

## Growth response and feed conversion ratio of *Ctenopharengedon Idella* fed on Soyabean formulated feed

M.P. Bhilave, S.V. Bhosale and S.B. Nadaf

Department of Zoology, Shivaji University, Kolhapur, (MS) INDIA

**ABSTRACT :** Commercialization of aquaculture is increasing the demand for aquaculture feeds. Traditionally, these feeds have been based on animal protein. However, due to cost and availability considerations, it is inevitable that more plant protein supplements will be utilized in the feeds in the future. Plant proteins are more cost effective than animal protein supplements. The growth and feed conversion ratio of a fish is remarkable tool to compute the acceptability of formulated feed. A twelve week experiment was conducted in glass aquaria to evaluate the specific growth rate and feed conversion ratio of fingerlings of freshwater fish *Ctenopharengedon idella* fed on formulated feeds of different combinations of soyabean and deoiled groundnut cake. In the present study soyabean and deoiled groundnut cake were used to formulate the feed in various combinations that is from 100% soyabean formulated feed to 100% conventional feed that is deoiled groundnut cake feed. The fish gained highest body weight at 100% formulated feed than 100% conventional feed as well as having high SGR and low FCR values as compared to other feeds.

**Keywords :** Formulated feed, SGR, FCR, soyabean, groundnut cake

### INTRODUCTION

For the improvement of fisheries and to achieve maximum yields from resources of fresh water, it is necessary to provide artificial feed, by which fish grows rapidly and attains maximum weight in shortest possible time. As in other animals, fish requires a nutritious diet for proper growth and quality protein production. To date, nutritionists and feed manufacturers have concentrated their efforts on determining the feedstuff that may be used to produce a cost effective fish feed formulation. Among commonly used feed ingredients, fish meal is considered to be the best ingredients, due to its compatibility with the protein requirement of fish (Alam *et al.*, 1996). Replacement of fish meal with cheaper ingredients of plant origin in fish feed is necessary because of rising cost and uncertain availability of fish meal Higgs *et al.*, 1995). Inclusion of feedstuffs with relatively high levels of carbohydrate in formulated fish feed is preferred in view of its protein-sparing action that may make the diet more cost effective (Hidalgo *et al.*, 1993). According to Rumsey (1993), increased use of plant protein supplements in fish feed can reduce the cost of fish meal. The research has focused on utilizing less expensive and readily available resources to replace fish meal, without reducing the nutritional quality of feed (EI-Sayed 1999). The Specific Growth Rate and Feed Conversion is an appropriate to judge the acceptability and suitability of artificial feed for fish. The information of SGR and FCR on locally available ingredients will provide the basis to develop the acceptable fish feed, hence the present study was carried out to evaluate the specific growth rates and feed conversion ratio of freshwater fishes fed on formulated feeds using locally available ingredients such as soyabean and deoiled groundnut cake.

### MATERIAL AND METHODS

Choice of ingredients to be used in feed formulation should be based on their qualities such as protein content, energy level, types of amino acids etc.. Protein is the main constituent of the fish body and plant sources are always higher in proteins hence soyabean was selected as plant protein sources in present formulation. The other ingredients such as milk powder, corn flour, eggs, cod liver oil, vitamin mixture containing vitamin B Complex and E, agar powder, garlic paste, pepper powder, and cumin powder is used.

### FORMULATION OF FEEDS

Soyabean meal was taken in powder form as principal ingredients. Ingredients mentioned above are added. All the ingredients are boiled till the mixture becomes semisolid mass. Ingredients in semisolid form are kept under refrigeration for 12 hrs. Then it was squeezed over polythene sheet and dried at room temperature for 48 hrs. The dried nodules are crushed into small pellets. Pellets are sun dried to avoid fungal infection. Following the above procedure all the feeds were formulated. Following the above procedure all the feeds were formulated in the percentage composition of 25% (soyabean meal 25% +groundnut oil cake 75%), 50% (soyabean meal 50%+groundnut oil cake50%), 75% (soyabean meal 75% +groundnut oil cake 25%), 100% formulated (totally of soyabean meal)and 100%conventional (totally of groundnut oil cake).

