Effects of supplementary nutrient in an aquaponic system for production of ornamental red tilapia (Oreochromis Sp.) and lettuce (Lactuca sativa var longifolia)

ABSTRACT

Effects of supplementary nutrient in the production of red tilapia (*Oreochromis* sp) and Lettuce *(Lactuca sativa* var *longifolia*) evaluated in a representative water recirculating aquaculture system. The nutrient solution supplemented was 25% level of (L25) nutrient solution as medium used for aquaponic production of lettuce in the NFT system (based on cooper's formula). Thus, a completely randomized experimental design conducted with two treatments in triplicates (Pl_{25} and PL_0). Six black rectangular tanks (114 x 86 x 100cm) used as fish culture tanks and each one equipped with three hydroponic troughs. Each tank filled with 640 L of water and aerated continuously with two circular air stones (3 L min^{-1}) during the experiment. The system was efficiently able to remove high rate of total ammonia - nitrogen (TAN) excreted by fish during the experiment. The fish attained marketable size (200g) during a 110 –day period. Nutrient supply had not significant effects (p>0.05) on growth of fish during experimental period. The yields (Biomass/tank) of fish in treatments PL25 and Pl_0 were 9.97 and 9.26 kg / tank, respectively. Three times cultivation and harvest of lettuce carried out during the experimental period. At the first harvest, the yield (mean wet weight) of lettuce showed significant (p<0.05) differences between treatments, 1437g and 85 g in treatments PL25 and Pl_0, respectively. In the second and third lettuce harvests, the yield of lettuce did not show any significant differences (p>0.05) and averaged 2112 and 1419 (Second harvest) and 1173 and 807 (Third harvest) for treatments PL25 and PL0, respectively. It was recorded that red tilapia could tolerate 25% of nutrient solution, used for aquaponic production of lettuce, and introduction of nutrient solution to the culture system is necessary to get higher yield of lettuce at initiation of culture system.

Keyword: Nutrient solution; Aquaponic system; Lettuce; Red tilapia; Nitrification; De-nitrification