

EFFECT OF OMEGA III FATTY ACID ON THE GROWTH OF HATCHERY BRED *Clarias gariepinus*

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ABSTRACT

Seventy-five (75), four weeks old hatchery bred *Clarias gariepinus* fingerlings were purchased and used for this research. The fingerlings were acclimated for five days in the tank and fed with fishmeal. Fingerlings were randomly distributed in fives into 15 bowls with a diameter of 54cm each. The bowls were randomly grouped in threes to form five treatments labelled 1-5 with three replicates each (A-C). Five different diets (I-V) with varying levels of omega III fatty acid inclusion were formulated and used to feed the fingerlings at a rate of 10% body weight. Diet 1 which was the control had no Omega III fatty acid inclusion. Diets 2-5 had 2000mg/Kg, 4000mg/Kg, 6000mg/Kg, 8000mg/Kg inclusion respectively. Length and weight were used as growth indices. These were measured weekly. Data collected were subjected to analysis of variance and means separated using Duncan's multiple range tests. Result showed that there was significant difference ($p < 0.05$) in growth, in response to the five diets. Response to diet 3 was better than the others.

Key words- *Clarias gariepinus*, fingerlings, length, weight, fishmeal

INTRODUCTION

Fatty acids are blocks of fat in the body (Zmijewski, 2016). Omega III fatty acid are unsaturated fats that the body cannot manufacture on its own, so they are gotten from food especially fish. Peter and Jenny (2017). Fish feed is the single most important factor in fish production with about 50% cost of production in fish farming being expended on feed. Thus, there is need to source for means of producing high quality feed to increase fish yield without appreciably increasing cost of feed. In achieving this goal, this study aims at investigating the effect of omega III fatty acid inclusion in fish diet on *Clarias gariepinus* fingerlings, to determine the optimum inclusion level of omega III fatty acid in the diet of *Clarias gariepinus* fingerlings and measure the standard length and body weight of fish as indices of growth.

MATERIALS AND METHODS

Collection of fish samples

Seventy-five (75), four weeks old fingerlings of pure hatchery bred *Clarias gariepinus* were bought from Izah farms, Asaba and transported to the fisheries laboratory of Delta State University, Asaba campus and used for the study.

Acclimation

The fish samples were acclimated for five days during which they were fed only fish meal. At the end of the acclimation period, the 75 fingerlings were randomly distributed in fives into 15 plastic bowls of diameter 54cm each filled with water. The bowls were then distributed 54cm each in threes to give five treatments labelled 1-5.

Feeding And Determination Of Morphometric Characteristics

Fingerlings were fed at a rate of 10% body weight with diet number corresponding to treatment. The total length and body weight of the fingerlings were measured before the commencement of the study to know the initial weight and length. Thereafter, measurement was taken weekly throughout the 8 weeks duration of the study.

Statistical Analysis

Data collected was subjected to analysis of variance (ANOVA) and means separated by using Duncan's multiple range tests.

Table 1- Ratio formulation at 40% crude protein as requirement for *Clarias gariepinus* fingerlings

INGREDIENTS	DIET1	DIET2	DIET3	DIET4	DIET5
Maize	4.60	4.60	4.60	4.60	4.60
Groundnut cake	24.00	24.00	24.00	24.00	24.00
Soyabean cake	22.00	22.00	22.00	22.00	22.00
Palm kernel cake	13.00	13.00	13.00	13.00	13.00
Wheat offal	9.80	9.80	9.80	9.80	9.80
Fish meal	24.10	24.10	24.10	24.10	24.10
Bone meal	1.00	1.00	1.00	1.00	1.00
Starch	1.00	1.00	1.00	1.00	1.00
Lysine	0.20	0.20	0.20	0.20	0.20
Methionine	0.20	0.20	0.20	0.20	0.20
Vitamin premix	0.10	0.10	0.10	0.10	0.10
Omega III fatty acid(mg)	-	2000	4000	6000	8000

Table 2- Weekly mean length (cm) of fish in various treatment diets.

Weeks	Diet/Tanks				
	1	2	3	4	5
1	6.6200 ^a ±0.1895	6.8733 ^a ±0.1048	7.2000 ^a ±0.1942	6.9400 ^a ±0.7317	6.9860 ^a ±0.1650
2	6.6607 ^a ±0.2087	7.0733 ^a ±0.4350	7.3467 ^a ±0.2421	7.1667 ^a ±0.9217	7.2400 ^a ±0.2474
3	6.7400 ^a ±0.2159	7.2600 ^b ±0.1632	7.7000 ^b ±0.2935	7.2933 ^b ±0.2337	7.4331 ^b ±0.2478
4	6.9900 ^a ±0.2309	7.1667 ^a ±0.2050	7.7733 ^a ±0.3358	7.7513 ^a ±0.2677	7.5533 ^a ±1.0714
5	7.0133 ^a ±0.2392	7.8133 ^b ±0.2046	7.0467 ^b ±0.3448	7.7200 ^b ±0.0208	7.5533 ^b ±1.0714
6	6.9867 ^a ±0.2705	8.1200 ^b ±0.2362	12.1233 ^c ±0.4147	7.6933 ^a ±0.2986	7.2733 ^a ±0.2849
7	6.7933 ^a ±0.3372	8.287 ^a ±0.2727	12.400 ^b ±0.3863	7.7333 ^a ±0.2986	7.4733 ^b ±0.2849
8	6.8533 ^a ±0.3436	8.4600 ^c ±0.2930	8.5067 ^c ±0.4038	7.8600 ^b ±0.2986	7.4330 ^b ±0.3942

