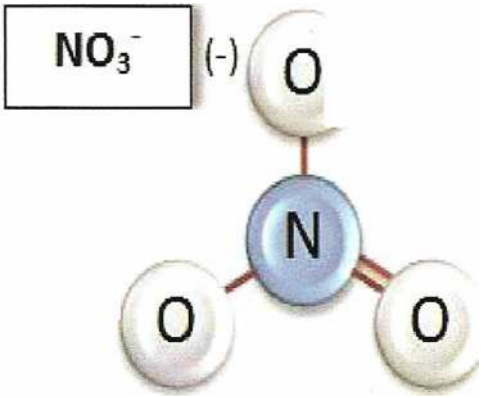
Nitrobacter



In the last stage of the nitrogen cycle, Nitrobacter bacteria convert the nitrites ($N0_2^-$) into nitrates ($N0_3^-$)

Nitrates are not highly toxic to fish in low to moderate levels. However, if nitrate levels rise to beyond 100ppm (parts per million), it is dangerous for fish.

Nitrobacter grow in a pH range of 5.8 -8.5 and has a pH optima between 7.6 and 7.8.

Plants & the Nitrogen Cycle

In an aquarium, regular water changes are required to reduce the $N0_2$- & $N0_3$-levels in the tank. However, in an aquaponics system, the nitrogen cycle is completed through the process of passing water onto the plants. By supplying plants the nitrate ($N0_3$-) rich water, they obtain a majority of the nutrients needed to grow. Most common fertilizers used in cultivating vegetables contain nitrates.

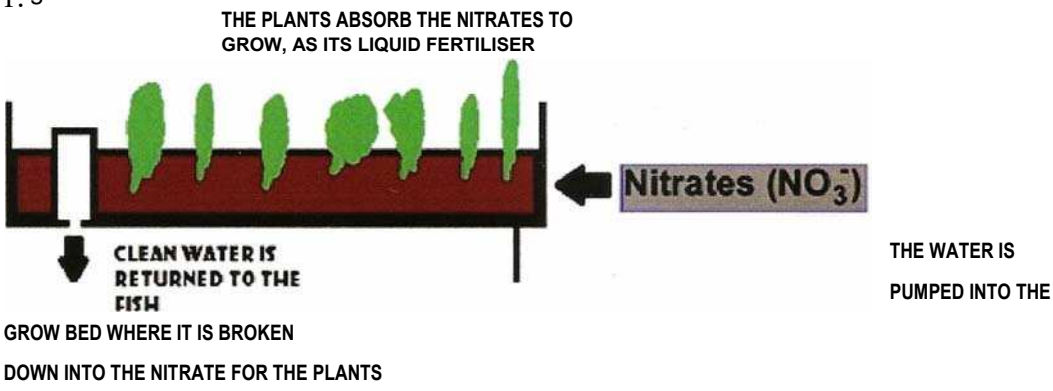


Figure 2: Plants in the nitrogen cycle

In an aquaponics system, after the plants absorb the nitrates the clean water is then passed back to the fish. This effectively eliminates the need to do water changes and therefore reduces the need for water replacement in fish tanks. In addition, it reduces the amount of water that plants need to grow because aquaponics is a closed system.

Compared to conventional vegetable-growing processes in the ground, aquaponics uses about 1/10th the water. There is some water lost in an aquaponics system, but this is generally through evaporation and transpiration.