

Accepted Manuscript

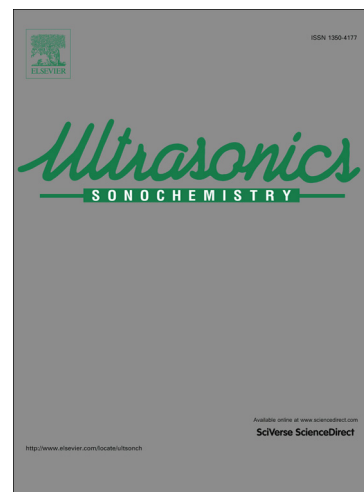
Mechanistic Investigations in Ultrasound-Assisted Xylitol Fermentation

Belachew Zegale Tizazu, Kuldeep Roy, Vijayanand S. Moholkar

PII: S1350-4177(18)30804-6
DOI: <https://doi.org/10.1016/j.ultsonch.2018.06.014>
Reference: ULTSON 4212

To appear in: *Ultrasonics Sonochemistry*

Received Date: 28 May 2018
Revised Date: 15 June 2018
Accepted Date: 17 June 2018



Please cite this article as: B.Z. Tizazu, K. Roy, V.S. Moholkar, Mechanistic Investigations in Ultrasound-Assisted Xylitol Fermentation, *Ultrasonics Sonochemistry* (2018), doi: <https://doi.org/10.1016/j.ultsonch.2018.06.014>

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.

Mechanistic Investigations in Ultrasound-Assisted Xylitol Fermentation

Belachew Zegale Tizazu, Kuldeep Roy and Vijayanand S. Moholkar*
Department of Chemical Engineering
Indian Institute of Technology Guwahati
Guwahati – 781 039, Assam, INDIA

* Author for correspondence. E-mail: vmoholkar@iitg.ac.in

Abstract

This study has investigated ultrasound-assisted xylitol production through fermentation of dilute acid (pentose-rich) hydrolysate of sugarcane bagasse using free cells of *Candida tropicalis*. Sonication of fermentation mixture at optimum conditions was carried out in ultrasound bath (37 kHz and 10% duty cycle). Time profiles of substrate and product in control (mechanical shaking) and test (mechanical shaking + sonication) fermentations were fitted to kinetic model using Genetic Algorithm (GA) optimization. Max. xylitol yield of 0.56 g/g and 0.61 g/g of xylose was achieved in control and test fermentations, respectively. The biomass yield also increased marginally (~17%) with sonication. However, kinetics of fermentation increased drastically (2.5×) with sonication with 2× rise in xylose uptake and utilization by the cells. With comparative analysis of kinetic parameters in control and test experiments, this result was attributed to enhanced permeability of cell membrane that allowed faster diffusion of nutrients, substrates and products across cell membrane, higher enzyme-substrate affinity, dilution of toxic components and reduced inhibition of intracellular enzymes by substrate.

Keywords: Xylitol, Fermentation, Sonication, Cavitation, Flow cytometry, Sugarcane Bagasse

Download English Version:

<https://daneshyari.com/en/article/7702196>

Download Persian Version:

<https://daneshyari.com/article/7702196>

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