Enhancing removal efficiency of ammonia and nitrate in shrimp farm wastewater using biofloc technology and effective microorganism s4 (em4)

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Abstrak

Shrimp farms generates wastewater which contain high concentration of ammonia and nitrate produced from feed residue and shrimp secretion. This study aimed to analyse concentration changes of ammonia and nitrate in shrimp farm wastewater by applying Biofloc Technology (BFT) combined with Effective Microorganisms 4 (EM4), and to determine the optimum concentration of EM4 in reducing ammonia and nitrate concentration. Experiment was carried out for 30 days in laboratory scale using three treatment tanks sized of 40x25x30 cm3. Each tanks equipped with aerator 7 L/min and lamp 30 watts contains different EM4 concentration: 3 ml/l; 5 ml/l; and 7 ml/l, 15 liters of fresh water, and 20 young shrimps. By the end of observation in all three treatment tanks, water parameter such as DO was recorded in ranged between 4.11-4.48 mg/l, pH 7.7-8.4, and temperature 29.1-30.7oC. Nutrients level include ammonia and nitrate were declined with the maximum removal of ammonia concentration from each treatment tank for EM4 3 ml/l, 5 ml/l, and 7 ml/l were 74.1%, 84.2%, and 88.9%, whereas for nitrate were 68.4%, 72.6%, and 83.7%, respectively. Ammonia and nitrate concentration were reduced to about 0.634 mg/l and 1.261 mg/l, respectively. Dosage EM4 of 7 ml/l was considered as the optimum concentration in reducing ammonia and nitrate concentration. It can be concluded that combination of BFT and EM4 is successfully work in removing ammonia and nitrate wasted in shrimp farm wastewater and maintain the nutrients and water quality in the safety level so that potential to be used as water recycle for shrimp aquaculture