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PERFORMANCE AND CARCASS TRIATS OF RAHMANI LAMBS FED RATIONS CONTAINING DRIED POULTRY MANURE WITH ADDITION OF BENTONITE CLAY.

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SUMMARY

The effect of substitution of dried poultry manure (DPM)-protein with concentrate feed mixture (CFM) – protein with or without bentonite clay supplementation IN growing lambs rations on digestibility, growth performance and carcass quality was investigated. Fifty six growing male Rahmani lambs aged 3-4 months old and weighing 22.2 kg were used. Animals were divided randomly into 8 equal groups (7 lambs in each) according to their live body weight. All lambs were fed on whole corn silage as a sole forage source to cover 40% of their total crude protein requirements and the other 60% was provided from CFM (R1), CFM+3%bentonite, B (R2), 50% CFM +10% DPM (R3), R3+3%B (R4), 40% CFM+ 20% DPM (R5),R5+3%B(R6), 30% CFM+30% DPM (R7)and R7 + 3% B(R8) for 6 months. In addition, 24 Rahmani rams were used to evaluate the nutritive values of the tested rations.

The results showed that using DPM at level of 30% in tested rations led to significant decrease in DM, OM, CF and EE digestibility except of that CP which was not significantly affected. But, clay supplementation had positive effect on digestibility of all nutrients. The high level of DPM (30%) reduced final body weight and hence total body gain and daily body gains (DBG) of Rahmani lambs as well as feed conversion based on DM, TDN and DCP. The DBG was significantly improved with presence of bentonite in the tested rations. The feed conversion efficiency and feed cost/kg weight gain were better with bentonite-supplemented rations compared with unsupplemented ones. Both DPM levels and bentonite did not significantly affect carcass cuts and offals weight and dressing percentage.

Keywords: *Rahmani lambs, performance, carcass, poultry manure, bentonite.*

INTRODUCTION

In Egypt, numerous scientific studies showed that utilization of poultry wastes (Litter and manure) (PW) as a source of protein is considered to be the most strategic ingredients of the unconventional feeding system of ruminants (El-Ashry *et at.,* 1987 and 2000, Gaber *et al.*., 1991 a & b, 1993 and 2001, and Saleh,1998).

Gabr *et al.* (2001) demonstrated that about 49% of PW crude protein is presented in form of non-protein nitrogen (NPN). Additionally, in spite of that uric acid is the highest nitrogenous compound of PW- crude protein which is of less solubility in the rumen than other sources of NPN resulting in slower hydrolysis to ammonia by ruminal microorganisms (Muller, 1980)

Care must be taken to avoid ammonia toxicity specially when relatively high level of PW are used in feeding farm animals. However clays are widely used as feed additives to ruminant feeds contained NPN (Marai *et al.*.,1997 Nowar *et al.*.,1993, Abd El-Baki *et al.*., 1995 and Ahmed,1999., Hassona *et al.*., 1999 and Abd El- Baki *et al.*., 2001) which act as a reservoir and regulator of ammonia concentration in the rumen, consequently, prevented ammonia toxicity, corrected rumen acidity and basicity. Moreover, clays can decrease the incidence of internal disorders in animal (Bernal and Lopez-Real, 1993) as a result of adsorb the toxic products of digestion and decrease the accumulation of toxic substances in the tissue (Hassona *et al.*, 1999).

However, little attention has been focused on the effects of feeding rations containing dried poultry manure (DPM) with bentonite clay supplementation on productive performance of growing lambs and more knowledge and information are needed in this respect

Therefore, the main objectives of the present work were to study the effect of replacing concentrate feed mixture-protein with DPM- protein at different levels with or without bentonite clay supplementation, on productive performance and carcass traits of growing lambs. Nutrient digestibilities, some rumen parameters and blood constituents as affected by dietary treatments were also studied.

MATERIALSAND METHODS

The present study was conducted at El-Serw Experimental Research Station, Animal production Research Institute, Agricultural Research Center, Ministry of Agric., Egypt Fifty six growing Rahmani lambs, selected from El-Serw Station herd, with an average age of 3-4 months and weighing 22.2 ±0.60 kg were used. The animals were divided into 8 equal groups (7 lambs each) according to their live body weight. The animals were weighed at the beginning then biweekly. The animals were fed for five weeks as a transitional period on the same experimental rations before the start of the experimental work.

The experimental rations were formulated and fed as total mixed rations (TMR) for 6 months. The TMR were offered twice daily in two equal portions and fed at 8 a.m. and 3 p.m. Eight experimental rations were formulated from the whole corn silage (WCS) as a sole forage to cover 40% of crude protein (CP) requirements recommended by NRC (1985) for sheep, while the remained 60% of CP was covered from CFM and dried poultry manure (DPM)at different proportions as presented in Table (1A).

The clay (bentonite) used in experiment was supplemented to R_2, R4, R6 and R_8 as 3% of total daily feed intake (CFM, DPM and WCS) as recommended by Ahmed (1999).

Poultry manure was collected from different layer houses (Sina and Gemeza strains) of the experimental station belonging to the El-Serw Research Station. The collected manure was from chicken fed only on a plant protein diet. The layers manure was sun dried for 21 days to destroy any pathogenic organisms (Fontenot and Webb, 1975) and any detected feathers or strange bodies were removed. This product was incorporated into rations without further processing.

