COMPARISON OF UNTREATED AND UREATED BARLEY STRAW IN BALADI LAMBS FEEDING

K. M. M. Mousa

Department of Animal Nutrition, Animal Production, Research Institute, Dokki, Egypt.

SUMMARY

The aim of this investigation was to comparatively study the influence of changing the roughage type of the diet on the digestibility and growth performance of lambs. Twenty-one baladi male lambs of an average initial live body weight (LBW) of 22.15 ± 0.111 kg/head were used after being divided into three similar groups. Animals were fed berseem hay, untreated or ureated barley straw *ad-lib* for groups 1 (control), 2 and 3 respectively. Concentrate feed mixture (CFM) and barley grain were each given at 1% of LBW for all groups. Three digestibility trials were carried out with lambs. Results indicated that the digestibility of DM, OM, CP, EE and NFE and TDN and DCP values and nitrogen balance of berseem hay ration (G_1-control) were significantly higher than those of other diets. Plasma total protein, albumin, globulin and rumen liquor pH value and TVFA's concentration were not significant among groups. Control group (berseem hay) had greater daily gain and the best feed conversion as kgDM/kg gain, while ureated barley straw ration (group 3) recorded the lowest cost/kg gain and the best economic efficiency. Under the circumstances of this study, it can be concluded that, ureation of straw improved its nutritive value and reduced costs of meat production in lambs and increased economic efficiency.

Keywords: *lambs, clover hay, ureated barley straw-daily gain-digestibility- feed conversion, rumen fermentation in blood metabolites.*

INTRODUCTION

The shortage of animal feeds and their improper distribution between the beginning of summer until the beginning of winter seasons are the main limiting factors of animal production in Egypt. As a solution scientists suggested cultivation of high producing forages and conservation of the surplus as hay (Mostafa *et al.*, 1995 and 1998) and/or the use of ammonia and urea to increase the crude protein contents of roughages, to improve their nutrients digestibilities (Fouad *et al.*, 1998 and Deraz and Mohamed, 1999). Cereal grains which have readily fermentable carbohydrates are required beside other concentrate components as supplements to obtain balanced rations (Shehatta and El-Sayed, 1994, Shehatta *et al.*, 1997 and Hanafy *et al.*, 1998).

Therefore, the aim of this study was to investigate the possibility of using barley straw (untreated or ureated) with barely grain in baladi lambs feeding.

MATERIALS AND METHODS

Twenty-one baladi lambs were randomly chosen from the herd of El-Kanater Station at 22.15 ± 0.111 kg average body weight (LBW). Lambs were divided into three similar groups according to LBW. All treatment groups were fed concentrate feed mixture (CFM) and barley grain (BG), both at the level of 1% of LBW. Control group (1)

consumed berseem hay *ad libitum*, treatment groups were offered either untreated (group 2) or ureated barley straw (group 3) *ad libitum*. Rations were fed twice daily. Drinking water was available at all times. The experimental period lasted for 150 days. The digestibility trial was conducted at the 11th week of the feeding trial using three lambs from each group. At the end of the collection period, composite (1 week) feed, feces and urine samples were prepared and preserved for analysis according to A.O.A.C (1980). Blood samples were collected at the end of the collection period from the left jugular vein. Plasma total protein and albumin were determined according to Patters (1968) and Doumas *et a.l* (1971), respectively. Rumen liquor samples were taken at the end of the collection period from three lambs for each group before the morning feeding and at 3 and 6 hrs post the zero samples. Rumen pH was immediately and directly determined by Beckman pH meter. The concentrations of NH_3-N were analyzed according to the method recommended by Abou-Akkada and Osman (1967). Total volatile fatty acids were determined applying steam distillation methods (Warner, 1964). The data were statistically analyzed using one way ANOVA procedure of S.A.S. (1982).

