قسم : الانتاج الحيوانى - كلية الزراعة - جامعة أسيوط
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استخدام اليوريا ومصاصة القصب فى علائق تسمين الحملان الصعيدى

جلال عبد الحافظ ، فيصل الحمصى

استخدم فى هذه الدراسة ٣٠ حمل صعيدى عمرها ٧ شهور . قسمت الى مجموعتين . المجموعة الاولى حملان كبيرة الوزن - المجموعة الثانية حملان صغيرة الوزن (١٥ فى كل مجموعة) .

قسمت كل من الحملان الكبيرة والصغيرة الوزن الى ثلاثة مجموعات هى أ ،ب ،جـ . غذيت المجاميع أ ، ب ، جـ على عليقة بها صفر ، ٢٠٪ ، ٤٠٪ من البروتين المهضوم فى صورة يوريا - كذلك غذيت المجاميع الثلاثة على مصاصة القصب كمصدر وحيد للعليقة المالئة .

أجريت ثلاثة تجارب هضم وميزان ازوت على المجاميع الثلاثة باستخدام الحيوانات الحيوانات كبيرة الحجم لمعرفة أثر استخدام اليوريا ومستواها على الهضم وعلى تمثيل الازوت . كذلك درس أيضا معدل النمو فى المجاميع المختلفة وكفائتها التحويلية للغذاء وكذلك صفات ذبائحها . وفيما يلى ملخص لنتائج هذه الدراسة :

١ - زيادة نسبة نيتروجين اليوريا فى العليقة أدى الى زيادة معاملات الهضم للمركبات الغذائية المختلفة وخاصة الألياف الخام بينما وجد أن مضاعفة كمية اليوريا لتصل الى ٤٠٪ من البروتين المهضوم فى العليقة نتج عنه انخفاض كمية الازوت المحتجز فى الجسم .
٢ - حدث تحسن فى كل من الزيادة اليومية فى الوزن وكذلك فى الكفاءة التحويلية وذلك بزيادة نسبة اليوريا فى العليقة وأن كانت الفروق بين المعاملات وكذلك بين الأحجام الصغيرة والكبيرة غير مؤكدة .
٣ - يمكن استخدام مصاصة القصب محل تبن القمح فى علائق تسمين الحملان .
٤ - لاتوجد اختلافات مؤكدة فى نسبة التصافى سواء بين المعاملات أو بين الأحجام المختلفة .
٥ - ليس للمعاملات أو حجم الحيوان تأثير معنوى على النسبة المئوية لقطع اللحم فى الذبائح .
٦ - لم يكن هناك تأثير مؤكد للمعاملات على المكونات الطبيعية للذبيحة وان كانت ذبائح الحيوانات أكثر احتواء على الدهن من الذبائح الصغيرة الحجم .

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THE VALUE OF UREA AS A NITROGEN SOURCE IN FATTENING RATIONS, CONTAINING BAGASSE, FOR LAMBS

(With 6 Tables)

By

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SUMMARY

Fifteen animals of each large and small size Saidi lambs of 7-8 months old were divided into 3 equal groups (A, B and C). Group A, B and C were fed on rations containing 0,20 and 40% of their digestible crude protein as urea, respectively. All groups were fed bagasse ad libitum. Three digestion and nitrogen metabolism trials were conducted on large groups to determine the effect of urea on digestibility and N-metabolism. Body performance and carcass traits were also studied. The results obtained could be summarized as follows.

1- Increasing the percentage of N as urea in the ration resulted in an increase in digestibility coefficients of nutrients especially the crude fibre and a decrease in N retention.
2- Daily gain and growth measures were slightly improved with increasing the urea level. The differences between treatments and size of animal were not significant.
3- Bagasse can be used as a roughage feed in the rations of fattening lambs.
4- Dressing percentage did not differ significantly between treatment groups and size of animals.
5- The source of N in the ration or size of animal had no significant effect on the percentage of carcass joints.
6- Physical composition of the carcass was not affected significantly by treatment. However, large animals had higher fat percentage as compared to small ones.

