RESULTS AND DISCUSSION

4.RESULTS AND DISCUSSION

4. 1 Digestion Trials :

4.1 . 1 Nutrients Digestion Coefficients :

The digestion coefficients of each of DM, CP , EE , CF , NFE , Ash and OM for each lamb were calculated in Tables [A -1to A -8] .

4.1.1. 1 Effect of T D N level :

Increasing TDN level from 62 to 72 level resulted in significant increases ($p < 0.01$) in all nutrients apparent digestion coefficients as shown in (table 3) .

For instance , (DM) coefficient increased from 62.46 to 70 24 % ; (OM) coefficient from 63.55 to 71.78 % ; (CF) coefficient from 60.56 to 62.08 % and (C P) coefficient from 61.38 to 64.94 % respectively as shown in (table 2) . Merchen *et al.*, (1987) indicated that at 10.5 % C P level lambs fed high energy diets had significantly higher digestion coefficients of (DM) ; (OM) and (CF) .

However, Tagari *et al.* ,(1964) had another point of view ; they stated that the increased digestibility of protein (due to substitution of carbohydrate roughages by starch) which led to an increased rate of ammonia liberation which was accompanied by a decrease in N retained in the body , so an increase in protein digestibility did not indicate an

Table (2) Means ± S.E.of Digestion Coefficients for DM ; C P ; E E ;C F ;NFE and OM of lambs fed different levels of TDN , UREA and C P.

Item	D M %	C P %	E E %	C F %	N F E %	O M %
TDN Level:						
62 ...	62.46 ± 0.39 a	61.38 ± 0.71 a	51.43 ± 1.26 a	60.56 ± 0.89 a	65.30 ± 0.30 a	63.55 ± 0.36 a
72 ...	70.24 ± 0.21 b	64.94 ± 1.16 b	62.65 ± 0.88 b	62.08 ± 1.88 b	74.38 ± 0.39 b	71.78 ± 0.13 b
UREA Level:						
With	65.80 ± 1.24 a	62.56 ± 1.25 a	56.13 ± 2.35 a	58.94 ± 0.84 a	69.60 ± 1.59 a	67.22 ± 1.36 a
Without	66.90 ± 1.16 b	63.76 ± 0.90 b	57.94 ± 1.55 b	63.70 ± 1.64 b	70.08 ± 1.21 b	68.11 ± 1.15 b
C P Level :						
10 % ...	66.62 ± 1.05	62.25 ± 0.46 a	59.70 ± 1.66 a	60.56 ± 1.21 a	69.27 ± 1.23 a	67.13 ± 1.31 a
16 % ...	66.09 ± 1.35	64.08 ± 1.44 b	54.38 ± 2.01 b	62.07 ± 1.69 b	70.40 ± 1.55 b	68.20 ± 1.21 b
overall Mean ± S. E.	66.35 ± 0.84	63.16 ± 0.76	57.04 ± 1.39	61.32 ± 1.03	69.84 ± 0.98	67.66 ± 0.88

N.B. : Means with different letters are significantly different .

Table (3) Analysis of Variance of Digestion Coefficients for D M ; CP ; EE ; C F , N F E , and O M of lambs fed different levels of TDN ; UREA and C P .

S. O. V.	df	D M		C P		E E		C F		N F E		O M	
		M S	F	M S	F	M S	F	M S	F	M S	F	M S	F
T D N	1	363.326	932.0**	76.184	113.67**	755.33	209.38**	13.878	9.10**	494.41	4017.9**	406.068	3849.8**
U R E A	1	7.238	18.57**	8.592	12.82**	19.657	-5.45*	136.184	89.31**	1.359	11.04**	4.788	45.04**
C P	1	1.654	4.24	20.167	30.09**	170.24	47.19**	13.666	8.96**	7.673	62.35**	6.912	65.53**
TDN X UREA	1	0.627	1.61	7.843	11.7**	36.704	10.17**	152.057	99.7**	11.579	94.10**	3.635	34.46**
TDN X CP	1	7.707	19.77**	194.94	290.9**	4.438	1.23	193.06	126.6**	7.161	58.20**	0.829	7.86**
U R E A X C P	1	1.949	5.00*	0.035	0.05	22.427	6.22*	9.238	6.06*	1.566	12.72**	1.26	11.95**
TDN X UREA X C P	1	0.295	0.76	2.693	4.02	0.141	0.04	40.223	26.38**	0.207	1.68	0.16	1.52
E R R O R	16	0.39		0.67		3.607		1.525		0.1231		0.106	

* = Significant at 5 % level .
** = Significant at 1% level .

improved protein utilization , but here in this study there was no substitution of roughage so any increase in CP digestibility means simply an improved protein utilization .

4.1.1. 2 Effect of Urea level :

From (table 3) urea decreased significantly ($p < 0.01$) apparent digestion coefficients of all nutrients except of (EE) where it was only significant at ($p < 0.05$) .

From Table (2) lambs fed urea had 65.80 % digestion coefficient of (DM) against 66.90 % for those fed no urea . This result is in complete accordance with findings of Huber *et al.*,(1968) who reported that a small but significant decrease in digestibility of DM was found when urea furnished 11 and 23 % of dietary nitrogen for dairy cows ; where digestibility coefficients of DM for the three treatments [0 ; 11 and 23 % urea nitrogen of dietary nitrogen] were 69.0 ; 66.5 and 66.0 % respectively . For the digestion coefficient of CP , urea decreased it significantly from 63.76 to 62.56 % (table 2) . Harris *et al.*, (1943) had the same result and explained the poor utilization of urea nitrogen probably meant that it was fed above the level of conversion into true protein by rumen microorganisms , and the kidneys would have to excrete the excess ammonia . Urea also decreased significantly the digestibility of CF from 63.70 to 58.94 % and OM from 68.11 to 67.22 %

as shown in Table (2) . Soliman *et al.*, (1985) stated that lambs given the formaldehyde treated casein supplement showed higher values for DM , OM and CF digestibility compared with those given the urea supplements .

4.1.1.3 Effect of CP level :

Increasing the CP level from 10 to 16 % increased significantly ($p < 0.01$) digestibility of CP ; CF ; NFE and OM , but decreased significantly ($p < 0.01$) that of EE (table 3) . The apparent digestion coefficient of CP increased from 62.25 to 64.08 % ; that of CF from 60.56 to 62.07 % ; that of NFE from 69.27 to 70.40 % and that of OM from 67.13 to 68.20 % as shown in table (2) . Fick *et al.*, (1973)had the same result since they found that nitrogen digestion coefficients were 51.2 % and 70.2 % for the two levels of biuret nitrogen supplementation [0 and10 g / head / day] respectively ,which were significantly different. Greathouse *et al.*, (1974) also ,approved that apparent protein digestibility was increased to 69.9% and 71.9% when urea or soybean meal respectively were added to the sorghum grain than that of steers (64.8%) fed only on sorghum grain . However , increasing C P level from 10 to 16 % decreased non significantly the digestibility of DM from 66.62 to 66.09 % respectively as shown in Table (2) . Mousa (1993) supported this result since he found that when Ossimi rams were fed on a basal diet (10.3 % C P) without or with 1.0 , 1.5 or 2.0 % urea ; the apparent

digestibility values of DM decreased 62.4 , 60.4 , 60.9 and 60.9 % ; while of OM digestibility increased 63.7, 61.5 , 63.5 and 64.7 % respectively .

4.2 Feeding Experiment :

4.2.1. Feed Conversion :

4.2.1.1 Effect of T D N level :

Lambs on (72 TDN level) had always smaller mean values of feed conversion (better) than that of those on 62 TDN level . A significant improvement in feed conversion overall mean value resulted in , since it decreased from 9.32 to 7.13 g ration / g gain by increasing TDN level from 62 to72 TDN level respectively as shown in Table (4) and in Table (5) the significance level was ($p<0.01$) at 1st interval (after 2 months) while it was only ($p<0.05$) after 6 months . El- Ashry (1971) explained that result ; that the presence of soluble carbohydrate in ration resulted in better feed conversion by ewes . Craddock *et al.*, (1974) indicated that feed conversion of lambs improved as energy levels increased [from 50:50 to 80: 20 of the ratio concentrate to roughage].The same result was found by Abdel-Hamid *et al.*, (1994) since they found that feed conversion improved from 6.4 to4.3 kg DM / kg gain by increasing TDN from level (2 / 3 of N R C requirements) to normal level of TDN for Rahmani lambs .

Table (4) Means + S.E. of Feed Conversion [Ration (g) / Gain (g)] at 3 intervals { After 2 , 4 and 6 months} of lambs fed different levels of TDN ; UREA and C P .

Interval / Item	2 Months	4 Months	6 Months	Overall mean ± S E
TDN Level :				
62 ...	10.45±1.31 / a	7.62±0.72	9.90±0.77a	9.32±0.79 a
72 ...	6.09±0.72 b	7.58±0.86	7.71±0.48 b	7.13±0.47 b
UREA Level:				
WITH	8.24±1.09	8.02±0.81	9.56±0.71 a	8.70±0.64
WITHOUT	7.87±1.21	7.20±0.80	7.87±0.58 b	7.75±0.70
C P Level :				
10 % ...	6.92±1.04	7.04±0.73	8.11±0.64	7.53±0.71
16 % ...	9.25±1.20	8.19±0.88	9.31±0.69	8.92±0.58
Overall Mean±S E	8.05±0.81	7.6±0.57	8.69±0.47	

N. B. : Means with different letters are significantly different .

Table (5) Analysis of Variance of Feed Conversion at 3 different intervals [after 2 ; 4 and 6 months] of lambs fed different levels of TDN , UREA and C P .

S. O. V.	df	After 2 Months M S	F	After 4 Months M S	F	After 6 months M S	F
T D N	1	136.742	8.57 **	0.008	0	34.518	7.20 *
Urea	1	2.079	0.13	4.909	0.45	22.836	4.70 *
C P	1	45.304	2.84	9.814	0.89	10.98	2.29
TDN X Urea	1	1.724	0.11	6.676	0.61	0.175	0.04
T D N X C P	1	0.479	0.03	6.054	0.55	6.054	1.26
Urea X C P	1	5.725	0.36	0.409	0.04	1.884	0.39
TDN X Urea X C P	1	0.04	0	0.956	0.09	4.719	0.98
E R R O R	21	15.959		10.992		4.796	

* = Significant at 5 % level .

** = Significant at 1% level .

4.2.1.2. Effect of Urea level :

The overall mean value of feed conversion of lambs fed urea was nonsignificantly greater 8.70 versus 7.75 g ration / g gain for those had no urea (table 4) . However , from Table (5) there is a significant increase ($p < 0.05$)because of urea at the last interval (after 6 months) . From Table (4) the feed conversion mean value after 6 months was 9.56 of lambs fed urea versus 7.87 g ration / g gain of lambs had no urea . Chalupa (1968) explained that the decreased rumen ureolytic activity (due to dietary urea) was associated with decreased live weight gains and tendency toward lowered feed efficiences . Bhattaacharya and Pervez (1973)had the same results and reported that the feed required per unit of gain of lambs fed the control ration was lower than that of urea supplemented group , where the average values were 10.6 and 13.4 kg feed /kg gain for the two levels of urea (0 and 1.5 %) respectively .

4.2.1.3 Effect of C P level :

No significant difference was detected by analysis of variance due to increasing C P level from 10 % to 16 % (table 5) . Moreover , the overall mean of feed conversion of lambs on 10 % C P was better efficient 7.53 versus 8.92 g ration / g gain for those on 16 % C P but with no significance (table 4) . This result is in complete agreement with findings of Braman *et al.*, (1973) who found that using increasing CP

level (11 , 13 , 15 and 17 %) with urea as supplemental nitrogen (less than 3 % of diet) , depressed significantly feed efficiency of steers 0.24 , 0.26 , 0.24 and 0.27 kg gain / kg feed respectively at 56 days . However , this result differed with Craddock *et al.*, (1974) who indicated that more feed / kg gain was significantly required by lambs fed diets containing 10.5 % protein than lambs fed diets containing 13.5 % protein [9.21 vs. 8.41 kg / kg gain] respectively . There is a big difference in C P level , since in this study C P levels were (10 and 16 %) ,but Craddock and his colleagues used (10.5 and 13.5 % C P) , so may be the level 13.5 % is still under the optimum CP level , or the ratio of Protein : Energy is low which decreases the nutrients absorption (Dixon *et al.* , 1993) and exhibit a low feed efficiency .

4.2.1.4 Effect of Interval :

There were no significant differences between overall means of feed conversion of the three intervals as shown in table (4) . The lowest (better) mean value was 7.60 g ration / g gain after 4 months ; while the largest value was 8.69 after 6 months (table 4) .

4.2. 2 . Economic Feed Efficiency and Relative Economic Feed Efficiency :

4.2.2.1 Effect of Interval :

From table (6) , the economic feed efficiency was calculated as the ratio between [Net Revenue / Feed cost] at the three intervals [after 2 , 4 and 6 months] .

For the last interval [after 6 months] the best value of economic feed efficiency was (1.0) of the 6th treatment [62 TDN and 10 % CP without urea] which is the real standard control ration , while the worst value was (0.02) of the 7th treatment[62 TDN and 16 % CP with urea] at the last interval also (Table 6) .

It was clear that , treatments (rations) [which do not contain urea] always had better economic efficiency values than that of those contain urea .

For example , the 2nd treatment [72 TDN and 10 %CP without urea] after 6 months had economic feed efficiency (0.8) , while the 1st treatment at same interval [72 TDN and10 % CP level with urea] had only (0.6) as economic feed efficiency (Table 6) .

For the Relative Economic Feed Efficiency , at the last

Table (6) Relative Economic Feed Efficiency of the 8 experimental rations fed to lambs at different intervals [after 2 ; 4 and 6 Months].

Ration Number	Price/kg Ration (L.E.)	Average Feed Intake AS FED (Kg)			FEED COST L.E.			Average Daily Gain (g)			Total Revenue (L.E.)			Net Revenue (L.E.)			Economic Feed EFFICIENCY			Relative Eco. EFFICIENCY		
		2M	4M	6M	2M	4M	6 M	2 M	4M	6M	2 M	4 M	6 M	2 M	4 M	6M	2M	4 M	6M	2M	4M	6M
1	0.655	1.015	0.991	1.097	0.665	0.649	0.719	187	139	125	1.68	1.251	1.13	1.02	0.6	0.406	1.5	0.9	0.6	115	75	60
2	0.687	1.007	1.005	1.107	0.692	0.69	0.761	189	160	155	1.7	1.44	1.4	1.01	0.75	0.634	1.5	1.1	0.8	115	92	80
3	0.738	1.024	0.995	1.106	0.756	0.734	0.816	149	122	120	1.34	1.098	1.08	0.59	0.36	0.264	0.8	0.5	0.3	62	42	30
4	0.783	1.026	1	1.117	0.803	0.783	0.875	180	137	146	1.62	1.233	1.31	0.82	0.45	0.439	1	0.6	0.5	77	50	50
5	0.528	0.974	0.963	1.07	0.514	0.509	0.565	120	134	113	1.08	1.206	1.02	0.57	0.7	0.452	1.1	1.4	0.8	85	117	80
6	0.539	1.007	0.979	1.097	0.543	0.528	0.591	136	130	130	1.22	1.17	1.17	0.68	0.64	0.579	1.3	1.2	1	100	100	100
7	0.625	0.965	0.968	1.076	0.603	0.605	0.673	76	111	76	0.68	0.999	0.68	0.08	0.39	0.011	0.1	0.7	0.02	8	58	10
8	0.604	0.954	0.977	1.087	0.576	0.59	0.657	88	127	104	0.79	1.143	0.94	0.22	0.55	0.279	0.4	0.9	0.4	31	75	40

interval [after 6 months] , the 6th treatment [62 TDN and 10% CP without urea] was consider as standard [relative economic efficiency = 100%] , and all other treatments had been related to it .

The highest relative economic feed efficiency value was (80 % of that of the 6th treatment) for both the 2nd treatment [72 TDN and 10 % CP without urea] , beside the 5th treatment[62 TDN and 10% CP with urea] as shown in table (6) .