RESULTS AND DISCUSSION

Digestibility trial and metabolic parameters :

The chemical analysis showed that the CP and ash contents were higher in ureated than untreated barley straw as shown in Table (1). Cloete *et a.l* (1993) found that, ureation of straw increased the CP and ash contents, while decreased the CF content. The improvement in CP percentage due to 4% urea treatment was 96.18%. This is in agreement with the observation of other authors (Swidan *et al.*, 1996; Mohamed *et al.*, 1999 and Abdel Salam, 2000). The variations in chemical composition of the three tested rations reflected the composition of their ingredients. The results of the digestibility and N balance trial are presented in Table (2). Low quality roughage (barley straw) diet (2) showed lower nutrient digestibilities than other rations. On the other hand, the increased CP digestibility of ureated barley straw diet (3) were probably due to the absorption of comparatively higher amount of ammonia through the rumen wall (Tiwari *et al.*, 1990). The available CP source provided ruminal ammonia with peptides and amino acids, which, in turn stimulated microbial production and hence, increased CF digestibility (Mehrez, 1992). Dryden and Leng (1988), found increased CF digestibility with ammoniated barley straw. He reported liberation of cellulose from the encrusting materials such as lignin, thus making cellulose more soluble. Abdel-Hamid *et al.* (1989), revealed that hemicellulose component of the straw cell wall is solubilized by urea treatment. The results are in agreement with those obtained by Deraz and Mohamed (1999), Mohamed *et al.* (1999), Jie *et al.* (1987), who found that chemical treatment of straw with urea increased the digestibility of most nutrients.

On the other hand, the DM, OM, CP, EE and NFE digestibilities of berseem hay ration (control) were much higher ($P < 0.05$) than those of other rations except CP digestibility of G3. This is probably related to the higher CP content of berseem hay ration in comparison to that of other rations (Table 1). In addition, leguminous hay unlike cereal straw is considered a high quality roughage and good source of protein, minerals and

vitamins which stimulate digestiblity. (Mostafa *et al.*, 1993). Orskov, (1982) and Van Soest, (1982) reported that the addition of CFM and barley grain to clover hay produced more available NH_3-N for the microorganisms in the rumen which achieved maximal rate of fermentation.

As shown in Table (2), digestibility of CF of berseem hay ration (group 1) was lower than those of both group 2 and 3 being 50.97% vs 51.59 and 52.09%, respectively. The low fiber digestion of clover hay ration may be partially attributed to the high lignin to hemicellulose ratio in legumes relative to that of grasses, which have low lignin to hemicelluloses ratios (Van Soast, 1968).

Regarding feeding values, berseem hay ration (G1) had higher TDN and DCP percent. Barley straw diet (G2) had lower TDN and DCP percents than ureated straw ration (G3) (Table-2). These results are in agreement with those reported by Van Soast and Moare (1985), El. Shinnawy *et al.* (1982) and Mostafa and El-Gaafarawy (1997) who reported that legume had notably higher DCP because of higher CP and total cell contents which are completely diyestible when urea or ammonia treated straw and berseem hay rations were compared. Fouad, (2001) found that ureation of barley straw increased its nutritive value in terms of TDN and DCP.

Data given in Table (2) show that nitrogen balance (g/d) of the control group was higher than untreated or ureated straw groups. While low quality roughage fed group (2) was lower ($P < 0.05$) in nitrogen balance than ureated straw group. The increase of nitrogen balance might be due to the higher digestible CP content of group 1 and 3 than group 2 (Table 2). Similar results were obtained by Swidan *et al.* (1996), Deraz and Mohamed, (1999), Abdel-Salam, (2000) and Fouad, (2001).