INTRODUCTION

Protein supplements are both scarce and costly, especially in developing countries and their future use for ruminants appears even more uncertain. Moreover, the quantities of the main roughages commonly used in formulating rations (barseem, hay, and wheat straw) are not enough and are expensive.

Fuerthermore, several by-products which are very low in crude protein such as bagasse are available and could be utilized for ruminant feeds when supplemented with a nitrogen source. Any attempt to use these by products as well as a cheaper source of nitrogen (urea) can contribute to solveng the concentrate and roughage shortages.

Thus, the research herein was undertaken to study the effect of using bagasse and different urea levels in the ration of fattening lambs on digestibility, nitrogen metabolism, body performance and carcass traits.

MATERIALS AND METHODS

Thirty Saidi lambs (15 animals of each large and small size) were randomly selected from the Saidi herd of the Agriculture Experimental Farm, Faculty of Agriculture, Assiut University, Assiut, Egypt and used in the present study. Animals of similar size were divided into 3 equal groups (5 animals of each). Animals were 7-8 months old at the beginning of the experiment which continued until the animals reached 12-13 months old at the end of experiment.

Groups were designated as A,B and C. Group A was fed on the control ration, while the other two groups B and C were fed on tested rations (containing two different levels of urea) as shown in table (1): Chopped bagasse was used at ad libitum feeding for all groups as the only roughage and the amount consumed was calculated by weighing the refuse and deducting it from the amount offered. The chemical composition of bagasse and concentrate mixtures are presented in table (2).

At the start of the experiment, lambs were drenched as a preventive measure against any infestation with internal parasites. Animals were kept in a semi-open shed and were fed in groups. All groups were fed on the same level of energy (1.7 x maintenance). Water was available at all times. Individual body weights were taken on 3 consecutive days at the beginning and at biweekly intervals. Food and water were withheld overnight before weighing.

TABLE (1): Composition of the experimental rations

Ingriedients	Rations		
	A	B	C
Decorticated cottonseed meal %	25	11.88	4.90
Rice bran %	25	12.87	14.70
Wheat bran (coarse) %	15	24.75	29.40
Corn %	32	46.55	46.10
Ca-carbonate %	2	2	2
Common salt %	1	1	1
Urea %	0.0	0.95	1.90

TABLE (2): Chemical analysis of the bagasse and the concentrates

	D.M. %	C.P. %	E.E. %	C.F. %	NFF %	Ash %
Bagasse	93.03	2.22	4.99	35.57	47.19	3.06
Conc. mix. A	90.68	19.90	8.48	5.37	47.10	9.83
Conc. mix. B	90.98	19.39	7.77	4.59	52.49	6.74
Conc. mix. C	91.51	19.44	7.27	4.77	53.09	6.94

Digestibility and nitrogen balance:

During the last month of the experiment, two lambs were taken from each large group and were housed in individual metabolic cages, for 10-day preliminary and 7-day collection periods (BARTH et al, 1974 and COLEMAN and BARTH, 1974). Animals were fed at a constant amount of bagasse (200 gm/day/animal). Faeces were collected daily during the collection period from each animal, weighed, thoroughly mixed and representative samples (10% of its weight) were taken in plastic bags for moisture determination. The dried samples from each animal were mixed at the end of the collection period, ground and kept for chemical analysis. The volume of the urine excreted daily was measured. Two ml. of concentrated sulphuric acid were added in the collecting bottle as preservative. Daily urine samples were later mixed and a representative sample taken and analysed for its nitrogen content.

Slaughter and carcass studies:

At the end of the experiment, two animals of each large and small size group were slaughtered according to Islamic traditions. Animals were fasted 24 hours period to slaughter and were weighed immediately before and after slaughtering. Following slaughtering and dressing, hot carcass weight was recorded. The tail of each carcass was removed and its weight was recorded.

The hot carcass was then cut longitudinally into two equal halves. The right side was subdivided into bone in joints following the procedure described by (TIMON and MAURICE 1965). To determine the physical composition of the carcass, leg, loin and neck joints were dissected completely into lean, fat and bone. (El-Hommosi and El-Alamy 1979) found that leg plus loin or leg plus neck were the excellent predictors for the physical components of the carcass of fat tailed sheep.

