

Short Term Growth Evaluation Study on Cat Fish (*Pangasius pangasius*) Fry Using Poultry Carcass Meal as a Dietary Protein Supplement

K.S. Vijay Amirtharaj* and G. Arul Oli**

Department of Coastal Aquaculture, **Department of Fisheries Extension,
Fisheries College and Research Institute, Thoothukudi - 628 008, Tamilnadu (India)

*e-mail: ksvijay444@gmail.com

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ABSTRACT

A short term trial study was undertaken to analyze the growth efficiency of Cat fish (*Pangasius pangasius*), by total replacement of fish meal with poultry carcass meal. Cat fish fry were stocked in two cement tanks at a stocking density of 7.5 m⁻². The experimental diet was prepared by totally replacing fish meal with poultry carcass meal. The control and experimental diets were fed @ 10% of the body weight twice a day for 150 days and reared up to advanced fingerling stage. The growth of fish fed with poultry carcass incorporated feed showed a significantly difference in terms of weight gain but not in their length.

Key words: By-products, carcass meal, formulated feed

The demand for fish and shell fishes are expected to increase dramatically worldwide in the coming years due to population growth, increasing disposable income and public awareness on “fish as health food”. Aquaculture has become increasingly important player in satisfying the demand, especially for high-value species, so aquaculture has shown a rapid increase in production in recent years (FAO, 2010). The share of aquaculture in fishery industry has increased from a mere 4% in 1970 to nearly 50% in 2012 (Transparency Market Research, 2014). The aquaculture industry depends only on formulated feed for its fast growth efficiency in short duration. In formulated feed the quantity and quality of protein determines the efficiency of feed in growth promotion, so dietary protein is critical for the growth and development of fish because it provides essential amino acids for muscle formation and enzymatic function (SRAC, 1998). Fish meal is a major protein source in aquaculture feeds. However, the supply of fish meal is limited (Rumsey, 1994; Barlow, 1997) and it depends entirely on landings from the capture fisheries. One of the cost effective alternative dietary protein supplement to fish meal is poultry carcass meal. Poultry carcass meal is the meal prepared from whole carcass of poultry with feather and bone sterilized, grinded and rendered, this is an effective method, for disposal of poultry in farms during mass mortality. A high quality poultry hen meal contains 58-63% crude protein, 12-26% ether extract and 18-23% ash (Bravo Jimenez *et al.*, 2009). Vilmaz Emre *et al.* (2003)

have reported negative impact of poultry by-product meal in mirror carp (*Cyprinus carpio* var. *specularis*) fingerlings tested at varying proportions. Poultry by-product includes only viscera, head, legs and feathers, so the proximate composition of poultry by-product varies from poultry carcass meal. Although the studies have been done by alternating fish meal with poultry by-product meal, but there is no much information related to the growth assessment of *Pangasius pangasius* fish by the incorporation of poultry carcass meal in fish feed. The present study was aimed to assess the effect of poultry carcass meal on growth promotion of Cat fish (*Pangasius pangasius*), which could be a low cost-alternative protein source in the formulation of fish feed.

MATERIALS AND METHODS

The present study was conducted at Fresh Water Ornamental Unit of Regional Research Centre, Tamil Nadu Veterinary and Animal Sciences University, Pudukkottai, Tamil Nadu (India). Cat fish fry selected for this study was procured from a private carp seed farm in Thitai (Tanjore district), Tamil Nadu. Fry were randomly allocated to the two cement tanks of 2 m² capacity at stocking rate of 15 fishes/tank (stocking density of 7.5 m⁻²).

