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Growth performance of ornamental fish species *Poecilia reticulate* W. Peters and *Pethia conchonius* F. Hamilton subjected to various treatments

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ABSTRACT

The present investigation suggested that the growth performance of Guppies (*Poecilia reticulata)* and Rosy barbs (*Pethia conchonius)* was assessed and prepared six different types of formulated novel diets comprised of some nutritional natural ingradients of probiotics (T1), *Spirulina* (T2), synthesized zinc oxide nanoparticles from *Spirulina* (T3), *Cynodon dactylon* (T4), synthesized zinc oxide nanoparticles from *C. dactylon* (T5) and combination of all five (T6) and the results was compared with the supplied commercial diet as a control. The growth trend of guppies and rosy barbs from all the supplied formulated novel diet of T6 resulted better rather than the imported commercial diets respectively. The natural biologically new novel diet for ornamental commercial fed might be replaced by experimental diet for the better growth production of guppies and rosy barb of ornamental fish.

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INTRODUCTION

In aquaculture, inadequate feeding practices can result in weight reduction, irregular growth patterns and poor nutrient absorption efficiency which negatively affects growth performance and the water quality of the rearing environment. Therefore, it is crucial to determine the optimal feeding rate and frequency for fish larvae, as this has a direct impact on their survival and growth. This assessment facilitates effective food scheduling, optimizes labour resources and ultimately enhances productivity. Guppies (*Poecilia reticulata*) and Rosy barbs (*Pethia conchonius)* are widely recognized as popular ornamental fish, cultivated extensively in various Asian countries as live-bearing species. As a member of the Poecilidae family, guppies are freshwater fish that are relatively easy to maintain and breed in aquarium settings. Their increasing popularity can be attributed to their adaptability and affordability.

Guppies are generally omnivorous, accepting a wide range of food types, including both dried and live options. The dietary needs of guppies vary in terms of quantity and quality, influenced by their feeding behaviors, digestive systems, size, reproductive status and environmental factors such as temperature and the availability of natural food sources (Mohideen *et al.*, 2014).

Consequently, it is crucial to tailor the feed supply to meet their energy requirements. In the context of ornamental fish, an appropriate diet formulation enhances nutrient digestibility, fulfills metabolic demands, reduces maintenance costs, and minimizes water pollution. Additionally, providing fish with appropriately sized feed is vital for optimal growth and survival. Guppies and rosy barbs are capable of thriving in confined environments, allowing culturists to devote less attention to nutritional management; however, inadequate and unbalanced feeding can lead to issues such as reduced growth and survival rates. Thus, the overall production of guppies is closely linked to the quality of feed and the total cost of feed formulation, which poses a significant economic challenge for aquarium culturists. For this reason, specially formulated feeds are designed to enhance the productivity of ornamental fish, ensuring optimal growth at minimal cost benefit ratio (Anka *et al.*, 2016).

MATERIALS AND METHODS

Fish selected and growth maintained

The guppy and rosy barb ornamental fishes were sourced from a commercial ornamental fish farm, specifically Angel Aquarium located near the new bus stand in Thanjavur, Tamil Nadu.

These fishes were reared in a laboratory setting, where their fish were collected and maintained in a culture tank (tank size 48 and 24). The fish underwent acclimatization in well water that was supplied to the laboratory as dechlorinated water. During the acclimatization phase, they were fed with various combinations insighted performed. The experimental diets included probiotics (T1), *Spirulina* (T2), synthesized zinc oxide nanoparticles from *Spirulina* (T3), *Cynodon dactylon* (T4), and synthesized zinc oxide nanoparticles from *C. dactylon* (T5) and the combination of novel diets of five of 1;1;1;1;1%(T6). Each fed with Cassava flour 33%,Soymeal 20%, Fish premix 0.5%, and Nitox Antimould 0.5% was thoroughly mixed and feeded in the respective tank two times in a day. The aquaria were thoroughly cleaned and water changed once in 15-days intervals. All these preparatory steps were completed prior to the commencement of the experiments.

Morphometric and gravimetric analysis

The experimental fishes were chosen based on their weight, ensuring that they belonged to the same age group. The length of the fish was recorded with guppies measuring between 1.5 and 2 cm. For this experiments, fishes weighied and ranges from 250 mg to 450 mg were measured respectively.

