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Case Study - Malatech Bioaugmentation

Municipal Wastewater Treatment Plant of a town

Q = 2 000 m3/d

Goals of bioaugmentation: The WWTP was established in 1974, 6 oxidation ditches with rotors for aeration and mixing. The town has not received money yet for building a new plant. The ditches, and the secondary Dorr clarifiers are well-designed for the cumulative load it receives, which means organic breakdown, and nitrification are carried out perfectly, while Phosphorus is removed by chemical treatment. The operator wanted to reduce OPEX on sludge dewatering, transportation, and disposal. Bioclean TM has a massive impact on excess sludge production in obligate aerobic systems, so we expected a significant reduction in excess sludge production. Since the WWTP had 6 oxidation ditches in operation, 4 equally sized, and 2 smaller, we aimed to increase the biological treatment capacity of the activated sludge to an extent where the 2 smaller ditches can be shut down without adverse effect on effluent parameters. This could mean a significant reduction in energy consumption as well.

Author: Malatech Water, Ltd.

Title: Municipal Wastewater Treatment Plant Optimization

Layout

Plant with 6 oxidation ditches in parallel, without primary clarifier.

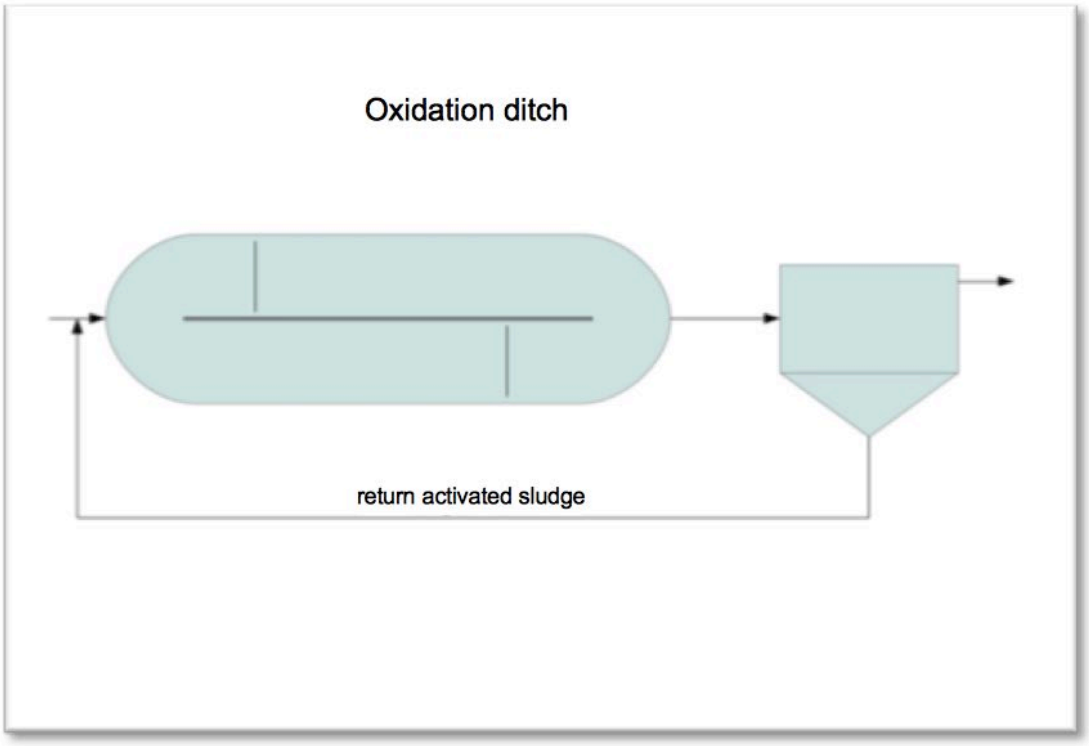

Figure 1 - Shematic diagram

Application used:

In order to improve the treatment efficiency **Bioclean TM** has been applied in a shock dose of 11 kg/day in the first week subsequently reduced to 1.5 kg/day in 5 weeks which has remained the maintenance dosage.

Main goals:

1) Reduction of the excess sludge quantity

2) Increase the treatment capacity of the activated sludge for being able to shut down 2 smaller ditches and reduce the overall energy consumption of the WWTP.

