BioLynceus

Industrial Wastewater Treatment Plant
0.7 MGD

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Denitrification with Candy Carbon® at an Industrial Wastewater Treatment Plant

Denitrification efficiency in wastewater treatment depends on several environmental conditions. The wastewater plant must maintain a consistent anoxic zone, an abundance of denitrifying microorganisms, and an organic carbon source. For optimal performance, denitrifying bacteria require a low dissolved oxygen region in the treatment process that is separated from aeration. An adequate proportion of these organisms is essential for removing bioavailable nitrogen, such as nitrate, from raw wastewater. Discharge to the anoxic zone can contain less carbon than is needed to achieve complete denitrification.[1]

This is often due to high carbonaceous biological oxygen demand in the aerobic treatment preceding the anoxic zone. Industrial wastewater may also be low in organic carbon substrate. Consequently, organic carbon is one of the limiting factors for complete denitrification.[2]

Augmenting treatment systems with an external carbon source can improve the efficiency of this process. The following case study describes the impact of Candy Carbon® (CC) treatment on nitrate removal at an industrial wastewater facility.

A 0.7 MGD outdoor industrial wastewater treatment plant (IWTP) was experiencing issues with its biological nutrient removal. Nitrification was occurring in the aeration basin, but denitrification was not occurring in the anoxic treatment cell. This caused the discharge to the plant's settling basin to contain high nitrate concentrations. Seeking advice, the facility's head operator contacted a BioLynceus® representative. The representative proposed that organic carbon loading to the denitrification basin was too low and that the biology needed additional carbon inputs to carry out denitrification.

BioLynceus® CC was applied by pump at the influent of the anoxic zone to provide additional organic carbon. After one month of treatment, efficient denitrification was achieved in the anoxic basin.

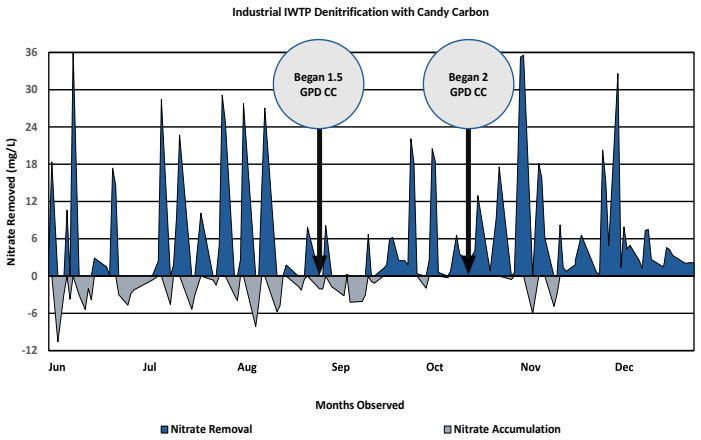

Figure 1. Nitrate removal from the anoxic zone was monitored at the IWTP for three months before CC treatment and for four months after treatment began. Nitrate removal values are positive (blue), while nitrate accumulation values are negative (grey).

The ratio of nitrate removal to nitrate accumulation increased from three to twelve over four months. This increase demonstrated that the plant experienced fewer periods of incomplete nitrate removal during treatment. Improved denitrification helped reduce nutrient loading to the settling basin. As a result of CC treatment, the IWTP effluent quality improved. BioLynceus® provided the facility with a high-strength organic carbon source for efficient denitrification.

1 United States Environmental Protection Agency (EPA). (2013). Wastewater Treatment Fact Sheet: External Carbon Sources for Nitrogen Removal. (EPA 832-F-13-016). Washington, DC: EPA Office of Wastewater Management.
2 Gerardi, M. (2006). Wastewater Bacteria. Hoboken, New Jersey: John Wiley & Sons, Inc., p. 86.

BioLynceus® Candy Carbon® is a quality organic carbon source for IWTP denitrification.

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