



DIETARY MEDICINAL HERBS IMPROVE GROWTH AND BIOCHEMICAL COMPOSITION OF COMMON CARP, *CYPRINUS CARPIO* FINGERLINGS

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Abstract

Cyprinus carpio fingerlings were fed with various levels of the commercial herbal growth promoter ('Liv.52'). After 60 days of culture, a very positive result was found in 'Liv.52' fed fingerlings. The administration of 'Liv.52' in all the levels produced significantly ($P < 0.05$) higher weight gain and muscle proximate composition (moisture, protein, carbohydrate, fat, ash and calorific contents). The utilization of feed increased significantly ($P < 0.05$) in the supplemented diet fed fish from that of control. Among the different percentages, 20% 'Liv.52' incorporation performed better in the overall status.

Key words : Herbal growth promoter, *Cyprinus carpio*, Liv. 52.

Introduction

Hormones, antibiotics, vitamins and several other chemicals have been tested in aquaculture operations for various remedies. Even though they give positive effects, they cannot be recommended due to their residual and other side effects. Plants are storehouses and sources of safer and cheaper chemicals. Herbal preparations are prescribed to cure various diseases, as they contain active principles. Herbal principles are known to have an important role in disease control due to their antioxidant and antimicrobial activities. Natural plant products have been reported to promote various activities like antistress, growth promotion, appetite stimulation, tonic and immunostimulation, and to have aphrodisiac and antimicrobial properties in finfish and shrimp larviculture due to the active principles such as alkaloids, flavonoids, pigments, phenolics, steroides and essential oils (Sivaram, 2004).

Effects of polyherbal formulation 'Immuplus' on growth, immunity and disease resistance of Indian major carp, *Labeo rohita* was determined by Kumari *et al.* (2007). Venkataramalingam *et al.* (2007) investigated the effect of medicinal herb, *Zingiber officinalis* on growth and feed utilization efficiency of tiger shrimp, *Penaeus monodon*. The present study has been undertaken to evaluate the efficiency of polyherbal formulation 'Liv.52' on growth, feed utilization efficiencies and biochemical composition in Indian major carp, *Cyprinus carpio*.

Materials and Methods

Herb and test diets

A commercial herbal growth promoter ('Liv.52') was obtained from local commercial markets. A basal diet as a control diet consisted of rice bran and groundnut oilcake in 1:1 ratio. The herbal growth promoter was supplemented into this diet at the levels of 5, 10, 15, 20 and 25% of basal diet. The diets were stored at -45° C immediately after preparing pellets of 3 mm diameter. The moisture content of the control diet was 38.8% and crude protein, fat and ash contents were 48.3, 15.1 and 2.9% on dry weight basis, respectively.

Fish and feeding trial

Common carp, *Cyprinus carpio* (Hamilton) were selected for the present feeding experiment. Fish were acclimatized for one month in the laboratory condition in non-chlorinated water. At the beginning 8 fish of both sexes each weighing 15.5 ± 0.6 g (mean \pm standard deviation) were introduced into plastic tanks (50L capacity). The fish were fed with control and test diets twice a day at the rate of 4% of body weight of the fingerlings for 60 days. Each experiment was tried in triplicates.

Growth parameters

Fingerlings were weighed at 15 day intervals to assess the growth performances in terms of percent weight gain, length gain, feed conversion ratio (FCR),

Table 1 : Weight gain, length gain and feed utilization efficiencies of *Cyprinus carpio* fingerlings fed with control and various levels of 'Liv.52'.

Growth parameters (%)	Control	T ₁	T ₂	T ₃	T ₄	T ₅
Weight gain	12.04	16.26	30.41	35.20	54.66	47.32
Length gain	4.54	8.02	13.31	21.81	29.27	26.10
FCR	2.50	2.44	2.40	2.10	1.89	1.93
PER	1.70	2.13	2.33	2.44	2.74	2.61
PPV	3.01	4.00	4.49	5.19	6.40	6.17
FE	27.01	43.30	48.84	54.44	63.29	60.73

Values are mean (n = 8).

Table 2 : Biochemical composition of *Cyprinus carpio* fingerlings fed with control and various levels of 'Liv.52'.

Biochemical composition	Before experiment	After experiment					
		Control	T ₁	T ₂	T ₃	T ₄	T ₅
Protein (%)	17.00	17.03	17.98	18.35	19.17	22.64	20.45
Carbohydrate (%)	2.51	4.21	4.70	5.14	5.84	6.12	6.01
Fat (%)	1.91	2.31	2.32	2.93	3.14	3.32	3.26
Calorific content (Kcal/gm)	110.04	136.25	148.27	152.18	157.46	164.45	160.032

Values are mean (n=8)

protein efficiency ratio (PER), protein productive value (PPV) and feed efficiency (FE).

Biochemical analysis

Muscle proximate composition such as protein, carbohydrate, fat and calorific content were analysed in *C. carpio* fingerlings before and after the experiment using standard methods of AOAC (2000). Similarly, test diets were analysed for their proximate composition.

Statistical analysis

Data were statistically processed for one way analysis of variance (ANOVA) and the level of significance was defined at $P < 0.05$.

Results and Discussion

Commercial herbal growth promoter ('Liv.52') supplementation significantly ($P < 0.05$) improved the weight gain and diet utilization efficiency (FCR, PER, PPV and FE) in *C. carpio* fingerlings than the control. A marked increase in growth and feed utilization efficiency were recorded in fish fed with 'Liv.52' at a rate of 20% for 60 days in comparison to other groups (table 1). The results were consistent with the results of previous researches. Livol (IHF-1000) is a commercial herbal growth promoter containing different plant ingredients such as *Bohaevia diffusa*, *Solanum nigrum* and *Terminalia arjuna* and has been found to significantly

improve digestion, thereby leading to better growth, production and health in cultivable fishes (Unnikrishnan, 1995; Jayaprakash and Eupharsia, 1996). The dietary ginseng herb (Ginsana® G115) greatly enhanced the growth performance, diet utilization efficiency and haematological indices in the Nile tilapia, *Oreochromis niloticus* fingerlings (Ashraf and Goda, 2008).

The effect of feeding 'Liv.52' on muscle proximate composition is presented in table 2. Feeding of experimental diets significantly ($P < 0.05$) increased the muscle protein, carbohydrate, fat, ash and calorific contents compared to control. The similar results are also reported by Ji *et al.* (2007), who observed enhanced proximate composition (water, protein, lipid and ash), weight gain and feed efficiency in Japanese flounder, *Paralichthys olivaceus* fed with various levels of medicinal herbs mixture. The herbal growth promoters help to induce the transcription rate. This process leads to increased RNA, total amino acid and finally increases production of proteins in the cells (Citarasu, 2009). Medicinal herbs also promote lipid metabolism that catabolize body fatty acid as main energy expenditure, resulting in efficient protein accumulation and growth performance (Jang and Choi, 2003). This may be the reason for the improvement of muscle biochemical composition and growth rate in the experimental fish.

The present results provides evidence that

commercial herbal product 'Liv.52' added to *C. carpio* diet, particularly at 20% for 60 days boostup growth as well as biochemical composition.

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