Sludge production

The **average quantity of waste activated sludge (WAS) before the biotechnological optimization was 120 m^3/day**. During the optimization process this amount has been significantly decreased, the average value of WAS **after the starting phase has been reduced to 50 m^3/day without a significant increase in the WAS MLSS concentration**. The plant does not have a primary clarifier, therefore the degradation of the particulate organic matter contributed to the decrease of the produced sludge's quantity. The operating MLSS concentration has been untouched keeping it around 4 200 mg/l.

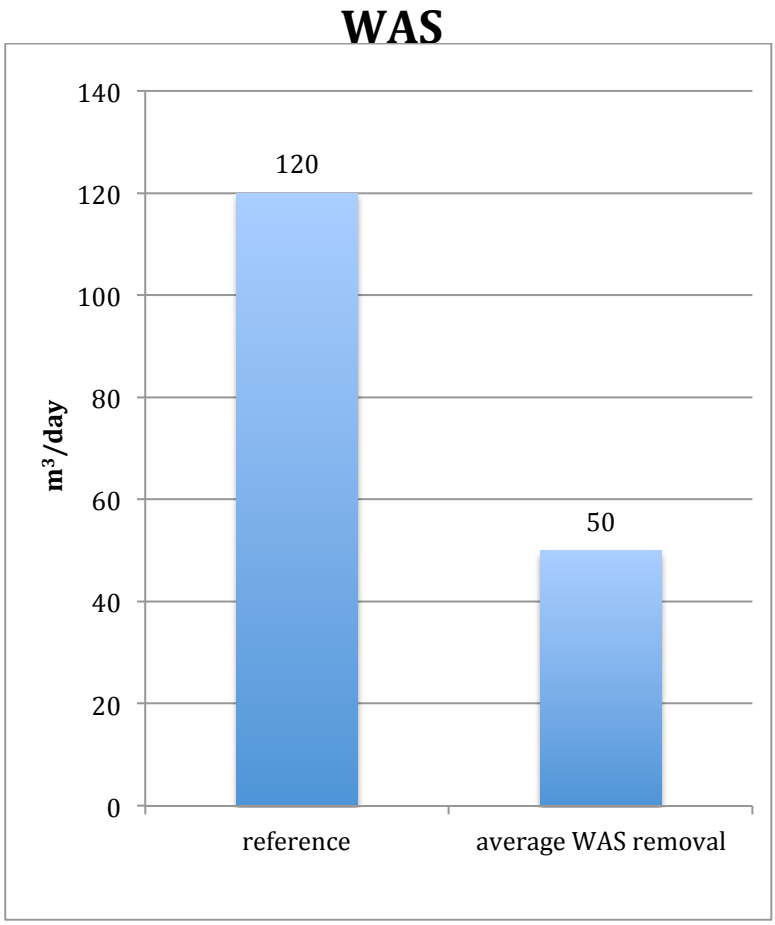

Figure 2 – Daily quantity of the waste activated sludge

Energy consumption

The plant operated with 6 oxidation ditches before the biotechnological optimization, and due to the Bioclean TM treatment 2 ditches have been shut down. Therefore, **the average power consumption has been decreased by 12%.**

