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UTILIZATION OF CORN STALKS IN RUMINANT FEEDING: 1- EFFECT OF REPLACEMENT OF BERSEEM HAY WITH TREATED CORN STALKS ON THE NUTRITIVE VALUES, RUMEN ACTIVITY AND SOME BLOOD TRAITS OF SHEEP.

By

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ABSTRACT

Four adult crossbred rams with an average 45.55±0.75 kg body weight were fed on four dietary diets in a randomized 4×4 Latin square design. Animals were fed on barley grain at 1.5% of live body weight plus (1) berseem hay (BH), (2) Treated corn stalks with urea 5% (TCS) and (BH) (1:2), (3) TCS and BH (2:1) and (4) TCS *ad libitum* to study the effect of replacement of BH with TCS on the nutritive values, rumen activity and some blood traits. Results revealed that the differences between the experimental diets were significant (P<0.05) for digestibility coefficients of DM, OM, CP, CF, NFE, NDF, ADF and the nutritive values (TDN%, DCP%). Nitrogen balance for diets (1 and 2) was significantly higher (P<0.05) than for diets (3 and 4). Ruminal pH values were not significantly affected by different diets except at 6 hrs after feeding. Ammonia-N concentrations were increased after feeding than before feeding. However, there were significant differences in ammonia-N concentration at 2 and 4 hrs after feeding. Moreover, the concentrations of volatile fatty acids (VFA's) were not significantly affected by different diets except at 2 hrs after feeding. The highest value of total protozoal counts was recorded by diet (2) (4.51 x10^5/ ml) at zero time. There

were no significant differences in the concentrations of total protein, albumin, globulin, A/G ratio, urea, AST and ALT among the experimental diets except creatinine concentration at zero time, while, at 3hrs after feeding the differences were significant in the concentrations of urea, AST and ALT, in blood of sheep fed on the experimental diets.

Key word: Corn stalks, Digestibility coefficients, Urea treatment, VFA and NH_3-N, Protozoa, Blood traits.

INTRODUCTION

In Egypt there is a wide gab between available feedstuffs and animal requirements. So, the shortage in animal feeds in Egypt necessitates that intense research efforts should be directed towards exploring the possibility of using new-unconventional resources or agricultural by-products as animal feed and improving their nutritive values (Shoukry *et al*., 1985). In Egypt, there are about 32 million tons of Agricultural by-products (M.A.L.R, Egypt, 2003). But the major limitations of these fibrous crop residues or farm wastes are characterized by extensive lignification of the cellulose and the hemi-cellulose and low levels of protein, soluble carbohydrates and minerals (Preston and Leng, 1987 and Van Hao and Ledin, 2001). Many methods and attempts are used to improve the nutritive value of crop residues. Such as physical treatment (chopping, grinding, etc.) (Abd El-Baki *et al*.,2001), chemical treatment by using an alkali such as sodium hydroxide , ammonia , urea ., a combination of both (Galina *et al*., 2003,2004), biological treatment (El-Ashry *et al*.,$2001_{a,b}$ and Bassuny *et al*., 2003b). and supplementation or combination with leaves of leguminous fodder plants (Bengaly ,1996 and Borhami *et al* .,1998,1999). One of the best methods to reduce feed costs is through the use of and utilize crop residues in addition to the use of urea treatment and supplementation with leaves of protein rich leguminous fodder plants which offers a cheap way to improve the nutrient content and feeding value of crop residues in ruminant livestock nutrition (Ørskov, 1995 and Aregheore and Perera, 2004).

The present work aimed to study the effect of using corn stalks treated with urea 5% in different combinations with berseem hay in sheep feeds on digestibility coefficients, nutritive values, rumen activity and some blood traits.

MATERIALS AND METHODS

This experiment was carried out at the Experimental Station of Faculty of Agriculture (Damanhour), Alexandria University, during 2005-2006. This study was conducted to evaluate the effect of replacement of berseem hay(BH) with treated corn stalks(TCS) with urea (5%) in the diet of sheep on their nutrients digestibility, rumen activity and some blood traits.

