

FRITZ-Zyme™

LIVE NITRIFYING BACTERIA

FOR WASTEWATER TREATMENT APPLICATIONS



FRITZ SPECIALTY DIVISION

Fritz-Zyme™ is a liquid formulation containing strains of the bacteria specifically responsible for the nitrification of ammonia and nitrite nitrogen.

Bio-augmentation with nitrifiers is a proven, cost effective and simple method to immediately start, re-establish or re-enforce the nitrifying population and help control ammonia and nitrite levels in wastewater treatment systems.

Fritz Industries has been producing the highest quality, viable nitrifying bacteria for over 20 years. Fritz's nitrifying bacteria concentrate has a proven history successfully establishing nitrification in aerobic treatment systems including activated sludge, lagoon and retrofitted physical/chemical unit processes in wastewater treatment plants serving a variety of industries.

There are very few producers of true live nitrifying bacteria, none of which can match the experience and success in terms of delivering larger volume as quickly as Fritz Industries. Fritz Industries Nitrifying Bacteria is on the Environment Canada Domestic Substances List (DSL) list and can be shipped into Canada.

Fresh concentrate is packaged and shipped daily from our production facility in Dallas, TX and delivered via next day services throughout the United States and around the world.

NITRIFIER'S Role in Wastewater

A majority of waste water treatment systems are required to meet regulatory compliance and remove nitrogenous compounds, including ammonia, from their final effluent. Nitrogen is one of the primary causes of cultural eutrophication (i.e., nutrient enrichment due to human activities) in surface waters.

Ammonia (as NH_3 and NH_4) is one of the main pollutants contained in wastewater facilities that can cause serious discharge permit violations. Wastewater treatment plants face a challenging problem meeting permit limits when ammonia levels are above effluent limits. Ammonia is toxic even at very low concentrations to fish and other aquatic organisms in receiving waters. Accordingly, federal, state and local governmental bodies have continued to increasingly enact more stringent regulations for controlling the amount of ammonia which can be discharged into a receiving body of water by wastewater treatment facilities.

Most wastewater facilities incorporate a biological process for ammonia removal. In Biological Nutrient Removal (BNR) systems, live nitrifying bacteria are employed to oxidize ammonia into relatively harmless nitrate. Live nitrifying bacteria are comprised of ammonia oxidizing bacteria (AOBs) and nitrite oxidizing bacteria (NOBs). AOBs oxidize ammonia to nitrite and NOBs oxidize the nitrite to nitrate. AOBs and NOBs naturally exist in fresh and saltwater the world over as colonies attached to substrates and/or floc for the sole opportunistic mission of oxidizing inorganic sources of nitrogen.



EFFECTS of Ammonia on Wastewater Systems

- » **Toxicity to fish life**
- » **Reduction of chlorine disinfection efficiency**
- » **Dissolved Oxygen depletion in the body of water**
- » **Adverse public health effects**
- » **Reduction in the suitability of water for reuse**

BENEFITS of Industrial Concentrated Nitrifiers

Nitrifying microbes are naturally occurring and will divide and multiply opportunistically so long as their energy sources are available. Conversely, they die back when these energy sources are depleted. While these microbial populations will die back immediately when energy sources are substantially consumed, they will not divide and multiply as fast as you can increase the energy sources. It is also possible to accidentally poison these microbes or force die offs by sudden extremes in treatment process conditions. Depletion of energy stocks used by the microbes is not common, but extreme changes in the treatment process influent for whatever sudden reason is common. Though these microbes are naturally occurring, waiting for biological nitrification colonies to divide, multiply and perform naturally as needed in the time span you may have available may not be within the capacity of the treatment infrastructure or the permitting parameters at your location.

- » **Re-Introduce nitrifying colonies lost from freezing conditions or toxic upsets**
- » **Re-enforces nitrification in under-performing systems**
- » **Provides a fast acting nitrifying seed for stalled systems or seasonal start-ups**

WASTEWATER PLANT USE

Concentrated Nitrifiers can be used in the following situations:

- » **Accelerate the establishment of nitrifying bacteria in newly commissioned or seasonally operated plants**
- » **Assist in the maintenance of satisfactory nitrification in plants with a history of inconsistent performance**
- » **Provide a re-seeding mechanism when nitrification is limited or stopped by adverse biochemical conditions**
- » **Boost nitrification levels during cooler months**
(Nitrification is inhibited at lower temperatures. Up to five times as much retention time may be needed in winter months versus the summer months since the activity drops significantly.)

INDUSTRIAL Applications

- » **DIGESTERS**
- » **LAGOONS**
- » **IMHOFF TANKS**
- » **CLARIFIERS**
- » **SLUDGE TANKS**
- » **RBC'S**
- » **AERATION TANKS**
- » **SECONDARY CLARIFIERS**
- » **TRICKLING FILTERS**
- » **OXIDATION TANKS**

PRODUCT CHARACTERISTICS / TECHNICAL SPECIFICATIONS

TARGETED ACTION	Nitrification
ACTIVITY	≥1000mg NH ₃ /liter/hour <i>NH₄N oxidation rate with a balanced population of nitrobacter</i>
STABILITY	Up to 3 months (refrigerated)
EFFECTIVE pH RANGE	6.5 – 8.5
EFFECTIVE TEMPERATURE RANGE	50° - 110° F / 15° - 40° C
TYPICAL PROPERTIES	Appearance: Turbid Pinkish Brown Liquid Fragrance: Slightly Musty Form: Liquid pH: 7.8 - 8.6
APPROX SALT TOLERANCE	100% @ 0ppt 92% @ 15 ppt 44% @ 25ppt 11% @ 35ppt <i>True saltwater nitrifiers are also available, call for details.</i>
PACKAGING	1 Gallon (3.78 L / 8.4lbs) jug 4.5L (10lb) jug

OPTIMUM CONDITIONS FOR USE

Fritz-Zyme bacteria perform best within a pH range of 6.5-9.0, with the optimum typically near 8.5. Wastewater temperature affects activity, with an approximate doubling in maximum growth rate for each 18°F (10°C) increase in temperature to an approximate upper limit of 104°F (40°C). Very low activity can be expected below 41°F (5°C).

STORAGE AND HANDLING

Refrigerate concentrate upon receipt and throughout period of use. DO NOT FREEZE. Avoid excessive skin contact, wash hands thoroughly with warm, soapy water after contact. Avoid eye contact.

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