

P1.52 - IN-VITRO ASSESSMENT OF BIOCIDES EFFECT ON TWO ACTIVATED-SLUDGE FILAMENTOUS BACTERIAL STRAINS

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ABSTRACT

Wastewater treatment is the world largest biotechnology in the world and stands for the defense of public health on one side and the protection of the natural aquatic ecosystems on the other. Activated-sludge process (AS) is the most widely used technique for wastewater treatment. The AS bacterial communities include floc-forming and non-floc-forming organisms, the latter mostly filamentous bacteria. AS goals often fail due to the overgrowth of filamentous bacteria, in a phenomenon known as filamentous bulking. Filamentous bacteria can also lead to the formation of foams compromising the treatment. The in-vitro effect of three biocides - triclosan, cetyl trimethyl ammonium bromide (CTAB), and glutaraldehyde - on two filamentous bacteria of usual occurrence in activate-sludge, *Gordonia amarae* and *Sphaerotillus natans*, was assessed. The XTT reduction assay showed a dose- dependent effect of all the three compounds on bacterial viability. Differences in the susceptibility to the exposure to each biocide also suggested strain-dependent effects. CTAB was the most toxic compound to *G. amarae* and the intermediate toxic when considering the assays with *S. natans*. Regarding the recovery assay (using cytometry), the results showed that both strains had not recovered from it in any of the three cases 48 h after biocide removal. In both strains, filaments were fragmented to single cells and, in the three cases, the ability to produce new filaments was lost at least until 48 h after the biocide removal. Glutaraldehyde was the biocide with the most prolonged toxicity in the case of *N amarae*, but CTAB showed the more pronounced acute effects on both strains. The differences observed in the toxicity effects corroborate the existence of different mechanisms of action of the three biocides and must be taken in consideration when the control of the overgrowth of a particular strain in activated-sludge is being considered.

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