The proximate chemical composition of tested ingredients and calculated chemical composition of consumed rations during the digestion trials are presented in Table (1).

The CFM contained: undecorticated cotton seed meal (21%), coarse wheat bran (38%), wheat flour (10%) yellow

Table (1A): Composition of different experimental rations

Item	Experimental rations							
	R_1	R_2	R_3	R_4	R_5	R_6	R_7	R_8
WCS(%)	40	40	40	40	40	40	40	40
CFM(%)	60	60	50	50	40	40	30	30
DPM(%)	-	-	10	10	20	20	30	30
Total	100	100	100	100	100	100	100	100

Table (1) : Chemical composition (% on DM basis) of feed ingredients and experimental rations during the digestibility trials

Items	DM	Chemical composition						
		OM	CF	CP	EE	NFE	Ash	GE*
Concentrate feed mixture (CFM)	89.21	89.99	15.80	16.07	3.10	55.02	10.01	17.67
Whole corn plant silage(WCS)	30.00	88.65	26.90	11.39	2.50	47.85	11.35	17.23
Dried Poultry manure (DPM)	92.50	80.30	13.90	24.00	2.45	39.97	19.70	16.16
Calculated chemical composition of experimental rations								
60%CFM+40%WCS(R1)	65.53	89.35	21.20	13.80	2.81	51.57	10.65	17.45
60%CFM+40%WCS+ 3% B(R2)	65.53	89.34	21.20	13.81	2.82	51.55	10.66	17.45
50%CFM+10%DPM+ 40%WCS(R3)	65.86	88.73	21.20	14.25	2.76	50.55	11.27	17.36
50%CFM+10%DPM+ 40%WCS+3%B(R4)	65.86	88.73	21.20	14.25	2.76	50.54	11.27	17.36
40%CFM+20%DPM+ 40%WCS(R5)	66.18	88.13	21.20	14.66	2.72	49.53	11.87	17.26
40%CFM+20%DPM+ 40%WCS+3%B(R6)	66.18	88.13	21.20	14.65	2.71	49.55	11.87	117.26
30%CFM+30%DPM+ 40%WCS(R7)	66.51	87.46	21.30	15.09	2.66	48.40	12.54	17.15
30%CFM+30%DPM+ 40%WCS+B(R8)	66.51	87.46	21.30	15.09	2.66	48.40	12.54	17.15

*Gross energy (GE) was calculated according to MAFF(1975) equation =GE Mj / kg DM=0.0226 CP+0.0407 EE+0.0192CF+0.0177 NFE where CP,EE,CF and NFE are expressed as g/kg, DM.

Table (2): The effect of DPM levels and bentonite supplementation on digestibility and nutritive values of experimental rations fed to rams.

Item	DPM Levels (%)				±SE	Bentonite		±SE
	0	10	20	30		without	with	
Digestion coefficients(%)								
DM	64.33a	63.88^{a}	63.50^{ab}	62.16^{b}	0.47	62.55^{b}	64.38^{a}	0.33
OM	67.85a	67.71^{a}	67.52^{a}	65.80^{b}	0.42	66.36^{b}	68.08^{a}	0.29
CP	73.82a	73.65^{a}	73.89^{a}	73.32^{a}	0.52	72.11^{b}	75.23^{a}	0.37
CF	47.21a	46.43^{ab}	46.67^{ab}	44.39^{b}	0.79	43.94^{b}	48.41^{a}	0.56
EE	77.58a	76.13^{b}	75.41^{b}	73.92^{c}	0.44	74.61^{b}	76.91^{a}	0.31
NFE	74.20a	74.47^{a}	74.14^{a}	72.53^{a}	0.58	73.79	73.87	0.41
Nutritive values(%)								
TDN	63.35a	62.69^{ab}	62.06^{b}	60.01^{c}	0.38	61.23^{b}	62.83^{a}	0.27
DCP	10.19^{d}	10.49^{c}	10.83^{b}	11.06^{a}	0.07	10.42^{b}	10.87^{a}	0.05

a-b: Means followed by different litters differ significantly at($p < 0.05$)

maize (22%), molasses (5%), limestone (3%) and common salt. (1%).

In additions, eight digestibility trials were conducted on 24 Rahmani rams averaged about 60 kg body weight and of 3 years old. Rahmani rams were selected from El-Serw Station Herd, then were divided into 8 equal groups (3 rams each). Each digestibility trial lasted for 42 days, at which 35 days were considered as a preliminary period for adapting the animals to the tested rations, followed by 7 days as a collection period. At the last day of the collection period of each digestion trial, rumen liquor samples were taken using rubber stomach tube before feeding and at 0,2,4,6 and 6 hrs post-feeding from three animals of each treatment. The collected rumen fluid samples were filtered through three layers of gause without squeezing for the determination of pH. Ruminal ammonia was determined according to Conway (1957). Total volatile fatty acids (TVFA's) were determined by the steam distillation method as described by Warner (1964).

