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EFFECT OF POULTRY LITIER-BASED SILAGE ON BODY WEIGHT AND HAEMATOLOGY OF SHEEP

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Thirty lambs of approximately equal age and weight were divided into three groups and fed farm ration, poultry litter-based silage and silage with concentrate. The animals were kept for 6 weeks. There was non-significant difference in erythrocyte count, packed cell volume, MCV, MCH, MCHC and total leukocyte count of experimental and control sheep at 3 and 6 weeks post-treatment. There was non-significant difference in haemoglobin concentration and erythrocyte sedimentation rate of control and experimental animals at 3 weeks post-treatment. At 6 weeks post-treatment, there was significant decrease in haemoglobin concentration of sheep fed poultry litter-based silage and significant increase in erythrocyte sedimentation rate.

INTRODUCTION

The maximum production potential of our livestock is seldom attained mostly because of inadequate nutrition especially the green fodder. The maximum productivity from animals may be achieved by employing specific techniques as well as exposing new feed resources (Muller, 1982).

Poultry litter used as a fertilizer, is a potential source of nitrogen and energy for ruminants such as sheep and more valuable as a feed ingredient than as a fertilizer (Arndt *et al.,* 1979). Economic value of poultry litter as feed component in balanced diets for ruminants is 3-10 times greater than their value as plant nutrient (Smith and Wheeler, 1979).

Poultry dropping being a good nitrogen source, is a priceless waste material. Recycling of poultry litter for the ruminant feeding may improve the quality of fodder or silage from cereal fodder. But being a waste product may have some harmful effects.

Therefore, a project was made to study the body weight and haematological changes of sheep fed on silage prepared with poultry dropping in comparison to a concentrate and routine farm ration.

MATERIALS AND METHODS

Thirty lambs of approximately equal age and weight were obtained and maintained at Sheep-Goat Farm, Department of Animal Nutrition, University of Agriculture, Faisalabad. The lambs were randomly divided into three groups having 10 in each group and were fed farm ration, poultry litter based silage and silage with concentrate mixture A.

The silage used in this experiment was prepared from Sudax (Sadabahar) fodder using poultry litter as an additive. Fodder was chaffed to a particle size of 2-3 cm with an electric chaff cutter and poultry litter mixed at the rate of 30%. The litter was collected from a commercial broiler farm in

which the birds were kept on sawdust and reared on standard rations. Molasses were added as a source of fermentable energy and ensiled in airtight polythene bags for 30 days.

Silage composed of 94% sadabahar and 6% molasses. The poultry litter based silage composed of 64, 30 and 6% Sudax, broiler litter and molasses, respectively. The composition of farm ration and concentrate mixture A is given in Table 1. The animals were kept for 6 weeks and initial and final body weights were recorded to see the effect of poultry litter on body weight.

Table 1. Composition of farm and concentration ration

Ingredients	Farm ration	Concentrate mixture A
Cottonseed cake (undecorticated)	20	80
Maize oil cake	21	-
Guar meal	6	20
Wheat bran	5	-
Rice polishing	8	-
Molasses	14	-
Wheat straw	25	-
Total	100	100

Blood samples were collected from all sheep from every group at a 3 week interval. The blood samples were collected using ethylene diamine tetra-acetic acid (EDTA) as an anticoagulant at a rate of 1 mg ml^{-1}. The blood was used for haematology including erythrocyte count, haemoglobin concentration, haematocrit, erythrocyte indices and totalleukocytic count using the methods described by Coles (1986). The data were subjected to analysis using a statistical package MSTAT-C on a compatible personal computer.

RESULTS

Effects on body weight: There was non-significant difference between initial and final body weights in all groups (Table 2).

Effect on haematology:

Erythrocyte count: Erythrocyte count did not show any marked difference in poultry litter based silage and concentrate with mixture A fed sheep compared with the control groups (Table 3). Erythrocyte count increased with age in all groups including the control group.

Haemoglobin concentration: There was non-significant difference between groups in the haemoglobin concentration during the first 3 weeks of the treatment. At 6 weeks, haemoglobin concentration decreased significantly in the group I which was fed poultry litter hased silage (Table 3). The time effect was significant and with the increase in age, there was an increase in haemoglohin concentration of sheep in all groups.

Packed cell volume: There was non-significant difference between means of control and poultry litter based silage fed sheep (Table 3). There was a significant increase in packed cell volume of sheep in all groups of sheep with age.

Erythrocyte sedimentation rate: There was non-significant difference in the erythrocyte sedimentation rate (ESR) of three groups of during the first 3 weeks of experiment. At 6 weeks, sheep fed poultry litter based-silage and sheep fed silage with concentrate showed a significant increase in erythrocyte sedimentation rate as compared with the control group (Table 3), There was a significant increase in ESR with age in all the groups.