Feed utilization

The mass budget framework utilized in this study was proposed by Petrusewicz and Macfadyen (1970). Metabolism was determined as the difference between assimilation (A) and production (P). The feeding rate (Fr), assimilation rate (Ar), conversion rate (Cr), and metabolic rate (Mr) were computed by dividing the respective quantities by the product of the mid-body weight (g) of the organism and the duration (in days). These rates are expressed in milligrams per gram of live fish per day. The mid-body weight (MBW) of the test subjects represented the midpoint in the growth of the organism during the testing period and was calculated using the following formula (Vigneeswaran *et al.*, 2010).

MBW= Initial live weight of test fish (g) + final live weight of test fish/ 2

Feeding rate (cr)= Food Consumption (mg/individual)/ MBW (g) × Duration (day)

Absorption rate (ar)= Food assimilated (mg/individual)/ MBW (g) × Duration (day)

Conversion rate (pr)= Food Converted (mg/individual)/ MBW (g) × Duration (day)

Metabolic rate (Mr)= Amount of food metabolished (mg/ individual)/MBW (g) × Duration (day) Absorption efficiency (Ae %)

Proximate analysis of experimental diets

Proximate composition was carried out and estimated the percentage of moisture, ash, protein, Carbohydrate and lipid as described by Association of Official Analytical Chemists (AOAC, 2006).

Sampling frequency

Fish sampling was done on fortnight basis at 15 30, 45 and 60 days interval to recorded their growth and development in terms of weight (g) and length (mm) increment. Fish samples were collected randomly from each cistern and measured. The fishes was weighed by using digital balance. Length of fish was measured by measuring scale (Vigneeswaran *et al.,* 2010).

Growth indices

% length gain= {(Final length–Initial length)/ (Initial length)} ×100

% weight gain= {(Final weight–Initial weight)/ (Initial length)} × 100

Specific growth rate (SGR)

The specific growth rate of fish was calculated using the formula:

SGR = (LnW2- LnW1)/ (K1-K2) × 100

Where, W1= Weight of fish at time K1

W2= Weight of fish at time K2

K1 = Initial time

K2 = Final time

Feed conversion ratio (FCR)

FCR = FI (g)/WG (g)

Where, FI= Feed intake

WG= Weight gain

Survivality (%) = (total number harvested/total number stocked) × 100

RESULTS AND DISCUSSION

The previous investigation demonstrated that the addition of dietary prebiotics and probiotics contributed to the preservation of the condition factor during the growth phase, which serves as an indicator of the nutritional health of individual fish. Analysis of the proximate composition revealed that the muscle tissue of the fish examined in this study exhibited a high protein level, alongside low fat and ash content. Guppies and Rosy barbs, a freshwater ornamental fishes is known for its elevated protein content and minimal fat. Furthermore, the incorporation of dietary prebiotics and probiotics resulted in an enhancement of crude protein levels and a reduction in lipid content when compared to the control group, which may prove advantageous for aquaculture purposes (Annasari *et al.,* 2012).

In this study, the proximate composition of experimental diets was significantly changed by the inclusion of dietary probiotics and control commercial feed. The tested diets showed a significant increase in the crude protein content followed by carbohydrates; the highest levels were found in the T6 diet like combination feed followed by the T1 like probiotics treatments compared with the control during at the end of 60 days. In contrast, there was an observed decreased in the crude lipid contents in all treated new novel feed and control respectively. In both phases of treatments, the proximate composition contained a low ash content followed by moisture were noted as shown in Table 1.

This performance trend clearly indicated that certain characteristics of the supplemented diets contributed to the improved growth performance of *Pethia conchonius.*

According to dietary prebiotics and probiotics serve as functional bioactive feed that support the growth and well-being of living organisms. These supplements, both prebiotics and probiotics, typically influence the endogenous flora within the gastrointestinal tract by producing enzymes or modifying enzyme activity. The digestive tract's primary function is to digest food into smaller molecules that can be absorbed through the epithelial lining of the gastrointestinal tract (Merrifield *et al.,* 2011), facilitated by digestive enzymes. The intake of dietary prebiotics and probiotics can enhance the secretion of these digestive enzymes in fish intestines. Numerous studies have shown that dietary prebiotics play a crucial role in modulating beneficial intestinal microflora, which is essential for the secretion of digestive enzymes, particularly amylase.

