



Water & Waste Management

BioRemove™ COD LT

Pulp & Paper

Case study: Enhanced BOD removal in the winter and controlled odors in the summer

Rethink Tomorrow

novozymes® 

The application of Novozymes OdorCap® 5700 and to the wastewater treatment system of a paperboard mill enhanced odor control during summer months and BioRemove™ COD LT improved cold weather BOD removal in the fall/winter.

Benefits

- **Lowered effluent BOD by 60% within one month**
- **Significantly decreased odors**

Background - Winter

A container board manufacturer generates 1 MG of wastewater per day. It is treated with 2 aerated lagoons (14 MG each) and 1 polishing lagoon (3 MG). The treated wastewater is then discharged to the local Publicly Owned Treatment Works (POTW).

Every winter, this facility had experienced problems with elevated levels of BOD and TSS in the effluent. The plant was unable to handle fluctuating influent levels, which began to impact the POTW. Novozymes was contacted to assist.

Application - Winter

Novozymes' technical wastewater experts visited the site and assessed the situation. The first step towards finding a solution was to troubleshoot the wastewater operation. This involved monitoring DO levels in various parts of the basin, checking oxygen uptake rates, measuring residual macronutrients,

performing microscopic analyses, and reviewing all of the data. It was decided that low water temperature (<10°C) was the likely culprit for suppressing biological activity.

Novozymes proposed a bioaugmentation program using BioRemove™ COD LT, a blend of bacterial strains specially selected for its ability to grow quickly in cold temperatures. The mill accepted the proposal and a trial began January 5.

Results - Winter

After a short inoculation period, BOD levels started to drop. In one month, effluent BOD was 60% lower than it was before the trial. Temperatures remained low through mid-March and loading did not change significantly during the period.

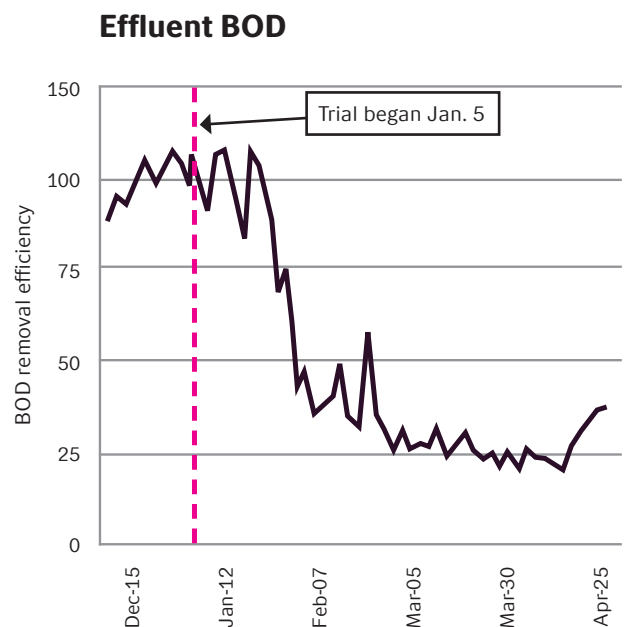


Figure 1. Effluent BOD.

Background - Summer

In the summer months, odor becomes a major concern at this mill. Warm

temperatures allow odor-causing compounds to more easily strip into the air, and make bacteria grow faster in places where growth is not desired. Under anaerobic conditions, hydrogen sulfide, reduce sulfur compounds, and organic acids can cause a stink for miles around.

Application - Summer

To better understand where the odors were being generated, the mill underwent an OdorTrak analysis. Samples were taken from around the mill and specific odor-causing chemicals were identified. The analysis suggested the primary clarifier was the main culprit. A second bioaugmentation program, this time using Novozymes' OdorCap® 5700, was accepted after the OdorTrak analysis was presented to mill management.

Results - Summer

During the first two weeks of the trial, concentration of the most relevant compounds remained lower than pre-trial levels. The odor surrounding the primary clarifier was noticeably reduced.

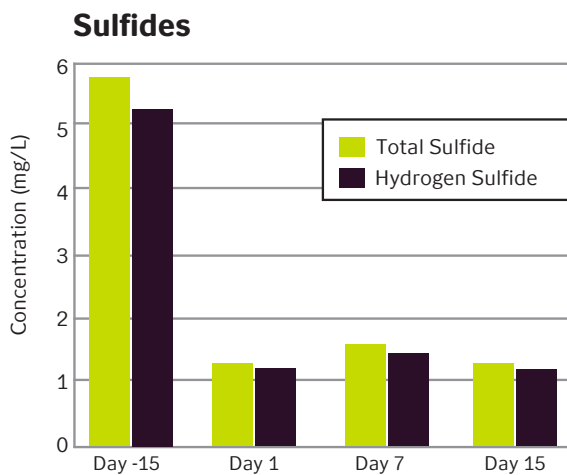


Figure 2. Sulfides.

Reduced sulfur compounds

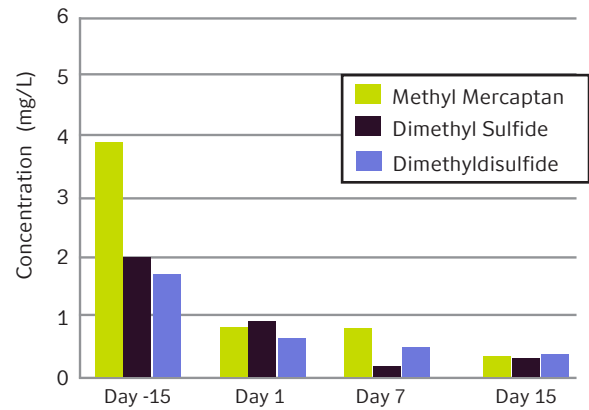


Figure 3. Reduced sulfur compounds.

Organic acids

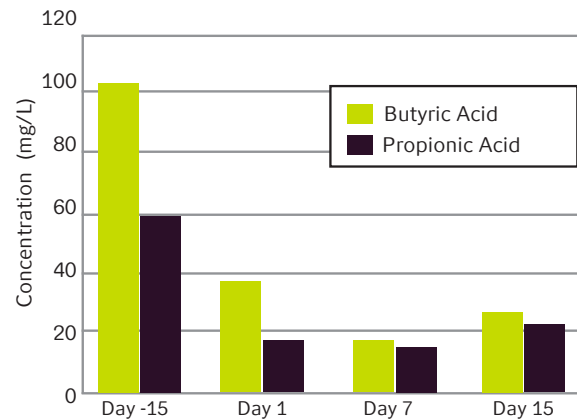


Figure 4. Organic acids.

Conclusion

Novozymes' biological program was easy to implement and provided significant benefits: Maintaining effluent quality during the winter, and controlling odors in the summer. Novozymes' solutions resulted in:

- **Lower operating costs**
- **Improved plant efficiency**
- **Simplified operations**



About Novozymes

Novozymes is the world leader in biological solutions. Together with customers, partners and the global community, we improve industrial performance while preserving the planet's resources and helping to build better lives. As the world's largest provider of enzyme and microbial technologies, our bioinnovation enables higher agricultural yields, low-temperature washing, energy-efficient production, renewable fuel and many other benefits that we rely on today and in the future. We call it Rethink Tomorrow.

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