TLC SALTWATER

AQUACULTURE
NITROGEN CYCLE BACTERIA

All aquatic organisms, finfish and shellfish produce waste as a result of the nutrition they receive, and excrete their nitrogenous waste directly to the environment as highly soluble ammonia. This waste product is toxic to fish, shellfish and crustaceans, and in ideal water conditions, ammonia levels should be non-existent as even the smallest amount can cause reduced growth rates and gill damage, and high concentrations are usually fatal.

Algal blooms are caused by an imbalance of nutrients (mainly phosphorus, nitrogen, and carbon) and lighting, which can result in depletion of dissolved oxygen, and create a build-up of organic sediment, high BOD and high suspended solids, as well as foul odours and off-flavours.

TLC SALTWATER is a completely natural, chemical-free solution containing beneficial bacteria, formulated and proven to rapidly and safely cycle saltwater recirculating aquaculture systems, tanks, ponds and lagoons. Use to cycle new systems and when adding new species, as well as for maintenance.

Eliminating toxic ammonia and nitrate is critically important for a healthy aquaculture system. **TLC SALTWATER** contains specific strains of both nitrifying and denitrifying bacteria which oxidize and convert toxic ammonia and nitrite to a non-toxic nitrate, as well as controlling algae and biofilm growth.

- **ENHANCES WATER QUALITY & HEALTH**
- **CONSISTENTLY IMPROVES WATER CLARITY**
- **RAPIDLY ELIMINATES TOXIC AMMONIA & NITRITES**
- **REDUCES ALGAE, SCUM & SLUDGE**
- **INCREASES FISH & SEAFOOD HEALTH & YIELD**
- **DECREASES FISH MORTALITY**
- **100% NATURAL (NOT A CHEMICAL) - NON-TOXIC & NON-PATHOGENIC**
- **COMPLETELY SAFE FOR FISH, AQUATIC ANIMALS & PLANTS**

THE NITROGEN CYCLE

In aquaculture, a mechanism called “The Nitrogen Cycle” begins with the ammonia excreted by finfish and shellfish. Naturally occurring Nitrosomonas bacteria converts the ammonia (NH_3) to another compound called nitrite (NO_2). Like ammonia, the nitrite is toxic to aquatic organisms and must be oxidised further to a less toxic form of nitrogen. This is accomplished by another naturally occurring genus of bacteria called Nitrobacter, which converts the nitrite to nitrate (NO_3), which is non-toxic at the levels usually found in an RAS (>200 mg/L). This constant change from ammonia to nitrite to nitrate is called the nitrogen cycle, and when a given tank or pond is converting all the NH_3 into NO_2, and is just as rapidly converting all of the NO_2 into NO_3, the tank is considered to be “fully cycled”.

Aquaculturalists are extremely cautious to not add new fish to an aquaculture tank or system until the NH_3 levels are down to almost zero (0.2ppm max.). Meanwhile, NO_2 is less toxic and NO_3 is relatively non-toxic.

What is the difference between nitrification and denitrification?

Nitrification is a biological process that converts ammonia to nitrite and nitrite to nitrate. The process of denitrification, is when the resulting nitrate is reduced to a harmless nitrogen gas.

The table below gives a good contrast between the 2 processes:

Nitrification	Denitrification
Converts NH_3 to NO_2 to NO_3	Converts NO_3 to N_2
Requires nitrifying bacteria	Requires denitrifying bacteria
Requires oxygen (aeration)	Requires low dissolved oxygen (less than 0.5 mg/litre)
Releases Hydrogen ions	Increases alkalinity, increases pH
Consumes alkalinity, lowers pH	Soluble organic food is required
Requires relatively clean environment	

Note that the presence of soluble organic food is a requirement for denitrification, as is low dissolved oxygen levels. Since **TLC SALTWATER** contains solubilising bacteria, there will always be some low level of soluble organic food, and aquaculture tanks and ponds have zones where there is less oxygen, which means that there is low dissolved oxygen in at least part of the system. This is generally sufficient to support denitrification.

Through denitrification, NO_3 (the product of nitrification) reacts with soluble organic food and denitrifying bacteria. The end product is nitrogen gas (N_2) which makes up 79% of our atmosphere! Through denitrification, some NO_3 is eliminated from the aquarium, tank or pond, further reducing the food source for algae, helping to eliminate potentially toxic algae blooms.

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NEW TANK / BIOFILTER SYSTEM SET-UP

TLC SALTWATER is added to water for rapid and safe set-up of aquaculture tanks and systems so that you can safely add livestock right away, rather than having to wait weeks or even months. Just one dose will instantly populate an aquarium with all the live, active nitrifying bacteria needed to prevent ammonia and nitrite toxicity.

DOSE RATE: 250ppm

MAINTENANCE

Regular dosing is required at least once a month, but best results come with weekly dosing, to keep your water cycled, clean and healthy. Regular use will keep ammonia and nitrite levels low. Because ammonia and nitrite levels will remain low and because tank walls and surfaces will remain clear, labour intensive scraping, cleaning, and water changes will be minimized.

DOSE RATE: 250ppm

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This product contains live bacteria. Store at room temperature with cap closed. Refrigeration is not necessary.