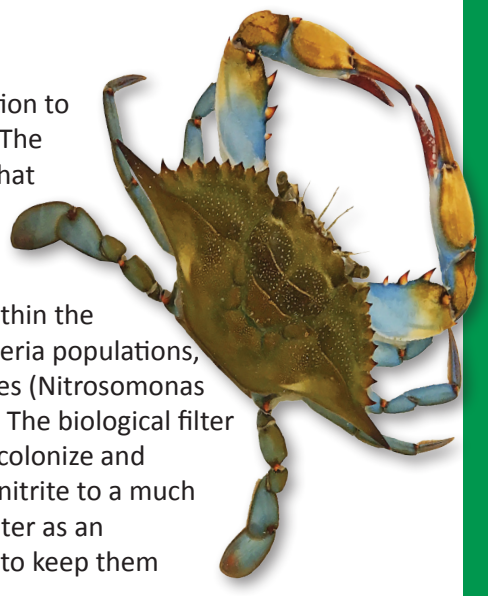
Biological Filtration



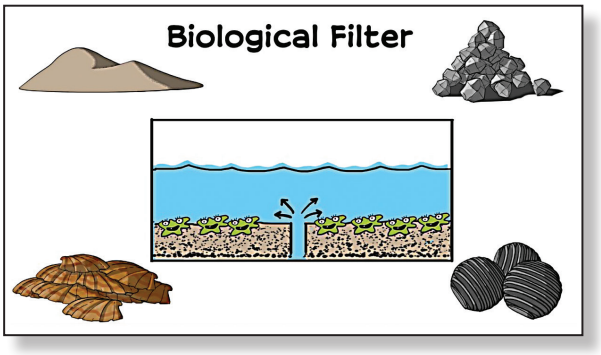
Recirculating crab shedding systems require biological filtration to be successful. The biological filter provides two basic functions. The first is trapping and containment of tank debris and sediments that make it past the mechanical filtration. The more important function is conversion of nitrogenous compounds from crab waste into safer compounds.

A functioning biological filter essentially provides an area within the recirculated flow of water where bacteria can thrive. These bacteria populations, known as nitrifying bacteria, are composed primarily of two types (Nitrosomonas and Nitrobacter), and both are found naturally in soil and water. The biological filter simply provides the bacteria a suitable location where they can colonize and multiply enough to convert toxic compounds like ammonia and nitrite to a much less toxic compound — nitrate. You can think of the biological filter as an in-system population of bacteria that must be cared for and fed to keep them happy and growing.

Basic requirements of biological filter bacteria populations:

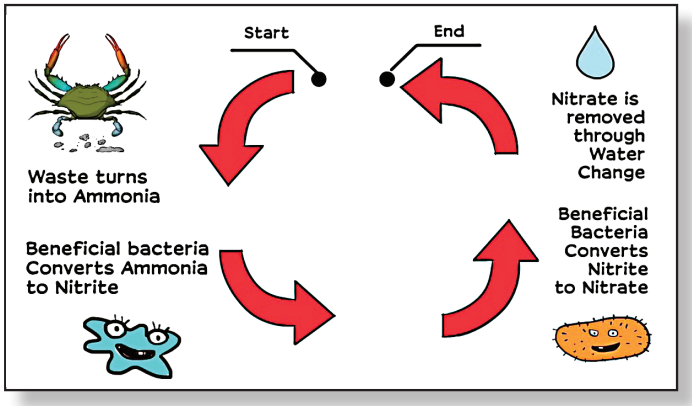
1. Substrate (a place to grow)

These single cell bacteria need a place to settle, adhere and grow. Nitrosomonas and Nitrobacter bacteria live and reproduce in areas when there is sufficient substrate (place for them to attach) within the recirculating system.



2. Food (ammonia and nitrite)

Like most living things, to grow and multiply, bacteria need to have food. As the water passes through the substrate, Nitrosomonas species feed on ammonia (from crab waste) in the recirculated



water and convert it to a nitrogen form called nitrite. Unfortunately for crabs and other aquatic species, high concentrations of nitrite are very toxic. However, the Nitrobacter species in the system will now feed on nitrite in the water and ultimately convert it to the less toxic nitrogen form — nitrate, which the crabs can tolerate.

Things like chlorine, chloramine or sudden temperature and salinity changes can kill the bacteria. To keep crabs and bacteria happy and healthy, water needs to be properly treated to current system conditions before adding it. If you bleach or disinfect your system, you will need to start over with bacterial populations.

Crab shedding publications often recommend shedders maintain a few hard crabs or fish in their recirculating systems while starting up a new system or between molting sessions. This is important because even though there may be no molting crabs to attend to, the bacteria in the system still need to be fed.

3. Warm water temperatures

Like molting crabs, nitrifying bacteria need warm temperatures to thrive. Temperatures suitable for molting crabs are also sufficient for bacterial metabolism and reproduction. Cool temperatures can reduce bacterial growth and slow the feeding on ammonia and nitrite.

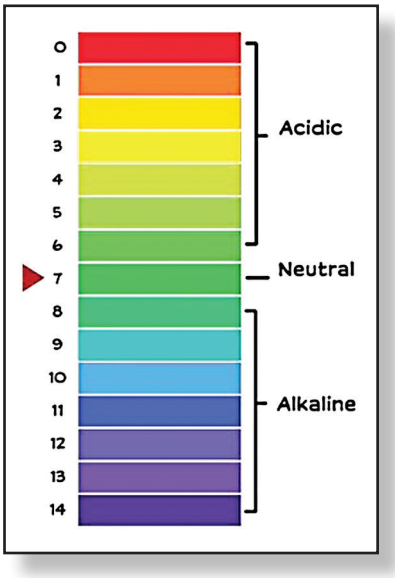
4. Oxygen in the water

Adequate oxygen is not only essential for crabs, it is also required for bacteria to consume, metabolize and convert toxic nitrogen compounds into less toxic forms. Nitrate contains more oxygen than nitrite, and researchers have proposed that during significant oxygen concentration drops in the water, nitrate is reduced back to the highly toxic form of nitrite. It is important to always maintain water flow or spray in running recirculating systems. Adding an airstone from an aerator into your sump can also ensure oxygen levels are not a problem.

5. pH

If pH drops too low in the sump, it can kill the bacteria or limit their growth. Adding baking soda can raise the pH.

Biofilters should be gently rinsed with treated water to remove large build up and debris and to reduce the possibility of killing bacteria. However, the film of slime on the biofilter is your bacteria. Do not scrub it off.



Sea Grant Louisiana

NOAA National Oceanic and Atmospheric Administration U.S. Department of Commerce

http://www.laseagrant.org/outreach/projects/soft-shell-crab/

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Funding: This work was funded by National Sea Grant College Program (NOAA) Award NA18OAR4170355