

Dietary Supplementation of Plant-Based Immune Booster and Antioxidant (curae health Oxyphpto) for Health Management in Nile Tilapia fingerlings

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Abstract

This research investigated the feeding rates of 2, 4, 6 and 8 per cent and control of 60 days with oxyphyto™, Tilapia fish growth enactment, nutritional efficacy and antioxidant capability. The experiment was conducted by randomly placing fish in experimental units; the quality of water was satisfactory to the species. The dietary oxyphyto™ significantly ($P < 0.05$) improved the maximum body weight, weight gain and growth performance. Gradual increase in nutritional profile and antioxidant capacity has significantly increased values ($P < 0.05$) in all the diet. Oxyphyto™-dosing biosafety data can aid in setting up fish health and food safety management practices.

Introduction

The oxyphyto™ helps to stimulate immunity, enhance metabolism and stamina system in the body of the all the living organism Oxyphyto formula has a combination of super antioxidants and phytonutrients extracts that can be found in nature and combined to enhance health. The natural extracts to be used in the formulation are all handpicked and of the best quality (Senthil Kumaran et al., 2008). Formulated diets are commonly used in

aquaculture to fulfill the nutritional needs of cultured aquatic organisms. The formulated diets are tailored and balanced to deliver the required nutrients, vitamins and minerals needed to grow, to promote the health and the wellbeing of the cultured organisms. Such diets are useful in the field of maximizing growth rates, reproductive performance as well as immune system functionality thereby making aquaculture operations efficient

and sustainable. Developed diets are particularly essential where natural food sources are inadequate or not in enough amounts to cater to the nutrition requirements of the cultured species (Menaga and Fitzsimmons, 1969). Unlike other fish that are too unclean to cultivate, it is easier to cultivate it to make a profit or a non-profit. Over the last few years, the culture of tilapia fish has gained great popularity among fish farmers. Today, it is the second largest producer of all the world, right after carp (Chen et al., 2010). Fish development will be based on either negative or positive factors. The aquaculture predominantly relies on feeding as ingestion of feed and stocking rates, biotic and abiotic interactions (Bhatnagar et al., 2010). Thus, proper management of fish ponds needs the understanding of quality of the water which is affected by abiotic and biotic processes (Slawski et al., 2011). In Australia and some other countries, fish contributes 63% of faunal protein consumption and the annual fish consumption is 14 4kg/cap. The world is involved in fisheries activities with about 1.4 million people directly and 11 million people indirectly. According to a nutrition survey, every year, approximately 30,000 children become blind due to vitamin deficiency (Valente et al., 2013). In order to increase the consumption of animal

proteins, capture the attention on aquaculture. River and estuary fish production is a hard task and thus pond aquaculture must be resorted to. Carp, tilapia, and catfish are found in freshwater aquaculture. The other agriculture (aquaculture) is competing with land and water. There could be a possibility of an intense fish culture style that can be used to boost fish production to supply the Indian population which is growing in size with animal protein most of which is provided by fish of 60 per cent of our daily protein needs (Dof, 2008). Due to population growth and unavailability of more land resources, intensive aquaculture is evolving towards augmented fish production in a country. In India, a typical, semi-intensive aquaculture method is used for fish culture. Due to population growth, the land in Bangladesh is waning. The intensive systems of aquaculture yield greater numbers of fish in a lower area as compared to semi-intensive and extensive systems. Aquaculture needs antibiotic treatment to combat infections and promote growth of fish (Chen et al., 2010). The most prevalent is the oral antibiotic therapy that is used in aquaculture due to its ability to decrease contamination (Abraham et al., 2021). This study used tilapia as an experiment species to examine fish growth in the lab utilizing an immunomodulatory diet.

Materials And Methods

Collection and acclimatisation

Fish with an average weight of 5.6 g were haphazardly allocated among fifteen glass aquariums, each having a height of 5.08 cm, and the water levels were standardized at 30 cm. All tanks had continual aeration and carbon-filtered water. Daily tank water changes. This experiment employed a 12-hour indoor light cycle. Fish were fed tailored meals until satiety twice daily at 09:00 and 17:00 h for 12 weeks. Three tanks of each diet. Every two weeks, tank-weighted fish were weighed to track growth. Diet-starved fish were handled to reduce stress. Diet was tracked every day. Final sampling was used to weigh each fish individually.