At the end of the feeding trials, blood samples were taken in heparinized tubes from the jugular vein of growing lambs at 3 hours post-feeding.

Blood samples was separated by centrifugation at 4000 rpm for 10 minutes, then frozen at-20 Ċ until analysis for total protein, albumin, urea, creatinine, NH_3-N, glucose, cholesterol, GOT and GPT using kits and the methods reported by biochemistry (Biomerieux) laboratory reagents and products. Serum total globulin was calculated by difference.

At the end of the experimental period, 3 rams from each group were randomly taken for slaughtering.

The proximate chemical analysis of tested materials and faeces were analyzed according to A.O.A.C.(1995) procedures.

The statistical analysis was performed using the least squares method described by Likelihood programme of SAS (1994). The differences among means were carried out according to Duncan's New Multiple Rang Test (Duncan, 1955).

RESULTS AND DISCUSSION

Chemical composition

The results of chemical composition of the tested ingredients and calculated composition of consumed experimental rations are presented in Table (1). The obtained results indicate that the values of chemical nutrients of maize silage and DPM are more close to those recorded by El-Ayouty *et al.* (2000), El-Ashry *et al.*. (2000a) and Gabr *et al.*. (2001). Regarding the calculated chemical composition of the experimental rations, the obtained results in Table (1) indicate that, generally, most of chemical nutrients were practically similar, but the OM was decreased while CP and ash content were tended to increased with increasing rate of replacing CFM by DPM (Gabr *et al.*, 2001). Thus, the R_1 and R_2 (control rations) showed the lowest values of CP and ash content (13.8 and 10.66% respectively), but OM and NFE content were the highest (89.35 and 51.57%, respectively).

Digestibility coefficients and nutritive values:

The results in Table (2) show that replacing DPM up to 20% instead of CFM did not significantly affect most of digestibility coefficients of tested rations. When DPM reached at 30 % level, a significant reduction in digestibility was noticed for DM, OM, CF and EE, while digestibility of CP and NFE did not show difference compared with the control. Similar results were observed by El-Ashry *et al.* (1987); Abo El-Nor *et al.* (1993) and Nowar *et al.* (1997). The nutritive values expressed as TDN % was decreased with increasing DPM level. This decrease was significant at 30% DPM level, compared with other levels (0,10 and 20% DPM). These results are in accordance with those obtained by Reddy *et al.* (1990) with DPM in cow rations and El-Ashry *et al.* (2000a) with cage layer dropping (CLD) in sheep rations. The digestible crud protein (DCP) was significantly increased with increasing DPM in tested rations compared with control ration. (0% DPM). This could be explained as the physical and chemical nature of crude protein in DPM which is characterized by its high solubility, degradability and susceptibility to fermentation in the rumen (Gabr *et al.* 1991a). Similar results were reported by Gabr *et al.* (2001) who noticed that the DCP content was significantly higher with increasing DPM levels (0,15 and 35%) in Zaraibi goats rations.

Regarding the effect of bentonite clay on digestion coefficients, the results reveal that adding bentonite to sheep rations had a positive effect on digestibility of all nutrients as well as the TDN and DCP values as shown in Table (2). The present results are in agreement with the finding of Nowar *et al.* (1993), Abd El-Baki *et al.* (1995) and Ahmed (1999) with Rahmani rams and Zaraibi bucks received bentonite, tafla and kaolin supplemented rations.

These finding may suggest that adding clay at 3% level render the feeds more available for absorption during digestion, either by increasing the reactive surface areas of nutrients (Pulatov *et al.*, 1983) or improving feed utilization through slowing feed rate of passage through the digestive tract which reflected in better absorption (Ousterhout, 1967) or both.

The interaction between DPM levels and bentonite supplementation had no significant effect on the digestion coefficients of all nutrients and nutritive values(TDN and DCP)as well.

Ruminal parameters:

The effect of DPM levels, bentonite addition and sampling time on pH value, ammonia – N and total volatile fatty acids (VFA's) concentrations are presented in Table (3). The obtained results revealed that DPM levels did not significantly affect ruminal pH values. Similar results have been reported by Yildiz *et al.* (1995) when DPM was used at the same levels (0,10,20 and 30%) in sheep rations. Also, using bentonite had no significant effect on pH values (Table, 3) . Similarly, Hassona *et al.* (1995) reported that adding bentonite , tafla and kaolin had no effect on ruminal pH values of goats and sheep . But, the effect of sampling time (0,2,4 and 6 hrs) on pH values was significant. The maximum pH values were recorded at 0 hrs and gradually decreased to the minimum at 4 hrs post-feeding and tended to increase again thereafter at 6 hrs. The differences in pH values among all hours were significant.

The effect of DPM, bentonite and sampling time on ruminal ammonia-N concentration were significant as shown in Table (3) and Fig.(1). The ruminal NH3-N reached its maximum concentration at 2 hrs post-feeding in all treatments then followed by a relatively sharp decline in no clay rations (T_1,T_3, T_5 and T_7) and gradual decrease with clay rations(T_2,T_4,T_6 and T_8)with advancement of time. This may be due the capability of clays to adsorb ammonia through the first hours of post-feeding as reported by Marein *et al.* (1969) who stated that bentonite might adsorb ammonia from solution when its concentration in rumen fluid is high. If the adsorbed nitrogen can be released at a later time, when its concentration in

Table (3):The effect of DPM levels, bentonite supplementation and time on some ruminal parameters.