But the lowest relative economic feed efficiency was (10 % of the standard) for the 7th treatment [62 TDN and 16 % CP with urea] as shown in table (6) , and that simply because of the decreased rumen ureolytic activity due to dietary urea (Chalupa , 1968) , or because of increasing CP level with urea as supplemental nitrogen (less than 3 % of the diet Braman *et al.*,1973),or because of unfavorable protein : energy ration in the diet(Dixon *et al.*,1993),r because of all these factors together .

4.2.3 Rectal Temperature (Tre) :

4.2.3.1 Effect of TDN level :

From Table (8) the TDN level had no effect on (Tre) ; whether in any month or at any season (summer or winter) . From Table (7) the same result was found , even on the overall mean where it was 39.51 C versus 39.38 C for lambs on 72 TDN level and those on

Table (7) Monthly and seasonally mean ± S.E. of Rectal Temperature (Tre) of lambs fed different levels of TDN , UREA and C P .

Item	0 .	1 .	2 .	3 .	4 .	5 .	6 .	Overall Mean± S E	Summer	Winter
TDN Level:										
62 ...	39.42 ± 0.12	39.56 ± 0.09	39.50 ± 0.07	39.50 ± 0.05	39.31 ± 0.05	39.17 ± 0.09	39.25 ± 0.08	39.38 ± 0.04	39.48 ± 0.04	39.15 ± 0.07
72 ...	39.50 ± 0.11	39.75 ± 0.1	39.57 ± 0.09	39.65 ± 0.1	39.42 ± 0.08	39.32 ± 0.1	39.38 ± 0.13	39.51 ± 0.04	39.58 ± 0.07	39.29 ± 0.09
UREA Level:										
Wih	39.54 ± 0.12	39.67 ± 0.09	39.56 ± 0.04	39.60 ± 0.07	39.40 ± 0.07	39.28 ± 0.08	39.46 ± 0.12 a	39.47 ± 0.07	39.52 ± 0.07	39.25 ± 0.07
Without	39.38 ± 0.11	39.65 ± 0.10	39.51 ± 0.1	39.54 ± 0.09	39.33 ± 0.08	39.21 ± 0.11	39.17 ± 0.07 b	39.43 ± 0.06	39.53 ± 0.05	39.19 ± 0.10
C P Level:										
10 % ...	39.33 ± 0.11	39.54 ± 0.07 a	39.49 ± 0.06	39.50 ± 0.07	39.33 ± 0.06	39.17 ± 0.09	39.25 ± 0.10	39.38 ± 0.05	39.48 ± 0.04	39.13 ± 0.07
16 % ...	39.58 ± 0.1	39.77 ± 0.11 b	39.58 ± 0.09	39.65 ± 0.09	39.40 ± 0.08	39.32 ± 0.10	39.38 ± 0.11	39.52 ± 0.07	39.57 ± 0.07	39.31 ± 0.09
Overall Mean ± S E	39.46 ± 0.08 ab	39.66 ± 0.07 a	39.54 ± 0.05 a	39.57 ± 0.06 a	39.37 ± 0.05 b	39.24 ± 0.07 b	39.31 ± 0.07 b		39.53 ± 0.04 a	39.22 ± 0.06 b

N.B. : Means with different letters are significantly different .

Table (8) Analysis of Variance of monthly and seasonally of Rectal Temperature (Tre) of lambs fed different Levels of TDN ; UREA and C P .

Month		0		1		2		3		4		5		6		Summer		Winter	
S. O. V.	df	M S	F	M S	F	MS	F	M S	F	M S	F	M S	F	MS	F	M S	F	M S	F
T D N	1	0.042	0.27	0.211	4.05	0.029	0.41	0.128	1.81	0.065	1.32	0.14	1.81	0.094	1	0.06	2.13	0.128	2.55
Urea	1	0.167	1.07	0.003	0.05	0.01	0.15	0.023	0.33	0.023	0.47	0.029	0.37	0.51	5.44 *	0.002	0.06	0.023	0.47
C P	1	0.375	2.4	0.315	6.05*	0.057	0.8	0.128	1.81	0.023	0.47	0.14	1.81	0.094	1	0.05	1.79	0.211	4.21
TDN X Urea	1	0.167	1.07	0.211	4.05	0.057	0.8	0.003	0.04	0.023	0.47	0.01	0.13	0.094	1	0.027	0.95	0.023	0.47
TDN X C P	1	0.042	0.27	0.753	14.45**	0.26	3.69	0.128	1.81	0.44	8.89 **	0.844	10.88**	0.51	5.44 *	0.26	9.26 **	0.586	11.69 **
Urea X C P	1	0.167	1.07	0.211	4.05	0.01	0.15	0.065	0.93	0.003	0.05	0.029	0.37	0.094	1	0.05	1.79	0.023	0.47
TDNXUreaX C P	1	0	0	0.065	1.25	0.057	0.8	0.211	3	0.003	0.05	0.01	0.13	0.01	0.11	0.01	0.37	0.023	0.47
ERROR	16	0.156		0.052		0.071		0.07		0.05		0.078		0.094		0.028		0.05	

* = Significant at 5 % level .
** = Significant at 1 % level .

62 TDN level respectively . There is a nonsignificant increase in (Tre) in favor of higher level of TDN (7 2) , and that difference is still in the normal range[(from about 37.5 to 40.5 C of Tre ,(Hafez , 1968)] , which means that lambs are not under stress and simply are in suitable conditions .

4.2.3.2 Effect of Urea level :

There was no significant difference in (Tre) overall mean due to urea , since it was 39.47 C for lambs fed urea against 39.43 C for those had no urea as shown in table (7) , which means that animals are not stressed but within the normal range (Hafez , 1968) . However , there was a statistically significant ($p < 0.05$) difference because of urea at December (6^{th} month) on (Tre) monthly mean as shown in Table (8) . The (Tre) mean of lambs fed urea at December was 39.46 C versus 39.17 for those fed no urea (table 7) , but this difference is still within the limit (Hafez ,1968) and the animals are not suffering from any stress .

4.2.3.3 Effect of C P level :

There was a significant ($p < 0.05$) increase in (Tre) mean value from 39.54 C to 39.77 C in July month due to increasing C P level from 10 % to 16 % , and the general trend noticed was that increasing CP level resulted in a non significant increase in (Tre) monthly means from August till December including the two seasons Summer and Winter as shown in

tables (7) and (8) . This result is in accordance with findings of Shoukry (1981) .

4.2.3.4 Effects of month :

There were significant differences in Tre overall monthly mean . The overall Tre monthly mean of each of July , August and September months were significantly higher than that of October , November or December (Table7) . The highest monthly overall Tre mean was 39.66 C of July , while the lowest was 39.24 C of November (Table 7) . The seasonal Tre overall mean also differed significantly as shown in table (7) . These monthly and seasonally differences in the Tre overall means are normal and followed diurnal fluctuations in ambient temperature according to Hafez (1956) .

4.2.4 Skin Temperature (Tsk) :

4.2.4.1 Effect of T D N level :

From table(10) , the analysis of variance revealed that TDN level had significant ($p < 0.01$) effect on monthly means of (Tsk) in months of June , July and in Summer season , but it was significant at ($p < 0.05$) level in December month . The overall mean of (Tsk) was statistically significantly higher 38.53 versus 38.24 C for lambs on 72 TDN level and those on 62 TDN level respectively as shown in Table (9) . Also , in Summer season there was a significant difference in favor of lambs on 72

Table (9) Monthly and seasonally means ± S.E. of Skin Temperature (Tsk) of lambs fed different levels of TDN , UREA and C P .

Month / Item	0 .	1 .	2 .	3 .	4 .	5 .	6 .	Overall Mean ± SE	Summer	Winter
TDN Level:										
62 ...	38.17 ± 0.08 a	38.25 ± 0.10 a	38.51 ± 0.11	38.85 ± 0.08	38.29 ± 0.07	37.58 ± 0.17	37.98 ± 0.14 a	38.24 ± 0.06 a	38.42± 0.06 a	37.80 ± 0.12
72 ...	38.71 ± 0.12 b	39.00 ± 0.11 b	38.52 ± 0.1	38.96 ± 0.1	38.50 ± 0.09	37.63 ± 0.2	38.46 ± 0.17 b	38.53 ± 0.08 b	38.74 ± 0.07 b	38.02± 0.13
UREA Level:										
With	38.44 ± 0.15	38.71 ± 0.16	38.54 ± 0.11	38.94 ± 0.09	38.42 ± 0.08	37.88 ± 0.20 a	38.46 ± 0.12 a	38.40 ± 0.08	38.60 ± 0.09	37.93 ± 0.16
Without	38.43 ± 0.11	38.54 ± 0.14	38.49 ± 0.10	38.88 ± 0.08	38.38 ± 0.09	37.33 ± 0.13 b	37.98 ± 0.19 b	38.38 ± 0.08	38.56 ± 0.07	37.90 ± 0.1
C P Level:										
10 % ...	38.39 ± 0.14	38.63 ± 0.11	38.43 ± 0.10	38.85 ± 0.07	38.33 ± 0.08	37.42 ± 0.14	38.21 ± 0.22	38.38 ± 0.1	38.55 ± 0.05	37.81± 0.15
16 % ...	38.49± 0.11	38.63 ± 0.19	38.60 ± 0.11	38.96 ± 0.10	38.46 ± 0.09	37.79 ± 0.21	38.23 ± 0.1	38.39 ± 0.05	38.61 ± 0.1	38.01 ± 0.1
Overall Mean ± SE	38.44 ± 0.09 bc	38.63 ± 0.11 b	38.51 ± 0.07 bc	38.91 ± 0.06 a	38.40 ± 0.06 bc	37.60 ± 0.13 d	38.22 ± 0.12 c		38.58 ± 0.05 a	37.91 ± 0.09 b

N.B. : Means with different letters are significantly different .

Table (10) Analysis of Variance of monthly and seasonally of Skin Temperature (Tsk) of lambs fed different levels of T D N ; UREA and C P .

Month		0		1		2		3		4		5		6		Summer		Winter	
S. O. V.	df	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F
TDN	1	1.755	14.55**	3.375	29.45**	0	0	0.065	0.62	0.26	2.78	0.01	0.04	1.378	6.15*	0.629	11.76**	0.287	1.81
Urea	1	0.001	0.01	0.167	1.45	0.019	0.13	0.023	0.22	0.01	0.11	1.76	6.26*	1.378	6.15*	0.009	0.16	0.006	0.04
C P	1	0.059	0.49	0	0	0.165	1.15	0.065	0.63	0.094	1	0.844	3	0.003	0.01	0.021	0.4	0.235	1.48
TDN X Urea	1	0.338	2.81	0	0	0.116	0.81	0.023	0.22	0.01	0.11	0.01	0.04	0.023	0.1	0.018	0.34	0.001	0
TDN X C P	1	0.2	1.66	0.667	5.82*	0.378	2.63	0.023	0.22	0.094	1	0.01	0.04	0.065	0.29	0.219	4.15	0.032	0.2
Urea X C P	1	0.01	0.08	0.042	0.36	0.005	0.03	0.023	0.22	0.01	0.11	1.76	6.26*	1.148	5.13*	0.007	0.14	1.438	9.05**
TDN Xurea X C P	1	0.093	0.77	0.042	0.36	0.019	0.13	0.211	2.02	0.01	0.11	0.094	0.33	0.211	0.94	0.04	0.76	0.006	0.04
ERROR	16	0.121		0.115		0.144		0.104		0.094		0.281		0.224		0.053		0.159	

* = Significant at 5 % level .
** = Significant at 1 % level .

TDN (38.74 against 38.42 C) than those on 62 TDN level respectively (Table 9). Folk (1974) explained how (Tsk) is regulated by vasodilation in peripheral blood vessels when ambient temperature is increased to increase heat loss to environment or the reversal action (vasoconstriction) in cold environment to decrease heat loss and preserve it for the animal . Moreover , these fluctuations in (Tsk) is following the ambient temperature , and Hafez (1956) and Shoukry (1981) reported that diurnal and seasonal fluctuations .

4.2.4.2 Effect of Urea level :

Supplementation of urea increased non significantly (Tsk) overall mean which was (38.40 C) for lambs fed urea versus (38.38C) for those had no urea (Table 9) . However, there were significant (statistically) ($p < 0.05$) effects of urea on Tsk in November and December months only (Table 10) .

4.2.4.3 Effect of C P level :

From tables (9) and (10) the CP level had no significant effect on (Tsk) . The (Tsk) overall mean was 38.38 C against 38.39 C for lambs on 10 % CP level and those on 16 % CP level respectively . However , the general trend was that lambs fed 16 % CP level had nonsignificantly higher Tsk mean value than that of those on 10 % CP level (Table 9) .

4.2.4.4 Effects of month :

The overall Tsk monthly mean of September (38.91 C) was significantly higher than that of any other month , meanwhile that of November was significantly the lowest mean value (37.60 C) as shown in table (9) . The Tsk overall mean of summer season (38.58 C) was significantly higher than that (37.91C) of winter season (Table 9) . However , all these differences were actually within the rhythmic diurnal variations according to changes in ambient temperature and had no physiological significance (Hafez ,1956) and Shoukry (1981) .

4.2.5 Respiration Rate (R R) :

4.2.5.1 Effect of TDN level :

From tables (11) and (12) TDN level had no significant effect on (RR) . The RR overall mean value was 39.84 versus 40.64 for lambs on 62 TDN level and 72 TDN level respectively ,and the general trend was that lambs on 72 TDN level had nonsignificantly higher RR than those on 62 TDN level (Table 11) .

4.2.5.2 Effect of Urea level :

There was no significant effect on (RR) not at any month, nor in any season due to providing urea in diet (Table 12) . The RR overall mean was 40.11 for lambs fed urea against 40.37 for those had no urea (Table 11) . Urea non significantly decreased RR .

Table (11) Monthly and seasonally means ± S.E. of Respiration Rate (R R) of lambs fed different levels of TDN , UREA and C P .

Month / Item	0	1	2	3	4	5	6	Overall Mean± SE	Summer	Winter
TDN Level:										
62 ...	52.17 ± 3.17	38.42 ± 1.04	51.44 ± 2.07	50.83 ± 1.90	39.50 ± 2.09	29.22 ± 1.08	28.33 ± 1.67	39.84 ± 0.83	46.57 ± 1.14	27.42 ± 0.9
72 ...	52.83 ± 2.93	38.92 ± 1.29	54.28 ± 1.41	52.08 ± 1.73	41.50 ± 1.89	29.67 ± 0.9	28.67 ± 1.08	40.64 ± 0.9	47.90 ± 1.04	28.42 ± 0.68
UREA Level:										
With	51.83 ± 2.79	37.17 ± 1.15	51.94 ± 1.48	51.33 ± 1.83	40.25 ± 1.93	29.22 ± 1.07	28.33 ± 1.04	40.11 ± 1	47.12 ± 1.24	27.83 ± 0.82
Without	53.17 ± 3.28	40.17 ± 1.01	53.78 ± 2.08	51.58 ± 1.82	40.75 ± 2.09	29.67 ± 0.92	28.67 ± 1.7	40.37 ± 0.71	47.35 ± 0.96	28.00 ± 0.80
C P Level:										
10 % ...	51.17 ± 3.18	37.33 ± 1.10	52.17 ± 1.48	50.92 ± 2.09	39.33 ± 2.31	28.44 ± 1.03	27.67 ± 0.77	39.77 ± 0.94	46.77 ± 1.03	26.83 ± 0.77
16 % ...	53.83 ± 2.87	40.00 ± 1.11	53.56 ± 2.09	52.00 ± 1.5	41.67 ± 1.59	30.44 ± 0.87	29.33 ± 1.8	40.71 ± 0.78	47.70 ± 1.17	29.00 ± 0.72
Overall Mean ± S E	52.5 ± 2.11 a	38.67 ± 0.81 b	52.86 ± 1.26 a	51.46 ± 1.26 a	40.50 ± 1.39 b	29.44 ± 0.69 b	28.50 ± 0.97 b		47.23 ± 0.77 a	27.92 ± 0.56 b

N.B. : Means with different letters are significantly different .

