

Toxicity Mitigation in an Industrial Sequencing Batch Reactor

Managing toxic loadings at industrial wastewater treatment facilities can be challenging. Influent from food-processing industries can introduce harmful cleaning products. In *Wastewater Bacteria*, Michael Gerardi explains that surfactants in cleaning chemicals can damage the cell membranes and cellular proteins of wastewater microorganisms.¹ Biota with damaged cellular structures may be unable to properly metabolize the organic substrate and nutrients in wastewater.

Bioaugmentation can be used to mitigate the harmful effects of toxicity in wastewater systems. Introducing a concentrated and diverse community of microorganisms can increase functional plant biomass, reducing recovery time after a toxic event. The following case study outlines bioaugmentation with BioLynceus® ProBiotic Scrubber® II (PBII) and Candy Carbon® (CC) at an industrial sequencing batch reactor (SBR) plant.



Figure 1. Design of the industrial wastewater plant described in the case study. The facility processes dairy wastewater with a single SBR tank (right), sludge holding basin (middle), and equalization tank (left). The plant experienced toxic loadings that inhibited biological treatment.

The 0.05 MGD mechanical plant at a commercial dairy was experiencing frequent toxic hits that were killing off the biology in its treatment process (Figure 1). Highly concentrated loads of disinfection chemicals and surfactants were introduced into the system following equipment cleanings at the dairy. This regularly disrupted

biological treatment at the facility. Because of these toxic loadings, the plant effluent quality was significantly reduced. After consulting a trusted wastewater expert, the plant operators were advised to augment the system with new biology to restart the treatment process.



Figure 2. SBR tank processing high-strength dairy wastewater.

A regimen of PBII and CC was implemented to restore biological treatment after a toxic loading. PBII supplied the plant with a functional community of microorganisms to facilitate wastewater processing, while CC provided a readily available carbon source for the added biology. The goals of bioaugmentation were to (1) improve treatment process recovery time and (2) stimulate biological treatment by increasing biomass.

Soon after the initial inoculation of PBII and CC, the wastewater operators reported rapid recovery and improved efficiency in the restored biological treatment. The plant was functioning properly after just a few days of treatment. Additionally, bioaugmentation with PBII and CC improved the quality of the facility's effluent. Working with BioLynceus® and its affiliates helped the SBR operate efficiently and restart more easily after toxic loadings.

¹ Gerardi, M. (2006). *Wastewater Bacteria*. Hoboken, New Jersey: John Wiley & Sons, Inc. Pp. 184, 203.