

Accepted Manuscript

Review

Ultrasound-assisted biological conversion of biomass and waste materials to biofuels: A review

Zumar M.A. Bundhoo, Romeela Mohee

PII: S1350-4177(17)30329-2

DOI: <http://dx.doi.org/10.1016/j.ultsonch.2017.07.025>

Reference: ULTSON 3780

To appear in: *Ultrasonics Sonochemistry*

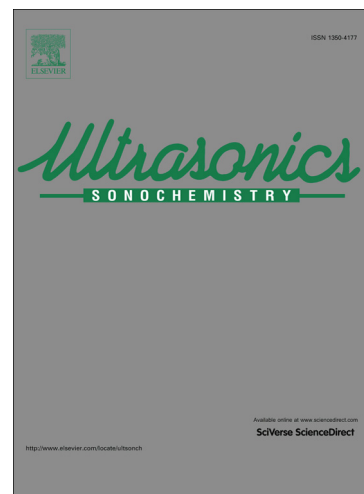
Received Date: 16 April 2017

Revised Date: 16 July 2017

Accepted Date: 17 July 2017

Please cite this article as: Z.M.A. Bundhoo, R. Mohee, Ultrasound-assisted biological conversion of biomass and waste materials to biofuels: A review, *Ultrasonics Sonochemistry* (2017), doi: <http://dx.doi.org/10.1016/j.ultsonch.2017.07.025>

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.



Ultrasound-assisted biological conversion of biomass and waste materials to biofuels: A review

Zumar M.A. Bundhoo*, Romeela Mohee

Department of Chemical & Environmental Engineering, Faculty of Engineering, University of Mauritius, Réduit, Mauritius

Abstract

Ultrasound irradiation has been gaining increasing interests over the years to assist biological conversion of lignocellulosic biomass and waste materials to biofuels. As such, this study reviewed the different effects of sonication on pre-treatment of lignocellulosic biomass and waste materials prior to biofuel production. The mechanisms of ultrasound irradiation as a pre-treatment technique were initially described and the impacts of sonication on disruption of lignocellulosic materials, alteration of the crystalline lattice structure of cellulose molecules, solubilisation of organic matter, reducing sugar production and enzymatic hydrolysis were then reviewed. Subsequently, the influences of ultrasound irradiation on bio-methane, bio-hydrogen and bio-ethanol production were re-evaluated, with most studies reporting enhanced biofuel production from anaerobic digestion or fermentation processes. Nonetheless, despite its positive impacts on biofuel production, sonication was found to be energetically inefficient based on the lab-scale studies reviewed. To conclude, this study reviewed some of the challenges of ultrasound irradiation for enhanced biofuel production while outlining some areas for further research.

Keywords:

Sonication, Ultrasound irradiation, Biofuel, Energy efficiency, Pre-treatment technology, Enzymatic hydrolysis

1. Introduction

Bio-energy has been gaining increasing interests over the years with its contribution for energy production amounting to approximately 10% of global primary energy supply [1]. As a component of bio-energy, biofuels, which can be classified as solid, liquid or gas, can be produced from biological or thermochemical routes from a wide variety of substrates ranging

*Corresponding author. Tel.: +230 59 35 48 73. E-mail address: zumar.bundhoo@gmail.com (M.A.Z. Bundhoo).

Download English Version:

<https://daneshyari.com/en/article/5144419>

Download Persian Version:

<https://daneshyari.com/article/5144419>

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