



Clean Thoughts

NEWSLETTER
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HURRICANE PREPAREDNESS

STORM PREPAREDNESS AND RECOVERY

Dating back to Hurricane Ivan in 2004, EBS has helped countless clients recover after major storms. In fact, one of our core values is "Calm in the Middle of the Storm". We know the effects of major storms are challenging for both business and families. EBS is here to help.

Since receiving shipments on-site can be difficult during these events, we recommend that facilities have a stock of one or more of the following on-site as part of their emergency plan.

- Bioaugmentation cultures (aka inoculum)- In case of washout or loss of power, our [BioStar™](#) or [MicroStar™](#) formulas can be applied to re-establish viable biomass.
- [BAC™ & BAC-2™ unit](#) (patented on-site bacteria grow-up systems) - Increases bioaugmentation efforts between 2-3 orders of magnitude.
- Nutrient - EBS [MacroGro™](#) nutrient formulations support cell synthesis to achieve optimal BOD removal.
- Food (BOD) source - Oftentimes after a storm event, production is down with minimal BOD available. EBS [MicroCarb™](#) provides a carbon source necessary for biomass growth.
- Alternate oxygen source - O₂ deficiency can arise when aerators are down. EBS has a calcium nitrate-based solution that can be applied safely and effectively to reduce the negative impacts of oxygen-deficient conditions and prevent the formation of hydrogen sulfide (H₂S).



ASK THE BIOWIZARD

WHEN NITRIFICATION IS FAILING, WHAT CAN BE DONE?

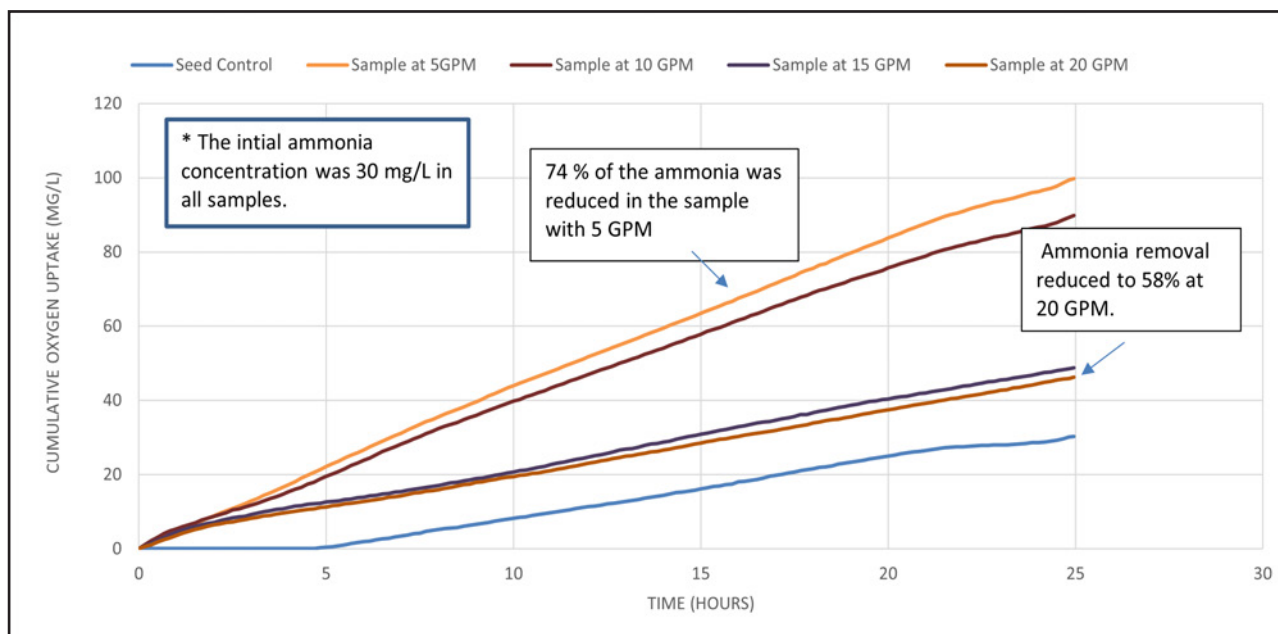
Due to their much slower growth rates compared to heterotrophic (BOD degrading) bacteria, nitrifiers offer unique challenges to the treatment plant operations personnel. Replenishing the population of nitrifying bacteria following a wastewater treatment system upset can be very challenging. After several years of research and process development, EBS has introduced our EBS NitriFire™ nitrifying bacteria formulation. These unique products can be applied to quickly bolster the nitrifying bacteria population and decrease the time it takes for a system to resume stable operation. EBS NitriFire™ contains ammonia oxidizing bacteria (AOB) and nitrite oxidizing bacteria (NOB), both of which are critical for ensuring complete nitrification. For more information about EBS NitriFire™, contact Kellen Lauer at lauer@ebsbiowizard.

TECHNOLOGY CORNER

OUR RESPIROMETRY CAPABILITIES - Benefits of a Nitrification Study

Ever wonder how the introduction of a waste stream will affect your nitrifying system? As most of us know, biological ammonia removal through nitrification can be a tricky process. The bacteria responsible for nitrification are more susceptible to changes in environmental conditions and inhibitory substances than heterotrophic bacteria. EBS can determine if loss of nitrification is due to inhibition of the ammonia oxidizing bacteria (AOB), the nitrite oxidizing bacteria (NOB), or both. We can also study whether nitrifier bioaugmentation may help the problem or if environmental conditions are not conducive to a nitrifying population of bacteria.

