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EFFECTS OF GROUND DATE SEEDS AS A PARTIAL REPLACER OF GROUND MAIZE ON NITROGEN METABOLISM AND ANIMAL PERFORMANCE OF SHEEP

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ABSTRACT

Digestibility and feeding trials were conducted to investigate the effect of ground date seeds (GDS) as a partial replacer for ground maize (GM) on nutritive values, nitrogen metabolism, and lambs performance. Four mature Ossimi rams of 40 ± 1.45 kg live body weight (LBW) were used in digestibility trials and sixteen Ossimi growing male lambs with an average LBW of 19.88 ± 0.86 kg were used in group feeding experiment for 120 days. The diets used in both experiments were concentrate feed mixture (CFM) + wheat straw (WS) that represent 1% of LBW as a control diet (D1), while 15, 30 and 45% of ground maize (GM) in (CFM) were substituted by ground date seeds (GDS) for diet 2 (D2), diet 3 (D3) and diet 4 (D4), respectively. The results of the digestibility trials revealed that replacing the GM with 15, 30 or 45% GDS was associated with a significant increase in CP, EE, CF and NFE digestibilities. The corresponding nutritive value expressed as total digestible nutrients (TDN), starch value (SV) and digestible crude protein (DCP) % were increased significantly ($P \leq 0.05$) with GDS inclusion the diet.

There was significant ($P \leq 0.05$) increase in nitrogen balance (NB) with GDS treatments compared to the control group. Also nitrogen absorption (NA) was increased significantly ($P \leq 0.05$) in the diets containing GDS, the values were 11.90, 12.13, 12.14 and 12.23 g / day for D1, D2, D3 and D4, respectively.

Significant increase ($P \leq 0.01$) were recorded in total gain and daily gain for lambs fed containing GDS diets. Total dry matter consumed along the whole feeding period was significantly differed ($P \leq 0.01$) among groups, being 129.84, 135.91, 139.39 and 143.51 kg for D1, D2, D3 and D4, respectively. Feed conversion ratio expressed as kg feed / kg gain was in favor of lambs fed D3 (6.49) than those fed D2 (6.71) compared with 6.83 for D1 and 7.18 for D4. The economical view was improved ($P \leq 0.01$) due to GDS inclusion in the diets. Results indicated that ground date seeds could be used up to 30 % of the ground maize in the feed mixture of sheep without any adverse effects.

Keywords: Sheep, ground date seeds, animal performance and nitrogen metabolism.

INTRODUCTION

In recent years, the price of energy sources had increased dramatically with the increase of demand for feeding of animals. The increases of feed prices encouraged nutritionists to search for cheaper high energy feed ingredients. In Egypt, the amount of date palm trees averaged 11.2 million trees, which produced 1.17 million ton of date and 174.93 thousand ton seeds which increased the supply of agro-industrial by products for livestock feeding (Ministry of Agriculture, 2004). Ground date seeds are considered as medium grade protein feed and important source of energy. It

contains 7.0 to 8.0% crude protein and 73.19 % TDN (AL-Yousef *et al*., 1994). In Egypt, during summer season, the available feeds (mainly CFM and straws) cover only 39 % and 22 % of the animal requirements of energy and protein, respectively (EL-Serafy, 1991). Replacing the concentrate with 10 or 20 % date deeds was associated with a non significant decrease in daily gain for growing lambs (AL-Dabeeb, 2005). Moreover, Soliman *et al*. (2006) revealed that rations containing 40 and 60 % date seeds as a replacer for ground maize (GM) increased the digestibility coefficients of feed nutrients, daily gain and economical efficiency of lambs. The main objectives of this study were to investigate the effects of feeding ground date seeds (GDS) as a partial replacer for ground maize (GM) in concentrate feed mixture (CFM) on nutritive value, nitrogen metabolism and performance of fattening lambs**.**

MATERIALS AND METHODS

This work was conducted at the Agricultural Research Institute, Mallawy Research Station, El-Minia, Mallawy, Egypt, while the laboratory analysis was done in Faculty of Agric., El-Minia University.

