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Case Study - Malatech Bioaugmentation

Municipal Wastewater Treatment Plant of a city and its suburbs

Q = 40 000 m3/d

Goals of bioaugmentation: The facility is outdated, it only has aerobic reactors after primary clarification, and not equipped with Bio-P, and anoxic reactors. Authorities lowered the limit for effluent Total Nitrogen, which caused a headache for the operator. Besides, they wanted to decrease OPEX for sludge dewatering, transportation, disposal, as well as energy costs. Since Bioclean TM is very strong in improving Total Nitrogen removal even without anoxic zones, and our bioaugmentation naturally lowers the targeted OPEX, Bioclean TM treatment seemed a logical step.

Author: Malatech Water, Ltd.

Title: Municipal Wastewater Treatment Plant Optimization

Layout

Aerobic tanks with primary clarifier.

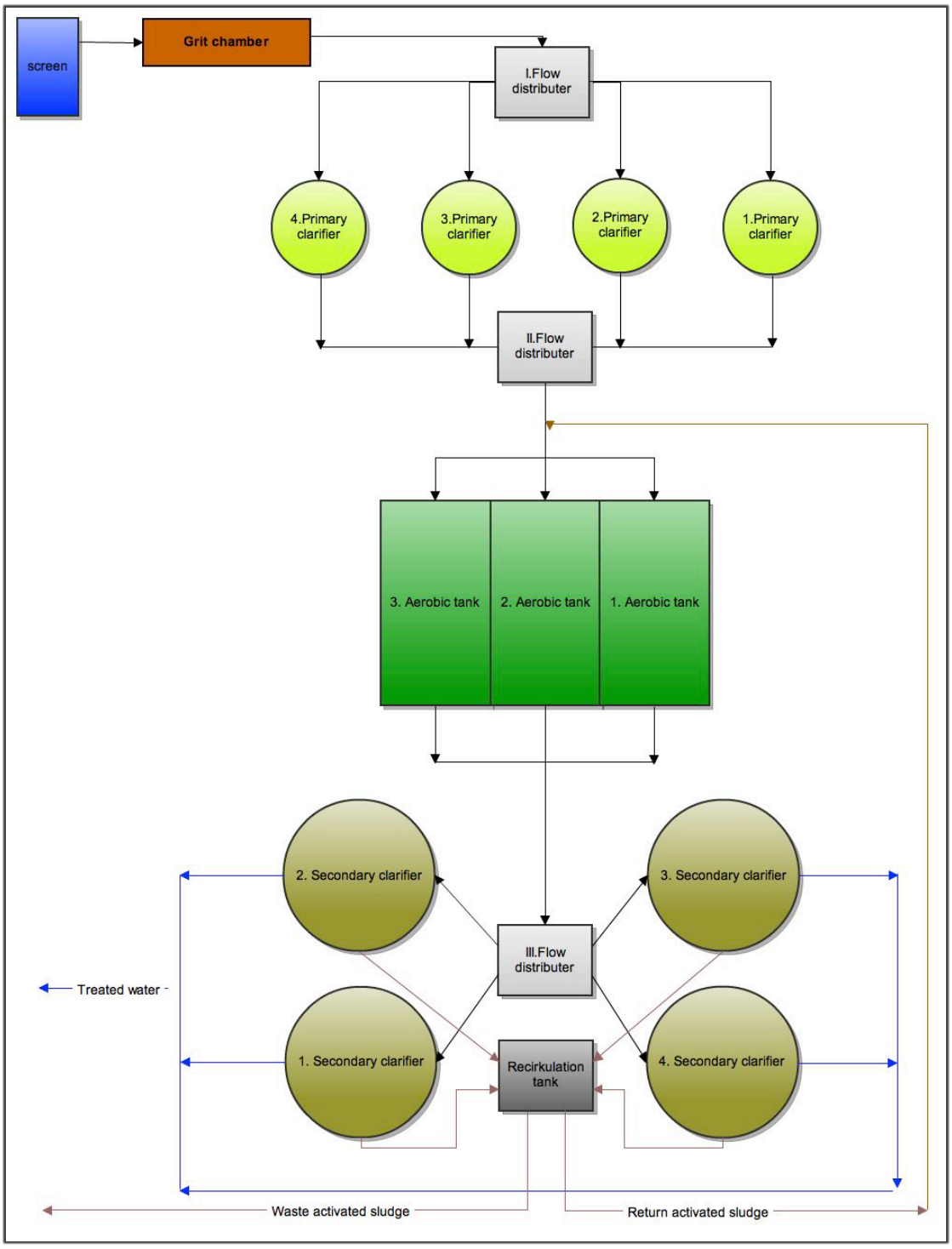

Figure 1 – Layout

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Application used:

In order to improve the treatment efficiency **Bioclean TM** has been applied in a shock dose of 50 kg/day in the first week subsequently reduced to 8 kg/day in 3 weeks which has remained the maintenance dosage.