Corn stalks were collected from the experimental station, chopped to 2-3 cm in length and arranged in a stack consisting of three layers (100 kg each). Fifteen kg fertilizer grade urea (46.5 % Nitrogen) was dissolved in 120 liters of water to prepare the solution needed for this stack. Urea solution was sprayed at a rate of 0.4 liter per kg of corn stalks using a hand garden sprayer. The treated stacks were kept closed by covering it tightly with a black plastic sheet for three weeks. Therefore, the stacks were kept covered and adequate amounts of treated materials were taken daily and aerated for 24 hr before feeding. Four adult "crossbred" rams with an average 45.55±0.75 kg body weight were fed on four dietary diets in a randomized 4×4 Latin square design. Animals were fed on barley grain at 1.5% of live body weight plus (1) BH, (2) TCS and BH (1:2), (3) TCS and BH (2:1) and (4) TCS, *ad libitum*. The experimental diets were offered to animals for 14 days as a preliminary period followed by 7 days as a collection period to estimated digestibility coefficients, nutritive values and nitrogen utilization throughout digestibility trials conducted according to the Official methods. At the end of each digestibility trial rumen content samples were withdrawn using a stomach tube at 0, 2, 4 and 6 hrs after feeding. The samples were filtered by using double layer of cheesecloth and pH values were measured immediately by using pH meter. Then the sample of rumen liquor was divided into two portions, one for estimation of NH_3-N and total volatile fatty acids (VFA's) concentrations after centrifuged at

3000 r.p.m. for 15 minutes and acidified by using concentrated sulphuric acid (98.7 %) before freezing, and the other sample was preserved with formalin 40 % (3 rumen liquor:1 formalin) for estimation of total and differential protozoal counts. Also, blood samples were collected from the jugular vein at 0, 3 hrs after feeding. Blood samples were centrifuged at 3000 r.p.m. for 15 minutes and the serum was frozen for blood parameters analysis (Total protein, Albumin, Globulin, A/G ratio, Creatinine, Urea, AST and ALT).

Chemical analysis:

Ureated corn stalks, berseem hay, barley grains, orts and feces samples were analyzed for DM, Ash, CP, EE, CF and urinary nitrogen according to The Official Methods of AOAC (1995). Cell wall constituents were estimated according to the methods described by Van Soest and Wine (1967). Ammonia nitrogen (NH3-N) concentrations were estimated using Magnesium Oxide (MgO) and the Markham micro distillation apparatus (Markham, 1942). Total volatile fatty acids were determined by steam distillation as described by Warner (1964). Total and differential protozoal counts were determined according to the methods described by Abou-Akkada *et al*. (1969). Total protein, albumin, urea, creatinine, ALT and AST in blood serum were estimated using kits and the methods described by Biomerieux (Biochemistry Laboratory Reagents and Products).

Statistical analysis:

Data were statistically analyzed by (GLM) general linear model procedures (SAS, 2000) and the differences between mean values were compared by Duncan's multiple range test (Duncan, 1955).

RESULTS AND DISCUSSION

Chemical composition and cell wall constituents of berseem hay, corn stalks and barley grains are shown in Table (1). Results indicated that treated corn stalks with urea 5% increased CP, EE, NFE and hemicellulose and decreased CF, ash, NDF and ADF than untreated corn stalks. These results are in agreement with those reported by El-Ashry *et al*., (1997) and El-Shinnawy *et al*., (1999).

The results in table (2) summarized dry matter intake (DMI), digestibility coefficients, nutritive values and nitrogen balance of the experimental diets. The results indicated that there were no significant differences among the experimental diets in DMI. Concerning DMI from roughages the lowest values was for D1. While (D2) and (D3) gave the highest values of DMI from roughages. No significant differences were detected concerning DM intake (%) BW. However, diet (4) gave the highest value. These results are similar with those reported by El-Basiony *et al*., (2003). Digestibility coefficients of the experimental diets showed that the differences between the experimental diets were significant ($P<0.05$) for digestibility coefficients of DM, OM, CP, CF, NFE, NDF and ADF. Dry matter digestibility was the highest for diet (2), while diet (1) recorded the lowest value. The highest OM digestibility was observed with diet (2). On the other hand, diets (1) and (4) were recorded the lowest values. Concerning, CP digestion of diet (2) obtained the highest value, while, the lowest value was recorded by diet (4). These results were similar with the results reported by El-Shinnawy *et al*., (1999). Also, there were significant differences ($P<0.05$) of CF digestibility. The digestion coefficient of CF was higher for diet (4) than the other diets. These results may be attributed to the effect of urea treatment on corn stalks. Urea breaks down the ligno-cellulose bonds of the residue, decreased CF content, increasing rate and extent of rumen microbial digestion. These results are in agreement with those reported by El-Ashry *et al*., (1997) and El-Shinnawy *et al*., (1999). No significant differences were found among experimental diets for EE digestion.