Table 2. Initial and final body weights or sheep

Mean	Group I	Group 11	Group III
Mean initial body weight (kg)	15.40 ± 0.31	15.12 ± 1.23	14.90 ± 0.53
Mean final body weight (kg)	26.20 ± 0.51	24.62 ± 0.25	25.80 ± 0.97
Gain in weight (kg)	10.8	9.50	10.90
Mean daily weight gain (kg)	0.216	0.190	0.218

Group I = Farm ration (control), Group 11= Poultry litter based silage, Ill. Silage simple with concentrate mix concentrate mixture A.

Table 3. Effect or poultry litter based silage on haematology or sheep

Weeks post-feeding	Mean ± SE		
	Group I	Group 11	Group III
Erythrocyte count (n x 10^6)			
3	6.443 ± 0.397	6.%0 ± 0.269	6.787 ± 0.219
6	7.660 ± 0.666	5.326 ± 0.474	5.973 ± 0.388
Haemoglobin concentration (g dl^{-1})			
3	7.441 ± 0.311	7.520 ± 0.252	7.840 ± 0.214
6	11.030 ± 0.401	8.800* ± 0.701	11.470 ± 0.760
Packed cell volume (pey %)			
3	21.600 ± 0.957	21.800 ± 0.629	22.100 ± 0.752
6	26.200 ± 1.073	23.300 ± 1.202	27.100 ± 1.048
Erythrocyte sedimentation rate (ESR mm/24 hours)			
3	20.400 ± 3.987	13.800 ± 2.081	14.200 ± 1.143
6	19.000 ± 1.247	43.000* ± 3.091	51.400* ± 5.368
Totalleukocytic count (n x 10^3 l-^{1})			
3	3.336 ± 0.225	3.134 ± 0.770	2.957 ± 0.232
6	9.458 ± 1.049	8.213 ± 1.452	8.60 ± 0.753

• = Significant at PSO.01.

Erythrocyte indices: There was non-significant difference in mean corpuscular volume, mean corpuscular haemoglobin and mean corpuscular haemoglobin concentration of the three groups of sheep (Table 4). There was a significant increase in erythrocyte indices with the increase in age in all the groups.

Table 4. Effect of poultry litter based silage on erythrocyte indices of sheep

Weeks post-feeding	Mean ± SE		
	Group I	Group 11	Group III
Mean corpuscular volume (11)			
3	34.708 ± 2.701	34.6657 ± 2.697	33,330 ± 1,598
6	39.072 ± 7.172	47.303 ± 5.330	47.699 ± 3.657
Mean corpuscular haemoglobin (pg)			
3	11.960 ± 0.731	11,000 ± 0.670	11.676 ± 0,533
6	16,500 ± 2.998	17.750 ± 2.400	19.680 ± 1,483
Mean corpuscular haemoglobin concentration (g dl-1)			
3	35.831 ± 2,178	34.660 ± 1.320	35.751 ± 1,450
6	42.367 ± 1.354	37.362 ± 2.994	43.297 ± 2,452

Total leukocytic count: There was no marked difference in total lcukocytic count (TLC) of control, poultry litter-based silage and silage with concentrate fed sheep (Table 3). There is a significant increase in total lcukocytic count with age in all groups (P~0.01).

DISCUSSION

Poultry litter has been widely used as a protein source for ruminants throughout the world since 1955 (Noland, 1955). It has mostly proven to be a good nitrogen source of most of the ruminants which nearly equals with soybean meal and urea (Smith and Calvert, 1972).

Effects on body weight: Non-significant differences were observed in the average daily weight gain in three groups of sheep. These results are similar to those of Bhattacharya *et al.* (1971) who used 30% unprocessed screened wood shaving broiler litter in practical fattening rations of cattle and sheep without any ill effects.

Bosman (1973) also concluded non-significant difference in feed intake, live weight gain or C(lfCaSSchaructcristics after replacing maize meal and fish meal by 20 or *40'YrJ* poultry litter.

Bcrbcci *et al.* (1975) determined mean daily weight gain 21o, 194, 20 and 224 g after giving lucerne hay 30, 20, 20, 20, maize cobs, 20, 20, 25, 25 dried poultry dropping 50, 30, 35, 40% to 50 day-old lambs, while Akkilic and Orkiz (1976) reported average daily weight gain 176, 143 and 140 g after giving concentrate rations with or without 15 and 30% poultry litter. These results are nearly consistent to the present study.

Effects on blood picture: There was non-significant effect of poultry litter based silage on RBC count, PCV and erythrocyte indices Le. MCV, MCH and MCHC while haemoglobin concentration decreased and ESR increased at 6 weeks in the litter fed groups as compared with the control group. Total lcukocytic count did not differ among different groups.

Information on blood picture in response to poultry litter based silage feeding is not available in literature for comparison. The gradual increase in most of blood parameters in control as well as poultry litter based silage fed groups indicates that these values increase with age which could be a normal phenomenon in sheep. However, none of the treatment rations affected the normal growth of sheep in these experiments. This indicates that growth of sheep when fed poultry litter was normal. It is also probable that sheep can adopt and tolerate continuous use of poultry litter without any disturbance in growth. Charles (1975) also reported that such material (poultry litter) could be safely and profitably used in feed without danger to animals or human health.

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