The growth performance observed in relation to the consumption of dietary prebiotics exhibited variations that were likely attributable to structural distinctions. The inclusion of the post-feeding trial (Phase 2), during which the treated fish were given an unsupplemented (control) diet for a designated period following the experiment, offers a comprehensive examination of the impact of dietary prebiotics and probiotics on fish growth performance.

Table 1. Proximate analysis of the experimental diets

Proximate content	*Poecilia reticulata* (Guppy)							*Pethia conchonius* (Rosy Barb)						
	Control	T1	T2	T3	T4	T5	T6	Control	T1	T2	T3	T4	T5	T6
Protein (µg/g)	14.8	15.3	9.1	14.2	11.3	9.5	16.8	32.0	32	20.6	27.1	25.0	21.0	32.9
Lipid (µg/g)	3.6	3.9	3.1	3.2	2.8	2.2	4.3	5.2	5.6	4.6	4.8	4.3	4.1	5.8
Ash %	6.3	6.7	5.3	5.9	5.1	4.6	6.9	15.6	15.7	10.1	12.4	11.5	10.7	16.1
Moisture %	6.2	6.6	5.2	5.8	5.5	5.1	6.8	8.47	8.55	7.14	8.20	8.03	7.45	9.12
Carbohydrate (µg/g)	12.0	12.7	9.4	11.5	11.1	10.8	13.0	36.5	38.1	30.7	31.4	38.1	36.7	40.3

T1 – Probiotics, T2 – *Spirulina*, T3 – Synthesized zinc oxide nanoparticles from *Spirulina*, T4 – *Cynodon dactylon*, T5 - Synthesized zinc oxide nanoparticles from *C. dactylon*, T6 –T1+T2+T3+T4+T5

This represents the first instance of such a post-feeding trial conducted in the realm of fish nutrition research. During the post-feeding phase, it seems that the bioactive effects persist for 7 weeks for the LBA treatment, 6 weeks for the live zine oxide nanoparticles treatment, and 4 weeks for the three prebiotics evaluated in this research. This phenomenon may be attributed to the influence of residues retained in the gastrointestinal tract. In Phase 1, when the fish were provided with supplemented diets, it is possible that not all nutrients from these diets were utilized for growth; the continuous supplemented feeding in Phase 1 may have led to the accumulation of dietary residues that could be accessible during Phase 2, when the treated fish were solely fed the control diet (Munir *et al.,* 2016).

The observed higher SGR of the supplemented diets compared to the control diets administered after Phase 1. The residual effects of supplementation during Phase 2 (post-feeding trial) were evident in the increased feed conversion ratio (FCR). It can be deposted that fish require a comparable level of energy to sustain growth in both phases; The substituting the supplemented diets with control (unsupplemented) diets may not have provided adequate energy to uphold growth performance. Consequently, the growth performance of the supplemented fish diminished over time in Phase 2, which correlates with the differences in fish survival noted between Phase 1 and Phase 2. Nonetheless, no significant morphological alterations (hepatosomatic index, viscerosomatic index, and intestinal pH factor) were observed in the fish between these two phases likely due to the absence of biological effects prior to the cessation of supplementation (Munir *et al.,* 2016).

Table 2. Growth performance, feed utilization and survival of ornamental fish from 15thday interval