Preparation of CFM:

Concentrate feed mixture (CFM1) of the control diet (D1) was consisted of 35 % ground maize, 30 % undicorticated cotton seed meal, 15 % wheat bran, 12 % rice bran, 5 % molasses, 2 % limestone and 1 % common salt. All feed ingredients were purchased from the local market. Portions of the ground maize (GM) being 15, 30 and 45 % were replaced (weight by weight on DM basis) by ground date seeds (GDS) for CFM2, CFM3 and CFM4, respectively as illustrated in Table (1). The ingredients of each diet were mixed together and pelleted separately.

Digestibility trials:

Four mature Ossimi rams averaged of 40 ± 1.45 kg LBW were used to estimate the digestibility coefficients of diets containing 0, 15, 30 and 45 % date seeds as replacements of GM portion of the control diet. Animals were fed wheat straw at 1 % of their live body weight and the rest was at 3 % of their live body weight (DM basis) was covered from one of the above mentioned concentrate feed mixtures. The experiment was performed in four stages, three weeks of each, in latin square design. Animals were kept in individual metabolic cages. Each trail lasted 21 days, 14 days as preliminary period followed by 7 days for total fecal and urine collection. Diets were offered twice daily at two equal portions at 09.00 a.m. and 4.00 p.m. Fresh water was freely available in front of animals in each cage. Minerals and vitamins blocks were fixed among cages to enable animals for licking whenever they require. Daily excreted feces were weighed, sampled (10 % of the total daily collection) and dried at 70C° for 24 hours. At the end of collection period, the seven days, dried fecal samples of each ram were mixed, grind and kept in tietly tied nylon bags for laboratorial analysis. Daily acidified urine volume was measured, then 5 % representative samples were collected and used for daily urinary N- determination for each animal.

Group feeding experiment:

Sixteen growing male Ossimi lambs, four months age with 19.88 ± 0.86 kg LBW as an average initial body weight were used in this experiment for 120 days, they were divided into four groups each of 4 animals. Groups 1, 2, 3 and 4 were fed on CFM1, CFM2, CFM3 and CFM4, respectively + WS as 1 % of their LBW. Amounts of feeds were adjusted according to body weight changes every two weeks. Feeds were offered twice daily at 9.0 a.m. and 4.0 p.m. in two equal portions. Water was freely available along the experimental period. Lambs were weighed every two weeks before feeding. Total gain was determined by differences between final and initial body weight. Daily gain was obtained by dividing total gain by the days of feeding in the experiment. Total dry matter consumption and feed conversion were also calculated.

Laboratorial analysis:

Proximate analysis of feeds and feces were carried out according to the AOAC. (1990) for dry matter (DM), crude protein (CP), crude fiber (CF), ether extract (EE) and ash.

Economical evaluation:

Simple economical evaluation was adapted as the difference between feed costs and price of produced body weight gain (BWG). The price of body weight gain was calculated at the prevailing market price of 1 kg LBW. The cost of feeding was calculated, considering that the local price of one ton of CFM1, CFM2, CFM3, CFM4 and wheat straw on DM basis were 1050, 1018, 987, 955 and 300 LE, respectively.

Statistical analysis:

Statistical analysis was performed using General Linear Models (GLM) procedure of SAS system (1998).

RESULTS

Proximate analysis:

The constituents of the experimental CFM's were illustrated in Table (1). However, the proximate analysis of the feed ingredients and the experimental diets (DM basis) are presented in Table (2). Ground date seeds (GDS) is relatively lower in nitrogen free extract (NFE) as compared with ground maize (GM). The values were 69.85 *vs*. 82.65 %. Crude protein (CP) content in GDS was relatively lower than GM being (7.51 *vs*. 8.95 %), while ether extract (EE) content in GDS (3.12 %) was slightly higher than GM (2.36 %). Crude fiber content of GDS was about 4 times that of GM. Organic matter (OM), crude protein (CP) and ether extract (EE) of CFM1, CFM2, CFM3 and CFM4 were almost the same, while CF was increased and NFE was decreased as the portion of GDS was increased. The values of CF were 15.45, 16.07, 16.68 and 17.30 %, while the values of NFE were 60.93, 60.26, 59.59 and 58.91 % for CFM1, CFM2, CFM3 and CFM4, respectively.

