EVALUATION OF A DIETARY ORGANIC ACID BLEND ON GROWTH PERFORMANCE OF TILAPIA (*Oreochromis niloticus*)

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INTRODUCTION

Widespread application of antibiotics in aquatic animal and livestock production became a public concern due to the emergence of antibiotic-resistant bacteria.

This also posted a potential hazardous for human health. The use of organic acids as an alternative method to control microbial pathogen population in fish gut is emerging as a more sustainable solution for fish production (de Vet, 2005, Ramli et al., 2005, Luckestadt, 2006,).

The propose of this study was to investigate whether an organic acid product (Biotronic AS) would improve growth performance parameters in tilapia.

MATERIALS AND METHODS

Androgen-treated all males tilapia, approximately 7 g each, were randomly allocated into rectangular plastic tanks (60 liters), using 20 fish per tank.
Six treatments with three replicates were applied in this experiment: as presented below:

•Diets

T1 - Basal Diet (31% CP)

T2 - Basal Diet + 0.5 % Oxytetracyclin (AGP)

T3 - Basal diet + 0.5% Acidifier

T4 - Basal Diet 1 % Acidifier

T5 - Basal Diet + 1.5% Acidifier

T6 - Basal Diet + 0.1 % Hexamethylenetetramine. (HMT)

Fish were fed to satiation 2 times a day, and water quality parameters (temperature, pH, dissolved oxygen (DO), and total ammonia) were monitored and recorded routinely during a 8-week experimental period.

Table 1. Growth performance of the fish fed the experimental diets

Treatments	Initial Weight (g)	Final Weight (g)	Weight Gain (g)
Control	7.73 ± 0.22[a]	37.91 ± 1.53[a]	30.17 ± 1.71[a]
Oxytetracyclin	7.27 ± 0.12[a]	40.25 ± 0.55[a]	32.99 ± 0.67[a]
0.5 % Acidifier	6.65 ± 0.28[a]	35.18 ± 2.70[a]	28.53 ± 2.89[a]
1.0 % Acidifier	7.12 ± 0.16[a]	35.08 ± 2.15[a]	27.96 ± 1.99[a]
1.5 % Acidifier	7.77 ± 0.31[a]	41.33 ± 2.92[a]	33.56 ± 3.22[a]
HMT	7.21 ± 0.21[a]	35.09 ± 3.25[a]	27.88 ± 3.44[a]

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RESULTS and DISCUSSION

Fish showed a good growth performance with 387% to 434% of body weight gain over the 9 week trial period.

Overall, there was no statistical significant difference ($P>0.05$) in weight gain, total length and FCR measurements among treatments. Optimal conditions during the trial period eg. good water quality and nutrition and no major bacterial challenge have probably contributed to the lack of significant effects between treatments.

Nevertheless, despite the optimal conditions it was possible to observe a slight performance improvement in fish fed the 1.5 % acidifier supplemented diet and AGP diet. The 1.5 % acidifier inclusion resulted in a numerical 11 % increase in body weight gain when compared to control diet (30.18 vs 33.56). and achieved better results than the inclusion of the AGP (33.56 vs 32.98.). These could be economically important during conventional tilapia production and reduce the use of antibiotics as growth promoters as previously reported by de Vet (2005).

Supplementation of organic acid salts showed no effect on observed pH (7.3-7.6).

Table 2. Effect of different dietary treatment on body length.

Treatments	Initial Length (cm)	Final Length (cm)
Control	7.73 ± 0.09[a]	12.49 ± 0.12[a]
Oxytetracyclin	7.63 ± 0.05[a]	12.75 ± 0.12[a]
0.5 % Acidifier	7.44 ± 0.13[a]	12.35 ± 0.25[a]
1.0 % Acidifier	7.56 ± 0.10[a]	12.22 ± 0.43[a]
1.5 % Acidifier	7.79 ± 0.06[a]	12.92 ± 0.50[a]
HMT	7.62 ± 0.07[a]	12.29 ± 0.46[a]

Table 3. Effects of the different dietary treatments on FCR and survival

Treatments	FCR	Survival Rate (%)
Control	1.43 ± 0.06[a]	86.67 ± 7.64[a]
Oxytetracyclin	1.40 ± 0.00[a]	86.67 ± 7.64[a]
0.5 % Acidifier	1.53 ± 0.10[a]	80.00 ± 10.00[a]
1.0 % Acidifier	1.43 ± 0.00[a]	80.00 ± 5.00[a]
1.5 % Acidifier	1.38 ± 0.09[a]	83.33 ± 7.64[a]
HMT	1.53 ± 0.18[a]	91.67 ± 5.77[a]

CONCLUSIONS

We anticipate that inclusion of dietary organic acid blends in tilapia feed may be a good alternative in order to reduce the application of AGP's and attain economic tilapia culture.

Field studies should be taken to test the efficacy of acidifiers under practical conditions.

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