

Total Lipid Alteration Gill and Muscle of Fingerlings of Freshwater Fish *Labeo Rohita* Fed on Formulated Feed

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Abstract: Now a day's consumer wants to know and ensured the nutritional value of the products what they are eating. The biochemical composition of the whole body indicates the fish quality. In the biochemical composition lipids are of great important not only to fish nutrients but also to human nutrition. For this in the present experiment, Nighty days experiment was conducted in glass aquaria to study lipid content in intestine of fingerlings of freshwater fish *Labeo rohita* fed on 100%, 75%, 50% and 25% non-conventional source of protein in formulation of fish feed i.e., Blood of bovine animals obtained from slaughter house waste and conventional feed. i.e., Groundnut oil cake. The fishes were fed at the rate of 2% of the body weight every day. After specific time intervals the fishes were weighed and sacrificed for intestine tissue. The estimation of total lipid by Floch's method. The above result demonstrated that, the maximum lipid content was observed at 25% formulated feed followed by 50% 100% and 75% formulated as compared to conventional feed and muscle at 100% formulated feed as compared with conventional feed.

Keywords: Lipid, Formulated Feed, Conventional Feed. *Labeo Rohita*, etc.

I. INTRODUCTION

Fish require a high quality and nutritionally balanced diet for adequate growth within the shortest time. Therefore, local production of fish feed using locally available ingredients at low cost is crucial to the development and sustainability of aquaculture. Affordable quality feed will make fish farming attractive to private investors and boost fish production. In the fish feed formulation protein in the feedstuffs helps to formulate proper and growth effective fish diet (Maina *et al.*, 2002). The identification and utilization of non-conventional and lesser utilized plant protein sources to replace fishmeal either partially or totally in practical diets of fish has been an area of research in aquaculture nutrition (Siddhuraju & Becker, 2003). However, the increasing cost of quality fish feed required for aqua feed, due to decline in stocks of fish from capture fishery and competition for feed in animal husbandry, therefore need of search alternative sources of animal protein for fish feed. Hence in the present study, non-conventional animal protein source as blood of bovine animal is used in feed formulation as primary ingredient along with another ingredient.

Fishes and their biochemical parameters can be considered as bio-indicators or bio-monitors of aquatic system for assessing the quality of water and also the survival and growth rates of fishes grown such environment. Dietary lipids provide energy and Essential Fatty Acids (EFA) to the fish and they also assist the absorption of fat-soluble vitamins (NRC, 1993). Lipids are of great importance not only to fish nutrition but also to human nutrition. Dietary lipids provide energy and Essential Fatty Acids (EFA) to the fish and they also assist the absorption of fat-soluble vitamins (NRC, 1993 and Nadaf and bhilave 2014). Lipids play important physiological roles in providing energy, essential fatty acids and fat-soluble nutrients for normal growth and development of fish and human being. Hence in the present study aimed to determine effect of different combinations of formulated feed (100%, 75%, 50% and 25%) and conventional feed on activity total lipid alteration in gill and muscle of freshwater fish *Labeo rohita* which gives the understanding of utilization of nutrients in feed by fish.



II. MATERIALS AND METHODS

Formulation of Feed

In the present study, for formulation of fish feed, the non-conventional animal protein source such as blood of bovine animal (80gm) was taken along with ingredients like milk powder (60 gm), corn flour (20 gm) and eggs (70 gm) were added and mixed well. Agar powder (4 gm) was added as binding agent and turmeric (0.5gm) and garlic (1 gm) were added as antibiotics. Then the mixture was boiled and cooled at room temperature. After cooling cod liver oil (3.5 ml) was added. The vitamin mixture of vitamin B complex (1gm) and vitamin E (1ml) were added in the mixture. This mixture was kept under refrigeration for 12 hrs. After 12 hrs it was squeezed over polythene sheet and then dried at room temperature for 24 hrs. The dried nodules were crushed into small pellets. The nodules were sun dried to avoid fungal infection. Finally, it was weighted and stored in the bottle. Following the above procedure all the feeds were formulated in the percentage composition of 25% (blood 25%+groundnut oil cake 75%), 50% (blood 50%+ groundnut oil cake 50%),75% (blood 75% + groundnut oil cake 25%),100% formulated (100% blood) and 100% conventional (100% groundnut oil cake). (Bhilave *et al.*, 2010)

Experimental Protocol:

The fingerlings of freshwater fish *Labeo rohita* measuring about 4 to 5 cm in length were obtained from the Fish Seed Rearing Centre, Rankala, Dist. Kolhapur, unit of Department of Fisheries, Government of Maharashtra. After obtaining them, they were brought to the laboratory and acclimatized in rectangular glass aquaria of 36x12” with 60 liters capacity containing aerated water for seven days. During acclimatization adequate aeration was maintained and temperature was maintained from 28°C to 30°C. The fishes which survived during acclimatization were distributed randomly into five aquaria (10 in each) and labeled as per the feed combination. They were fed at the rate of 2% of total body weight. The feeding was done once in a day. The body weights and lengths were recorded at each time interval i.e., 30, 45, 60, 75 and 90 days throughout the experimental period respectively.