Recently, a client reached out to EBS to assess the impact that frac tank wastewater could have on their wastewater treatment plant (WWTP) if they were to treat the contents biologically. EBS measured oxygen uptake over a 25-hour period to determine if varying doses of the frac tank water caused any inhibition the carbonaceous and nitrifying bacteria. Upon conclusion of the study, it was determined higher concentrations (above 10 GPM) of the frac tank waste caused inhibition of the nitrifiers. This was reflected through the decreased oxygen uptake rates and reduced ammonia removal. It was suggested that lower doses (below 10 GPM) of the frac tank should be introduced to the WWTP to help reduce the threat of inhibition to the nitrification process. Short-term respirometry studies such as these can help decision makers determine the best, most cost-effective way to deal with unwanted waste before sacrificing the entire biological population.



The above graph shows the cumulative oxygen uptake from nitrifying bacteria exposed to different concentrations of the frac tank waste. As the dose of frac tank waste increased, the sustained rate of oxygen uptake, and in turn nitrification, decreased. Ammonia removal also decreased from 74% to 58% at higher concentrations.



This Issue Trivia Questions:

1. Fill in the Blank Two different types of bacteria are required to complete nitrification, the first step is completed by the _____ oxidizing bacteria and the second step is done by the _____ oxidizing bacteria.
2. True or False. Rotifers are usually found when dissolved oxygen is low, <0.5 mg/L.
3. What is the most abundant element in the universe?

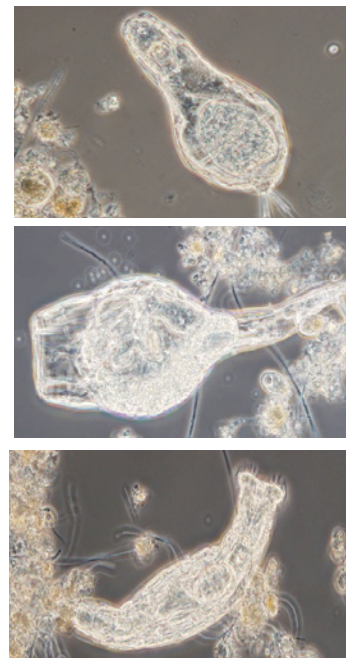
KNOW YOUR BUGS

ROTIFERS

Rotifers, one of the larger organisms often found in wastewater samples, are multi-cellular organisms ranging in size from 50 to 500 μm . They are motile and are often seen grazing on bacteria or attached to debris by their forked tail or toe. Rotifers feed on algae, dispersed bacteria, bacterial floc, protozoan species, and dead organisms. In secondary systems, rotifers remove bacteria, algae, and small floc particles. It is generally accepted that the grazing on the floc aids in oxygen transfer into the floc structure. Rotifers also reduce the solids in the system and may have an incremental impact on effluent quality. Rotifers are strictly aerobic organisms, so their presence is typically indicative of an environment consistently maintaining aerobic conditions. They are often found in systems with a low F/M, high MCRT, and/or high MLSS. A sudden disappearance of rotifers may indicate a sudden increase in BOD loading or toxic shock. Early diagnosis by monitoring your microbiological population can prevent small problems from turning into major upsets.

References:

1. Foster, M. H. & Klopping, P.H. (2003). **Aerated Stabilization Basins for Pulp and Paper Mills**. Corvallis, Oregon. Callan and Brooks Publishing, Inc.



SPOTLIGHT ON ALLIANCE PARTNER

DR. ANDREW ENGLANDE

Dr. Englande joined EBS in 2015 as Sr. Wastewater Consultant and Adviser to the Treatability Lab following a 35-year career in academia. During his time with EBS, he has been a wonderful asset to the collaborative atmosphere of EBS by providing advice on laboratory research projects and client applications.

Previously, Dr. Englande was a Professor at Tulane University, Department of Global Environmental Health Sciences where he now holds the position of Professor Emeritus. He specializes in natural resource management including water quality and toxics assessment/control, with research areas in industrial waste management, wastewater and water treatment; bioremediation; the fate of trace contaminants and pathogens in the environment. Dr. Englande has published over 150 papers covering topics such as sustainability, wastewater and water treatment, waste minimization, and kinetics of contaminant removal by biological systems. He has presented a similar number of papers at international, national, and local conferences and has organized and participated in numerous continuing education programs and workshops.



Trivia answers:

1. Ammonia oxidizing/Nitrite oxidizing bacteria
2. False, rotifers are typically found when dissolved oxygen conditions are sufficient, usually around 2 mg/L.
3. Hydrogen, ~70% of the universe consists of hydrogen

EXCITING ANNOUNCEMENT!

EBS HAS CREATED AN INNOVATION GROUP

We are excited to announce that we are creating a new work group focused on enhancing existing products and developing new ones.

We invite you to share your most challenging hurdles faced when operating your treatment system.

We look forward to updating you on our latest discoveries and lessons learned in the near future!

Thank you,
EBS Innovations Team

[Wastewater Challenges Survey](#)



SPECIALIZED TRAINING PROGRAMS OFFERED



1. SEMINAR - Aerated Stabilization Basins (ASB) and Activated Sludge Systems
Mandeville, LA - October 11-13th



2. WEBINAR - Fecal Bacteria Testing
Online - TBD



3. WEBINAR - Nitrification & Denitrification
Online - TBD

We want to hear from you! For more information regarding upcoming training programs, operational issues at your facility, request a specific article topic, or want to participate in our “Ask the BioWizard” questions, please contact us by phone, email info@ebsbiowizard.com or through our [Contact Us](#) form located on our website.