Item		pH values	NH_3-N (mg/100ml)	VFA's (meq./100ml)
DPM levels (%) :	0	6.58	22.62^{b}	9.23^{a}
	10	6.54	22.66^{ab}	9.15^{ab}
	20	6.55	22.70^{ab}	9.07^{ab}
	30	6.56	22.84^{a}	8.93^{b}
	SE	0.02	0.07	0.07
Bentonite:	Without	6.57	23.00^{b}	8.96^{b}
	With	6.55	22.40^{a}	9.23^{a}
	SE	0.01	0.05	0.05
Time (hrs)	0	6.92^{a}	16.47^{d}	7.55^{d}
	2	6.55^{b}	26.34^{a}	9.50^{b}
	4	6.35^{d}	25.28^{b}	10.61^{a}
	6	6.42^{c}	22.73^{c}	8.73^{c}
	SE	0.02	0.07	0.07

a-b: means bearing different letters in the same column are significantly different($P< 0.05$)

Table(4): Growth performance of lambs fed the experimental rations

Item	DPM Levels(%)				±SE	Bentonite		±SE
	0	10	20	30		without	with	
Initial LBW (kg)	22.00	22.07	22.29	22.36	0.60	22.00	22.36	0.42
FinalLBW(kg)	54.64	53.18	52.71	51.71	0.87	51.68^{b}	54.44a	0.62
Total gain(kg)	32.64^{a}	31.11^{ab}	30.42^{b}	29.35^{b}	0.60	29.68^{b}	32.08^{a}	0.42
Daily gain (ADG) (g)	181^{a}	173^{ab}	169^{b}	163^{b}	3.00	165^{b}	178^{a}	2.00

a,b: means bearing unlike letters in the same row are significantly different ($p<0.05$)

Table(5) Effect DPM levels and bentonite supplementation on daily feed intake* , feed conversion and feed cost for the experimental rations fed to lambs.

Item	Bentonite level	DPM levels			
		0%DBM	10%DPM	20%DPM	30%DPM
Total DMI g/h/d	0%	1391.93	1346.9	1314.15	1278.08
	3%	1384.33	1346.55	1307.5	1268.3
TDN intake g/h/d	0%	873.16	855.6	807.41	752.66
	3%	885.56	807.41	819.54	775.22
DCP intake g/h/d	0%	139.19	138.19	139.56	137.9
	3%	143.69	144.48	144.22	143.83
DBG g/h/d	0%	176.19	167.46	163.49	152.38
	3%	186.51	171.17	174.60	173.81
DM/kg gain	0%	7.90	8.05	8.05	8.39
	3%	7.42	7.58	7.51	7.32
TDN/kg gain	0%	4.49	4.98	4.94	4.85
	3%	4.75	4.81	4.71	4.48
DCP/kg gain	0%	0.79	0.83	0.86	0.91
	3%	0.77	0.81	0.83	0.84
DM intake $g/kg^{0.75}$	0%	91.45	89.67	88.08	87.27
	3%	88.85	87.6	84.96	82.53
Feed cost/kg gain(LE)	0%	4.00	3.80	3.43	3.22
	3%	3.78	3.57	3.21	2.82

