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D F Hessels

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Values of Commonly-used Protein Supplements in Broiler Rations

By D. F. HESSELS, M.D.A., Broiler Officer, Poultry Branch

THE performances of broiler flocks in the latter part of 1964 were below standard. Low body weights and a high incidence of gizzard erosion were common on farms. It was therefore decided to test the biological values of the commonly-used protein supplements and also to try to find a correlation between gizzard erosion and any of the protein supplements.

Protein supplements tested in two trials at the Poultry Research Station, Wembley were meat meal, whale meal, South African fish meal, Angolian fish meal and soya-bean meal.

Experimental procedure

In each trial each ration was fed to 400 broiler chickens, two pens of 100 meat-type cockerels and two pens of 100 meat type pullets. Each pen provided 100 sq. ft. of floor space.

The experiment was repeated to verify the results obtained in the first trial. The rations in the first experiment were fed in the form of crumbles while mash was fed in the second trial. Results published are a combination of both experiments.

The protein supplements were fed in the following combinations:

Ration 1: Meat meal + soya-bean meal.
Ration 2: Cheynes Beach whale meal + soya-bean meal.
Ration 3: S.A. fish meal + soya-bean meal.
Ration 4: Angolian fish meal + soya-bean meal.
Ration 5: Meat meal + Cheynes Beach whale meal + S.A. fish meal + Angolian fish meal + soya-bean meal.

Ration 6: Meat meal + Cheynes Beach whale meal + S.A. fish meal + Angolian fish meal.

Components of rations

<table>
<thead>
<tr>
<th>Ration No.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gristed wheat</td>
<td>lb.</td>
<td>lb.</td>
<td>lb.</td>
<td>lb.</td>
<td>lb.</td>
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<tr>
<td>Gristed oats</td>
<td>60</td>
<td>5.5</td>
<td>5</td>
<td>5</td>
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<tr>
<td>Meat meal</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
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<tr>
<td>Cheynes Beach whale meal</td>
<td>3.75</td>
<td>3.75</td>
<td>3.75</td>
<td>3.75</td>
<td>3.75</td>
<td>3.75</td>
</tr>
<tr>
<td>S.A. fish meal</td>
<td>3.75</td>
<td>3.75</td>
<td>3.75</td>
<td>3.75</td>
<td>3.75</td>
<td>3.75</td>
</tr>
<tr>
<td>Angolian fish meal</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Soya-bean meal</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Rock phosphate</td>
<td>700</td>
<td>700</td>
<td>700</td>
<td>700</td>
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<tr>
<td>Standards vitamin/mineral mixture</td>
<td>96</td>
<td>91.5</td>
<td>92.5</td>
<td>92.5</td>
<td>92.5</td>
<td>87.5</td>
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Crude protein

<table>
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<th>Ration</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Ration 1</td>
<td>22.3</td>
</tr>
<tr>
<td>Ration 2</td>
<td>22.3</td>
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<tr>
<td>Ration 3</td>
<td>22.3</td>
</tr>
<tr>
<td>Ration 4</td>
<td>22.3</td>
</tr>
<tr>
<td>Ration 5</td>
<td>22.3</td>
</tr>
</tbody>
</table>

Results

The financial returns from the two experiments were combined to give the following results at ten weeks of age.
The cost of feed was based on retail prices of the ingredients in the rations; the price of the birds liveweight was 2s. 4d. per lb.

The biological value of whale meal proved to be inferior to any of the other three animal protein supplements used, while South African fish meal gave the best results.

**Mortality**

Mortality was unusually high on some rations. Most of the birds which died had pale, swollen kidneys and sometimes hydro-pericardium. These symptoms were seen between 10 and 25 days of age.

**Mortality rates**

The three rations, numbers 2, 5 and 6, had the highest mortality in both total mortality and losses to 28 days of age.

The cause of these high losses is being investigated.

**Gizzard Erosion**

The gizzards of 25 per cent. of all 4,800 birds in both experiments were examined and scored for degree of gizzard erosion.

Scoring for gizzard erosion was as follows:

(1) Clean.—Lining almost clear of cracks and ulcerations.

(2) +.—10 to 20 per cent. of lining covered by cracks and shallow ulcerations.

(3) ++.—Up to 50 per cent. of lining covered by rather marked ulcerations.

(4) +++.—Practically the whole of the gizzard lining covered by severe ulcerations.

There was some unavoidable overlap between the groups and it was therefore decided to combine the clean with +, and the ++ with +++ groups.

These figures clearly indicate that no correlation exists between any of the rations and gizzard erosion.

**ACKNOWLEDGMENTS**

Grateful thanks are due to the staff of the Poultry Research Station and to Messrs. M. E. Nairn and P. Ketterer, Veterinary Pathologists, for their assistance.
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* Molasses pump spraying directly into tank.
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