Concerning, NFE digestibility was recorded the highest ($P<0.05$) value by diet (2), while the lowest value was recorded by diet (1). Replacement of ureated corn stalks significantly increased digestibility coefficients of NDF and ADF ($P<0.05$).

The differences between the experimental diets were significant ($P<0.05$) in nutritive values when expressed as (TDN% and DCP %). The highest values of TDN (%) was recorded by diet (2) and the lowest values obtained by diet (1). While the highest values of DCP (%) were recorded by diets (1), (2) and (3). While the lowest value obtained by diet (4). These results were in agreement with those

reported by Borhami, *et al*.,(1998,1999); Salem, (1996) and Ismaiel (2006).

The effect of feeding fibrous residue materials as a good fodder combined with the chemically treated poor quality roughages were observed by Bengaly (1996) and Hindrichsen *et al*., (2002) and (2004). Most of the protein of berseem hay is non-soluble protein which may escapes fermentation in the rumen. However, ammoniation of poor quality roughages increased their crude protein content which is mainly non-protein-nitrogen. The combination of two sources of protein may affect the nutritive value and feed utilization in ruminants (Gabra, 1984).

There were significant differences ($P<0.05$) among the experimental diets in fecal nitrogen, digested nitrogen and nitrogen balance expressed as gm/h/day and nitrogen balance as (%nitrogen intake and %digested nitrogen), however, the differences in nitrogen intake and urinary nitrogen expressed as gm/h/day were not significant. The highest values of nitrogen balance as gm/h/day or percentage of nitrogen intake and digested nitrogen were for diets (2) and (1). These results are in harmony with those reported by Salem, (1996), El-Shinnawy *et al*., (1999) and Marwoha *et al*., (1990)

Effect of the experimental diets on the rumen liquor pH of sheep at 0, 2, 4 and 6 hrs after feeding are shown in Table (3). The results indicated that ruminal pH values were not significantly affected by different treatments except at 6 hrs after feeding the differences were significant ($P< 0.05$). The highest ruminal pH value was recorded for diet (2) and (4) at zero time of feeding, whereas, the lowest value was that for diet (3) at 4 hrs after feeding. The recorded pH was within the reported ranges for normally functioning rumen. Similar results were obtained by Shoukry *et al*.,(1988) and Mohamed, (2001) they reported that the normal value of ruminal pH of sheep ranged between 4.96 and 7.92. Moreover, El-Ashry *et al*., (1997) studied the effect of chemical treatment (3.5% urea) on rumen liquor parameters of sheep fed on rice straw or corn stalks treated with urea and found that the minimum pH values were observed at 3hrs after feeding and tended to increase after 6hrs.

The results of ammonia-N (NH_3-N) concentration of the RL of sheep fed on the experimental diets are presented in Table (4).

Ammonia-N concentrations were increased after feeding than before feeding and it increased with increasing the time after feeding. The differences between the experimental diets were significant ($P< 0.05$) at 2 and 4 hrs after feeding. Diet (4) recorded the highest values at 2 and 4 hrs after feeding. The values obtained from the present results were in normal range. These results were agreed with those obtained by Ismaiel, (2006). The optimal concentration of ammonia nitrogen for microbial growth and protein synthesis ranged from 0.35 to 29 mg/100 ml R.L. (Owens and Bergen, 1983).