Main goals:

1) Reduction of dewatered excess sludge quantity

2) Reduction of energy consumption of the biology

3) Effluent quality improvement to eliminate discharge limit violations (COD,TN, TP)

Sludge production

The **average quantity of dewatered sludge was 2234 m^3/month before** the biotechnological optimization. **After the startup phase the average amount has been reduced significantly to 1851 m^3/month** which was due to the significant reduction of excess sludge removal rate since our treatment has had no influence on the raw sludge removed from the primary clarifiers.

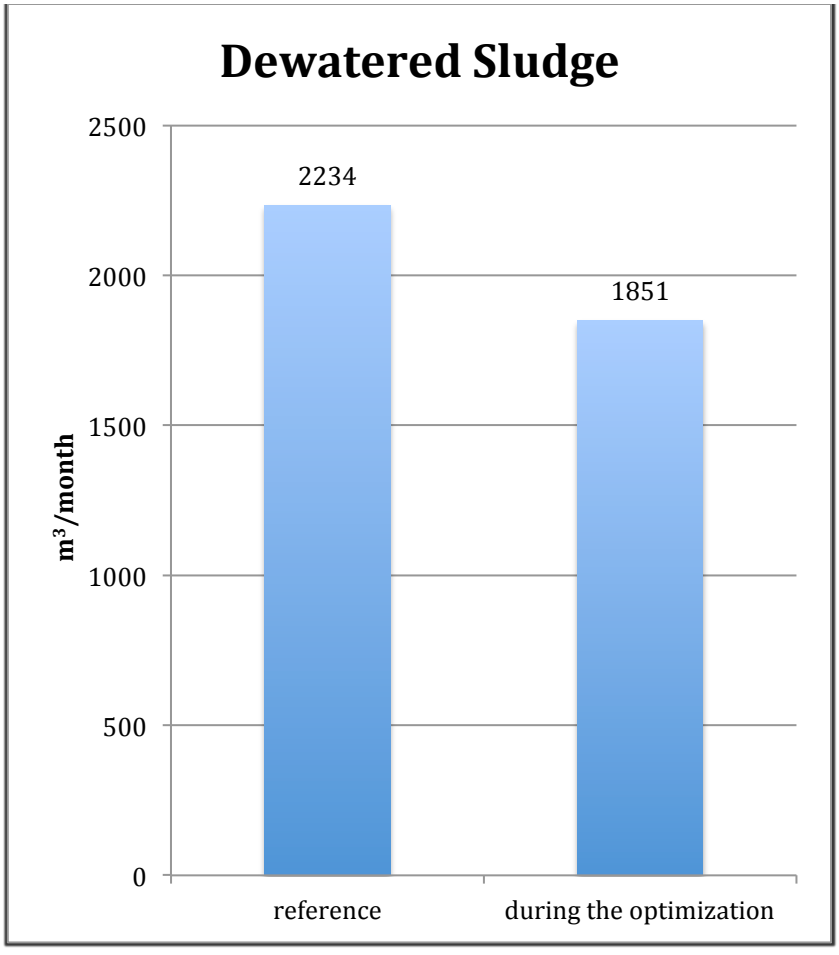

Figure 2 – Monthly quantity of the dewatered sludge

Energy consumption

Due to the **Bioclean TM** optimization we were able to decrease the energy consumption by enhancing DO utilization within the activated sludge bulk. Lower average operating frequency of the blowers resulted a significant drop in the energy consumption of the entire plant **(the entire energy consumption of the plant has decreased by 18% while the COD breakdown and nitrification has significantly improved.**