Table (1): Concentrate feed mixture composition of the experimental diets (% of ingredients on DM basis).

Ingredients %	Experimental CFM			
	CFM1	CFM2	CFM3	CFM4
Yellow maize	35	29.75	24.5	19.25
Date seeds	---	5.25	10.5	15.75
Undicorticated cotton seed meal	30	30	30	30
Wheat bran	15	15	15	15
Rice bran	12	12	12	12
Molasses	5	5	5	5
Limestone	2	2	2	2
Common salt	1	1	1	1
Total	100	100	100	100

CFM1, 2, 3 and 4 = Concentrate feed mixtures fed to groups 1, 2, 3 and 4, respectively.

Table (2): Proximate analysis of feed ingredients, experimental concentrate mixtures and diets.

Ingredients	DM	Nutrients % (DM basis)					
		OM	CP	CF	EE	NFE	Ash
Ground maize(GM)•	88.01	97.85	8.95	3.89	2.36	82.65	2.15
Ground date seeds (GDS)•	95.12	96.13	7.51	15.65	3.12	69.85	3.87
Wheat straw (WS)•	89.04	88.12	2.98	33.42	1.25	50.47	11.88
CFM1○	89.57	91.55	12.87	15.45	2.30	60.93	8.45
CFM2○	89.94	91.46	12.79	16.07	2.34	60.26	8.54
CFM3○	90.32	91.37	12.72	16.68	2.38	59.59	8.63
CFM4○	90.69	91.28	12.64	17.30	2.42	58.92	8.72
Diet 1ɵ	89.44	90.69	10.40	19.94	2.04	58.31	9.31
Diet 2ɵ	89.72	90.62	10.34	20.41	2.07	57.80	9.38
Diet 3ɵ	90.00	90.56	10.28	20.87	2.10	57.31	9.44
Diet 4ɵ	90.28	90.49	10.23	21.33	2.13	56.80	9.51

● = Feed ingredients, ○ = Concentrate feed mixtures and ɵ = Experimental diets.
DM = Dry matter, OM = Organic matter, CP = Crude protein, CF = Crude fiber, EE = Ether extract and NFE = Nitrogen free extract.

Nutrients digestibility:

Digestibility coefficients of OM, CP, CF, EE, NFE are presented in Table (3). Insignificant ($P \geq 0.05$) decrease was recorded for OM digestibility, the values were 64.54, 63.43, 62.7 and 62.43 % for D1, D2, D3 and D4, respectively. In contrast, significant ($P \leq 0.01$) increases were observed for CP as GDS was increased in the diet. The difference between D1 and D4 in crude fiber digestibility was significant ($P \leq 0.05$). Considering the EE digestibility, the differences between each of D4 and D3 on one side and D1 on the other side was significant ($P \leq 0.05$). Digestibility of NFE in D1 (70.61) was significantly ($P \leq 0.05$) lower than the other diets D2 (73.07), D3 (74.32) and D4 (75.25) %.

Nutritive values

Table (3) illustrates the nutritive value expressed as total digestible nutrients (TDN %), starch value (SV %) and digestible crude protein DCP %

of the experimental diets. Significant (*P ≤ 0.01*) increases were recorded for TDN and (*P ≤ 0.05*) for SV or DCP % in animals fed diets containing GDS than control diet. The TDN values were increased significantly (*P ≤ 0.01*) as the proportion of GDS was increased in the diets. Significant (*P ≤ 0.05*) increase in starch value % was found among D3 and D4 *vs.* D1. The values were 48.64 and 48.84 *vs*. 46.79 %. A significant increase (*P ≤ 0.05*) was found between D4 and D1 in DCP g / day.

Table (3): Digestibility coefficients and nutritive values of experimental diets fed by sheep.