Table (12) Analysis of Variance of monthly and seasonally of Respiration Rate (RR) of lambs fed different levels of T D N ; UREA and C P .

Month		0		1		2		3		4		5		6		Summer		Winter	
S . O . V .	df	M S	F	M S	F	M S	F	M S	F	MS	F	M S	F	M S	F	M S	F	M S	F
T D N	1	2.667	0.02	1.5	0.11	48.167	1.06	9.375	0.2	24	0.51	1.185	0.09	0.667	0.03	10.667	0.62	6	0.84
Urea	1	10.667	0.08	54	3.9	20.167	0.44	0.375	0.01	1.5	0.03	1.185	0.09	0.667	0.03	0.327	0.02	0.167	0.02
C P	1	42.667	0.31	42.667	3.08	11.574	0.25	7.042	0.15	32.667	0.7	24	1.82	16.667	0.69	5.227	0.31	28.167	3.93
TDN X Urea	1	112.67	0.81	0.167	0.01	8.167	0.18	0.042	0	73.5	1.57	24	1.82	54	2.25	12.327	0.72	24	3.35
TDN X C P	1	0.667	0	1.5	0.11	37.5	0.83	92.042	1.95	96	2.06	0	0	16.667	0.69	2.667	0.16	0	0
Urea X C P	1	6	0.04	24	1.73	9.796	0.22	15.042	0.32	60.167	1.29	1.185	0.09	16.667	0.69	1.927	0.11	0.167	0.02
TDNX Urea X C P	1	66.667	0.48	20.167	1.46	15.574	0.34	0.042	0	37.5	0.8	0.296	0.02	32.667	1.36	17.34	1.02	0.667	0.09
E R RO R	16	138.5		13.833		45.426		47.125		46.667		13.185		24		17.068		7.167	

* = Significant at 5 % level .
** =Significant at 1 % level .

4.2.5.3 Effect of C P level :

No significant difference was detected in RR mean value because of increasing CP level (from 10 to 16 %) at any month or any season as shown in table (11) and in table (12) . The RR overall mean increased non significantly from 39.77 to 40.71 because of increasing CP level from 10% to 16% respectively (Table 11) . The general trend was that increasing CP level from 10 % to 16 % increased non significantly RR mean value (Table 11) . This result is in complete agreement with findings of Parer (1963) who stated that RR were greater in high plane fed sheep than those on low plane diet .

4.2.5.4 Effects of month :

There were (statistically) significant differences in RR monthly overall means as shown in table (11) . The RR overall mean of each of June , August and September exceeded significantly those of months July , October , November and December (Table 11) .

Besides , the RR overall mean of summer season (47.23) exceeded significantly that (27.92) of winter season table (11) . Actually these differences are normal and known to ensue because of fluctuations in ambient temperature (Hafez , 1968) and (Shoukry , 1981) .

4.2.6 Rumen Liquor Parameters

4.2.6.1 Rumen pH :

4.2.6.1.1 Effect of TDN level :

The PH overall mean at prefeeding period within the three intervals did not exhibit any significant difference (6.42 versus 6.38) due to increasing TDN from 62 to 72 TDN level respectively as shown in table (13) .

For the 3 hours postfeeding period , TDN level also had no significant effect on PH overall mean where it was 6.13 versus 6.23 for lambs on 62 and 72 TDN level respectively within the three intervals (Table 13) . This result could be considered in accordance with findings of Abdel-Hamid *et al.*, (1994) who found that PH average value increased by increasing TDN level from the 2 / 3 level to the normal NRC recommended level ; which actually does not differ with our result in this study because we used the normal recommended NRC level of TDN (62) and a higher level (72) .

As for the 6 hours post feeding period , there was no significant difference on PH overall mean which was 6.74 against 6.71 for lambs on 62 TDN level and those on 72 TDN level respectively as shown in table (13) . From table (14) also, there was no significant effect due to TDN on ruminal PH . Clifford *et al.*, (1968 a) approved this result because

Table (13) means ± S.E. of Rumen liquor PH at different periods (Prefeeding ; 3 and 6 hours post feeding) within 3 intervals { after 2 ; 4 and 6 months } of lambs fed different levels of TDN ; UREA and C P .

Item	AFTER 2 MONTHS Prefeeding	3 hours	6 hours	AFTER 4 MONTHS Prefeeding	3 hours	6 hours	AFTER 6 MONTHS Prefeeding	3 hours	6 hours	OVERALL MEAN± Prefeeding	3 hours	S. E. 6 hours
TDN Level:												
62 ...	6.47 ± 0.05	6.07 ± 0.09	6.78 ± 0.05a	6.42 ± 0.08	6.15 ± 0.08	6.82 ± 0.03	6.39 ± 0.06	6.16 ± 0.08	6.73 ± 0.06	6.42 ± 0.05	6.13 ± 0.05	6.74 ± 0.03
72 ...	6.40 ± 0.07	6.13 ± 0.10	6.58 ± 0.06 b	6.41 ± 0.08	6.24 ± 0.08	6.73 ± 0.08	6.32 ± 0.06	6.30 ± 0.06	6.72 ± 0.05	6.38 ± 0.03	6.23 ± 0.05	6.71 ± 0.03
UREA Level:												
With	6.44 ± 0.06	6.10 ± 0.10	6.72 ± 0.04	6.43 ± 0.08	6.26 ± 0.09	6.82 ± 0.04	6.37 ± 0.06	6.28 ± 0.08	6.73 ± 0.05	6.40 ± 0.03	6.22 ± 0.05	6.75 ± 0.02
Without	6.43 ± 0.07	6.10 ± 0.10	6.64 ± 0.08	6.39 ± 0.08	6.12 ± 0.08	6.73 ± 0.08	6.35 ± 0.07	6.18 ± 0.06	6.72 ± 0.06	6.40 ± 0.05	6.13 ± 0.06	6.70 ± 0.03
C P Level:												
10 % ...	6.37 ± 0.05	5.97 ± 0.09 a	6.65 ± 0.05	6.35 ± 0.07	6.09 ± 0.05 a	6.76 ± 0.08	6.30 ± 0.05	6.23 ± 0.08	6.64 ± 0.06 a	6.38 ± 0.04	6.17 ± 0.06	6.69 ± 0.02 a
16 % ...	6.50 ± 0.07	6.24 ± 0.09 b	6.71 ± 0.07	6.47 ± 0.09	6.30 ± 0.10 b	6.79 ± 0.04	6.41 ± 0.08	6.23 ± 0.07	6.81 ± 0.04 b	6.42 ± 0.04	6.19 ± 0.05	6.77 ± 0.03 b
Overall Mean ± S E	6.44 ± 0.04 b	6.10 ± 0.07 d	6.68 ± 0.04 a	6.41 ± 0.06 bc	6.19 ± 0.06 cd	6.77 ± 0.04 a	6.36 ± 0.05 bc	6.23 ± 0.05 cd	6.73 ± 0.04 a			

N.B. : Means with different letters are significantly different .

Table (14) Analysis of Variance of Rumen liquor PH at different periods [Prefeeding ; 3 and 6 hours post feeding] within 3 intervals after (2,4 and 6 months) of lambs fed different levels of T D N : UREA and C P .

S . O . V .	d f	M S	F	S . O . V .	d f	M S	F
TDN	1	0.004	0.06	TDN X INTERVAL	2	0.08	1.45
UREA	1	0.12	2.17	UREA X C P	1	0.0004	0.01
C P	1	0.113	2.04	UREA X PERIOD	2	0.029	0.52
PERIOD	2	5.518	99.60 **	UREA X INTERVAL	2	0.026	0.46
INTERVAL	2	0.052	0.93	CP X PERIOD	2	0.018	0.32
TDN X UREA	1	0.152	2.73	CP X INTERVAL	2	0.32	5.77 **
TDN X C P	1	0.564	10.18 **	PERIOD X INTERVAL	4	0.073	1.31
TDN X PERIOD	2	0.116	2.08	TDN X UREA X CP	1	0.067	1.21
				E R R O R	188	0.055	

* =Significant at 5 % level .
** = Significant at 1 % level .

they stated that all concentrates or high grain diets would promote lower ruminal PH than high roughage diets .

Goodrich and Meiske (1969) explained that diets containing larger amounts of readily available carbohydrates resulted in lowered ruminal PH values .

4.2.6.1.2 Effect of Urea level :

At prefeeding period ,providing urea in ration did not actually affect on the PH overall mean , since it was 6.40 for both groups those fed urea and those had not as shown in table (13) and in table (14) .

This result is in complete agreement with Koeln *et al.*, (1985) who stated that changes in ruminal PH with time were similar for all treatments .

At 3 hours post feeding period , urea increased non significantly the PH overall mean where it was 6. 22 versus 6. 13 for lambs fed urea and those had no urea (Table 13) .

As for the 6 hours post feeding period urea increased also non significantly PH overall mean , where it was 6. 75 versus 6. 70 for lambs fed urea and lambs had no urea respectively (Table 13) . Robertson and Miller (1971) explained that there was a trend towards a higher rumen PH when urea corn meal supplement replaced all the soybean meal presumably due to the higher ammonia nitrogen and lower Total Volatile Fatty Acids (TVFA) concentrations .

4.2.6.1.3 Effect of C P level :

There were nonsignificant increase in PH overall means because of increasing CP level from 10 % to 16 % in both periods prefeeding and 3 hours post feeding . Since it was 6.38 against 6.42 for prefeeding period , and it was 6.17 versus 6.19 for the 3 hours post feeding respectively as shown in table (13) . However , analysis of variance showed no significant effect of CP level on rumen PH (Table 14) . These results are in accordance with findings of Warly *et al.*, (1994) who used three levels of crude protein [low , medium and high] which resulted in no significant difference in ruminal PH . While for the 6 hours post feeding period , the PH overall mean increased significantly from 6.69 to 6.77 by increasing CP level in diet from 10 % to 16 % respectively (Table 13) . This result is in complete agreement with findings of Etman *et al.*, (1992) who found significant difference in overall PH values between calves fed ration C (4% urea)than those fed ration A (0 % urea) and ration B (2 % urea) .

4.2.6.1.4 Effects of period and interval :

Analysis of variance (Table 14) indicated that PH values affected significantly ($p< 0.01$) by period [prefeeding, 3 or 6 hours post feeding] , and there was no effect on PH values because of interval . Comparing the PH overall means at different periods (Table 13) showed that the overall means of the 6 hours post feeding period within

any of the three intervals (2 or 4 or 6 months) significantly exceeded those of the two other periods (whether prefeeding or the 3 hours post feeding) within any of the 3 interval (2 or 4 or 6 months).

The prefeeding period after 2 months (1st interval) exceeded significantly than the 3 hours post feeding period at any interval . And the prefeeding periods of the two other intervals (4 or 6 months) exceeded significantly than the 3 hours post feeding period after 2 months (Table 13) .

This result is in accordance with findings of Etman *et al.*, (1992) who indicated that PH values were slightly higher before than after feeding for all 3 experimental rations , and the overall PH values showed significant differences between calves fed ration C (4% urea) than those fed ration A (0 % urea) and ration B (2 % urea) .

4.2.6.2 Ruminal Ammonia :

4.2.6.2.1 Effect of TDN level :

Increasing TDN from 62 to 72 level resulted in a significant decrease in ammonia overall mean from 1.44 to 1.32 mg / dl at prefeeding period (Table 15) . This result is in complete agreement with findings of Bozinowa (1972) since he reported that adding extra starch (100 g / day / head) for wethers given NPN , reduced the rumen ammonia nitrogen to about 35 mg / dl .

However , increasing TDN from 62 to 72 level increased non

Table (15)means ± S.E. of Rumen liquor Ammonia (mg /dL) at different periods { Prefeeding; 3 and 6 hours postfeeding } within 3 intervals { after 2, 4 and 6 months } of lambs fed different levels of TDN , UREA and C P .

Item	AFTER 2 MONTHS Prefeeding	3 hours	6 hours	AFTER 4 MONTHS Prefeeding	3 hours	6 hours	AFTER 6 MONTHS Prefeeding	3 hours	6 hours	OVERALL MEAN ± -S . E . Prefeeding	3 hours	6 hours
TDN Level:												
62...	1.47± 0.06	2.92± 0.10	1.80± 0.06	1.38± 0.05	3.09± 0.09	1.74± 0.07	1.48± 0.07 a	3.15± 0.09	1.70± 0.09	1.44± 0.03 a	3.05± 0.07	1.78 ± 0.04
72 ...	1.37± 0.05	2.97± 0.13	1.86± 0.13	1.28± 0.06	3.19± 0.10	1.82± 0.11	1.31± 0.05 b	3.26± 0.07	1.81± 0.09	1.32± 0.04 b	3.14 ± 0.08	1.79 ± 0.08
UREA Level:												
With	1.45 ± 0.07 a	3.20 ± 0.11 a	1.99 ± 0.11 a	1.34 ± 0.05	3.34 ± 0.08 a	1.97 ± 0.09 a	1.47 ± 0.07	3.33 ± 0.08a	1.87 ± 0.10	1.43 ± 0.04	3.29± 0.06 a	1.94 ± 0.05 a
Without	1.34 ± 0.04 b	2.68 ± 0.06 b	1.67 ± 0.06 b	1.33 ± 0.06	2.94 ± 0.08 b	1.59 ± 0.06 b	1.32 ± 0.05	3.08 ± 0.06 b	1.64 ± 0.07	1.33 ± 0.03	2.90 ± 0.04 b	1.63 ± 0.04 b
C P Level:												
10 % ...	1.32 ± 0.04 a	2.90 ± 0.10	1.67 ± 0.08 a	1.28 ± 0.05	3.13 ± 0.11	1.70 ± 0.08	1.36 ± 0.05	3.14 ± 0.08	1.74 ± 0.09	1.32 ± 0.04 a	3.09 ± 0.07	1.70 ± 0.05
16 % ...	1.52 ± 0.06 b	2.98 ± 0.13	1.99 ± 0.09 b	1.38 ± 0.05	3.15 ± 0.09	1.86 ± 0.10	1.43 ± 0.07	3.27 ± 0.08	1.77 ± 0.09	1.44 ± 0.04 b	3.10 ± 0.08	1.87 ± 0.07
Overall Mean ± S E	1.42 ± 0.04 c	2.9 ± 0.08 a	1.83 ± 0.07 b	1.33 ± 0.04 c	3.14 ± 0.07 a	1.78 ± 0.06 b	1.39 ± 0.04 c	3.20 ± 0.06 a	1.75 ± 0.06 b			

N. B. :Means with different letters are significantly different .

Table (16) Analysis of Variance of Rumen liquor Ammonia at different periods [Prefeeding ; 3 and 6 hours post feeding] within 3 intervals after { 2 ; 4 and 6 months } of lambs fed different levels of TDN ;UREA and C P .

S. O. V.	df	MS	F	S. O. V.	df	MS	F
TDN	1	0.004	0.07	TDN X INTERVAL	2	0.029	0.52
UREA	1	3.76	68.17**	UREA X C P	1	0.006	0.1
C P	1	0.472	8.56**	UREA X PERIOD	2	0.432	7.83**
PERIOD	2	57.764	1047.19**	UREA X INTERVAL	2	0.069	1.25
INTERVAL	2	0.056	1.02	CP X PERIOD	2	0.151	2.74
TDN X UREA	1	0.094	1.7	CP X INTERVAL	2	0.211	3.83 *
TDN X C P	1	0.472	8.56**	PERIOD X INTERVAL	4	0.238	4.31 **
TDN X PERIOD	2	0.194	3.51 *	TDN X UREA X CP	1	0.161	2.92
				ERROR	188	0.055	

* =Significant at 5 % level .
** = Significant at 1 % level .

significantly the ammonia overall mean (from 3.05 to 3.14 mg / dl) and (from 1.78 to 1.79 mg / dl) for both periods 3 hours and 6 hours post feeding respectively (Table 15) . This result is in accordance with findings of Abdel- Hamid *et al.*, (1994) who found that feeding Rahmani lambs on two levels of TDN [2 / 3 of recommended NRC level and the normal level] resulted in higher average values of ruminal ammonia in groups that had normal TDN level .

In spite of that , analysis of variance did not exhibit any significant effect due to TDN on ruminal ammonia as shown in table (16) .