Parameters	15th day													
	Poecilia reticulata (Guppy)							*Pethia conchonius* (Rosy Barb)						
	Control	T1	T2	T3	T4	T5	T6	Control	T1	T2	T3	T4	T5	T6
Initial weight (g)	0.480 ±0.01	0.520 ±0.24	0.417 ±0.01	0.420 ±0.11	0.510 ±0.08	0.440 ±0.00	0.500 ±0.03	2.350 ±0.00	2.467 ±0.02	2.417 ±0.01	2.445 ±0.01	2.318 ±0.04	2.429 ±0.08	2.612 ±0.05
Final weight (g)	0.500 ±0.14	0.530 ±0.07	0.406 ±0.07	0.430 ±0.01	0.500 ±0.15	0.442 ±0.18	0.540 ±0.12	2.360 ±0.01	2.479 ±0.00	1.960 ±0.04	2.450 ±0.05	2.415 ±0.02	2.440 ±0.06	2.786 ±0.01
Weight gain (g)	0.020 ±0.04	0.010 ±0.01	0.00	0.010 ±0.04	0.00	0.002 ±0.01	0.040 ±0.00	0.010 ±0.05	0.012 ±0.01	0.00	0.005 ±0.00	0.097 ±0.01	0.011 ±0.02	0.174 ±0.04
Initial length (cm)	2.450 ±0.01	2.490 ±0.14	2.345 ±0.01	2.470 ±0.00	2.500 ±0.22	2.360 ±0.14	2.580 ±0.12	4.225 ±0.01	4.450 ±0.00	4.287 ±0.00	4.500 ±0.01	4.712 ±0.07	4.268 ±0.04	4.215 ±0.04
Final length (cm)	2.460 ±0.27	2.503 ±0.02	2.301 ±0.05	2.477 ±0.14	2.498 ±0.11	2.358 ±0.17	2.595 ±0.14	4.236 ±0.00	4.470 ±0.02	4.221 ±0.00	4.521 ±0.07	4.814 ±0.01	4.288 ±0.05	4.318 ±0.04
Length gain (cm)	0.010 ±0.00	0.013 ±0.01	0.00	0.003 ±0.00	0.00	0.00	0.015 ±0.03	0.011 ±0.01	0.020 ±0.04	0.00	0.021 ±0.08	0.102 ±0.00	0.020 ±0.01	0.103 ±0.05
SGR (%)	0.133 ±0.01	0.066 ±0.04	0.077	0.066 ±0.01	0.00	0.013 ±0.02	0.266 ±0.00	0.066 ±0.01	0.080 ±0.01	0.606	0.033 ±0.04	0.646 ±0.00	0.073 ±0.00	1.160 ±0.00
FCR	0.60 ±0.01	0.56 ±0.00	0.62 ±0.00	0.69 ±0.01	0.60 ±0.05	0.67 ±0.07	0.55 ±0.03	0.25 ±0.01	0.24 ±0.00	0.21 ±0.01	0.24 ±0.05	0.24 ±0.00	0.24 ±0.01	0.21 ±0.08
Survival (%)	100.0 ±0.01	100.0 ±0.05	80.0 ±0.01	100.0 ±0.02	98.12 ±0.01	99.03 ±0.08	100.0 ±0.00	100.0 ±0.01	100.0 ±0.01	80.4 ±0.01	100.0 ±0.00	98.10 ±0.03	91.0± 0.04	100.0 ±0.01

T1 – Probiotics, T2 – *Spirulina*, T3 – Synthesized zinc oxide nanoparticles from *Spirulina*, T4 – *Cynodon dactylon*, T5 - Synthesized zinc oxide nanoparticles from *C. dactylon*, T6 –T1+T2+T3+T4+T5

Table 3. Growth performance, feed utilization and survival of ornamental fish from 30thday interval

