

Effects of fish stocking density on water quality, growth performance of Tilapia and yield of butterhead lettuce grown in decoupled recirculation aquaponic systems

ABSTRACT

This study was conducted over a period of 52 days to determine the effects of fish stocking density on the water quality, growth performance of tilapia and yield of butterhead lettuce cultivated in decoupled recirculation aquaponic systems (DRAPS). In this study, three respective tilapia stocking densities (treatments) of 8 Kg m⁻³, 10 Kg m⁻³, and 12 Kg m⁻³ were used to evaluate the butterhead lettuce in the DRAPS, which consist of two independent loops. All treatments were done in triplicates. The results showed with increased stocking density, the electrical conductivity, total dissolved substances and salinity increased and dissolved oxygen decline. The results showed that the highest stocking density produced the highest nutrients accumulation of ammonia-nitrogen (NH₃-N), ammonium (NH₄), nitrite-nitrogen (NO₂-N) and nitrate-nitrogen (NO₃-N) and potassium (K) except for phosphorus (P). Nevertheless, based on the conversion of fish feed to NO₃-N and P per kilogram of feeds, the lowest stocking density provided the highest concentration of NO₃-N and P. It was documented that DRAPS relied solely on the fish waste produced an insufficient concentration of N, P, K and iron. The average survival rate of tilapia in all treatments was above 94% and was not a significant difference among the treatments.

Keyword: Decoupled Aquaponics Systems; Stocking density; Tilapia; Butterhead lettuce (*Lactuca sativa*)