

Accepted Manuscript

A parametric response surface study of fermentative hydrogen production from cheese whey

M. Akhlagi, M.R. Boni, G. De Gioannis, A. Muntoni, A. Poletini, R. Pomi, A. Rossi, D. Spiga

PII: S0960-8524(17)31274-9

DOI: <http://dx.doi.org/10.1016/j.biortech.2017.07.158>

Reference: BITE 18578

To appear in: *Bioresource Technology*

Received Date: 22 June 2017

Revised Date: 24 July 2017

Accepted Date: 26 July 2017

Please cite this article as: Akhlagi, M., Boni, M.R., De Gioannis, G., Muntoni, A., Poletini, A., Pomi, R., Rossi, A., Spiga, D., A parametric response surface study of fermentative hydrogen production from cheese whey, *Bioresource Technology* (2017), doi: <http://dx.doi.org/10.1016/j.biortech.2017.07.158>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



A PARAMETRIC RESPONSE SURFACE STUDY OF FERMENTATIVE HYDROGEN PRODUCTION FROM CHEESE WHEY

M. Akhlagi¹, M.R. Boni¹, G. De Gioannis^{2,3}, A. Muntoni^{2,3}, A. Poletti^{1*}, R. Pomi¹, A. Rossi¹,
D. Spiga²

¹ Department of Civil and Environmental Engineering, University of Rome “La Sapienza”, Italy

² Department of Civil and Environmental Engineering and Architecture, University of Cagliari,
Italy

³ IGAG – CNR (Environmental Geology and Geoengineering Institute of the National Research Council), Italy

* Corresponding author: Prof. Alessandra Poletti, Department of Civil and Environmental Engineering, University of Rome “La Sapienza”, Via Eudossiana 18 – 00184 Rome (Italy); tel/fax: +39/06 44585037; e-mail: alessandra.poletti@uniroma1.it

ABSTRACT

Batch factorial experiments were performed on cheese whey + wastewater sludge mixtures to evaluate the influence of pH and the inoculum-to-substrate ratio (ISR) on fermentative H₂ production and build a related predictive model. ISR and pH affected H₂ potential and rate, and the fermentation pathways. The specific H₂ yield varied from 61 (ISR = 0, pH = 7.0) to 371 L H₂/kg TOC_{whey} (ISR = 1.44 g VS/g TOC, pH = 5.5). The process duration range was 5.3 (ISR = 1.44 g VS/g TOC, pH = 7.5) – 183 h (ISR = 0, pH = 5.5). The metabolic products included mainly acetate and butyrate followed by ethanol, while propionate was only observed once H₂ production had significantly decreased. The multiple metabolic products suggested that the process was governed by several fermentation pathways, presumably overlapping and mutually

Download English Version:

<https://daneshyari.com/en/article/4996580>

Download Persian Version:

<https://daneshyari.com/article/4996580>

[Daneshyari.com](https://daneshyari.com)