FISHLESS CYCLING (5 to 7 days)

BEFORE YOU BEGIN FISHLESS CYCLING:

1. All measurements in these instructions are per 10 gallons of water. *You may use a 10-gallon tank to do the cycling if that makes things easier.* If the tank is under 10 gallons, use the same amount (10-gallon dose) of bacteria. It is almost impossible to overdose the bacteria.

2. Use a LIQUID water testing kit. ***DO NOT USE TEST STRIPS,*** *as they are too inaccurate*.

3. Use a heater, and raise the temperature of your water to as close to 90°F as possible.

4. Using an air pump and as many air stones as you wish, add as much aeration as possible. (*Add up to one air stone per gallon, but you cannot have too much aeration. The more, the better*.)

5. Add the optional wavemaker to your tank or add a filter that can move as much water as possible. Ideally, the water should move at a rate of 1600 gallons per hour (GPH) for every 10 gallons. This can cut the time in half for the cycle to become established.

6. Take all necessary measurements at the same time every day if possible.

DAY 1:

- Add 1 US ounce (30 ml) of MICROBIAL FUEL CELLS per 10 gallons and 1 US ounce of NITROGEN/AMMONIA OXIDIZING BACTERIA per 10 gallons (the two bottles of liquid that come in each kit).
- Using the measuring spoon included in your kit, add two measures of the AMMONIA SOURCE compound (*powder*) per 10 gallons. (A measure is a level spoonful of the powder.)
- Using the measuring spoon included in your kit, add four measures of the NITRITE SOURCE compound *(powder*) per 10 gallons.
- NITRITE SOURCE normally is added only once on Day 1. However:
- After adding the AMMONIA SOURCE (*powder*) and NITRITE SOURCE (*powder*), allow 15 minutes for the solution to mix well. Test the water. It should read 1-3 PPM of AMMONIA and 1-3 PPM of NITRITE. If it is too low, add more of either one or both. If it is too high, change enough water to get as close to 2 PPM as possible.

Day 2:

- Test the water. It should read 1-3 PPM of AMMONIA and 1-3 PPM of NITRITE. If it is too low, add more of either one or both. If it is too high, change enough water to get as close to 2 PPM as possible.

- If AMMONIA has fallen below 1 PPM, add two measures per 10 gallons of the AMMONIA SOURCE compound (*powder*) to restore it to about 2 PPM. Add 1 US ounce (30ml) of *each liquid bacterial product* (MICROBIAL FUEL CELLS and NITROGEN/AMMONIA OXIDIZING BACTERIA) per 10 gallons.

Day 3:

- Test the water. It should read about 1-3 PPM of AMMONIA and 1-3 PPM of NITRITE. If ammonia has fallen below 2 PPM, add two measures per 10 gallons of the AMMONIA SOURCE compound (*powder*) to restore it to about 2 PPM.
- Add 1 US ounce (30ml) of each bacterial product (MICROBIAL FUEL CELLS and NITROGEN/AMMONIA OXIDIZING BACTERIA) per 10 gallons.

Day 4 through Day 7:

- Test the water. It should read about 1-3 PPM of AMMONIA and 1-3 PPM of NITRITE.
- If AMMONIA has fallen below 2 PPM, add two measures of the AMMONIA SOURCE compound (*powder*) per 10 gallons to restore it to about 2 PPM.
- Add 1 US ounce (30ml) of each bacterial product (MICROBIAL FUEL CELLS and NITROGEN/AMMONIA OXIDIZING BACTERIA) per 10 gallons.
- Continue adding AMMONIA SOURCE compound and both liquid bacterial products daily until NITRITE falls to 0.25 or less. The system is fully cycled at this point. Total time should be approximately 7 days.

<u>Change the water before adding fish!</u>

Only add a few fish at a time and check the water. Fishless Cycling may not initially create the identical bacterial complement as live fish require, so minor ammonia or nitrite spikes are possible after adding fish. If this occurs, change 50% of the water and add a dose of both bacterial products. It will adjust and drop both ammonia and nitrite to zero in a few days.

You may remove excess aerators or wavemakers/pumps after 7 days. Do not overdose on the ammonia or nitrite. It is almost impossible to overdose the bacteria.

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FISH-IN CYCLING (10-12 days)

BEFORE YOU BEGIN FISH-IN CYCLING:

- A quality LIQUID water testing kit is required. DO NOT USE TEST STRIPS as they are too inaccurate.
- Raise the temperature to 84°F.
- Add as much aeration as you deem safe for fish. If the currents are too strong, remove some aeration, but use as much aeration as possible.

Cycling with fish present requires more work than Fishless Cycling and takes about twice as long because you cannot adjust parameters for optimal bacterial growth with live fish present. When cycling with live fish, you MUST make certain that the fish are protected from ammonia and nitrite at all times!

IMPORTANT: When cycling with fish, test the water DAILY. If you measure more than 0.5 PPM of either ammonia or nitrites, CHANGE 50% of the water immediately and add an additional dose of both bacterial products.

Day 1 through Day 12: Add one US ounce (30ml) of each bacterial product per10 gallons. If the tank is under 10 gallons, use the same amount (10-gallon dose) of bacteria. It is almost impossible to overdose the bacteria.

Once you test zero ammonia and zero nitrite for two consecutive days, THE SYSTEM IS CYCLED. Always add fish slowly so the system can adjust to the changing bioload and bacterial complement.

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ADDITIONAL NOTES:

If ammonia or nitrite exceed 0.5 for Fish-In Cycling, change 50% of the water. When changing water, reapply a dose of both bacterial products.

You may add an ammonia detoxification/removal chemical (such as *Prime* or *Ammo Lock* or *Fritz ACCR* or *MicrobeLift Ammonia Remover*) for additional protection, but note, these offer limited protection, so water changes are much better protection.

FOR FISHLESS CYCLING: Change 50% of the water if ammonia or nitrite exceed 3 PPM. When changing water, reapply a dose of both bacterial products. Do not add ammonia detoxifiers or removers.

Both bacterial products employ sulfur as a preservative. However, the MICROBIAL FUEL CELLS bacteria have a pungent, hydrogen sulfide odor. This is harmless and will dissipate immediately once introduced to the water and exposed to oxygen.

Store bacterial products at room temperature. Keep them well sealed and in the dark. They should remain viable for approximately one year.

Store the AMMONIA SOURCE and NITRITE SOURCE in the refrigerator if required for future use.

It is common for a brown biofilm to form on surfaces that will disappear over time. Alternatively, small, white organisms like stentors may form, but these too will disappear over time. If either of these develops, do not clean or wipe down until the system is cycled, at which point it will easily wipe off. Allow it all to fall into the substrate and become part of the biome.

All bacterial products pose some risk for infection. No pathogenic or zoonotic species are present, but some people, especially immunocompromised individuals, have reported developing a temporary rash. Do not drink! Do not rub your eyes or allow near open cuts or wounds. Wear gloves when handling this or any bacterial product.

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