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# Effects of Dietary Protein and Lipid Levels on Growth and Body Composition of Juvenile Fancy Carp, Cyprinus carpio var. Koi

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**Abstract :** A 4 × 2 factorial experiment was conducted to determine the optimum dietary protein and lipid levels for juvenile fancy carp, Cyprinus carpio var. koi. Eight experimental diets were formulated to contain four protein levels (200, 300, 400, and 500 g kg-1) with two lipid levels (70 and 140 g kg-1). Triplicate groups of fish (initial weight, 12.1±0.2 g fish-1) were hand-fed the diets to apparent satiation for 8 weeks. Weight gain, daily feed intake, feed efficiency ratio and protein efficiency ratio were significantly ($P < 0.0001$) affected by dietary protein level, but not by dietary lipid level ($P > 0.05$). Weight gain and feed efficiency ratio tended to increase as dietary protein level increased up to 400 and 500 g kg-1, respectively. Daily feed intake of fish decreased with increasing dietary protein level and that of fish fed diet contained 500 g kg-1 protein was significantly lower than other fish groups. The protein efficiency ratio of fish fed 400 and 500 g kg-1 protein was lower than that of fish fed 200 and 300 g kg-1 protein. Moisture, crude protein and crude lipid contents of muscle and liver were significantly affected by dietary protein, but not by dietary lipid level ($P > 0.05$). The increase in dietary lipid level resulted in an increase in linoleic acid in liver and muscle paralleled with a decrease in n-3 highly unsaturated fatty acids content in muscle of fish. In considering these results, it was concluded that the diet containing 400 g kg-1 protein with 70 g kg-1 lipid level is optimal for growth and efficient feed utilization of juvenile fancy carp.

**Keywords :** fancy carp, dietary protein, dietary lipid, Cyprinus carpio, fatty acid
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