Rumen liquor parameters:

Results presented in table (3) show that differences in rumen pH values among the groups at zero, 3 and 6 hrs after feeding were insignificant. However, rumen pH showed a decrease after 3 hrs and increased again after 6 hrs due to the absorption of the produced fatty acids in the rumen. The values of rumen liquor pH in the present study are within the range reported by Abdel-Gawad *et al.* (1993), who found that the normal value of ruminal pH of sheep varied between 4.96 and 7.92. There was no significant differences between type of roughages on TVFA'S concentration of rumen liquor being 7.61, 7.56 and 7.56 meg% for B. hay and B. straw and ureated B.straw, respectively; El-Shinnawy *et al.* (1991) found that the concentration of TVFA'S did not differ much between urea fed group and other groups. Total VFA'S of the three groups increased after 3 hrs of feeding due to the rumen fermentation activities, then decreased after 6 hrs post feeding due to absorption of the fatty acids from the rumen. El-Ashry *et al.* (2000), found that TVFA'S concentration in the rumen fluid was low before feeding and increased with time after feeding.

Barley straw fed group had lower values ($P < 0.05$) of ammonia-N. concentration than other roughage fed groups. This may be due to the lower protein content and intake and consequently lower CP digestibility and DCP value (Table 1 & 2). Results revealed that, NH_3-N concentrations in all groups increased after 3 hrs post feeding. El-Danasoury (1976) found that, in buffaloes, cows, sheep and goats, the peak of NH3-N concentrations occurred between 1-3 hrs

Table (1) Chemical analysis of ingredients used in the experimental diets:

Items	DM%	As % of DM or in dry matter , %					
		OM	CP	CF	EE	NFE	Ash
Concentrate feed mixture*	91.99	90.18	14.22	12.83	3.10	60.03	9.82
Barley grains	91.32	96.69	9.18	7.72	2.31	77.48	3.31
Barley straw	90.14	86.03	4.19	37.42	1.51	39.91	13.97
Ureated barley straw**	90.36	84.18	8.22	36.91	1.58	34.47	15.82
Berseem hay	90.93	88.00	11.98	31.11	2.39	42.52	12.00
Experimental rations (calculated)							
Ration (1) B.H. + CFM. + barley grains	90.28	90.54	11.95	20.52	2.74	55.33	9.46
Ration (2) B.S. + CFM.+ barley grains	90.41	89.91	8.32	22.96	2.12	56.51	10.09
Ration (3) U.B.S.+CFM.+ barley grains	90.56	89.20	10.45	21.44	2.14	55.17	10.80

*** Concentrate feed *mix.* contained : 34% undecorticated cotton seed cake, 31% corn, 24% wheat bran, 7% molasses, 3% limestone and 1% mineral salt.**

**** Barley straw was treated with 4% urea (4 kg Urea in 50 liter water/100 kg barley straw).**

Table (2): Digestibility, feeding values and nitrogen balance of the experimental rations.

Items	Digestibilities %						Feeding values %		Nitrogen balance
	DM	OM	CP	CF	EE	NFE	TDN	DCP	g/day
G_1	68.87^a	71.77^a	66.77^a	50.97	70.32^a	80.63^a	67.39^a	7.51^a	5.78^a
G_2	62.78^c	67.39^c	58.37^b	51.59	65.84^b	75.14^b	62.31^b	4.56^c	3.70^c
G_3	65.02^b	69.35^b	64.32^{ab}	52.09	67.20^b	77.10^b	63.66^b	6.32^b	4.89^b

a,b and c, means with different superscripts in the same column differ significantly ($P < 0.05$).

Table (3):Effect of feeding the experimental rations to lambs on some parameters of rumen liquor

Items	Groups												SE
	G_1				G_2				G_3				
	Hours After feeding				Hours After feeding				Hours After feeding				
	0	3	6	$\bar{X}$	0	3	6	$\bar{X}$	0	3	6	$\bar{X}$	
pH value	6.90	6.23	6.40	6.51^a	6.90	6.29	6.41	6.53^a	6.90	6.27	6.49	6.55^a	0.02
TVFA'S meq%	6.50	9.04	7.30	7.61^a	6.52	8.58	7.21	7.56^a	6.50	6.99	6.99	7.56^a	0.04
NH_3. N. mg%	11.27	26.40	16.60	18.09^a	11.42	25.37	14.03	16.94^a	11.91	30.62	30.62	19.78^a	0.31

after feeding of untreated or ureated diets.

