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NURSERY PHASE *Oreochromis niloticus* CULTIVATION IN LOW SALINITY WATER DOSED WITH A PRODUCT THAT STIMULATES MICROBIOLOGICAL ACTIVITY IN AQUATIC ENVIRONMENTS

CICERO SILVA RODRIGUES DE ASSIS^{1*}, BRUNO ARAUJO DOS SANTOS²,
GLACIO SOUZA ARAUJO³

¹Undergraduate in Aquaculture Engineering at the Instituto Federal de Educação, Ciência e Tecnologia do Ceará - IFCE, Campus Aracati, rodovia CE 040, km 137,1, Aeroporto, Aracati, CE, CEP 62.800-000.

²Undergraduate in Aquaculture Engineering at the Instituto Federal de Educação, Ciência e Tecnologia do Ceará - IFCE, Campus Aracati, rodovia CE 040, km 137,1, Aeroporto, Aracati, CE, CEP 62.800-000.

³ Professor at the Instituto Federal de Educação, Ciência e Tecnologia do Ceará - IFCE, Campus Aracati, rodovia CE 040, km 137,1, Aeroporto, Aracati, CE, CEP 62.800-000.

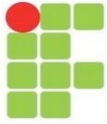
ABSTRACT: This study evaluated the zootechnical performance of the Nile tilapia (*Oreochromis niloticus*) during the fry stage and assessed the behaviour of the physical and chemical parameters of the water while applying *Biocelerator 500*[®], an aqueous solution of inorganic nanoparticles that stimulates the breakdown of organic matter, at various daily doses. The tilapias were fed four times per day (08:00; 11:00; 13:00; and 16:00) at an initial rate of 15% of the biomass of the fish, reduced later to 6% of the biomass, using a commercial feed containing 40% and 35% raw protein, respectively.

The feeding rate was adjusted fortnightly according to the updated data of the average weights of the fish. The experimental design that was adopted was completely randomized and had a 4 x 3 factorial arrangement. The product was dosed four times a day (0 mL; 2 mL; 4 mL; and 6 mL, i.e., T0; T2; T4; and T6, respectively) in each 3 m³ (3x1x1m) farming tank, with three repetitions each. The tanks were adapted with artificial aeration 24 hours per day and did not have anti-bird screens. Twelve concrete tanks, stocked with 25 fish/m³, were used (initial weights and lengths of 1.45±0.9 g and 4.15±0.5 cm, respectively).

These fish were produced and sexually reversed at the José William Bezerra e Silva Pisciculture Centre of the Instituto Federal de Educação, Ciência e Tecnologia do Ceará (Federal Institute of Education, Science and Technology of Ceará) - IFCE, Aracati Campus), which is also where this experiment was conducted. There was a total of 75 fish per tank, which was equal to an initial biomass of 0.11 kg per tank. This experiment had a duration of 56 days and occurred during the fry stage of the fish. Fifty percent of the water of the tanks was replaced once per week, which did not involve the syphoning of the bottom of the tanks for the removal of organic matter.

The growth of the animals was measured fortnightly, in which a sample of approximately 25% of the stocked fish was collected from the cultivation tanks with the aid of a net. This sample of fish provided data, such as their average weights and lengths, which were obtained using a digital semi-analytical balance and an ichthyometer, respectively. The parameters survival rates, final biomass generated, average daily weight gain and apparent feed conversion ratio were also determined at the end of the experiment for each level of treatment.

The authors noted that the fish developed best in the treatment in which 4 mL of the product was applied daily (T4). Under these conditions, the fish reached final average weights and lengths of 50.23±7.19g and 13.67±5.96 cm, respectively, as compared to 45.81±7.06g and 13.58±3.46 cm;



45.29±5.13g and 13.56±7.06 cm; and 43.20±4.84g and 13.54±8.07 cm for T6; T2 and T0, respectively.

This demonstrates higher levels of zootechnical performance in fish when using Biocelerator 500[®], a compound consisting of inorganic nanoparticles that stimulate the degradation of organic matter in water. Researchers also noted that the highest survival rate for the fish was recorded for the treatment in which a 2 mL daily dose of the product was applied (T2) (98.67±1.89%), followed by treatment levels T6; T4; and T0, which had survival rates of 96.07±0.53%; 95.33±0.94%; and 93.33±2.71%, respectively.

The highest levels of final biomass and daily increases in weight were noted for the treatment in which a 4 mL dose of the product was applied daily (T4). Those fish attained values of 3.59±0.094 kg and 0.87±0.102 g day⁻¹, respectively, followed by the treatments T6; T2; and T0, which provided the following values: 3.37±0.180 kg and 0.79±0.100 g day⁻¹; 3.35±0.056 kg and 0.78±0.066 g day⁻¹; and 3.04±0.124 kg and 0.75±0.060 g day⁻¹, respectively.

Lastly, regarding the apparent feed conversion ratio, the best result was also noted for treatment T4 (1.17±0.081), following by treatments T6 (1.20±0.025), T2 (1.25±0.161) and the control treatment (T0), which returned a value of 1.35±0.109 (Table 1). As such, the authors demonstrated the efficiency of Biocelerator 500[®] in reducing the amount of organic matter in the water with respect to each of the treatment levels that were tested, most notably that level in which a daily dosage of 4 mL was applied. In conclusion, one may compare the degradation of the organic matter at the bottom of the experimental control tank in which the product was not applied (T0), to that of the tank in which Biocelerator 500[®] was used, which also demonstrates the reduction of organic matter in the water (Figure 1).

Table 1. Survival rate (S), final biomass (B), final average weight (W), final average length (L), average daily weight gain (ADWG) and apparent feed conversion (AFC) for the fish upon completion of the cultivation (fry stage) with the application of Biocelerator 500[®] at different daily dosages. The figures are expressed as averages ± standard deviations.

Treatment	S (%)	B (kg)	W (g)	L (cm)	ADWG (g day ⁻¹)	AFC
T0	93.33±2.71	3.04±0.124	43.20±4.84	13.54±8.07	0.75±0.060	1.35±0.109
T2	98.67±1.89	3.35±0.056	45.29±5.13	13.56±7.06	0.78±0.066	1.25±0.161
T4	95.33±0.94	3.59±0.094	50.23±7.19	13.67±5.96	0.87±0.102	1.17±0.081
T6	96.07±0.53	3.37±0.180	45.81±7.06	13.58±3.46	0.79±0.100	1.20±0.025

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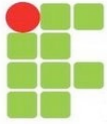


Figure 1



Figure 2

Figure 1. Bottom of the tank upon completion of cultivation depicting the treatment with the microorganism stimulant (left) and without it (right), which demonstrates the efficiency of the product in helping to degrade the organic matter in the water.

KEYWORDS: fry stage, performance, organic matter, *Oreochromis niloticus*.