

Studies on some productive traits in fish

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Three experiments were conducted at the laboratory of Fish Nutrition, Faculty of Agriculture at Moshtohor, Zagazig University (Banha Branch). The aim of the first and the second experiments was to investigate the effect of two dietary fat levels (5% and 10%) and different levels of L-carnitine (0, 300, 600, 900, 1200 and 1500 mg/kg diet for the first experiment and 0, 300, 600, 900 and 1200 mg/kg diet for the second experiment) under each level, on growth performance, feed utilization, carcass traits and body composition of Nile tilapia, *Oreochromis niloticus* and common carp *Cyprinus carpio*. The first experiment was performed during the period from 13 February until 15 May 2002 (12 weeks). The second experiment was conducted during the period from 13 January until 4 April 2003 (12 weeks). Twenty four aquaria were used for the 1st experiment representing 12 treatments. Each aquarium was stocked with 30 fish of Nile tilapia with initial weight ranged between 5.78 to 6.13g. Twenty aquaria were used for the 2nd experiment representing 10 treatments. Each aquarium was stocked with 15 fish of common carp with initial weight ranged between 11.85 to 12.96 g. The fish fingerlings were distributed randomly into the experimental aquaria. The third experiment was conducted to study the effect of dietary L-carnitine on growth performance and survival rate of Nile tilapia reared in low water temperature ranged from 9.4 to 11.5°C. This experiment was performed during the period from the 1st of December 2003 until the 1st of March 2004. Results of the first experiment could be summarized as follow: Increasing dietary fat content from 5 to 10% significantly increased final body length, weight gain, feed intake while body weight, specific growth rate and protein efficiency ratio were not significantly affected by increasing dietary fat level. With regard to the effect of different L-carnitine levels in tilapia diets, results showed that, all dietary L-carnitine levels (300-1500 mg/kg diet) significantly increased final body weight, body length, weight gain, specific growth rate, feed intake and feed conversion ratio while protein efficiency ratio was not significantly affected. The interaction between dietary fat and L-carnitine levels had significant effects on weight gain specific growth rate and feed conversion. For each dietary fat level (5 or 10%) increasing dietary L-carnitine, significantly improved body weight, body length, weight gain, specific growth rate, feed intake and feed conversion ratio while protein efficiency ratio was not significantly affected by each of dietary fat, L-carnitine levels and their interactions. Results of the effect dietary fat on carcass traits showed that increasing dietary fat from 5 to 10% did not significantly alter the percentages of dress-out, flesh and by-products. Results of carcass traits also showed that incorporation of L-carnitine in tilapia diets increased the percentages of dress-out, flesh and decreased the percentage of by-products. - The interaction between dietary fat and L-carnitine levels had a significant effect on viscera ($P < 0.001$), flesh ($P < 0.05$) and by-products ($P < 0.01$). For each dietary fat level (5 or 10%), increasing L-carnitine in tilapia diets significantly increased dress-out percentage (at 10% dietary fat only), and flesh percentages while the by-products percentage significantly decreased at 10% fat only. Results of proximate analysis showed that, increasing dietary fat in tilapia diets significantly increased fat and decreased moisture and ash content of whole body of tilapia fish while protein was not altered. whereas moisture, protein and ash contents of fish flesh were not significantly affected by dietary fat level. Moisture and protein percentage of Nile tilapia fish by products were decreased and fat content was increased as dietary fat increased from 5 to 10%. Increasing L-carnitine levels in tilapia diets significantly increased protein and decreased fat contents of whole body of tilapia fish and the same trend was also observed for the effect of L-carnitine on proximate analysis of fish flesh and fish

by-products. The interaction between dietary fat and L-carnitine levels had a significant effect on fat and ash contents of whole fish and moisture, protein and fat contents of fish flesh. Results of the second experiment could be summarized as follows: Increasing dietary fat levels from 5 to 10% significantly increased final body weight, weight gain, specific growth rate, feed intake and protein efficiency ratio of common carp while body length and feed conversion ratio were not affected by increasing fat levels. Incorporation of L-carnitine in carp diets significantly increased fish final body weight, body length, weight gain and specific growth rate. Also, incorporation of L-carnitine levels in carp diets, increased feed intake ($P < 0.05$) and improved feed conversion ratio and protein efficiency ratio. The interaction between dietary fat and L-carnitine levels showed that seemed to have a significant effect on body weight, body length, weight gain and feed intake and it is also observed that, within each dietary fat level (5 or 10%), all L-carnitine levels (300-1200 mg/kg diet) significantly increased final body weight, body length, weight gain, specific growth rate, feed intake and improved both feed conversion ratio and protein efficiency ratio. Fat from 5 to by-products while the carcass analysis showed that, increasing dietary 10% significantly decreased dress-out and percentage and increased viscera content percentages of flesh was not significantly affected. Incorporation of L-carnitine in carp diets had a significant effect on the percentages of dress-out, flesh and by-products. Increasing L-carnitine levels in carp diets, decreased the percentage of dress-out with 5% dietary fat level and by-products while the percentages of flesh increased with increasing the level of L-carnitine in carp diets. Interaction between dietary fat and L-carnitine levels in carp diets had significant effects on the all carcass traits of common carp fish. Results of proximate analysis of carp whole fish showed that, increasing dietary fat from 5 to 10% significantly ($P < 0.001$) decreased the percentages of moisture, protein and ash while increased fat percentage. The same trend was also observed for proximate analysis of fish flesh and by-products of common carp. Increasing L-carnitine levels in carp diets significantly increased protein content of whole fish, moisture while fat content of whole fish were decreased and ash content was significantly affected. The same trend was almost observed in the case of proximate analysis of fish flesh and fish by-products. Proximate analysis of whole fish except moisture percentage seemed to be significantly ($P < 0.001$) affected by the interaction of dietary fat and L-carnitine levels in carp diets, where, increasing dietary L-carnitine levels (within the two dietary fat levels, 5 and 10%) significantly increased protein and almost decreased fat content of whole fish, fish flesh and fish by-products of common carp. Results of third experiment could be follows: tilapia fish including . However, sensitivity of L-carnitine in diet, gave the cold water. Final body weight and body length of Nile reared in cold water ($9.4-11.5^{\circ}\text{C}$) were not affected fish diet different levels of dietary L-carnitine percentages of survival rate were higher in c. supplemented with different levels of L-carnitine co diet containing 0% L-carnitine. Survival rate gradually, in parallel with increasing levels of L-c. This result indicates that, however, Nile tilapia fish in low ambient water temperature, the supplemented carnitine diet of fish reared in low water temperature tilapia fish hardness and protection against temperature. In conclusion, dietary L-carnitine supplementation in low or high levels (300 to 1200 mg/Kg diet) improved growth and feed utilization, decrease tissue fat and increase tissue protein of Nile tilapia and common carp and also increased survival rate of Nile tilapia fry reared during cold season.