Designing an experiment

Initially, the fish were categorized into five experimental groups, with each tank accommodating 40 fish. The four dietary variations included Oxyphyto TM at concentrations of 2%, 4%, 6%, and 8%, while the control group received a diet without Oxyphyto TM. The trial spanned 60 days, during which the fish were fed a stable pelleted diet equivalent to 5% of their body weight. The feeding regimen aligned with their respective diets for the first 30 days, after which assessments of

growth, nutritional composition, and antioxidant capacity were conducted at 30-day intervals.

Feed preparation with oxyphytoTM

The preparation processes for fish feed (Hardy, 1996). The food ingredients homogenized feed components. Hand-mixing the aforementioned materials with distilled water created a paste. The paste was cut into 2cm square flakes and frozen at -20 °C. Fish meal and groundnut cake provide protein, lipids from fish oil, carbs from rice flour, binders from wheat flour, and mineral and vitamin combinations (Table.1).

Feed immovability determination

The water immovability of the pellets was gritty over period of 1 hour by wet durability test with significant reform to suit the existing situation. The triplicate of 5g samples of pellet of each diet were dropped into small petriplate with plastic tank containing continues aerated seawater. The immersion times examined were 10, 20, 30, 40, 50, 60 mints. After immersion the dissolved solids pellet feed were taken and dried out in the oven at 105 0 C for 30 min. Feed stability was calculated using the following formula:

$$\text{Water immovability (\%)} = \frac{\text{Finial dry weight} - \text{Initial dry weight}}{\text{Initial dry weight}} \times 100$$

Growth estimation

To study fish development and feed utilization after 60 days on oxyphytoTM.

The growth factors were designed using the following formula:

$$\text{Weight expansion (g)} = \text{Final weight (g)} - \text{Initial weight (g)}$$

$$\text{SGR (\%)} = 100 \times \frac{\ln W_1 - \ln W_0}{T}$$

Where, W_0 = Average initial body weight

W_1 = Average final body weight, T = time

$$\text{FCR (g)} = \frac{\text{Total feed expended by fish (g)}}{\text{Total weight expansion by fish (g)}}$$

$$\text{Survival (\%)} = 100 \times \left(\frac{\text{Final fish number}}{\text{Initial fish number}} \right)$$

Assessment of Protein

Fish (10 mg) dried tissue samples were homogenized with 1 cc of 10% TCA on ice. Samples were centrifuged at 3000 rpm for 20 minutes. After dissolving pellets in 1N NaOH, protein was estimated. 10 min at room temperature with 5 ml of alkaline reagent. Add 5 ml of 1N Folin-Ciocalteu reagent, stir, and leave at room temperature for 30 minutes. The OD was recorded against the blank at 640 nm (Niamke et al., 2016).

$$\text{Protein (\%)} = \frac{\text{Standard value} \times \text{OD of the sample}}{\text{Weight of the tissue (g)}} \times 100$$

Assessment of Carbohydrate

The optical density of 5 mg of oven-dried tissue was determined in a test tube containing 1 ml of 5% phenol and 50 ml of concentrated sulfuric acid. The

measurement was taken at 490 nm against a blank after incubating for 30 minutes at 30°C, using D-glucose (Dubois et al., 1956).

$$\text{Carbohydrate (\%)} = \frac{\text{Standard value} \times \text{OD of the sample}}{\text{Weight of the tissue (g)}} \times 100$$

Assessment of Lipid

2:1 chloroform: methanol mixture (5 ml) was added to 500 mg of powdered dried tissue, and the ensuing mixture was filtered through a microfilter

to remove lipids. After drying in the oven and refilling with fat, this extract was measured into a preweighed beaker and reweighed (Folch et al., 1957).

$$\text{lipid (\%)} = \frac{\text{Weight of the lipid content (g)}}{\text{Weight of the tissue (g)}} \times 100$$

Assessment of ash

The dry weight of 1 gram, underwent combustion in a muffle furnace at 560°C for a duration of 5 hours to determine the

ash content. The resulting residues were then weighed, and the percentage was calculated (FAO, 2009).

$$\text{Ash (\%)} = \frac{\text{Weight of ash (g)}}{\text{Weight of the sample (g)}} \times 100$$

Assessment of Moisture

The moisture content of wet tissues were predictable by following the formula

$$\% \text{ Composition of moisture} = \frac{\text{Wet weight of tissue (g)} - \text{dry weight of tissue (g)}}{\text{Wet weight of tissue (g)}} \times 100$$

Assessment of antioxidant activity

Muscles oxidative stress levels were measured based on the oxidative stress biomarker concentrations, viz., catalase activity and superoxide dismutase (SOD) activity.

