

Fritz-Zyme TURBO START®

by California State University / from: www.fritzzyme.com

FRITZ-ZYME™ was recently scientifically proven to be the absolute best source of nitrifying bacteria available, as shown in a independent study performed at the Biological Science Department at California State University. The large project was directed by experts in aquatic nitrification. When contacted by these biologists for samples, Fritz Pet Products was eager to have their bacteria included in the study, which also tested Hagen's Cycle™, Aquarium Products' Biozyme™, Aquatronics' Bacter Plus™, Mardel's A.C.T.™, Precision Aquarium Testing's Sure Start™ and many others. Results showed that FRITZ-ZYME™ #9 Saltwater Nitrifying Bacteria was the only product to produce any testable decrease in either ammonia or nitrite in saltwater. By 14 days into the test, the FRITZ-ZYME™ #9 had reduced the ammonia level by over 70%. FRITZ-ZYME™ #7 Freshwater Nitrifying Bacteria had reduced the ammonia by over 60%. No comparable results were found with any other product tested. California State University performed further testing, researching why FRITZ-ZYME™ produced such superior results. Electron microscope pictures showed that FRITZ-ZYME™ was the only product to form large, uniformly developed bacterial mats on bio-media. Products showing slight ammonia reduction created small, broken bacterial mats. Those showing no ammonia reduction never produced colonized cultures on media. Clearly, the difference was in the bottle: FRITZ-ZYME™ contained large, concentrated true nitrifying cultures.

TURBO START™ is concentrated FRITZ-ZYME™. It gives nitrification an even larger boost by introducing over thirty million live nitrifying bacteria per ounce, rapidly accelerating the nitrification process. Ammonia and nitrite are quickly reduced to safe levels. Both ammonia and nitrite are reduced by over 90% in less than 5 days. Fish stress (induced by high levels of ammonia and nitrite) is also reduced and mortalities normally associated with "New Tank Syndrome" are eliminated. Just follow the easy lab-verified starter plan!

Many products that don't effect ammonia or nitrite claim to contain nitrifiers, causing confusion among hobbyists about nitrifying bacteria. The misinformation presented in ads and product labels hides the fact that most of these products actually contain species of heterotrophic Bacillus and Pseudomonas bacteria - NOT nitrifiers. This is why they don't work. True nitrifying bacteria belong to the Nitrobacteraceae family. Nitrifiers are strictly aerobic autotrophs which utilize inorganic (without carbon) compounds as their primary energy source (specifically ammonia and nitrite). Five genera are accepted as ammonia-oxidizers and four as nitrite-oxidizers. Identified to grow naturally in both wild environments AND in the bio-filter in captive freshwater systems, Nitrosomonas (ammonia-oxidizers) and Nitrobacter (nitrite-oxidizers) are the most well known. Marine nitrifiers (Nitrosococcus and Nitrococcus) are different from the freshwater nitrifiers but are closely related. Though several products claim to contain these nitrifiers, very few actually do.

Many companies package spore-forming Bacillus bacteria and claim that the bottle contains nitrifiers. These products always have a long shelf-life (greater than 7 months). Since true nitrifiers are not spore-forming, products containing true nitrifiers always have a short shelf life. In this way, it is easy to determine when an "imposter bacteria" is masquerading as a nitrifier; it will either not have a posted shelf life, or the shelf life will be longer than 7 months. All dry product formulations claiming to contain nitrifiers use blatant false advertising. These products consist of sludge-eaters in their spore stage. Dry formulas can NOT contain nitrifiers; since true nitrifiers are not spore forming, they cannot be dried into powdered products. Any microbiologist will confirm this fact. Nitrifiers cannot survive the drying or freeze-drying process; they will not maintain any valuable culture or inoculate. Other products recommend the addition of gravel, bio-media or water from an established aquarium. This is usually the only source of nitrifiers with their method; the product itself usually contains trace elements and chemicals. An element of risk is involved when adding water or media from another system, as there is a large risk of introducing ich, velvet and other pathogens. When using competitive products containing heterotrophs (not nitrifiers), the

nitrogen cycle basically follows the same course as when no bacteria are added at all and the system cycles naturally. The cycle with these products still normally lasts 30 days in freshwater, and up to 60 days in saltwater. Hobbyists often lose fish as they desperately wait for the cycle to finish. Hobbyists and experts who have used these deceitful products in the past are understandably skeptical about FRITZ-ZYME™ and TURBO START™. But laboratory testing has shown how FRITZ-ZYME™ and TURBO START™ are different. Results are incomparable.

Below, images from an electron microscope show test results

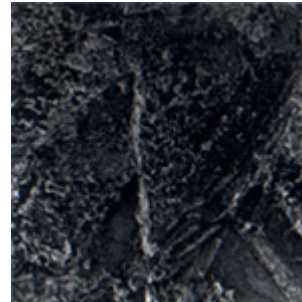
Testing was performed over a 14 day period with readings taken every two days. A known amount of ammonia was added to flasks. Nitrite and nitrate presence resulted from ammonia conversion.



An electron microscope shows Fritz-Zyme #7 as the only product to form large, uniformly developed bacterial mats on biofilter medium.



Products showing slight ammonia removal created small, broken bacterial mats covering biofilter medium.



An uncolonized calcium carbonate chip was typical of products that removed no ammonia or nitrite.