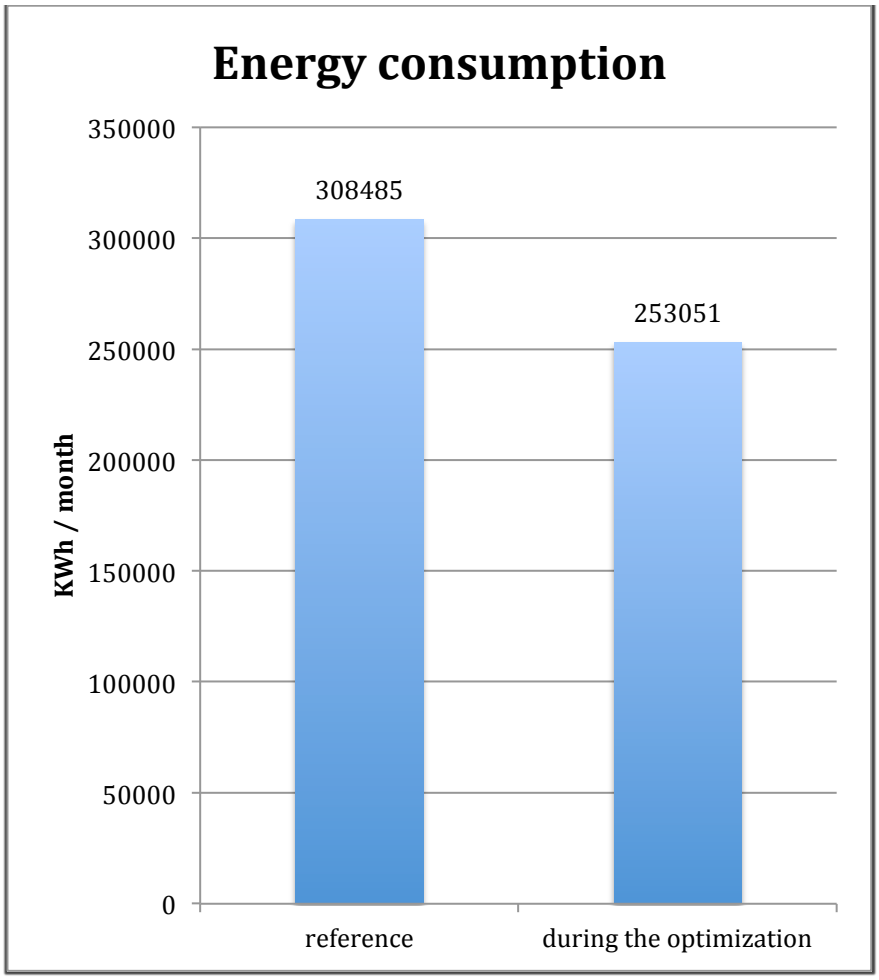

Figure 3 – Average monthly energy consumption

Effluent Parameters

The plant has only aerobic reactors, the biological nitrogen removal step is not installed. In order to improve the Nitrogen removal removal rate, we counted on Bioclean TM's exceptional ability in SND (simultaneous nitrification-denitrification). By dosing the **Bioclean TM** the size of flocs has been improved for the intrafloc denitrification, besides **our microbial strains started the SND process, which further decreased effluent Total Nitrogen, and stabilized it at a significantly lower level than before, constantly below the authority limit.**