Parameters	30th day													
	Poecilia reticulata (Guppy)							*Pethia conchonius* (Rosy Barb)						
	Control	T1	T2	T3	T4	T5	T6	Control	T1	T2	T3	T4	T5	T6
Initial weight (g)	0.480 ±0.01	0.520 ±0.24	0.415 ±0.01	0.420 ±0.11	0.510 ±0.08	0.500 ±0.03	0.440 ±0.00	2.350 ±0.00	2.467 ±0.02	2.445 ±0.01	2.318 ±0.04	2.429 ±0.08	2.368 ±0.07	2.612 ±0.05
Final weight (g)	0.520 ±0.14	0.545 ±0.07	0.401 ±0.04	0.440 ±0.01	0.490 ±0.15	0.560 ±0.12	0.445 ±0.18	2.390 ±0.01	2.492 ±0.00	2.480 ±0.05	2.380 ±0.02	2.460 ±0.06	2.268 ±0.07	2.820 ±0.01
Weight gain (g)	0.040 ±0.04	0.025 ±0.01	0.00	0.020 ±0.04	0.00	0.060 ±0.00	0.005 ±0.01	0.040 ±0.05	0.025 ±0.01	0.035 ±0.00	0.062 ±0.02	0.031 ±0.02	0.00	0.208 ±0.04
Initial length (cm)	2.450 ±0.01	2.490 ±0.14	2.347 ±0.04	2.470 ±0.00	2.500 ±0.22	2.580 ±0.12	2.360 ±0.14	4.225 ±0.01	4.450 ±0.00	4.500 ±0.01	4.712 ±0.07	4.268 ±0.04	4.157 ±0.04	4.215 ±0.04
Final length (cm)	2.470 ±0.27	2.515 ±0.02	2.158 ±0.02	2.490 ±0.14	2.480 ±0.11	2.610 ±0.14	2.350 ±0.17	4.275 ±0.00	4.490 ±0.02	4.560 ±0.07	4.790 ±0.01	4.320 ±0.05	4.002 ±0.02	4.390 ±0.04
Length gain (cm)	0.020 ±0.00	0.025 ±0.01	0.00	0.020 ±0.00	0.00	0.030 ±0.03	0.00	0.050 ±0.01	0.040 ±0.04	0.060 ±0.08	0.078	0.103 ±0.01	0.00	0.175 ±0.05
SGR (%)	0.133 ±0.01	0.083 ±0.04	0.049	0.066 ±0.01	0.00	0.200 ±0.00	0.016 ±0.02	0.133 ±0.01	0.083 ±0.01	0.116 ±0.04	0.646 ±0.00	0.073 ±0.00	0.062	0.693 ±0.00
FCR	0.57 ±0.01	0.55 ±0.00	0.57	0.68 ±0.01	0.61 ±0.05	0.53 ±0.03	0.67 ±0.07	0.25 ±0.01	0.24 ±0.00	0.24 ±0.05	0.25 ±0.00	0.24 ±0.01	0.20	0.21 ±0.08
Survival (%)	100.0 ±0.01	100.0 ±0.05	75.0 ±0.01	100.0 ±0.02	90.12 ±0.01	100.0 ±0.00	85.01 ±0.08	100.0 ±0.01	100.0 ±0.01	100.0 ±0.00	85.10 ±0.03	90.0± 0.04	76.0 ±0.00	100.0 ±0.01

T1 – Probiotics, T2 – *Spirulina*, T3 – Synthesized zinc oxide nanoparticles from *Spirulina*, T4 – *Cynodon dactylon*, T5 - Synthesized zinc oxide nanoparticles from *C. dactylon*, T6 –T1+T2+T3+T4+T5.

In the present study, the inclusion of dietary feed such as probiotics (T1), *Spirulina*(T2), synthesized zinc oxide nanoparticles from *Spirulina* (T3), *Cynodon dactylon*(T4), synthesized zinc oxide nanoparticles from *C. dactylon* (T5) and combination of all five(T6) and the result was compared with the supplied commercial diet as a control (Table 2- 5) resulted changes in the growth of Guppies and Rosy barbs. The growth performance was significantly increased in the feeding treatments during the T6 treatment (Table 2- 5) but decreased significantly at different points during the T5 treatment. Growth was significantly higher in both treatments for fish fed the T1 and T6 treatment.Therefore feed supplements significantly increased the SGR of Guppies and Rosy barbs fingerlings during the Treatment T6, but the SGR decreased gradually for the T5 fish after 15 days. In both intervals 15, 30, 45 and 60 days, the SGR of the T6 treatment was significantly higher than the other treatment including control were recorded respectively (Table 2-5).

