

ABSTRACT

INFLUENCES OF PHYSICIST STATE OF ORGANIC MATTER IN THE EFFICIENCY OF CONSTRUCTED WETLANDS OF SUBSURFACE FLOW

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The constructed wetlands of subsurface flow are natural systems used for the residual water treatment. Their principals components are a gravel bed, emergent plants and residual water; this last is not exposed to the environment but circulates through the gravel without arising to the surface. Its operation basically consists in the formation of one biofilm adhered to the gravel that biochemically degrades the polluting agents that the residual water brings. Nevertheless there is other physical processes us such the particle retention by the media granular.

In this study the influence of the physical state of the organic matter in the efficiency of these wetlands is evaluated. For such aim, they were constructed two models of wetlands in laboratory with a surface of 0.5 m² each one, operating with discontinuous flow. Their main elements, æ to say, gravel and plants, were engaged of the constructed wetlands of subsurface flow that are in the Can Suquet housing, located in Les Franqueses del Vallés (Barcelona, north-east Spain). Respect to the environmental conditions of illumination a structure of artificial light was constructed and regulated to simulate the day and the night. The wetlands were fed with synthetic residual waters, one of them with organic matter in particulate state, using starch, and the other with dissolved organic matter, using glucose. Thus each wetland treated exclusively a type of residual water and equal concentration of contaminants.

The experimental was centered in the daily analysis of the influents and effluents, by means of the measurement of the turbidity, transmittance, conductivity, ammonium and chemical oxygen demand, during approximately two months. By means of the obtained results was determined the efficiency of each model, a comparison took place according to the physical state of the organic matter and was evaluated the influence of this state in the yield of wetlands. The elimination of organic matter was of 76% and ammonium of 27% in the glucose wetland, and the other hand the starch wetland registered an elimination of 69% of organic matter and a 34% of ammonium. The previous percentage allow to conclude that the residual water treatment with particulate organic matter has minors purification yields because must undergo greater changes in its physical and chemical state to manage to be degraded by biofilm.

Therefore, according to the results, if it is required to increase the yields of elimination of contaminants, is suggested to make a process previous to the wetlands that remove particles of the residual water, us can be a system of coagulation-flocculation with organic coagulants that do not alter the biochemical processes in the wetland.