Blood plasma parameters:

Table (4) shows the blood plasma parameters in terms of total protein and its fractions when growing lambs were fed the experimental rations. The total protein, albumin and globulin showed higher values for berseem hay fed group, while barley straw fed group had lower values. Chandler *et al.* (1968) reported a positive correlation between dietary protein intake and plasma protein concentration. No significant ($P < 0.05$) changes concerning these metabolites were found. El-Ashry *et al.* (1997) found that ureated roughage for sheep didn't decrease the concentration of blood protein or change the ratio among the protein fractions. The obtained results were in agreement with the findings of Abdel-Salam (2000) and Fouad, (2001).

Performance of lambs on experimental diets:

Data shown in Table (5) illustrate the performance of treatment groups. As presented in this table, the average initial weights of the experimental groups was almost similar indicating the complete randomization of the groups. The average daily body weight gain were 143.40, 91.27 and 121.53 g/d, for G_1, G_2 and G_3, respectively. These results indicated that the B. hay fed lambs (control) were superior in growth performance followed in a descending order by G_3 and G_2, respectively ($P < 0.05$). Mathison *et al.* (1991) reported that feeding hay and concentrates would result in a more even pattern of fermentation in the rumen and that could improve daily gain. Results in this study are in harmony with those absorved by Abdel-Salam, (2000), who revealed that, ureated barley straw increased daily gain of sheep by 26% in comparison with untreated barley straw ration. The lowest body weight gain was recorded on untreated barley straw (91.27 g/d). The daily gain followed the nutritive value (TDN, DCP) which was the highest for G1 and the lowest for G2.

Based on the assumption that the price of one ton of CFM, B.G., B.S., U.B.S. and B.hay were, 610, 320, 70, 100 and 340 L.E., respectively, the price of 1 kg body weight gain was 10. L.E. Economical efficiency (as a ratio between price of the weight gain and cost of feed consumed).

As presented in Table (5), DM intake were significantly ($P < 0.05$) higher for G_1 and followed in a descending order by G_3 and G_2, respectively. These results might be due to the higher berseem hay consumption of group (1). Intake of TDN and DCP/day by groups was found to be the higher ($P < 0.05$) for G_1 followed by G_3 and G_2, respectively. These results could be related to higher OM and CP content of B.hay and its ration (Table 1). Results presented in Table (5), also, show that the best feed conversion ratio calculated as kg of DM required for each kg gain was obtained by G_1 followed by G_3 than G_2 (significant, $P < 0.05$). On the other hand, TDN conversion ratios indicated that the G_3 was better than other groups. The DCP conversion ratios were found to be, 0.57, 0.45 and 0.49 kg DCP /kg gain for G_1, G_2 and G_3, respectively. These results indicated that ureated barley straw improved the TDN conversion.

As presented in Table (5), average costs in L.E. for one kg gain for the G_1, G_2 and G_3 were 4.81, 4.41 and 3.72 respectively. On the other hand, economical efficiencies were found to be 2.99, 3.26 and 3.81 for the G_1, G_2 and G_3, respectively. Cost/kg weight gain and economical efficiency were in favour of ureated barley straw ration followed by

Table (4) Effect of type of rations fed to lambs on some blood plasma metabolites.

