

Use of Biological Treatment Methods to Treat Shrimp Farm Effluents

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Abstract

The shrimp culture effluents have been known to release high concentrations of nutrients, suspended solids, and toxic metabolites to the environment. Since the shrimp farms release their effluents directly to the same water body that acts as the water source for shrimp culture, it has caused deterioration of water quality in the receiving water source. Therefore, treatment of effluent before release was required and the use of biological treatment methods was introduced to upgrade the quality of effluent.

Six species of locally available molluscs were used to treat the effluent and 3 species showed good survival under farm conditions. Molluscs were capable of reducing 30% of suspended particles in 48 hours. Seaweeds were used to reduce nutrients but when seaweeds were directly exposed to the effluent the survival rates were low[>40%]. But when effluents were permitted to flow through a settling tank prior to treatment, survival increased to 45- 50% and 20% nutrients were reduced in 24 hours. Use of milk fish in treatment tanks reduced the sediment load by 60% at the end of the culture cycle. Use of probiotics to improve water quality through reducing the levels of toxic metabolites were not very successful as there was no significant difference in the water quality with respect to 6 types of probiotics tested. This may be due to the method of use or due to environmental conditions in the farming areas which do not favour the activity of these probiotics. Two probiotic types showed reduction of ammonia, nitrite and sulphide while one was successful in reducing only ammonia.

Further research is required to identify better methods of upgrading water quality without damaging the environment further, to identify other suitable organisms that could be used for effluent treatment, and develop probiotic species that are adapted to the prevailing environmental conditions in the farming areas. Development of complete recirculation systems, incorporating biological organisms to reduce the entry of pathogens, entry of carriers, and adverse impacts of farms on environment and adverse impacts of environment on farms would be the only solution to sustainable shrimp culture activities.