

Reefers Den

Reef Keeping Basics (Phase 1)

MARCH 16, 2015

- ✓ Thorough Explanation About Cycling
- ✓ Water Parameters Checking (*Temperature, Salinity, pH, Ammonia, Nitrite, Nitrate, Phosphate, Calcium, Alkalinity, Magnesium, Iodine, TDS, Copper & Other Trace Elements*)
- ✓ Purpose of Activated Carbon, GFO, Biopellet
- ✓ Purpose of Different Chemical Filtration
- ✓ Reef Supplement: Their purpose and Usage Direction (Alpha, Balance, Eight.Four, Calcification, Fuel, Ions, Vibrance)
- ✓ Modifying Skimmer to Improve Performance
- ✓ Coral Fragging
- ✓ Q & A

Understanding the Nitrogen Cycle in your Aquarium

prepared by: Mindfreak

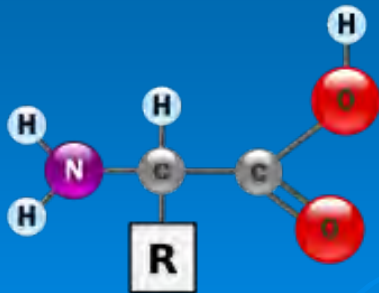
The background of the slide is a solid blue color. In the lower half, there are several faint, concentric circular ripples that resemble water droplets or ripples in a pond, scattered across the bottom right and center areas.

Do you know...?

- Why is the nitrogen cycle important?
- How does nitrogen get into an aquarium?
- How does ammonia form in an aquarium?
- How does a cycled aquarium get rid of ammonia? Where does it go?
- What is the difference between ammonia (NH_3) and ammonium (NH_4^+)?
- How does pH affect the formation of ammonia?

Why is Nitrogen Important?

- Nitrogen is a key constituent of living tissue.
- Nitrogen is used in the formation of amino acids, which are the building blocks of proteins.
- Proteins are used to build tissues and other important substances in our bodies including muscle tissue, organ tissue, enzymes.

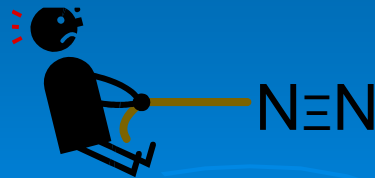


The general structure of an “alpha” amino acid.

(Figure from Wikipedia.)

Where does nitrogen come from?

- The atmosphere is a huge reservoir for nitrogen, consisting of about 80% nitrogen gas.
- Nitrogen gas consists of two atoms held together with a triple bond. This bond is very hard to break, so most nitrogen in living organisms is recycled in more available forms.



The triple bond in nitrogen gas is very difficult to break.

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What is nitrogen cycling?

The **nitrogen cycle** is the process by which nitrogen is converted between its various chemical forms. This transformation can be carried out through both biological and physical processes. Important processes in the nitrogen cycle include fixation, ammonification, nitrification, and denitrification


How does nitrogen get into the aquarium?

- Nitrogen enters the aquarium from:
 - Bodies of the fish
 - Fish food
 - Decaying matter.
- Every time you add fish, add corals, or feed your fish, you are adding nitrogen to the aquarium.
- Let's find out what happens to it in the aquarium.


Nitrogen Cycle in the Aquarium

- 3 steps of the nitrogen cycle occur in the aquarium.

1. Organic wastes (fish feces, dead fish, decomposing plant matter, etc.) decompose, producing ammonium.
2. Ammonium is converted to nitrite by bacteria
3. Nitrite is converted to nitrate by another type of bacteria




Organic matter enters aquarium (fish, fish food, plants)



1 - Organic wastes decompose into ammonium


3 - Nitrite is converted to nitrate by "nitrosomonas" bacteria.



2 - Ammonium is converted to nitrite by "nitrobacter" bacteria.

Is there really a “cycle” in the aquarium?

➤ Is this really a cycle?



Organic matter enters aquarium (fish, fish food, plants).




1 - Organic wastes decompose into ammonium.



2 - Ammonium is converted to nitrite.



3 - Nitrite is converted to nitrate.



Nitrates are removed through water changes.

