

## Evaluation of growth and production of common carp *Cyprinus carpio* in aquaponic system and traditional aquaculture method

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### Abstract

Due to fresh water resource limits and environmental damage caused by aquaculture waste using systems based on sustainable development at the global level is highly regarded. Aquaponics or fish and plant co-culture system is one of the new approaches to achieve aquaculture sustainable development. In this study which was conducted, in 2015, at Ahvaz Azadegan warm water fish culture complex, 6 recirculation aquaponic systems with concrete tanks (400 liters) as well as 3 one-acre soil ponds (Traditional system) were used to grow common carp. hydroponic systems with gravel substrate and tank volume ratio of 2:1 for basil (*Ocimum Basilicum*) culture. In this study common carp fry of mean initial body weight  $6.04 \pm 0.17$  g were randomly distributed in two experimental treatments. Fish were reared at two rearing densities, low density (L): 26 specimens tank-1 (65 fish per cubic meter) and high density (H): 52 specimens tank-1 (130 fish per cubic meter). In 3 one-acre soil ponds, 1100 common carp fish (0.11 fish per cubic meter) were distributed. At the end of the 60-day experimental period in low-density aquaponic system, the final Individual weight was  $156.70 \pm 11.88$  gr and production of  $4.07 \pm 0.31$  kg ( $10.19 \pm 0.77$  kg / m<sup>3</sup>) and aquaponic system with high density, respectively average final Individual weight was  $95.75 \pm 8.15$  gr and production  $4.98 \pm 0.42$  kg ( $12.45 \pm 1.06$  kg / m<sup>3</sup>) and in soil pond average final Individual weight was  $447.6 \pm 26.7$  gr and Production was  $488.3 \pm 29.1$  kg / ha ( $0.049 \pm 0.0029$  kg / m<sup>3</sup>). The production in low and high density aquaponic systems was 200 and 238 times that of pond, respectively. The economic index in the pond was 1.98 and 2.46, respectively, which indicates a low cost of production of common carp in the soil pond. The water consumed to yield one kilogram common carp in the traditional system was 98 times higher than in the aquaponic systems, indicating a very high water conservation in the aquaponic system. According to the results of this study, using aquaponic system for cultivation of common carp with basil is much more efficient and more effective in saving fresh water consumption, but the economic conversion index of aquaponic system is higher than Traditional system. This fact shows high cost in aquaponic system.

**Keywords:** Recirculating aquaponic, *Cyprinus carpio*, Integrated fish culture, Azadegan Fish Complex.