4.2.6.2.2 Effect of Urea level :

The analysis of variance revealed a significant ($p < 0.01$) effect of urea on ruminal ammonia (Table 16) . Urea increased significantly the ammonia overall mean from 2.90 to 3.29 mg / dl at 3 hours post feeding period , and it also increased significantly the ammonia overall mean from 1.63 to 1.94 mg / dl at 6 hours post feeding period , but it increased nonsignificantly the overall mean of ruminal ammonia from 1.33 to 1.43 mg / dl at prefeeding period as shown in table (15) . This result is in good agreement with findings of Bahattacharya and Pervez (1973) ,and of Ludwick *et al.*, (1977) who found that ruminal ammonia nitrogen was significantly higher for urea fed lambs (25.4 vs. 10.8 mg / dl) than those fed soy protein respectively, same trend was

found in their 2nd trial where the average ruminal ammonia of lambs fed urea differed significantly (29.6 vs 7.6 mg / dl) than those fed soy protein respectively .

4.2.6.2.3 Effect of C P level :

Analysis of variance indicated a significant ($p < 0.01$) effect of CP on rumen ammonia as shown in table (16) .

Increasing CP level from 10 % to 16 % resulted in a significant increase in ammonia overall mean from 1.32 to 1.44 mg / dl at prefeeding period (Table 15) , but increased it non significantly from 3.09 to 3.10 mg / dl at 3 hours post feeding period and from 1.70 to 1.87 mg / dl at 6 hours post feeding period (Table 15) .

This result was also found by Tagari *et al.*, (1964) who showed that any increase in protein level in the ration administered to sheep was followed by an increase in ruminal ammonia concentration , and a significant correlation was found between the protein content of rations and the integration value of rumen ammonia concentration .The same conclusion was detected by Warly *et al.*, (1994) who fed wethers on three levels of crude protein [low , medium and high] , resulted in a significant higher rumen ammonia -nitrogen with high crude protein group than for low or medium crude protein groups .

4.2.6.2.4 Effect of period and interval :

The analysis of variance (Table 16) detected a significant ($p < 0.01$) effect of period on rumen ammonia , while there was no effect due to interval on rumen ammonia . The ammonia overall means of 3 hours post feeding periods at any interval (2 or 4 or 6 months) exceeded significantly both overall means of those at prefeeding or at 6 hours post feeding periods at any interval (2 or 4 or 6 months) as shown in table (15) . A complete agreement for this result was found by Tancurov (1971) who indicated that ruminal ammonia concentration was maximum at about 3 hours after feeding by using a ration of hay with straw for sheep . At the same time , ammonia overall means at 6 hours post feeding periods at any interval (2 or 4 or 6 months) excelled significantly those of the prefeeding periods at any interval (2 or 4 or 6 months) as shown in table (15) .

4.2.6.3 Ruminal Total Volatile Fatty Acids (TVFA) :

4.2.6.3.1 Effect of TDN level :

From tables (17) and (18) there was no difference in TVFA overall mean at prefeeding period because of TDN level ,where the mean value was 2.55 Meq / dl for both levels of TDN (62 and 72) . As for the TVFA overall mean of the 3 hours post feeding period , there was only a slight difference (4.74 versus 4.75 Meq / dl) for 62 TDN

Table (17) means ± S.E. of Rumen liquor Total Volatile Fatty Acids (TVFA) (Meq /dL) at different periods (Prefeeding ; 3 and 6 hours postfeeding) within 3 intervals { 2 ; 4 and 6 months} of lambs fed different levels of TDN ; UREA and C P .

Item	Prefeeding	3 hours	6 hours	AFTER 4 MONTHS Prefeeding	3 hours	6 hours	AFTER 6 MONTHS Prefeeding	3 hours	6 hours	OVERALL MEAN ± S. E. Prefeeding	3 hours	6 hours
TDN Level :												
62 ...	2.58 ± 0.07	4.67 ± 0.07	2.47 ± 0.05 a	2.63 ± 0.07	4.63 ± 0.06	2.76 ± 0.07	2.45 ± 0.05	4.81 ± 0.03	2.78 ± 0.07	2.55 ± 0.04	4.74 ± 0.04	2.69 ± 0.04 a
72 ...	2.63 ± 0.07	4.74 ± 0.15	3.11 ± 0.16 b	2.53 ± 0.05	4.73 ± 0.06	2.79 ± 0.04	2.48 ± 0.05	4.89 ± 0.07	2.85 ± 0.07	2.55 ± 0.03	4.75 ± 0.07	2.89 ± 0.06 b
UREA Level :												
With	2.60 ± 0.09	4.74 ± 0.07	2.71 ± 0.16	2.53 ± 0.05	4.70 ± 0.06	2.68 ± 0.05 a	2.51 ± 0.05	4.88 ± 0.07	2.75 ± 0.07	2.55 ± 0.03	4.76 ± 0.05	2.75 ± 0.07
Without	2.61 ± 0.06	4.67 ± 0.16	2.87 ± 0.13	2.63 ± 0.07	4.66 ± 0.06	2.87 ± 0.05 b	2.43 ± 0.04	4.82 ± 0.04	2.87 ± 0.07	2.55 ± 0.04	4.73 ± 0.06	2.83 ± 0.04
C P Level :												
10 % ...	2.62 ± 0.07	4.58 ± 0.09	2.81 ± 0.16	2.65 ± 0.06	4.60 ± 0.06 a	2.83 ± 0.06	2.48 ± 0.06	4.77 ± 0.04 a	2.82 ± 0.06	2.57 ± 0.02	4.65 ± 0.04 a	2.81 ± 0.06
16 % ...	2.60 ± 0.07	4.83 ± 0.14	2.77 ± 0.14	2.51 ± 0.06	4.76 ± 0.05 b	2.72 ± 0.05	2.46 ± 0.04	4.93 ± 0.06 b	2.80 ± 0.08	2.53 ± 0.04	4.84 ± 0.06 b	2.78 ± 0.06
Overall Mean ± S E	2.61 ± 0.05 f	4.70 ± 0.08 abc	2.79 ± 0.10 e	2.58 ± 0.04 f	4.68 ± 0.04 b	2.78 ± 0.04 d	2.47 ± 0.04 f	4.85 ± 0.04 a	2.81 ± 0.05 cd			

N.B. : Means with different letters are significantly .

Table (18) Analsis of Variance of Rumen liquor Total Volatile Fatty Acids (TVFA)at different periods[prefeeding; 3and6 hours postfeeding] within 3 intervals { after 2 ; 4 and 6 months } of lambs fed different levels of TDN ; UREA and C P .

S . O . V .	d f	M S	F
TDN	1	0.247	3.51
UREA	1	0.017	0.24
C P	1	0.078	1.11
PERIOD	2	104.386	1483.87**
INTERVAL	2	0.018	0.26
TDN X UREA	1	0.025	0.35
TDN X C P	1	0.008	0.11
TDN X PERIOD	2	0.229	3.26 *
TDN X INTERVAL	2	0.467	6.63 **
UREA X C P	1	0.029	0.41
UREA X PERIOD	2	0.051	0.73
UREA X INTERVAL	2	0.177	2.51
CP X PERIOD	2	0.32	4.55 *
CP X INTERVAL	2	0.067	0.95
PERIOD X INTERVAL	4	0.159	2.26
TDN X UREA X CP	1	0.35	4.98 *
E R R O R	188	0.07	

* =Significant at 5 % level .

** = Significant at 1 % level .

level and 72 TDN level respectively table (17) .The same result was obtained by Miller *et al.*, (1979) who found no difference in moles per 100 g of rumen TVFA due to corn (or roasted corn) or wheat which differed in starch content (61 % vs. 68 % respectively) and in sugar (1.4 % vs. 2.5 %) besides molasses urea liquid supplement . The roasted corn was more susceptible to enzymatic attack and was digested at a faster rate than regular corn , which suggested that TVFA production from roasted corn would be more rapid than from regular corn and provide optimum conditions for urea utilization . While for the overall mean at the 6 hours post feeding , it increased significantly from 2.69 to 2.89 Meq / dl by increasing TDN from 62 to 72 level respectively (Table 17) . Same result was found by Nakanishi *et al.*, (1993) , where the average values of ruminal TVFA were 3.9 , 4.0 , 5.0 and 5.6 mmole / 100 ml by using 4 levels of beet molasses (0 , 2 , 4 , and 6 % on DM basis) respectively . Abdel-Hamid *et al.*, (1994) shared in same result when used two levels of TDN (normal and 2 / 3 of the recommended NRC level) for Rahmani lambs , and found higher average values of ruminal TVFA in lambs fed on the normal TDN level .

4.2.6.3.2 Effect of Urea level :

Urea not only did not affect the TVFA overall mean at prefeeding period , but also the mean value of both groups (fed urea or not)

had the same value 2.55 Meq / dl as shown in table (17) .
No significant effect on TVFA was detected by analysis of variance due to urea level (Table 18) .

For the TVFA overall mean at 3 hours post feeding period , there was a slight non significant increase , where it was 4.76 versus 4.73 Meq /dl for lambs fed urea and those had no urea respectively (Table 17) .
Stewart *et al.*, (1958) reported only slight differences in the average concentrations of TVFA occurred between the four rations [hay only, hay and grain , hay and urea and the fourth hay + urea +grain] being from 810 to 883 mg / 100 ml , and that urea addition to ration did not markedly stimulate TVFA production of steers .

As for the TVFA overall mean at 6 hours post feeding period , urea decreased it non significantly from 2.83 to 2.75 Meq / dl for lambs fed no urea against those fed urea (Table 17) .
Bhattacharya and Pervez (1973) had same result when they stated that TVFA mean values did not differ between groups of sheep , since the mean values were 13.34 , 13.47 and 13.67 ml eq / 100 ml for rations of wheat straw supplemented with one of 3 levels of urea [0.0,1.0 and 2.0 %] respectively . Etman *et al.*,(1992) supported this results , since they found TVFA overall mean (9.04 mg eq / 100 ml) of calves on

ration C (4 %) which was significantly lower than 10.27 and 9.70 mg eq / 100 ml of those on ration A(0.0 % urea) and those on ration B (2 % urea) respectively , and explained this result , when they stated that it could be noticed that the TVFA concentration decreased with percentage of urea and decreasing concentrate level in ration .

4.2.6.3.3 Effect of CP level :

From table (17) , increasing CP level from 10 % to 16 % resulted in a slight non significant decrease in TVFA overall mean from 2.57 to 2.53 Meq / dl respectively at prefeeding period (Table 17) . Analysis of variance in table (18) showed no significant effect of CP level on TVFA values . Moreover , increasing CP level from 10 % to 16 % also resulted in a non significant decrease in the TVFA overall mean from 2.81 to 2.78 Meq /dl at 6 hours post feeding period respectively as shown in table (17) . The same result was found by Randel *et al.*, (1975) when they formulated different diets supplemented with urea or urea and maize or soybean meal with NPN or without NPN to give 12.1 - 13.4 % crude protein rations which did not affect rumen TVFA . However , increasing CP level from 10 % to 16 % increased significantly TVFA overall mean at 3 hours post feeding period from 4.65 to 4.84 Meq / dl respectively (Table 17) . Warly *et al.*, (1994) had same result when they fed wethers

on three levels of crude protein [low , medium and high] , and found that groups fed medium and those on high level of crude protein had significantly higher concentrations of ruminal TVFA than those on low level of CP .

4.2.6.3.4 Effects of period and of interval :

From table (18) , analysis of variance revealed that period had a significant ($p < 0.01$) effect on rumen TVFA , while interval did not affect on TVFA . The TVFA overall means of the 3 hours post feeding periods within any interval (2 , or 4 or 6 months) significantly exceeded the overall means of the prefeeding periods and the 6 hours post feeding within any interval (2 or 4 or 6 months) as shown in table (17) .The same result was found by Fenner *et al.*, (1967) who noted that rumen TVFA concentrations increased up to 3 hours after feeding and then decreased . Hinman and Johnson (1973) also found that differences in the rate of VFA production in rumen of wethers between treatments were more evident at 4 hours post feeding than at 8 hours post feeding .

Moreover , the TVFA overall mean at 6 hours post feeding period within last interval (6 months) was significantly higher than the overall means of the prefeeding period at any interval (2 , or 4 or 6 months) as shown in table (17) .

4.2.7 Blood plasma parameters :

4.2.7.1 Plasma Total Proteins (Tp) :

4.2.7.1. 1 Effect of TDN level :

Increasing TDN from 62 to 72 level increased non significantly the (Tp) overall mean from 6. 67 to 6.75 g / dl (Table 19) . From table (20) the analysis of variance revealed significant ($p < 0.01$) effects of TDN on (Tp) in three months August , September and ($p < 0.05$) in June .

4.2.7.1.2 Effect of Urea level :

Urea increased significantly the (Tp) overall mean from 6.57 g / dl of lambs had no urea to 6.86 g / dl for lambs fed urea (Table 19) . Analysis of variance (Table 20) also revealed significant ($p < 0.05$) effects of urea on (Tp) in months of July , October , November and December , but ($p < 0.01$) in June . This result is in complete agreement with findings of Etman *et al.*,(1992) who showed that there were significant difference in blood serum (Tp) of grroups of calves fed ration B [2 % urea] and ration C [4 % urea] than those fed ratio A [0 % urea] , and the overall mean of serum (Tp) concentrations increased with increasing urea in ration [6.40 , 6.57 and 6.76 g / 100 ml] for rations contained 0.0 % , 2 % , and 4 % urea respectively .

Table (19) Monthly means ± S.E. of Plasma Total Proteins (TP) (g / dL) of lambs fed different Levels of TDN , UREA and C P .

Month Item	0	1	2	3	4	5	6	Overall Mean ± S E
TDN Level:								
62 ...	6.41± 0.08 a	6.81± 0.19	6.35± 0.06 a	6.48 ± 0.12 a	6.44 ±0.09 a	6.43 ±0.09	6.63 ±0.13	6.67 ±0.08
72 ...	6.65 ±0.14 b	6.99 ±0.13	7.07 ±0.15 b	7.28 ±0.16 b	6.87± 0.13 b	6.67 ±0.14	6.90±0.15	6.75 ±0.08
UREA Level:								
With	6.66 ±0.14 a	7.06 ±0.18 a	6.76 ±0.15	6.99 ±0.18	6.84 ±0.14 a	6.73 ±0.13 a	6.95 ±0.17a	6.86 ±0.07 a
Without	6.40 ±0.08 b	6.74 ±0.13 b	6.66 ±0.16	6.77 ±0.18	6.47 ±0.09 b	6.38 ±0.08 b	6.58 ±0.08b	6.57 ±0.07 b
C P Level:								
10 % ...	6.26 ±0.05 a	6.78 ±0.18	6.58 ±0.13 a	6.75 ±0.19	6.63 ±0.12	6.50 ±0.13	6.55 ±0.12 a	6.65 ± 0.08
16 % ...	6.80 ±0.12 b	7.03 ± 0.14	6.84 ±0.17 b	7.01 ±0.18	6.68 ± 0.13	6.60 ± 0.11	6.98 ± 0.14 b	6.78 ± 0.08
Overall Mean ± S E	6.53 ± 0.08 b	6.90 ± 0.11 a	6.71 ± 0.11 ab	6.88 ± 0.13 a	6.65 ± 0.09 ab	6.55 ± 0.08 b	6.76 ± 0.10 ab	

N.B. : Means with different letters are significantly different .

Table (20) Analysis of Variance of monthly Plasma Total Proteins concentrations (TP) of lambs fed different levels of TDN ; UREA and C P (g / d L).

