AMINOCarp® based diet improves growth performances of Indian carp, Rohu

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Introduction

Rohu, *Labeo rohita* (one of the Indian major carp) is the 9th largest produced fish in the world (1.17 million tonne/year), farmed mainly in Indian subcontinent (FAO 2012). Recently, the practice of using commercial feeds in rohu farming has gained much attention and is growing steadily. However, under commercial conditions, more importance is still given to crude protein (CP) content of feed than to their amino acid profile. This is partly because of lack of knowledge of the amino acid nutrition of carp. AMINOCarp®, a tool developed mainly for common carp, provides amino acid recommendations for a given growing period based on presumed growth and feeding rates, feeding frequency and contribution of natural food. This tool can be highly useful to rohu feed producers, but a validation test was needed given that the tool was developed mainly for common carp. The objective of this study was therefore to evaluate the growth performance of rohu fed diets formulated based on essential amino acid (EAA) levels found in commercial feeds in the market versus those recommended by AMINOCarp®.

Materials and Methods

A trial was conducted with fingerling rohu (~11 g, initial body weight) at Mangalore Fisheries College, India. Control diet was formulated based on the EAA levels found in the commercial carp feed samples (n = 14, CP: 29-34%) collected from major Indian carp feed producers during 2011-2012. Treatment diet (AMINOCarp®) was formulated based on EAA levels (89% dry matter) recommended by AMINOCarp® which was obtained by assuming that rohu would grow at 3.5% body weight/day (specific growth rate) when feeding them at 5% body weight/day, over a period of 60 days, with a daily feeding frequency of two times and zero natural feed. Amino acid contents of commercial diet were lower than those of AMINOCarp® recommendations for Lys

(1.57 vs. 1.98%), Met (0.53 vs. 1.07%), Met+Cys (0.99 vs. 1.54%) and Thr (1.11 vs. 1.22%). The study was conducted outdoors in cement tanks (25 m3, 5×5×1 m), with 6 replicate tanks per diet, and 25 fish per tank. Fish were fed twice daily to their apparent satiation for a period of 90 days which was 30 days longer than that initially planned. All the fish were weighed in each tank on days 0 and 90, and mean weight gain was computed for each tank. Feed consumption was recorded over the study period and FCR (feed conversion ratio) was calculated for each tank. Protein retention efficiency (PRE, % intake) of fish for each tank was calculated (body protein gain × 100 / dietary protein intake). Body protein gain was measured as the difference in the body protein content on day 0 (n=10 fish from initial stock, ~11 g) and 90 (n= 3 fish per tank). All the response variables (survival, feed consumption, body weight, weight gain, FCR and PRE) were subjected to Student's t-test, where P <0.05 is considered significant. Economic analysis for both the groups was performed by computing income over feed cost (IOFC) where stocking density was assumed to be 100,000/ha. Feed cost and fish price were considered based on the local market price at the time of the study.

... Results overall suggest that feeding rohu based on AMINOCarp® recommendations can be

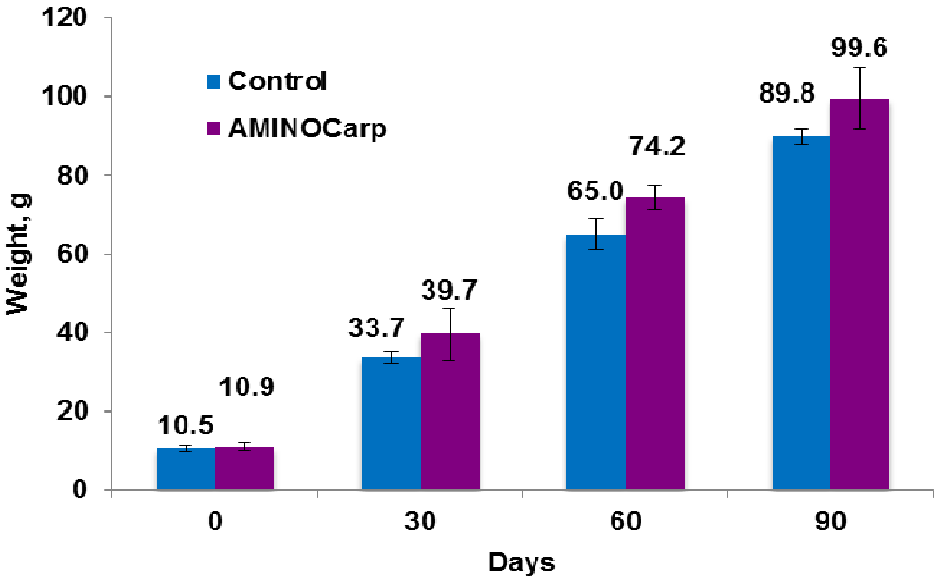
Results

Results are presented in Table 1. Compared to the control group, the AMINOCarp® group showed a significant improvement in final body weight (by 9.78 g) and weight gain (by 9.33 g) over the 90-day trial period (Fig 1). No differences were observed in feed consumption between the two groups, however, compared with control group, FCR significantly improved in the AMINOCarp® group with significant (P < 0.05, t-test) improvement in body protein retention (by 4.6%). Economic analysis calculated based on income over feed cost (IOFC) showed higher income for AMINOCarp® group than for control group (Table 2). Results of this study demonstrated that the current industry carp diets are deficient of certain EAA and feeding rohu based on AMINOCarp® recommendations can produce better growth performances with higher profitability.

Parameters*	Control	AMINOCarp®
Survival (%)	91.33 ± 3.16	94.00 ± 2.68
Final weight (g)	89.79 ± 1.93a	99.57 ± 7.75b
Weight gain (g)	79.34 ± 2.47a	88.67 ± 8.14b
Feed consumption (g/fish)	137.58 ± 2.58	131.84 ± 23.02
FCR (g/g)	1.74 ± 0.07a	1.48 ± 0.15b
Protein retention (%)	30.0 ± 1.21a	34.6 ± 3.80b

*Rows with different superscripts are significantly different, P < 0.05, t-test

Table 1: Growth performances (mean ± SD) of rohu fed experimental diets over 90 days



* Values are significantly different, P < 0.05

Fig 1. Growth pattern of rohu fed control versus AMINOCarp® based diet over 90 days

Variable	Control	AMINOCarp®
Stocking density (fish / ha)	100,000	100,000
Final weight, g	89.8	99.6
Total harvest (kg)	8980	9960
Gross income at USD 1/kg	8980	9960
Feed consumption (g/fish)	137.58	131.84
Total feed required(kg)	13758	13184
Feed cost (USD/kg)	0.419	0.460
Total feed cost (USD)	5764.6	6064.64
IOFC (USD/ha)	3215	3895
Difference (USD/ha)		680

Table 2: Economic analysis of the data of this experiment, expressed as income over feed cost (IOFC)

Conclusions

- Feed analysis for essential amino acids (EAA) revealed that commercial Indian carp diets contain lower levels of Met, Met+Cys and Lys compared with those of AMINOCarp® recommendations for fingerling (starter) rohu.
- Feeding AMINOCarp® based diets to rohu produced significantly better body weight gain, FCR and protein retention over a 90-d growing period.
- Results overall suggest that feeding rohu based on AMINOCarp® recommendations can be more profitable under commercial conditions.

More information

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