CHAPTER VII

GROWTH RESPONSE IN CHICKS FED WITH PRAWN SHELL POWDER AS A FEED ADDITIVE
Shrimps are much used in the U.S.A. as a feed additive for swine and poultry; near the coast they are fed fresh, whereas inland they are dried and ground and added to the feed (Kole Wageningen, 1969). Rapid growth, early maturity, heavy birds and quick appearance of feathers were obtained in chicks fed with shrimp meal as an additive (Fonda et al. 1934). On the west coast of India in places like Calicut, Mangalore and Karwar prawns are fished in great numbers and most of the shells are thrown back into the sea to avoid the putrifying odour. However, stray dogs have developed a taste for prawn shells discarded on the coastal sands and often eat them.

It was stated in Chapter I that one of our aims in the present investigation was to test the suitability of certain hitherto unutilized items in poultry feed, and in this chapter we report the results of feeding trials in which prawn shell powder was used as a feed additive.

MATERIAL AND METHODS

In these feeding trials shells of the most prolific species of prawns, *Metapenaeus affinis* dried in the sun and ground in a pestle and mortar were used. The chicks experimented with were one-week old, raised in the poultry
Table 1: Per cent composition of the mashes under feeding trials

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Crude protein value %</th>
<th>Control mash</th>
<th>Experimental mash I</th>
<th>Experimental mash II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chick concentrate</td>
<td>32.00</td>
<td>35</td>
<td>32.5</td>
<td>26.00</td>
</tr>
<tr>
<td>Maize</td>
<td>9.00</td>
<td>15</td>
<td>13.5</td>
<td>11.00</td>
</tr>
<tr>
<td>Rice polish</td>
<td>12.00</td>
<td>45</td>
<td>40.5</td>
<td>33.6</td>
</tr>
<tr>
<td>Wheat bran</td>
<td>15.00</td>
<td>05</td>
<td>4.5</td>
<td>3.75</td>
</tr>
<tr>
<td>Drawn shell powder</td>
<td>26.25</td>
<td>—</td>
<td>10.0</td>
<td>25.00</td>
</tr>
</tbody>
</table>

% crude protein value of the different mashes (calculated value)  

<table>
<thead>
<tr>
<th>Metabolizable energy value K.cal/Kg. mash of the different mashes (calculated value as per)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1472</td>
</tr>
</tbody>
</table>

Each 100 gm. of mash contained 30 mg. "Vita blend" (Glaxo Laboratories, Bombay) vitamin mixture and 1 gm. "alvomin" (The Alkali and Chemical Corporation, Madras) mineral mixture.
house of the Department of Zoology, of the Karnataka
University. The chicks were of the black breed evolved
in the Department from a cross of New Hampshire and the
Indian Country Fowl. Thirty chicks of average weight
of 45 g. were selected and sorted out into three groups
of ten each and reared in wooden cages with wire screen
all round and wooden bottom and roof. (50" x 50" x 30").

The compositions of the three mashes used are
shown in Table 1. Batch 1 was fed with the regular chick
mash, batch 2 with 10 per cent prawn shell powder in the
mash, and batch 3 with 25 per cent prawn shell powder
in the mash. All mashes were well fortified with minerals
and vitamins. Feed and water were supplied ad libitum.
The crude protein levels and calculated metabolizable
energy values of the mashes are indicated in the table.

Weights of individual chicks were determined
weekly. The results were subjected to analyses of variance
and significant difference, if any, were determined ac­cor­
ding to the procedure of Fischer and Yates (1949). The
percentage increase in weight of experimental batches over
those of control was also determined.
### Table 2: Effect of Sun dried prawn shell powder on the rate of growth of the chicks

<table>
<thead>
<tr>
<th>Condition of the experiment</th>
<th>Initial</th>
<th>1st week</th>
<th>11th week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basal diet (controls)</td>
<td>40.8 ± 2.3</td>
<td>59.4 ± 2.3</td>
<td>105.3 ± 5.4</td>
</tr>
<tr>
<td>90% basal diet + 10% prawn shell powder</td>
<td>40.5 ± 2.1</td>
<td>80.2 ± 2.3</td>
<td>143.8 ± 6.3</td>
</tr>
<tr>
<td>75% basal diet + 25% prawn shell powder</td>
<td>40.6 ± 2.1</td>
<td>111.0 ± 5.5</td>
<td>149.0 ± 7.08</td>
</tr>
</tbody>
</table>

(+): Significant at \( P<0.05 \)

(++) : Highly Significant at \( P<0.001 \)
RESULTS AND DISCUSSION

The results of the feeding trials are given in Table 2. Fig. I illustrates the growth response in a histogram.

The figures given in the table show that the increments of growth exhibited by chicks fed with prawn shell powder additives are better than those of basal mash fed ones. In addition the chicks fed with 25 per cent prawn shell powder as feed additive show better increments of growth than those fed with 10 per cent of the stuff in the basal mash. Thus the advisability of prawn shell powder as an animal feedstuff suitable for poultry is primarily established.

Implied in these results is the inevitable conclusion that the prawn shell powder as it is a good source of animal protein, additional animal protein in the feed will certainly result in better growth. This finding confirms the conclusion arrived at by Schumaier and McGinnis (1969) who found that when the protein level of the basal feed is raised from 22 to 34 per cent by the addition of fish meal, better growth increments resulted.

Apart from the above conclusion is the valid impression that the prawn shell powder constituents are
digestible, absorbable, metabolisable as well as palatable. In any feed additive these requirements are essential. Moreover, it could be safely assumed that prawn shell powder is free from toxins, since had there been any such, the addition of 25 per cent of it in the feed would have shown some decrement in growth.

SUMMARY

1. With the addition of 10 per cent of prawn shell powder in the feed, better increments of growth in chicks resulted in comparison with that of chicks fed with the conventional chick mash. Still better increments in growth resulted when the level of prawn shell additive was raised to 25 per cent. The manifestation of better growth might be due to the raising of the animal protein level as was shown by Schumaier and McGinnis (1969).

2. Implied in the growth response of chicks fed with prawn shell powder as an additive, is the inevitable conclusion that the constituents of this animal feed stuff are palatable, digestible, absorbable and metabolisable and are free from toxins.