0.1 ml of 1.5mM NBT and 67mM, pH 7.8 phosphate buffer. The absorbance of the solution at 560 nm was recorded after the solution was added with 0.05ml riboflavin. The absorption of the blue color was re-tested after 15 minutes of continuous light. Percent inhibition was determined by a comparison between sample and control absorbances. The required volume of the sample to scavenge half of the superoxide anion was 1 unit of enzyme activity, per U/mg protein (McCord et al., 1969).

Super Oxide Dismutase Activity (SOD)

The 0.01 ml of tissue homogenate was added to the 0.2 ml of 0.1M EDTA,

Catalase activity (CAT)

The enzymatic process was measured with the help of the method of studying catalase activity (Cohen et al., 1970). 100 μ L of tissue extract was mixed with 0.17 mmol/L (10 μ L mmol/mL) ethanol and incubated on ice for 30 minutes. 30 min later 1 per cent Triton - 100 was added and samples were left at room temperature. Room temperature reactions. The H₂O₂ breakdown of catalase was measured. To 200 of phosphate buffer, 50 ul of phosphate buffer and 50 ul of tissue extract, 1 ml of H₂O₂ in phosphate buffer was added and mixed. The reaction was stopped after 30 minutes by 100 μ L H₂SO₄. Any excess H₂O was spectrophotometrically measured at 480 nm over a 30-60 seconds period using 1.0 absorbance unit as the standard KMnO₄. The U/mg protein of catalase (CAT) activity is in the form of U/mg protein.

Statistical analysis

All the experiment data were evaluated by the oneway analysis of variance (ANOVA) and Duncan multiple range test (Testing of a p value at 0.05 to indicate significance) which was done using the SPSS version 20.

Results

Feed Stability

The feed stability test results of experimental diets in water are given in Table. 2 demonstrates the results of feeding tests in water. All diets were stable after 10 min immersed in water. The concentration of oxyphytoTM extract does not have an impact on feed stability.

Growth performance

The differences in the weight of fish (g), length (cm) or survival (percent) of fish with the different diets were not found to have any significant difference ($p > 0.05$). It is interesting to note that the diet with the best percentage gain in surviving body weight was the 8% diet. The average fish (*O. niloticus*) length and weight and survival rate of fed with formulated diet for 60 days are shown in Table. 3. There were no differences in body weight (g), fish length (cm) and survival rate (%) among the diets ($p > 0.05$). The diet with the greatest gain of surviving body weight was the 8 % diet.

Antioxidant activity

In this research the SOD and Catalase activity was higher in fish that were fed oxyphytoTM diet. The 2%, 4%, 6% and 8% of the activity of the SOD activity was significantly increased by oxyphytoTM fed highest as compared to control diet. Among the SOD activity the maximum activity was observed in diet for

8 % (31.18 ± 0.21 U/mg protein) at 60th day and the minimum in control diet (12.52 ± 0.26 U/mg protein) at 30th day (Table.4a and Table 4b). Among the Catalase activity the maximum activity was observed in diet for 8 % (50.74 ± 0.50 U/mg protein) at 60th day and the minimum in control diet (43.72 U/mg protein) at 30th day (Table.4a and Table 4b). The present investigation suggested that 8% of diet was significantly higher antioxidant profile in fish tissues compared to control diet.

