

Nitrification with ProBiotic Scrubber® N in an Activated Sludge Plant

An effective activated sludge system has the capacity to remove ammonia from influent wastewater through nitrification. Several factors affect efficient ammonia and nitrite oxidation in wastewater treatment, including temperature and the abundance of microorganisms that degrade carbonaceous and nitrogenous biological oxygen demand (cBOD and nBOD). The optimal temperature for wastewater nitrification is above 59°F.¹

Additionally, bacteria that quickly degrade cBOD help increase the time available for nitrifying bacteria to oxidize ammonia and nitrite. Nitrification is often the rate-limiting reaction in wastewater treatment, so maintaining a high abundance of nitrifying organisms is essential for efficient ammonia and nitrite removal.

Augmenting a treatment system with concentrated populations of nitrifying and cBOD-metabolizing biota can help improve nitrification. BioLynceus® ProBiotic Scrubber® N (PBN) is a live-culture bioaugmentation product designed to increase the abundance of these organisms. The following case study summarizes the application of PBN at a 0.2 MGD activated sludge plant (ASP) in Arizona.

The ASP was experiencing excess ammonia in its effluent. Nitrification was not occurring properly in the system, which caused issues with meeting total nitrogen limits. Restoring a nitrifying biomass in the treatment process was important to avoid permit violations.

The facility had successfully used BioLynceus® products in the past, so the Operations Manager decided to use PBN to improve ammonia conversion in the system. Daily doses of PBN were administered to the lift station ahead of the primary treatment process.

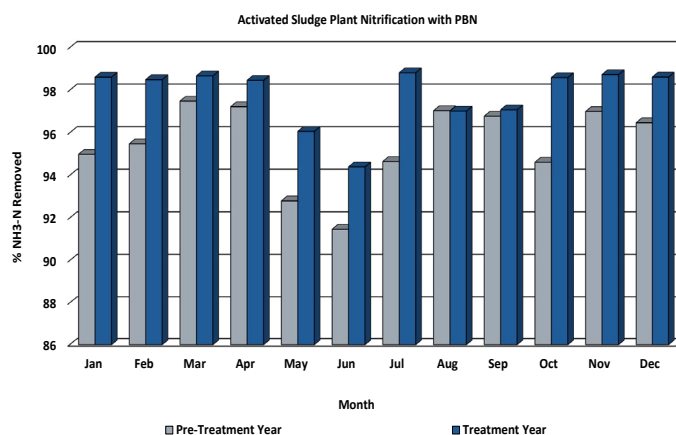


Figure 1. Monthly percentage of ammonia as nitrogen (NH₃-N) removed from the aeration basin at an ASP during a year with PBN treatment (blue) and a year without PBN treatment (grey).

Within days, ammonia concentrations decreased, and total nitrogen levels were comfortably below permit limits. Continual treatment with PBN also improved ammonia removal by an annual average of 3% (Figure 1). The greatest increase in ammonia removal was 4% in July, while the smallest was 0% in August. The BioLynceus® bioaugmentation program improved ammonia removal at the ASP. The client continues to experience improved nitrification with PBN in the ASP system.

¹ Gerardi, M. (2016). *Wastewater Bioaugmentation and Biostimulation*. Lancaster, Pennsylvania: DEStech Publications, Inc. Pp. 20, 64.