* Group feeding

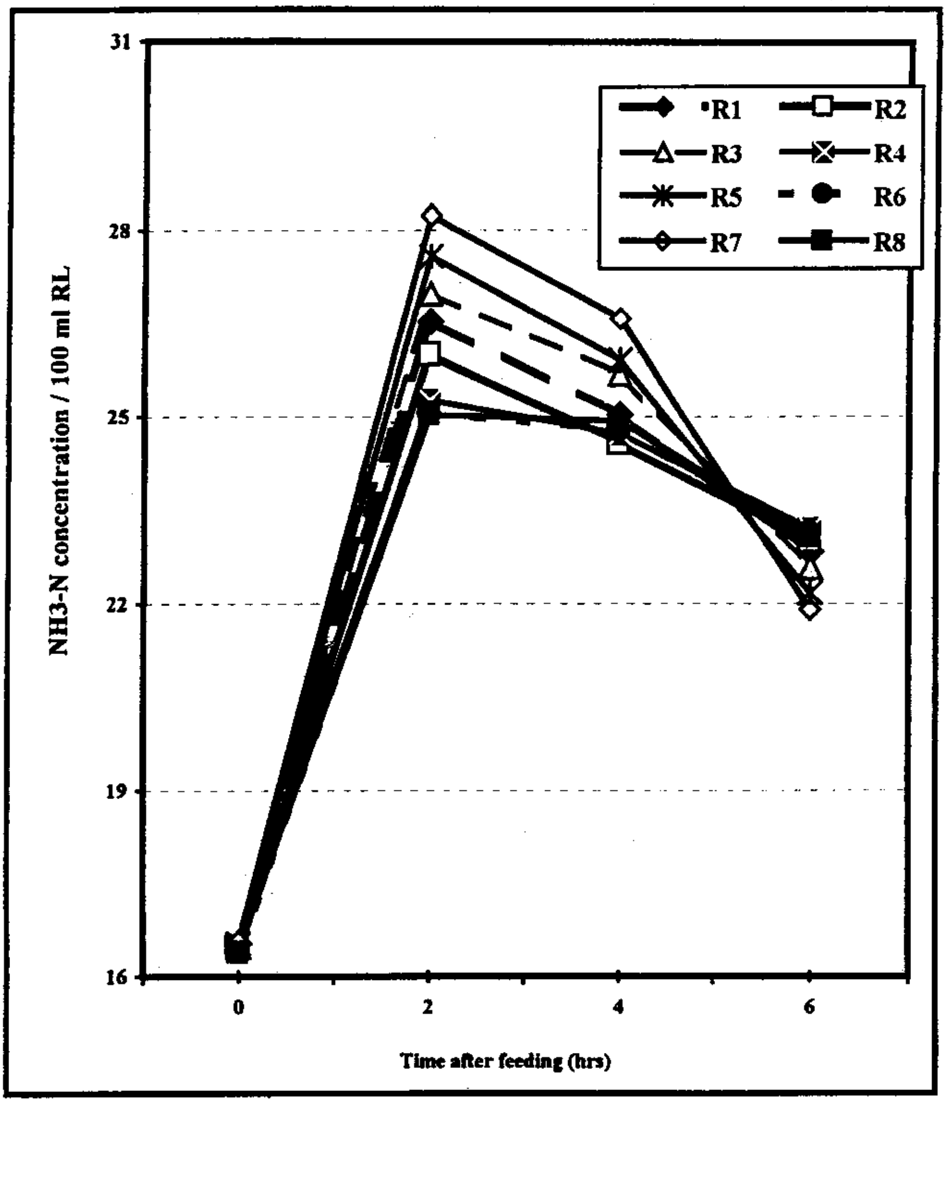

Fig (1): Effect of feeding the experimental rations on ruminal ammonia-N concentration with sheep

rumen fluid decreased, protein synthesis could be extended over a long period of time. Similar results were achieved by, Aiad (1990) and Galal (1997).

Results in Table (3) indicate that there is no significant differences between control rations (0 % DPM) and the lower DPM levels (10 and 20 %) on TVFA's concentration. But, with ration containing 30%DPM level, TVFA's concentration was significantly decreased. Similar observations were obtained by Chen and Jan (1992) and Unal *et al.* (1992) and Ko *et al.* (1990). The results show also that addition of bentonite had significantly increased TVFA's concentration in ruminal fluid of sheep. This observation is in harmony with the finding of Galal (1997) and Ahmed (1999). In the same line, the effect of sampling time on ruminal TVFA's concentrations was significant. The highest values of TVFA's concentration was at 4 hrs post-feeding which was reflected on lowering pH values at that time. Similar results were given by Gabr *et al.* (2001)

Growth performance

The effect of DPM levels and bentonite supplementation on growth performance of lambs is presented in Table (4). The results show that daily body gain (DBG) was retarded significantly in animals fed rations contained DPM at 20 and 30% levels (169 and 163 g/h/d vs. 181 g/h/d). Replacement CFM with DPM at lower level (10%) also reduced growth rate, as being 173 g/h/d, but difference was not significant. Similar results were observed by Abd El-Gawad (1989). El-Ashry *et al.* (2000b) found that the DBG of lambs were significantly lower for animals given poultry dropping (88.6 g/h/d) than those fed linseed meal (153.0 g/h/d) only as a major source of protein. Moreover, Gabr *et al.* (1993) tested rates of replacement with DPM (50 and 75 %) in rations of growing lambs and found insignificant reduction in daily gain (106 and 105 vs. 118 g/h/d).

On the other hand, addition of bentonite had a significant impact in increasing DBG (from 165 to 178 g/h/d). Similar results were reported by Ahmed *et al.*. (2002) with growing lambs, and Hassona (1995) and Ahmed *et al.* (2000) with growing goats. The improvement in small ruminant rations as result to presence of clays may be attributed to the role of clays on decreasing rate of passage, increasing NH_4 ion exchange (Grim, 1968), increasing digestibility and absorption of nutrients (Abd El-Baki *et al.*, 1995 and Ahmed, 1999) or its reaction with dietary protein and forming a complex compound which has a retarding effect on protein degradability and improving nitrogen utilization (Britton *et al.*, 1978).