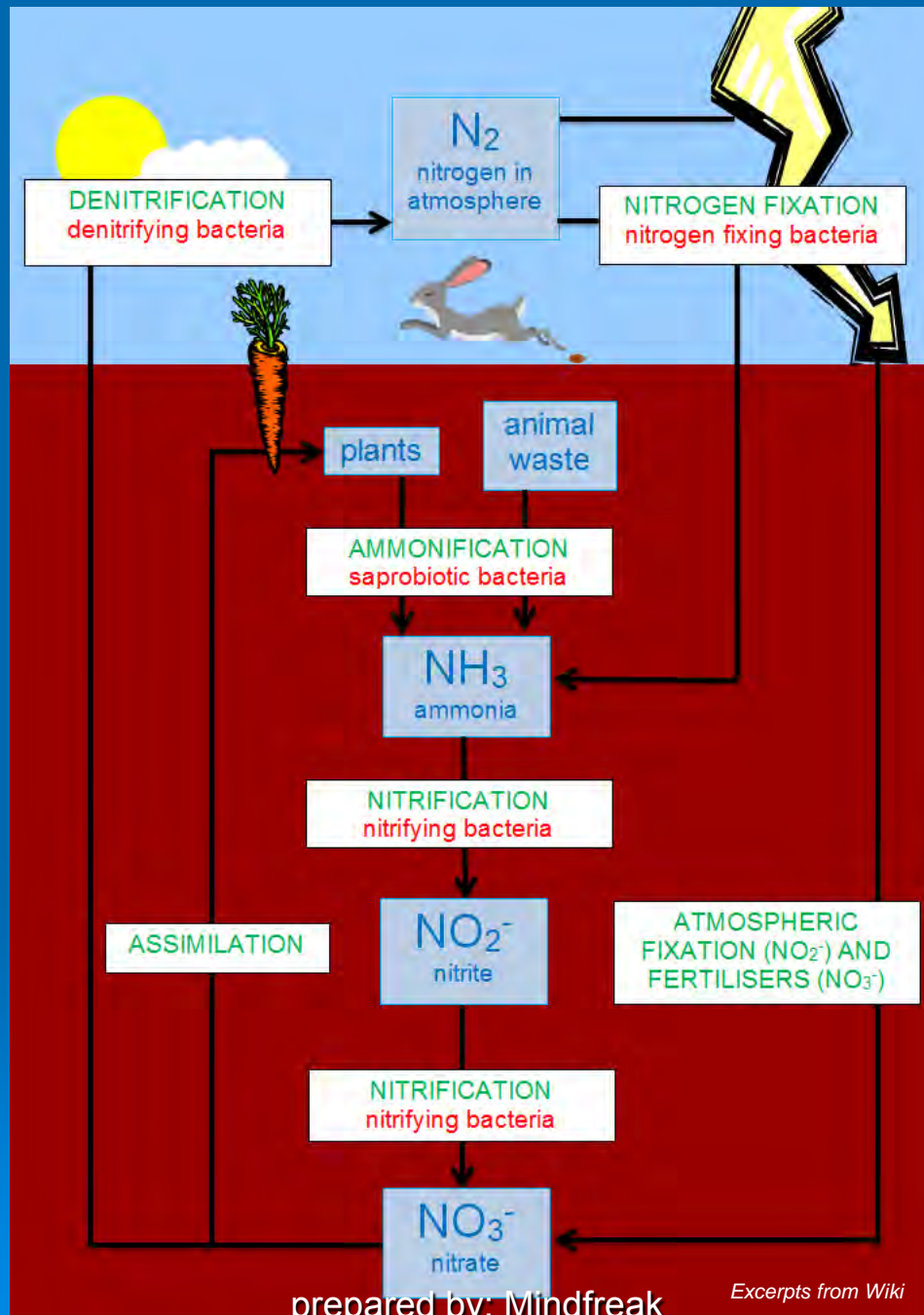
Where does the nitrate go? Does it get recycled in the aquarium?

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- No – the nitrate does not get recycled. It builds up in the water. To a limited extent, it can be taken up by aquarium plants, but not sufficiently for you to rely on.
- To complete the cycle, we need to remove the nitrate and put it back into the global nitrogen cycle. We do this through water changes.

