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CERTIFICATE

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THE EFFECTS OF DIFFERENT FEEDS ON THE GROWTH AND BIOCHEMICAL PARAMETERS OF FRESHWATER ORNAMENTAL FISH *XIPHOPHORUS HELLERII*

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Abstract

The present study was to optimize the growth of Sword tail (Xiphophorus hellerii) on different feed. The growth of the animal mainly depends on the biological, physiological and biochemical factors. The feed influences the growth of the fishes. In this experiment Xiphophorus hellerii is fed with artificial feed and spirulina as live feed in different proportions of gram weight (0.1, 0.15, 0.2, 0.25 g/w). The feeding treatment was done for 20 days. The maximum length and weight of fishes fed with different feeds were measured. The highest weight gain in sword tail is 0.09g fed with Spirulina than the sword tail fed with artificial feed. And these fishes were treated with different feeds were analyzed for biochemical estimation. In this analysis the Spirulina feed had high protein and carbohydrate content is 13.9mg/g and 3.12mg/g, than artificial feed and control, whereas Lipid content is high in artificial feed 72mg/g than Spirulina and control. This results clearly showed that the growth in weight and body length obtained at the highest in the Xiphophorus hellerii when fed with Spirulina feed. Protein is one of the nutrients that play a vital role for the growth and also important for fish health.

Keywords: Sword tail fish, Artificial feed, *Spirulina*, growth performance, Biochemical composition.

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Introduction

Ornamental fish culture is an vital prime business. Because they are very gentle, charming colors and could be easily accommodated in confined spaces[1]. Aquaculture of ornamental tropical fish in aquariums often supervises the status *Xiphophorus hellerii* of nourishing of a balanced diet for fish health and upkeep of water quality in the aquarium [2] are members of the Cichlidae family and are known in world ornamental trade as Sword tail fish. They are marketed all over the world and yield foreign exchange to some extent. The success of production of fish depends mainly on the right choice of food which provides all the nutrients. Aquarium fishes accept a wide variety of live and formulated feeds [3]. Supplementary feeding is a daily practice in aquaculture to enhance the production of fish to marketable size in short period. Shortage of food supply reduces the survival, food intake and growth. On the other hand excess feeding will pollutes the water quality and increases the production cost [4]. Due to array of problems in ornamental fish culture fed with formulated diet, consequently the live feed remains as an important feed source [5].

Spirulina platensis is a blue-green algae, filamentous, spiral shape with high nutritional value. These algae have a composition content of nutrients, for example, 60-70% protein, essential amino acids, chlorophyll, glycogen, vitamins. It also contain bioactive compounds with antioxidant activity that could be used to supplement food. Nutrient content of S. platensis is very complete, vitamins B12, Phosphorus, iron, calcium [6]. Fish mainly assimilates proteins in its muscles. Fish protein has relatively high digestability and is considered to have high biological and growth promoting value. [7]. Many authors studied the effect of feeding frequency on feed intake and growth in fishes [8].

Biochemical studies of fish tissue are of significant interest for their specificity in relation to the food values of the fish and for the assessment of their physiological needs at different periods of life. In order to achieve high growth rate and biochemical composition in angel fish fed with artificial feed and spirulina as live feed has yet to be determined. The aim of this study was to examine the efficiency of different diets on the growth enhancement and bio chemical composition of sword tail, (*Xiphophorus helleri*).

Materials and method

Systematic position of Sword Tail (*Xiphophorus hellerii*)

Class [illegible]
Order [illegible]
Family [illegible]
Genus *Xiphophorus*
Species *hellerii*

Sexually matured were obtained from the *Xiphophorus hellerii* local ornamental fish dealer(1:16 ratio of male and female) totally 24 fishes and they were reared in 20 L capacity of 8 separate glass tanks 1:2 ratio of male and female. The first four group of fishes were fed with artificial feed, which ranges from 0.1, 0.15, 0.2, 0.25 gram of weight and another 4 glass group of fishes were fed with *spirulina* feed which ranges from 0.1, 0.15, 0.2, 0.25 gram of weight. The feed was given twice in a day. The medium was changed between two days of intervals. Before introducing the fish in the aquaria their length and weight were measured. Initial measurements were noted. This experiment were conducted for 20 days and after 20 days again their length and weight were measured for final measurements. The biochemical parameters, were tested after 20 days.

Collection of test samples

In this analysis a portion of the muscle from the widest part of the body (devoid of bones), after removal of skin was taken from the experimental fish, and [illegible] carbohydrate, protein and lipid [illegible]

Results

Table 1 shows the [illegible] performance of *Xiphophorus hellerii* [illegible] artificial feed in 0.1, 0.15, 0.2, 0.25 grams [illegible] 20 days experiment. There [illegible] increase in length and weight from [illegible] to final days of experiment [illegible] 4.2-4.3, 4.2-4.3cm [illegible] and [illegible] 0.8, 0.5-0.8g/20 respectively [illegible] that the growth performance of *Xiphophorus hellerii* when fed with *Spirulina* feed [illegible] 0.15, 0.2, 0.25 grams for 20 days experiment 4.0-4.2, 4.2-4.6, 4.6-4.8, 4.7-4.8 cm [illegible] 0.6-0.7, 0.6-0.7, 0.7-0.8, [illegible] respectively. Among these feeds [illegible] *Xiphophorus hellerii* fed with *spirulina* [illegible] 0.25g shows high weight gain than the fish fed with artificial feed of same 0.25g.

