

**THE USE OF MODERN TECHNIQUES IN
THE ENGINEERING AND MANAGEMENT
OF FISH FARMS**

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ABSTRACT

This study was carried out in central laboratory for aquaculture research (2017). Two experiments were conducted. The first experiment was aeration system was conducted to determine the best levels of oxygen supply on growth performance and oxidation status of Nile tilapia (*Oreochromis niloticus*), Common carp (*Cyprinus carpio*) and Grey mullet (*Mugil cephalus*) fingerlings stocked at (85%, 10% and 5%), respectively; total of fingerlings with initial weight of weighting (10) g/fish were reared in tanks and supplied with normal water with air pumping and filtration system applied throughout the experiment with 2 replicates reared in 16 tanks made of fiber glass to evaluate the effect of perforated pipe location 0 and 100 cm from the bottom of tank , distance between holes 10, 20 cm, air pressure levels (P) 0.2 and 0.4 bar on water quality , growth rate of fish and net profit.

The obtained results revealed that the perforated pipe location of 100 cm with distance between holes of 10 cm and air pressure (P) of 0.4 bar gave the highest average of water quality such as pH (8.18 ± 2.48 , 7.97 ± 1.11 and 8.23 ± 0.41 mg/l), dissolved oxygen (8.38 ± 2.54 , 7.74 ± 1.11 and 7.15 ± 0.35 mg/l), water temp ($27\text{ }^{\circ}\text{C} \pm 8.21$), ammonia (0.28 ± 0.08 , 0.29 ± 0.002 and 0.35 ± 0.017 mg/l), salinity (0.18 ± 0.009 mg/l) , total hardness (170.9 ± 51.97), alkalinity (180.7 ± 54.95 mg/l), The highest average of growth rate values; final body weight (74.9 ± 22.77 , 77.4 ± 1.16 and 71.9 ± 3.59 g), final body length (19.2 ± 5.83 , 18.2 ± 0.27 and 16.4 ± 0.32 cm), final body weight gain (5 ± 0.20 , 4.4 ± 0.06 and 4.6 ± 0.09 g), final condition factor (1.36 ± 0.05 ,

1.38±0.23 and 2.61±0.26g/cm³) and final feed conversion ratio (1.56±0.47, 1.62±0.02 and 1.68 ± 0.03 g/fish), Final Specific growth rate (SGR %) were (1.93±0.58, 1.68±0.02 and 2.0 ±0.04%) and final survival rate (%) were (91.8±2.9 , 88.9±2.6 and 90.2±1.2) for Nile tilapia (*Oreochromis niloticus*), Grey mullet (*Mugil cephalus*) and Common carp (*Cyprinus carpio*) and distances between holes of 10 cm and pressure levels of 0.4 bar respectively. The obtained results in the first experiment revealed that total feed intake were 7.63, 7.88 and 5.34 kg/m³ and 7.93, 7.90 and 5.68 kg/m³ for tilapia; common carp and mullet respectively at pumping air pressure (0.2 and 0.4) bar with significant differences among the pipe location of (100cm) and air pressure tested. Compared with the control result were 4.37, 5.89 and 4.82 kg/m³. total feed cost of reared fish in water tank were 57.22, 59.1 and 40.05 LE/ kg/m³ and 59.47, 59.25 and 42.6 LE/ kg/m³ for tilapia; common carp and mullet respectively at pumping air pressure (0.2 and 0.4) bar with significant differences among the pipe location of (100cm) and air pressure tested. Compared with the control result were 32.77, 44.17 and 36.15 LE/ kg/m³. The second experiment was conducted to examine the effect of using magnetized water on productivity of fish. A total of 350 fishes with different density of (12, 25 and 50 fish/m³) for Tilapia and Common carp fingerlings weighting (10) g were randomly allotted into two groups each one has 2 replicates reared in 12 tanks, the first group provided normal water, mean while the fish in the second group were reared in magnetized water (obtained from water magnetizer that fixed at the main water source) the physical and chemical properties of water were determined using a pH meter, ion chrome atography.

Growth performance parameters were evaluated after two weeks compared with normal water (control). The magnetized water was more ($P < 0.05$) alkaline and had greater ($P < 0.05$) concentrations of total hardness. The obtained results in the second experiment revealed that the fish groups reared at low density of (12 fish /m³) and treated with magnetic water recorded the highest water quality such as dissolved oxygen i.e., 8.70 ± 0.34 and 7.9 ± 0.3 mg/l, pH 8.1 ± 0.28 and 7.20 ± 0.15 mg/l, water temp 28.7 ± 1.14 C, ammonia, 0.11 ± 0.003 and 0.11 ± 0.004 mg/l, alkalinity 146 ± 5.84 and 149 ± 5.66 mg/l and total hardness, 160 ± 3.20 and 164 ± 2.46 mg/l and the highest growth rate values such as final live body weight 93.25 ± 3.73 and 124.9 ± 4.75 g ; body length were 16.3 ± 0.65 and 18.6 ± 0.70 cm; condition factor (K) were 2.99 ± 0.10 and 2.64 ± 0.05 g/cm³; feed conversion ratio (FcR) 1.49 ± 0.05 and 1.49 ± 0.05 g/fish; specific growth rate 31.66 ± 1.10 and 31.66 ± 0.69 g/fish; relative growth rate (RGR) 25.9 ± 1.03 and 25.83 ± 0.98 g/fish; specific growth rate (SGR) 31.66 ± 1.10 and 31.66 ± 0.69 ; final survival rate (%) 91.0 and 89.0% for tilapia and common carp, respectively.

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