As for feed conversion efficiency (feed/gain), the obtained results indicated that increasing DPM level had negative effect on feed conversion expressed as kg DM/kg gain since it tended to be increased as the DPM level increased as shown in Table (5). When feed conversion based on DCP, it was noticed that sizes of differences were greatly reduced especially with rations supplement with bentonite. Similar results have been reported by Stock *et al.* (1987) and El-Ashry *et al.* (2000b) since they reported that using poultry excreta in ruminant rations had negative effects on efficiency of feed utilization. However, El-Ashry *et al.* (2000a) found that the effect of replacing CFM by caged layer dropping at 0,17 and34% on feed efficiency (kg DM/kg gain) was not significant. Results in Table (5) showed that the feed conversion (DM, TDN and DCP/kg gain) of lambs was improved with adding bentonite to all rations (with or without DPM). These results are in agreement with those obtained by Nower *et al.* (1993) with growing sheep. The values of feed cost/kg weight gain were 4.00,3.80,3.43 and3.22 for lambs given rations containing DPM at 0,10, 20 and30% respectively and the corresponding values (with 3% bentonite) were 3.78,3.57, 3.21 and 2.82. Thus, feed cost/kg weight gain were reduced (by 41.8%) with 30%DPM in presence of bentonite (Ration 8). These results are in accordance with those obtained by Hassona *et al.* (1995) and Ahmed *et al.* (2000)

Blood constituents:

Effect of DPM levels and bontonite addition on some blood components are presented in Table (5). The results reveal that tested blood constituents were not significantly affected by DPM levels. Such result could indicate that inclusion of DPM had no adverse effects on blood components which satisfactory could suggest quite equal health condition. The obtained values of blood components are within the normal range recorded by Gabr *et al.* (1999&2001) for small ruminants. The results in Table (6) indicate also that most of blood constituents were not significantly affected with adding of bentonite to the tested rations. However, adding of the bentonite clay to lambs rations, induced significant decrease in blood ammonia and urea as shown in Table (6). This may be associated with the lower ($P < 0.05$) ruminal NH3-N of sheep fed bontonite clay rations than those fed the unsupplemented ones (Table 3). The response shown by these animals was quite similar to that reported by Gabr *et al.* (2001) as well as Mabjeesh *et al.* (1996) who found a close positive relationship between blood urea- N and ruminal NH3-N concentration of lactating dairy cows. These results are in line with those reported by Hassona *et al.* (1995) who found that adding bentonite, kaolin and tafla clay to NPN rations fed to growing lambs and kids led to reducing blood ammonia and urea than the control.

Carcass characteristics:

The data of dressing percentage and carcass cuts weights of Rahmani lambs fed the experimental rations are presented in Table (7). The difference among DPM levels in fasting and carcass weights as well as dressing percentage were not statistically significant. The highest values of carcass weight and dressing percentage were recorded with 20 % DPM, followed by 10 % DPM, however, the lowest values were detected with 30 % DPM as well as control ration (0 % DPM). Similar trend was reported by Rodriguez *et al.* (1989) with growing lambs fed rations containing 10,20 or 30 % poultry litter. Regarding the effect of bentonite clay on fasting and carcass weight and dressing percentage, the results reveal that adding bentonite to lamb rations had a positive effect on previous parameters. The same results were observed also with Allam *et al.* (2002) with both bentonite and aluminosilicate in Rahmani lambs rations.

The effect of DPM levels on most of carcass cuts weights was not significant as shown in Table (7). Only the difference in flank weight had been differed significantly ($P<0.05$), where DPM levels of 10&20% had the least weight (0.48 and 0.45 kg, respectively) while feeding the high level (30%) gave the highest weight (0.62 kg). The same trend was observed by Chen and Jan (1992) with goats given rations containing 0,15,30 and 45% dried poultry waste. But Sayed, (1996) found that carcass cuts as shoulder, loin, neck rack and brisket weights were decreased for groups received yellow corn with poultry

Table (6):Effect of DPM levels and bentonite supplementation on some blood parameters of growing lambs fed on theexperimental rations.

Item	DPM Levels(%)				±SE	Bentonite		±SE
	0	10	20	30		without	with	
Glucose(mg/100ml)	70.67	67.50	65.67	64.17	3.36	65.00[a]	69.0[a]	2.38
Urea(mg/100ml)	40.33	41.00	40.33	43.67	1.00	43.33[a]	39.33[b]	0.71
Cholesterol(mg/100ml)	72.83	78.50	74.33	75.67	3.23	76.50[a]	74.17[a]	2.28
GOT(IU/L)	61.83	65.31	66.17	66.33	2.06	66.50[a]	63.33[a]	1.46
GPT(IU/L)	16.50	15.00	16.33	16.67	1.33	16.83[a]	15.42[a]	0.94
Total protein(g/100ml)	6.92	7.00	7.03	6.92	0.11	7.03[a]	6.90[a]	0.08
Albumin(A)g/100ml	3.65	3.78	3.87	3.93	0.09	3.88[a]	3.74[a]	0.06
Globulin(G)g/100ml	3.20	3.20	3.15	2.98	0.12	3.12[a]	3.15[a]	0.09
A/G(ratio)	1.17	1.20	1.25	1.33	0.06	1.28[a]	1.20[a]	0.04
Creatinine(mg/100ml)	0.79	0.81	0.82	0.83	0.03	0.82[a]	0.80[a]	0.02
Ammonia-N(mg/100ml)	0.44	0.44	0.47	0.48	0.02	0.48[a]	0.43[b]	0.01

a, b means bearing unlike letters in the same row are significantly different($P < 0.05$)

Table (7): The effect of DPM levels and bentonite supplementation on dressing percentage and carcass cuts of lambs fed on the experimental rations