Table 4. Growth performance, feed utilization and survival of ornamental fish from 45thday interval

Parameters	45th day													
	Poecilia reticulata (Guppy)							*Pethia conchonius* (Rosy Barb)						
	Control	T1	T2	T3	T4	T5	T6	Control	T1	T2	T3	T4	T5	T6
Initial weight (g)	0.480 ±0.01	0.520 ±0.24	0.480 ±0.04	0.420 ±0.11	0.510 ±0.08	0.440 ±0.00	0.500 ±0.03	2.350 ±0.00	2.467 ±0.02	2.458 ±0.03	2.445 ±0.01	2.318 ±0.04	2.429 ±0.08	2.612 ±0.05
Final weight (g)	0.560 ±0.14	0.580 ±0.07	0.410 ±0.01	0.460 ±0.01	0.370 ±0.15	0.450 ±0.18	0.600 ±0.12	2.420 ±0.01	2.530 ±0.00	2.269 ±0.06	2.600 ±0.05	2.220 ±0.02	2.470 ±0.06	2.940 ±0.01
Weight gain (g)	0.080 ±0.04	0.060 ±0.01	0.00	0.040 ±0.04	0.00	0.010 ±0.01	0.100 ±0.00	0.070 ±0.05	0.063 ±0.01	0.00	0.155 ±0.00	0.00	0.041 ±0.02	0.328 ±0.04
Initial length (cm)	2.450 ±0.01	2.490 ±0.14	2.350 ±0.07	2.470 ±0.00	2.500 ±0.22	2.360 ±0.14	2.580 ±0.12	4.225 ±0.01	4.450 ±0.00	4.247 ±0.02	4.500 ±0.01	4.712 ±0.07	4.268 ±0.04	4.215 ±0.04
Final length (cm)	2.490 ±0.27	2.530 ±0.02	2.251 ±0.06	2.500 ±0.14	2.420 ±0.11	2.310 ±0.17	2.640 ±0.14	4.295 ±0.00	4.520 ±0.02	4.151 ±0.03	4.580 ±0.07	4.800 ±0.01	4.360 ±0.05	4.890 ±0.04
Length gain (cm)	0.040 ±0.00	0.040 ±0.01	0.00	0.030 ±0.00	0.00	0.00	0.060 ±0.03	0.050 ±0.01	0.070 ±0.04	0.00	0.080 ±0.08	0.088	0.092 ±0.01	0.675 ±0.05
SGR (%)	0.133 ±0.01	0.083 ±0.04	0.152	0.066 ±0.01	0.00	0.016 ±0.02	0.200 ±0.00	0.155 ±0.01	0.140 ±0.01	0.077	0.344 ±0.04	0.00	0.091 ±0.00	0.728 ±0.00
FCR	0.53 ±0.01	0.51 ±0.00	0.63	0.65 ±0.01	0.81 ±0.05	0.66 ±0.07	0.50 ±0.03	0.24 ±0.01	0.23 ±0.00	0.23	0.23 ±0.05	0.27 ±0.00	0.24 ±0.01	0.20 ±0.08
Survival (%)	100.0 ±0.01	100.0 ±0.05	75.0 ±0.00	100.0 ±0.02	70.12 ±0.01	80.01 ±0.08	100.0 ±0.00	100.0 ±0.01	100.0 ±0.01	74.0 ±0.00	100.0 ±0.00	70.10 ±0.03	80.0± 0.04	100.0 ±0.01

T1 – Probiotics, T2 – *Spirulina*, T3 – Synthesized zinc oxide nanoparticles from *Spirulina*, T4 – *Cynodon dactylon*, T5 - Synthesized zinc oxide nanoparticles from *C. dactylon*, T6 –T1+T2+T3+T4+T5.

Table 5. Growth performance, feed utilization and survival of ornamental fish from 60thday interval