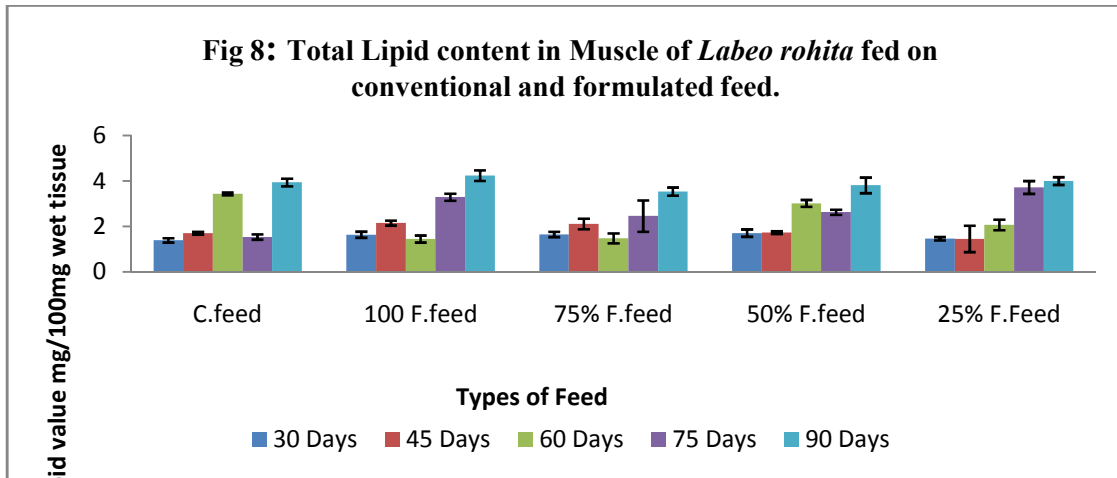
Biochemical Studies:

After time intervals of 30,45,60,75 and 90 days fingerlings of fishes were taken, weighed and scarified for tissues like gill and muscle. The tissues were quickly excised and cleaned off extraneous material, weighed and used for biochemical estimation like total lipid by Barnes and Blackstock (1973).The mean value was calculated and expressed in mg/100 mg of tissue.

III. RESULTS AND DISCUSSION

Table 1:Total lipid content from muscle of freshwater fish *Labeo rohita* fed on Conventional and Formulated feed.

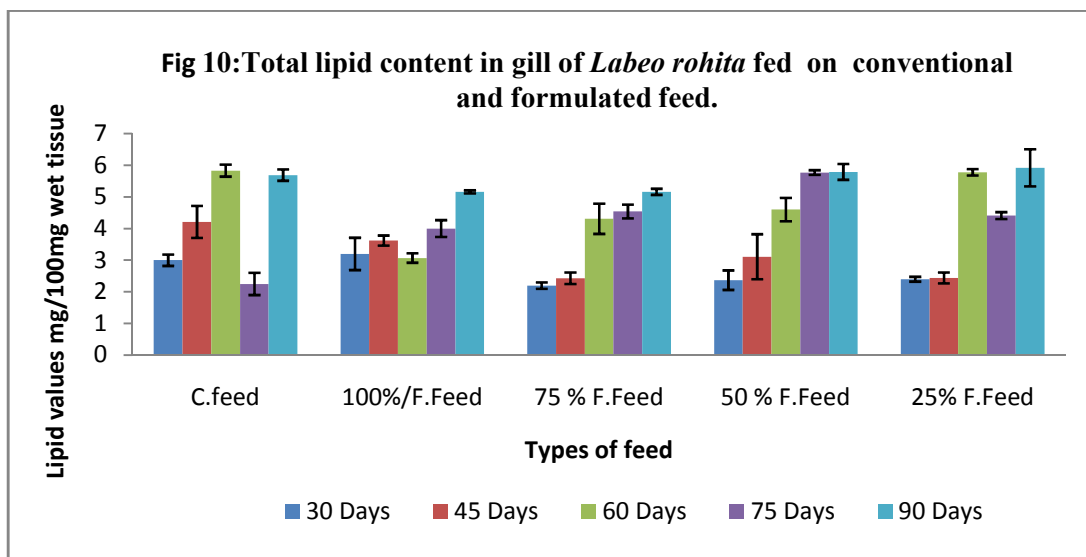
Sr. No	Days	Conventional Feed	Formulated feed			
			100%	75%	50%	25%
1	30 days	1.39±0.10	1.64±0.06 ^{ns}	1.65±0.06 ^{ns}	1.71±0.12*	1.46±0.17 ^{ns}
2	45 days	1.54±0.16	2.15±0.11*	1.48±0.22 ^{ns}	2.63±0.11***	1.45±0.23 ^{ns}
3	60 days	1.70 ±0.13	1.45±0.23 ^{ns}	2.46±0.15**	1.73±0.16 ^{ns}	2.07±0.18 ^{ns}
4	75 days	3.43±0.12	3.29±0.06 ^{ns}	2.11±0.16**	3.02±0.69 ^{ns}	3.72±0.35 ^{ns}
5	90 days	3.52±0.23	4.24 ±0.58**	3.94±0.08 ^{ns}	3.81±0.28 ^{ns}	4±0.17 ^{ns}