Month		0		1		2		3		4		5		6	
S . O . V.	df	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F
T D N	1	0.35	8.*	0.202	1.9	3.082	47.4**	3.76	18.4**	1.084	8.9**	0.327	2.1	0.454	2.6
UREA	1	0.4	9.2**	0.602	5.6*	0.06	0.9	0.304	1.5	0.844	6.9*	0.735	4.7*	0.844	4.8*
C P	1	1.76	40.2**	0.375	3.5	0.427	6.6*	0.4	1.9	0.02	0.2	0.06	0.4	1.084	6.1*
TDNX Urea	1	0.35	8.*	0.327	3.1	0.24	3.7	0.05	0.3	0.304	2.5	0.082	0.5	0.22	1.3
TDN XCP	1	0.094	2.1	3.527	32.9**	0.54	8.31*	0.22	1.1	0.034	0.3	0.107	0.7	0.0004	0
Urea XCP	1	0.12	2.8	0.06	0.6	0.375	5.8*	0.07	0.3	0.034	0.3	0.042	0.3	0.034	0.2
TDNXUreaXCP	1	0.094	2.1	0.375	3.5	0.735	11.3**	1	4.9*	0.094	0.8	0.042	0.3	0.094	0.5
ERROR	16	0.044		0.107		0.065		0.205		0.122		0.155		0.177	

* =Significant at 5 % level .

** = Significant at 1 % level .

4.2.7.1.3 Effect of C P level :

Increasing CP level from 10 % to 16 % increased non significantly the (Tp) from 6.65 to 6.78 g / dl respectively (Table 19) . Analysis of variance in table (20) showed a significant ($p < 0.05$) effects of CP on plasma (Tp) in months of August and December , besides a significance at ($p < 0.01$) in June . This result differed with findings of Pathak and Sharma (1991) who indicated that examining isoenergetic diets containing 3 levels of CP [8.81 , 11.32 or 13.58 %] which represented 75 , 100 and 125 % of NRC maintenance requirement for goats resulted in a similar values of serum (Tp) in all groups . The difference in results may be due to that we used here in this study a higher level of C P (16 % versus 10 %) , besides two different TDN levels and not isoenergetic rations .

4.2.7.1.4 Effects of month :

The (Tp) overall monthly means of each of July and September excelled significantly both means of June and November (Table 19) .

4.2.7.2 Plasma Albumin (A) :

4.2.7.2.1 Effect of TDN level :

From table (21) increasing TDN level from 62 to 72 resulted in significant increase in plasma (A) overall mean from 2.74 to 2 ' While the analysis of variance detected that there were

Table (21) Monthly means ± S.E. of plasma Albumin (A) (g / dL) of lambs fed different levels of TDN , UREA and C P .

Month / Item	0	1	2	3	4	5	6	Overall Mean± S E
TDN Level:								
62 ...	2.80± 0.03	2.74± 0.03 a	2.81± 0.04	2.67± 0.04 a	2.69± 0.05	2.66± 0.04 a	2.73± 0.04	2.74± 0.03
72 ...	2.83± 0.04	2.83± 0.03 b	2.83± 0.04	2.85± 0.04 b	2.73 0.05	2.81± 0.03 b	2.74± 0.05	2.79± 0.02
UREA Level:								
With	2.82± 0.02	2.77± 0.03	2.81± 0.04	2.75± 0.04	2.68± 0.06	2.73± 0.05	2.73± 0.04	2.76± 0.03
Without	2.82± 0.04	2.80± 0.03	2.83± 0.04	2.77± 0.05	2.73± 0.03	2.74± 0.04	2.75± 0.05	2.77± 0.02
C P Level:								
10 % ...	2.82± 0.04	2.75± 0.03	2.81± 0.04	2.70± 0.05 a	2.60± 0.04 a	2.68± 0.04 a	2.70± 0.05	2.72± 0.02 a
16 % ...	2.82± 0.03	2.82± 0.03	2.83± 0.03	2.82± 0.04 b	2.82± 0.02 b	2.79± 0.03 b	2.78± 0.04	2.81± 0.02 b
Overall Mean± S E	2.82 ± 0.02 a	2.78 ± 0.02 ab	2.82 ± 0.03 ab	2.76 ± 0.03 ab	2.71 ± 0.03 c	2.73 ± 0.03 bc	2.74 ± 0.03 bc	

N.B. : Means with different letters are significantly different .

Table (22) Analysis of Variance of monthly plasma Albumin (A) of lambs fed different levels of T D N ; UREA and C P (g %).

Month		0		1		2		3		4		5		6	
S. O. V.	df	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F
T D N	1	0.007	0.4	0.042	4.17	0.002	0.09	0.202	13.08**	0.007	0.67	0.135	9.82**	0.0004	0.02
Urea	1	0	0	0.007	0.67	0.002	0.09	0.002	0.11	0.015	1.5	0.002	0.12	0.004	0.19
C P	1	0	0	0.027	2.67	0.002	0.09	0.082	5.30 *	0.282	28.17**	0.082	5.94 *	0.034	1.69
TDN X Urea	1	0	0	0.015	1.5	0	0	0.015	0.97	0.007	0.67	0.007	0.48	0.004	0.19
TDN X C P	1	0.027	1.6	0.002	0.17	0.027	1.42	0.015	0.97	0	0	0.027	1.94	0.0004	0.02
Urea X C P	1	0.007	0.4	0	0	0.007	0.36	0.002	0.11	0.082	8.17 *	0	0	0.01	0.52
TDN X Urea X C P	1	0.007	0.4	0.002	0.17	0.015	0.8	0.015	0.97	0.007	0.67	0.002	0.12	0.184	9.19 **
ERROR	16	0.017		0.01		0.019		0.015		0.01		0.014		0.02	

* = Significant at 5 % level .

** = Significant at 1% level .

significant (p <0.01) effects because of TDN in months of September and November months , but there was a significant (p < 0.05) only in July month as shown in table (22) .

4.2.7.2.2 Effect of Urea level :

Urea decreased non significantly plasma (A) overall mean from 2.77 to 2.76 g / dl (Table 21) . Moreover, the analysis of variance in table (22) showed no significant effect due to urea on plasma (A)concentration . This result is approved by Singh and Sawhney (1967) who stated that the levels of serum proteins decreased as the intake of urea increased . Oltjen *et al.*, (1969) supported this result since they reported that no differences in the levels of albumin (A)and globulins (G) for calves fed purified diet containing urea , compared to those on soy protein as the sole nitrogen source .

4.2.7.2.3 Effect of C P level :

Increasing C P level from10% to 16 % increased significantly (A) overall mean from 2.72 to 2.81 g / dl as shown in table (21) . Analysis of variance also (Table 22) detected significant (p < 0.01) effect of C P on plasma (A) in October month , and at (p < 0.05) in September and in November months . Koeln *et al.*, (1985) showed same trend when they fed lambs on different rations { (corn only) , (impregnated corn) , (corn + urea) and (corn + SBM) } the found that

mean values of serum (A) were 4.02 , 4.34 , 4.27 and 4.06 respectively , where it tended to be higher in lambs fed the two urea supplemented rations .

4.2.7.2.4 Effect of month :

Plasma (A) monthly overall mean of June excelled significantly that of months of October , November and December months. While the overall mean of August exceeded significantly that of October month as shown in table (21) .

4.2.7.3 Plasma Globulin (G) :

4.2.7.3.1 Effect of TDN level :

Increasing TDN level from 62 to 72 resulted in a non significant increase in plasma (G) overall mean from 3.93 to 3.96 g / dl (Table 23) . However , analysis of variance revealed significant ($p < 0.01$) effect because of TDN on plasma (G) in months of August , September and October , and at ($p < 0.05$) level in months of June and July as shown in table (24) .

4.2.7.3.2 Effect of Urea level :

Urea increased significantly plasma (G) overall mean from 3.80 g / dl of lambs had no urea to 4.09 g / dl of lambs fed urea as shown in table (23) . From table (24) there were significant ($p < 0.05$) effect of

Table (23) Monthly means ± S.E. of Plasma Globuline (G) (g /dL) of lambs fed different Levels of TDN , Urea and C P .

Moth Item	0	1	2	3	4	5	6	Overall Mean ± S E
TDN Level:								
62 ...	3.61 ± 0.09 a	3.98 ± 0.19 a	3.54 ± 0.06 a	3.82 ± 0.12 a	3.72 ± 0.09 a	3.78 ± 0.09	3.89 ± 0.13	3.93 ± 0.07
72 ...	3.82 ± 0.14 b	4.26 ± 0.13 b	4.24 ± 0.14 b	4.43 ± 0.15 b	4.18 ± 0.14 b	3.86 ± 0.13	4.16 ± 0.14	3.96 ± 0.06
UREA Level:								
With	3.84 ± 0.13 a	4.26 ± 0.19 a	3.95 ± 0.15	4.23 ± 0.15	4.16 ± 0.15 a	3.98 ± 0.12 a	4.23 ± 0.15 a	4.09 ± 0.06 a
Without	3.58 ± 0.09 b	3.98 ± 0.13 b	3.83 ± 0.15	4.02 ± 0.17	3.74 ± 0.09 b	3.65 ± 0.08 b	3.82 ± 0.09 b	3.80 ± 0.05 b
C P Level:								
10 % ...	3.44 ± 0.07 a	3.96 ± 0.19 a	3.77 ± 0.15 a	3.93 ± 0.17 a	3.87 ± 0.13	3.81 ± 0.11	3.85 ± 0.14	3.93 ± 0.07
16 % ...	3.98 ± 0.10 b	4.28 ± 0.13 b	4.01 ± 0.15 b	4.31 ± 0.14 b	4.03 ± 0.14	3.83 ± 0.12	4.20 ± 0.12	3.96 ± 0.07
Overall Mean+_S E	3.71 ± 0.08 d	4.12 ± 0.12 ab	3.89 ± 0.11abcd	4.12 ± 0.11 a	3.95 ± 0.09 abcd	3.82 ± 0.08 bcd	4.03 ± 0.10 ab	

N. B. : Means with different letters are significantly different .

Table (24) Analysis of Variance of monthly plasma Globulin (G) of lambs fed different levels of TDN ; UREA and C P (g / dl) .

Month		0		1		2		3		4		5		6	
S. O. V.	df	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F
T D N	1	0.26	5.39 *	0.427	4.32 *	2.94	52.66**	2.22	13.56 **	1.26	11.59**	0.042	0.29	0.427	2.44
Urea	1	0.4	8.28 *	0.482	4.88 *	0.082	1.46	0.26	1.59	1.084	9.97 **	0.667	4.6 *	0.96	5.49 *
C P	1	1.76	36.42 **	0.602	6.09 *	0.375	6.72 *	0.844	5.15 *	0.15	1.38	0.002	0.01	0.735	4.2
TDN X Urea	1	0.35	7.25 *	0.482	4.88 *	0.24	4.3	0.01	0.06	0.22	2.03	0.042	0.29	0.282	1.61
TDN X C P	1	0.02	0.42	3.375	34.18 **	0.327	5.85 *	0.12	0.74	0.034	0.31	0.24	1.66	0	0
Urea x C P	1	0.07	1.46	0.06	0.61	0.282	5.04 *	0.094	0.57	0.22	2.03	0.042	0.29	0.007	0.04
TDN X Urea X CP	1	0.15	3.11	0.427	4.32 *	0.96	17.19**	0.77	4.70 *	0.15	1.38	0.06	0.41	0.015	0.09
ERROR	16	0.048		0.099		0.056		0.164		0.109		0.145		0.175	

* = Significant at 5 % level .

** = Significant at 1% level .

urea on plasma (G) in months of June , July , November and December , besides at ($p < 0.01$) in October month . The findings of Oltjen *et al.*, (1969) approved this result since they reported that the level of beta globulin was approximately 20 % higher for calves fed a purified diet containing urea , compared to those on soy protein as the sole nitrogen source .

4.2.7.3.3 Effect of C P level :

There was a slight nonsignificant increase in plasma (G) overall mean from 3.93 to 3.96 g / dl due to increasing C P level from 10 % to 16 % respectively (Table 23) . However , analysis of variance revealed significant ($p < 0.05$) effects because of C P on plasma (G) in months of July, August and September , but significant at ($p < 0.01$) in month of June (Table 24) .

4.2.7.3.4 Effects of month :

Plasma (G) overall monthly mean of September significantly excelled that of either of June or November, while the (G) overall mean of each of July and December exceeded significantly that of June as shown in table (23) .

4.2.7.4.Plasma Albumin / Globulin (A / G) ratio :

4.2.7.4.1 Effect of TDN level :

Increasing TDN level from 62 to 72 had a nonsignificant increase on

(A / G ratio) overall mean where it changed from 0.71 to 0.72 respectively (Table 25) . However , analysis of variance showed a significant ($p < 0.01$) effect due to TDN on (A / G ratio) means in months of July , August and October as shown in table (26) .

4.2.7.4.2 Effect of Urea :

Urea decreased significantly the (A / G ratio) overall mean from 0.74 of lambs had no urea to 0. 69 of lambs fed urea table (25) , while in table (26) urea exhibited a significant ($p < 0.01$) effect on (A / G ratio) mean in October month as detected by analysis of variance . This result is in complete agreement with findings of Ludwick *et al.*, (1977) who reported that serum total proteins levels and serum albumin levels decreased with time for lambs fed both nitrogen sources[soy protein or urea] , however the decrease was greater for lambs fed urea where the average value of A / G ratio for lambs fed soy protein was(0.82) greater than of those on urea (0.74) .

4.2.7.4.3 Effect of C P level :

Increasing C P level from 10 % to 16 % resulted in a non significant increase in (A / G ratio) overall mean from 0.71 to 0.72 respectively table (25) , while analysis of variance showed significant ($p < 0.1$) effects on (A / G ratio) values due to C P in months of June, July , September and October as shown in table (26) .

Table (25) Monthly means ± S.E. of Plasma A / G ratio of lambs fed different Levels of TDN , UREA and C P.

Month / Item	0	1	2	3	4	5	6	Overall MEAN ± SE
TDN Level:								
62 ...	0.75 ± 0.03	0.65 ± 0.02 a	0.67 ± 0.03 a	0.65 ± 0.02	0.65 ± 0.03 a	0.71 ± 0.02	0.67 ±0.03	0.71 ±0.01
72 ...	0.78 ±0.02	0.73 ±0.03 b	0.80 ±0.02 b	0.71 ±0.03	0.75 ±0.03 b	0.74 ±0.03	0.71 ±0.03	0.72 ±0.01
UREA Level:								
With	0.74 ±0.03	0.67 ±0.04	0.72 ±0.03	0.66 ±0.03	0.66 ±0.3 a	0.70 ±0.02	0.65 ±0.03	0.69 ±0.01 a
Without	0.79 ±0.03	0.71 ±0.03	0.75 ±0.03	0.70 ±0.03	0.74 ±0.02 b	0.75 ±0.02	0.73 ±0.03	0.74 ±0.01 b
C P Level:								
10 % ...	0.71 ±0.02 a	0.65 ±0.02 a	0.71 ±0.02	0.63 ±0.02 a	0.66 ±0.03 a	0.71 ±0.03	0.67 ±0.02	0.71 ±0.01
16 % ...	0.82 ±0.03 b	0.73 ±0.04 b	0.76 ±0.04	0.73 ±0.03 b	0.74 ±0.03 b	0.74 ±0.02	0.71 ±0.04	0.72 ±0.01
Overall Mean ± S.E.	0.77 ± 0.02 a	0.69 ± 0.02 bc	0.74 ± 0.02 ab	0.68 ± 0.02 c	0.70 ± 0.02 bc	0.72 ± 0.02 abc	0.69 ± 0.02 bc	

N. B . : Means with different letters are significantly different .

Table (26)Analysis of Variance of monthly plasma (A / G) ratio of lambs fed different levels of T D N ; UREA and CP .

Month		0		1		2		3		4		5		6	
S . O . V.	df	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F
T D N	1	0.005	0.9	0.033	10.82 **	0.087	17.75 **	0.018	3.41	0.044	11.77**	0.004	0.69	0.011	1.21
Urea	1	0.015	3.05	0.006	1.85	0.004	0.79	0.006	1.21	0.039	10.27**	0.019	3.01	0.031	3.42
C P	1	0.076	15.27 **	0.038	12.60 **	0.014	2.75	0.057	10.76**	0.041	10.82**	0.006	0.96	0.014	1.54
TDN X Urea	1	0.012	2.39	0.021	7.04 *	0.012	2.37	0.00005	0.01	0.00156	0.39	0.0003	0.04	0.013	1.45
T D N X C P	1	0.001	0.15	0.091	29.82 **	0.003	0.67	0.00006	0.01	0.004	0.94	0.022	3.52	0	0
Urea X C P	1	0.00004	0.01	0.0001	0.04	0.003	0.59	0.003	0.57	0.018	4.80*	0.001	0.11	0.001	0.08
TDN X Urea X CP	1	0.006	1.23	0.012	3.92	0.05	10.18**	0.015	2.75	0.006	1.5	0.003	0.45	0.02	2.16
ERROR	16	0.005		0.003		0.005		0.005		0.004		0.006		0.009	

* = Significant at 5 % level .