Items	Diets©				± SE
	D1	D2	D3	D4	
Dry matter digestibility %	60.38	62.38	60.03	59.51	0.94^{NS}
Organic matter digestibility %	64.54	63.43	62.70	62.43	0.92^{NS}
Crude protein digestibility %	64.67^{b}	66.43^{a}	66.87^{a}	67.70^{a}	0.52^{**}
Crude fiber digestibility %	40.17^{b}	40.80^{ab}	41.67^{ab}	41.87^{a}	0.48^{*}
Ether extract digestibility %	73.40^{b}	74.20^{ab}	74.70^{a}	74.50^{a}	0.29^{*}
Nitrogen free extract digestibility %	70.61^{b}	73.07^{a}	74.32^{a}	75.25^{a}	0.77^{*}
Nutritive values					
Total digestible nutrients %	59.27^{b}	60.89^{a}	61.69^{a}	62.16^{a}	0.46^{**}
Starch value and %	46.79^{b}	48.12^{ab}	48.64^{a}	48.84^{a}	0.46^{*}
Digestible crude protein g / day	74.35^{b}	75.82^{ab}	75.90^{ab}	76.43^{a}	0.59^{*}
Digestible crude protein g / kg BW / day	1.85^{b}	1.89^{ab}	1.90^{ab}	1.91^{a}	0.01^{*}
Digestible crude protein %	10.88^{b}	11.37^{ab}	11.54^{a}	11.68^{a}	0.18^{*}

±SE = Standard error, NS = Not significant, * = *(P < 0.05)*, ** = *(P < 0.01)*.
© Means in the same row with different letters significantly (*P ≤ 0.05*) differ.

Nitrogen metabolism

Results of nitrogen metabolism are illustrated in Table (4). Total crude protein intake (TCPI g / day) and consequently total nitrogen intake (TNI) were gradually and significantly decreased (*P ≤ 0.01*) as GDS was increased tin diets. The values were 115.00, 114.13, 113.50 and 112.88 g / day for D1, D2, D3 and D4, respectively for TCPI and 18.40, 18.26, 18.16 and 18.06 TNI g / day for D1, D2, D3 and D4, respectively. The same trend was recorded for fecal nitrogen (FN), but urine nitrogen was insignificantly decreased as GDS inclusion in the diet was increased. However, a significant (*P ≤ 0.05*) increase between diets D1 and D4 was recorded in nitrogen balance (NB). The values of NB were increased as GDS proportion was increased in the diet. The values were 3.36, 4.49, 4.77 and 5.12 g / day for D1, D2, D3 and D4, respectively. The values of N-balance / N-absorbed (the biological values) were also improved as GDS inclusion was increased.

Table (4): Nitrogen metabolism by sheep fed diets containing different levels of ground date seeds.

Items	Diets©				± SE
	D1	D2	D3	D4	
Total crude protein intake g /day	115.00^{a}	114.13^{b}	113.50^{c}	112.88^{d}	0.001**
Total nitrogen intake g /day	18.40^{a}	18.26^{b}	18.16^{c}	18.06^{d}	0.001**
Fecal nitrogen g /day	6.50^{a}	6.13^{ab}	6.02^{b}	5.61^{c}	0.19**
Nitrogen absorbed g /day	11.90^{b}	12.13^{ab}	12.14^{ab}	12.23^{a}	0.09*
Urine nitrogen g /day	8.54	7.64	7.37	7.11	0.49^{NS}
Total nitrogen excretion g /day	15.04^{a}	13.77^{ab}	13.39^{b}	12.94^{b}	0.52*
Nitrogen balance g /day	3.36^{b}	4.49^{ab}	4.77^{ab}	5.12^{a}	0.51*
Biological value	0.28^{b}	0.37^{a}	0.39^{a}	0.41^{a}	0.04*

±SE = Standard error, NS = Not significant, * = *(P < 0.05)* and ** = *(P < 0.01)*.
© Means in the same row with different letters significantly (*P ≤ 0.05*) differ.

Group feeding experiment

Data of group feeding experiment are presented in Table (5). Insignificant differences were detected among groups for final body weight. The differences in total weight gain (TWG) and daily gain (DG) were increased significantly (*P ≤ 0.01*) as GDS proportion was increased in the diet until 30 % replacement level. The highest values of TWG and DG were shown for D3 (21.50 kg and 179.33 g / day, respectively). The intermediate values were recorded for D2 and D4 (20.25 and 20.00 kg for total gain and 168.75 and 165.92 g for daily gain, respectively). While the lowest total gain and daily weight gain were recorded for D1 (19.00 kg and 158.33 g / day). Therefore, the feed conversion values expressed as kg DM intake / kg gain were improved from 6.83 for D1 to 6.71 and 6.49 for lambs fed D2 and D3. The feed conversion was the lowest significantly (*P ≤ 0.01*) when D4 was fed in comparison with D2 and D3.