Analysis of feeds, faeces and urine were carried out according to the official methods of A.O.A.C. (1965).

Statistical analysis of the data were carried out according to (SNEDECOR and COCHRAN 1968).

RESULTS

Results are presented in tables 3,4,5, and 6.

DISCUSSION

Digestibility and nitrogen metabolism:

Apparent digestibility values of the different nutrients of the rations and the nitrogen utillization data are presented in table (3). Generally, apparent digestibility values increased as the urea content of the ration increased (Table 3). The effect of urea is most evident in the digestibility of the crude fiber which increased by 30% and 55.6% due to addition of urea in ration B and C, respectively. This trend agrees with the previously reported work by (BARTH et al,1974) who found that increasing the percentage of total N as urea from 24 to 48% resulted in a significant (P/ 0.0.5) increase in crude protein digestibility. Also, (ABD EL-HAFEEZ and TONY 1975) reported that urea improved the digestibility especially that of protein and N.F.E. Moreover, in vitro results of (BELASCO 1954) suggested that urea support cellulose digestion as well or better than most plant protein sources.

Results of nitrogen utilization showed that nitrogen intake was relatively higher in group B which consumed the ration containing 20% of the digestible protein as urea than those in the control group (A), however, fecal N was slightly less in group B. On the other hand, N- intake was nearly similar in groups A and C, but fecal nitrogen from animals fed ration (C) containing 40% of the digestible N as urea was less than that from animals consuming the control ration. This was reflected in the value of both apparent and true digestibility. These results which agree with those of (BARTH et al,1968), (LOWERY and McCORNICK 1969) and (OLTJEN et al,1971) were probably best explained by the high rate of hydrolysis of the urea and the subsequent absorption of liberated ammonia via the rumen wall (BARTH et al, 1974& COLEMAN and BARTH, 1974).

Urinary N from animals fed the ration containing 40% of the digested N as urea (Group C) was higher than from animals consuming either of the other rations.Since this increase in urinary N was greater than the decrease in fecal N, the overall effect of increasing urea N resulted in decreased nitrogen retention. This decrease in N retention agrees with the results of (BARTH et al, 1974).

Body performance: From the data presented in table (4) it is evident that there is slight difference between the final weight of animals in the three treatments. Results also show that the palatability of bagasse did not differ from wheat straw which is commonly used in the farm. The average daily intake of bagasse by large groups was nearly similar to the intake from wheat straw (0.29 kg) reported by (ABD EL-HAFIZ and EL-HOMMOSI 1979) when 1-year old lambs were fed wheat straw ad libitum in addition to 0.99 kg concentrate. Therefore, bagasse can be used as a roughage feed.

TABLE (3): Coefficients of digestibility (%) and nitrogen utilization as affected by urea level

group / Item	A (0.0 urea)	B (20% of D.C.P. as urea)	C (40% of D.C.P. as urea
Apparent digestibility:			
Dry matter	64.79	67.72	67.72
Organic matter	68.91	72.15	73.09
Crude Protein	70.88	73.35	74.38
Crude fibre	29.67	38.59	45.17
Ether extract	80.55	82.39	83.51
N-free extract	74.13	76.38	77.26
Nitrogen utilization:			
N intake, g/day	29.30	31.6	28.64
Fecal N, g/day	8.53	8.42	7.34
Urinary N, g/day	11.00	11.02	13.85
N retention, g/day	9.77	12.16	7.45
Metabolic fecal N, g/day[1]	4.14	4.25	3.82
True N digestibility, %[2]	85.02	86.80	87.71
N retention, %[3]	33.35	38.48	26.01

1- Metabolic fecal N = 11.9 x kg DM in feces/day (Swanson & Herman, 1943).

2- True N digestibility = N intake - (fecal N - MFN) / N intake x 100.

3- N retention % = N intake - fecal N - urinary N/N intake x 100.

There was a slight non significant increase in average daily gain in the treatment groups B and C compared with that obtained in the control one (A) and this change was accompained by a slight improvement in the growth measure.