** = Significant at 1% level .

4.2.7.4.4 Effect of month :

The (A / G ratio) overall mean of June month excelled significantly that of months July , September , October and December (Table 25) . Moreover , the (A / G ratio) overall mean exceeded significantly that of September month only (Table 25) .

4.2.7.5 Plasma Urea (P U) :

4.2.7.5.1 Effect of TDN level :

Increasing TDN level from 62 to 72 increased non significantly (PU) overall mean from 12. 04 to 12. 18 mg % (Table 27) .However , the analysis of variance detected significant ($p < 0.05$) effect of TDN on (PU) in months of July and November (Table 28) . This result is in good agreement with findings of Fick *et al.*, (1973) who indicated that energy supplementation to sheep increased significantly blood urea nitrogen , where the average combined pre-feeding and 2 hours post-feeding values were 8.6 , 11.3 and 12.1 mg / dl for 0 , 60 and 120 g of energy supplement / head / day respectively . Martin *et al.* ,(1981) differed completely , since they reported that increasing energy levels for wethers depressed blood urea nitrogen concentrations , suggesting that the presence of more readily available energy could have resulted in greater incorporation of NPN into microbial protein and thus lowered the amount of ammonia absorbed from the rumen and converted to rumen blood urea .

Table (27)Monthly means ± S.E. of Plasma Urea (PU) (mg%) of lambs different levels of TDN , UREA and C P .

Month / Item	0	1	2	3	4	5	6	overall Mean ± SE
TDN Level:								
62 ...	11.20 ± 0.89	11.25 ± 0.80 a	11.99 ± 0.85	10.88 ± 0.49	12.71± 0.37	12.25 ± 0.66 a	11.28 ± 0.68	12.04± 0.38
72 ...	11.43 ± 0.42	13.58 ± 0.71 b	12.17 ± 0.62	12.03 ± 0.65	12.83 ± 0.79	13.83 ± 1.17 b	12.10 ± 0.70	12.18 ± 0.58
UREA Level:								
With	11.95 ± 0.89	13.50 ± 0.97 a	13.42 ± 0.77 a	11.48 ± 0.69	13.10 ± 0.68	13.41 ± 1.16	12.68 ± 0.54 a	12.79 ± 0.55 a
Without	10.68 ± 0.31	11.33 ± 0.50 b	10.74 ± 0.42 b	11.43 ± 0.50	12.44 ± 0.53	12.67 ± 0.75	10.70 ± 0.72 b	11.43 ± 0.32 b
C P Level:								
10 % ...	11.32 ± 0.89	12.40 ± 1.06	11.77 ± 0.96	11.24 ± 0.43	12.55 ± 0.54	12.61 ± 1.09	11.38 ± 0.75	12.08 ± 0.62
16 % ...	11.32 ± 0.42	12.43 ± 0.53	12.39 ± 0.40	11.67 ± 0.73	12.99 ± 0.68	13.47 ± 0.84	12.00 ± 0.63	12.14 ± 0.32
Monthly Overall Mean± S.E.	11.32 ± 0.48 bc	12.42 ± 0.58 ab	12.08 ± 0.51 ab	11.45 ± 0.42 bc	12.77 ± 0.43 a	13.04 ± 0.68 ab	11.69 ± 0.48 ab	

N. B. : Means with different letters are significantly different .

Table (28) Analysis of Variance of monthly plasma UREA (PU) of lambs fed different levels of T D N ; UREA and C P (mg %).

Month		0		1		2		3		4		5		6	
S. O. V.	df	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F
T D N	1	0.327	0.08	32.667	7.85 *	0.184	0.04	8.05	2.89	0.094	0.02	14.884	5.73 *	4.002	1.95
Urea	1	9.627	2.3	28.167	6.77 *	42.934	8.70 **	0.02	0.01	2.6	0.69	3.3	1.27	23.602	11.49**
C P	1	0	0	0.007	0	2.344	0.47	1.084	0.39	1.17	0.31	4.42	1.7	2.282	1.11
TDN X Urea	1	0.06	0.01	16.007	3.85	0.26	0.05	3.604	1.29	10.27	2.73	1.55	0.6	12.042	5.86 *
T D N X C P	1	27.307	6.51 *	3.84	0.92	0.01	0	16.17	5.80 *	2.47	0.66	31.97	12.31 **	23.602	11.49**
Urea X CP	1	13.5	3.22	28.167	6.77 *	16.5	3.34	11.344	4.07	2.87	0.76	28.384	10.93**	4.002	1.95
TDN X Urea XCP	1	8.64	2.06	9.127	2.19	3.92	0.79	10.8	3.87	21.094	5.61 *	127.42	49.07**	26.882	13.09**
ERROR	16	4.193		4.162		4.937		2.788		3.76		2.597		2.054	

* = Significant at 5 % level .

** = Significant at 1% level .

4.2.7.5.2 Effect of Urea level :

Urea increased significantly the (PU) overall mean from 11.43 mg % of lambs had no urea to 12.79 mg % for those fed urea (Table 27) . The analysis of variance revealed significant ($p < 0.01$) effect of urea on plasma (PU) because of urea in months of August and December , besides there was a significant ($p < 0.05$) effect in July as shown in table (28) . This result is in complete agreement with findings of Koeln *et al.*,(1985)who indicated that the tendency for lambs fed unsupplemented corn to have lower blood urea nitrogen (BUN) values was probably due to the lower N intake by those animals , where the mean values of BUN for lambs fed corn only , impregnated corn , corn + urea and corn + SBM were 3.27 , 7.32 , 6.31 and 5.56 mg / dl respectively .

4.2.7.5.3 Effect of C P level :

Increasing CP level from 10 % to 16 % resulted in a non significant increase in (PU) overall mean from 12.08 to 12.14 mg % respectively (Table 27) . Moreover , the analysis of variance did not find any significant difference in (PU) due to CP as shown in table (28) . Preston *et al.*, (1965) explained that blood urea concentration was a good indication of ration's protein adequacy in growing lambs , and low blood urea nitrogen was associated with a low protein to energy ratio in the diet and retarded growth , when the protein to energy ratio was increased above

optimum level , blood urea increased rapidly and was not associated with increase in growth rate . Cocimano and Leng (1967) reported that high concentrations of urea in blood corresponds with high level excretion and inefficiency .

4.2.7.5.4 Effect of month :

The (PU) overall mean of October month only exceeded significantly that of June and that of September (Table 27) .

4.2.7.6 Plasma Creatinine (Cr) :

4.2.7.6.1 Effect of TDN level :

Increasing TDN level from 62 to 72 decreased non significantly plasma (Cr) overall mean from 1.70 to 1.67 mg % respectively (Table 29) . Analysis of variance detected a significant ($p < 0.05$) effect of TDN on plasma (Cr) in June month only as shown in table (30) . Cameron (1992) stated that in response to fasting some serum physiological parameters decreased ,while (Cr) increased . That could be considered accordance with our result , because fasting is actually a decreasing in TDN level .

4.2.7.6.2 Effect of Urea level :

Urea increased significantly plasma (Cr) from 1.64 mg % of lambs had no urea to 1.73 mg % of lambs fed urea (Table 29) . Moreover , analysis of variance revealed significant ($p < 0.01$) effects of urea on

Table (29) Monthly means ± S.E. of Plasma Creatinine (Cr) (mg %) of lambs fed different levels of TDN ,UREA and C P.

Month / Item	0	1	2	3	4	5	6	Overall Mean± S E
TDN Level :								
62 ...	1.77± 0.04 a	1.74± 0.03	1.78± 0.02	1.66± 0.03	1.68± 0.03	1.66± 0.04	1.67± 0.03	1.70± 0.02
72 ...	1.66± 0.04 b	1.72± 0.03	1.72± 0.03	1.63± 0.04	1.62± 0.03	1.63± 0.03	1.65± 0.03	1.67± 0.02
UREA Level:								
With	1.75± 0.03	1.77± 0.02	1.78± 0.02	1.72± 0.02a	1.72± 0.02a	1.71± 0.02a	1.68± 0.03	1.73± 0.01 a
Without	1.68± 0.05	1.69± 0.03	1.72± 0.04	1.57± 0.03b	1.58± 0.03b	1.58± 0.03b	1.64± 0.03	1.64± 0.02 b
C P Level :								
10 % ...	1.65± 0.04 a	1.71± 0.03	1.73± 0.04	1.64± 0.04	1.63± 0.03	1.62± 0.04	1.65± 0.03	1.66± 0.02
16 % ...	1.78± 0.04 b	1.75± 0.02	1.77± 0.02	1.65± 0.03	1.67± 0.03	1.67± 0.03	1.67± 0.03	1.71± 0.02
Overall Mean ± S E	1.71 ± 0.03 ab	1.73 ± 0.02 a	1.75 ± 0.02 a	1.65 ± 0.02 b	1.65 ± 0.02 b	1.64 ± 0.02 b	1.66 ± 0.02 b	

N.B. : Means with different letters are significantly different .

Table (30) Analysis of Variance of monthly plasma Creatinine (Cr) of lambs fed different levels of T D N ; UREA and C P (mg %) .

Month		0		1		2		3		4		5		6	
S . O . V.	df	M S	F	M S	F	MS	F	M S	F	M S	F	M S	F	M S	F
T D N	1	0.07	6.04 *	0.004	0.41	0.027	2.91	0.004	0.45	0.2	4.08	0.007	1	0.002	0.22
Urea	1	0.034	2.89	0.034	3.68	0.027	2.91	0.12	14.45 **	0.094	18.75 **	0.107	16.00 **	0.007	0.89
C P	1	0.12	10.32 **	0.01	1.14	0.007	0.73	0.0004	0.05	0.01	2.08	0.015	2.25	0.002	0.22
TDN X Urea	1	0.0004	0.04	0.01	1.14	0	0	0.02	2.45	0.0004	0.08	0.015	2.25	0.107	14.22 **
TDN X C P	1	0.004	0.32	0.004	0.41	0.007	0.73	0.02	2.45	0.02	4.08	0.007	1	0.002	0.22
Urea X C P	1	0.01	0.89	0.0004	0.05	0.007	0.73	0.01	1.25	0.004	0.75	0.007	1	0	0
TDN X Urea X CP	1	0.02	1.75	0.0004	0.05	0.0001	0	0.01	1.25	0.01	2.08	0.015	2.25	0	0
E R R O R	16	0.012		0.009		0.009		0.008		0.005		0.007		0.008	

* = Significant at 5 % level .

** = Significant at 1% level .

plasma (Cr) in months of September , October and November as shown in table (30) .

4.2.7.6.3 Effect of C P level :

Increasing C P level from 10 % to 16 % increased non significantly plasma (Cr) overall mean from 1.66 to 1.71 mg % respectively (Table 29) .However , analysis of variance detected a significant ($p < 0.01$) effect of C P on plasma (Cr) in June month only as shown in table (30) .

4.2.7.6.4 Effect of month :

There were significant differences between plasma monthly (Cr) overall means (Table 29) . The overall mean of (Cr) of July month excelled significantly that of each of September , October , November and December . Moreover , the (Cr) overall mean of August exceeded significantly those of September , October , November and December as shown in table (29) .

4.2.7.7 Plasma Total Cholesterol (TC) :

4.2.7.7.1 Effect of TDN level :

Increasing TDN level from 62 to 72 resulted in a nonsignificant increase in plasma (TC) overall mean from 67.77 to 68.34 mg % (Table 31) . However , analysis of variance revealed significant

($p < 0.01$) effects of TDN on plasma (TC) in months of August , September and December , besides significant ($p < 0.05$) in November as shown in table (32) . This result was in accordance with findings of Abdelatif and Ahmed (1993) who reported that plasma (TC) in Sudanese desert sheep was significantly higher with the concentrate diet in the shaded environment than that of those in the unshaded environment.

4.2.7.7.2 Effect of Urea level :

Urea increased nonsignificantly plasma (TC) overall mean from 67.59 mg / dl of those had no urea to 68.52 mg /dl for those fed urea (Table 31) . While analysis of variance revealed significant($p < 0.01$) effect of urea on plasma (TC) in months of June , July and October , moreover, urea had significant ($p < 0.05$) effect on plasma (TC) in months of September and December as shown in table (32) .

4.2.7.7.3 Effect of C P level :

Increasing CP level from 10 % to 16 % increased non significantly plasma (TC) overall mean from 67.55 to 68.56 mg / dl (Table 31) . While , analysis of variance revealed significant ($p < 0.01$) effect of CP on plasma (TC) in months of October and December , and significant ($p < 0.05$) effect in month of November as shown in table (32) .

A contradictory result was obtained by Kadzere and Charama (1993) who indicated that when they fed castrated male goats on diets

Table (31) Monthly means ± S.E. of Plasma Total Cholesterol (Tc) (mg / dL) of lambs fed different Levels of TDN , UREA and C P .

Month / Item	0	1	2	3	4	5	6	Overall Mean ± S. E .
TDN Level:								
62 ...	67.00 ± 1.40	71.72 ± 0.50	66.03 ± 1.46 a	65.33 ± 2.87 a	67.57 ± 1.08	72.26 ± 0.53 a	57.34 ± 0.78 a	67.77 ± 0.3
72 ...	67.38 ± 2.42	72.19 0.43	72.79 ± 1.27 b	69.78 ± 1.54 b	68.80 ± 2.72	73.69 ± 0.39 b	60.83 ± 1.77 b	68.34 ± 0.52
UREA Level:								
With	71.47 ± 1.07 a	72.79 ± 0.39 a	69.42 ± 1.65	68.83 ± 2.68 a	71.11 ± 1.34 a	73.20 ± 0.43	60.33 ± 1.89 a	68.52 ± 0.33
Without	62.91 ± 1.83 b	71.12 ± 0.40 b	69.40 ± 1.77	66.28 ± 2.00 b	65.26 ± 2.30 b	72.75 ± 0.57	57.84 ± 0.66 b	67.59 ± 0.48
C P Level:								
10 % ...	66.28 ± 1.88	71.93 ± 0.42	68.74 ± 1.93	67.11 ± 2.20	64.58 ± 2.17 a	72.17 ± 0.48 a	57.20 ± 0.43 a	67.55 ± 0.44
16 % ...	68.10 ± 2.04	71.98 ± 0.52	70.08_+ 1.41	68.00 _+ 2.57	71.79_+ 1.24 b	73.78 ± 0.42 b	60.97 ± 1.86 b	68.56 ± 0.37
Overall Mean ± S. E.	67.19 ± 1.37 c	71.95 ± 0.33 b	69.41 ± 1.18 bc	67.55 ± 1.66 bc	68.18 ± 1.44 bc	72.98 ± 0.35 a	59.08 ± 1.01 d	

N.B. : Means with different letters are significantly different .

Table (32) Analysis of Variance of monthly plasma Total Cholesterol (TC) of lambs fed different levels of T D N ; UREA and C P (mg %) .

Month		0		1		2		3		4		5		6	
S. O. V.	df	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F
T D N	1	0.882	0.15	1.354	0.95	274.05	55.36**	119.26	25.29**	9.127	1.59	12.327	5.33*	72.802	14.47**
Urea	1	438.615	73.08**	16.834	11.80**	0.0004	0	38.76	8.22*	205.335	35.73**	1.215	0.53	37.002	7.36 *
C P	1	19.802	3.3	0.01	0.01	10.8	2.18	4.77	1.01	311.04	54.13**	15.682	6.78 *	85.127	16.92**
TDN X Urea	1	254.802	42.45**	1.55	1.09	119.26	24.09**	128.344	27.21**	96.802	16.84**	2.16	0.93	92.827	18.45**
T D N X C P	1	81.402	13.56**	0.15	0.11	196.654	39.73**	64.354	13.65**	97.607	16.98**	0.007	0	46.482	9.24**
Urea X C P	1	26.042	4.34	9.25	6.48*	0.01	0	753.76	159.82**	55.815	9.71**	0.735	0.32	92.042	18.30**
TDN X Urea X CP	1	115.282	19.21**	6.304	4.42 *	88.55	17.89**	332.27	70.45**	270.682	47.10**	0	0	58.907	11.71**
ERROR	16	6.002		1.427		4.95		4.716		5.747		2.311		5.03	

* = Significant at 5 % level .

