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Rabbit Feeding on Cow Manure Supplemented Diets

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SUMMARY. Twenty eight New Zealand White rabbits (1560 + 23 g) were divided into four groups of seven. Treatments were control, 10%, 20% or 30% of dried cow manure (DCM). Diets were nearly isonitrogenous and isocaloric. Approximate chemical analysis of DCM was 14.3% crude protein; 2.8% ether extract; 30.0% crude fibre; 32.0% N.F.E. and 20.4% crude ash. The total digestible nutrients (TDN) values were 80.0%, 68.3%, 61.5% and 54.5%; those for metabolizable energy (ME) were 3.29, 2.78, 1.70 and 1.33 MCal / kg food. The digestibility coefficient values for dry matter were 84.8%, 75.3%, 63.2% and 53.2% and 53.8%; and those for organic matter were 84.6%, 75.2%, 64.5% and 57.5%, respectively.
Supplementation of DCM resulted in low body gains, feed intake and poor conversion ratios compared to the control diet. The 30% DCM rabbit group had a significant difference (P< 0.01). Digestion of most of the nutrients were greatly affected by DCM additions (P< 0.05). The poor performance of incorporated diets could be related to palatability of diets, dietary fibre levels and the type of that fibre. Using DCM in rabbit diets up to 20% gave adequate growth, while 30% DCM diet failed to support performance as compared to the control diet and more trials are necessary to evaluate DCM with breeding stock.

Key words: *cow manure, growth performance, digestibility coefficients*

Introduction

Animal does not entirely utilise food. The chemical analysis of animal manure is varied according to breed, types of diet, and the physiological status of the animal. Thus, animal manure may have sufficient proportions of most of the nutrients. It has been used as a feed studying its effect on growth performance, and to decrease the cost of feeding.

There are two kinds of manure which are obtainable either from ruminants, or from non-ruminants. Several workers have studied the incorporation of animal manures into various breed diets. Flegal and Dorn (1971) fed a dried poultry waste to laying hens. Radwan *et al.* (1983) compared using different sources of manures (cow, poultry, rabbit and sheep manures) all at 10% incorporated into rabbit diets. However, Lall (1984) evaluated a monogastric waste, dried rabbit excreta, which was fed to sheep. This study aimed to investigate the effect of dried cow manure (D.C.M.) incorporating upon performance and the digestibilities of the New Zealand White rabbits.

Experimental procedure

Twenty eight rabbits averaged 1560 g body weight were divided into four groups, of seven each. Each treatment was assigned to one of four dietary treatments: basal, 10%, 20% or 30% DCM. The rabbits were located in wooden hutches of 50"x70"x50" dimensions. The study was carried out for 5 weeks at the field research station, College of Agriculture, at Fayoum, Egypt.

Diets were formulated from a variety of ingredients hand mixed and offered mash. Dried cow manure was obtained from the Animal Production Farm, College of Agriculture, Cairo University, Fayoum, Egypt. Composition of diets is shown in Table 1. The quantity of feed intake was recorded daily. Animals were weighed weekly to the nearest gram. A digestibility trial was carried out on the fifth week, where food and faeces were recorded daily.

Samples of diets, faeces, and DCM were ground in a coffee blender to be ready for chemical analysis. The chemical analysis of diets is given in Table 2 and of DCM is given in Table 3. The routine chemical analyses were done according to the A.O.A.C. (1970). The figures were tested statistically by analysis of variance (ANOVA) and least significant differences (LSD) for Snedecor (1980).

Results and discussion

GROWTH PERFORMANCE

The data of growth peformance is presented in Table 4. Statistical analysis of initial weights revealed no significant differences between groups. The final weights decreased with increasing DCM levels. Only 30% DCM group showed a significant reduction in growth ($P< 0.05$). There were parallel effects on growth rates. Incorporation of DCM resulted in decrease of feed intake, and 30% DCM group were significantly different ($P< 0.01$). Food conversion ratio (FCR) significantly increased with increasing DCM levels ($P< 0.01$). The depressive effect of DCM upon growth may be due to the palatability which in turn reflected on feed consumption. The 30% DCM group consumed on an average 26 g of food daily less than that for the control, the diets were isocaloric (see Table 2). Using DCM at levels up to 20% did not result in a significant decrease, and this result is in agreement with that of Radwan (1983).

Protein quality of D.C.M., its composition of essential amino acids, and their pattern, may be poor, and clearly resulted with the 30% level.

Table 1. Composition of experimental diets

Item	Cow manure supplementation (D. C. M.)			
	Control	10%	20%	30%
Yellow corn	30.0	28.0	32.0	29.0
Barley meal	5.0	5.0	1.0	--
Wheat bran	8.0	9.0	3.0	--
Bean meal	17.0	8.0	--	--
Soyabean meal	15.0	20.0	26.0	24.0
Cotton seed meal	8.0	3.0	1.0	--
D.C.M. *	--	10.0	20.0	30.0
Sawdust	10.0		10.0	10.0
Fish meal	2.0	10.0	2.0	2.0
Cotton seed oil	2.0	2.0	2.0	2.0
Lime stone	1.0	2.0	1.0	1.0
Bone meal	1.0	1.0	1.0	1.0
Mineral mix.	0.5	0.5	0.5	0.5
Vitamin mix.	0.5	0.5	0.5	0.5
Salt	0.5	0.5	0.5	0.5

* D.C.M.: Dried cow manure was obtainable from research station at College of Agriculture, Fayoum, Egypt.

