Effect of dilute acid pretreatment severity on the bioconversion efficiency of *Phalaris aquatica L.* lignocellulosic biomass into fermentable sugars

Ioannis A. Pappas, Zoi Koukoura, Chrisoula Tananaki, Christos Goulas

PII: S0960-8524(14)00738-X
DOI: http://dx.doi.org/10.1016/j.biortech.2014.05.072
Reference: BITE 13480

To appear in: *Bioresource Technology*

Received Date: 25 February 2014
Revised Date: 11 May 2014
Accepted Date: 21 May 2014

Please cite this article as: Pappas, I.A., Koukoura, Z., Tananaki, C., Goulas, C., Effect of dilute acid pretreatment severity on the bioconversion efficiency of *Phalaris aquatica L.* lignocellulosic biomass into fermentable sugars, *Bioresource Technology* (2014), doi: http://dx.doi.org/10.1016/j.biortech.2014.05.072

Effect of dilute acid pretreatment severity on the bioconversion efficiency of *Phalaris aquatica L.* lignocellulosic biomass into fermentable sugars

Ioannis A. Pappas[1,2], Zoi Koukoura[2], Chrisoula Tananaki[3], Christos Goulas[4]

[1]Chemical Process Engineering Research Institute, LPRE, 6th km Harilaou Thermi Road, 57001, Thessaloniki

[2]Aristotle University, Department of Forestry and Natural Environment, Range Ecology Laboratory, 54124, Thessaloniki

[3]Aristotle University, School of Agriculture, Apiculture-Sericulture Laboratory, 54124, Thessaloniki

[4]Idras 33, 55236, Panorama, Thessaloniki

*Corresponding author: e-mail: pappas@cperi.certh.gr, telephone: 2310498178

Abstract

The effect of dilute acid pretreatment severity on the bioconversion efficiency of *Phalaris aquatica* lignocellulosic biomass into fermentable sugar monomers was studied. The pretreatment conditions were expressed in a combined severity factor (CSF), ranged from 0.13 to 1.16. The concentration of xylose and total monomeric sugars released from hemicellulose increased with pretreatment as the CSF increased. Dilute acid pretreatment resulted in about 1.7 fold increase in glucose release relative to the untreated biomass, while CSF was positively correlated with glucose recovery. A maximum glucose yield of 85.05 % was observed at high severity values (i.e. CSF 1.16) after 72h. The total amount of sugars released (i.e. xylose and glucose) was increased with pretreatment severity and a maximum conversion efficiency of 76.1 % of structural carbohydrates was obtained at a CSF =1. Our data indicated that *Phalaris aquatica* L. is an alternative bioethanol feedstock and that hemicellulose removal promotes glucose yield.