



Amazon Aquatics

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NITROGEN CYCLE

The nitrogen cycle is the natural process that occurs in your tank to transform the harmful chemicals produced by the fish waste into less harmful chemicals. Out of all the cycles in your tank it is one of the most important to understand and any serious fish keeper should realise the impact it has on your aquarium. The Nitrogen Cycle involves three main chemicals; ammonia, nitrite and nitrate. During the cycle, ammonia and nitrite are transformed into a less harmful chemical Nitrate by bacteria which is then used up by plants and taken out with water changes. Even though this chemical is less harmful it still needs to be kept at lower levels to ensure healthy growth and longevity of your fish. Due to the difficulty of detecting ammonia in the past and how little was known of its affect on the cycle this process was known as the Nitrite Cycle once. The nitrogen cycle runs as follows (whilst reading through these instructions it may be helpful to refer to the diagram above)

Ammonia [NH₃] enters the water through fish respiration and excretion, as well as decaying matter in the tank. Ammonia is toxic to fish and normal symptoms for ammonia poisoning are cloudy water, fish gasping at the surface of the water, ragged fins and inflamed/red gills. Even low amounts can cause illness so always ensure that your ammonia readings for your water are zero. It is widely believed adding plants will fix this problem but the amount of impact a plant has of reducing ammonia is miniscule.

Ammonia is converted into nitrite [NO₂] by nitrosomonas bacteria (as well as others). Nitrite is less toxic to fish than ammonia, but is still very harmful. Low levels can be tolerated by fish, but always ensure that any readings you take are zero. If you have a constant nitrite reading then there is a problem in your system. Nitrosomonas and nitrobacter - see next step - bacteria are known as litho-tropic bacteria. This means that they require oxygen to survive.

Nitrite is converted into nitrate [NO₃] by nitrobacter bacteria (as well as others). Although not nearly as toxic as ammonia and nitrite, high nitrate levels can lead to outbreaks of disease such as white spot and fungus due to the nitrates reducing the fish's resistance to disease. As well as affecting fish growth and colour. High nitrate levels may also lead to algal bursts as the extra nutrients provided by the nitrates promote their growth.

Nitrates are converted into harmless chemicals by plants and algae Although used by plants and algae as a food source, under normal conditions - unless an aquarium is well stocked with healthy plants - nitrates will build up over time. Regular water changes will help to reduce the amount of nitrate, although some local water supplies may already have high levels of nitrate prior to making a water change. Adding extra plants to an aquarium will help to reduce nitrate as well as keeping algae growth down. This is due to the plants out-competing the algae for nutrients.