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INFLUENCE OF FEEDING THREE TYPES OF DRY POULTRY MANURE ON BROILER GROWTH, FEED CONSUMPTION, FEED EFFICIENCY AND MORTALITY

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SUMMARY

This study was carried out to determine the feasibility of dry poultry manure (DPM) as a feed stuff. Three types of DPM were studied: 1- layer litter manure, 2- caged layer manure, 3- processed caged layer manure. Three hundred fifty one-day old broiler chicks were allocated at random into seven dietary treatments, chicks in T1 (control) were fed on starter and finisher commercial diets. Chicks in T2 and T3 were fed diets supplemented with 5% and 10% layer litter manure, respectively. Chicks in T4 and T5 were fed diets contained 5% and 10% caged layer manure, respectively, while chicks in T6 and T7 were fed diets contain 5% and 10% processed caged layer manure, respectively.

Body weight gain, feed consumption and feed efficiency of the chicks were not significantly influenced by feeding diets containing 5% DPM. But the inclusion of 10% DPM in the diet has significantly ($P < 0.05$) decreased the body weight gain and feed efficiency and increased the feed consumption and mortality.

INTRODUCTION

The chemical analysis of poultry manure showed that it contained variable nutrients for poultry rations, namely, protein (Lee and Blair, 1973; Parsons *et al*, 1982), energy (Mohammad and Al-Soudi, 1976) and minerals (Hileman, 1971). If this cheap materials is used in some way in poultry rations, the cost of the ration could be reduced and consequently production cost is lowered.

Research conducted with dried poultry manure (DPM) included in poultry rations has demonstrated varying results. Flegal and Zindel (1970 a; 1970 b) have reported an inverse relationship for broiler weight gain, feed efficiency and egg production as levels of DPM in the diet were increased. Trakulchang and Balloun (1975) recorded a decline in egg production and feed efficiency by feeding layers 16% protein diets containing 12.5 and 25% DPM. These workers also reported a nonsignificant improvement in broiler weight gain and feed efficiency when fed 15% protein ration with 10 to 20% DPM added to the diets to provide essential amino acids and non-protein nitrogen. They suggested that feeding high levels of DPM to poultry may produce ammonia toxicity due to its high uric acid content. However, Lee and Blair (1973) fed diets contained 5% and 10% DPM to broilers in four-week feeding trials and observed no improvement in weight gain but a significant increase in feed efficiency compared with broilers fed starter rations containing 22% crude protein.

MATERIALS AND METHODS

Three hundred fifty one-day old Lohman broiler chicks were allocated at random into seven dietary treatment groups: T1, T2, T3, T4, T5, T6 and T7. Each group of chicks was subdivided into two replicates of 25

chicks each and placed in four square meters pen. Chicks in T1 group were used as control and fed commercial starter and finisher diets. Starter diets were used between 0 to 4 weeks, whereas finisher diets were then offered until 6 weeks. The composition and analysis of the starter and finisher diets are shown in table 1. Chicks in other treatments were fed on the same starter and finisher diets after the addition of DPM for the mentioned periods.

Table 1: Composition of the control diets (%)

Ingredients	Starter diet	Finisher diet
Ground yellow corn	56	64.2
Soybean meal (44% protein)	29	23
Barley meal	1.4	-
Wheat meal	4	6
Fish meal	8	5
Limestone flour	1	1
Salt	0.4	0.5
Vitamin and mineral mixture*	0.2	0.3
Adjusted calculated analysis(1)		
Crude protein (Nx6.26)%	24.2	21.6
Metabolizable Energy (kcal/kg)	3015.9	3091.5
Lysine (%)	1.3	1.4
Methionine (%)	0.42	0.36

* Vitamin and mineral mixture provided per kilogram of diet: 6000 IU of vitamin A, 900 IU vitamin D, 22 IU vitamin E, 10 mg riboflavin, 1mg folic acid and 200 mg $ZnCO_3$.

(1)The values were calculated using the chemical analysis Titus and Fritz (1971).

Three types of DPM were used: 1- layer litter, Highsex 60 weeks old, 2- caged layer manure which was collected from beneath layer cages, Highsex 60 weeks old, 3- processed poultry manure, a cage layer manure that has been chemically extracted with 5% potassium hydroxide solution to remove uric acid. All types of DPM were sun dried by spreading 5 cm-layer of manure in an open area at an approximate temperature of 35-42 C for 10 days. Before it was incorporated into the diets, the processed DPM was ground in a Hammermill grinder. The dietary treatment of the chicks groups other than T1 group were as follow:

-T2: control diets + 5% layer litter
-T3: control diets + 10% layer litter
-T4: control diets + 5% caged layer manure
-T5: control diets + 10% caged layer manure
-T6: control diets + 5% processed caged layer manure
-T7: control diets + 10% processed caged layer manure

Chicks were fed the experimental diets *ad libitum* for six weeks. Weight gain (g), feed consumption (g), feed efficiency (g feed/g gain) and mortality (%) were weekly determined. Analysis of Variance (Steel and Torrie, 1965) and Duncan's multiple range test (Duncan, 1955) were used to analyze the data for significant differences.

The chemical analysis of layer litter and caged layer manure were fully discussed by Bucholtz *et al.* (1971), Shannon *et al.*(1973) and Mohammad and Al-Soudi (1976). However, the chemical analysis of the processed caged layer manure was not fully described yet. Accordingly, standard analysis procedures (A.O.A.C., 1975) were used for proximate analysis of processed caged layer manure (Table 2). The amino acid composition was

determined with a Beckman amino acid analyzer following protein hydrolysis with 6N HCI.

Table 2: Chemical composition of the processed cage layer manure.