Moreover, the growth measure was better in small lambs than in the large ones, inspite of large animals scored, on the average, a slightly higher values for daily gain compared to small ones. This may be due to the fact that the small animals were not depositing substaintial amount of fat in their bodies like that of the large animals. This is supported by the results of the physical composition of the carcass (Table 6).

Dressing percentage: Results in table (4) show that carcass weight and dressing percentage did not differ significantly between treatment groups. This may be explained on the basis that all groups was fed on the same level of energy and the fact that the variation in the energy level intake has the significant effect on dressing percentage (POPANOV, 1970 and BOND et al, 1972).

On the other hand, in spite of the carcass weight differed significantly between both size of lambs, but it was not large enough to affect the dressing percentage.

Carcass Joints:

Results of different meat cuts as a percentage of the half carcass weight are shown in table (5). These results show that source of N in the ration had no significant effect on the percentages of different joints of the carcass as the energy level was held constant (REYNOLDS et al, 1966 and EL-TAWIL, 1970).

Concerning the effect of animal size, it is quite clear that the percentages of carcass joints was nearly the same in large and small animals. However, carcasses of small size had the higher leg percentage and the lower percentage of tail than those of large size. (KEMP et al,1970) showed that as the weight of the carcass increased the yield of breast and flank and kidney and pelvic fat increased significantly, while yield of leg, shank,kidney and bone waste decreased (P/ 0.01).

TABLE (4): Growth rate, growth measure and dressing value in Saidi lambs fed on three experimental rations

	Group A		Group B		Group C		significance	
	Large	Small	Large	Small	Large	Small	Treat.	Size
Av. intial wt. kg	27.3± 1.93[1]	21.6± 0.53	27.6± 1.69	21.7± 1.29	27.5± 1.75	21.7± 0.75	n.s.	**
Av. final wt. kg	41.6± 3.36	35.2± 1.63	43.4± 1.83	36.6± 1.64	42.8± 2.53	37.4± 1.63	n.s.	**
Av. daily gain gm	98.0± 12.09	90.67± 8.26	105.33± 7.12	99.33± 10.02	102.53± 6.58	104.67± 12.5	n.s.	**
Av. daily bagasse intake "kg"	0.29± 0.012	0.17± 0.010	0.28± 0.012	0.16± 0.011	0.28± 0.013	0.16± 0.009	n.s.	**
Av. daily conc. intake "kg"	0.84± 0.04	0.74± 0.04	0.85± 0.05	0.74± 0.05	0.83± 0.05	0.74± 0.05	n.s.	**
S.V. intake kg/day	0.650	0.550	0.650	0.560	0.636	0.554		
Growth measure (kg S.V./kg gain)	6.63± 1.52	6.07± 0.67	6.17± 0.42	5.64± 0.76	6.20± 0.50	5.29± 0.75	n.s.	**
Fasting wt kg[2]	44.0± 4.0	35.0± 2.0	44.30± 0.3	35.5± 3.5	45.5± 1.5	38.5± 3.5	n.s.	**
Carcass wt kg[2]	21.83± 2.88	17.51± 1.38	22.45± 1.25	18.1± 2.5	22.16± 1.0	17.93± 1.43	n.s.	**
Dressing %[1]	49.61± 2.05	50.03± 0.51	50.68± 3.17	50.79± 2.04	48.70± 0.59	46.57± 0.54	n.s.	n.s.

n.s.=not significant ** P/ 0.01 1- Average ± S.E. 2- Results and means of two animals.