** = Significant at 1% level .

containing four levels of crushed soybean [0 , 11 , 22 and 33 %] , serum (TC) decreased but not significantly , at the day 28 the lowest serum (TC) was recorded of animals in group 1[0 % soy bean in diet] . Abdelatif and Ahmed (1993) had the same trend with Sudanese desert sheep since they reported that the crude protein level in diet had a decreasing effect on plasma (TC) .

4.2.7.7.4 Effect of month :

The highest plasma (TC) monthly overall mean was 72.98 mg / dl of November month , while the lowest was 59.08 mg / dl of December (Table 31) . The plasma (TC) monthly overall mean of November month (72.98 mg / dl) exceeded significantly that of June, July , August , September October and December (Table 31) , while that of July excelled that of June,September,October and December (Table 31). The plasma (TC) monthly overall mean of each of June , August , September and October significantly exceeded that of December month (Table 31) .

4.2.7.8 Plasma Alkaline Phosphatase (Alk) :

4.2.7.8.1 Effect of TDN level :

Increasing TDN level from 62 to 72 resulted in a non significant increase in plasma (Alk) overall mean from 72.36 to 73.10 IU / L (Table 33) . While the analysis of variance revealed that TDN had

significant ($p < 0.01$) effects on plasma (Alk) in all months of experimental period as shown in table (34) . This result is in accordance with findings of Abdel Hamid *et al.*, (1994) who found that feeding Rahmani lambs on two levels of TDN [2 / 3 of recommended NRC level and the normal level] resulted in a positive effect on plasma (Alk) which means increasing TDN level resulted in an increase in blood (Alk) level .

4.2.7.8.2 Effect of Urea level :

The overall mean of plasma (Alk) decreased not significantly because of urea providing from 74.51 IU / L of lambs fed no urea to 70.95 IU / L of lambs fed urea (Table33) . However , analysis of variance detected significant ($p < 0.01$) effect on plasma (Alk) in all months of experimental period except in October which was at ($p < 0.05$) as shown in table (34) , which disagrees with findings of Singh *et al.*, (1985) who reported that when goats fed normally (control diet) or had half of the digestible crude protein supplied by urea , resulted in a similarity in plasma (Alk) concentration in both groups .

4.2.7.8.3 Effect of C P level :

Increasing CP level from 10 % to 16 % did not significantly affect on plasma (Alk) overall mean where it was 72.49 versus

Table (33) Monthly means± S.E. of Plasma Alkaline Phosphatase (Alk) of lambs fed different levels of TDN , UREA and C P (IU / L).

Items	0	1	2	3	4	5	6	Overall Mean ± S E
TDN Level :								
62 ...	77.43 ± 5.42 A	66.65 ± 2.92 A	75.89 ± 5.16 A	59.58 ± 3.36 A	35.01 ± 2.30 A	86.12 ± 3.23 A	68.76 ± 6.91 A	72.36 ± 2.79
72 ...	79.76± 4.32 B	86.03± 1.75 B	97.21 ± 2.22 B	70.91 ± 4.73 B	36.86 ± 1.86 B	101.45± 5.96 B	76.55 ± 5.03 B	73.10± 1.62
UREA Level:								
With	76.32 ± 4.80 A	73.05 ± 3.42 A	82.52± 5.42 A	58.26± 1.44 A	35.28± 1.64 A	90.44 ± 5.75 A	65.47 ± 6.18 A	70.95± 2.06
Without	80.87± 4.93 B	79.63 ± 3.87 B	90.58 4.45 B	72.23± 5.34 B	36.59± 2.48 B	97.13 ± 4.63 B	79.84± 5.30 B	74.51± 2.38
C P Level :								
10 % ...	77.55 ± 6.74 A	70.56± 3.19 A	83.72 ± 5.66 A	63.09 ± 2.96 A	30.74± 1.15 A	83.72± 5.38 A	66.36 ± 4.47 A	72.49± 1.94
16 % ...	79.64 ± 1.63 B	82.12± 3.52 B	89.38 ± 4.32 B	67.40 ± 5.47 B	41.13 ± 1.64 B	103.85± 3.04 B	78.95 ± 6.06 B	72.97± 2.59
Monthly overall mean ±S.E	78.59± 3.40 B	76.34± 2.62 C	86.55± 3.53 AB	65.24± 3.07 D	35.94± 1.46 E	93.79± 3.68 A	72.65± 4.25 C	

N. B. : Means withdifferent letters are significantly different .

Table (34) Analysis of Variance of monthly plasma Alkline Phosphatase cncentrations (Alk) of lambs fed different levels of TDN ; UREA and C P (IU / L).

Month		0		1		2		3		4		5		6	
S . O . V .	d f	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F
T D N	1	32.69	17.8**	2254.476	1047**	2726.189	701**	769.081	516**	20.461	14.9**	1408.827	922**	363.949	190**
UREA	1	123.806	67.2**	259.844	120.7**	389.057	100**	1170.686	786**	10.349	7.57*	268.403	175**	1237.258	648**
C P	1	26.313	14.3**	801.917	372.6**	192.497	49.5**	111.715	75.1**	646.051	472.**	2432.107	1592**	951.804	498**
TDN X Urea	1	4008.56	2176**	43.875	20.4**	852.876	219**	575.26	386**	100.696	73.7**	319.594	209**	174.528	91.5**
TDN X C P	1	94.764	51.5**	17.425	8.1*	1281.443	329**	1019.467	685**	122.402	89.6**	0.032	0.02	124.306	65.2**
Urea X CP	1	0.964	0.52	305.521	141.9**	1268.906	326**	128.159	86.1**	135.946	99.5**	838.511	549**	269.072	141**
TDN X UreaX CP	1	2053.32	1114**	63.733	29.6**	109.013	28**	1412.2	949**	116.689	85.4**	2180.083	1427**	6838.426	3584**
ERROR	16	1.842		2.152		3.887		1.488		1.367		1.527		1.908	

* =Significant at 5 % level .
** = Significant at 1 % level .

72.97 IU / L respectively (Table 33) . However , analysis of variance revealed that C P had significant ($p < 0.01$) effect on plasma (Alk) as shown in table (34) .

4.2.7.8.4 Effect of month :

There were significant differences between plasma monthly (Alk) overall means , where the overall mean of November (93.79 IU / L) exceeded significantly that of months of June , July , September , October and December (Table 33) . The plasma monthly (Alk) overall mean of August excelled significantly that of months of July , September , October and December (Table 33) . The monthly plasma (Alk) overall mean of each of June and July exceeded significantly that of September and October (Table 33) . The monthly plasma (Alk) overall mean of each of September and December significantly exceeded that of October (Table 33) . This result is in complete agreement with findings of Russof *et al.*, (1954) who reported monthly variations in plasma (Alk) in cattle . Shoukry (1981) supported this trend since he found seasonal differences in plasma (Alk) in rams , where it was significantly the highest (30.7 King Armstrong Units / dl) in spring .

4.2.7.9 Total Body Water and Body Composition :

4.2.7.9. A . Total Body Water percent (TBW %) :

4.2.7.9.A .1 Effect of TDN level :

Increasing TDN level from 62 to 72 had decreased not significantly the (TBW %) overall mean from 67.05 % to 66.96 % as shown in table (35) . The analysis of variance did not find also any effect of TDN on (TBW %) whether at start or at end of experiment (Table 36).

4.2.7.9.A . 2 Effect of Urea level :

Urea increased nonsignificantly (TBW%) overall mean from 66.81 % for lambs had no urea to 67.19 % for those on urea (Table 35) . From table (36) , analysis of variance detected no effect of urea on (TBW %) .

4.2.7.9.A.3 Effect of C P level :

Increasing C P level from 10 % to 16 % decreased not significantly (TBW %) overall mean from 67.04 % to 66.97 % respectively as shown in table (35) . Analysis of variance found no effect due to CP on (TBW %) as shown in table (36) .

4.2.7.9.A.4 Effect of the period of the experiment :

The (TBW %) overall mean decreased significantly from 69.02 % at start of the experiment to 65.03 % at the end (Table 35) .

4.2.7.9.B Body Fat percent (B F %) :

4.2.7.9.B.1 Effect of TDN level :

Increasing TDN level from 62 to 72 increased non significantly

Table (35) Means ± S.E. of body composition percentas predicted by using (TBW)
of lambs fed different levels of TDN ;UREA and C P at Start and End of experiment .

Item	TBWS %	B F S %	B P S %	B A S %	T B W E %	B F E %	B P E %	B A E %	Overall Mean ± S. E. TBW	BF	BA
TDN Level:											
62 ...	69.10± 0.09	6.12± 0.13	19.53± 0.03	5.25± 0.01	65.08± 0.33	11.58± 0.45	18.39± 0.09	4.95± 0.03	67.05± 0.19	8.85± 0.23	5.10± 0.01
72 ...	68.93± 0.14	6.34± 0.2	19.48± 0.04	5.24± 0.01	64.98± 0.36	11.71± 0.48	18.37± 0.1	4.94± 0.03	66.96± 0.15	9.03± 0.21	5.09± 0.01
UREA Level:											
With	69.02± 0.12	6.22± 0.17	19.51± 0.04	5.25± 0.01	65.36± 0.4	11.20± 0.54	18.47± 0.11	4.97 ± 0.03	67.19 ± 0.18	8.71± 0.24	5.11 ± 0.01
Without	69.01± 0.12	6.25 ± 0.17	19.50± 0.04	5.24 ± 0.01	64.70 ± 0.25	12.09 ± 0.34	18.29 ± 0.07	4.92 ± 0.02	66.81 ± 0.15	9.17 ± 0.17	5.08 ± 0.01
C Plevel:											
10 % ...	68.93 ± 0.11	6.12 ± 0.16	19.48 ± 0.03	5.24 ± 0.01	65.14 ± 0.38	11.49 ± 0.51	18.35 ± 0.09	4.95 ± 0.03	67.04 ± 0.16	8.92 ± 0.22	5.10 ± 0.01
16 % ...	69.10 ± 0.13	6.35 ± 0.18	19.53 ± 0.04	5.25 ± 0.01	64.92 ± 0.31	11.80 ± 0.42	18.41 ± 0.11	4.94 ± 0.02	66.97 ± 0.19	8.96 ± 0.22	5.10 ± 0.01
Overall Mean ± S E	69.02 ± 0.09 a	6.23 ± 0.12 a	19.51 ± 0.03 a	5.25 ± 0.01 a	65.03 ± 0.24 b	11.65 ± 0.32 b	18.38 ± 0.07 b	4.95 ± 0.02 b			

N.B. : Means with different letters are significantly different .

Table (36) Analysis of Variance of predicted Body Components (MS value X 1000) percent ofbody weight of lambs [at Start and End of experiment] fed different levels of TDN ; UREA and C P .

S. O. V.	df	B W S		T B W % S		B F % S		B P % S		B A % S		B W E		T B W % E		B F % E		B P % E		B A % E	
		M S	F	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F	M S	F
TDN	1	5.51	0.07	0.019	0.95	0.11	0.79	0.0016	0.68	0.0004	0.68	308.2	2.83	0.0055	0.04	0.019	0.03	0.0007	0.04	0.00014	0.04
UREA	1	6.51	0.09	1E-04	0.01	0	0.01	0.00011	0.05	0.00002	0.04	192.7	1.77	0.285	2.14	1.26	2.28	0.034	2.1	0.0077	2.06
CP	1	0.094	0	0.022	1.08	0.14	0.99	0.0018	0.77	0.00036	0.66	60.17	0.55	0.0344	0.26	0.158	0.29	0.004	0.25	0.0009	0.25
TDN X Urea	1	5.51	0.07	0.08	0.11	0.02	0.12	0.00048	0.2	0.00012	0.22	10.67	0.1	0.0001	0	0	0	0.00002	0	0.00001	0
TDN XCP	1	21.094	0.28	0.015	3.98	0.58	4.06	0.00099	4.24	0.0022	3.96	160.2	1.47	0.55	4.15	2.42	4.37	0.066	4.1	0.0148	3.97
Urea XCP	1	0.26	0	0.005	0.75	0.11	0.79	0.0022	0.93	0.00047	0.85	24	0.22	0.076	0.57	0.268	0.48	0.0096	0.6	0.0022	0.6
TDN X Urea X C P	1	21.094	0.28	0.02	0.24	0.03	0.17	0.00026	0.11	0.00006	0.11	6	0.06	0.38	2.83	1.65	2.98	0.045	2.79	0.01	2.77
ERROR	16	74.948		0.325		0.14		0.00235		0.00055		108.9		0.133		0.553		0.0161		0.00374	

* =Significant at 5 % level .
** = Significant at 1 % level .

(BF %) overall mean from 8.85 % to 9.03 % respectively (Table 35) . Analysis of variance did not reveal any significant effect of TDN on (BF %) as shown in table (36) .

4.2.7.9.B.2 Effect of Urea level :

Urea decreased nonsignificantly the (BF %) overall mean from 9.17 % to 8.71 % for lambs fed urea as shown in table (35) . From table (36) the analysis of variance found no significant effect because of urea on (BF %) .

4.2.7.9.B.3 Effect of C P level :

Increasing C P level from 10 % to 16 % increased non significantly (BF %) overall mean from 8.92 % to 8.96 % respectively (Table 35) , while in table (36) , analysis of variance detected no significant effect due to C P on (BF %) .

4.2.7.9.B.4 Effect of the period of the experiment :

The (BF %) overall mean significantly increased from 6.23 % at start of experiment to reach 11.65 % at the end of experiment (Table 35) , which is normal because the animals their growth period and began to store fat in their bodies .

4.2.7.9. C. Body Protein percent (B P %) :

4.2.7.9.C.1 Effect of TDN level :

Increasing TDN level from 62 to 72 decreased not significantly (B P %) overall mean from 18.96 % to 18 .93 % respectively (Table 35) . Analysis of variance in table (36) revealed no significant effect of TDN on (B P %) .

4.2.7.9.C.2 Effect of Urea level :

Urea increased non significantly the (B P %) overall mean from 18.90 % to 18.99 % as shown in table (35) , moreover the analysis of variance revealed no significant effect of urea on (B P %) as shown in table (36) .

4.2.7.9.C.3 Effect of C P level :

Increasing C P level from 10 % to 16 % resulted in a non significant increase in (B P %) overall mean from 18.94 % to 18.95 % respectively (table 35) . The analysis of variance revealed no significant effect of C P on (B P %) as shown in table (36) .

4.2.7.9.C.4 Effect of the period of the experiment :

The (B P %) overall mean decreased significantly from 19.51 % at start of experiment to 18.38 % at the end of experiment (Table 35) , that decrease is obvious because animals after finishing growth period do not need building more tissues (protein) in their bodies .

4.2.7.9.D Body Ash percent (B A %) :

4.2.7.9.D.1 Effect of TDN level :

There was a slight non significant effect of increasing TDN level from 62 to 72 on the (B A %) overall mean , since it decrease from 5.10 % to 5.09 % respectively (Table 35) . The analysis of variance found no significant effect of TDN level on (B A %) as shown in table (36) .

4.2.7.9.D.2 Effect of Urea level :

Urea increased non significantly the (B A %) overall mean from 5.08 % to 5.11 % (Table 35) . Analysis of variance revealed no significant effect of urea on (B A %) as shown in table (36) .

4.2.7.9.D.3 Effect of C P level :

Increasing C P level from 10 % to 16 % did not exhibit any difference on (B A %) overall mean , since it was 5.10 % for both levels (Table 35) . Analysis of variance showed no significant effect due to C P on (B A %) as shown in table (36) .

