Industrial Wastewater Treatment Plant
8.9 MGD

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Start-Up of an 8.9 MGD Anaerobic Digester at a Sugar Refinery

Halfway through a sugar beet processing campaign (September through May), a Midwest refinery noticed that something was wrong with its wastewater processing system. The plant discharge was within the limits of its NPDES permit parameters, but the chemical oxygen demand (COD) readings from its 8.9 million-gallon anaerobic digester varied significantly between the top, center, and bottom of the digester. The system engineer suspected that the mixers were not operating properly.

Without functional mixing, the digester was unable to process the refinery's high-COD wastewater. To address the problem, the facility's processing and engineering team decided to repair the mixing blades in the digester at the end of the campaign. The digester was emptied and cleaned during the process, which removed all active biology from the tank. After maintenance was completed, the anaerobic digester needed to be reseeded to resume processing high-COD wastewater properly.

Initially, using activated sludge from a neighboring sugar refinery's anaerobic digester was proposed to seed the repaired digester. This process would involve hauling thousands of gallons of activated sludge at an estimated cost of $70,000 to $100,000. In addition to the cost, seeding with activated sludge from another facility would be highly time-consuming and risky. The sludge could introduce unknown foreign contaminants into the newly cleaned and repaired system.

This could cause unpredictable treatment issues in the future. The plant sought alternative options, which led it to BioLynceus®. The BioLynceus® team suggested reseeding with ProBiotic Scrubber® II (PBII). This live-culture treatment would supply the digester with a diverse microbial community and provide a solution that was more cost-effective, easier to transport, and more reliable.

PBII was added to the digester along with the facility's high-strength COD wastewater to restart the digester. After four days of PBII treatment, the digester was producing methane consistently, indicating that the microbiology was properly processing the influent COD. Seeding the digester with PBII saved the refinery time and money because sludge hauling was not necessary to restart the system.

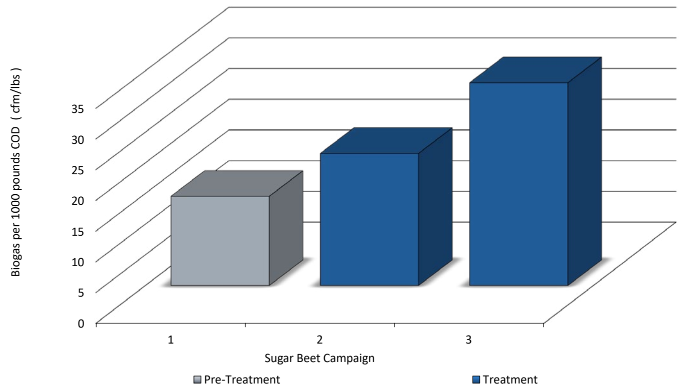

Figure 1. Cumulative biogas produced per 1,000 pounds of influent COD was calculated for an anaerobic digester at an industrial wastewater plant from November to March during three sugar refinery production campaigns. PBII was used to seed the anaerobic digester at the end of campaign 1. Treatment continued through campaigns two and three. The displayed values were calculated by dividing the total biogas produced by the COD loading.

An additional benefit of PBII treatment was that methane production was much higher than before treatment (Figure 1). The average increase in biogas produced during the second and third campaigns was 13 cfs per 1,000 lbs COD. These results were also attributed to cleaning the digester and repairing the mixers before implementing the product. The methane produced was used as a cleaner energy source to help operate the drying kilns.

With BioLynceus®, the anaerobic digester was restarted with less financial burden than would have been required using activated sludge. The biogas produced by the digester also provides the refinery with a stable energy source.

BioLynceus® ProBiotic Scrubber® II is a cost-effective program for digester start-up.

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