Note

**Effect of feeding livol incorporated diet on nutrient digestibility, body indices and organoleptic quality of rohu, Labeo rohita**

K. MAHESHPAPPAG, T.J. RAMESHA, B. GANGADHAR AND T.J. VARGHESE
College of Fisheries, Mangalore - 575 002, India

**ABSTRACT**

Supplementation of a fishmeal based pelleted diet (30% protein) containing Livol, a herbal growth promoter at 0.5, 1.0 and 1.5% levels increased the nutrient (Protein, Fat, NFE) digestibility and decreased hepatosomatic indices. These parameters were the best at 0.5% level of dietary Livol. No effect on viscerosomatic indices and organoleptic quality of the fish was observed on feeding Livol incorporated diets.

Growth promoters act pharmaco logically to improve the metabolic and/or digestive efficiency and promote protein deposition and hence growth. The growth parameters of Labeo rohita fed with Livol, a herbal growth promoter, has been reported earlier by Maheshappa et al., 1999. Similar studies conducted on catla (Gireesha, 1993), common carp (Abraham, 1992) and mrigal (Nandeesha, unpublished) revealed the growth promoting effect of Livol. This paper reports the effect of Livol on nutrient digestibility, body indices and organoleptic quality of Labeo rohita.

Livol (Table 1) was incorporated in a fishmeal based standard pelleted feed (Varghese et al., 1976) at three levels viz., 0.5, 1.0 and 1.5% (Table 2). The diet containing no growth promoter was served as the control diet. Diets were prepared by mixing all the sieved ingredients with requisite quantity (750ml/kg) of water and cooked in a pressure cooker for 30 minutes. The growth promoter along with vitamin and mineral mixture were mixed with the dough and pelletised to 2.5mm pellets. The dried pellets (<10% moisture) were subjected to proximate analysis (AOAC, 1975) and stored in polythene bags until use.

Digestibility study was conducted in four aerated aquaria (1.2 x 0.5 x 0.5m) with static water system for each feed. Four fish (av. wt. 20.0g) were stocked in each aquaria and acclimated to control diet for a week. Fish in each aquaria were

<table>
<thead>
<tr>
<th>Table 1. Composition of Livol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingredients</td>
</tr>
<tr>
<td>Yavtika</td>
</tr>
<tr>
<td>Raktapushpa</td>
</tr>
<tr>
<td>Dhaval</td>
</tr>
<tr>
<td>Varuni</td>
</tr>
<tr>
<td>Markav</td>
</tr>
<tr>
<td>Ugragandha</td>
</tr>
<tr>
<td>Rohini</td>
</tr>
<tr>
<td>Manthpak</td>
</tr>
</tbody>
</table>
fed with one of the diets at 5% body weight (Jhingran, 1991; Gangadhar et al., 1998) once daily at 10hr. The unconsumed feed was removed at 16hr. Faecal matter was collected through siphoning the water from aquarium at 09hr on the following day. After collection of faecal matter, water from the tanks was completely changed. Faecal samples thus collected were dried immediately. Samples were collected for a period of 20 days, pooled treatment wise and proximate composition analysed (AOAC, 1975). The nutrient digestibility was determined employing crude fibre as marker (De Silva et al., 1990).

Three fishes from each treatment of a feeding trial (Maheshappa et al., 1999) conducted for 120 days in cement cisterns of 25m³ were used to determine the body indices viz., hepatosomatic index (HSI) and viscerosomatic index (VSI) employing the method followed by Keshavanath and Renuka (1998). Eleven panelists evaluated the organoleptic quality, on termination of the experiment, based on various attributes like colour and gloss of skin, odour, texture and flavour of flesh (Nandeesha et al., 1988).

Multiple range test (Duncan, 1955) was used to rank the treatment means tested for significance (P<0.05) employing analysis of variance (ANOVA) for the different parameters.

Feeding the diets supplemented with Livol resulted in higher digestibility of protein, fat and NFE. Among the nutrients, the digestibility of fat was the highest and that of the NFE, the lowest. Nutrient digestibilities were the highest in fish receiving 0.5% level of dietary Livol (Table 3). Digestibility, a measure of digestion and absorption (bio-availability) of ingested food depends upon several factors including the dietary composition. Growth promoters (hormonal and non-hormonal) improving the nutrient digestibility is reported for several species (Gangadhar et al., 1988; Keshavanath et al., 1999).

### Table 2. Ingredient proportion and proximate composition of experimental diets.

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Diets</th>
<th>Proximate parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
<td>0.5%L</td>
</tr>
<tr>
<td>Rice bran</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Fishmeal</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Groundnut oilcake</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Tapioca flour</td>
<td>10</td>
<td>9.5</td>
</tr>
<tr>
<td>Vitamin &amp; Mineral mix*</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Livol</td>
<td>-</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Gross energy (kJ/g) 13.71

Figures in parenthesis indicate standard deviation.