Experimental diet and design

An experimental diet was formulated by completely replacing fish meal with poultry carcass meal in diet; whereas the control feed comprised of fish-meal based diet. The experimental feeds were estimated to contain 35% crude protein, 9.5% crude fat and 7.2% ash whereas control diet formulated contained 24% crude protein, 7.2% crude fat and 6.2% ash. Both, control and experimental feed samples were analyzed for proximate composition analysis at the Department of Fish Processing Technology, FCRI, Thoothukudi, Tamil Nadu. The control feed had ingredient composition as: dry fish meal (25%), groundnut oil cake (25%), rice bran (10%), soya powder (10%), ragi powder (9.8%), corn powder (20%) vitamin premix (0.1%) and mineral premix (0.1%). The vitamin premix per kg contained 40,00,000 IU vitamin A, 4,80,000 IU vitamin D₃, 40,000 mg vitamin E, 2,400 mg vitamin K₃, 4,000 mg vitamin B₁, 6,000 mg vitamin B₂, 40,000 mg niacin, 10,000 mg Ca-panthothenate, 4,000 mg vitamin B₆, 10 mg vitamin B₁₂, 100 mg D-biotin, 1,200 mg folic acid, 60,000 mg inositol and 40,000 mg vitamin C. The mineral premix per kg contained 75,000 mg Zn, 5,000 mg Fe, 23,750 mg Mn, 2,00,000 mg Mg, 1,100 mg Se, 2,750 mg I and 2,000 mg Co. In experimental diet fish meal was replaced by poultry carcass meal and rest ingredients were same as in control feed.

Experimental procedure

The two batches of fishes were stocked in cement tanks of size 2 m². The average weight and length of experimental fish were noted before stocking. The fish were fed two times a day 10.00 and 16.00 hrs. Fishes were fed to satiation and most care taken to assure that all feed broadcasted in trial tanks got consumed. Feed was given @ 10% of total biomass body weight. Average weight gain and average length was recorded after every 10 days once throughout the study period, this study was carried for a total of 150 days.

RESULTS AND DISCUSSION

The growth performance of Cat fish fed with poultry carcass-base feed and control feed are given in Table 1. The fish fed on poultry carcass-based feed showed a significant gain in weight but no significant increase in length. The findings are in conformity with earlier reports of gains by replacing fish meal with poultry by-product meal in Rohu (Hansan and Das, 1993) and Carp (Steffens, 1988).



Fig. 1: Cat fish (*Pangasius pangasius*)

Table 1: Growth performance Cat fish (*P. pangasius*) fed with treatment and control feed

Parameters	Control	Carcass
Initial weight (g)	0.90	0.90
Final weight (g)	6.62	12.71
Average weight gain (g)	5.72	11.81
Average daily weight gain (g)	0.038	0.079
Initial length (cm)	2.80	2.80
Final length (cm)	8.10	11.20

In the present study fish meal was completely replaced with poultry carcass meal rather than the poultry by-product meal as in the earlier studies on European eel (Appelbaum *et al.*, 1996) and Tilapia (El-Sayed, 1998). The growth from treatment feed was significantly higher than the control diet with an average daily growth of 0.079 g whereas in control feed average daily growth attained was 0.038 g. While considering the water quality, the tank fed

Table 2: Water quality parameters in tanks

Quality parameters	Control	Carcass
pH	7.5-8.3	7.8-8.9
Temperature (°C)	25-27	25-27
Alkalinity (mg/l)	158-162	155-164
Hardness (mg CaCO ₃ /l)	327	327
Ammonia (ppm)	Nil	Nil

with carcass feed showed a drastic change in water colour due to unconsumed feed left over when compared to the tank fed with control feed. The trial tank was given frequent water exchange, to maintain its quality. Throughout the study the water quality parameters were observed for every ten days (Table 2).

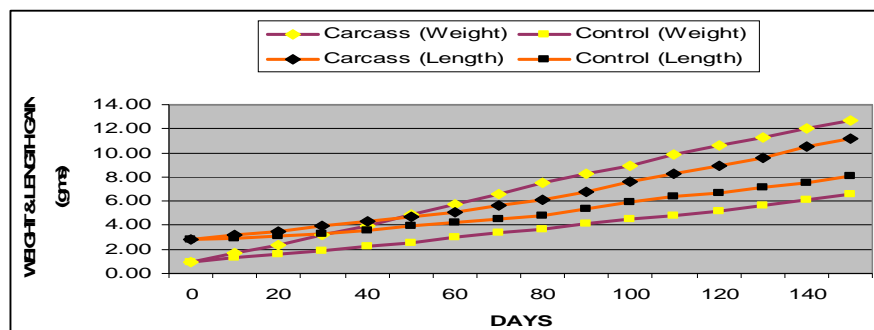


Fig. 1: Weight and length variations in Cat fish during experimental period

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