What do we mean by a “cycled” aquarium?

- A “cycled” aquarium is one that has an established population of the bacteria that convert ammonium to nitrite and nitrite to nitrate.
- The bacteria that decompose wastes, producing ammonium, grow very quickly.
- It takes longer for the other types of bacteria to develop to convert ammonium to nitrite, and nitrite to nitrate.
- In a cycled aquarium, these steps occur very quickly so there is no build up of ammonium.
- Let’s take a closer look at each step.



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Excerpts from Wiki

Step 1 - Ammonium

- Ammonium is an ion that is fairly non-toxic to fish. However it easily changes to a highly toxic form, ammonia, which can stress and kill fish quickly.
- If the pH is acidic (<7) the ammonium ion is favored. When the pH is basic (>7), the ammonium ion is quickly turned to ammonia, which is deadly for the fish.

Steps 2 and 3 - Nitrite and Nitrate

- Nitrite, like ammonia, is also very toxic to fish.
- Nitrate is less toxic in low to moderate concentrations, but becomes stressful as concentrations build up.
- The bacteria that do these steps of the cycle are aerobic. That means they need oxygen. If you don't have a good supply of oxygen in the aquarium, or if you get a sudden increase in the organic wastes, the bacteria can deplete the water of oxygen quickly, which will also kill fish.

USING BOTTLED BACTERIA TO KICKSTART YOUR SYSTEM

prepared by: Mindfreak



BIODIGEST is made up of natural nitrifying, nitrate reducing and facultative bacterial strains selected for their ability to convert ammonia into nitrites, nitrites into nitrates and nitrates into nitrogen. Biological filtration quickly gets underway thanks to nitrifying bacteria such as *Nitrosomonas europaea* and *Nitrobacter winogradskyi*...

Aquarium cleaning by waste matter digestion is helped by the presence of numerous different strains of heterotrophic bacteria present in optimal proportions such as *Paracoccus denitrificans* and *Pseudomonas stutzeri*...

These bacteria work together with each strain finishing off the work started by the others. Some are capable of biosynthesising nitrate reducing enzymes in aerobic conditions. This enables water to be effectively purified, nitrates and phosphates to be reduced and prevents the spread of filamentous algae.

WHY SHOULD THE PRODUCT BE USED EVERY TWO WEEKS?

BIODIGEST is particularly effective in the first two weeks. The speed at which the bacteria develop differs from one strain to another.

BIODIGEST guarantees optimal purification proportions for a fortnight. If you want to speed up the purification process, you should not increase doses but instead should use the product more frequently.

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BIOPTIM contains all the microelements needed for aquarium life (selected amino acids, enzymes, natural vitamins (including riboflavin) and a natural plant surface active agent enabling better membrane absorption by cells).

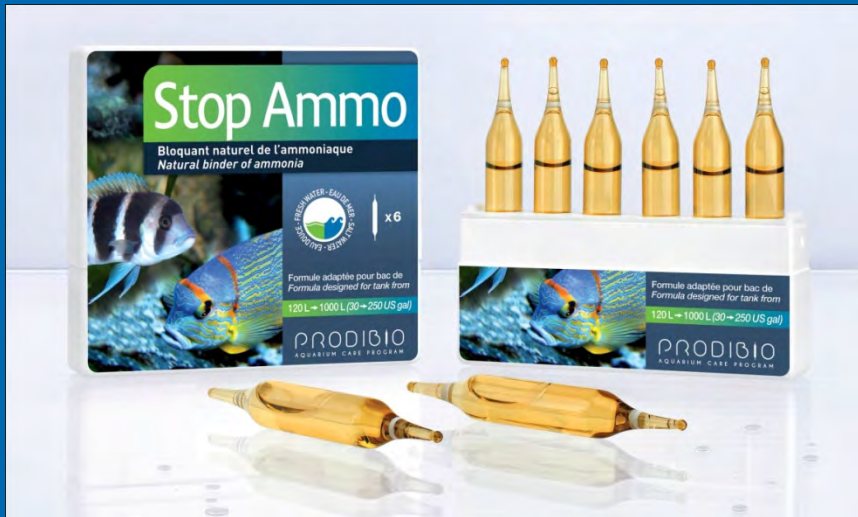
It also provides trace elements: sulphur for proteins, iron for plants and fish blood, cobalt for B vitamins and boron for many products metabolised during cell building, calcium, magnesium, manganese, zinc, molybdenum and potassium.

