

Case Study - Malatech Bioaugmentation

1 300 m³/d Pharmaceutical MBR Wastewater Treatment Plant

Goals of bioaugmentation:

The industry releases its treated effluent to a municipal wastewater canalization system of a city. Due to a massive cumulative overload, and numerous inhibitory, and toxic organic substances present in the pre-treated wastewater, the factory barely could keep effluent COD below 1 000 mg/l, and NH₄-N below 100 mg/l, which are the limits set by the local municipal sewage system operator. Operator aimed to eliminate payment of fines, increase the resistance, and tolerance of the biology towards inhibitory substances, and start the effective biodegradation of these organic substances

Photo is not available for this WWTP

Author: Malatech Water Ltd.

Title: Pharmaceutical industrial wastewater treatment plant optimization

The client is an international company, among the world leaders in the pharmaceutical industry.

The plant is modern, well-equipped. After a physicochemical pre-treatment the raw wastewater enters the anoxic-aerobic MBR system. Activated sludge is kept between 12 000 - 13 000 mg/l concentration (MLSS). From the UF membrane tanks there is a recirculation line into the anoxic zone. The entire installation is covered, and the gases coming from the reactor are driven through a biofilter, since the factory is located in the middle of the city.

The entire MBR system has been designed to treat the wastewater for the canalization limits only (COD lower than 1 000 mg/l, NH₄-N lower than 100 mg/l, TN lower than 150 mg/l). Such designs barely work well in real life conditions because of microbial reasons. In this case the inlet pre-treated COD concentration is between 11 000 - 18 000 mg/l respectively, while NH₄-N varies between 190-500 mg/l. The plant's biology is forced to operate at conditions of continuous overload.

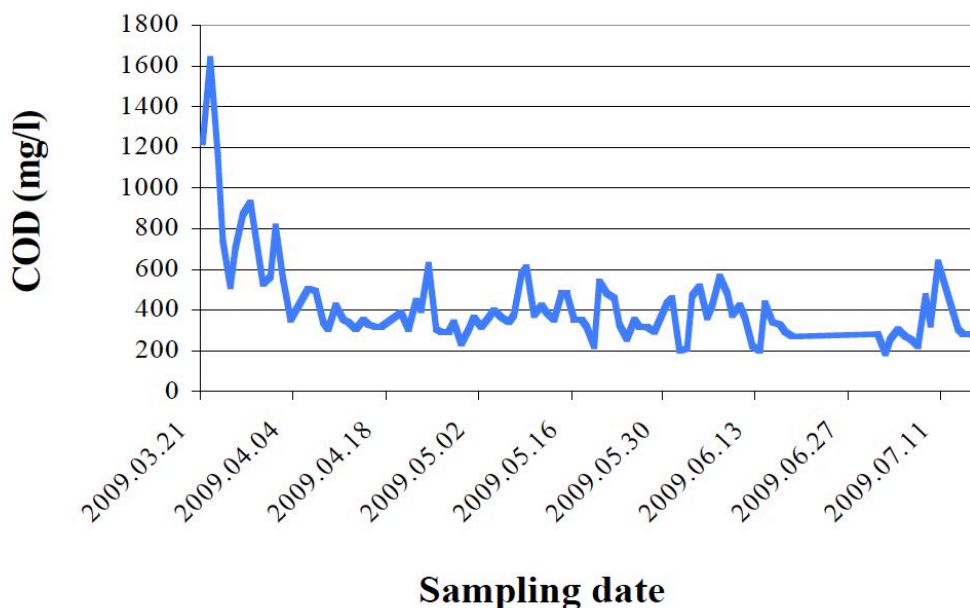
We have calculated with the existence of inhibitory organic substances, and lacking biological treatment capacity, which means the we have used **Bioclean TM, BioGuarde I, and Ammonia Guarde** for bioaugmenting the activated sludge. Bioclean TM generally improves the operational window of the activated sludge bacteria for various parameters, and increases its resistance towards inhibition. BioGuarde I was added from Day 1 together with Bioclean TM. After 5 weeks of bioaugmentation with the 2 materials, we introduced Ammonia Guarde to restore nitrification.

Results:

Diagrams show COD, and NH₄-N concentrations right from the start of bioaugmentation treatment. **Effluent COD fluctuated between 800 - 2 000 mg/l before treatment, and stabilized between 200-600 mg/l in less than a month after the start of bioaugmentation.**

NH₄-N fluctuated between 200-500 mg/l in the effluent before treatment. Nitrification has been restored in 3-4 weeks after the starting the dosage of Ammonia Guarde. Since then, the representative effluent NH₄-N concentrations are less than 50 mg/l.

Effluent COD concentration



Effluent NH₄-N concentration

