A Chick Growth Factor in Cow Manure

IV. METHODS OF DRYING MANURE

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(Received for publication February 13, 1947)

Considerable interest in the feeding value of cow manure has developed since the initial papers by Hammond (1942, 1944). Whitson et al. (1945) demonstrated the effectiveness of cow manure as a substitute for animal protein in improving a diet in which soybean oil meal was the primary source of protein. They concluded that the active material in cow manure was neither a protein nor any of the chemically characterized vitamins. Rubin and Bird (1946a) reported on the non-identity of the chick growth factor in cow manure with chick growth factors previously described and (1946b) presented a procedure for the preparation of concentrates of the factor and described some of its properties. In addition to the growth factor, there is also an androgenic substance in cow manure (Riley and Hammond 1942) which stimulates comb growth.

The scarcity of protein feedstuffs of animal origin and their relatively high cost, when available, accentuate the value of cow manure as a possible substitute. The presence on many farms of both poultry and cattle facilitates the feeding of cow manure. However, the cost of dehydrating equipment is prohibitive in many cases. Therefore, it was considered desirable to conduct an experiment to determine whether the use of such equipment could be eliminated. In this experiment, oven-dried manure was compared with sun-dried manure and pasture-dried chips.

EXPERIMENTAL

The experiment consisted of eight groups of thirty-three chickens each. Four diets were used; each diet was fed to duplicate groups. The chickens were crossbreds; they were the progeny of crossbred dams (Rhode Island Red X Barred Plymouth Rock) and New Hampshire sires. They were selected for the experiment at two weeks of age. All the very light and very heavy birds were discarded. Those of intermediate weight were divided into groups according to individual weights, so that each group was balanced with every other group on a weight basis.

The dams of the chickens had been on an all-plant-protein diet for more than a year and, therefore, the progeny were well depleted of the growth factor of cow manure. The chicks were reared from hatch-
ing time to twelve weeks of age in a section of a long brooder house which was divided into eight pens. They were brooded under electric brooders.

During the first two weeks after hatching, all chicks were fed the basal diet, which consisted of yellow corn 38.0 percent, barley 20.0, alfalfa leaf meal 3.0, soybean oil meal 35.0, butyl fermentation solubles (containing 250 micrograms of riboflavin per gm.) 0.6, steamed bone meal

RESULTS AND DISCUSSION

The results of the experiment are tabulated in Table 1. The weights and comb measurements at twelve weeks were averaged separately for the sexes.

<table>
<thead>
<tr>
<th>Pen No.</th>
<th>Supplement</th>
<th>Av. Wt. Females gm.</th>
<th>Comb measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Females</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Length mm.</td>
</tr>
<tr>
<td>1</td>
<td>None</td>
<td>1,023</td>
<td>2.51</td>
</tr>
<tr>
<td>5</td>
<td>None</td>
<td>1,028</td>
<td>2.31</td>
</tr>
<tr>
<td>2</td>
<td>Oven-dried manure</td>
<td>1,293</td>
<td>3.27</td>
</tr>
<tr>
<td>6</td>
<td>Oven-dried manure</td>
<td>1,244</td>
<td>3.35</td>
</tr>
<tr>
<td>3</td>
<td>Sun-dried manure</td>
<td>1,243</td>
<td>3.19</td>
</tr>
<tr>
<td>7</td>
<td>Sun-dried manure</td>
<td>1,229</td>
<td>3.05</td>
</tr>
<tr>
<td>4</td>
<td>Chips from pasture</td>
<td>1,170</td>
<td>2.55</td>
</tr>
<tr>
<td>8</td>
<td>Chips from pasture</td>
<td>1,215</td>
<td>2.73</td>
</tr>
</tbody>
</table>

1 33 chickens in each group.
2 Supplements fed as 5% of diet.

The expected stimulation of growth above that of the basal group was obtained with the oven-dried cow manure. The results show that the sun-dried manure was just as beneficial. The chips dried in the pasture, where they had been dropped, were slightly inferior.

The comb growth measurements indicate considerable destruction of the androgenic substance in the chips dried in the pasture. There was very little difference between the combs of the females fed the basal diet and of those fed chips. However, there was substantially more comb growth on the cockerels fed chips than on the cockerels fed the basal diet. The data indicate that the sexes differ in their response to lower levels of the androgenic substance. Pullets require a greater quan-
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SUMMARY

Dehydration equipment was not essential for the production of a manure product capable of stimulating growth when used in an all-plant-protein diet. Sun-dried manure was as effective as oven-dried manure in stimulating growth and comb development. Dried manure chips from the pasture were almost as effective as oven-dried manure from the standpoint of growth, but were inferior from the standpoint of comb development.

REFERENCES


tity of the androgenic substance to produce a comb response than cockerels. It cannot be concluded that there was any difference in androgenic potency between the oven-dried and sun-dried materials. The results obtained with pullets were consistent in indicating slightly greater potency in the oven-dried sample. The results obtained with cockerels were less consistent but indicated a slightly greater potency in the sun-dried material.

This experiment showed that the sun-dried and oven-dried cow manures, when added to an all-plant-protein diet, were practically equal in ability to stimulate growth and comb development. Pasture chips produced slightly less body growth and considerably less comb growth than did oven-dried manure. Comb stimulation in a broiler flock is advantageous in that it contributes to a desirable appearance of the live birds at time of sale. However, the appreciable difference between the growth obtained with the basal diet and with the diet to which chips were added, shows this material to be a worthwhile supplement especially in view of the economy of labor in its preparation.

The low androgenic potency of the chips might make them suitable for feeding to laying hens (Whitson et al., 1946) but additional work would have to be done before they could be recommended for this purpose. Jaap and Thayer (1945) found no androgenic potency in a similar sample. The fresh sun-dried manure retained most of its hormone activity and would not be suitable for feeding to laying hens.