

## Calibration of a Simplified Model Describing an Urban Waste Water Treatment Pilot Plant based on N/D and BEPR Criteria

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**Keywords:** *Modelling, monitoring, N/D, BEPR*

A simplified model of the IAWQ Activated Sludge Model No. 2 (ASM2) [1] has been developed and calibrated. In order to use models for applications in real-time parameter identification or retrofit of existing municipal waste water facilities modifications to the ASM2 are necessary to minimise the complexity of the model and the number of parameters involved.

The model has been applied to a municipal waste water treatment pilot plant with an A<sup>2</sup>/O multistage process treating 500 liters per day of a complex synthetic waste water. The A<sup>2</sup>/O process allows for biological organic matter, nitrogen and phosphorus removal. This fully automated pilot plant is equipped with in-line sensors (pH, T, DO and ORP) and on-line analyzers for ammonium, nitrite, nitrate and phosphate allowing process monitoring. Ammonium is analyzed through a commercially available continuous flow analyzer (CFA). A FIA analyzer is used in order to determinate phosphate, and another for simultaneous nitrate and nitrite analysis [2]. All the elements of the plant (pumps, valves, stirrers,...) and analyzers are computer controlled and a data acquisition system has been implemented.

Data obtained from batch and continuous operation experiments and simulations with MATLAB have been used for calibrate the modified model. The main differences between this model and the ASM2 are the state variables chosen and the processes considered, reducing significantly the number of parameters to be identified. With reference to this, just two COD fractions (slowly and readily soluble biodegradable organic matter) have been considered instead of the five different COD fractions considered in the ASM2. Phosphorous accumulating organisms (PAO) are not considered in the modified model because they are heterotrophs, so heterotrophic and autotrophic biomass are sufficient to describe the processes involved.

This model still has to be validated but good results have been obtained in comparison with simulations done using the ASM2.

*Acknowledgements: The Fundação Calouste Gulbenkian provided financial support for E.C. Ferreira through a post-doctoral research grant.*

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