



Treatment of Shrimp Pond Effluent Using Sedimentation Pond in the Tropics

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Abstract: Aquaculture plays a major role in providing the needed protein. However, there have been reports of negative impacts of shrimp farming which include environmental pollution. Therefore, shrimp pond effluent had to be retained for treatment. Treatment in tanks showed good improvement in water quality but in sedimentation ponds it may not be the case. Therefore, the objective of this study was to determine the water quality of effluent retained in sedimentation pond for a duration of 76 hours. Results show that water quality at 1/3 depth was better than 2/3 depth. There was an improvement in water quality with reductions of TSS, BOD₅, COD, nitrate-N, nitrite-N, SRP and TP ranging from 25-52% except for DO and TAN. In addition, there was fluctuation of each parameter during the duration of study. It is important to monitor the water quality prior to the release of effluent so that it coincides with low nutrients and acceptable DO and partial release of the top 1/3 portion is recommended. There is a limit on the reduction achievable by sedimentation ponds likely due to processes occurring in the sediment. For higher reductions, other methods of effluent management and recovery of nutrients have to be considered.

Key words: Shrimp aquaculture, sedimentation pond, water quality, effluent treatment.

1. Introduction

Aquaculture is an important industry worldwide as it provides the needed protein for the growing population [1]. In Malaysia, aquaculture is actively being promoted due to its relatively clean and ample supply of water and extensive coastline. Among the aquaculture activities taking place is shrimp aquaculture which is carried out at the estuaries. Shrimp aquaculture is a lucrative industry as the shrimp were predominantly exported to developed countries. However, there have been reports of negative impacts of shrimp aquaculture in different parts of the world [2-6]. Those impacts include the poor management of effluents which impacted the environment. As a result,

in Malaysia, shrimp farm operators are required to channel shrimp pond effluents into the sedimentation ponds for retention prior to discharge. Studies of effluent retained in tanks showed good improvement of water quality after retention and those treatments with plants did better than without plants [7]. However, batch retention in actual sedimentation pond has to be studied as treatment of effluent in tanks may not simulate all the processes occurring in the earthen sedimentation pond which is used repeatedly. In Australia, efficiency of continuous flow sedimentation pond of different residence times in the treatment of shrimp effluent has been reported [8, 9]. However, in Malaysia, batch retention is commonly practised. Therefore, the objective of this study was to determine the change in the water quality of the retained water from harvested shrimp pond in the sedimentation pond.

2. Materials and Methods

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