
MICROBIOLOGICAL MONITORING OF INFLUENT AND EFFLUENT OF AN WASTEWATER TREATMENT PLANT - TREATMENT EFFICIENCY -

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ABSTRACT

The knowledge of wastewater microbiology is of major importance, not only to understand the processes involved but also to control the efficiency of the treatment systems and the sanitary quality of the effluents. The aim of this study was to assess, in time and space, the evolution of microbial populations' density and biochemical parameters of the main system of wastewater treatment of Braga –“ETAR de Frossos”. The efficiency of the activated sludge process was evaluated, by determining the reduction of the microbial populations and biochemical parameters values from influent samples to the effluent ones. Along the experimental period the chosen sampling points were: two in the wastewater treatment plant - WTP (influent and effluent) and three in the watercourse where the WTP effluent is discharge (confluence of “ribeira de Panoias/rio Torto”). The efficiency of the culture media used to recover and enumerate CFU/mL of selected groups of microorganisms was also evaluated. These groups, selected either for its degradation capacities or for its pathogenic potential, were: (i) total heterotrophs, (ii) total coliforms and *E. coli* and (iii) pseudomonas and aeromonas. The evolution pattern of microbial populations was similar between heterotrophs and pseudomonas/aeromonas, whose densities were higher in the hottest months, particularly in the two sampling points more distant from the dump point of the WTP, although the coliform populations exhibited a relatively uniform pattern. These data suggest a proliferation of opportunistic bacteria after wastewater treatment. The capacity of the different solid media tested to recover the CFU/mL of the chosen microbial groups was very different: the R2A medium was, generally, more efficient in the recovery of heterotrophs than PCA medium; the CCA medium seemed to be more efficient in coliforms recovery than McC medium and in PIA medium the recovery and enumeration of pseudomonas was more advantageous and precise. The good efficiency of the WTP was evaluated by comparative analysis of the microbial data with the physical, chemical and biochemical parameters (routine analyses in the WTP laboratory). However, the microbial population densities were not significantly correlated with the biochemical parameters, in agreement with the BOD₅ and COD limitations referred by many authors.

Besides its contribution for the knowledge of the microbial biocenosis of Braga's activated sludge WTP – “ETAR de Frossos” and of the effluent's water, this work showed a set of experimental evidences suggesting the necessity of monitoring microbial populations of WTP. These groups of microbial populations seemed to be important tools to improve the control and efficiency of WTP, accounting for the ecological state of the receiving waters and public health preservation.