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New insights on the roles of bacteria and protozoa in activated-sludge processes

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Wastewater treatment is one of the most important biotechnological processes in the world. Nevertheless, the highly complex microbial communities in wastewater treatment plants (WWTP) are barely understood, remaining, most of the time, as a “black box”. Even though many microbiological methods are available to study the activated-sludge communities, many recent questions on the role of a significant number of microorganisms are kept unanswered. The current model and design concepts of activated-sludge consider bacteria as the sole active biomass. The activities of all other microbial community members (protozoa, metazoa, phages, etc.) are hidden in a simple decay process responsible for the reduction of active biomass and there is an assumed difficulty in establishing the way of how the interactions between the bacterial and the eukaryotic populations can affect the performance of the treatment system.

PROTOFILWW project (PTDC/AMB/68393/2006) aimed at the study of 37 WWTP during 2 years, allowing for the identification of the little metazoa, protozoa and filamentous bacteria in 296 samples and enabling the correlation of these communities with physical-chemical and operational parameters. Furthermore, several studies on related subjects were and are being carried on to enlighten the roles of the different organisms in the depurating process, on how they interact with each other and on methods to identify certain filamentous and floc-forming bacteria with relevant functions in these artificial ecosystems. Simultaneously, a web-based platform was conceived to ensure the dissemination of knowledge and the communication of results between the project team and the WWTP technicians and managers.