

Toxicity Treatment in a Facultative Lagoon System

The biology in wastewater lagoons can be significantly impacted by toxic substances introduced through illicit drug manufacturing. Surface waters contaminated with amphetamines and the chemicals used to manufacture them are known to suppress aquatic life, including microorganisms.¹ These chemical compounds inhibit biofilm formation and promote a higher abundance of species equipped to survive in toxic environments. Microorganisms that can maintain cellular function in the presence of toxic waste can displace many of the essential biota needed for efficient wastewater processing. Similar impacts can occur in wastewater systems affected by drug-related toxic discharges. The following case study describes the process of restoring the biology in a lagoon system that was killed off by methamphetamine-manufacturing chemicals.



Figure 1. Wastewater in cell one of the facultative lagoon system after the toxic hit, exhibiting a milky-white color.

Wastewater operators in a rural Wyoming municipality noticed that the wastewater in the first cell of their 0.02 MGD facultative lagoon system had turned milky white and was producing a strong odor (Figure 1). After several community members complained about the strong odor coming from the treatment facility, management began investigating the health of

the lagoon system. They determined that the odor resulted from the plant biology dying after toxic chemicals were introduced into the system. These chemicals were allegedly discharged into the collection lines from a meth lab that had been raided shortly before the wastewater system began to smell. An occupant of the meth lab admitted to flushing the methamphetamine-manufacturing chemicals down the toilet when law enforcement officers were seen outside the residence. To quickly restore biological treatment in the lagoons, the city contacted BioLynceus®.



Figure 2. Two-cell facultative lagoon system serving a rural Wyoming municipality.

A combined regimen of ProBiotic Scrubber® II (PBII) and potassium permanganate (PP) was applied to the first treatment cell. Daily doses of PBII were applied for 14 days. PP was added to provide oxygen to the lagoon system and accelerate the treatment response. After five days of bioaugmentation, the odor from the lagoons dissipated. By the end of the two-week treatment period, the basins were properly processing influent wastewater, and the lagoon system had returned to a healthy color. BioLynceus® bioaugmentation quickly restored biological wastewater treatment in the facultative lagoon system.

¹ Lee S., Paspalof A., Snow D., Richmond K., Rosi-Marshall J., & Kelly J. (2016). Occurrence and Potential Biological Effects of Amphetamine on Stream Communities. *Environmental Science Technology*. 50 (17): 9727-9735.