



“Gheorghe Asachi” Technical University of Iasi, Romania



BIOCONVERSION OF POTATO WASTEWATER TO ALCOHOL

Maria Iasmina Moza¹, Monica Mironescu^{2*}

¹Department of Ecology and Environmental Protection, Faculty of Science, “Lucian Blaga” University,
5-7 Ion Rațiu Street, Sibiu, 550012, Romania

²Department of Agricultural Science and Food Engineering, Faculty of Agricultural Sciences, Food Industry and Environmental
Protection, “Lucian Blaga” University, 7-9 Ion Rațiu Street, Sibiu, 550012, Romania

Abstract

This research offers a novel approach for potato wastewater (PW) bioconversion to alcohol by microwaves gelatinization, liquefaction and simultaneous saccharification and fermentation (SSF). Concentrated PW from potato processing to obtain fries was treated by gelatinization, enzymatic hydrolysis through liquefaction and saccharification, and fermentation; a mini-bioreactor was used, with low oxygen, temperature, pH and mixing control. The yeast *Saccharomyces cerevisiae* and a commercial mix of lactic bacteria were used for fermentations. Two fermentation systems were tested: SSF and saccharification followed by fermentation (SF). The results indicated gelatinization with microwaves at 85°C for 5 minutes as being very efficient on the starch hydrolysis, compared with the classical thermal gelatinization. SF and SSF cultivation systems showed differences in terms of RS production and consumption and ethanol production; the final values after 48 h of cultivation were around 1% RS (both SF and SSF) and 6% ethanol in SF and 7% ethanol in SSF. Yeast and lactic bacteria were not significantly influencing each other at the cultivation on PW and the lactic bacteria showed no influence on the ethanol production. The most adequate strategy was to cultivate only yeast in SSF system at 35°C for 36 hours with production of around 7% ethanol with more than 0.5 g ethanol/g RS.

Key words: ethanol, gelatinization, potato wastewater, SSF

Received: February, 2016; Revised final: February, 2017; Accepted: February, 2017

* Author to whom all correspondence should be addressed: e-mail: monica.mironescu@ulbsibiu.ro; Phone: +40(269)211338; Fax: +40(269)212558