

Evaluation Spirulina based fish feed formulation on Growth Indices of *Cirrhinus mrigala* fingerlings

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ABSTRACT : In this experimental study we were designed five experimental diets with containing changeable concentration of five experimental diet was prepare by various concentration of Bitter gourd (*Spirulina*) powder as.20g/kg(DA), 30g/kg(DB), 50g/kg (DC) and 100g/kg(DD). Diet Z is as control. The highest weight gain and specific growth rate values, at the end of the experiment. FCR and PER values were also recorded in fish fed DC (50g/kg of diet) and DD (100g/kg of diet). Fish fed Spirulina significant differences were recorded in the survival rate among groups best survival rate was found at DC and DD followed by D5 ($p > 0.05$).it clearly indicates that from 50 to 75 gram per kilo gram of bitter gourd work better than full concentration i.e.100 gram per kilogram of diet. Energy utilization (EU, %) were noted significantly good at DC and DD

KEY WORDS: *Spirulina* , Growth, *Cirrhinus mrigala* fingerling.

INTRODUCTION

Now a day's many commercial diets come in market for fishes but most of diet had been made with routine formulation. Mohamed, A.H ((1) carried out experiment and said that feed stabilizer can be the part of improved growth in fishes performance. Some of these ingredients used fish diet with medicinal plants responsible for use of chemicals through the global trend. He had Attempts to use the natural materials such as medicinal

plants to enhance efficiency of feed utilization and animal productive performance. As per the literature available the spirulina shows the best effect on growth and health of fishes. Spirulina is a freshwater blue-green filamentous alga, and it is receiving rising concentration being bioactive component rich. Madhava et al.(2) ; And Lin et al.,(3) shows that it's with vitamin A and B12,some minerals, polyunsaturated fatty acids, carotenes and other pigments that have antioxidants activity (

MATERIALS AND METHODS

Cirrhinus mrigala fingerlings were obtained from local fish supplier Latur . Fish were acclimatized to the laboratory conditions for 20 days. Water quality parameters were monitored on a weekly basis throughout the experimental period using the standard APHA methodology (4.) By the mean of multi-purpose water meter (YSI 600 XL, Xylem Inc., USA). The parameters are; water temperature ($21\text{ }^{\circ}\text{C} \pm 0.2$), dissolved oxygen ($6.1 \pm 0.2\text{ mg/l}$) and pH (7.5 ± 0.4). Fish were fed the test diets until visual apparent satiation, 7 days a week for 60 days. Fish in each aquarium were counted and weighed biweekly throughout the experiment. Total amount of feed consumed by the fishes in each aquarium, during the study, after that feed consumed for each individual fish was calculated consequently.

1. Experimental Feed:

Spirulina was purchased from the local market. Dried and made it to convert powder form. After that five experimental diet was prepare by various concentration as. 20g/kg (DA), 30g/kg (DB), 50g/kg (DC) and 100g/kg (DD). With soybean based diet DA used as control where no Bitter melon were used. Ingredients of the diet shown in table A

2. Investigation of sample

After 60 days, the fishes of each aquarium were weighed collectively and average final weight (g/fish) was calculated.

3. Growth Parameters:

Total length, and weight, liver and viscera weights and gut length were recorded for the purpose of determining growth parameters viz HSI- hepatosomatic index, VSI- viscerosomatic index, CF-condition factor and RIL-relative intestine length. Hepatosomatic index (HSI) was determined according to Busacker (5) as using formula: $HSI = 100 \text{ [liver weight (g)/ total body weight (g)]}$; Viscerosomatic index (VSI) was estimated according to Ricker (6) as using formula: $VSI = 100 \text{ [viscera weight (g)/ total body weight (g)]}$. CF was estimated according (7); $CF = 100 * (TW/TL^3)$ where; TW: Total fish weight (g); TL: Total fish length (cm). Relative intestine length (RIL) was determined according (8) as using formula: $RIL = \text{absolute intestine length (cm)/ TL (cm)}$.

