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Effect of Enriched Conventional and Aminoacid Supplemented Feed on Length Weight Relationship of Freshwater Fish *Oreochromis mossambicus* [Peters]

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Abstract

The present investigation was conducted to understand the length weight relationship of *Oreochromis mossambicus* for a period of sixty days. Enrichment of the conventional feed, containing rice bran and groundnut oil cake in equal proportions, with black gram and roots of winter cherry reduced the palatability. Aminoacids are known to act as good feeding stimulants. A screening of the different aminoacids for stimulant effect showed that the aminoacid leucine had the maximum influence on the feeding of *Oreochromis mossambicus*. Leucine was added to the enriched conventional feed at 0.1% level and the fishes were fed for sixty days to study to study the effect of black gram and roots of winter cherry on the length to weight relationship in *Oreochromis mossambicus*. Regarding length-weight relationship, for the experimental fish the slope was slightly higher indicating that these fish were heavier for their length when compared to the control fish.

INTRODUCTION

The feeding activity of fish is influenced by many factors such as availability of food, health condition of fish, quality and flavour of feed etc. It is unnecessary to emphasize the importance of feed for the maintenance of fish in a healthy condition. Differences in feeding rate are responsible for variations in growth rate, longevity, fecundity, time of spanning [New, 1987] and Corpulence [Love,1974]. The fish eats are long as the food is available and palatable, where access to food is restricted; fishes eat more of it, when it later becomes available [Shalini Singh and Mukhtar A. Khan, 2002]. At such a time, there is improvement in the growth rate. Fish adjusts also to a less nutrition's food by eating more of it. In regulating the food consumption, the energy content is more important than the protein content of the diet [Mareel Huel, 2000].

Researches also reveal that the quantity of food intake is also influenced by the social situation. Jack mackerel's become satiated by 1g of food when upto 5 fish are kept together, but they eat more when the group is bigger, the satiation quantity rising to approximately 4g in a group of a fish or more [Yanong, 1999].

Review of Previous Work

The flavor plays a key role in making the food more attractive. Channel cat fish readily take food flavoured with L-Cysteine and tend to avoid food mixed with other aminoacids, though they can soon become habituated to them [Piper, R.G., [1993]. The feeding stimulants in dover sole were found to be betaine and dimethylin and the amount of food eaten was strongly influenced by their presence [Mackie and Mitchell, 1982]. Work done by many authors indicate that each species of fish has specific feeding stimulant[s].

The amino acid from shrimps which most strongly stimulates cod to devour them is glycine, which also exhibits a synergistic effect with alanine, proline and arginine [Ellingsen and Doeving, 1986]. The dietary aminoacids which stimulate the feeding of herbivorous fish differ markedly from those which stimulate carnivorous fish [Johnson and Adams, 1986]. Carps possess external taste receptors which are strongly stimulated by some aminoacids, especially proline [Maruti et al., 1983].

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Materials and Methods

The test animal chosen for the study is *Oreochromis mossambicus* [Peters]. A total of 50 healthy fish *Oreochromis mossambicus* of varying lengths ranging from 4.5 to 6.5 cm and weighing about 25 g to 60 g, were procured from the fish farm at near Chidambaram, Tamilnadu, India. They were acclimatized for a week in a plastic tank with hundred litres of water. During the acclimatization period, the fish were kept under starvation and water was replenished daily. The mortality was found to be about 20% out of the survived fish were separated into plastic tank.

The water obtained from the public distribution system was stored for 24 hrs and used. The water in each tub was changed twice every day, completely in the morning an hour before feeding the fish and partially in the evening after siphoning off the fecus. Though scrubbing and cleaning of the tubs were done daily before replenishment.

Feed Formulation

A total of 22 different feeds were prepared. Feed one was the conventional feed with rice bran and groundnut oil cake mixed in equal proportions. Feed two to twenty one were prepared by adding to the conventional feed an aminoacid at 0.1% level, the aminoacid being different in each feed. The aminoacids used were alanine, arginine, hydrochloride, aspartic acid, cystine, cysteine hydrochloride, glutamic acid, hydroxyproline, isoleucine, leucine, methionine, phenylalanine, proline, serine, tyrosine and valine. Feed 22 was prepared by enriching the conventional feed with 15 % blackgram and 5% roots of winter cherry.

Preparation

The feed were prepared by mixing groundnut oil cake and ricebran in equal proportions. The feed was fortified with vitamins and minerals. The ingrediants of experimental feed comprised ricebran, groundnut oil cake, roots of winter cherry, blackgram,

vitamin mineral mix and all the aminoacids at 0.1% level. They were mixed and the pellets were prepared and the pore size was adjusted so as to get the pasts of 1mm thickness. [Table-1]

TABLE-1. Formulation of experimental diet

Ingredients	Percentage
Ricebran	40.0%
Groundnut oil cake	40.0%
Blackgram	15.0%
Winter cherry root	3.9%
Vitamin-mineral mix	1.0%
Aminoacid-leucine	0.1%

Result and Discussion

Results show that the feed number 22 the enriched conventional feed is the least favoured one. It seems that one or both of the ingredients, blackgram and winter cherry roots made the feed less palatable than the conventional feed. [feed-1]. Feeds with hydroxyproline, cystine and alanine were also not liked by the fish and feeding rates for these feeds were 3.9%, 4% and 4.1% of body weight respectively. Fish consumed the conventional feed at the rate of 4.2% of body weight and since the feeds with aminoacids arginine hydrochloride, aspartic acid, norleucine and ornithine hydrochloride also were consumed at the same rate as conventional feed it may be presumed that these aminoacids have neither repulsive nor attractive properties. For feeds having aminoacids cysteine hydrochloride, glutamic acid, lysine hydrochloride, methionine, phenylalanine, proline, serine, tyrosine and valine. The feeding rates were between 4.3 and 4.9% of body weight. While for feed with threonine the rate was 6% of body weight. Feed with tryptophan was consumed at 5.2% of body weight. The amount of feed with isoleucine was consumed at 6.7% of body weight. Leucine was found to stimulate most and the fish ate the feed at 7.2% of body weight.

A fish can be made to eat more of food by stimulating its appetite or by making the food attractive by adding a flavor. Steroid hormones have been used to stimulate the appetite. The flavour of a food may attract or repel a fish. Laurel et al., [2000] found that fishes of the genus *Ictalurus* were attracted most of the aminoacid cysteine hydrochloride. Channel cat fish readily taken food flavoured with L-cysteine and tends to avoid food mixed with other aminoacids [Lilliard, A, 1983]. Park et al., [1997] found that cod likes food containing glycine. Carps generally like feeds flavored with proline [Mareel Huel, 2000]. Regarding length weight-relationship, for the experimental fish the slope was slightly higher indicating that these fish were heavier for their length when compared to the control fish.

Table 1: Showing one way analysis of variance [ANOVA] of Length and weight of fish before and after 60 days of feeding with conventional feed.

Parameter	Source	Sum squares	df	Mean squares	f	p
Length	Between Within total	5.42 4.84 10.26	2 5 7	 2.71 0.968	2.799	0.001
Weight	Between Within total	13815.26 72722.86 86538.12	2 5 7	 6907.63 14544.57	2.11	0.001

Table 2: Showing variations in length [cm] and weight [g] of fish before and after feeding the conventional feed.

Parameters	Before feeding	After 60 days of feeding with conventional feed
Length	5.59 ± 1.25	7.24 ± 0.78
Weight	36.70 ± 2.10	68.54 ± 3.2

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