Proximate Composition

The proximate composition of Nile tilapia fed with oxyphytoTM was significantly ($p < 0.05$) no different level for during experimental time (Table. 5a and 5b). Among the proximate composition the maximum percentage of protein was noted during 60th day of 8% diet ($39.14 \pm 0.47\%$) and the lowest in control diet at 30th day ($38.65 \pm 0.27\%$). The carbohydrate percentage was maximum during 60th day at 6% of diet ($12.76 \pm 0.09\%$) and the lowest in control diet at 30th day ($12.84 \pm 0.30\%$). The lipid level percentage was maximum during 60th day at 6 % of diet ($4.26 \pm 0.32\%$) and the lowest in control diet at 30th day (4.12 ± 0.23). The moisture content level was maximum during 60th day at 6 % of diet ($68.05 \pm 0.09\%$) and the lowest in control

diet at 30th day ($64.16 \pm 0.39\%$). The maximum percentage of moisture of the ash was obtained on 60th day with 8% diet ($9.19 + 0.78$ 0.12) and lowest in control diet ($6.79 + 0.12$) diet. Increased ash content of the sample lowered the digestibility of other components of the diet leading to poor growth of the aquatic organisms that low ash content was treated as good to human consumption. The analysis of the results provided above showed that snails that were nourished by 8% oxyphytoTM had the most prominent levels of proximate composition in relation to that of snails on the control diet.

Discussion

Commercial fish farming depends on good fish feed. There is also a wide supply of domestic raw materials in the country, such as, fowl by-product meal, blood meal, and oilcakes, cereal by products, and leaf meals are in the mix (Akand et al., 1991). These simple feeds are applicable in supplementing fish feed (Bhadra et al., 1996). Growing and surviving fish need food. This paper discloses that the frequency of feeding is associated with weight. The oxyphytoTM that had been created was the current diet which increased overall energy and metabolic rate. It lowers the level of tension and enhances mood. This is an immunity booster which has potent

antioxidants, phytonutrients and natural extracts. Proximate compositions aid in the determination of the nutrient and energy levels of an aquatic organism. Plant-based diet impacted *O. niloticus* proximate makeup. This could be because of better feed consumption in Plant and Animal source formulated diets, and that fish fingerlings had a greater intake of feed leading to greater feed consumption and a higher fish protein content (Abdel-Tawwab et al., 2008). The fish that was fed using herbal extracts increased at a faster rate. Our study revealed that *O. niloticus* grew more when using oxyphytoTM prepared meals (immune booster) because of its biochemical composition (Zhang et al., 2006). Methanolic extracts of herbs increased survival and growth of shrimp, but also decreased the bacterial load (Citarasu et al., 2003). Both gain of body weight and enhancing immune booster of carp fish following feeding trial of a 5:1 ratio of chinese angelica root preparation of a TCM. Tilapia fed a 6% oxyphytoTM diet had higher growth compared to one fed on a control diet (Jiang et al., 2015). Fishmeal constitutes 60 percent or more of aquaculture diets and substituting this feed constituent has been a long-term objective (Karapanagiotidis et al., 2014). The soy protein with added gluten of wheat and chicken by-products can be used as up to

50% of fishmeal in feed formulations. Fish growth and biomarkers are used to measure the growth of the species in feeding experiments. In underdeveloped countries, there is optimal development, survival, feed efficiency, and production with low cost, high-quality feeds (Limbu et al., 2020). The antioxidant functions and antioxidation of free radical were enhanced with the nutritional immune booster feed (Wan et al., 2019). These findings demonstrated that the immune booster diet fy2qa could lead to changes in the liver and muscle antioxidant capacity by squashing the free radicals (Murakami et al., 2006). Some studies indicate that tetracyclines are antioxidants (Limbu, et al., 2020). SOD and MDA levels in the two tissues had almost reverted to control levels after 3 weeks of no dosing. The activities of SOD and CAT in oxyphytoTM fed fish were the same as in the control in our investigation. oxyphytoTM purifies and de-toxicifies the body. Vitamin C, Vitamin E and Vitamin A lessen the effect of oxidative damage and chronic illness. Ascorbic acid helps in the process of natural skin rejuvenation which repairs the damaged cells. Purifies and cleans the body. We had an indication that oxyphytoTM can enhance antioxidant signalling in fish. When the dosage was discontinued, antioxidant capacity of fish improved.

