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Sustainable Aquaculture for a Secure Future

Title: Effect of Stocking Density on Water Quality and Production of Red Tilapia in a Recirculated Water System

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Abstract: Red tilapia with an average size of 75 g were reared for 70 days in concrete circular tanks at densities of 50, 100 and 200 fish/m3 in a recirculated water system. At a loading rate of 1 kg/liter/min and a feeding rate of 1.5% body weight/day with 22% protein commercial pellets, the daily weight gains were in the order of 0.77, 0.65 and 0.64 g/fish in the low, medium and high stocking densities, respectively, with corresponding net yields of 27.01, 40.98 and 57.37 g/m3 day. The FCR values were 2.25, 2.57 and 2.61 in the low, medium and high stocking densities, respectively. Although the individual fish growth rate and feed utilization efficiency were inversely related to increasing stocking density, there were no significant differences between these parameters at the medium and high densities. The net yield increased with increasing density levels, but appeared to level off at the higher densities. Behavioral studies indicated that the growth-inhibiting agonistic behavioral patterns were generally unabated even at the highest stocking density. Use of constant loading rates maintained almost similar and safe water quality levels in all treatments. Stocking levels did not influence the digestibility of the feed and carcass composition of the fish.

Nitrogen budget constructed for the experimental period suggested that in all treatments about 80% of the nitrogen consumed by the fish was wasted in the form of solids and solubles. The apparent rates of oxygen consumption and ammonia produced by the fish in the different treatments were not significantly different. The treatment system was found to be effective in removing various waste metabolites, but the efficiency varied among the parameters. Ammonia and solids were removed more efficiently than others. Nitrite, COD and TP were removed less efficiently and were found to accumulate in the system over time.

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