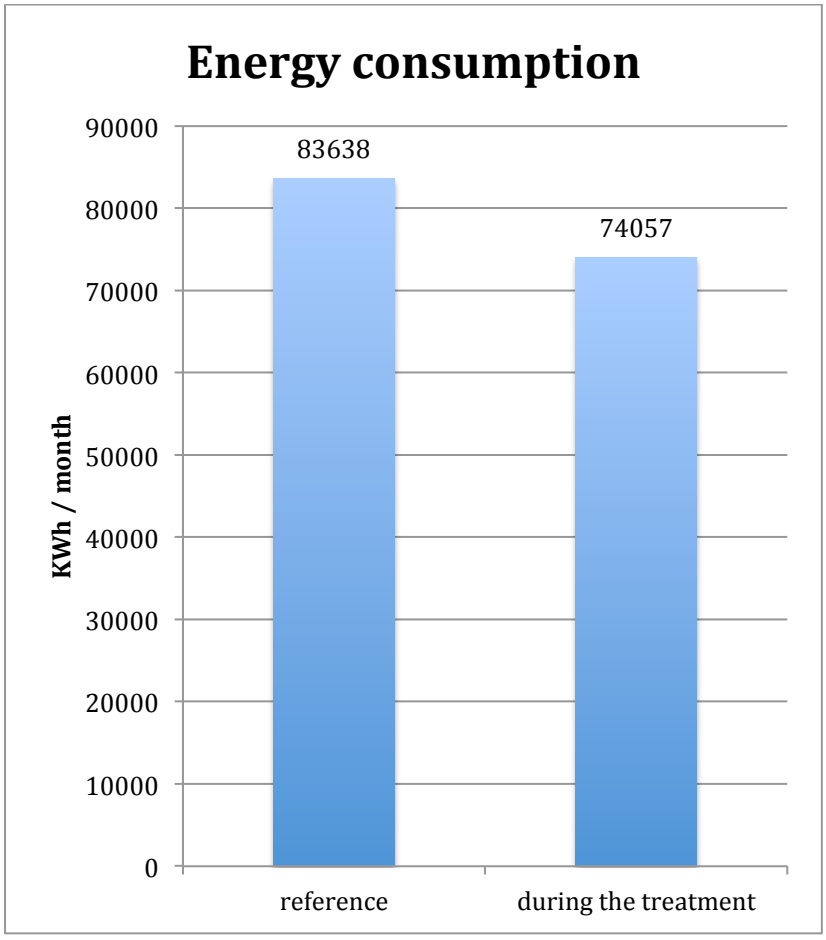

Figure 3 – Average monthly energy consumption

Polyelectrolyte Consumption

The quantity of the polyelectrolyte used for dewatering the sludge **has been reduced from 50 kg/month to 13 kg/month.**

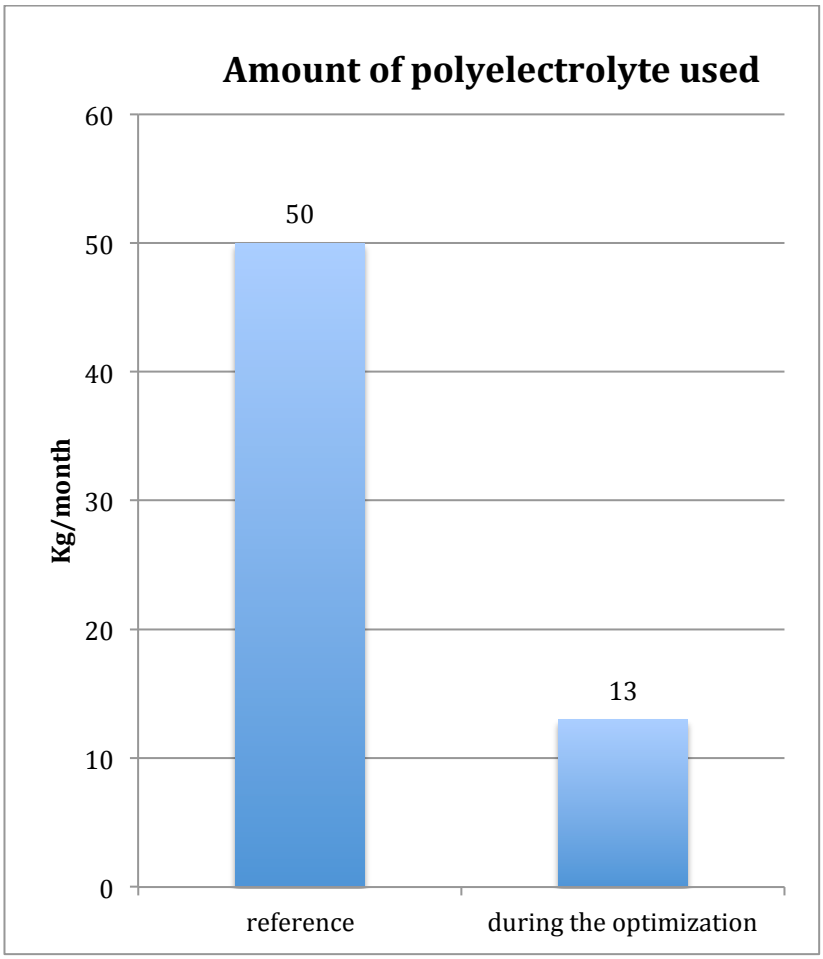

Figure 4 – Quantity of monthly used polyelectrolyte

Effluent parameters

The quality of the treated water has improved due to the enhanced removal of organic matter and to the stable nitrification; the fluctuation of the parameters have become moderated. The operation of the secondary clarifier has been stabilized due to the improvement of the floc structure, which has decreased the suspended solids in the effluent.