

The diversity of eukaryotic organisms of activated sludge

Pliashecznyk¹ V., Kuzmina² T., Babko³ R.

¹ Uzhhorod National University, Ukraine;

² Sumy State University, Ukraine;

³ Schmalhausen Institute of Zoology NAS of Ukraine, Ukraine

Activated sludge is one of the most studied to date ecological systems of artificial origin. At the same time, activated sludge is the most energetically dependent artificial system. This system is most similar to the laboratory continuous cultures, but unlike the latter is implemented on an industrial scale. Because of limited living space in the laboratory cannot maintain multicomponent cultures, while the scale of treatment facilities (aeration tanks) supported multi-species composition of organisms reaching densities comparable to those in the cultures. The most common components in the composition of the activated sludge are ciliated protozoa. Among other protozoa in activated sludge naked and testate amoebae are usual. Multicellular eukaryotes presented by rotifers, nematodes, and rarely tardigrades. Except for the ciliated protozoa, organisms of the activated sludge are bacteriophages, and only in the assemblage of ciliates, a substantial proportion is predatory species. Ciliated protozoa is the most diverse group represented in the activated sludge and at the same time the most numerous and such that consume a significant part of the bacterial production. The number of species of ciliated protozoa as a rule many times more than the other species of hydrobionts present. Furthermore, ciliated protozoan species usually predominate not only in number, but also in achieving significant population densities and biomass.

There are various estimates of species diversity of ciliated protozoa in activated sludge of wastewater treatment plants around the world. Nevertheless, despite these differences, we safely can say that the number of ciliated protozoan species exceeds 300. Analysis of the literature and our research has shown that in the running stably treatment plant most usual number of species in one-time sample varies from 20 to 30. The reduction or increase in the number of species detected typically associated with instability in the work of sewage treatment plants and appearance in aeration tanks conditions extending spectrum of ecological niches. The extension of the species composition in most cases is the result of incorporating of atypical species into the structure of the activated sludge assemblage.