Item	Total protein gm%	Albumin gm%	Globulin gm%	AL/G ration
G_1	6.93a	4.37a	2.56a	1.71a
G_1	6.67a	4.13a	2.54a	1.61a
G_3	6.85a	4.31a	2.54a	1.70a
SE	0.081	0.064	0.019	0.012

Table (5): Productive performance of lambs fed the experimental rations

Items	Experimental rations		
	(1)	(2)	(3)
No. of animals	7	7	7
Initial wt. (kg)	22.14	22.12	22.19
Final wt. (kg)	43.65	35.81	40.42
Body wt. Change (kg)	21.51	13.69	18.23
Ave. Daily gain (g)	143.40[a]	91.27[c]	121.53[b]
Daily feed DMI (kg)			
CFM.	0.288	0.247	0.269
B. grain	0.286	0.245	0.268
B. straw	-	0.408	-
U.B. straw	-	-	0.403
B. hay.	0.513	-	-
DMI (kg/d)	1.087[a]	0.900[b]	0.940[b]
TDNI (kg/d)	0.733[a]	0.561[b]	0.598[b]
DCPI (kg/d)	0.082[a]	0.041[c]	0.059[b]
Feed efficiency			
Kg DM/kg gain	7.58	9.86	7.73
Kg TDN/kg gain	5.11	6.15	4.92
Kg DCP/kg gain	0.57	0.45	0.49
Feed cost/kg gain (L.E.)	4.81	4.41	3.72
Economical efficiency	2.99	3.26	3.81

a,b and c. means with different superscripts in the same row differ significantly ($P < 0.05$).

untreated barley straw then bersesm hay ration.

Under the circumstances of this study, it can be concluded that, ureation of straw improved its nutritive value and reduced costs of meat productin in lambs and increased economic efficiency.

REFERENCES

Abdel-Gawad, A.M.; K.M.A. Zahran and N.S.A. Khadr (1993). Use of ammoniated wheat or rice straw in sheep rations. J. Agric. Sci. Mansoura Univ., 18:3466.

Abdel-Hamid, A.M.; M.M. El-Shinawy, A.A. Gabr, J.H. Topps and A.K. Abou-Raya (1989). Urea as a source of ammonia for improving nutritive value of rice straw and maize stover 2. *In Sacco* and *In Vivo* evaluation. J. Agric. Sci. Mansoura Univ., 14:1530.

Abdel-Salam, O. (2000). Feeding studies on lambs in upper Egypt. Ph.D. Thesis, Fac. of Agric. Al. Azher Univ., Cairo.

Abou-Akkada, A.R. and H.E. Osman, (1967). Studies on the utilization of non protein nitrogen in Egypt, J. Agric. Sci., 169, 25.

A.O.A.C. (1980). Official Methods of Analysis. Association of Official Agricultural Chemists. 12th ED. Washington, D.C.

Chandler, P.; T. McCarthy and E.M. Kelser (1968). Effect of dietary lipid and protein on serum proteins, lipid and glucose in the blood of dairy calves. J. Nutr., 95:461.

Cloete, S.W.;P.T.T. Villers and N.M. Kritzinger (1993). The effect of ammoniation by urea on the nutritive value of wheat straw for sheep. South African J. Anim. Sci., 13: 143.

Deraz, T.A.A. and S.G.A. Mohamed (1999). The effect of feeding ureated bean straw on lambs performance. Egypt. J. Appl. Sci; 14:1.

Doumas, B.; W. Waston and H. Biggs (1971). Albumin standards and measurements of serum with bromocresol green. Clin. Chem. Acta., 31: 87.

Dryden, G.M.C.L. and R.A. Leng (1988). Effect of ammonia and sulphur dioxide gases on the composition and digestion of barley straw. Anim. Feed Sci. & Tech., 19:121.

El-Ashry, M.A.; M.F. Ahmed, S.A. El-Saaday; M.E.S. Youssef, I.A. Gomaa and T.A.A. Deraz (1997). Effect of mechanical *vs.* mechano-chemical or mechano-biochemical treatments of crop residues on their use in ruminant rations: digestibility, nitrogen balance and some blood and rumen liquor parameters of sheep. The 6th Conf. on Anim. Nutr. El-Minia, 17.19 Nov. Egypt. J. Nut- & Feeds I. (Special Issue): 99.