Item	DPM Levels (%)				±SE	Bentonite		±SE
	0	10	20	30		Without	with	
Fasting wt kg	57.86	55.33	56.83	57.00	2.29	56.08	57.33	1.62
Hot Carcass wt kg	25.86	26.17	27.01	25.93	1.09	25.74	26.74	0.77
Dressing A%*	44.87	47.21	50.14	46.86	1.62	46.70	47.83	1.14
Dressing B%**	51.35	53.64	56.04	53.01	2.04	53.00	54.02	1.44
Carcass cut weight. Kg								
Shoulder	4.30	4.13	4.26	4.41	0.16	4.17	4.38	0.11
Leg	7.92	7.97	8.19	7.53	0.41	7.77	8.03	0.29
Loin	1.67	1.50	1.91	1.63	0.13	1.78	1.57	0.09
Neck	1.87	2.01	1.83	1.97	0.15	1.89	1.95	0.10
Rack	5.31	5.71	5.25	4.98	0.36	5.14	5.48	0.26
Brisket	1.05	1.03	1.00	0.96	0.08	1.00	1.02	0.05
Flank	0.54[ab]	0.48[b]	0.45[b]	0.62[a]	0.04	.048[b]	0.57[a]	0.03
Tail	3.21	3.54	4.05	3.87	0.35	3.57	3.77	0.24
Prime %	74.31	73.72	72.76	71.59	1.62	73.44	72.74	0.86
Carcass cuts as % from carcass weight								
Shoulder %	16.64	15.87	16.26	17.03	0.39	16.24	16.66	0.28
Leg %	30.62	30.43	30.31	29.05	1.01	30.18	30.02	0.71
Loin %	6.49[ab]	5.73[b]	7.02[a]	6.31[ab]	0.39	6.91[a]	5.87[b]	0.28
Neck %	7.18	7.14	6.84	7.61	0.47	7.03	7.35	0.33
Rack %	20.56	21.71	19.66	19.20	0.88	20.13	20.44	0.62
Brisket %	4.04	3.91	3.70	3.64	0.21	3.84	3.80	0.15
Flank %	2.08[b]	1.85[b]	1.66[b]	3.04[a]	0.24	1.87[b]	2.44[a]	0.17
Tail %	12.40	13.39	15.11	14.13	1.13	13.85	13.66	0.80

a-b: Means followed by different litters differ significantly at ($P<0.01$)

* :(Hot carcass weight/ fasting body weight) x100

** :(Hot carcass weight/ empty body weight) x100

Table (8): Effect of DPM levels and bentenite supplementation on lambs fed different experimental rations.

Item	DPM levels(%)				±SE	Bentenite		±SE
	0	10	20	30		without	with	
Fasting weight, kg	57.9	55.3	56.8	57.0	2.29	56.1	57.3	1.62
Hot carcass weight, kg	25.9	26.2	27.0	25.9	1.09	25.7	26.7	0.77
Pelt weight, kg	6.4	5.4	5.9	6.1	0.25	6.04	5.8	0.18
Leg weight, kg	1.21	1.15	1.08	1.20	0.03	1.16	1.16	0.02
Head weight, kg	3.7	3.5	3.5	3.6	0.13	3.60	3.59	0.09
G.L. full weight, kg	11.4	10.41	10.40	10.01	0.46	10.36	10.72	0.32
G.L. empty weight, kg	4.1	3.8	3.8	3.6	0.12	3.8	3.8	0.09
Internal fat. wt, kg	0.41	0.54	0.64	0.61	0.09	0.57	0.53	0.06
Kidney fat. wt, kg	0.10	0.16	0.14	0.12	0.02	0.14	0.13	0.02
Testes wt. ,kg	0.38	0.34	0.41	0.37	0.03	0.37	0.38	0.02
Spleen weigh, t kg	0.08	0.07	0.07	0.06	0.01	0.07	0.07	0.01
Kidney weight, kg	0.13	0.13	0.12	0.13	0.01	0.13	0.13	0.004
Heart weight, kg	0.16	0.19	0.20	0.23	0.02	0.19	0.21	0.01
Liver weight kg	0.74	0.74	0.69	0.68	0.04	0.68	0.75	0.03
Lungs and tracia, kg	0.67	0.63	0.67	0.59	0.05	0.63	0.65	0.004
Total offales*,kg	2.33	2.10	2.15	2.06	0.12	2.06	2.26	0.08
Total offals as% from fasting weight	4.04	3.78	3.90	3.73	0.16	3.72	4.00	0.29
Liver as % from fasting weight	1.27	1.33	1.21	1.14	0.14	1.21	1.30	0.29

*:Liver, Kidney, Testes, Spleen, Heart, Lungs and Tracia

Teble (9): Effect of DPM levels and bentonite supplementation on chemical composition of carcass of growing lambs fed on the experimental rations.

Item	DPM levals (%)				SE	Bentonite		±SE
	0	10	20	30		without	with	
Moisture	71.23	71.93	72.25	72.33	0.46	71.96	71.92	0.32
Chemical composition(on DM basis %)								
CP	72.25	72.78	73.94	72.95	0.96	73.03	72.92	0.68
EE	23.44	22.57	21.60	22.87	1.80	22.38	22.86	0.57
Ash	4.32	4.64	4.46	4.19	0.28	4.59	4.21	0.20

dropping ration. .As for the effect of bentonite clay, it was not significantly affected either cuts (shoulder, leg, lion, neck, rack, brisket and tail) or prime cuts (Table, 7) while of significant effect only as it increased flank weight (0.57 kg), compared to the control ration (0.48 kg). Similar results were observed by Marai *et al.* (1997) who found that the carcass cuts (neck, rack, loin, legs, brisket and flank) and prime cuts were not significantly differed by adding clays.

