

Start-Up of a 6.7 MGD Anaerobic Digester at a Sugar Refinery

Halfway through a sugar beet processing campaign (September through May), a Midwestern refinery noticed 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 fix 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 properly process high-COD wastewater again.

Initially, activated sludge from a neighboring sugar refinery's anaerobic digester was suggested as seed material for the repaired digester. This process would have involved hauling thousands of gallons of activated sludge at an estimated cost of \$70,000 to \$100,000. In addition to the expense, seeding with activated sludge from another facility would have been highly time-consuming and risky. The sludge could have introduced unknown foreign contaminants into the newly cleaned and repaired system.

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

PBII was added to the digester along with the facility's high-strength COD wastewater to restart the system. After four days of PBII treatment, the digester was consistently producing methane, 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.

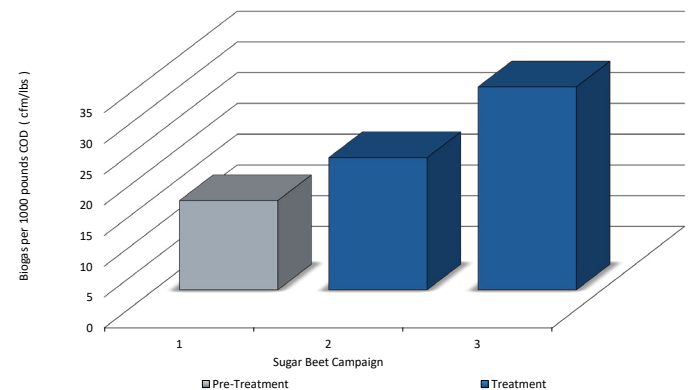


Figure 1. Cumulative biogas produced per 1,000 pounds of influent COD was calculated for an anaerobic digester at an industrial wastewater plant from November to March during three sugar refinery production campaigns. PBII was used to seed the anaerobic digester at the end of campaign 1. Treatment continued through campaigns 2 and 3. The values displayed were calculated by summing the biogas produced and dividing 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 lb 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 at a lower cost than it would have been using activated sludge, and the biogas produced by the digester provided the refinery with a stable energy source.