El-Ashry. A.M.; H.M. Khattab, M.K. Hathout and S.K. El-Sayed (2000). The use of different energy and nitrogen sources in complete rations for Rahmany lambs. Conf. on Anim. Prod. In the 21st Century, Challenges and Prospects. 18-20 April 2000, Sakha, Khafr El-Sheikh, Egypt.

El-Danasoury, M.A. (1976). Utilization of non protein nitrogen in ruminants. M.Sc. Thesis, Fac. of Agric. Alex. Univ.

El-Shinnawy, M.M.; F.M. Farrag; A.K. Abou-Raya; I.A. Abou-Selim, I.A. Soliman and B.B. Matter (1991). Effect of feeding various sources of NPN on the performance of growing calves. 2-Digestibility and ruminal activity. J. Agric. Sci. Mansoura-Univ., 16: 1975.

El-Shinnawy, M.M.; A.Z. Mehrez; M.K. Hathout and B.K. Ibrahim, (1982). The feeding qualities of enriched

stalks to substitute clover hay in the rations of ruminants. 1.Metabolism trials with sheep. Res. Bull. 558, Fac. Agric. Zagazig Unvi, Egypt.

Fouad, R.T. (2001). Effect of replacing concentrate feed mixture by barley grains on seédi lambs performance in upper Egypt. J. Agric. Sci. Mansoura Univ., 26: 7619.

Fouad, R.T.; T.A. Deraz and S.A. Attia-Ismail, (1998). Biological *versus* urea treatment of roughages for sheep. J. Agric. Sci. Mansoura Univ., 23: 103.

Hanafy, M.A.; S.A. El-Saadany, Y.I. El. Talty and A.A. El-Mekass, (1998). Effect of feeding different sources of forages and concentrates on sheep performance. Egypt. J. Anim. Prod. 35, Suppl. Issue. Dec. (1988), 467.

Jie, C.; C. Weihuo, Q, Weilin and L. Tianshul, (1987). Digestion and utilization of ammoniated rice straw in Hu sheep. Acto Vete. et Zootechnica Sinica., 18: 1:5.

Mathison, G.W., D.F. Engstrom and D.D. Macleod (1991). Effect of feeding whole and rolled barley to steers in the morning or afternoon in diets containing differing proportions of hay and grain. Anim. Prod., 53:321.

Mehrez, A.Z. (1992). Influence of roughage: concentrate ratio on nitrogen requirements of rumen microbs for maximal rate of fermentation. Proc. Int'l Conf. of Manipulation of Rumen Micro-Organisms to Improve Efficiency of Fermentation and Ruminal Production. Alex. Egypt. 20-23 Sep. 1992.

Mohamed, A.H.; T.A. Deraz and A.A. Abdel-Aziz, (1999).Effect of the modification of urea treatment of roughages on intake, digestibility, rumen liquor and blood parameters with sheep. Egypt. J. Appl. Sci., 14:36.

Mostafa, M.R.M. and A.M. El-Gaafarawy, (1997). Ammoniated rice straw in comparison with clover hay in feeding dairy cows. Egypt. J. Appl. Sci., 12:1.

Mostafa, M.R.M.; M.F. El-Sayes, K.E. Etman and M.K. Hathout (1995). Performance of lambs fed alfalfa hay or berseem silages. Proc. 5th Sci. Conf. Anim. Nutr. Ismailia, 12-13 Dec.

Mostafa, M.R.M., R.T. Fouad, M.F. El. Sayes and A.E.M. Khinizy, (1998). Performance of barki lambs fed conserved forages prepared by different methods. First International conference on Anim. Prod-and health in Semi-Arid Areas, El Arish-North Sinai, Egypt, 1-3 Sep.

Orskov, E.R. (1982). Protein Nutrition in Ruminants. Test Book, Acad. Press Inc. London.