Value expressed is mean of n (n=5) ± SD, * P< 0.05, **P<0.01, ***P<0.001, NS = Non significant

Table2: Total lipid content from gill of freshwater fish *Labeo rohita* fed on conventional and formulated feed.

Sr. No	Days	Conventional Feed	Formulated feed			
			100%	75%	50%	25%
1	30 days	2±0.18	3.2±0.51***	2.2±0.19 ^{ns}	2.37±0.35 ^{ns}	2.41±0.19 ^{ns}
2	45 days	4.21±0.51	3.62±0.16 ^{ns}	2.43± 0.15***	2.44±0.27***	2.44±0.05***
3	60 days	5.83±0.10	3.07±0.18***	4.31±0.48***	5.78±0.22 ^{ns}	5.78±0.10 ^{ns}
4	75 days	2.25±0.31	4±0.71**	4.54±0.37***	4.41±0.08***	4.41±0.25***
5	90 days	5.16±0.17	5.69±0.08 ^{ns}	5.20±0.10 ^{ns}	5.79±0.11*	5.92±0.59**



Value expressed is mean of n (n=5) ± SD, * P< 0.05, **P<0.01, ***P<0.001, NS = Non significant

IV. RESULT AND DISCUSSION

Islam and Tanaka (2004) reported that, protein is one of the most important dietary nutrients in feed and which considerably affecting by growth, survival and yield or production of fish. They are providing essential and non-essential amino acids to synthesize body protein and energy for maintenance. Generally, the feed stuffs of animal origin are considered the better alternative protein sources of the fish meal in formulating fish feed because of their higher protein content and superior indispensable amino acids than that of plant origin (Robinson and Li 1998). Thus, in the present investigation, the non-conventional animal protein source such as blood of bovine animal is used in feed formulation as primary ingredient along with other ingredients which was observed enhance the growth and disease resistance infishes. In the present study different combinations of formulated feeds were designed, accordingly to least cost formulation to include non-conventional animal protein source such as blood of bovine animal of with different percentage with groundnut oil cake (100%, 25%, 50%, and 75%) and this formulated feed was well accepted and utilized by fingerlings of *Labeo rohita* (Bhilave *et al.*, 2011).

The total lipid contents of fish are reported to vary significantly with gradual increase in the weight and length of the fish and also due to seasonal changes aside from the available nutrients in varied habitats. These increments of body lipid by increasing dietary lipid level have been reported in previous studies (Kaushik and Oliva-Teles, 1985; Medale *et al* 1991, Nadaf and Bhilave 2014)

In the present study, experimental fishes fed on formulated feed was found highest lipid content at 25% formulated feed 5.92 ± 0.59 mg/100mg wet tissue followed by 50% formulated feed followed by 100% formulated feed 5.69 ± 0.08 mg/100mg wet tissue and 75% formulated feed was 5.20 ± 0.10 mg/100mg wet tissue as compared to conventional feed was 5.16 ± 0.17 mg/100mg wet tissue of 90 days experiment while the highest lipid content in muscle of experimental fishes at 100% formulated feed 4.24 ± 0.58 mg/100 mg wet tissue while at 75% formulated feed followed by 50% formulated feed followed by 25% formulated feed as compared to conventional feed of 90 days experiment.

According to Agbedi and Octobusin 2009, the total replacement of fish meal with blood meal in the diet of catfish *Garipepinus* culture in the net cages show no any adverse effect on growth (Nalawade and Bhilave 2015) Allan (1998) reported that blood meal in feed was well utilized by Barrmundii and Atlantic salmon which were adapted to carnivorous diets. In Past the literature reported that, blood meal rich in lysine, leucine and valine. and high in histidine and phenylalanine. (Crawshaw 1994, Hertrampf and pedal- Pascal 2000). Therefore, increasing research on blood. New inclusion in fish feed for better reasonable diets in the fish forming industry. As desired by fish *farmers* worldwide from obtained result, we concluded that, the formulated feed give superior growth at low cost with healthier fish.

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