

Technologies on Resource Efficiency:

Anammox Control Strategy

First results:

For the demonstration in Sweden (IVL), the pilot plant is currently in demonstration and operated based on an experimental plan with different combinations of pH, redox and nitrogen load levels, in order to locate the optimal operation condition for the partial nitrification/anammox process. The experimental plan is divided into ten different operational periods whereas the pilot plant is currently (April 2016) operated according to the settings in the ninth period. The final evaluation of the experiments will be carried out before summer of 2016.

For the demonstration in Belgium (Aquafin), the pilot plant has been as well upgraded with needed sensors and other equipment needed for a different control strategy. The pilot plant has been relocated in the meanwhile as to choose more favorable influent water. Testing is ongoing. A nitrite and an ammonia analyzer are now being used to optimize aerated vs. non-aerated times, with pH as an early warning for possible biomass preservation.

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OptimEDAR

First results:

OptimEDAR was installed in Empuriabrava in March 2015, and it has been integrated in the plant control system. The control of the blowers of the plant was switched to the OptimEDAR unit October 2015. The first operational results point out improvements of the energy consumption in the aeration and the denitrification process, particularly after the peak flows because of the Easter holidays. A second testing phase is foreseen, to verify up to which point could be improved the phosphorus removal.

The second OptimEDAR unit was installed in Wijer (BE) in November 2015. The objective in this plant is the phosphorous removal. There is a new challenge in Wijer because of the different behavior due to dilution. First promising results are achieved, having good results both carbon removal and nitrogen removal. After some fine tuning the phosphorus removal is foreseen.

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Microbubbles

First results:

The use of fluidic oscillation to generate microbubbles showed improved oxygen transfer in clean water but those results have not been repeated in mixed liquor. Perlemax intends to use a combined oscillator and diffuser for the next round of tests. Use of fluidic oscillation in Anaerobic Digestion has shown that microbubbles do increase the amount of methane produced.

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Model based predictive control

First results:

The dynamic process model has been implemented in order to validate process model and to act as a basis for the MPC-simplified model. The control structure has been decided and first set of manipulated and controlled variable has been specified.

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Model-based energy audits in water resource recovery facilities

First results:

Both institutions, ICRA and Aquafin, have proceeded setting up a common methodology for the calibration of a complex modelling exercise. The chosen exercise involves the model description of an integrated water and sludge line of two full scale treatment plants. In both cases, the calibration results have come to a fit for the results of the water line, while work has still to be devoted on the modelling of the sludge line. The models will then be used to advise on possible energy saving strategies.

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