

Nutrient recycling through aquaponics and night-lighting

ABSTRACT

Aim: The effects of night lighting on production of peppermint in an NFT aquaponic system were examined in this study. **Methodology:** Hybrid lemon fin barb juveniles were co-cultured with peppermint in an aquaponics system. The peppermint was subjected to 12 hr ambient natural daylight and 0, 6 and 12 hr night lighting respectively for a period of 14 weeks (two batches of 7 weeks each). Nitrogen, phosphorus and potassium uptake of the fish and peppermint were measured. Dissolved oxygen, pH, TDS, conductivity, ammonia-nitrogen, nitrite-nitrogen, nitrate-nitrogen and temperature were monitored during this period. Fish and plant NPK composition were analyzed before and after the experiment. **Results:** Night-lighting did not affect the NPK composition and growth of fish. The plants responded positively to increased night-lighting hours. A significant increase in stem length, leaf numbers and production mass (19% higher with 12 hr night-lighting) was observed at harvest. Approximately 18% more nutrients were taken up with night lighting. The total recovery of the hybrid lemon fin barb-peppermint system with a 12 hr natural day lighting and 12 hr night lighting ranged from 27-34% for N, 41-49% for P and 26-31% for K. **Interpretation:** The peppermint production and nutrient recovery in the aquaponics system were enhanced with increase in photoperiod.

Keyword: Aquaponics; Hybrid lemon fin barb; NFT; Peppermint; Photoperiod