Table 2. Chemical analysis of experimental diets and D.C.M.

Nutrient	D. C. M. Supplementation (%)				
	Control	10%	20%	30%	D.C.M
Moisture	5.9	5.5	6.1	5.5	3.8
	Analysis on dry matter basis				
Crude protein	19.5	19.7	20.4	19.8	14.3
Ether extract	5.0	5.3	6.4	5.6	2..8
Crude fibre	14.3	15.7	17.0	18.6	30.5
N.F.E.	49.0	44.1	42.0	43.2	32.0
Ash	12.0	15.2	14.0	12.8	20.4
Calorific value, (KCal/g)	3.8	3.7	3.8	3.8	3.3
Feed cost/ kg, p	18.3	17.5	17.4	15.6	--*

* It suggested that the price of this waste was zero (no price).

Table 3. Effect of D.C.M. supplementation on growth performance

Item	D. C. M. supplementation (%) Control	10	20	30
Initial weight, g	1479+426	1609+320	1556+217	1592+147
Final weigh, g	1973+369[a]	1995+347[a]	1890+221[a]	1706+174[b]
Daily weight gains, g	14.1+5.3[a]	11.0+1.5[a]	9.5+1.2[a]	3.3+0.5[b]
Daily feed intake, g	98.6+0.3[a]	97.0+5.0[a]	76.2+5.0[a]	72.2+3.5[b]
Feed conversion (feed/gain)	8.4+2.8[a]	10.6+2.0[a]	9.6+1.8[a]	26.6+3.0[b]
Growth rate *	33.4+21.5[a]	24.0+4.4[a]	21.5+6.0[a]	7.2+6.6[b]

Values are presented as means + SEM.

$$\text{* Growth rate} = \frac{\text{Total weight gains}}{\text{Initial body weight}} \times 100$$

a, b: Values significantly different at P< 0.05.

Table 4. Effect of D.C.M. supplementation on digestibilities

Item, %	D. C. M. supplementation (%) Control	10	20	30
Dry matter	84.1+1.5[a]	75.3+1.4[b]	63.2+1.2[c]	53.8+1.6[d]
Organic matter	84.6+1.6[a]	75.2+1.0[b]	64.5+1.1[c]	67.5+1.3[d]
Crude protein	87.4+1.6[a]	76.8+1.5[b]	72.2+1.4[c]	66.8+1.6[d]
Ether extract	87.9+6.0[a]	77.9+5.4[b]	75.1+6.2[b]	62.3+7.0[c]
Crude fibre	55.8+4.0[a]	35.3+3.6[b]	5.1+2.3[c]	2.0+2.0[d]
N. F. E. *	91.6+3.6[a]	86.9+7.0[b]	83.2+4.2[c]	76.6+3.0[d]
Total digestible nutrients (TDN)	80.0+7.0[a]	68.3+6.4[b]	61.5+6.2[c]	54.5+5.0[d]
Metabolizable energy, KCal/g	3.3+0.2[a]	2.8+0.1[b]	1.7+0.2[c]	1.3+0.2[d]

Values are presented as means + SEM.
a, b, c, d: Values are significantly different at P< 0.05.
* N. F. E.: Nitrogen- free extractives.

The 30% DCM was inadequate to support growth as compared to the control group. The low gain results in this study might be due to the age of animals (15 weeks), and the season when the experiment was carried out (it was summer and the temperature were 33-38°C). In addition to that, the breed was impure.

DIGESTABILITIES

Results of DCM incorporation on food digestion are given in Table 5. Digestibility of dry and organic matter decreased with raising DCM levels ($P < 0.05$). The values of total digestibility nutrients (TDN) and metabolizable energy (ME) were significantly low on the 30% diet group. This result agrees with that of Lall (1984). The highly significant depressive effect of DCM on food digestion could be related to several reasons. Firstly, the biological value of DCM was low which in turn may result in a poor protein digestion. Secondly, dietary fibre levels could have effects on growth rate, even though the diets were similar in metabolizable energy levels (Hale and Utley, 1985). Also, high fibre diets could limit the utilisation of available nutrients for digestibilities (King, 1984).

The type of fibre might have affected this digestion either by trapping and protecting proteins and carbohydrates from being digested (King, 1984) or by binding of essential amino acids, and this may contribute to the decrease in protein utilisation (Howard *et al.*, 1986). The poor digestion of nutrients in incorporated diets resulted in a poor metabolizable energy values for those diets. The results of this study suggest that DCM may be utilised into rabbit diets up to 20% with adequate growth, but the quality of dietary fibre should be also taken into account.

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