Superscripts with the same alphabets on the horizontal rows are not significantly different ($P>0.05$)

Table 3- Weekly mean weight (g) of fish in various treatment diets.

Weeks	DIETS/TANKS				
	1	2	3	4	5
1	2.3060 ^a ±0.2085	2.8330 ^b ±0.1498	2.7867 ^b ±0.2485	2.9133 ^b ±0.1980	3.2667 ^b ±0.2312
2	2.4067 ^a ±0.2318	3.6800 ^b ±0.1759	3.7330 ^b ±1.1139	3.4333 ^b ±0.2373	3.3335 ^b ±0.2375
3	2.6200 ^a ±0.2104	3.2267 ^a ±0.1878	2.9067 ^a ±0.3527	2.6067 ^a ±0.2837	2.5267 ^a ±0.2619
4	3.1669 ^a ±0.2914	4.2867 ^a ±0.2831	3.6333 ^a ±1.7860	3.2667 ^a ±0.2729	6.0933 ^b ±3.2152
5	3.1132 ^a ±0.2792	4.3667 ^b ±0.2894	3.6400 ^a ±0.4720	3.3133 ^a ±0.2838	2.9933 ^a ±0.2962
6	3.9000 ^a ±0.3871	4.9200 ^b ±0.4322	4.3067 ^a ±0.5957	3.7360 ^a ±0.2567	3.0667 ^a ±0.3097
7	2.9133 ^a ±0.4763	4.9667 ^b ±0.4657	4.3935 ^c ±0.6856	3.5200 ^a ±0.2924	2.9533 ^b ±0.3414
8	2.9600 ^a ±0.4971	5.0600 ^b ±0.4722	5.6400 ^b ±0.7453	3.6200 ^a ±0.2944	3.0333 ^a ±0.3309

Superscript with same alphabets in the horizontal rows are not significantly different ($P>0.05$)

Table 4- Overall mean weight (g) and length (cm) of fish in various diets

Parameters	DIETS/TANKS				
	1	2	3	4	5
Weight	2.96 ^c	3.76 ^b	4.17 ^a	3.30 ^c	3.43 ^c
Length	6.98 ^c	7.71 ^b	8.39 ^a	7.51 ^b	7.56 ^b

Superscripts with the same alphabet in the horizontal rows are not significantly different ($P>0.05$)

Table 5-Proximate analysis for diets

	DIETS				
	1	2	3	4	5
Ether extract	38.39	38.36	40.60	53.09	65.93
Crude protein	40.00	40.00	40.01	39.96	40.00
Crude fiber	89.2	95.3	93.50	98.84	96.20
Ash	16.54	17.82	18.40	17.51	20.60
Moisture	11.80	15.80	15.97	11.47	11.70

RESULTS AND DISCUSSION

This study revealed that fish fed with no lipid source had poor growth performance. This is supported by Okoye and Eyo (2014), who reported that fingerlings fed with no lipid source, had poor growth performance. At the initial stage of the experiment, there were left over feed in the tank which was not unusual the fish were still getting used to the new diet. The consumption increased by the second week, this is because they were now used to the diet fed to them.

In this study, it was observed that there was a significant increase in weight in tank 3 fed diet 3 (4000mg/kg), followed by tank 2 fed diet 2 (2000mg/kg). Growth rate of fish samples in tank 1 which is the control tank with no inclusion of omega III fatty acid was lower than all other tanks. This result is supported by George Mateljan foundation (2009) who reported that omega III fatty acid in cat fish diet increased growth of the fish. Fatty acid fish are utilized for energy (Steven and Helfish, 2012).

The study therefore, has proved that the inclusion of omega III fatty acid which is a high energy nutrient at the rate of 4000mg/mg of feed will lead to increase in length and weight of *Clarias gariepinus*. Also the inclusion of higher or lower values of omega III fatty acid would lead to poor growth. Therefore, 4000mg/kg of omega III fatty acid inclusion in the diet of *Clarias gariepinus* will increase the growth rate.

CONCLUSION AND RECOMMENDAION

In conclusion, fishes were found to perform better in tank 3 fed 4000mg/kg of omega III fatty acid. Inclusion of omega III fatty acid in fish diet may ensure a better growth rate in fish production.

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