Conclusion

Finally, oxyphytoTM dose levels in *O. niloticus* lowered mortality, growth and immunobooster when dosed. It decreased antioxidant capacity, balanced immune related genes, and caused cellular stress in healthy *O. niloticus*. A 60-day post-medication improvement observation of OxyphytoTM residues was observed. This study on oxyphytoTM biosafety will help create fish health management methods and increase fish safety.

Conflict of Interest

The authors report no conflicts of interest in this work

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References

- Abdel-Tawwab, M., Abdel-Rahman, A. M., & Ismael, N. E. M. (2008). Evaluation of commercial live baker's yeast (*Saccharomyces cerevisiae*) as a growth promoter for fry Nile tilapia

(*Oreochromis niloticus* L.) challenged with *Aeromonas hydrophila*. *Aquaculture*, 280(1–4), 185–189.

- Abraham, T. J., Julinta, R. B., Roy, A., Singha, J., Patil, P. K., & Kumar, K. A. (2021). Dietary therapeutic dose of oxytetracycline negatively influences the antioxidant capacity and immune-related genes expression in Nile tilapia (*Oreochromis niloticus* L.). *Environmental Toxicology and Pharmacology*, 87, 103685.
- Akand, A. M., Soeb, M., Hasan, M. R., & Kibria, M. G. (1991). Nutritional requirements of Indian major carp, *Labeo rohita* (Hamilton): Effect of dietary protein on growth, food conversion and body composition. *Agriculture International*, 1, 35–43.
- Bhadra, A., Hossain, M. A., Kamal, M., & Rahman, M. A. (1996). Growth and survival of African catfish (*Clarias gariepinus*) on different formulated feed and live food mixtures. *Progressive Agriculture*, 7(1), 47–51.
- Bhatnagar, A., Jana, S. N., Garg, S. K., Patra, B. C., Singh, G., & Barman, U. K. (2014). Water

quality management in aquaculture.

In *Course Manual of Summer School on Development of Sustainable Aquaculture Technology in Fresh and Saline Waters* (pp. 203–210). CCS Haryana Agricultural University.

- Chen, J., Sun, R., Pan, C., Sun, Y., Mai, B., & Li, Q. X. (2010). Antibiotics and food safety in aquaculture. *Journal of Agricultural and Food Chemistry*, 68(43), 11908–11919.
- Citarasu, T., Venkatramalingam, K., Micheal Babu, M. M., Raja Jeya Sekar, R., & Petermarian, M. (2003). Influence of the antibacterial herbs *Solanum trilobatum*, *Andrographis paniculata* and *Psoralea corylifolia* on the survival, growth and bacterial load of *Penaeus monodon* post larvae. *Aquaculture International*, 11(6), 581–595.
- Cohen, G., Dembiec, D., & Marcus, J. (1970). Measurement of catalase activity in tissue extracts. *Analytical Biochemistry*, 34, 30–38.
- Department of Fisheries (DoF). (2009). *Training Manual on Water Quality Management in Shrimp Farm* (p. 108). Dhaka, Bangladesh: Department of Fisheries.
- Dubois, M., Gilles, K. A., Hamilton, J. K., Rebers, P. A., & Smith, F. (1956). Colorimetric method for determination of sugars and related substances. *Analytical Chemistry*, 28(3), 350–356.
- Folch, J., Lees, M., & Sloane Stanley, G. H. (1957). A simple method for the isolation and purification of total lipides from animal tissues. *Journal of Biological Chemistry*, 226(1), 497–509.
- Food and Agriculture Organization. (2009). *The State of World Fisheries and Aquaculture 2008*. Rome: Food and Agriculture Organization of the United Nations.
- Hardy, R. W. (1996). Alternate protein sources for salmon and trout diets. *Animal Feed Science and Technology*, 59(1–3), 71–80.
- Jiang, J., Shi, D., Zhou, X. Q., Hu, Y., Feng, L., & Liu, Y. (2015). In vitro and in vivo protective effect of arginine against lipopolysaccharide-induced inflammatory response in the intestine of juvenile Jian carp (*Cyprinus carpio* var. Jian). *Fish &*

