

In recent months the appearance of a new aquarium water conditioner from Kordon (division of Novalek, Inc., Hayward, CA), called AmQuel<sup>®</sup>+, has been the cause of confusion and a great number of questions about its claims. It's not surprising that AquaScience Research Group (ARG) would be receiving such questions from users of AmQuel+ because the product Kordon has marketed for a number of years under the name AmQuel<sup>®</sup> was developed and patented, and is manufactured, by ARG. However, to set the record straight, the new product, AmQuel<sup>®</sup>+, is not a product of ARG. ARG is not responsible for its performance nor the claims made for it. Indeed, ARG has had the product evaluated by an independent testing laboratory that concluded ***AmQuel+ does not remove nitrates and nitrites as claimed!***

Let's look at exactly what claims are being made for AmQuel+. The product is summarized in the following excerpt from Novalek's web page:

"AmQuel removes (actually detoxifies) a slight amount of Nitrites and Nitrates and other related organics, but less than 1 ppm, and not enough to be significant. AmQuel+ removes (detoxifies) both Nitrites and Nitrates, and is very different from AmQuel in taking out hefty amounts of these toxic compounds per dose (see Product Data Sheet [KPD-79](http://www.novalek.com/kpd79) for AmQuel+ for more information). Therefore, AmQuel+ can take care of the toxicity of the entire nitrogen cycle by detoxifying them - ammonia through nitrites through nitrates, yet still leave the remains available to the nitrifying and other beneficial bacteria to consume them. The beneficial bacteria do not know the difference and eat the nitrogenous compounds that AmQuel+ has provided. This is a major advantageous breakthrough in aquarium and pond keeping in being able to eliminate the toxicity of the entire nitrogen cycle to fishes and aquatic invertebrates. Also, AmQuel+ reduces or removes a range of toxic nitrogenous compounds that otherwise build up in older aquariums and ponds. This allows the need for water changes to be less frequent, which can be a great saving in time and expense." (<http://www.novalek.com/kpd80.htm#anchor429880>)

The AmQuel<sup>®</sup>+ is claimed to take out "**hefty amounts** (emphasis added)" of nitrites and nitrates." After performing its own tests which indicated the product did not work, ARG decided to have AmQuel+ tested by a well-respected lab that has no financial ties to the pet or aquarium industry (the identity of the laboratory is available upon written request).

What caused us to take this dramatic action? Here's what we found in our own laboratory. Using Kordon's AquaTru nitrite and nitrate test kits, we conducted some preliminary tests in the aquariums at ARG's laboratory. The initial results showed that, indeed, added nitrite and or nitrate anions could not be detected after the addition of the AmQuel<sup>®</sup>+, but there were indications that the product was masking or interfering with the color indicator associated with the testing procedure.

With growing suspicions about AmQuel+, therefore, ARG decided to have independent tests performed using a laboratory method that would not be interfered with by the product itself. The testing lab chose to use ion chromatography. This type of chromatography (despite the name) is not based upon color, but on the conductivity of ions in the water sample. It is well known that ionic substances dissolved in water increases its conductivity. Using this, ion chromatography uses a small diameter column

filled with an adsorptive substance that allows the ions in a water sample to be separated (based upon ionic size and charge) and eluted (washed out), one after the other, to a very sensitive conductivity detector. As each ion comes through the column and to the detector, a plotter prints out a chromatogram where each individual ion appears as a spike, or peak, over a flat baseline. The height and width of the peak (the area under the peak) represents the concentration of each ion detected, and the position of each peak along the length of the chromatogram represents the time it took for each ion to elute from the column. Typically the larger the ion the longer it takes to travel the length of the column. Nitrate and nitrite are small ions and elute relatively quickly, and the column used is able to separate the two ions even though they differ only by the weight of one oxygen atom.

The tests were performed on AmQuel®+ samples acquired in California. They were sent directly to the testing lab and subjected to the lab's examination. A full copy of the test results can be requested from ARG, but it is approximately 200 pages long (including all correspondence between the lab and ARG). The pages that pertain only to the tests and their results are slightly fewer. Interested parties may request copies of the tests; all requests must be in writing. The tests were conducted on December 4<sup>th</sup> and 5<sup>th</sup>, 2003.

The bottom line is summed up in the second sentence of the first paragraph of the "Summary Report":

"The significance of the test was that Amquel+ does not remove nitrates at levels of 10.0 mg/L and 75.0 mg/L, and Amquel+ does not remove nitrites at levels of 0.500 mg/L and 3.00 mg/L, when the Amquel+ is used according to the directions on the label (1 teaspoon or 5 mL per 10 gallons of water)."

AmQuel®+ and AmQuel® are both registered trademarks of Novalek, Inc.