



International Conference
on Advanced Production and Processing

**2nd International Conference
on Advanced Production and Processing
20th-22nd October 2022
Novi Sad, Serbia**



17:15–18:30	Poster session	
20:00	Gala dinner	
 LECTURE SESSION III 21.10.2022 (Classroom 10, Faculty of Technology Novi Sad) Chairs of the Session: Jelena Pavličević and Jasmin Šuljagić		
10:00–10:15	MC Labor	Sponsor
SDCE-OL4 10:15–10:30	Sándor Beszédes , Zoltán Jákói, Laura Haranghy, Réka Dobozi, Cecilia Hodúr MONITORING OF BIOMASS FERMENTATION EFFICIENCY BY DIELECTRIC MEASUREMENT	Oral presentation
SDCE-OI5 10:30–10:45	Nikolett Sz. Gulyás , Cecilia Hodúr, Eszter Szőke-Trenyik, Balázs Szabó, Szabolcs Kertész APPLICATION OF RESPONSE SURFACE METHODOLOGY TO THE ULTRAFILTRATION OF DAIRY WASTEWATER	Oral presentation
SDCE-OI6 10:45–11:00	Hadid Sukmana , Etelka Tombácz, Gergő Ballai, Gábor Kozma, Zoltán Kónya, Cecilia Hodúr THE ADSORPTION OF CATIONIC DYES FROM AQUEOUS SOLUTION USING HUNGARIAN AND INDONESIAN RICE HUSK	Oral presentation
SDCE-OI7 11:00–11:15	Jelena Kovač , Branislava Nikolovski, Jelena Bajac BIO-OIL MODEL SYSTEM SEPARATION BY VACUUM DISTILLATION: OPTIMIZATION WITH ASPEN PLUS	Oral presentation

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MONITORING OF BIOMASS FERMENTATION EFFICIENCY BY DIELECTRIC MEASUREMENT

Sándor Beszédes, Zoltán Jákó, Laura Haranghy, Réka Dobozi, Cecilia Hodúr

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There are known several biological processes for the utilization of biomass, such as ethanol fermentation or anaerobic digestion. Some of the core challenges of enzymatic hydrolysis and fermentation are the on-line and real-time monitoring of process efficiency, detection of optimum process time and end product inhibition, and predicting end-point of biodegradation processes. Determination of the changes in dielectric behavior of bio-systems is suitable for these purposes, but the applicability of dielectric measurements is not investigated in details in biomass biodegradation and utilization processes.

Our research focuses on the determination of the frequency dependent change of reflection coefficient (Γ), dielectric constant (ϵ') and dielectric loss factor (ϵ'') in the frequency range of 200-2400 MHz during batch enzymatic hydrolysis of cellulosic biomass (using corn cob feeds and grits as substrate for enzymatic degradation by enzyme blend of xylanase and cellulase), lab-scale yeast ethanol fermentation (applying separated and simultaneous saccharification and fermentation process, as well), and lab-scale batch mesophilic anaerobic digestion process (using municipal and food industry originated wastewater sludge as feed).

Our results verified that the decomposing of high molecular weight components, therefore the increment of the concentration of smaller and more polar compounds, furthermore the liberation of ionic components from cell membranes and intracellular space and/or the destruction of extracellular polymeric substance, and the change of binding energy of water molecules to macromolecules (ratio of free to bounded water) have effect on the dielectric behavior of the high water contented suspensions and substrate-enzyme-microorganisms-end/side products contented systems. It can be concluded that the dielectric constant (ϵ') measured at a frequency range of 300-500 MHz was the more sensitive parameter to monitor the biodegradation process and fermentation efficiency of cellulosic biomass and wastewater sludge, as well.

Keywords: Dielectric parameters, Biomass, Fermentation, Anaerobic digestion, Efficiency

Acknowledgements: The research is supported by János Bolyai Research Scholarship of the Hungarian Academy of Sciences (BO/00161/21/4) and UNKP-22-5 (Beszédes S.) New National Excellence Program of the Ministry for Innovation and Technology from the source of the National Research Development and Innovation Fund.