EVALUATION OF WHOLE AND DEHULLED LUPIN FOR DIETS OF PRAWNS


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Fish meal is a major component of the feed formulated for most farmed aquatic animals. Demand for fish as a food source for human and farmed animals has been increasing (New and Wijkstrom 1990). This situation has caused the aquaculture feed industry to look for alternatives to fishmeal which will provide similar or better economic benefit to the aquaculture industry. One of the alternative groups of feed ingredients is legumes, especially the high protein seeds such as soybean meal, faba beans and lupins. The present experiment examined the growth rates of prawns fed diets based on the substitution of fishmeal with various inclusion levels of whole or dehulled lupin using a summit dilution approach.

The experiment consisted of 3 groups of diets. In the first group, a fish meal based summit formulation was diluted with cellulose at 10% increment from 0 to 40% inclusively. The second and the third groups comprised 7 diets each, in which the summit formulation was diluted with inclusions of either whole or dehulled lupin at 10% increments from 10 to 70% inclusively. The experimental design was a 19x2 randomised block. Six prawns (average individual body weight 2.5±0.65g) were placed in each 250 litre tank. Prawns were acclimatised to experimental conditions for 1 week during which the maximum feed intake was established. During the experiment, prawns were fed at a restricted feeding level (5% body weight provided in 2 meals/day). Feeding level was adjusted every week based on the weekly growth of the prawns.

The best growth (0.1g/prawn.day) and FCR (1.7) was shown by prawns fed the summit diet. As the summit diet was diluted with cellulose, a linear reduction in daily growth was observed (P<0.05; r² = 0.99) (Figure 1). A similar result was also obtained with whole lupin (P<0.05; r² = 0.97) or dehulled lupin (P<0.05; r² = 0.96). The slopes of the whole and dehulled lupin diets were not significantly different (P>0.05). However, the slope of the cellulose diets was significantly greater than that of both lupin diets, indicating that dehulled and whole lupins were contributing nutrient to support prawn growth. Progressive decline in growth with increasing lupin content implies a progressive nutrient imbalance, possibly due to deficiency of some essential amino acids. However, full explanation of the observed results awaits nutrient accretion determination to be provided from comparative slaughter data.

Figure 1. Effect of dilution of summit diet with either cellulose (C), whole lupin (WL) or dehulled lupin (DL) on average daily growth (ADG) of prawns


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