

## ACS spring meeting in San Francisco March 2010

Program area Biofuels & Bioproducts:

Recent Advances Fermentation and Product Separation Technologies for the Production of Fuels and Chemicals from Biomass (Oral): Contributed

TITLE: Fermentation to medium chain fatty acids as precursors for biodiesel

Kirsten J. J. Steinbusch,<sup>a</sup> Hubertus V. M. Hamelers,<sup>a</sup> Caroline M. Plugge<sup>b</sup> and Cees J. N. Buisman<sup>a</sup>

<sup>a</sup> Sub-department of Environmental technology, Wageningen University, Bomenweg 2, 6703 HD Wageningen, The Netherlands.

<sup>b</sup> Laboratory of Microbiology, Wageningen University, Dreijenplein 10, 6703 HB Wageningen, The Netherlands;

### ABSTRACT

The research describes a new mixed culture fermentation to produce a biodiesel precursor from residual biomass streams. It was found that ethanol and products from acidified biomass streams as acetate and hydrogen can be converted to medium chain fatty acids (MCFA) with 6 and 8 carbon atoms. MCFA can be further processed to diesel-like components by ketonization. Since acidification and ketonization are proven technologies, the objective was to demonstrate technical feasibility of MCFA production by mixed cultures. In fed-batch reactor, caproic and caprylic acid were produced in resp. 8.2 and 0.32 g/l, concentrations close to solubility levels. Further optimization could increase product concentrations above the solubility level, which simplifies product removal by simply decantation. During MCFA fermentation, the microbial population were stable and mainly dominated by bacteria closely related to *Clostridium kluyveri*. Combination of easy product removal and stable fermentation without sterilization, makes the production process ideal for bulk production.