Patters, T. (1968). Colorimetric determination of total proteins. Clin, Chem., 14:1147.

S.A.S. (1982). User's guide: statistics. S.A.S. Inst., Cary.NC. Releigh.

Shehatta, E.I.; Faten, F. Abou Ammo and Saida M. Ahmed (1997). Effect of nutritional regimae and castration on growth performance and slaughter traits of zaraibi (goat kids). Egypt. J. App. Sci.; 12: 1.

Shehatta, E.I. and I.A. El-Sayed, (1994). Fattening lambs on different kinds of grains. Menofiya J. Agric. Res., 19: 1441.

Swidan, F.Z.; M.K. Hathout and A.H. Mohamed, (1996). Effect of ammonia treatment on chemical analysis, intake and digestibility of some by-products by sheep. 6th Conf. Agric. Dev. Res. Ain shams Univ. Cairo. Dec. 17-19.

Tiwari, S.P.; V.B. Singh and R. Usha Wahra, (1990). Urea molasses

minerals block as a feed supplement. Effect on growth and nutrient utilization in buffalo calves. Anim. Feed Sci. and Tech., 29:333.

Van Soast, P. (1968). Structural and chemical characteristics which limit the nutritive value of forages. Amer. Soc. Agron. Spec. Pub., 13:63.

Van Soest P.J. (1982). Nutritional Ecology of the Ruminants. O & B Books Inc. Corvallis, Oregon, USA.

Van Soest, P. and L.A. Moore (1965). New chemical methods for analysis of forages for the purpose of predicting nutritive value. 9th Grassland Congr. Sao Paulo, Brazil, P. 283.

Warner, A.C.I. (1964). Production of volatile fatty acids in the rumen. 1. methods of measurements. Nutr. Abs. and Rev., 34.339.

مقارنة تبن الشعير الغير معامل أو المعامل باليوريا فى تغذية الحملان البلدى

خالد محمود محمد موسى

قسم تغذية الحيوان معهد بحوث الإنتاج الحيوانى ،مركز البحوث الزراعية الدقى – مصر

الهدف من البحث هو دراسة تأثير استخدام علائق مختلفة المادة الخشنة على نمو ومعاملات الهضم بواسطة الحملان البلدى. تم تقسيم ٢١ حولى ذكر على ثلاث مجاميع متساوية غذيت جميعها على ١% علف مركز + ١% حبوب الشعير من وزن الجسم بجانب دريس البرسيم (مجموعة ١ مقارنة).. أو تبن الشعير (مجموعة ٢).. أو تبن شعير معامل باليوريا (مجموعة ٣) وذلك لحد الشبع لمدة ١٥٠ يوماً. وقد أجريت تجربة تمثيل غذائى أثناء إجراء تجربة التغذية.. كانت كل معاملات الهضم عدا معامل هضم الألياف وكذلك قيمة المركبات الكلية المهضومة والبروتين المهضوم وميزان الأزوت، لصالح مجموعة الدريس (الكنترول).. بينما لم تكن هناك فروق معنوية فى قيم البروتين الكلى والبيومين وجلوبيولين الدم وكذلك قيم الاس الهيدروجينى ومجموع الأحماض الدهنية الطيارة التى قدرت فى سائل الكرش. كانت معدلات النمو وكفاءة تحويل الغذاء ككيلو جرام مادة جافة مأكوله إلى كيلو جم نمو لصالح الكنترول (الدريس).. بينما تفوقت مجموعة التبن المعامل باليوريا (المجموعة الثالثة) فى انخفاض تكلفة كيلو النمو مع ارتفاع الكفاءة الاقتصادية.

بناء على هذه الدراسة يمكن القول أن معاملة التبن باليوريا قد أدت إلى تحسين قيمته الغذائية وخفضت من تكاليف إنتاج اللحم فى الحملان البلدى ورفع كفاءتها الاقتصادية.