- Shellfish Immunology*, 42(2), 457–464.
- Karapanagiotidis, I., Daskalopoulou, E., Vogiatzis, I., Rumbos, C., Mente, E., & Athanassiou, C. (2014). Substitution of fish meal by fly (*Hermetia illucens*) prepupae meal in the diet of gilthead seabream (*Sparus aurata*). In *Proceedings of HydroMediT* (pp. 110–114). Volos, Greece.
 - Limbu, L.-Q., Chen, M.-L., & Zhang, Z.-Y. D. (2020). A global analysis on the systemic effects of antibiotics in cultured fish and their potential human health risk: A review. *Fish and Fisheries*.
 - Limbu, S. M., Chen, L.-Q., Zhang, M.-L., & Du, Z.-Y. (2020). A global analysis on the systemic effects of antibiotics in cultured fish and their potential human health risk: A review. *Reviews in Aquaculture*, 1–45.
 - Lugert, V., Thaller, G., Tetens, J., Schulz, C., & Krieter, J. (2016). A review on fish growth calculation: Multiple functions in fish production and their specific application. *Reviews in Aquaculture*, 8(1), 30–42.
 - McCord, J. M., & Fridovich, I. (1969). An enzymic function for erythrocyte. *Journal of Biological Chemistry*, 244(22), 6049–6055.
 - Menaga, M., & Fitzsimmons, K. (1969). Growth of the tilapia industry in India. *World Aquaculture Society*, 48, 49–52.
 - Murakami, Y., Ishii, H., Takada, N., Tanaka, S., Machino, M., Ito, S., & Fujisawa, S. (2008). Comparative anti-inflammatory activities of curcumin and tetrahydrocurcumin based on the phenolic O–H bond dissociation enthalpy, ionization potential and quantum chemical descriptors. *Anticancer Research*, 28(2A), 699–707.
 - Niamke, S., Patrice, K. P., Kouadio, J., & Koffi, D. (2016). Effect of some chemicals on the accuracy of protein estimation by the Lowry method. *Biochemistry*, 17(2), 1–5.
 - Senthil Kumaran, V. S., Arulmathi, K., Srividhya, R., & Kalaiselvi, P. (2008). Repletion of antioxidant status by EGCG and retardation of oxidative damage induced macromolecular anomalies in aged

rats. *Experimental Gerontology*, 43(3), 176–183.

- Slawski, H., Adem, H., Tressel, R. P., Wysujack, K., Kotzamanis, Y., & Schulz, C. (2011). Austausch von Fischmehl durch Rapsproteinkonzentrat in Futtermitteln für Steinbutt (*Psetta maxima* L.). *Züchtungskunde*, 83, 451–460.
- Valente, L. M. P., Moutou, K. A., Conceição, L. E. C., Engrola, S., Fernandes, J. M. O., & Johnston, I. A. (2013). What determines growth potential and juvenile quality of farmed fish species. *Reviews in Aquaculture*, 5, S168–S193.
- Wan, Z., Wang, C., Zhou, J., Shen, M., Wang, X., Fu, Z., & Jin, Y. (2019). Effects of polystyrene microplastics on the composition of the microbiome and metabolism in larval zebrafish. *Chemosphere*, 217, 646–658.
- Zhang, Y., Zhang, K., Dabrowski, P., & Hliwa, P. (2006). Indispensable amino acid concentrations decrease in tissues of stomachless fish, common carp, in response to free amino acid- or peptide-based diets. *Amino Acids*, 31, 165–172.

Table 1: OxyphytoTM Composition of basal and experimental diets fed with *Oreochromis niloticus*

S.No	Ingredients	Control	2%	4%	6%	8%
1	Fish meal	38	37	36	35	34
2	Ground nut oil cake	38	37	36	35	34
3	Maida	11	11	11	11	11
4	Tapioca	11	11	11	11	11
5	Cod liver oil	1	1	1	1	1
6	Vitamin & Mineral premix *	1	1	1	1	1
7	Oxyphyto	0	2	4	6	8
Nutritional Composition (%)						
1	Moisture	65.55 ± 0.25 ^a	60.15 ± 0.56 ^a	59.55 ± 0.24 ^c	61.50 ± 0.19 ^a	63.16 ± 0.45 ^a
2	Protein	35.65 ±	37.58 ±	38.02	38.69	40.02 ±

