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Influence of the sewage composition in the development of the microfauna in a bench-scale activated-sludge system.**João Carlos Silva¹, Vânia Ferreira¹, Isabel Mina², Ana Nicolau¹**¹Centre of Biological Engineering, University of Minho, Braga, Portugal; ²Department of Biology, University of Minho, Braga, Portugal

In an activated-sludge system, the efficiency of the wastewater treatment depends on the activity of the microorganisms inhabiting this artificial ecosystem. On the other hand, the microbial communities are largely determined by the physical-chemical and the operation conditions prevailing in the plant. The composition of the influent water is a non-negligible factor to take in account when operating a wastewater treatment plant (WWTP). Some industrial wastes promote the growth of particular bacteria, while easy degradable substrates and low organic contents are said to favour the filamentous microorganisms, altering the floc-forming to filamentous balance, thus endangering the performance of the system. However, only few data like these exist about the eukaryotic populations. The present work aimed at studying the development of the prokaryotic and eukaryotic populations and the plant performance of two bench-scale WWTP, comprising a bioreactor and a decanter, in a series of assays using different types of artificial sewage. These included glucose, peptone, a complex sewage of acetate, milk powder, urea and sucrose and finally a mixture of acetate and trace elements, the two latter with two different flow rates. Monitoring of the WWTP overall performance was performed through the determination of Chemical Oxygen Demand (COD), Total and Volatile Suspended Solids (TSS and VSS) and Biochemical Oxygen Demand (BOD₅). The microbial communities, comprising Protozoa, metazoa and Filamentous Bacteria were monitored by microscopic analysis. Significant differences were observed in the performance of the WWTP concerning solids and organic matter removal efficiencies. Microscopic analysis also revealed the presence of different of protozoa and metazoan populations in the aerated tanks. Among the most common protozoa were *Arcella sp.*, *Aspidisca sp.* and *Vorticella sp.* *Drepanomonas sp.* was identified only in the WWTP fed with glucose and *Spathidium sp.* when peptone was used. Concerning filamentous bacteria, *Beggiatoa spp.* was the dominant *taxon* in the system fed with glucose, but when the systems were fed with peptone or with the complex mixture, *Sphaerotilus natans* dominated. Acetate plus trace elements favoured the co-dominance of *Sphaerotilus natans*, 021N Type and *Nostocoida limicola I*. The results add important information to the knowledge of how the composition of the sewage determines the microbiological communities in activated-sludge systems.