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## **EFFECT OF PRE-TREATMENT AND BIOSURFACTANTS ON THE ENZYMATIC HYDROLYSIS OF LIGNOCELLULOSE**

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### **Abstract**

Reactivity of the natural cellulose containing products is low due to the rough structure of cellulose and lignin content in the plant biomass. It is possible to increase the reactivity of the cellulose containing products by various methods of pretreatment of such substrates. Ecologically safe method of cellulose pre treatment, which comprises the combination of mechanical granulation and freeze explosion, was used in experiment. By using the above mentioned methods, loosening of cellulose structure is achieved as well as partial break down of lignin. The effectiveness of pretreatment based on the final sugar content yield was assessed. By freeze explosion pre treatment of the agricultural waste the degree of the enzymatic hydrolysis has increased by 12-15% on average. In order to intensify the process of hydrolysis, often low- molecular weight compounds are used. The influence of effect of biosurfactants on the synthesis of the cellulases, on their stability and on the process of hydrolysis of the agricultural wastes was studied. Biosurfactants enhance the emulsification of hydrocarbons, have the potential to solubilize hydrocarbon contaminants and increase their availability for microbial degradation. Addition of the biosurfactants (rhamnolipid, trehalose lipid and mixture of biosurfactants 0.1%) to the nutrient medium of the cellulase producing microorganisms resulted in the increase of the cellulases synthesis by about 60%. Direct addition of the biosurfactants to the incubation medium had no effect on cellulase activity, but thermostability has increased by 28%. Biosurfactants action prolongs the process of enzymatic hydrolysis of agricultural waste and glucose productivity by about 20-25%.

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