		0.27 ^a	0.33 ^b	±0.18 ^c	±0.15 ^a	0.13 ^a
3	Carbohydrate	11.84 ± 0.10 ^a	11.31 ± 0.41 ^a	11.07 ± 0.12 ^b	13.16 ± 0.18 ^b	13.47 ± 0.32 ^a
4	Fat	3.12 ± 0.13 ^a	3.45 ± 0.12 ^a	3.02 ± 0.10 ^a	2.84 ± 0.11 ^a	2.39 ± 0.39 ^{ac}
5	Ash	6.79 ± 0.15 ^c	7.31 ± 0.07 ^a	8.77 ± 0.08 ^a	8.50 ± 0.15 ^c	8.16 ± 0.15 ^{ab}

^{abc} (Mean±SD) the identical letters in a row are not distinguishable at P<0.05

Table 2. Feed immovability of experimental diets with Oxyphito™

Time (Minutes)	Fed with Oxyphyto™ (%)				
	Control	2%	4%	6%	8%
10	96.31 ± 0.38 ^a	96.63 ± 0.49 ^{ba}	97.92 ± 0.27 ^{ca}	98.12 ± 0.23 ^{da}	98.13 ± 0.73 ^e
20	95.13 ± 0.24 ^a	95.63 ± 0.44 ^b	96.44 ± 0.37 ^c	96.79 ± 0.35 ^d	95.13 ± 0.47 ^e
30	92.78 ± 0.74 ^a	94.11 ± 0.22 ^{ba}	93.35 ± 0.27 ^{ca}	90.12 ± 0.36 ^d	92.12 ± 0.81 ^e
40	89.17 ± 0.86 ^a	85.84 ± 0.34 ^b	86.39 ± 0.61 ^{ca}	84.91 ± 0.84 ^{da}	86.65 ± 0.36 ^{eb}
50	87.25 ± 1.02 ^{ab}	85.22 ± 0.61 ^{ba}	83.12 ± 0.48 ^{ca}	85.41 ± 0.26 ^{da}	82.62 ± 0.31 ^{eb}

60 84.61 ± 0.56^a 87.14 ± 0.46^b 85.69 ± 0.12^c 86.94 ± 0.74^d 83.91 ± 0.29^{eabc}

^{abcd} (Mean $\pm$ SD) the identical letters in a row are not distinguishable at $P < 0.05$.

Table 3. Growth Performance Assessment of *O. niloticus* under Oxyphyto™ Feeding for (60 days)

S.No	Treatments	Initial body weight	Final weight body	Initial length (cm)	Final length (cm)	Weight gain (g)	SGR (g)	FCR (%)	Survival (%)
1	Control	5.36 ± 0.39^{ab}	12.65 ± 0.02^b	5.08 ± 0.15^a	6.51 ± 0.01^a	7.29 ± 0.12^b	12.15 ± 0.01^{aa}	0.46 ± 0.14^b	85 ± 0.57^b
2	2%	5.12 ± 0.45^{ab}	13.61 ± 0.02^{ba}	5.21 ± 0.16^a	6.41 ± 0.04^b	8.49 ± 0.036^a	14.15 ± 0.05^a	0.41 ± 0.29^a	88 ± 0.57^b
3	4%	5.69 ± 0.27^{ac}	15.23 ± 0.01^{ba}	5.61 ± 0.08^a	6.08 ± 0.09^a	9.54 ± 0.01^a	15.09 ± 0.01^a	0.38 ± 0.05^a	89 ± 0.57^{ab}
4	6%	5.67 ± 0.26^a	19.26 ± 0.03^b	5.96 ± 0.06^b	6.55 ± 0.07^a	13.59 ± 0.05^{ac}	22.65 ± 0.05^a	0.29 ± 0.05^b	93 ± 0.57^b
5	8%	5.02 ± 0.36^{ac}	18.56 ± 0.02^{bc}	5.65 ± 0.04^c	6.96 ± 0.05^a	13.54 ± 0.14^b	22.56 ± 0.06^b	0.27 ± 0.03^{ac}	92 ± 0.57^b

^{abcd} (Mean $\pm$ SD) the identical letters in a row are not distinguishable at $P < 0.05$.