Concentration of total volatile fatty acids (VFA's) in the rumen liquor of sheep (Table 3) indicated that concentration of (VFA's) were not significantly affected by different treatments except at 2 hrs after feeding there were significant differences ($P< 0.05$) among different diets. However, the concentration of (VFA's) was increased after feeding than before feeding. These results were in agreement with the results obtained by Abd El-Gawad (1984) and Ismaiel, (2006).

Data of total protozoal counts in the rumen of sheep fed on the experimental diets are shown in Table (4). Significant differences ($P<0.05$) were detected among the experimental diets at the different times of sampling. Total protozoal counts were decreased after feeding than before feeding. The overall means of total protozoal counts clearly showed significant ($P<0.05$) effect for diet (2) which showed the highest values compared with other treatments. The results of differential protozoal counts (%). The data showed that there were no significant differences according to different diets on differential protozoal counts at 0, 2 and 4 hrs after feeding except at 6 hrs after feeding there were significant differences among diets. It could be seen that the *Entodinium* had the highest percentage of ruminal protozoa (36.96 to 49.99 %), followed by *Diplodinium* (22.93 to 39.93%) and then *Holotrichia* (7.15 to 19.21%). Concerning *Entodinium*, there were significant differences were detected among the experimental diets at 6 hrs after feeding and recorded the highest percentage of ruminal protozoa by (D1). Concerning *Diplodinium*, significant differences were detected among the experimental diets at 6 hrs after feeding and recorded the highest percentage of ruminal protozoa by (D4). There were significant differences were detected among the experimental diets at 6 hrs after feeding and recorded the highest percentage of ruminal *Holotrichia* by diet (3).

The results of total and differential protozoa counts are in agreement with those obtained by Mackie *et al*., (1978) who observed that the numbers of protozoa in the rumen increased proportion to amount of readily fermentable carbohydrate in the ration including of 60% grain and molasses. Moreover, Warner (1965) reported that *Entodiniomorphs* are usually abundant in the rumen of animals given high concentrate ration, and *Holotrichs* appear in the greatest numbers in animals given hay or forages rich in soluble sugars. Hassona *et al*.,(1995) reported that the greater average of total protozoal counts before feeding than after feeding samples may be due to the dilution of rumen digesta with higher drinking water, ingested feed and saliva secreted.

The results of blood parameters for the different experimental diets at 0 and 3 hrs after feeding are shown in Table (5). At zero time, the results indicated that there were no significant differences in the concentrations of total protein, albumin (A), globulin (G), A/G ratio, urea, aspartate amino transferase (AST) and alanine amino transferase (ALT) among the experimental diets. On other hand, at 3 hrs post feeding the differences were significant ($P< 0.05$) in the concentrations of urea, AST and ALT, while other blood parameters were not significant between the experimental diets. These results were similar to those showed by El-Ashry *et al*., (1997) and Ismaiel, (2006). Generally, blood parameters were within the normal values as recorded by Stanek *et al*., (1992).

From the present results it can be concluded that, chopped corn stalks treated with (5% urea) could be replaced of berseem hay at a level of 35 to 65 % in ruminant animals roughages fed *ad libitum* plus 1.5% barley grain.

Table (1): Chemical composition, cell wall constituents (%) and gross energy of untreated and treated corn stalks, berseem hay and Barley grains "on DM basis".

Items	Corn stalks		Berseem hay	Barley grains
	Untreated	Treated with 5% urea		
DM	96.55	95.88	94.67	90.23
CP	3.58	9.23	12.75	9.21
CF	37.28	31.80	33.53	8.86
EE	1.42	1.88	2.00	2.32
NFE	50.59	51.12	41.61	75.57
Ash	7.13	5.97	10.11	4.04
NDF	78.70	71.61	60.90	29.92
ADF	59.03	43.27	36.97	9.97
Hemicellulose	19.67	28.34	23.93	19.95
GE (Mcal/ kg DM)	4.18	4.30	4.18	4.32

Table (2): Dry matter intake, digestibility coefficients, nutritive values and nitrogen balance of the experimental diets estimated by sheep rams.

