

Performance evaluation of aquafeed developed from fish processing discards

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Industrial fish processing activities generate huge quantities of waste in the form of head, viscera, skin, scales and other trimmings. The unscientific disposal of these materials results in environmental pollution and proliferation of harmful agents. It has been observed that these discards can be better utilised by converting into poultry feed, fish feed and animals feed by incorporating with other feed ingredients. This not only adds value to the process discards, but also introduces as a major protein and mineral supplements/ingredient for feed industry.

Five different feed formulations were made from both sorted and bulk wastes, viz. squid, cuttle fish, sardine head waste, shrimp head waste and domestic fish market waste (contains discards of various fish/shrimp species). For feed preparations, the wet discards were directly fed to the feed line without prior dehydration or drying. Pelleted sinking fish feed was prepared by mixing with other ingredients like rice bran, soyabean powder, wheat flour, corn powder and sufficient water, followed by cooking the dough and pelleting using a pelletiser. It was dried in electric dryer to a moisture content of below 10%.

GIFT Tilapia fingerlings were procured from registered hatcheries and acclimatised for 10

days (figure 1). The fishes were made into 6 groups of 10 fingerlings having average weight of 5.6 g. Nutritional quality of the developed feeds was assessed by conducting feeding trials in plastic tanks for a period of 45 days keeping a commercial feed as control diet. During the feeding trials, 30% of water was exchanged daily. The change in weight of tilapia during the study



Fig. Feeding trial set-up with monosex *Tilapia fry*

period was assessed (Table 1).

Among the six formulations of aqua feed the highest growth rate was observed for shrimp head waste feed. The squid waste feed and domestic market waste meal feed performed equally good. The commercial feed and cuttlefish waste meal indicated significantly lower growth rate compared to the other four feed formulations.

Table -1 Average Body Weight of Tilapia Fed with Formulated Feed

	Cuttle fish waste meal feed	Shrimp head waste meal feed	Domestic market waste meal feed	Commercial feed	Sardine head waste meal feed	Squid waste meal feed
Growth % in 45 days	253.71	476.78	443.39	210.71	386.20	443.86

The higher weight gain and specific growth rate in shrimp head waste feed observed in the trial might be on account of the higher protein content

and better feed attraction and subsequent higher level of feed consumption.

Prevalence of extended spectrum beta lactamase (ESBL) *E. coli* in fishes from the retail markets of Guwahati, Assam.

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It is reported that 90-95% of the population of Assam depend on fish as their main protein diet with per capita consumption of 9.00 kg (Bhuyan *et al.*, 2017). Fishes being a major food in a state like Assam and reports direct the possible transmission of antimicrobial resistance through fish, it is impending to conduct a surveillance to estimate the prevalence of antimicrobial resistance pathogen. The impact of drug resistant bacterial transmission from livestock and aquaculture resources/seafood to humans is poorly understood. Antimicrobial resistance is a global issue as indicated by the rapid increase in cephalosporin and carbapenem resistance in Enterobacteriaceae, leading to limitations in treatment options for infections caused by these bacteria (Bush *et al.*, 2011). Extended- Spectrum Beta Lactamase (ESBLs) are considered as a major source of resistance in Enterobacteriaceae towards oxyimino- cephalosporins (Bradford, 2001). The present study highlights the prevalence of ESBL *E. coli* in fishes sold in the selected retail markets of Guwahati, Assam. The microbiological identification and antibiotic susceptibility test (AST) profile of the isolates were carried out

using BD Phoenix™ M50 automated system (BD Diagnostics, USA).

A total of 79 fish samples were collected from the retail markets situated in three selected locations (Silagant, Garchuk and North Guwahati Town Committee region) in Assam in the month of August, 2019. The samples include the most common food fishes silver carp (*Hypophthalmichthys molitrix*), rohu (*Labeo rohita*), red belly piranha (*Pygocentrus nattereri*), catla (*Catla catla*) and native fish varieties caught from either river or beel (lake) namely singara (*Mystus tengara*), singhi (*Heteropneustes fossilis*), kawoi (*Anabas testudines*), puthi (*Puntius spp.*), bata (*Labeo bata*), aree (*Sperata seenghala*) etc.

Fish samples were collected in sterile polythene bags and transported (maintaining cold chain) to the laboratory in National Research Centre on Pig, Rani, Guwahati for initial processing. Samples were processed within 3-4 hrs of initial procurement. The gut portion of the fish were taken for the isolation of *E. coli*. Macerated fish samples were aseptically transferred to modified form of Brilliant Green Bile Lactose