### Experimental set up

Experiments were conducted in laboratory in glass aquaria of adequate size. The fingerlings of freshwater fishes

*Centropharengedon idella* were brought to the laboratory and acclimatized for one week. They were fed at the rate of 5% of total body weight. Feeding was carried out for 90 days. The body weights of fishes were also recorded at selected time intervals from each aquarium respectively. The SGR and FCR values were obtained by taking into consideration the recording weights of fishes and by applying the standard formula.

**RESULTS AND DISCUSSION**

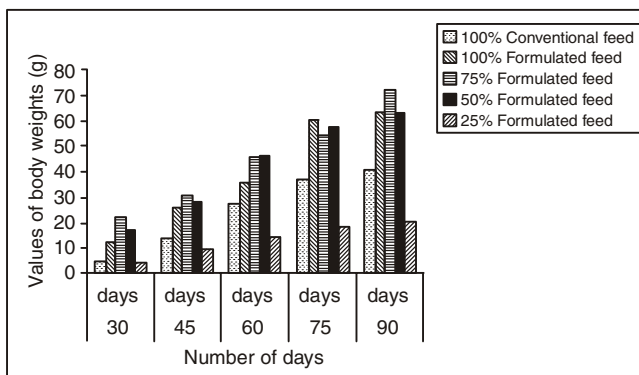
In present study the overall growth of fingerlings remained high for 100% formulated feed while low for 100%conventional feed (Table 1). The values of Specific Growth Rate of fingerlings remained high for formulated feed from Soyabean (0.327%) while it was 0.166% for conventional feed (Table 2). This growth response shown by the fishes may be due to the higher protein content of formulated feed than the conventional feed.

**Table 1 : Increase in body weight in terms of percentage (%).**

Type of feed	30 days	45 days	60 days	75 days	90 days
100% Conventional feed	4.66	13.85	27.70	37.29	41.08
100% Formulated feed	12.54	26.2	35.51	60.81	63.10
75% Formulated feed	22.19	30.69	45.93	54.00	72.49
50% Formulated feed	17.25	28.62	46.28	57.12	63.27
25% Formulated feed	4.33	9.43	14.55	18.37	20.38

Where increase in body weight is given by,

$$\text{Weight gain (\%)} = \frac{(\text{Final weight} - \text{Initial weight})}{\text{Initial body weight}} \times 100$$



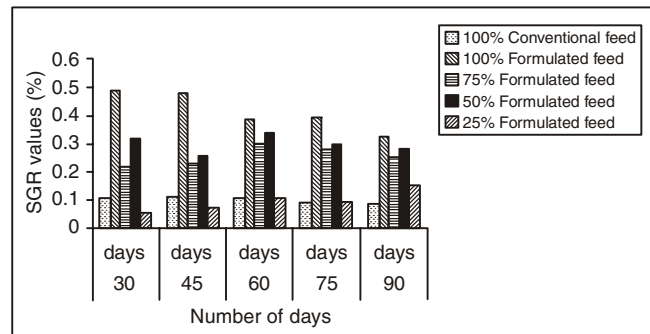
**Fig.1.** Increase in body weight (%).

**Table 2. The values of specific growth rates of experimental fishes fed on different combinations of feeds.**

Type of feed	30 days	45 days	60 days	75 days	90 days
100% Conventional feed	0.105	0.114	0.106	0.092	0.087
100% Formulated feed	0.492	0.476	0.383	0.393	0.327
75% Formulated feed	0.219	0.228	0.296	0.279	0.251
50% Formulated feed	0.318	0.256	0.340	0.299	0.279
25% Formulated feed	0.056	0.072	0.106	0.092	0.149

Where SGR is given by the formula,

$$\text{SGR } (\mu) = \frac{\text{Log (Final weight} - \text{Initial weight)}}{T} \times 100$$



**Fig.2.** Specific growth rate for *Centropharengedon idella*.

**Table 3. The values of feed conversion ratio of experimental fishes fed on different combinations of feeds.**

Type of feed	30 days	45 days	60 days	75 days	90 days
100% Conventional feed	14.49	4.87	2.43	1.81	1.64
100% Formulated feed	4.23	2.02	1.49	0.87	0.84
75% Formulated feed	2.39	6.53	4.35	0.98	0.73
50% Formulated feed	3.87	2.33	1.44	1.17	1.05
25% Formulated feed	16.66	7.63	4.95	3.92	3.53

Where FCR values were calculated by the formula,

$$\text{FCR} = \frac{\text{Total dry weight of food}}{\text{Final weight} - \text{Initial weight}}$$