Table-3 shows the biochemical composition of fish before and after treated with artificial feed and *Spirulina* feed to the fish and tested after 20 days of experimental period. The components of two different diets and control were analyzed for carbohydrate protein and lipid tests. Based on the results the *Spirulina* feed had high protein and carbohydrate content is 13.9mg/g and 3.12mg/g, than artificial feed and control whereas Lipid content is high in artificial feed 72mg/g than *Spirulina* and control.

Table.1 Growth performance in sword tail fed with artificial feed

Feed in grams (g)	Initial length of fish(cm)	Final length of fish(cm)	Initial weight of fish(g)	Final weight of fish(g)	Total increase in length (cm)	Total increase in weight (g)
0.1	3.9±0.35	4.1±0.32	0.6±0.04	0.7±0.05	0.2±0.1	0.1±0.04
0.15	4.1±0.32	4.2±0.17	0.5±0.03	0.6±0.04	0.1±0.04	0.01±0.04
0.2	4.2±0.17	4.3±0.15	0.6±0.05	0.8±0.22	0.1±0.04	0.02±0.1
0.25	4.2±0.17	4.3±0.15	0.5±0.03	0.8±0.22	0.1±0.04	0.03±0.02

Table.2 Growth performance in sword tail fed with livefeed (*spirulina*)

Feed in grams (g)	Initial length of fish(cm)	Final length of fish(cm)	Initial weight of fish(g)	Final weight of fish(g)	Total increase in length (cm)	Total increase in weight (g)
0.1	4.0±0.45	4.2±0.40	0.6±0.24	0.7±0.23	0.2±0.1	0.1±0.04
0.15	4.2 ±0.23	4.6±0.32	0.6±0.24	0.7±0.23	0.4±0.1	0.1±0.04
0.2	4.6±0.32	4.8±0.34	0.7±0.23	0.8±0.22	0.2±0.1	0.1±0.04
0.25	4.7±0.41	4.8±0.34	0.8±0.23	0.9±0.26	0.1±0.1	0.1±0.04

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Figure.1 Growth performance in sword tail fed with

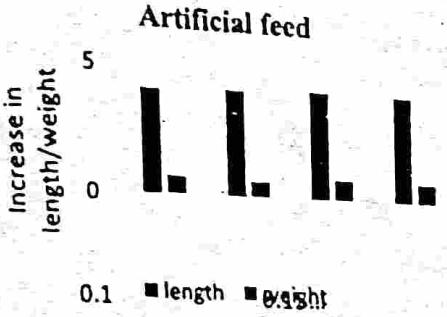
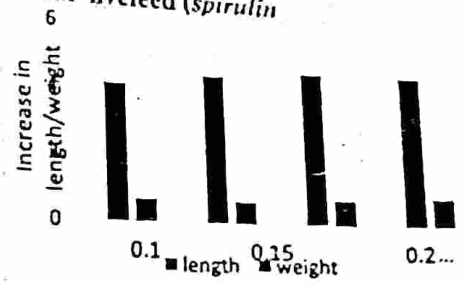


Figure.2 Growth performance in sword tail fed with livefeed (*spirulin*



Discussion

Parameters	Control(mg/g)	After experiment	
		Artificial feed(mg/g)	*Spirulina*(mg/g)
Protein	7.5±0.25	4.21±0.40	13.9±0.07
Lipids	55±0.57	72±1.0	68±1.0
Carbohydrates	3.05±0.01	2.4±0.1	3.12±0.01

Table.3 Biochemical Analysis

Live feeds are being utilized as nursery, weaning, maturation diets and they also improve energy balance which results in maturation, quick growth, coloration and physiological conditions [9]. In this experiment the sword tail when fed with different feeds, both artificial and *Spirulina* feeds. Spirulina diet elicited the maximum growth parameters like weight and length. Use of plant products as protein source in fish feeds shows considerable application potential for aquaculture worldwide [10]. The present study shows the higher body weight was observed in a fish when it fed with *Spirulina* (live feed) to a frequency of twice per day. Similar results were also observed in Red sword tail which indicated that feeding twice a day resulted in the highest growth and reproductive success [11]. It may due to the high amount of protein and growth stimulatory effect of *Spirulina* in the diet.

Generally changes in chemical body composition have been known to reflect storage or depletion of energy reserves. The seasonal variation in chemical composition is due to an alternate accumulation and expenditure of fat and protein. In the present study the chemical composition of *X. hellerii* fed with Spirulina, the protein content is 15.6mg/g, lipid content is 87mg/g and carbohydrate content is 3.72mg/g. the concentration of protein was found to be high in the muscle of the experimental animals when compared with protein content in artificial feed. This may due to high content of amino acids, which could have been inhibited by the fish [12]. Similar study also reveals that protein content 85mg/g, carbohydrate is 2.81mg/g and lipid content is 118mg/g these values are high when compared with artificial feed. Fat is not as readily utilizable substance as carbohydrate, it uptake of lesser quantity of lipid components by tissues for utilization. So it might be high [13]. From the present study it is concluded that the efficacy of the diet with *Spirulina* and artificial was evaluated through food utilization and biochemical parameters. This results clearly showed that the growth in weight and body length obtained at the highest in the *Xiphophorus hellerii* when fed with *Spirulina* feed. Protein is one of the nutrients that play a vital role for the growth and also important for fish health.

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