Table (5) : Performance of lambs fed the experimental rations.

Items	Diets©				± SE
	D1	D2	D3	D4	
Initial body weight (kg).	19.50	20.25	19.50	20.25	0.86^{NS}
Final body weigh (kg).	38.50	40.50	41.00	40.25	1.05^{NS}
Total gain (kg).	19.00^{c}	20.25^{b}	21.50^{a}	20.00^{bc}	0.35**
Daily gain (g).	158.33^{c}	168.75^{b}	179.33^{a}	165.92^{bc}	3.06**
Total dry matter intake (kg)	129.84^{d}	135.91^{c}	139.39^{b}	143.51^{a}	.0001**
Feed conversion (kg DM/kg gain)	6.83^{ab}	6.71^{b}	6.49^{b}	7.18^{a}	0.12**

±SE = Standard error, NS = Not significant, ** = (*P < 0.01*)
© Means in the same row with different letters significantly (*P ≤ 0.05*) differ.

Economical evaluation:

The obtained results of economical efficiency for lambs fed the experimental diets are presented in Table (6). The highest total feed cost along the feeding period was observed for D2 and D3 (113.96 and 113.62 LE, respectively) , while the intermediate total feed cost was recorded for D4 (113.55 LE.) and the lowest was 111.99 LE. for the control diet (D1). Significant *(P ≤ 0.01)* differences were found among treatments, due to the lower price of GDS which decline the total coast of the diet by increasing the portions of GDS in diets. The highest cost of one kg gain was recorded for

animals fed D1 (5.90 LE.), while the figures for other treatments were declined to 5.63, 5.29 and 5.68 LE. for D2, D3 and D4, respectively. Addition of GDS to the diet resulted in an improvement of interest / kg gain. The improvements were 2.69, 6.09 and 2.15% for D2, D3 and D4 above the control diet.

Table (6): Economical efficiency for lambs fed the experimental rations.

Items	Diets©				± SE
	D1	D2	D3	D4	
Dry matter intake (kg):-					
Roughage	32.46	33.98	34.84	35.88	0.0001^{NS}
Concentrate	97.38	101.93	104.51	107.63	0.0001^{NS}
Total dry matter intake	129.84^{d}	135.91^{c}	139.39^{b}	143.51^{a}	0.0001^{**}
Roughage cost	9.74^{d}	10.19^{c}	10.46^{b}	10.76^{a}	0.0001^{**}
Concentrate cost	102.25^{d}	103.70^{a}	103.15^{b}	102.79^{c}	0.0001^{**}
Total feed cost (LE)	111.99^{d}	113.96^{a}	113.62^{b}	113.55^{c}	0.0001^{**}
Feed cost / kg gain (LE)	5.90^{a}	5.63^{ab}	5.29^{c}	5.68^{bc}	0.10^{**}
Total interest (LE)	192.01^{b}	210.04^{b}	230.38^{a}	206.45^{b}	4.35^{**}
Interest / kg gain (LE)	10.1^{c}	10.37^{bc}	10.71^{a}	10.32^{ac}	0.10^{**}
Improvement %	-----	2.69	6.09	2.15	

±SE = Standard error, NS= not significant (P≥0.05), ** = (*P < 0.01*).
Price of 1kg DM feed for CFM1, CFM2, CFM3, CFM4 and wheat straw were 1.050, 1.018, 0.987 0.955 and 0.3 LE., respectively.
Total feed coast = Price of 1kg DM feed x Total dry matter consumed.
Feed cost / kg gain = Total feed coast / Total body weight gain.
Price of 1kg live body weight = 16 LE at the time of the experiment.
Total interest = (Price of 1kg live body weight x Total gain kg) – (Total feed cost).
Interest / kg gain = Price of 1kg live body weight gain – Feed cost / kg gain.
© Means in the same row with different letters significantly (*P ≤ 0.05*) differ.