Items	Diets				SEM	Significancy
	D_1	D_2	D_3	D_4		
Live body weight, kg	45.37	45.37	46.12	45.37	0.73	NS
DM intake, gm/h/d						
Concentrate	617.96	584.34	568.09	601.29	17.92	NS
Roughage	603.40	623.71	620.32	612.32	9.37	NS
Total	1221.37	1208.05	1188.42	1213.72	17.33	NS
DMI intake (%) B.W	2.67	2.61	2.61	2.69	0.25	NS
Digestibility coefficients (%):						
DM	65.59^{b}	69.00^{a}	67.59^{ab}	67.05^{ab}	1.15	*
OM	67.90^{b}	70.54^{a}	68.83^{ab}	67.97^{b}	1.18	*
CP	63.27^{b}	66.77^{a}	62.25^{b}	57.87^{c}	1.42	*
EE	71.41	70.63	72.65	62.48	1.96	**NS**
CF	47.25^{c}	55.53^{b}	54.05^{b}	61.75^{a}	2.95	*
NFE	75.84^{a}	76.32^{a}	75.45^{ab}	73.33^{b}	0.90	*
NDF	57.04^{b}	64.36^{a}	64.65^{a}	64.66^{a}	2.30	*
ADF	33.43^{c}	42.01^{b}	44.98^{b}	51.83^{a}	2.94	*
Nutritive values (%):						
TDN	64.49^{b}	67.92^{a}	67.56^{ab}	66.63^{ab}	1.04	*
DP	6.75^{a}	6.81^{a}	6.27^{a}	5.49^{b}	0.21	*
Nitrogen balance (g/h/d):-						
Nitrogen intake	20.87	19.64	19.16	18.45	0.43	**NS**
Fecal nitrogen	7.64^{a}	6.48^{b}	7.21^{ab}	7.70^{a}	0.22	*
Digested nitrogen	13.23^{a}	13.16^{a}	11.95^{ab}	10.75^{b}	0.47	*
Urinary nitrogen	7.23	6.62	7.18	6.94	0.26	**NS**
Nitrogen balance	5.99^{a}	6.54^{a}	4.77^{b}	3.81^{c}	0.30	*
NB % Nitrogen intake	28.90^{a}	33.29^{a}	24.84^{b}	20.51^{c}	1.26	*
NB % % Digested nitrogen	45.72^{a}	49.69^{a}	39.93^{b}	35.44^{c}	1.40	*

a,b,c, means with different letters in the same raw are significantly different (P< 0.05), * Significant at (P < 0.05), NS = Not significant. , SEM = Standard error of means, Diets: 1=BG plus BH, 2=BG plus BH +TCS (2:1), 3=BG plus BH +TCS (1:2), 4=BG plus TCS.

Table (3): Ruminal pH, ammonia-N and Total volatile fatty acids concentration of liquor of sheep fed on the experimental diets.

Time after feeding (hrs)	Diets				SEM	Significancy
	D_1	D_2	D_3	D_4		
Ruminal pH						
0	7.16	7.22	7.07	7.22	0.03	NS
2	6.68	6.86	6.63	6.86	0.05	NS
4	6.80	6.82	6.58	6.67	0.06	NS
6	6.92^{ab}	7.04^{a}	6.68^{b}	6.87^{ab}	0.06	*
Average	6.94^{ab}	7.04^{a}	6.79^{b}	6.95^{a}	0.04	*
Ammonia-N (mg/100ml R.L.)						
0	8.84	6.18	6.69	7.57	0.65	NS
2	14.36 b	16.97 ab	15.18 ab	20.78 a	1.20	*
4	10.16 b	13.77 ab	11.08^{b}	18.83 a	1.76	*
6	8.00	11.05	9.29	10.07	1.04	NS
Average	10.34 b	11.99 ab	10.56^{b}	14.31^{a}	0.75	*
VFA's **concentration (mEq/100 ml R.L.)**						
0	6.82	7.63	6.04	6.65	0.46	NS
2	9.78^{ab}	10.48^{a}	8.01^{b}	8.10^{b}	0.43	*
4	10.46	11.38	8.46	9.60	0.63	NS
6	10.71	11.35	9.96	8.48	0.52	NS
average	9.44^{ab}	10.21^{a}	8.11^{b}	8.21^{b}	0.30	*

a,b means with different letters in the same raw are significantly different (P< 0.05).