BIOPTIM is a natural product that affects cellular bioactivators. It dynamises the cellular metabolism of most of the bacteria living in marine water aquariums and reinforces the biological reactions by increasing the number of bacteria and therefore optimising water quality.

BIOPTIM speedily accelerates the digestion of organic matter, reduces the BOD – biological oxygen demand – and therefore contributes to a raised Redox potential.

It also facilitates the elimination of nitrates and phosphates, which are an early warning sign of algae problems, and carbohydrates, and therefore helps to regulate decomposition odours and optimise water quality

prepared by: Mindfreak



Stop Ammo traps ammonia and reduces the proportion of nitrites when starting up a new aquarium and in water used to transport fish. This prevents the fish from being shocked or killed.

Stop Ammo is made from the extracts of specially selected plants. The plants in question have developed a special molecular system with the capacity to trap ammonia nitrogen. Ammonia nitrogen is particularly volatile and toxic and is firstly stored in a non-volatile, non-toxic form, and then synthesized in the form of food, namely proteins and amino acids.

The saponins have been removed in order to make the plant extract suitable for use in aquaculture and aquariums (saponins are poisonous for fish gills).

WHEN SHOULD YOU USE STOP AMMO?

Stop Ammo can be used in the following cases:

- In your aquarium to limit an accidental rise in nitrites, caused, for example, by a dead fish.
- In water used to transport fish to reduce the water's ammonia content by 15- 50%, cutting the risk of fish disease and stress.
- When your fish are acclimatizing to reduce or eliminate fish loss and encourage quicker acclimatization.



START UP combines STOP AMMO START and BIODIGEST START in the same pack. The pack enables you to quickly get biological filtration underway and to introduce the first fish within a few hours.

STOP AMMO START is made from plant extracts which are chosen for their capacity to trap ammonia nitrogen. One of STOP AMMO START's properties is that it reduces nitrite production when a new aquarium is being started up with a specific adapted concentration.

BIODIGEST Start is made up of natural nitrifying, nitrate reducing and facultative strains selected for their ability to kick start the aquarium nitrogen cycle and therefore convert ammonia into nitrites, nitrites into nitrates and nitrates into nitrogen. These bacteria (50 billion in each 1ml ampoule) work together with each strain finishing off the work started by the others.

START UP enables you to quickly introduce 1/3 of your toughest fish into your new aquarium (after four hours for freshwater tanks and 12 hours for marine water tanks).



The proliferation of pathogenic agents such as *Pseudomonas*, *Aeromonas* and *Vibrio* needs to be controlled and minimised in order to reduce bacterial infections in the water used to transport fish.

SAFE TRAVEL is a concentrated suspension of purifying bacteria selected for their capacity to develop in water used to transport fish (oxygenation and temperature, for example) and they do this by feeding on the organic waste produced by the animals. The probiotic effect of Safe Travel prevents the development of pathogens by depriving them of food.



REEF BOOSTER

All types of coral, even those with zooxanthellae, which feed on light, require nutrient supplements. Reef Booster has been developed in partnership with aquaculture experts based on highly effective products that are used to start up crustacean, mollusk and bivalve larvae.

The product is a complete nutrient supplement containing all the elements required by the invertebrates that feed solely or partly on microplankton and for zooxanthellae carrying coral which need microplankton.

Reef Booster favours the development of corals, clams and micro-fauna and the reduction of nitrates and phosphates by feeding and maintaining anaerobic bacteria on live rocks.

After a few weeks of use, hermatypic corals (*Plerogyra* and *Euphyllia*) expand and the ahermatypic polyps (*Scleronephthya* and *Tubastraea*) and the Gorgonians flourish. Coral colour also stabilises.

Reef Booster contains very high concentrations of the polyunsaturated w3-fatty acid groups which all marine organisms need.

A few drops in fish feed make it more appetising, making reef booster an excellent solution when starting to feed difficult or recently imported fish.

Reef Booster

is a finely micronized nutrient supplement for corals and live rocks.

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The End

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