In the same line, the obtained results reveal that the average weight of different offals and organs were not significantly affected by DPM levels, B supplementation and their interaction as shown in Table (8). Similar results were observed by EL-Hakim *et al.* (1994) with sheep fed bentonite supplemented rations and Assem(2000)with sheep fed rations containing NPN with or without tafla clay.

The chemical composition of eye muscle samples (L.D.) taken between the 9,10 and 11th ribs of carcass of fattened lambs are shown in Table (9). The statistical analysis showed insignificant effect for either DPM level and bentonite clay on meat component studied. The estimates of chemical composition of meat in the present study are within the normal range reported by Sayed (1996), El-Reweny (1999) and Assem (2000). The effect of bentonite treatment on chemical composition of meat was not significant as shown in Table (9). El-Hakim *et al.* (1994) observed that average of moisture, CP, EE and ash contents of eye muscle were nearly similar among different groups fed rations supplemented with or without bentonite.

It could be concluded that DPM-protein could be economically and successfully replace up to 30 % of total CP requirements of growing Rahmani lambs (with addition 3% bentonite) without adverse effect on digestibility, daily gain and carcass quality as well as blood constituents or animal health in general. The effect of bentonite at level of 3 % was positive on all parameters studied with all tested rations (with or without DPM).

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الأداء الإنتاجى وصفات الذبيحة للأغنام الرحمانى المغذاة على علائق محتوية على زرق الدواجن المجفف مع إضافة البنتونيت

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أجريت هذه الدراسة بهدف دراسة أثر إحلال بروتين العلف المركز ببروتين زرق الدواجن المجفف مع أو بدون إضافة البنتونيت فى علائق الأغنام الرحمانى النامية على القيم الهضمية والأداء الإنتاجى وجودة الذبيحة. حيث تم استخدام عدد ٥٦ ذكر رحمانى عمر٣-٤ شهور بمتوسط وزن ٢٢,٢ كجم حيث قسمت إلى ٨ مجموعات متساوية فى العدد(٧ حملان فى كل مجموعة) تبعاً لوزن الحيوانات.

ولقد غذيت كل مجموعة على سيلاج الأذرة بالكيزان كمصدر وحيد للمادة الخشنة ليغطى ٤٠% من الاحتياجات البروتينية اللازمة للنمو، وتم تغطية الـ٦٠% الباقية من العلف المركز(عليقة١)&العلف المركز+بنتونيت٣% (عليقة ٢)،٥٠% علف مركز+١٠%زرق دواجن مجفف(عليقة٣)& عليقة(٣)+٣% بنتونيت(عليقة٤)&٤٠% علف مركز+٢٠%زرق دواجن مجفف(عليقة٥)&عليقة(٥)+٣%بنتونيت(عليقة٦)&٣٠%علف مركز+٣٠%زرق دواجن مجفف(عليقة٧)&عليقة(٧)+٣%بنتونيت(عليقة٨).وتمت التغذية لمدة١٨٠ يوم،وتم تقيم القيمة الغذائية للعلائق السابقة بإجراء عدد٨ تجارب هضم مع الكباش التامة النمو.

وأوضحت النتائج إلى أن استخدام زرق الدواجن بمستوى٣٠%بدون بنتونيت أدى إلى انخفاض معنوى فى معاملات هضم المادة الجافة والعضوية والألياف الخام والدهن الخام فيما عدا البروتين الخام الذى لم يتأثر معنوياً،ومع إضافة البنتونيت أدى ذلك إلى تحسن ايجابى فى كل معاملات الهضم، أما بالنسبة لتجارب النمو فقد أدى إضافة البنتونيت أيضا مع المستوى ٣٠% زرق الدواجن المجفف إلى تحسن معنوى فى معدل الزيادة الوزنية اليومية وكذلك معدل التحول الغذائى وكذلك خفض تكلفة الغذاء اللازم لإنتاج كجم نمو مقارنة بالعليقة المقارنة ولم يؤثر معنوياً كل من مستوى الزرق أو إضافة البنتونيت على جودة قطعيات الذبيحة أو الأعضاء الداخلية ونسبة التصافى.

يتضح من الدراسة أن استخدام زرق الدولجن المجفف وإحلاله بمعدل ٣٠% من بروتين العلف المركز اللازم لنمو الأغنام الرحمانى مع إضافة البنتونيت بمعدل ٣% للعلائق المستخدمة لم يؤثر سلبياً على الهضم أو الزيادة الوزنية اليومية أو صفات الذبيحة وكذلك مكونات الدم وصحة الحيوانات بصفة عامة ، وكان لاستخدام البنتونيت تأثير إيجابى مع كل القياسات التى أجريت مع العلائق المختبرة سواء كان بها زرق دواجن أم لا.