EFFECTS OF VARYING LEVELS OF SODIUM CHLORIDE ON CHEMICAL COMPOSITION OF CAGED LAYER DROPPINGS

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ABSTRACT

This study aim was to find out the effect of varying (graded) levels of sodium chloride (NaCl) on the chemical composition of caged layer droppings in two genotypes. The experimentation was carried out at the poultry units of the Teaching and Research Farm of University of lbadan, lbadan Nigeria during the months of April to June 2009. Four graded levels of dietary sodium chloride in iso-nitrogenous and iso-caloric diets were fed to two strains of laying domestic chicken. The moisture content of the droppings was observed to increase insignificantly with increased dietary salt, while dry matter content of the droppings decreased insignificantly with increased dietary salt content.
Keywords: *Caged layers droppings, Chemical composition, Dietary sodium chloride, Iso-nitrogenous and Iso-caloric diets, Two strains of layers.*

INTRODUCTION

Poultry population all over the world is rapidly increasing. While many new producers are entering into the business, old producers are continuously increasing their stock population. However, wastes (Poultry droppings and litters) from these birds are so enormous to the extent that the disposal poses many problems to the farmers and it often threatens further expansion of the projects. This problem of waste disposal most especially in the concentrated areas where there is limited land for disposal of large tonnage of poultry waste coupled with increase public consciousness of environmental pollutions is on the increase. This has challenged animal scientists to embark on extensive research work to investigate the possibility of reclaiming the nutrients contained in poultry wastes by using it as feed ingredient for different classes of animals (including fish) thereby reducing total cost of production.

Bhattacharya and Pontenot, (1969); Parigi-Bini (1981), Flegal and Zindel

(1972); Hodgets (1971); Flegal et al (1972) determined the chemical composition of dehydrated poultry droppings. The results obtained varied. The variation which is much marked in the crude protein content has been attributed to the type of feed, the system of husbandry, storage conditions, duration of storage and level of management (NRC, 1994). Despite the many uses of these poultry droppings, the slurry nature most often complicates its handling and renders it almost totally useless. The objective of this study is to find out the effect of varying (graded) levels of sodium chloride on the chemical composition of cage layer droppings in two genotypes. This is based on the fact that adult chicken can tolerate much higher inclusion of sodium chloride (NaCl) in the diet than the chicks. It can tolerate about ten times the recommended range of 0.25 - 0.30%.

MATERIALS AND METHODS

The experiment was carried out at the poultry units of the Teaching and Research Farm of University of lbadan, lbadan, Nigeria during the months of April to June. Two strains of layers were used for the experiment. These consisted of the Lohman (brown plumage with spotted white) and the Nera (black plumage). There were four hundred layers in each strain. The layers had no visible sign of diseases(s) and were thirty-six weeks of age at the onset of the experiment. There were four treatment groups in each strain comprising one hundred layers per group. The average weight per group was almost equal to one another with insignificant difference.

The layers were housed in the California type of cages, which were previously thoroughly cleaned and disinfected. The layers were dewormed and were placed on antis tress water medication for five days before the commencement of the experiment. Two groups, (one group from each strain) received same treatment containing same level of sodium chloride. Experimental feed, was prepared with same formulation (iso-caloric and iso-nitrogenous) without inclusion of salt in the initial stage. After sharing the feed into four, a calculated amount of salt (NaCl) was added to each ration to give feed A B C D having salt levels of 0.30%, 0.45%, 0.60% and 0.75% respectively using ration A as control. Two groups, one from each strain received one treatment ration. That is treatment A $(A_1 A_2)^B$, $(B_1 B_2)^C$ $(C_1 C_2)^D$ $(D_1 D_2)$ received rations ABCD respectively. The layers were fed ad-libition; cool and clean water was supplied along with the feed ad-libitum, while the percentage composition of the experiment rations was presented on tables.

Samples of feed were collected and analyzed for nutrients constituent using the methods of A.O.A.C., 1970. All the results were expressed on dry matter basis. In the case of droppings; fresh samples were collected at 7 days interval on ten occasions for immediate analysis after each collection. The experiment design was complete randomized design with strain and dietary salt levels as factors. The experiment lasted 12 weeks during when weekly proximate analysis data were recorded for each group in each strain and subjected to statistical analysis.