* - Supplevite - M (each 250g provides, Vitamin A - 500,000 I.U.; Vitamin D₃ - 100,000 I.U.; Vitamin B₂ - 0.2 g; Vitamin E - 75 Units; Vitamin K - 0.1 g; Cal. Pantothenate - 0.25 g; Nicotinamide - 1.0 g; Vitamin B₁₂ - 0.6 mg; Choline chloride - 15 g; Calcium - 75 g; Manganese - 2.75 g; Iodine - 0.1 g; Iron - 0.75 g; Zinc - 1.5 g; Copper - 0.2 g; Cobalt - 0.045 g) supplied by Sarabhai Chemicals, Baroda, India.
Livol supplementa-
tion at 0.5% and 1.0% resulted in higher
nutrient digestibility in catla and com-
mon carp (Abraham, 1992; Gireesha,
1993). Livol is known to be a liver tonic,
metabolic stimulant and enhance diges-
tive enzyme activity in catla (Gireesha,
1993) and mrigal (Nandeesha, unpub-
lished report). Rohu receiving diets sup-
plemented with L-carnitine showed
higher fat digestibility (Keshavanath and
Renuka, 1998). Higher protein and fat
digestibilities have been observed in com-
mon carp and rohu fed with 19-
norethisterone (Gangadhar
et al., 1998).

Improved food assimilation and better
digestibility of nutrients with 17
/G61
-MT
feeding has been reported in common
carp (Deb, 1986) and mahseer (Gogoi and
Keshavanath, 1988).

Diets containing Livol showed reduc-
tion in hepatosomatic indices over the
control on feeding rohu (Table 3). This
lower values could be attributed to the
mobilisation of fat from liver to the mus-
cle as in the case of steroid treated fish
(Lone and Matty, 1980). The viscero-
somatic indices on the other hand showed
no significant (P>0.05) difference be-
tween the treatments. The observations
recorded in the study is in agreement
with the results of works done on com-
mon carp (Abraham, 1992) and catla
(Gireesha, 1993) employing Livol incor-
porated diets. Lone and Matty (1980) and
Deb (1986) reported similar observations
in common carp and Indian major carps
respectively on feeding with diets con-
taining 17α-MT.

Organoleptic quality is a matter of
great importance from the perspective of
consumer acceptance and is influenced
by the quality of feed (DeSilva and
The study revealed that addition of Livol
in the diet of rohu had no effect (P>0.05)
on the quality of raw and cooked flesh of
fish in terms of colour and gloss of skin,
odour, texture and flavour. Abraham
(1992) and Nandeesha (unpublished) re-
ported similar observations in common
carp and mrigal fed with Livol supple-
mented diets. Flesh quality of rohu was
not affected by feeding L-carnitine incor-
porated diets (Keshavanath and Renuka,
1998).

The results of the present study in-
fer that incorporation of Livol in the diet
of rohu improves the nutrient digestibil-
ity and viscero-somatic indices without
affecting the flesh quality. Incorporation
of Livol at 0.5, 1.0 and 1.5% resulted in
additional cost of rupees 0.15, 0.30 and

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Diets</th>
<th>Control</th>
<th>0.5%L</th>
<th>1.0%L</th>
<th>1.5%L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digestibility coefficients (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protein</td>
<td>87.15a</td>
<td>91.24b</td>
<td>88.70a</td>
<td>88.63a</td>
<td></td>
</tr>
<tr>
<td>Fat</td>
<td>93.43b</td>
<td>96.05b</td>
<td>95.77b</td>
<td>95.00b</td>
<td></td>
</tr>
<tr>
<td>NFE</td>
<td>73.34c</td>
<td>78.61c</td>
<td>77.08b</td>
<td>76.79b</td>
<td></td>
</tr>
<tr>
<td>Body Indices</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSI</td>
<td>0.91c</td>
<td>0.70b</td>
<td>0.73b</td>
<td>0.66a</td>
<td></td>
</tr>
<tr>
<td>VSI</td>
<td>10.01c</td>
<td>10.19a</td>
<td>11.02a</td>
<td>11.35a</td>
<td></td>
</tr>
</tbody>
</table>

Figures in parenthesis indicate standard deviation.
Figures in the same row having same superscription are not significantly different (P>0.05).

TABLE 3. Nutrient digestibility coefficients and body indices of rohu fed with Livol incorporated diets.
0.45 respectively/kg of diet. However, in view of the improved nutrient digestibility and growth (Maheshappa et al., 1999), the addition of Livol to the diet of carps is beneficial.

References