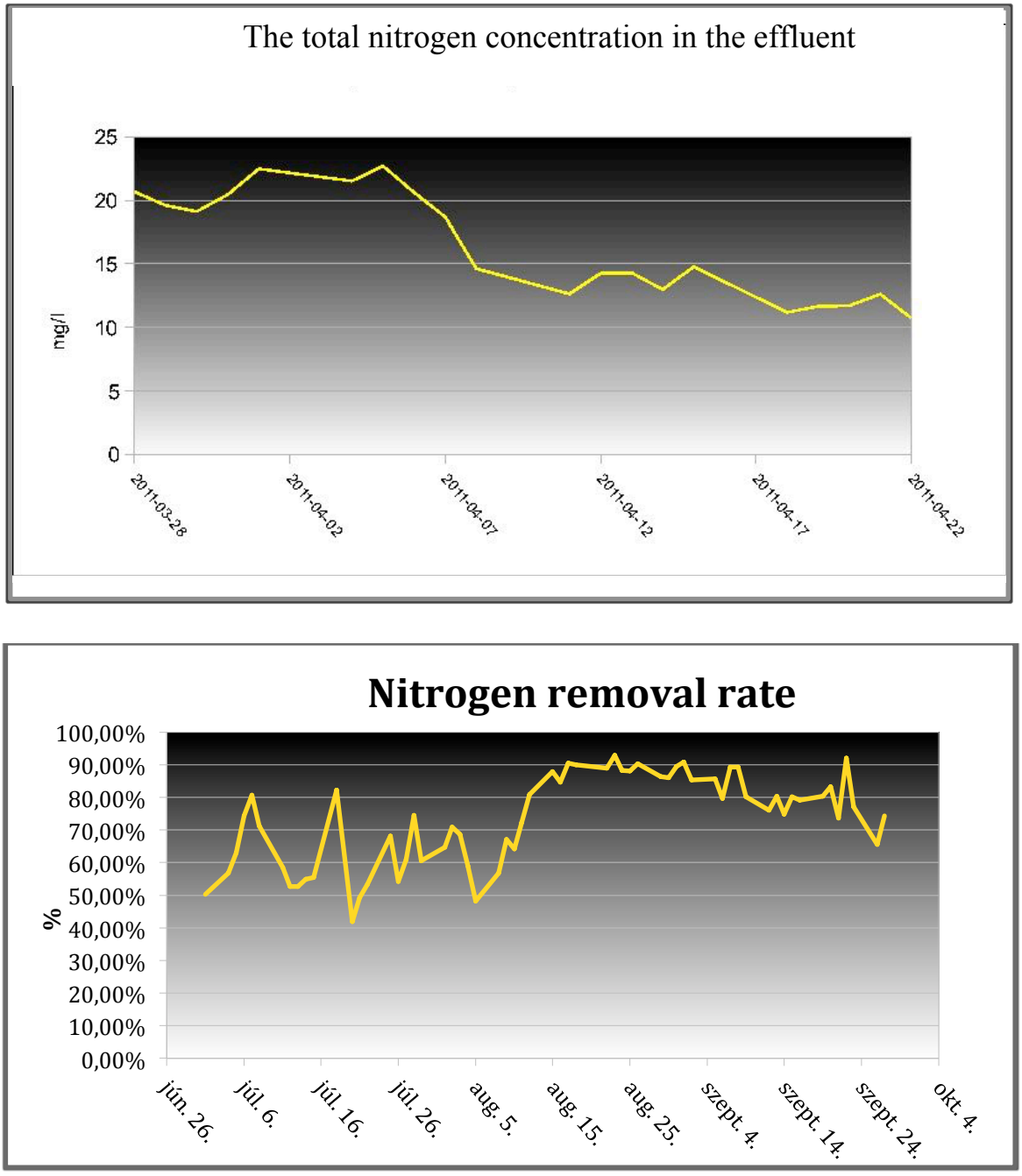

Figure 4 – The improvement of nitrogen removal

The plant is not equipped with anaerobic reactors and chemical phosphorus removal is also not applied. **Bioclean TM** has enhanced the utilization rate of phosphorus. After the dosing, the phosphorus build-in rate within the bacteria has significantly improved as well as the effluent TP levels.