RESULTS AND DISCUSSION

Table 3 shows the means of the pooled weekly proximate analysis of the layers droppings for the two genotypes (Lohman and Nera strains). The results from the two genotypes did not show any significant differences among the treatment means, so the data were pooled together. Dry matter percentage falls within the range of 30.69 to 27.72%. It is highest in ration A with the lowest level of salt and lowest in ration D with highest level of salt. This trend may be due to the fact that increase in dietary salt level may have led to increased water consumption, which could have led to droppings with higher percentage of moisture. This explanation may be supported, looking at the moisture percentages on table 3. It increases from ration A to D. This implies that increased salt level decreases dry matter level while moisture level is increased simultaneously. Despite the differences within the means for moisture content and within the means for dry matter content of the analyzed layers' droppings there were no significant differences even at probability (0.05). A difference in the crude protein levels, which ranges between 8.06 and 8.94, shows no significant differences within the means. This implies that graded levels of dietary salt did not affect the crude protein levels in the layers droppings.

There were no significant differences in percentages of crude fibre, ash, ether extracts and chloride in the droppings from the four rations and from the two genotypes of laying chickens. Although the levels on nitrogen free extracts varied from 12.17 to 10.19, but did not show significant differences at $p< (0.05)$

CONCLUSION

The aim of this study was to find out the effect of varying (graded) levels of sodium chloride on the chemical composition of cage layer droppings in two genotypes. Four graded levels of dietary sodium chloride in iso-nitrogenous and iso-caloric diets were fed to two strains of laying domestic chicken. Results obtained from the experiments indicate that increasing dietary salt level in cage layers encourage increase moisture level of the dropping making the dropping to be more slurry in nature.

Table 1: Percentage composition of experimental ration (C.P 18.5%; 2700 kcal / kg ME)

Ingredients	A	B	C	D
Maize	41.73	41.73	41.73	41.73
Maize offal	12.79	12.79	12.79	12.79
Soya meal (full fat)	21.79	21.79	21.79	21.79
Wheat offal	10.00	10.00	10.00	10.00
Fish meal	3.00	3.00	3.00	3.00
Methionine	0.16	0.16	0.16	0.16
Oyster shell	8.00	8.00	8.00	8.00
Bone meal	2.00	2.00	2.00	2.00
Salt (NaCl)	0.30	0.45	0.60	0.75
Premix	0.25	0.25	0.25	0.25
Total %	100	100	100	100

Source: Experiment, 2009

Table 2: Percentage Proximate Analysis of the experimental rations ME 2700 kcal/kg or CP% 18.5%

Nutrients	A	B	C	D
Dry matter	95.91	95.90	95.92	95.91
Crude protein %	18.55	18.55	18.55	18.55
Crude fibre	5.48	5.48	5.48	5.48
Ether extracts	5.82	5.82	5.82	5.82
Ash	9.43	9.43	9.43	9.43
Nitrogen Free Extracts	56.63	56.63	56.63	56.63
Moisture	4.09	4.10	4.09	4.09
Salt (NaCl)	0.30	0.45	0.60	0.75
Total	100	100	100	100

Source: Experiment, 2009

Table 3: Means of the pooled proximate Analysis of the droppings of caged laying domestic chicken/under thermal stress (percentage)

Treatments	A1	A2	B1	B2	C1	C2	D1	D2
Dry matter	30.69	30.69	28.64	29.21	28.20	29.48	27.83	27.72
Crude protein	8.38	8.50	8.06	8.50	8.31	8.94	8.50	8.25
Crude fibre	7.91	9.35	7.16	7.86	6.36	8.61	6.49	6.52
Ether extracts	0.71	0.77	0.82	0.74	0.68	0.78	0.69	0.70
Ash	1.40	0.89	1.34	0.92	1.38	0.90	1.36	0.88
Moisture	69.31	69.36	71.36	70.79	71.80	70.52	72.17	72.28
Nitrogen free extracts	12.17	11.03	11.18	11.09	11.42	10.19	10.79	11.27
Chloride	0.12	0.10	0.08	0.10	0.05	0.06	0.05	0.10

Source: Experiment, 2009

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