Short communication

Rapid *in vitro* tests to determine the toxicity of raw wastewater and treated sewage effluents

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Abstract

Wastewater consists of a complex mixture of substances. During wastewater treatment these harmful substances can be eliminated or degraded. However, persistent compounds released with the treated sewage effluents enter the environment and pose a risk to animal and human life. To determine the potential risks involved, screening tests are needed to monitor wastewater for potential toxic contaminants. The aim of this study was to validate and use screening tests to determine the toxicity of raw wastewater and treated sewage effluents from 3 sewage treatment plants in the Western Cape, South Africa. Raw wastewater and treated sewage effluents were screened for cytotoxicity using lactate dehydrogenase (LDH) release from cells as biomarker, for neurotoxicity using acetylcholinesterase (AChE) inhibition and for genotoxicity using the Save Our Soul (SOS) test. Results showed no cytotoxicity for both raw wastewater and treated sewage effluents from all sewage treatment plants. Raw wastewater from all sewage treatment plants contained AChE inhibitors and sewage treatment processes were not effective at eliminating these AChE inhibitors. Raw wastewater from all sewage treatment plants tested positive for genotoxicity. Treated sewage effluents from all three sewage treatment plants displayed no genotoxicity indicating effective removal of genotoxins by all three sewage treatment plants investigated.

Keywords: Lactate dehydrogenase, acetylcholinesterase, toxicity, genotoxicity, sewage effluents, biomarker