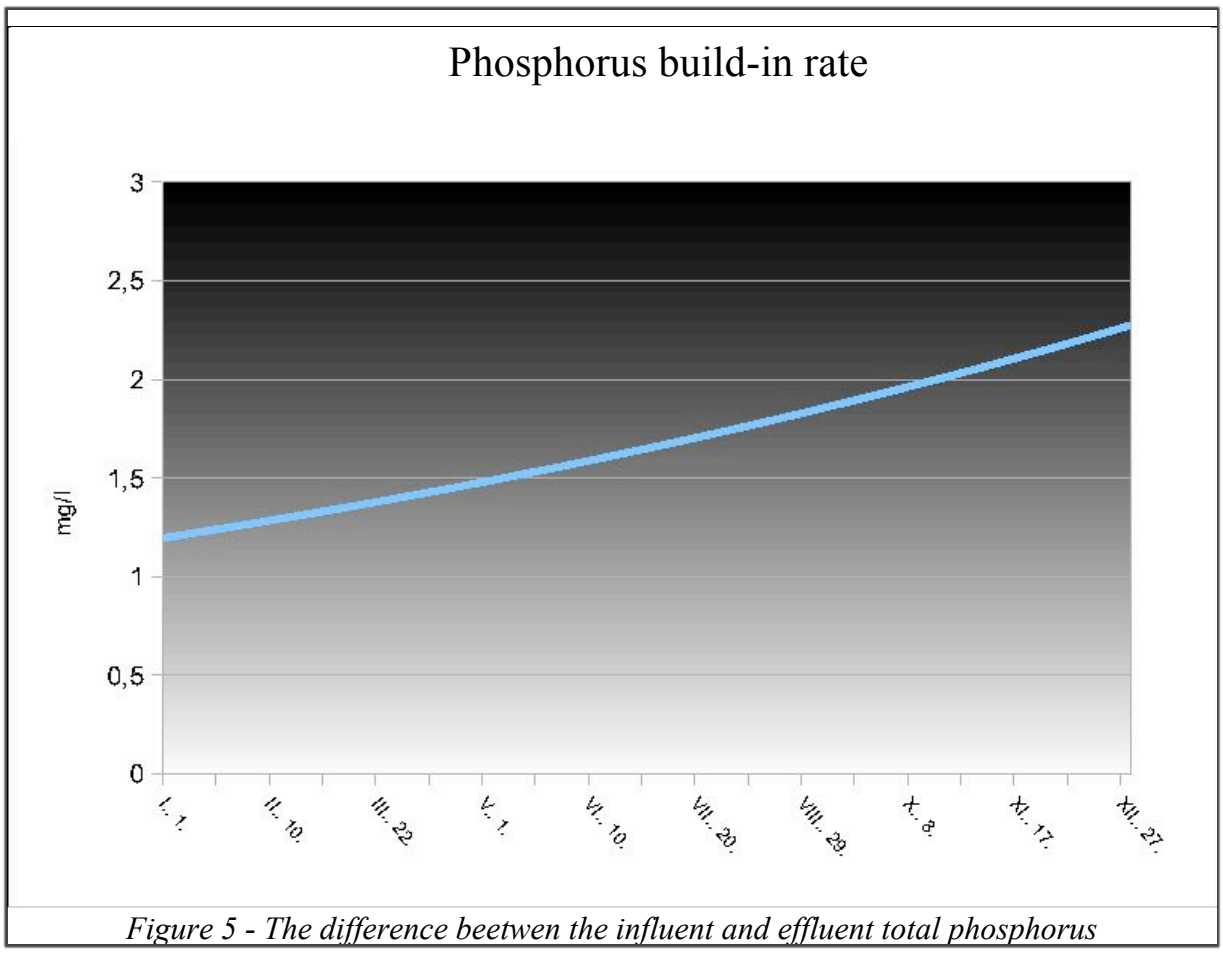

Figure 5 - The difference beetwen the influent and effluent total phosphorus

The quality of the effluent water has improved due to a more efficient organic matter removal and more stable nitrification, the fluctuation of the parameters has been reduced as well. The operation of the secondary clarifiers got stable by the floc structure's improvement, which also reduced the suspended solids content of the effluent water.