**Full Paper** 

Registration Code of Publication: 14-39-9-52 Subsection: Physical Chemistry. Publication is available for discussion in the framework of the on-line Internet conference "Butlerov readings". http://butlerov.com/readings/ (English Preprint) Contributed: November 29, 2014.

## Effect of ultrasonic cavitation on reactivity of lignocellulosic substrates during the bioconversion of plant biomass

© Andrey G. Dontsov,<sup>1\*+</sup> Anatoliy P. Karmanov,<sup>1</sup> Lyudmila S. Kocheva,<sup>2</sup> Alexey V. Rudkovskiy,<sup>3</sup> Svetlana A. Kuznetsova,<sup>3,4</sup> and Vladimir V. Volodin<sup>1</sup>

<sup>1</sup> Laboratory of Biochemistry and Biotechnology. Federal State

Institution of Science Institute of Biology, Komi Scientific Center, Ural Branch of the Russian Academy

of Sciences. Kommunisticheskaya St., 28. Syktyvkar, 167982. Komi Republic. Russia.

*Phone:* +7 (8212) 43-68-28. *E-mail: dontsov@ib.komisc.ru* 

<sup>2</sup>Laboratory of Chemistry of Minerals. Federal State Institution of Science Institute of Grology, Komi

Scientific Center, Ural Branch of the Russian Academy of Sciences. Pervomavskaya St., 54.

Syktyvkar, 167982. Komi Republic .Russia. Phone: +7 (8212) 43-68-20. E-mail: lskocheva@geo.komisc.ru Laboratory of Synthesis Processes and Hydrocarbon Conversion. Federal State Institution of Science

Institute of Chemistry and Chemical Technology, Siberian Branch of the Russian Academy of Sciences. Akademgorodok St., 50, block. 24. Krasnoyarsk, 660036. Russia. Phone: +7 (391) 249-54-81.

*E-mail: ksa@icct.ru* 

<sup>4</sup>Laboratory of Analytical and Organic Chemistry. Siberian Federal University. Svobodny Pr., 79. Krasnovarsk, 660040. Russia.

\*Supervising author; <sup>+</sup>Corresponding author

Keywords: bioconversion, lignocellulosic substrates, enzymatic hydrolysis, ultrasonic cavitation.

## Abstract

The use of ultrasound for the pretreatment of lignocellulose substrates in a heterogeneous medium leads to an increase their reactivity during the bioconversion in the sugars using cellulolytic enzymes. Under the influence of ultrasonic cavitation the process proceeds of lignin depolymerization, which facilitates its dissolution at the alkaline extraction stage. Lignin exhibits a protective effect with respect to the amorphous phase of cellulose, that allows to carry out the activation of substrates due to their delignification.