* Significant at (P < 0.05),NS = Not significant. SEM = Standard error of means.

Diets: 1=BG plus BH, 2=BG plus BH +TCS (2:1), 3=BG plus BH +TCS (1:2), 4=BG plus TCS.

Table (4): Total and differential protozoal counts (%) in the rumen liquor of sheep fed on the experimental diets during digestibility trials.

Items	Time after feeding (hrs)	Diets				SEM	Signi fica
		D_1	D_2	D_3	D_4		
	Total protozoal counts (x 10^5 / ml)						
Total	0	2.88 ab	4.51 a	2.24 ab	2.15 b	0.37	*
	2	1.91 ab	2.91 a	1.59 b	1.48 b	0.20	*
	4	1.45 b	2.47 a	1.59 b	1.41 b	0.13	*
	6	1.61 b	2.41 a	2.04 ab	1.51 b	0.15	*
	Average	1.97 b	3.07 a	1.87 b	1.64 b	0.13	*
Entodinium	0	49.99	47.50	47.78	49.38	1.40	NS
	2	43.35	46.49	53.03	36.96	2.71	NS
	4	49.48	39.40	53.38	45.35	2.59	NS
	6	47.46 a	45.42 ab	46.46 ab	38.39 b	2.24	*
	Average	**47.57** ab	**42.95** b	**50.16** a	**44.28** ab	**1.14**	*
Diplodinium	0	31.41	30.92	29.16	29.29	1.59	NS
	2	34.39	31.52	32.59	37.26	1.74	NS
	4	33.91	36.19	26.05	38.17	2.99	NS
	6	30.95 ab	35.93 ab	22.93 b	39.93 a	3.02	*
	Average	**32.66** ab	**33.64** ab	**27.68** b	**36.16** a	**1.20**	*
Holotrichia	0	16.38	16.48	19.21	16.08	1.55	NS
	2	18.46	15.91	14.20	16.39	1.97	NS
	4	12.72	16.73	14.64	7.15	1.89	NS
	6	12.60 cb	17.06 ab	18.75 a	8.75 c	1.82	*
	Average	**15.04**	**16.55**	**16.70**	**12.09**	**0.91**	NS

a,b,c, means with different letters in the same raw are significantly different (P< 0.05), * Significant at (P < 0.05), NS = Not significant, SEM = Standard error of means, Diets: 1=BG plus BH, 2=BG plus BH +TCS (2:1), 3=BG plus BH +TCS (1:2), 4=BG plus TCS.

Table (5): Blood traits of sheep fed on the experimental diets.

Items	Time after feeding (hrs)	Diets				SEM	Significan
		D_1	D_2	D_3	D_4		
Total protein	**0**	5.02	5.22	5.18	4.65	0.14	NS
(gm/ 100 ml)	**3**	6.07	5.60	5.24	5.13	0.18	NS
Albumin	**0**	3.61	3.18	3.52	3.16	0.08	NS
(mg/ 100 ml)	**3**	3.43	3.28	3.12	3.14	0.12	NS
Globulin	**0**	1.41	2.03	1.65	1.49	0.12	NS
(mg/ 100 ml)	**3**	2.64	2.07	2.11	1.98	0.16	NS
A/G ratio	**0**	2.56	1.79	2.15	2.25	0.13	NS
	3	1.51	1.70	1.59	1.96	0.19	NS
Creatinine	**0**	1.23^{b}	1.34^{ab}	1.81^{a}	1.59^{ab}	0.07	*
(mg/ dl)	**3**	1.46	1.20	1.66	1.79	0.11	NS
Urea (mg/dl)	**0**	28.08	32.24	35.33	40.93	1.93	NS
	3	43.60^{ab}	40.47^{b}	44.55^{ab}	50.03^{a}	2.32	*
AST (u/l)	**0**	21.91	43.30	29.73	32.71	3.48	NS
	3	17.69^{c}	43.09^{a}	27.12^{b}	24.82^{b}	4.17	*
ALT (u/l)	**0**	6.84	10.55	9.64	8.02	1.13	NS
	3	4.36^{c}	12.24^{a}	6.80^{b}	7.48^{ab}	1.18	*

a,b,c, means with different letters in the same raw are significantly different (P< 0.05).