RESULTS

Initial weight, final weight, weight gain, specific growth rate and survival rate of *Cirrhinus mrigala* fingerlings are presented in Table B. The highest weight gain and specific growth rate values, at the end of the experiment . FCR and PER values were also recorded in fish fed DC (50g/kg of diet) and DD (75g/kg of diet) . Fish fed Spirulina significant differences were recorded in the survival rate among groups best survival rate was found at DC and DD followed by D5 ($p > 0.05$).it clearly indicates that from 50 to 75 gram per kilo gram of bitter gourd work better than full concentration i.e.100 gram per kilogram of diet. Energy utilization (EU, %) were noted significantly good at DC and DD followed by D5 DB and control DA which shows fishes respond well to dietary bitter gourd as supplement.

DISCUSSION

Using of natural feed additive is becoming useful for fish feeding rather than classic chemical feed additives due to the accumulative effect of the chemical components induced deterrent effects on consumer health. The use of medicinal and aromatic plants in fish diets is still limited, this being expert only at experimental scale. In the present study an improvement in *Cirrhinus mrigala* fingerlings growth and feed utilization index was recorded when fish fed diet containing Spirulina

CONCLUSION

The present investigation showed a significant improvement of fish growth, feed utilization and digestive activities by the administration of Spirulina to *Cirrhinus mrigala* fingerlings diet as compared to the control. The beneficial effects of using Spirulina on fish growth appear to be associated with significant growth parameter. More research is necessary to evaluate Spirulina supplementation in *Cirrhinus mrigala* fingerlings diet according to its digestibility, amino acid profile and content of anti-nutritional factors.

The current research shows that spirulina improved growth performance and feed efficiency of *mrigala*. In addition, this study found that the optimum rate of spirulina in the fish supplementary diet is best replacement for fish without undesirable effects on fish growth and. In same way, Ibrahem et.al. (9) shows a significant increase in the growth performance parameters and survival rates of *O. niloticus* in Spirulina-based groups at concentration level of 10g/kg. The use of spirulina in fish diet is useful. After that Nandeasha et.al. (10) Account that weight gain of *O. niloticus* augmented with increasing the level of algae supplement in fish diet.

Table A. Fish Feed Formulation

ingredients	Experimental diets				
	Diet Z control	DA	DB	DC	DD
Groundnut cake	60.0	60.0	60.0	60.0	60.0
Jawar offal	4.00	4.00	4.00	4.00	4.00
Mix flour	3.40	3.40	3.40	3.40	3.40
Processed soybean ^a	31.60	31.60	31.60	31.60	31.60
Spirulina powder	20g*	30g*	50g*	100g*
	g* Grams per 1 kg of diet				

Table B. Effect of *Spirulina* on growth performance of *Cirrhinus mrigala* fingerlings

ingredients	Experimental diets				
	Diet 1	Diet 2	Diet 3	Diet 4	Diet 5
(IW, g/fish) Initial body weight	1.30 ± 0.1	1.40 ± 0.1	1.38 ± 0.1	1.45 ± 0.1	1.41 ± 0.1
(FW, g/fish) Final body weight	6.25±0.05b	6.50±0.05b	6.60±0.19b	7.60±0.36a	7.20±0.52ab
(SGR, %/d) Specific growth rate	1.16±0.01b	1.19±0.01b	1.33±0.04b	1.37±0.07a	1.38±0.09ab
(FCR) Feed conversion ratio	2.01±0.06a	2.00±0.06a	1.69±0.03b	1.75±0.07b	1.70±0.14b
Protein productive value (PPV)	19.10±0.63b	20.13±0.63b	30.56±0.49a	32.61 ± 1.03a	28.06 ± 2.26a
Protein efficiency ratio (PER)	1.03±0.03b	1.06±0.03b	1.32±0.01ab	1.29±0.05a	1.34±0.1a
Energy utilization (EU, %)	10.01±0.33b	10.09±0.33b	9.10±0.16c	10.64±0.47a	9.88±0.71b
Survival rate (SR, %)	88 ± 2.08	91± 2.08	99 ± 0	97 ± 0	98 ± 2.08

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