

EFFECT OF COTTONSEED MEAL ON THE GROWTH AND SURVIVAL OF THE BLACK TIGER PRAWN (*Penaeus monodon*)

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Imported fish meal continues to provide the major source of protein in Australian prawn feeds. Proteins of plant origin are readily available and inexpensive but have a less than ideal amino acid profile. Limiting essential amino acids could be economically supplemented using ingredients that are rich in those nutrients. However, a further problem with protein sources of plant origin is the presence of endogenous anti-nutritional components. These components have to be destroyed or inactivated prior to protein sources being used in aquafeeds. Cottonseed meal (CM) for example has an excellent amino acid profile but its use is limited by the toxicity associated with the presence of gossypol. This trial investigated the growth rate and survival of black tiger prawns fed diets based on the substitution of fishmeal with various inclusion levels of CM using a summit dilution approach.

Two groups of diets were used in the trial. In the first group, a fishmeal-based summit diet was diluted with ground pipi shell as filler at 10% increments from 0% to 40% inclusively. In the second group, the summit diet was diluted with CM at 10% increments from 0% to 70% inclusively. The trial design was a 12x2 randomised block of 250 litre tanks. Ten prawns (average body weight 2.85 ± 0.57 g) were placed in each tank. Prawns were acclimatised to trial conditions for 10 days during which the maximum feed intake was established. During the trial, prawns were fed at a restricted feeding rate of 5% body weight provided in two meals/day for six weeks. Feeding level was adjusted according to fortnightly weighings and/or prawn mortalities.

As the summit diet was diluted with pipi shell a linear reduction in daily growth was observed ($r^2=0.54$, $P<0.05$) (Figure 1). Growth of prawns fed diets with CM also resulted in decrease until 50% inclusion of CM ($r^2=0.90$, $P<0.05$) then stopped ($r^2=0.003$). However the decrease in growth with CM was significantly higher ($P<0.05$) compared to growth with pipi shell diets. Similarly survival of prawns in CM diet groups declined linearly ($r^2=0.90$, $P<0.05$) after 20% CM inclusion, then levelled at 15% survival when diet had 50% CM. There was no significant difference between growth and survival of prawns fed 100% summit diet and 10% CM diet. These results indicate that CM may be usefully included in prawn feed only at concentrations of 10% or less. The poor growth and survival at higher levels suggest gossypol toxicity and the possibility of residual pesticide contamination of CM.

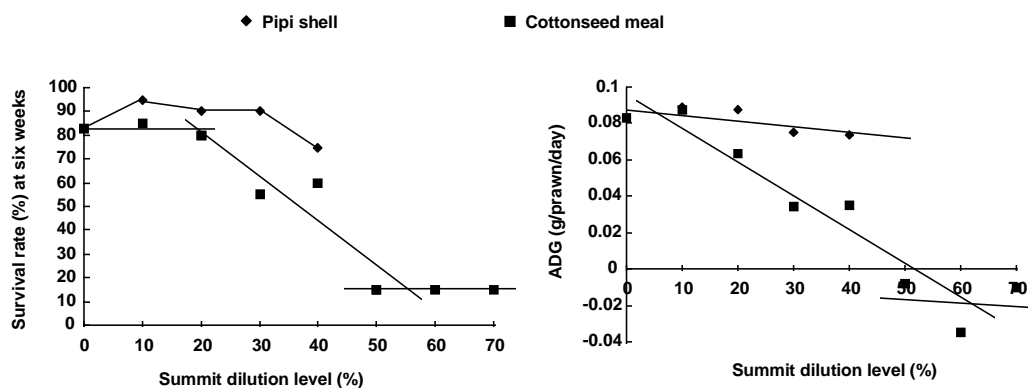


Figure 1. Effect of dilution of summit diet with either pipi shell or CM on average daily growth (ADG) and survival of prawns