Table 5a . Proximate Composition Analysis of *O. niloticus* Following a 30-Day Feeding Period with Oxyphyto™

Proximate Composition						
S. No	Nutritional composition (%)	Control	2%	4%	6%	8%
1	Moister	70.88 ± 0.35 ^a	66.15±0.46 ^{cb}	65.65 ± 0.20 ^{ca}	66.27 ± 0.29 ^{da}	64.16 ± 0.35 ^{ea}
2	Protein (%)	38.65 ± 0.27 ^{ac}	40.58 ± 0.43 ^{bc}	41.02 ± 0.17 ^c	40.90 ± 0.35 ^{dc}	41.22 ± 0.33 ^{ec}
3	Carbohydrate (%)	12.84 ±0.30 ^{ab}	12.31± 0.34 ^b	12.07 ± 0.13 ^c	13.16 ± 0.10 ^{ab}	12.47 ± 0.40 ^{el}
4	Fat (%)	4.12 ± 0.23 ^{ad}	3.21 ± 0.33 ^{bd}	2.58 ± 0.28 ^{cd}	2.92 ± 0.12 ^d	2.12 ± 0.29 ^e
5	Ash (%)	6.79 ± 0.12 ^a	7.31 ± 0.07 ^b	8.77 ± 0.06 ^{ca}	8.50 ± 0.08 ^{da}	8.17±0.08 ^{ea}

^{abc} (Mean±SD) the identical letters in a row are not distinguishable at P<0.05.

Table 5b. Proximate Composition Analysis of *O. niloticus* Following a 60-Day Feeding Period with Oxyphyto™

Proximate Composition						
S. No	Nutritional composition (%)	Control	2%	4%	6%	8%
1	Moister	72.18 ± 0.15 ^a	69.25±0.36 ^{cb}	67.35 ± 0.50 ^{ca}	68.05 ± 0.09 ^{da}	67.26 ± 0.25 ^{ea}
2	Protein (%)	39.15 ± 0.47 ^{ac}	42.58 ± 0.33 ^{bc}	42.32 ± 0.17 ^c	43.10 ± 0.25 ^{dc}	43.22 ± 0.13 ^{ec}
3	Carbohydrate (%)	13.05 ±0.10 ^{ab}	13.31± 0.44 ^b	13.08± 0.33 ^c	14.26 ± 0.30 ^{ab}	13.17 ± 0.10 ^{el}
4	Fat (%)	4.18 ± 0.33 ^{ad}	3.81 ± 0.13 ^{bd}	3.18 ± 0.18 ^{cd}	3.92 ± 0.52 ^d	3.12 ± 0.79 ^e
5	Ash (%)	7.19 ± 0.32 ^a	7.11 ± 0.27 ^b	9.77 ± 0.31 ^{ca}	9.10 ± 0.31 ^{da}	9.19±0.78 ^{ea}

^{abc} (Mean±SD) the identical letters in a row are not distinguishable at P<0.05.

4a . Antioxidant assay of *O. niloticus* fed with oxyphytoTM after 30 days

S.No	Treatments	SOD (U/mg Protein)	Catalyze (U/mg Protein)
1	Control	12.52 ± 0.26 ^a	43.72 ± 0.08 ^b
2	2%	13.32 ± 0.34 ^a	46.79 ± 0.43 ^{ab}
3	4%	15.28 ± 0.25 ^a	48.53 ± 0.10 ^a
4	6%	17.46 ± 0.26 ^a	51.21 ± 0.07 ^{ba}
5	8%	18.89 ± 0.33 ^a	50.35 ± 0.26 ^a

^{abc} (Mean±SD) the identical letters in a row are not distinguishable at P<0.05

Table 4b. Antioxidant assay of *O. niloticus* fed with oxyphytoTM after 60 days

S. No	Treatments	SOD (U/mg Protein)	Catalyze (U/mg Protein)
1	Control	21.46 ± 0.21 ^a	24.74 ± 0.25 ^b
2	2%	23.46 ± 1.02 ^a	20.45 ± 0.17 ^b
3	4%	27.38 ± 0.06 ^a	40.61 ± 0.55 ^{ba}
4	6%	34.51 ± 0.09 ^{ab}	56.25 ± 0.02 ^b
5	8%	31.18 ± 0.21 ^a	50.74 ± 0.50 ^b

^{abc} (Mean±SD) the identical letters in a row are not distinguishable at P<0.05