

Past and Present Research Systems of Green Chemistry

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Environmental impact assessment and bio-treatability potential of deep eutectic solvent based on holing chloride

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In the recent years, there has been intensive development of non-hazardous solvents and reaction media, able to replace common organic compounds which are possible aquatic contaminants due to their toxicity, volatility and persistency. As a result, Eutectic Solvents (ES) were introduced. However, they could spread widely by wastewaters and affect large areas in terms of acute and chronic toxicity. Because treatment of waste-water is usually based on biological processes the aim of the presented research focuses on the determination of the impact caused by the addition of selected ES to the aerobic Waste Water Treatment Plant (WWTP). Selected ES is based on choline chloride and malonic acid. Biodegradability of is usually determined using various non-standardized laboratory or pilot-scale long-term tests with activated sludge. First, its toxicity to microorganisms of activated sludge was and expanded also to other species, important for evaluation of environmental impact of selected ES. Then its biodegradability in common environmental conditions was determined to assess its pathways in natural environmental compartments. Then the pilot experiment was started with setting up pilot aerobic WWTP, feed by synthetic municipal wastewater and its efficiency was monitored using several parameters. After steady-state operation of WWTP was achieved, the increasing amount of ES was added in the influent and treatment efficiency was monitored continuously for 77 days. It has been confirmed that although the toxicity of ES to microorganisms was quite high, the impact of the biological treatment plant at the same concentrations was negligible.

Biography

Andreja Zgajnar Gotvajn obtained her PhD in the field of Chemical Engineering in 1998. She is Assistant Professor of Environmental Engineering and head of the Department of Chemical, Biochemical and Environmental engineering. Her research work is focuses on toxicity studies in aquatic compartments, risk assessment and hazard identification of chemicals, waste water treatment: Biological and advanced oxidation processes, etc. She participated in 6 national research projects; she is currently involved in the program Chemical Engineering. She also leads 4 bilateral research projects. In 2011 and 2012 she spent two months as a Visiting Professor and Researcher at Tulane University, School of Public Health & Tropical Medicine New Orleans, USA.

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