# A STUDY ON THE CHEMICAL COMPOSITION AND NUTRITIVE VALUE OF ANIMAL AND POULTRY WASTES IN RATION FOR SHEEP



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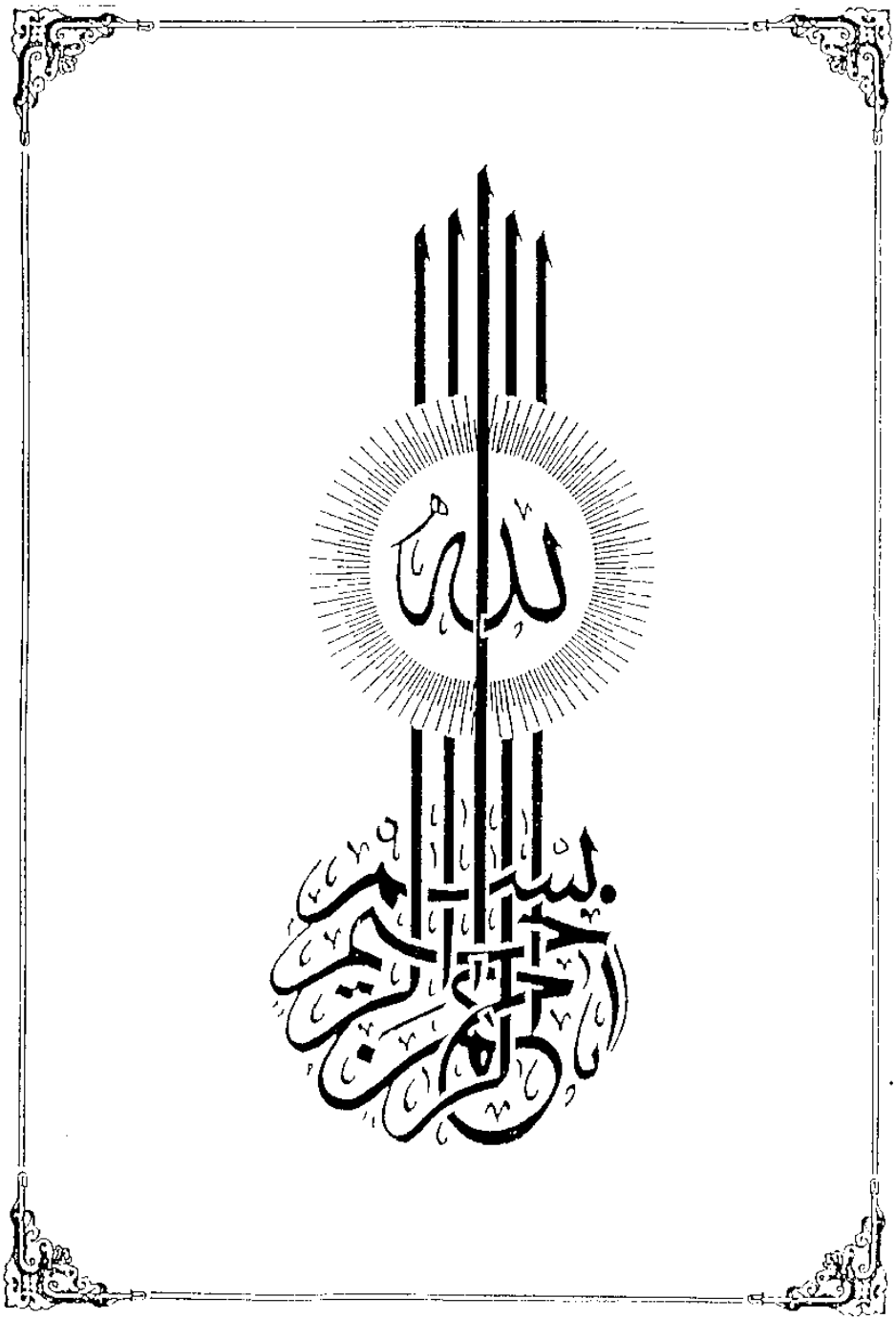

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# C O N T E N T S

# INTRODUCTION

Manure disposal problem is expected to get worse as a result of increased intensification of both poultry and animal production.

