

# IMPROVE AMMONIA REMOVAL WITH EBS PRODUCTS AND SERVICES

## NITRIFICATION

Environmental Business Specialists, LLC (EBS) is a recognized leader in the area of industrial biological wastewater treatment troubleshooting, training, and optimization. Our staff of over thirty-five dedicated wastewater specialists, including engineers, microbiologists, and chemists, have worked with some of the world's largest industrial wastewater treatment systems and can assist you in all aspects of system assessment and optimization.

Nitrification, an area of particular specialty, is a critical step in many wastewater treatment systems and is becoming more important as regulations tighten regarding nutrients in industrial effluents. Nitrification is a two-step process where ammonia ( $\text{NH}_3$ ) is converted to nitrite ( $\text{NO}_2^-$ ) and then to nitrate ( $\text{NO}_3^-$ ) and is carried out by a specific group of bacteria collectively referred to as nitrifying bacteria or nitrifiers. These bacteria are much more sensitive to environmental conditions than carbonaceous bacteria, the group of bacteria responsible for BOD removal. EBS offers a full menu of products and services specifically designed to alleviate the problems frequently found in the maintenance of nitrification levels in wastewater treatment plants (WWTPs).

## NITRISTAR™ 750 NITRIFYING BACTERIA FORMULATION

Sometimes, you simply need more nitrifiers faster than they can grow in the WWTP. To address this issue, EBS offers Nitristar 750, a high-activity and cost-effective nitrifier formulation used to establish a new nitrifier population or supplement the existing nitrifier population in a treatment system. Nitristar 750 contains both Nitrosomonas, a genus of bacteria that converts  $\text{NH}_3$  to  $\text{NO}_2^-$ , and Nitrobacter, a genus of bacteria that converts  $\text{NO}_2^-$  to  $\text{NO}_3^-$ , making it a complete nitrification product. Additionally, Nitristar 750 also has a specified  $\text{NH}_3$  to  $\text{NO}_2^-$  conversion rate of 750 mg  $\text{NH}_3$  per kg of product per hour and a specified  $\text{NO}_2^-$  to  $\text{NO}_3^-$  conversion rate of 250 mg  $\text{NO}_2^-$  per kg of product per hour. These two factors separate Nitristar 750 from other nitrifying bacteria products on the market, as the typical commercial nitrifier product contains little, if any, Nitrobacter strains and has a specified conversion rate of only 500 mg  $\text{NH}_3$  per kg of product per hour.

## NITRIFICATION TREATABILITY TESTING AT EBS

Periodic loss of nitrification can be a puzzling and serious problem for operators of municipal and industrial wastewater systems. To help solve these problems, EBS has conducted numerous treatability studies across a wide variety of industries to determine the process control parameters limiting nitrification. Treatability testing assesses the nitrifying capacity of a biomass under various conditions, such as temperature or alkalinity, and can also be used to evaluate the potential toxic impact of streams or compounds on the nitrifier population. This information is invaluable for both determining the root cause for loss of nitrification and evaluating the potential benefits of adding supplemental nitrifiers.

A typical treatability study consists of a brief review of WWTP data, design of an appropriate treatability study to address the problem, and the actual implementation of the treatability study using respirometry. Treatability testing typically takes 1-3 days with results available within 7 days and generally costs between \$1,500 and \$5,000, depending on the complexity of the study.



Figures 1 and 2 show the results of a treatability study where the addition of NitriStar 750 was evaluated to determine if adding supplemental nitrifiers could significantly increase the rate of nitrification for a WWTP that was experiencing nitrification issues. While the study results showed that Mixed Liquor Suspended Solids (MLSS) from the WWTP did contain a population of nitrifiers as evidenced by the respiration rate and some ammonia removal, the rate of nitrification was significantly increased when NitriStar 750 was added to the MLSS to supplement the nitrifer population, thus indicating the addition of NitriStar 750 could be used to increase the rate of nitrification for this WWTP.

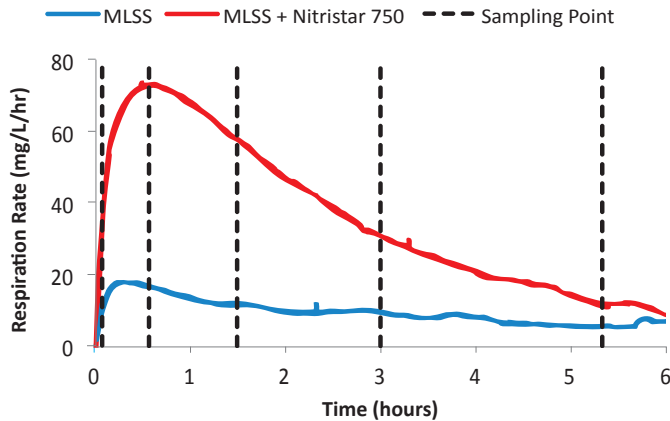


Figure 1 - Respiration rate of the MLSS with and without NitriStar 750 following the addition of 50 mg/L of  $\text{NH}_3\text{-N}$ .

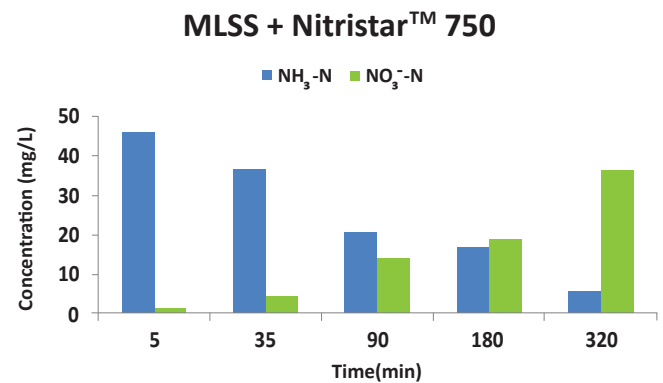
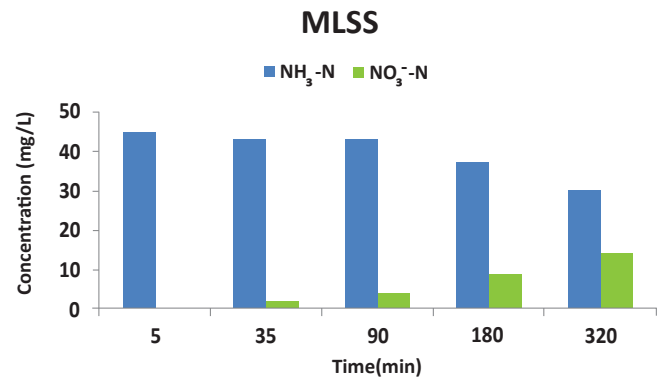
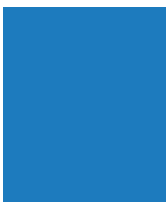


Figure 2 -  $\text{NH}_3\text{-N}$  and  $\text{NO}_3\text{-N}$  data obtained during the treatability study.



**To learn more about NitriStar™ 750, please contact us at 985-674-0660 or [info@ebsbiowizard.com](mailto:info@ebsbiowizard.com) today.**

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