DISCUSSION

Chemical composition of experimental diets as illustrated in Table (2) indicated that replacement of GDS increased CF, EE and ash content, but CP, and NFE were decreased for GDS containing diet (D2, D3 and D4) compared to the control diet (D1). These results are attributed to the nutrients content of both GM and GDS. It is clear that GM is characterized by greater contents of CP and NFE than GDS, while the later contains greater percentages of CF, EE and ash. The present results are in agreement with those obtained by Soliman *et al.,* (2006).

Digestibility coefficients of CP, CF and NFE were significantly increased for diets containing date seeds than control diet. These results could be attributed to the high content of EE in the diet containing date seed. Digestibility coefficients of CP and CF were increased by increasing dietary fat content (Philips *et al*., 1985 and Abou-El-Nasr and El-Kerdawy, 2003). The greater percentage of CF in diets containing date seeds could affect the texture of digesta and reduce the outflow rate of ruminal contents and its passage along the alimentary tract, which it may give better chance of ruminal fermentation and intestinal digestion and absorption (Church and Richard, 2005). In this view, the improvement in nutrients digestibility attained due to GDS inclusion could be explained (Table 3). Accordingly, the

total digestible nutrients (TDN) value was improved due to GDS inclusion. The improvement achieved in digestibility of NFE that represent more than 57 % of the whole concentrate feed mixture was 6.57 % when the control diet (D1) was compared with D4 that contain 15.75 % GDS. In the digestibility trial, rams fed the control diet had a higher nitrogen intake (NI) associated with greater amount of N excreted in the urine and feces compared to the diets containing GDS (Table 4). Accordingly, higher nitrogen absorbed was observed as the GDS increased in the diet. The DCP % of D4 was improved by 7.35 % as compared with D1. This again may ensure better N digestion and utilization as indicated by the surprising improvement in nitrogen balance / nitrogen absorbed value (biological value) that reached 46.4 % when D4 was compared by control diet (Table 4). Abd El-Rahman *et al.* (2003) reported that animals fed GDS containing diet had higher NH3-N in the rumen liquor compared to the control animals. They attributed this result to the higher level of DCP in the rations containing GDS when compared to the control group. In the present study, DCP (g / day) was higher by 1.9, 2.1 and 2.8 for D2, D3 and D4 relative to the control diet (D1).

Average daily gain was numerically higher in the present study for diet containing GDS at 15, 30 or 45% as a partial replacer of the GM when compared with the control group. Addition of GDS to the growing lambs' diets improved the productivity and positively effect on animal performance (Abou-El-Nasr 1985, El-Hag *et al*., 1993; Abd El-Rahman *et al.*, 2003 and Soliman *et al*., 2006). El-Hag *et al*. (1993) reported that the addition of discarded dates at the levels of 15 or 25 % of the whole DM of the ration was associated with an increase in growth rate of Awassi lambs. As the TDN value, that is an expression of digestible energy (NRC, 2001), was improved and the N-balance / N-absorbed, that is an expression of biological value (Church and Richard, 2005), was enhanced, it is acceptable that the total body weight gain to increase too (NRC, 1996). In this study, the total gain was improved by 13.16 % for D3 that contain 10.5 % date seeds in comparison with the control diet. Moreover, the dry matter consumed in this study was also greater as the GDS was included and it's proportion was increased. Therefore, the total body weight gain was enhanced (Table 5) as excess amounts of digested and absorbed nutrients were available for anabolic processes. As a result of this study, the feed consumption was enhanced when GDS represented 10.5 % of the concentrate feed mixture. Along with this net result, the difference between gain price and feed cost (interest) was improved due to GDS inclusion in the concentrate feed mixture up to 10.5 %.

The diets containing GDS were higher in interest by 2.69, 6.09 and 2.15 % for D2, D3 and D4, respectively relative to the control group. Data in the present study indicated that animals fed diets containing GDS were more economic efficient than control diet. Substitution of GM by 30 % of GDS in ruminant diets will lead to a reduction in feed cost (Table 5) due to the new untraditional energy resource that is available in a reasonable price. Results reported herein can be explained in the light of the proximate analysis (Table 2) and increasing the digestibility coefficients of CP, EE, CF, and NFE (Table 3).

