan Guwy
Tel: 01443 482239
E-mail: ajguwy@glam.ac.uk
www.glam.ac.uk

PARTNERS

Rank Hovis Ltd
Hydrogen Solar Ltd

COST AND DURATION

The Carbon Trust contribution towards this project is £209,992. The project started in September 2005 and is scheduled for completion in August 2007.

PROJECT REFERENCE NUMBER

2004-10-1872



Laboratory-scale, bio-hydrogen reactor fed with wheatfeed. Source: University of Glamorgan

OBJECTIVES

The overall objective of the project is to determine the potential of fermentation technology to produce either hydrogen biofuel or a hydrogen-enriched, methane biofuel from wheatfeed (an inevitable co-product of flour milling).

SUMMARY

Fermentative hydrogen production from wheatfeed is a new process with a potential to replace diesel (currently used in static applications and motor vehicles) with a sustainable, carbon-neutral fuel.

A previous feasibility study funded by the Carbon Trust gave promising laboratory-scale results, but was constrained by scale associated material transport and fluid dynamic limitations.

This study will use the laboratory-scale data to specify a larger scale reactor such that commercial pumps can be used to allow continuous, automatic and reliable operation. This will enable a full experimental programme to be carried out to establish the optimal reaction conditions and potential hydrogen yields.

Unlike the laboratory-scale work, this facility will include an anaerobic digester which will allow the true commercial potential to be evaluated, based on final process output data.

The main technical objectives are to:

- Design and construct a hydrogen-producing reactor at a scale suitable for reliable, continuous delivery of the wheatfeed at the rate needed and an anaerobic digester to convert the remaining organics to methane.
- Specify an experimental programme using the reactor to determine the continuous operating conditions that give maximum hydrogen yields with minimum water and nutrient addition.
- Operate the reactor and anaerobic digester on wheatfeed according to the experimental programme to determine conditions for optimal hydrogen production and the nature of the outputs.
- Produce a conceptual pilot-scale plant specification with a net energy balance and outline economic assessment.

The project team will meet these objectives through designing, commissioning and operating reactors at the Rank Hovis Barry flour mill. Rank Hovis will also provide infrastructure, wheatfeed, technical assistance and relevant data. Both Rank Hovis and Hydrogen Solar Ltd will assist in assessing the project results for technical and economic viability.



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