



Suspended solid and nitrate removal from aquaculture system wastewater by different approaches

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ABSTRACT

The present work aimed to develop the wastewater treatment process for the recirculating aquaculture system (RAS). Sedimentation, coagulation, and filtration were applied for treating suspended solid (SS) and nitrate in wastewater from a tilapia pond. The combination in series of sedimentation and dual-media filtration of sand–anthracite was found as the appropriate process for SS separation. The size of media and suspended particles can affect the filtration mechanism as well as filtration time and removal efficiency. SS removal efficiency of 92% with an average particle size of 28 μm in the effluent was obtained from the optimal experimental conditions of sedimentation and dual-media filtration. An overflow rate of 4.1 m/h was obtained as the optimal level, followed with an effective size of sand and anthracite of 0.80 and 2.00 mm, respectively. Moreover, up to 90% of nitrate was successfully removed via bio-filtration (with biofilm) after applying a C:N ratio of 2.1:1 and a filtration rate of 0.20 m/h.

Keywords: Bio-filtration; Dual-media rapid filtration; Nitrate removal; Recirculating aquaculture system; Suspended solid separation

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