

Effectiveness of QUICK START Nitrifying Bacteria in Aquariums with Increasing Fish Loads



OVERVIEW

This test was designed to compare how quickly the biological filter is established in new aquariums treated with QUICK START nitrifying bacteria, compared to untreated Control aquariums. The test also compares the level of ammonia and nitrite during the development of the biological filter. The aquariums were started with three guppies for seven days, and then five additional guppies were added for a total of eight fish. This experimental design was modeled on the common hobbyist practice of adding fish while the biological filter is developing. This puts fish at risk of prolonged exposure to harmful ammonia and nitrite. This test demonstrated that QUICK START nitrifying bacteria speeds up the development of the biological filter and significantly reduces exposure of fish to ammonia and nitrite.

EXPERIMENTAL DESIGN

A total of six 20-gallon (80L) aquariums were used. Three were QUICK START Treatment aquariums and three untreated Control aquariums. All aquariums were identical in set-up.

- Approximately 1 inch (2.5 cm) of new aquarium gravel
- Water temperature between 76-78°F (24-25°C)
- Water chemistry : dechlorinated tap water with pH 7.5-7.8, GH/KH 5 degrees, oxygen 7.2 - 7.8 ppm
- One Rena SmartFilter 20 (with no filter media) on each aquarium

Three guppies (*Poecilia reticulata*) approximately 1" (2.5 cm) in length were added to each aquarium. A single dose of QUICK START (20 ml) was added to the Treatment aquariums immediately after the fish were added. Control aquariums were not treated with QUICK START. Fish were fed 0.05 grams of API Tropical Flakes each work day, divided into two feedings per day, Monday through Friday. After seven days, an additional five guppies (2.5 cm length) were added. The feeding rate was increased to 0.1 grams of flake food per day. Water temperature was measured once a week with a Raytec Minitemp digital thermometer. Ammonia (TAN) and nitrite

(NO₂) were tested twice a week using a Hach DR2000 spectrophotometer. pH was tested once a week using an Orion 420A+ pH meter. Oxygen levels were tested once a week (YSI Model 58). Two data sets were evaluated. The first evaluation is the average number of days to complete the cycle. The second evaluation examines the average total ammonia and nitrite levels during the development of the biological filter.

RESULTS

Removal of ammonia in the QUICK START-treated aquariums was significantly more efficient than in the untreated Control aquariums (Figure 1). The average peak ammonia level in the untreated aquariums was 1.6 ppm (mg/l) compared to 0.2 ppm (mg/l) in QUICK START-treated aquariums. Complete ammonia removal required an average of 31 days in the untreated Control aquariums and 18 days in the QUICK START-treated aquariums.

Removal of nitrite in the QUICK START-treated aquariums was more efficient compared to the untreated Control aquariums (Figure 2). The average peak nitrite level in the untreated aquariums was 6.0 ppm (mg/l) and 0.2 ppm (mg/l) in QUICK START-treated aquariums. Nitrite removal required an average of 34 days in the untreated Control aquariums and 24 days in the QUICK START-treated aquariums.

DISCUSSION

New aquarium hobbyists typically add a few fish to start the development of the biological filter. The fish provide an ammonia source to fuel the nitrifying bacteria. Oftentimes hobbyists do not wait for the biological filter to fully develop before adding more fish. This can result in a prolonged start-up period with exposure to high levels of ammonia and nitrite.

The test results show that the biological filter developed faster in the QUICK START-treated aquariums than in untreated Control aquariums (Figure 3). The average peak ammonia in the QUICK START-treated aquariums was eight times less (1.6 vs 0.21) than the untreated Control aquariums. Average peak nitrite levels in the untreated aquariums was 30 times higher (6.0 vs 0.19) than the QUICK START-treated aquariums.

CONCLUSION

QUICK START nitrifying bacteria speeds up the development of the biological filter and significantly reduces fish exposure to ammonia and nitrite. The nitrogen cycle was completed in less time and with less potential fish stress, compared to untreated Control aquariums. QUICK START will make new aquarium start-ups easier for the aquarist and safer for the fish. QUICK START instantly starts the biological cycle process in new aquariums and will help maintain an active biological filter in established aquariums.

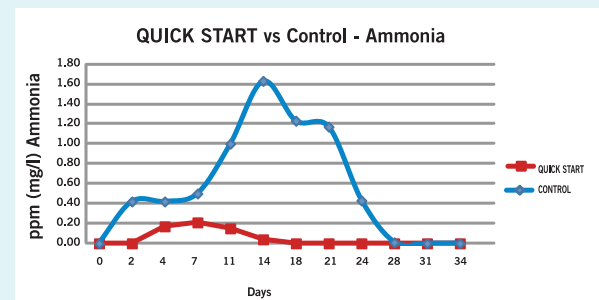


Figure 1. Average ammonia levels in the QUICK START and Control aquariums over time.

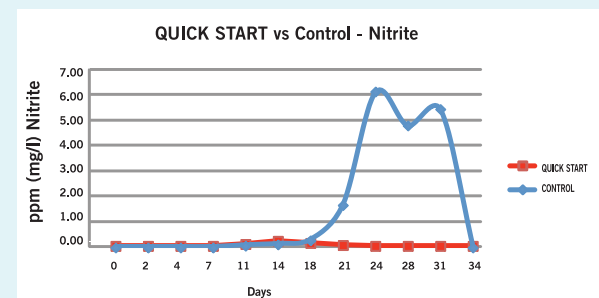


Figure 2. Average nitrite levels in the QUICK START and Control aquariums over time.

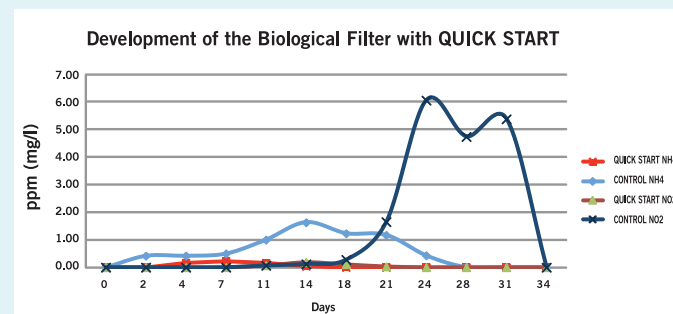


Figure 3. QUICK START-treated aquariums had more active biological filtration and lower levels of ammonia and nitrite compared to untreated Control aquariums.