Such wastes contain many nutritional ingredients or compounds which can be utilized by ruminants. The major draw back restricting the use of such wastes in ruminant rations is the lack of uniformity in their chemical composition, possibly due to differences in rations offered, type of production and period of storage of the excreta. The present study was carried out to examine the possibility of using different poultry and animal wastes in rations for sheep.

# REVIEW OF LITERATURE

## Chemical Composition

### a. Poultry Manure:

Artificially dried poultry manure has been shown to be a potential ingredient in compound feed for ruminants (De Bore and Steg, 1977).

Chemical composition (g/kg DM) of artificially dried Poultry manure is given in table (1).

Table(1) Chemical composition (g/kg DM ) of artifficially dried poultry manure.

| Item. | DM | Ash | C.P. | True P. | EE | Fiber | NFE |
|---|---|---|---|---|---|---|---|
| Value | 938 | 233 | 315 | 184 | 36 | 146 | 270 |

The average composition of laying hen manure obtained from different sources is summarized in table (2). The data indicate that dehydrated manure usually contains less than 10% moisture which occasionally may reach the level of 18%. It also contain about 30% C.P(only 11% true protein) and 12% crude fiber (dry basis).

Dried poultry waste handicapped by its high ash content (28%), which lowers its energy value. However, it is extremely rich in calcium (8.8%) and phosphorus (2.5%).

Table (2):- Nutrient composition of dehydrated poultry extreta (DPE).

| | | | | | |
|---|---|---|---|---|---|
| Dry Matter | % | 89.65 ± 7.7 [abcdek] | Ash | % | 28.0 ± 1.5 [abcde] |
| Crude protein | % | 28.0 ± 3.2 [abcdfk] | Calciam | % | 8.8 ± 1.1 [abcde] |
| True protein | % | 11.3 ± 1.4 [abg] | Phosphorus | % | 2.5 ± .6 [bd] |
| Digestible protein | % | 14.4 [f] | Magnesium | % | 0.67 ± .16 [b] |
| Crude Fiber | % | 12.7 ± 1.7 [abcd] | Sodium | % | 0.94 |
| Ether extract | % | 2.0 ± .5 [abcde] | Potassium | % | 2.33 ± .27 [bd] |
| Nitrogen Free Extract | % | 28.7 ± 2.8 [abcdg] | Chlorine | % | 0.94 ± .11 [bd] |
| Energy gross | Kcal/kg | 3533 ± 234 [ae] | Silica | % | 3.85 [d] |
| Digestible energy (Cattle) | Kcal/kg | 1875 [e] | Salt | % | 1.36 [d] |
| Digestible energy (Sheep) | Kcal/kg | 1911 ± 171 [dh] | Iron | % | 0.2 [bd] |
| IDN(Sheep) | % | 52.3 [f] | Cobalt | mg/kg | 0.0007 [c] |
| | | | Copper | mg/kg | 150 ± 45 [cd] |
| | | | Manganese | mg/kg | 406 ± 9 [bcd] |
| | | | Zinc | mg/kg | 463 ± 93 [bcd] |

[i] Pryor and conner, 1964.
[j] Quisenberry and Bradly; 1968.
[k] Barigi-Bini, 1969.
[g] El-Sabban et al., 1969.
[d] Long et al., 1969.
[f] Tinnini;t et al., 1972.
[h] Lowman and K night, 1970.
[b] Flegal and Zindel., 1970.
[a] Poline et al., 1971.
[e] Bull and Reid, 1971.

Effect of storage period on the chemical compositions of poultry manure:

literature on dehydrated poultry manure from cage layers often refered to as dehydrated poultry waste (DPW), show wide variation in its composition. The most common variation is in its crude protein content. An important cause of variation is duration of storage of the wet manure. Flegal et al., (1972), studied the effect of storage period on the crude protein content of poultry manure. They found that storage period of 3-weeks had no effect on crude protein content of the manure. Increasing the storage period from 4 to 14 weeks decreased the crude protein content of the manure from 30 to 18% (Table 3).

