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ECOTOXICOLOGICAL ASSESSMENT OF ANAEROBIC STABILIZED SEWAGE SLUDGE SUBJECTED TO SANITIZATION TREATMENTS

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Abstract

The aim of our investigations was to assess the potential ecotoxicological effects induced by complex chemical mixtures of anaerobically digested sewage sludge. The sensitivity of monocotyledonae cereal (*Triticum aestivum* L.) test plant to various sanitization treatments of anaerobic stabilized sewage sludge was evaluated. Several biometrical and biochemical response indicators were selected as endpoint in this ecotoxicological tests. Thus, the ecotoxicity of sewage sludge was evaluated through the responses of germination rate, root and stem system growth, the chlorophyll pigments and phenol contents. The sanitization treatments, respectively pasteurization and UVC exposure were applied to sewage sludge according to an experimental design wherein untreated sewage sludge was added as control sample. The results confirmed the increasing of untreated sewage sludge toxicity with the increasing of exposure time. In the case of wheat seeds kept in contact for 6 hours with the sludge treated for 30 minutes at 35°C it was observed an ascending trend of the germination rate responds with the sludge concentration. This involves a decrease of ecotoxicity compared with the one corresponding with untreated sewage sludge. Also, we appreciated a reduced ecotoxicity of low irradiated sludge than that of medium or high heat treatment in terms of germination rate inhibition measured after 14 days from the experiment beginning. By application of a medium UV dose, a low ecotoxicity was also observed, after 12h exposure time. Furthermore, the important role of phenolic compounds that protects the cell structures of the plant from environmental stress was confirmed by Principal Component Analysis.

Key words: ecotoxicity, pasteurization, sewage sludge, statistical analyses, *Triticum aestivum* L., UVC

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