

PS2: 64

Use of an aerobic selector to overcome filamentous bulking in activated sludge

Vânia Ferreira, Catarina Martins, Maria Olívia Pereira, Ana Nicolau

Universidade do Minho, Portugal

Secondary biological treatment of wastewater is a complex process and one of the most important steps to ensure the quality of the final effluent in activated sludge plants. In activated sludge systems, the performance of the process largely depends on the balance between filamentous and floc-forming bacteria. When the normal balance of the community is disturbed, filamentous bacteria tend to proliferate, causing various problems. Bulking and foaming phenomena are the major problems referred usually resulting in poor sedimentation of sludge and low quality final effluents. The application of selector reactor technology has become one of the promoted methods for the control of filamentous proliferation, enhancing sludge settle ability in activated sludge systems. The main objective of this research was the use of an aerobic selector to improve the performance of an urban wastewater treatment plant (WWTP), located in North of Portugal with two different parallel lines of treatment during four months. This WWTP receive domestic wastewater with irregular industrial discharges. The evaluation was accomplished through the observation of the diversity and abundance of filamentous microorganisms and the correlations between biological and physical-chemical and operational parameters. This WWTP was followed with recurrent episodes of filamentous bulking caused by *Sphaerotilus natans* and eventual occurrences of Nocardioforms and Type 1863. An aerobic selector was introduced in both lines in the beginning of the studied period, suppressed in one of the lines during 6 weeks, and then put into operation again until the end of the study. A total of 14 filamentous bacteria morphotypes were identified. The results show that the aerobic biological selector in continuous operation prevented the overgrowth of the filamentous Type 1863, of Nocardioforms and, in particular, of *Sphaerotilus natans*. Simultaneously, it allowed to lowering the oxygen levels in the aeration tanks without negative consequences in the overall performance of the WWTP, namely bulking occurrence. In this way, a significant energy save was allowed, even considering the aeration of the selector. The results are more relevant if one considers the fact that the main cause of the bulking problems in this WWTP was the overgrowth of *Sphaerotilus natans*, a filamentous bacterium known to be stimulated by low dissolved oxygen (DO) levels.