Parameters	60th day													
	Poecilia reticulata (Guppy)							*Pethia conchonius* (Rosy Barb)						
	Control	T1	T2	T3	T4	T5	T6	Control	T1	T2	T3	T4	T5	T6
Initial weight (g)	0.480 ±0.01	0.520 ±0.24	0.459 ±0.04	0.420 ±0.11	0.510 ±0.08	0.440 ±0.00	0.500 ±0.03	2.350 ±0.00	2.467 ±0.02	2.415 ±0.06	2.445 ±0.01	2.318 ±0.04	2.429 ±0.08	2.612 ±0.05
Final weight (g)	0.590 ±0.14	0.600 ±0.07	0.426 ±0.03	0.490 ±0.01	0.300 ±0.15	0.490 ±0.18	0.660 ±0.12	2.480 ±0.01	2.560 ±0.00	2.158 ±0.00	2.640 ±0.05	2.100 ±0.02	2.490 ±0.06	2.990 ±0.01
Weight gain (g)	0.110 ±0.04	0.080 ±0.01	0.00	0.070 ±0.04	0.00	0.050 ±0.01	0.160 ±0.00	0.130 ±0.05	0.093 ±0.01	0.00	0.195 ±0.00	0.00	0.061 ±0.02	0.378 ±0.04
Initial length (cm)	2.450 ±0.01	2.490 ±0.14	2.419 ±0.03	2.470 ±0.00	2.500 ±0.22	2.360 ±0.14	2.580 ±0.12	4.225 ±0.01	4.450 ±0.00	4.318 ±0.01	4.500 ±0.01	4.712 ±0.07	4.268 ±0.04	4.215 ±0.04
Final length (cm)	2.520 ±0.27	2.560 ±0.02	2.217 ±0.01	2.520 ±0.14	2.400 ±0.11	2.280 ±0.17	2.670 ±0.14	4.330 ±0.00	4.600 ±0.02	4.167 ±0.03	4.610 ±0.07	4.690 ±0.01	4.380 ±0.05	4.910 ±0.04
Length gain (cm)	0.070 ±0.00	0.070 ±0.01	0.00	0.050 ±0.00	0.00	0.00	0.090 ±0.03	0.105 ±0.01	0.150 ±0.04	0.00	0.110 ±0.08	0.00	0.112 ±0.01	0.695 ±0.05
SGR (%)	0.183 ±0.01	0.133 ±0.04	1.382 ±0.01	0.116 ±0.01	0.00	0.833 ±0.02	0.266 ±0.00	0.216 ±0.01	0.155 ±0.01	0.081 ±0.04	0.325 ±0.04	0.00	0.101 ±0.00	0.630 ±0.00
FCR	0.508 ±0.01	0.50 ±0.00	0.58 ±0.07	0.61 ±0.01	1.00 ±0.05	0.61 ±0.07	0.45 ±0.03	0.24 ±0.01	0.23 ±0.00	0.22 ±0.00	0.23 ±0.05	0.22 ±0.00	0.24 ±0.01	0.20 ±0.08
Survival (%)	100.0 ±0.01	100.0 ±0.05	10.0 ±0.01	100.0 ±0.02	50.12 ±0.01	30.01 ±0.08	100.0 ±0.00	100.0 ±0.01	100.0 ±0.01	10.0 ±0.01	100.0 ±0.00	40.10 ±0.03	50.0± 0.04	100.0 ±0.01

T1– Probiotics, T2– *Spirulina*, T3– Synthesized zinc oxide nanoparticles from *Spirulina*, T4– *Cynodon dactylon*, T5 - Synthesized zinc oxide nanoparticles from *C. dactylon*, T6 –T1+T2+T3+T4+T5.

The results obtained in the present study revealed that supplementation with dietary treatments T6 had a strong effect on growth performance in Guppies and Rosy barbs fingerlings. In the first phase, the ranking of performance for the supplemented diets was T2>T1>Control>T3>T4>T5>T6 (Table 2-5); the unsupplemented (control) diet showed the maximum performance. This performance trend clearly demonstrated that there were attributes of the supplemented diets that enhanced the growth performance of Guppies and Rosy barbs. The present study also revealed that the inclusion of dietary supplementary feeds led to maintenance of the condition factor during growth, which reflects the nutritional status of an ornamental fish.

CONCLUSION

In conclusion, the results obtained from the present study established the efficacy of supplemented natural novel diets. The existence of invitro condition in the estimated area can play a crucial role in maintaining the ecosystem and the food chain, particularly in relation to guppy and rosy barb fish farming practices. Results obtained in the present investigation reveal higher growth and fecundity in fish fed with new formulated natural novel enriched fed with herbal products and it is a testimonial to the role of new diet. Hence, the fish growth and development of extraordinary results by feed. The formulated fed for ornamental fish can improve the longevity and shining the size and shape of the fishes. The novel feed is suitable candidature for ornamental fish industry in the forthcoming generation.

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