* Significant at (P < 0.05), NS = Not significant. SEM = Standard error of means.

Diets: 1=BG plus BH, 2=BG plus BH +TCS (2:1), 3=BG plus BH +TCS (1:2), 4=BG plus TCS.

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الملخص العربي

الاستفادة من حطب الذرة فى تغذية المجترات : 1- تاثير استبدال دريس البرسيم بحطب الذرة المعامل باليوريا على القيمة الغذائية ونشاط الكرش وبعض صفات الدم فى الاغنام

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أجريت هذه الدراسة بمزرعة قسم الإنتاج الحيواني والداجني– كلية الزراعة بدمنهور- جامعه الإسكندرية خلال عامي 2005م – 2006 م . بهدف دراسة تأثير استخدام حطب الذرة المعامل باليوريا (5%) مع دريس البرسيم في تغذية الأغنام وعلى معاملات الهضم والقيمة الغذائية ونشاط الكرش وبعض قياسات الدم . استخدمت أربعه ذكور بالغة من الأغنام الخليطة في (مربع لاتيني) غذيت الأغنام على حبوب الشعير بنسبة 1.5 % من وزن الجسم مع دريس البرسيم أو مخلوط من دريس البرسيم و حطب الذرة المعامل بنسبة 1:2 ، أو مخلوط من دريس البرسيم و حطب الذرة المعامل بنسبة 2:1، او حطب الذرة المعامل ، وكان يقدم العلف المالئ حرا. وأوضحت نتائج هذه الدراسة ما يلى:

توجد فروق معنوية بين العلائق التجريبية وفى معاملات هضم كل من المادة الجافة والمادة العضوية والبروتين الخام والألياف الخام والكربوهيدرات الذائبة ومستخلص المحلول المتعادل من الألياف الخام ومستخلص المحلول الحامضى من الألياف الخام ومجموع العناصر الغذائية الكلية المهضومة %TDN و البروتين المهضوم %DP.

تحسن النيتروجين المحتجز معبرا عنه (جم/راس/يوم) فى حالة العليقة الاولى والثانية عن العليقة الثالثة والرابعة. اما بالنسبة لـدرجة حموضة سائل الكرش فلا توجد فروق معنوية الا بعد التغذية بـ 6 ساعات حيث وجد فروق معنوية بين العلائق التجريبية. بالنسبة لتركيزات الامونيا كانت هناك زيادة بعد التغذية عن قبل التغذية. أيضا كانت الفروق بين العلائق التجريبية معنوية عند الأوقات ساعتين وأربع ساعات بعد التغذية.

لا توجد فروق معنوية فى تركيز الأحماض الدهنية الطيارة بسائل الكرش عند الأوقات المختلفة من التغذية، ماعدا بعد التغذية بساعتين. أعلى قيمه للعدد الكلى لبرتوزوا الكرش سجلت بواسطة العليقة الثانية وذلك قبل التغذية. بينما كانت اقل القيم سجلت بواسطة العليقة الرابعة. بالنسبة لقياسات الدم أتضح انه لا توجد فروق معنوية قبل التغذية فى تركيز كل من البروتين الكلى والالبيومين والجلوبيولين و اليوريا وإنزيمات الكبد وكذلك النسبة ما بين الالبيومين والجلوبيولين ما عدا تركيز الكرياتينين كانت هناك فروق معنوية بين العلائق التجريبية. بينما عند وقت 3 ساعات بعد التغذية كانت هناك فروق معنوية فى تركيز كل من اليوريا وإنزيمات الكبد بينما باقي القياسات لم تظهر اى فروق معنوية بين العلائق التجريبية.

نستخلص انه يمكن الاستفادة من حطب الذرة بعد تقطيعه بآلة دراس القمح ومعاملته بمحلول اليوريا بنسبة 5% ليحل محل دريس البرسيم في تغذية المجترات .