Optimal Protein to Carbohydrate Ratio in Feed for Black Tiger Shrimp

(Penaeus monodon Fabricius, 1798)

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Abstract

Effect of various dietary protein to carbohydrate ratios on growth and survival rate of black tiger shrimp were determined by rearing 0.36-0.37 g initial weight juvenile in cages hanging in earthen pond for 12 weeks. The experiment comprised of 5 treatments with 3 replications each. Four formulated diets 1-4 were contained glutinous rice flour (wet milling) as major dietary carbohydrate source at 47.8, 42.4, 34.5 and 22.5 %, respectively and diet contained protein levels of 32.4, 35.5, 40.2 and 49.1 %. Lipid and gross energy of formulated diet were varied between 4.1-5.5 % and 444-454 Kcal/100 g dry feed, respectively. Gross energy to protein ratio of diet 1, 2, 3 and 4 were 14, 12.6, 11.1 and 9 Kcal/g protein, respectively. Control treatment (diet 5) commercial feed, which contained 44.1 % protein, 36.6 % carbohydrate and energy value of 470 Kcal/100 g dry feed (10.6 Kcal/g protein).

Result showed that dietary protein to carbohydrate ratios had no effect on average mean body weight, weight gain and survival rate of shrimps (p>0.05). Shrimps fed with 1-4 formulated diets had average mean body weight and weight gain varying between 10.2-10.9 g and 2684-2915 %, respectively. Survival rate were 42-56 %. Biochemical composition of whole shrimps at the end of experiment showed that shrimps carcass of formulated diets were not significance difference in dry matter (23.3-24.7 %), lipid (2.5-2.8 %), carbohydrate (6.0-7.5 %) and energy values (450-455 Kcal/100 g dry matter) (p>0.05), while there were significant difference in protein (p<0.05). Protein of shrimps fed with diet 4 and fed with commercial feed, which were 70.9 % and 70.6 %, respectively, were not significant difference (p>0.05). However, their protein content were significantly higher than those of shrimps fed with diet 1 (69.0 %) and diet 3 (69.8 %) (p<0.05). Shrimps fed with diet 2 had protein content of 69.8 % which was not significant difference from other diets (p>0.05).

It can be concluded that P. monodon cultured in earthen pond can utilized dietary carbohydrate varying in wide range between 22-48 % for protein sparing energy without significance
effect on growth, survival rate and proportion of protein in shrimp tissue. The recommended level of dietary carbohydrate is not higher than 42.4 % and dietary protein is not less than 35.5 %.

**Key words**: Protein and carbohydrate ratio, *Penaeus monodon*

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