CONCLUSION

It could be concluded that replacing the dietary yellow corn grain with ground date seeds up to 30 % in the concentrate feed mixture resulted in better digestibility, daily gain, feed conversion and economical efficiency as compared with the control diet. Date seeds could efficiently be used as useful ingredients in the ration of small ruminants taking into consideration the right proportion of date seeds used.

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تأثير استبدال نوى البلح المطحون كجزء من الذرة بالعليقة على تمثيل النيتروجين وأداء الأغنام

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1- محطة البحوث بملوى – المنيا.

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أجريت هذه الدراسة بمزرعة محطة البحوث الزراعية بملوى بهدف دراسة تاثير استبدال جزء من الذرة المجروشة بمثيلتها بنوى البلح المطحون فى عليقة الأغنام على تمثيل النيتروجين وحيوية الأغنام.

استخدم فى هذه الدراسة ٤ من ذكور الأغنام الأوسيمى البالغة بمتوسط وزن حى ٤٠ ± ١,٤٥ كيلو جرام لإجراء تجربة هضم ، واستخدم فى تجربة النمو ١٦ ذكر أوسيمى فى عمر الفطام بمتوسط وزن حى ١٩,٨٨ ± ٠,٨٦ كجم وقد تم توزيعهم على ٤ مجاميع بكل مجموعة ٤ حيوانات وإستمرت التجربة لمدة ١٢٠ يوما.

وكانت العلائق المستخدمة فى كلا التجربتين هى:-

العليقة الأولى: العليقة القياسية تحتوى على مخلوط علف مصنع + ١ % من وزن الجسم الحى تبن قمح.

العليقة الثانية: وهى نفس العليقة الأولى مع إستبدال ١٥ % من الذرة بالعلف المصنع بنوى البلح المطحون.

العليقة الثالثة: وهى نفس العليقة الأولى مع إستبدال ٣٠ % من الذرة بالعلف المصنع بنوى البلح المطحون.

العليقة الرابعة: وهى نفس العليقة الأولى مع إستبدال ٤٥% من الذرة بالعلف المصنع بنوى البلح المطحون.

وكان من أهم النتائج المتحصل عليها ما يلى:-

لم يتأثر معامل الهضم للمادة العضوية فى حين ارتفعت معنويا (مستوى ٠,٠٥) معاملات الهضم لكل من البروتين الخام والمستخلص الإيثيرى والألياف الخام والمستخلص الخالى من الآزوت فى المعاملات الثانية والثالثة والرابعة بالمقارنة بالعليقة الأولى (القياسية). زيادة القيمة الغذائية معبرا عنها بالمركبات الكلية المهضومة ، معادل النشا ، البروتين الخام المهضوم بالجرام / اليوم و نسبة البروتين المهضوم زيادة معنوية فى جميع العلائق المحتوية على نوى البلح بالمقارنة بالعليقة القياسية. إنخفاض المستهلك اليومى من النيتروجين وكذلك النيتروجين الخارج فى البول والروث والخارج الكلى اليومى إنخفاض معنويا مع زيادة المحتجز من الآزوت زيادة معنوية بالعلائق المحتوية على نوى البلح المطحون بالمقارنة بالعليقة القياسية.

حدثت زيادة معنوية فى الوزن الحى وكذلك معدل الزيادة اليومى فى حالة الحيوانات التى غذيت على علائق محتوية على نوى البلح بالمقارنة بمجموعة الكنترول ، وقد أظهرت العليقة الثالثة والتى تحتوى على ٣٠ % نوى البلح أعلى زيادة يومية بالمقارنة بباقى العلائق. حدثت زيادة فى كل من المستهلك من الغذاء اليومى ومعدل تحويل الغذاء بزيادة مستوى نوى البلح بالعليقة. أظهرت المعاملة الثالثة ٣٠ % نوى البلح أعلى معدل تحويل غذائى وأقل تكلفة إقتصادية لإنتاج وحدة واحدة من النمو فى الأغنام.

من النتائج السابقة يتضح أنه يمكن إستبدال الذرة المجروشة بنوى البلح فى علائق الأغنام مع الوضع فى الإعتبار النسبة التى تحقق أفضل إنتاجية بأقل تكلفة ممكنة.

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