

Microbial Maturation for Shrimp Ponds

This technical bulletin describes how to acclimate pond water, how to prepare ponds prior to filling, and how to microbially mature pond water.

Why Microbial Maturation is Important

Vibrio bacteria cause several diseases that result in wide-spread losses to the shrimp culture industry, including Early Mortality Syndrome (EMS) and White Feces Disease (WFD). For the past several years, the strategy used to combat *Vibrio* has been to disinfect pond bottoms and water. This pond management strategy has not been successful. It is now believed that total disinfection of pond bottoms and water may be contributing to the epidemic of EMS and WFD (De Schryver, et al 2014).

After disinfection, ponds generally have a destabilized and impoverished microbial community. This environment combines with high nutrient availability from organic waste to favor fast-growing bacteria such as *Vibrio*. The lack of competition from beneficial, slow growing bacteria results in rapid *Vibrio* recolonization (Attramadal et al 2012). Microbially matured water systems minimize the presence of pathogens that can grow fast, and invade unpopulated niches (De Schryver, et al 2014). If shrimp are stocked in microbially matured water, the probability of *Vibrio* infection is diminished.

Existing farms can establish a microbially matured population of biologically diverse beneficial organisms in the water column before the ponds are stocked. You can use portable submersible pumps to move water as required for this process. Use larger ponds as reservoirs and smaller ponds for water treatment. You can also establish nursery systems on existing farms that do not have them. Each farm needs to be assessed independently to determine which ponds will be used for a given purpose.

How to Acclimate Pond Water

1. Filter source water through 200 to 250 micron mesh to remove large particles and organisms that can carry disease.
2. Store the filtered water in a small pond so that suspended solids can settle out.
3. Sterilize the settled water with 25 to 30 ppm chlorine for at least 24 hours.
4. Check the water's mineral content, and add supplemental minerals as needed.
5. When chlorine has dissipated, pump the sterilized water into a larger pond, which is designated as an acclimation reservoir and inoculated with BiOWiSH® AquaFarm. If larger ponds are not available, use a series of smaller ponds as reservoirs. See BiOWiSH® user guides for details concerning application rates.
6. When the water is populated with beneficial bacteria and secondary organisms, such as rotifers and copepods, it is acclimated.
7. Use the acclimated water to fill nursery and production ponds. Acclimation reservoirs should maintain an adequate amount of water in them to serve as a source of beneficial organisms to acclimate new, sterilized water going into them.
8. Apply BiOWiSH® AquaFarm to acclimation reservoirs on a regular basis to maintain a population of beneficial heterotrophic bacteria.

Acclimated water reservoirs can also be used to store water that can be used in a following production cycle. Benefits of recycling water are as follows:

- Water with acceptable parameters (salinity, pH, alkalinity, etc.) is conserved.
- Risk of pathogens entering the farm system is reduced.
- Beneficial microbial communities and secondary productivity are maintained.

Furthermore, this is a responsible aquaculture practice to maintain on your farm.

How to prepare ponds before filling with acclimated water

1. After harvest, remove and properly dispose of all dead shrimp.
2. Flush, pump, or manually remove waste accumulated on the pond bottom during the previous crop. These are the result of decayed or uneaten feed, dead and decaying plankton/algae, and fecal matter from shrimp, which form a layer on the pond bottom that is black in color and produces a foul odor.
3. After waste is removed, dispose of it properly.

If the pond bottom is earthen

1. Sun dry the pond bottom. This is the most effective method of eliminating undesirable species, their eggs, and pathogens. Drying also oxidizes undesirable chemical substances, helps mineralize organic matter, and aids in the restoration of pond pH back to more neutral conditions.
2. Lime after each grow-out. Test soil pH to determine the amount of lime required for disinfection, acidity reduction, and accelerated mineralization.
3. Plow at least once per year.
4. Certain soil conditions and the impact of water tables may require special soil treatment. Please contact your local BiOWiSH representative or reference our online tools for best pond preparation liming, pH, and soil preparation.

If the pond bottom is lined

1. Wash and rinse pond bottom.
2. Disinfected using a chlorine solution.
3. Allow to dry.

How to Microbially Mature Ponds Filled with Acclimated Water

1. Apply BiOWiSH® AquaFarm as the pond is filling. See user guides at int.biowishtech.com for dosage rates.
2. As soon as the water is deep enough, aerate the pond water.
3. Check the mineral content of acclimated water, and apply supplemental minerals as needed.
4. Microbial maturation with BiOWiSH® AquaFarm requires approximately 3-5 days for nursery ponds, or 5-7 days for grow-out ponds.
5. Stock ponds after the microbial maturation period.

For more details, please see user guides or contact a BiOWiSH representative.