Table (3):- Effect of storage period length of fresh hen droppings on crude protein content of dried poultry waste (DPW). by (Flegal et al., 1972).

| Storage period (Days) | Percent of crude protein (Dry basis) |
|---|---|
| 7 | 30.3 |
| 14 | 32.9 |
| 21 | 31.2 |
| 28 | 30.2 |
| 35 | 27.4 |
| 42 | 25.7 |
| 49 | 25.0 |
| 56 | 20.4 |
| 63 | 24.9 |
| 70 | 23.5 |
| 77 | 21.2 |
| 84 | 22.4 |
| 91 | 19.9 |
| 98 | 18.3 |

b - Broiler litter:

The nutrient composition of broiler litter is shown in table (4). Many factors may contribute to the wide range of variation in the composition of broiler litter.

Under standard management systems the bedding used, such as corn cobs, peanut hulls, rice hulls, wood shavings etc., is an important source of variation. Broiler litter is valuable mainly for its nitrogen content, and field studies (Fontenat et al., 1971), have indicated that the average crude protein content of broiler litter obtained from various sources is about 30% on dry matter basis.

Broiler litter contains about 15% crude fiber, the major constituent of which is lignin.

It is high in ash (15%) with comparatively higher amounts of both calcium and phosphorus as compared to a natural feedstuffs.

About 50% of the crude protein is available in the form of true protein which high in glycine and somewhat low in arginine, lysine, methionine and cystime (Bhattacharya and Fontenot, 1966). Uric acid represent

Table (4):- Nutrient composition of broiler litter.
Dry matter basis.

| | | | | | |
|---|---|---|---|---|---|
| Dry matter (DM | % | 84.7 ± 4.2 [abcd] | Ash | % | 15 ± 3.2 [abce] |
| Crude protein | % | 31.3 ± 2.9 [abcde] | Calcium | % | 2.37 ± .9 [abcde] |
| True protein | % | 16.7 ± 2.4 [afh] | Phosphours | % | 1.8 ± .4 [abcde] |
| Digestible protein | % | 23.3 [abcde] | Sodium | % | 0.54 [e] |
| Percent digestibility | % | 74.6 ± 3.5 [abcgh] | Potassium | % | 1.78 [e] |
| Crud fiber | % | 16.8 ± 1.9 [abcd] | Magnesium | % | 0.44 [e] |
| Ether extract | % | 3.3 ± 1.3 [abcd] | Manganese | mg/kg | 225 [e] |
| NFE | % | 29.53 ± 1.6 [abce] | Iron | mg/kg | 451 [e] |
| DE (Sheep) | Kcal/kg | 2440 [a] | Copper | mg/kg | 98 [e] |
| ME (Sheep) | Kcal/kg | 2181 [a] | Boron | mg/kg | 38 [e] |
| TDN (Sheep) | Kcal/kg | 72.5 [a] | Aluminium | mg/kg | 284 [e] |
| | | | Zinc | mg/kg | 235 [e] |
| | | | Arsemic | mg/kg | 11 [e] |
| | | | Vit.$B_{12}$ | mg/kg | 828 [f] |

[c] Brugman et al., 1964.
[a] Bhattacharya and Fontenot, 1966.
[g] McInnis et al., 1968.
[b] Cenni et al., 1969.
[e] El-Sabban et al., 1969.
[f] Kumanov et al., 1970.
[d] Fontenot et al., 1971.
[h] Bhattacharya et al., 1971.

about 50% or slightly more of the total non protein nitrogen (NPN) of the litter, (Bhattachayra, 1964).

C- Cattle Manure:

The chemical composition, especially the crude protein, fiber and NFE content of cattle manure varies, depending on the level of dry matter intake, roughage level and digestibility of rations used for different kinds of production (Fisher, 1974).

The nutrients composition of cattle manure is presented in table (5), percent cell wall content on dry matter basis is 46 and 63% in beef and dairy cattle manure, respectively.

Lignine content is high (15%) in dairy manure. Crude protein content of beef cattle manure, is about 20% on dry matter basis, while that of dairy manure is about 12.6%. Cattle manure contains appreciable amounts of calcium and phosphorus.

Among other minerals, iron seems to be high. Ash content of some feed lot manure seems to be very high because of contamination with foreign matter, (Johnson, 1972).