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INVESTIGATION OF COMBINED ADSORPTION/OZONATION PROCESSES FOR REMOVAL OF BENZOTHIAZOLES

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Adoption of the Water Framework Directive (Directive 2000/60/EC) provides a policy tool enabling sustainable protection of water resources. The main aim of our research acitivities is to find the most appropriate technique for the removal of priority and relevant substances from water using ozone based reactions, designing controlled oxidation processes and eventually also an ozonation reactor. The aim of this presentation is to summarize the main results of ozone application to degrade BT and 2-MBT from model wastewater with selected ozone based processes (O3, O3/ZEO, O3/GAC). Benzothiazole (BT) and its derivates are widely used, mainly as herbicides and fungicides, anti-fungal drugs, corrosion inhibitors in cooling water, slimicides in the paper and pulp industry and largely as vulcanization accelerators in rubber production. They are toxic and poorly biodegradable. Benzothiazoles (BTs) have been detected in the environment for instance in wastewaters, soils, estuarine sediments, and superficial waters. Our results of ozone utilization for wastewater pretreatment indicates that 99% of BT were removed after 80 minutes of ozonation. Efficiency of BT mineralization was increased three times using the O3/GAC process compared with ozonation only. The 2-MBT removal rate was three times higher than that of BT wastewater. Efficiency of BT removal was lower by 31% in wastewater containing 2-MBT. The results of ozonation of wastewater containing BT and 2-MBT simulating real industrial wastewater prior to the biological treatment indicate the feasibility of this procedure. This work was supported by the Slovak Research and Development Agency under the contract No. APVV-0656-12. The authors would like to thank also for the support from the VEGA Grant 1/0859/14.

Biography

Ján Derco, D.Sc. has Graduated from the Faculty of Chemical and Food Technology, Slovak Technical University (SUT) as M.Sc. in Chemical Engineering. Then he started working at the Department of Environmental Engineering at the same faculty where he has continued his research. Later he obtained his PhD. and D.Sc. graduations from the same University. Presently he is working as Professor at the Institute of Chemical and Environmental Engineering SUT.

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