

Performance of a trickling filter constructed with locally available materials for fresh water ornamental fish aquaria

A trickling filter that could be mounted on the outer surface of an aquarium wall was designed and constructed using PVC pipes and pieces of plastic straws as the filter medium for small ornamental fish aquaria. Performance of this trickling filter was evaluated in relation to a conventional under gravel filter by monitoring selected water quality parameters while maintaining an equal biomass of goldfish on a commercially available feed at an equal ration. Three replicates using glass aquaria (60 cm 38 cm 30 cm) were arranged for each filter system and for the control which had no filter.

Void ratio, surface area and volume of the trickling filter were 0.96, 32 cm² and 643 mL while those of under gravel filter were 0.54, 784 cm² and 4000 mL respectively. There was no significant difference between the trickling filter and under gravel filter in converting ammonia to nitrite and then to nitrate ($p > 0.05$). Concentration of dissolved oxygen was significantly higher and water temperature was significantly lower in aquaria with trickling filters ($p < 0.05$) than those of aquaria with under gravel filters. However, pH of water in aquaria with trickling filter dropped to 4.2 towards the end of the experiment (63 days).

Void ratio of trickling filter, which was closer to one, would allow the free flow of water compared to the under gravel filter which could clog rapidly and develop anaerobic conditions in it due to low void ratio. Similarly, use of trickling filters offer more occupy a considerable space within an aquarium. Therefore this trickling filter could be recommended for small scale ornamental fish industry and it should be accompanied with a buffering agent in order to maintain pH.