TABLE (5)

Effect of urea levels on the percentage of carcass joints (in half carcass) in Saidi lambs

Treatments / joints	Group A Large	Group A Small	Group B Large	Group B Small	Group C Large	Group C Small	significance Treat	significance Size
Right side (kg)	9.125±1.33[1]	7.59±0.51	9.95±0.25	7.575±1.18	9.265±0.54	7.65±0.45	n.s	*
Leg %	23.56±1.5	26.19±1.1	24.62±0.6	26.58±1.5	24.42±0.74	26.54±1.27	n.s	n.s
Loin %	15.34±1.4	15.48±0.6	17.21±0.06	17.99±1.0	18.62±0.82	16.99±1.85	n.s	n.s
7-12th ribs %	6.58±0.71	6.75±0.71	7.41±0.95	7.43±0.33	6.48±0.65	6.70±0.89	n.s	n.s
1-6th ribs %	7.95±0.34	7.91±0.2	7.29±0.07	6.93±0.76	6.48±0.65	6.86±0.58	n.s	n.s
Shoulder %	17.26±0.05	17.29±1.0	16.71±0.46	16.83±0.31	17.49±0.56	17.81±0.43	n.s	n.s
Neck %	15.51±0.03	13.20±0.5	10.05±0.26	10.89±1.66	10.52±1.02	9.80±1.24	n.s	n.s
Breast & Flank%	15.89±0.16	19.76±0.03	16.58±0.42	16.36±0.26	14.44±0.65	14.71±0.77	n.s	n.s
Tail %	4.75±0.93	3.50±1.27	5.12±1.05	4.32±0.80	5.31±2.97	4.46±0.49	n.s	n.s

n.s = Not significant

* P/ 0.05

L Average ± S.E.

TABLE (6)

Effect of urea levels on carcass components

Treat. / Carcass components		Group A Large	Group A Small	Group B Large	Group B Small	Group C Large	Group C Small	significance Treat	significance Size
Leg	gm	2150±175[1]	1987.5±88	2450±0.00	1937.5±188	2262.5±62	2075±25		
Lean	%	77.91±3.9	74.21±2.0	71.43±4.1	75.48±0.2	74.03±0.2	75.30±3.9	n.s	n.s
Fat	%	9.88±1.4	5.66±0.4	11.74±0.6	5.81±2.7	6.63±0.90	7.23±3.5	n.s	n.s
Bone	%	12.21±4.3	20.13±1.6	16.84±1.5	18.71±8.0	19.34±1.1	17.47±0.3	n.s	n.s
Loin	gm	14.00±300	1175±125	1712.5±38	1362.5±288	1725±175	1300±225	n.s	n.s
Lean	%	66.96±4.8	68.09±0.80	53.28±6.3	61.47±0.8	55.07±1.7	57.69±0.4	n.s	n.s
Fat	%	22.32±5.3	14.89±1.6	28.47±7.4	18.35±3.6	23.19±3.5	18.27±1.7	n.s	n.s
Bone	%	10.72±0.5	17.02±2.5	18.25±0.9	20.18±4.5	21.74±5.2	24.04±1.3	n.s	n.s
Neck	gm	1050±150	850±100	1000±0.0	825±250	975±150	750±50		
Lean	%	77.38±2.8	72.06±1.9	76.25±3.8	78.79±2.9	73.08±2.3	71.67±6.5	n.s	n.s
Fat	%	5.95±2.8	5.88±0.0	5.00±0.0	4.45±3.2	6.37±0.0	4.64±0.0	n.s	n.s
Bone	%	16.67±0.0	22.06±7.1	18.75±1.3	16.67±6.1	20.55±11.0.	22.69±4.9	n.s	n.s

n.s = not significant

* = P/ 0.05

1 = Average ± S.E.

Physical components of the carcass:

The physical components (lean, fat and bone) of a carcass plays a main role in determing its quality. Results in Table (6) revealed that the effect of treatment on physical components of leg, loin and neck was not significant. Therefore, it can be concluded that using urea in the ration of fattening lambs had no unfavourable effects on carcass quality. It was noted that large animals had the highest values for dissectable fat percentage as compared to small ones. (KEMP et al 1970) found that the percent of fat trim increased significantly (P/0.01) in all carcass cuts with increasing slaughter weight.

Generally, the present study indicate that using urea at, even, 40% of the digestible nitrogen in the ration can be considered quite safe. This is in agreement with many investigators who cited that urea can be used safely and with no adverse effect on growth (ROBERTSON and MILLER, 1971 and EL-NAGGAR et al, 1978) and fattening (RAVEN, 1972).

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