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Relationships between microfauna, filamentous bacteria and environmental conditions in activated-sludge processes in Portugal

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Bacteria, protozoa and small metazoa compose the normal microbial community of activated-sludge. Protozoa play a direct role in reducing by grazing the amount of freely-suspended and loosely-attached bacterial cells. Also, filamentous bacteria, although endangering the performance of wastewater treatment plants (WWTP), should be considered as normal components of the activated-sludge microbial community. Contributions to this field of knowledge are still scarce: very few studies have established reliable relationships between the biological community – protozoa, small metazoan communities and filamentous bacteria – with the WWTP physical-chemical parameters. Correlations between plant performance and the abundance of certain species have been studied, being the Sludge Biotic Index (Madoni, 1994) the best known method to assess the activated-sludge plant performance through the analysis of protozoa and small metazoan communities. The present investigation aims at the identification of the protozoa, small metazoa and filamentous bacteria on 37 activated-sludge Portuguese WWTP operating under different environmental conditions, during one year. Each was studied four times, characterizing the possible causes of malfunctioning. Data based on the prevalence, abundance and distribution of these microorganisms will be presented. Most frequent protozoa were the crawling (CC) and the attached sessile (ASC) ciliates, being *Aspidisca cicada*, *Epistylis* sp. and *Microthorax* sp. the most abundant. The most frequent filamentous bacteria were Type 0041/0675, Type 0092, Type 1851, Nocardioforms, *Microthrix parvicella*, *Nostocoida limicola* II and *Haliscomenobacter hydrossis*; only the former four were found dominant in all samples. Correlations were found to be significantly positive ($p < 0,05$) between *Nostocoida limicola* II and Type 0092 and negative between *Thiothrix* II and *Microthrix parvicella*. Correlations between filamentous bacteria and protozoa were significantly positive ($p < 0,05$) for freely swimming ciliates (FSC)/Type 0092 and for flagellates (F)/*Thiothrix* II. Negative correlations were found for FSC and *Microthrix parvicella*, F and Nocardioforms.

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