Item	%
Moisture	8.0
Crude Protein (N. x6.25)	18.1
Crude Fiber	12.3
Ether Extract	2.5
Gross Energy (k cal/kg.)	2580
Ash	36.8
Lysine	0.30
Methionine	0.17
Cystein	0.10
Tyrosine	0.16
Histidin	0.18
Arginine	0.30
Glycine	0.90
Proline	0.58
Glutamic Acid	0.08
Serine	0.30

RESULTS AND DISCUSSION

The results of broiler body weight gain, feed consumption, feed efficiency and mortality are presented in table 3. Statistical analysis showed that the body weight gain and feed consumption of chicks fed the diets containing 5% DPM were not significantly different from

Table 3: Body weight gain, feed consumption, feed efficiency and mortality of broilers fed on three types of Dry Poultry Manure.

Item	Dietary treatment*						
	T1	T2	T3	T4	T5	T6	T7
Mean body weight (gm):							
one day old	41.9	41.8	41.9	41.9	41.7	41.9	42
6 wks old	1587.2 a	1554.2 a	1464.1 b	1285.5 a	1440 b	1568.9 a	1449 b
Mean body wt.gain(gm)	1545.3 a	1512.4 a	1422.2 b	1448.6 a	1398.3 b	1527 a	1407 b
Feed consumption(gm)	3709 a	3659 a	3840 b	3618 a	3910 b	3770 a	3900 b
Feed efficiency (feed/gain)	2.4 a	2.42 b	2.7 b	2.51 c	2.79 d	2.47 e	2.77 b
Mortality (%)	3.0	5.0	5.5	6.7	10.6	4.2	5.1

(a,b,c,d,e,) Means on the same line not followed by a letter in common differ significantly ($P < 0.05$).

* T1= fed on diet without DPM, T2 and T3= fed diets with 5% and 10% layer litter, respectively, T4 and T5= fed diets with 5% and 10% caged layer manure, respectively, T6 and T7= fed diets with 5% and 10% processed layer manure, respectively.

those of the control ($P > 0.05$). Increasing the percentage of the three types of DPM in the diets to 10% caused a significant ($P < 0.05$) decrease in body weight gain and increase in feed consumption. Similar findings were reported by Flegal and Zindel (1970 a) and Coon *et al.* (1978). The values of feed efficiency were not significantly affected when chicks were fed diets containing 5% DPM. Increasing the level of DPM in the diets caused a significant ($p < 0.05$) decrease in feed efficiency. These data indicated a lower metabolizable energy for diets which contained the DPM because of the fact that the three types of DPM had a lower metabolizable energy and the served diets were not adjusted to be isocaloric. These results have come in agreement with those of Coon *et al.* (1978) and Lee *et al.* (1978).

Chicks in the control group (T1) had significantly ($P < 0.05$) lower mortality rate as compared with chicks fed diets containing 5% DPM. Increasing the level of DPM in the diet to 10% resulted in increased mortality rate. On the other hand, chicks in T6 and T7 groups had lower mortality rate (4.2 and 5.1%, respectively) when compared with chicks in T4 and T5 groups (6.7 and 10.6%, respectively). The decreased mortality rate in T6 and T7 groups could be due to the decrease in the uric acid content of the processed cage layer manure. Such decrease in mortality rate was observed by Trakulchag and Balloun (1975) who indicated that treating the cage layer manure with 5% potassium hydroxide solution would remove the uric acid and therefore reduce the ammonia toxicity.

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تأثير ثلاثة انواع من فضلات الدواجن المجففة على بعض الصفات الانتاجية لفروج اللحم

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الخلاصة

بهدف معرفة تأثير اضافة فضلات الدواجن الى علائق فروج اللحم على بعض صفاته الانتاجية تمت دراسة ثلاثة انواع من فضلات الدواجن الجافة وهي:

١- فرشة الدجاج البياض.

٢- فضلات الدجاج البياض من المربى بالاقفاص.

٣- فضلات الدجاج البياض المربى بالاقفاص والمعاملة بمحلول هايدروكسيد البوتاسيوم لغرض التخلص من حامض اليوريك.

استخدمت ٣٥٠ فرخة لحم بعمر يوم واحد ووزعت عشوائيا على سبعة معاملات غذائية حيث غذيت افراخ المعاملة الاولى (السيطرة) على عليقة بادئه وعليقة نمو قياسية. اما افراخ المعاملة الثانية والثالثة فقد غذيت على عليقة تحتوي على ٥٪ و ١٠٪ من فرشة الدجاج البياض على التوالي، في حين غذيت افراخ المعاملة الرابعة والخامسة على عليقة تحتوي على ٥٪ و ١٠٪ من فضلات الدجاج البياض المربى بالاقفاص على التوالي. ان افراخ المعاملة السادسة والسابعة قد غذيت على التوالي على علائق تحتوي على ٥٪ و ١٠٪ من فضلات الدجاج البياض المربى بالاقفاص والمعاملة بمحلول هايدروكسيد البوتاسيوم.

لقد اشارت نتائج التجربة الى ان اضافة الانواع الثلاثة من فضلات الدواجن الى علائق فروج اللحم وبنسبة ٥٪ لم يكن لها تأثير معنوي ($P \leq 0.05$) على معدلات النمو واستهلاك العلف، وكفاءة تحويل الغذاء. اما عند رفع نسبة اضافة فضلات الدواجن للعليقة الى ١٠٪ فقد حصل انخفاض معنوي ($P \leq 0.05$) بمعدلات النمو وكفاءة تحويل الغذاء وزيادة معنوية في استهلاك العلف ونسبة الهلاكات.