4.2.7.9.D.4 Effect of the period of the experiment :

The (B A %) overall mean decreased significantly from 5.25 % at start of the experiment to 4.95 % at the end of experiment (Table 35) .

As the animal finished its growth period of bones and teeth formation , then there is more minerals to be excreted and no need to preserve the same amount of minerals in their bodies .

4.2.8 . Daily Gain

4.2.8.1. Effect of T D N level :

Increasing TDN level from 62 to 72 resulted in a significant increas in daily gain overall mean from 113.51 to 150.73 g / day respectively as shown in table (37) , meanwhile analysis of variance revealed that there was a significant ($p < 0.01$) effect of TDN on daily gain at 1st interval (after 2 months of the experiment) , and a significant ($p < 0.05$) effect a last interval (after 6 months) as shown in table (38) .

This result is in complete agreement with the findings of Bozinowa (1972 who found that daily gain of wethers were143g/day on rape seed meal , 133 g/day on urea , 117 g /day on ammoniated beet pulp, 111 g/day on urea with pulp and 125 g / day with no Nsupplement. While with extra starch (100 g / day) daily gains increased and were 139 ,155 ,153 , 144 and 147 g / day respectively in the same order . Karnezos *et al.*, (1994) had the same result , since they found that supplementing grazing lambs o alfa alfa with 3 levels of cracked maize (0 , 123 and 247 g / head / day) resulted in differences in average daily gain which were 141 , 154 and 169 g / day respectively .

Table (37) Means ± S.E. of Daily Gain (g) at 3 Intervals {after 2 ; 4 and 6 months } of lambs fed different levels of TDN ; UREA and C P .

Items	2 Months	4 Months	6 Months	Overall Mean ± S E
TDN Level:				
62 ...	107.23 ±16.66 a	125.85 ±10.25	107.46 ±9.86 a	113.51± 10.89 a
72 ...	176.06 ±15.09 b	139.56 ±13.05	136.56 ±7.76 b	150.73 ± 7.91 b
UREA Level :				
WITH	137.86 ±17.57	126.93 ±13.75	110.50 ±8.34 a	125.10 ± 9.98
WITHOUT	152.07 ±18.81	139.47 ±10.48	135.67 ±9.38 b	142.40 ± 10.50
C P Level :				
10 % ...	160.27 ±14.97	141.40 ±11.21	131.80 ± 9.28	144.49 ± 10.69
16 % ...	129.07 ±20.68	124.86 ±12.90	114.64 ± 9.23	122.86 ± 9.39
Overall Mean ± S E	145.21 ±12.75	133.41 ± 8.50	123.52 ± 6.63	

N.B. :Means with different letters are significantly different .

Table (38) Analysis of Variance of Daily Gain at different intervals { 2 ; 4 and 6 months } of lambs fed different levels of TDN ; UREA and C P.

Interval S. O. V.	df	After 2 MONTHS MS	F	AFTER 4 MONTHS MS	F	AFTER 6 MONTHS MS	F
T D N	1	33981.513	8.30 **	1349.405	0.53	6074.073	6.00 *
Urea	1	2054.534	0.5	1237.046	0.49	5006.712	4.95 *
C P	1	8041.29	1.96	2065.545	0.81	2220.639	2.19
TDN X Urea	1	2.075	0	251.018	0.1	15.391	0.02
TDN X C P	1	945.279	0.23	107.119	0.04	1022.025	1.01
Urea X C P	1	361.722	0.09	65	0.03	16.908	0.02
TDN X Urea X C P	1	511.262	0.12	285.235	0.11	104.494	0.1
ERROR	21	4096.052		2536.413		1012.143	

* = Significant at 5 % level .

** = Significant at 1% level .

4.2.8.2 Effect of Urea level :

Urea decreased non significantly the daily gain overall mean from 142.40 to 125.10 g / day (Table 37) . Bhattacharya and Pervez (1973) explained the same result , since they reported that the average daily gain of lambs did not show any significant treatment difference , however , gains in both treatments (two levels of urea 0.0 and 1.5 %) could be considered low where the average values were 0.08 and 0.05 kg for the two levels of urea respectively , the daily gain tended to be lower in the urea fed groups which was probably due to lowered feed intake . It is very clear that we have better rate of gain than that reported by them . Moreover , there was a significant ($p < 0.05$) decrease in daily gain (afte 6 months) at last interval because of that the urea (Table 38) , where th daily gain mean decreased from 135.67 to 110.50 g / day as shown in table (37) , this means that lambs fed urea gained only 81.45% as good as of those had no urea . McDonald (1966) had same result , since he reported that gains and feed efficiency of lambs was73 % as good with urea as with isolated soy protein . Clifford and Tillman (1967) also, found that lambs fed urea in the purified diet gained only 75 % as much as lambs fed soybean protein . Pate *et al.*, (1985) reported that steers fed urea gained 80 % of those had no urea ,which supported our result completely.

4.2.8.3 Effect of C P level :

In spite of greater daily gain means in favor of lambs on 10 % C P level at all the three intervals than that of those on 16 % C P level as shown in table (37) , but there was no significant difference due to increasing C P level from 10 % to 16 % as also shown in table (38) , even on overall daily gain mean where it was 144.49 versus 122.86 g / day respectively (Table 37) . It could be explained as that the surplus of C P in diet over 10 % is actually a burden and the animal is obliged to get rid of it at the expense of the daily gain . This result is in accordance with the findings of Braman *et al.*, (1973) since they noted that lambs fed urea supplemented diets did not respond in rate of gain to increasing dietary protein concentration .

4.2.8.4 Effect of interval :

There were no significant differences in overall daily gain means because of interval (Table 37) . The largest daily gain overall mean was that 145.21 g / day of 1st interval (after 2 months) , while the lowest one was123.52 g / day of the last interval (after 6 months) . That decline in daily gain is completely normal and explainable , since it followed the normal curve of animal growth which increases first till reaches its top then gradually decreases with age .

4.2.9 Carcass Parameters :

4.2.9.1 Eye Muscle [*Longissimus Dorsi*] Dissection :

4.2.9.1.1 Effect of TDN level :

Increasing TDN level from 62 to 72 decreased significantly the mean value of bone weight percent of eye muscle weight (B O W %) from 24.14 to 19.42 % (Table 39) respectively , and analysis of variance revealed a significant ($p < 0.01$) effect of TDN only on (B O W %) as shown in table (40) . However , increasing TDN level from 62 to 72 increased not significantly the other parameters of eye muscle : fat thickness on Ribes (FTR) from 0.78 to 0.89 cm ; fat thickness on eye muscle(TH) from 0.34 to 0.58 cm ; sample weight (WT) from 473.17 to 550.92 g ; lean weight % (LW %) from 48.34 to 49.27 % and fat weight % (Fat %) from 22.19 to 24.97 % as shown in table (39) . This result is in accordance with the findings of Younis *et al.*, (1976) who found that fat content of the 9 - 10 -11 rib cut was greater for sheep on higher plane of nutrition .

4.2.9.1.2 Effect of Urea level :

Urea increased significantly ($p < 0.05$) only the lean weight percent (L W %) as shown in table (40) . From table (39) urea increased significantly (L W %) from 47.90 to 49.71 % (the overall mean is 48.81 %) , it also increased not significantly fat thickness on eye

Table (39) Means ± S.E. of *Longissimus Dorsi* (Eye Muscle) Parameters of lambs fed different levels of TDN , UREA and C P.

Item	Fat Thick.Ribes (FTR) Cm	Fat Thick. L.D. (TH) Cm	Weight (WT) g	Fat %	Lean % (L W %)	Bone % B o w %
TDN Level:						
62 ...	0.78±0.16	0.34±0.07	473.17±52.52	22.19±1.44	48.34±1.01	24.14±1.08 a
72 ...	0.89±0.14	0.58±0.12	550.92±48.77	24.97±1.49	49.27±0.68	19.42±1.26 b
UREA Level:						
With	0.79±0.16	0.53±0.13	489.83±57.58	22.95±1.76	49.71±0.50 a	21.47±1.49
Without	0.88±0.14	0.39±0.07	534.25±44.79	24.21±1.22	47.90±1.06 b	22.09±1.24
C P Level :						
10 % ...	0.98±0.16	0.55±0.13	531.58±52.64	25.85±1.35 a	48.10±1.06	20.55±1.51
16 % ...	0.70±0.12	0.38±0.07	492.50±50.70	21.31±1.38 b	49.51±0.56	23.01±1.10
Overall Mean± S E	0.84±0.10	0.46± 0.07	512.04±35.97	23.58±1.05	48.81±0.60	21.78±0.95

N.B. : Means with different letters are significantly different .

Table (40) Analysis of Variance of Eye Muscle [*Longissimus Dorsi*] dissection parameters of lambs fed different levels of TDN ; UREA and C P .

S. O. V.	df	FTR		TH		WT		FAT%		LW %		BOW%	
		MS	F	MS	F	MS	F	MS	F	MS	F	MS	F
T D N	1	0.07	0.23	0.35	2.93	36270.375	1.08	0.007	1.74	0.001	1.23	0.021	8.12**
Urea	1	0.05	0.16	0.12	1.01	11837.042	0.35	0.002	0.42	0.002	4.55 *	0.0004	0.17
C P	1	0.454	1.47	0.184	1.54	9165.042	0.27	0.018	4.63 *	0.001	2.82	0.006	2.36
TDN X Urea	1	0.454	1.47	0.094	0.78	35.042	0	0.0001	0.04	0.003	6.32 *	0.00002	0.01
TDN X C P	1	0.0004	0	0.05	0.42	118582.042	3.55	0.001	0.13	0.002	4.24	0.002	0.94
Urea X C P	1	0.0004	0	0.094	0.78	3151.042	0.09	0.00002	0	0.001	1.43	0.001	0.27
TDN X Urea X C P	1	0.0004	0	0.05	0.42	77.042	0	0.0004	0.09	0.005	10.41**	0.005	2
ERROR	16	0.309		0.12		33448.583		0.004		0.0004		0.003	

FTR = Fat thickness on Ribes ; TH = Fat thickness on eye muscle ;
WT = Eye Muscle weight ; FAT % = Fat weight % of eye muscle ;
LW % = Lean weight % of eye muscle weight and BOW % = Bone weight % of eye muscle weight .
* = Significant at 5 % level .
** = Significant at 1% level .

muscle (T H) from 0.39 to 0.53 cm , while the overall mean is 0.46 cm (Table 39) . Muller *et al.*, (1971) supported this result , since they found that steers fed urea had higher means of several traits including lean content (LW) and fat thickness of eye muscle (TH) than those fed soybean meal .

However , urea decreased non significantly other parameters ; fat thickness on Ribes (FTR) from 0.88 to 0.79 cm and the overall mean was 0.84 cm , eye muscle sample weight (WT) from 534.25 to489.83 g with an overall mean 512.04 g , fat weight percent of eye muscle (FAT %) from 24.21 to 22.95 % with an overall mean 23.58 % , and bone weight percent (BOW %) from 22.09 to 21.47 % with an overall mean (21.78 %) as shown in table (39) ..

This result is in complete agreement with the findings of Abdel Hafiz and EL - Hommosi (1982) who found no significant effect of urea on physical components of eye muscle , and concluded that using urea in rations of fattening lambs had no unfavorable effects on carcass quality .

4.2.9.1.3 Effect of CP level :

Increasing C P level from 10 % to 16 % had a significant ($p < 0.05$) on FAT % only (Table 40) . From table (39) increasing C P level from 10 to 16 % resulted in a significant decrease from 25.85 % to 21.31 %

(with an overall mean 23.58 %) . This result is in complete agreement with findings of Craddock *et al.*, (1974) who explained that as percent protein in the diet increased, carcass measures increased on the low energy diets , but decreased on the high energy diets , and as energy level in the diet increased carcass fat measures increased on the low protein diets , but decreased on the high protein diets .

4.2.9.2 OFFALS :-

4.2.9.2.1 Effect of TDN level :

Increasing TDN level from 62 to 72 had only a significant ($p < 0.0\ 5$) effect on internal fat % as shown in table(42) . From table (41) the Internal fat % increased significantly from 0.22 to 0.42 % while the overall mean was 0.32 % . Increasing TDN level from 62 to 72 level increased not significantly other offals such as lungs and trachea % from 1.30 to 1.58 % (with overall mean 1.44 %) , and liver % from1.41 to 1.48 % (with overall mean 1.45 %) and the head % from 7.03 to 7.34 % (with overall mean 7.19 %)respectively as shown in table (41) .

4.2.9.2.2 Effect of Urea level :

Urea did not affect significantly any of the offals (Table 42) . From table (41) urea (apart from kidneys % which remained the same 0.21 %) increased not significantly all the offals ,for instance the internal fat % 0.27 to 0.37 % .

Table (41) Means ± S.E. of OFFALS weights as percent of preslaughter body weight of lambs fed different levels of TDN , UREA and C P .

Item	Lungs & Trachea %	Heart %	Liver %	Kidneys %	Internal Fat %	Spleen%	Head %
TDN Level:							
62 ...	1.30± 0.06	0.31± 0.02	1.41± 0.05	0.21± 0.01	0.22± 0.04 a	0.17± 0.03	7.03± 0.32
72 ...	1.58 ±0.14	0.30 ± 0.01	1.48± 0.04	0.21± 0.01	0.42± 0.09 b	0.16± 0.03	7.34 ±0.19
UREA Level:							
With	1.58 ±0.10	0.32 ±0.02	1.49 ±0.05	0.21± 0.01	0.37 ± 0.09	0.18± 0.03	7.41± 0.27
Without	1.30± 0.11	0.29± 0.01	1.40± 0.04	0.21± 0.01	0.27 ± 0.06	0.15± 0.02	6.96± 0.26
C P Level:							
10 % ...	1.41± 0.10	0.32± 0.02	1.45± 0.05	0.21± 0.01	0.41± 0.08 a	0.17± 0.02	7.47± 0.29
16 % ...	1.47± 0.13	0.29 0.01	1.44± 0.04	0.21± 0.01	0.23± 0.07 b	0.16± 0.03	6.90± 0.22
Overall mean ± SE	1.44± 0.03	0.31± 0.01	1.45± 0.02	0.21± 0.01	0.32± 0.03	0.17± 0.01	7.19± 0.16

N.B. : Means with different letters are significantly different .

Table (42) Analysis of Variance of OFFALS percent of preslaughter body weight (MS X 1000) of lambs fed different levels of TDN ; UREA and C P .

OFFAL S. O. V.	df	O 1 MS	O 1 F	O 2 MS	O 2 F	O 3 MS	O 3 F	O 4 MS	O 4 F	O 5 MS	O 5 F	O 6 MS	O 6 F	O 7 MS	O 7 F
T D N	1	0.76	3.72	0.004	0.35	0.058	1.26	0.00004	0	1.63	4.54 *	0.0025	0.03	0.197	0.72
Urea	1	0.85	4.16	0.038	3.09	0.093	2.03	0.00004	0	0.32	0.9	0.11	1.38	0.46	1.7
C P	1	0.03	0.16	0.026	2.17	0.0023	0.05	0.009	0.57	1.77	4.93 *	0.0041	0.05	0.71	2.58
TDN X Urea	1	0.5	2.45	0.027	2.25	0.031	0.68	0.009	0.57	0.0009	0	0.0077	0.1	0.01	0.04
T D N X C P	1	0.08	0.37	0.0087	0.72	0.082	1.8	0.023	1.45	0.016	0.04	0.82	10.77 **	0.32	1.17
Urea X C P	1	0.19	0.91	0.0037	0.31	0.0058	0.13	0.039	2.45	0.25	0.68	0.036	0.47	0.97	3.54
TDN X Urea X C P	1	0.0001	0	0.0098	0.81	0.027	0.6	0.0011	0.07	0.3	0.83	0.04	0.05	0.12	0.43
ERROR	16	0.205		0.0121		0.0457		0.0159		0.359		0.076		0.27	

O 1 = Lungs and Trachea weight % ; O 2 = Heart weight % ; O 3 = Liver weight % ; O 4 = Kidneys weight % ;
O 5 = Internal Fat weight % ; O 6 = Spleen weight % and O 7 = Head weight % of preslaughter body weight .
* = Significant at 5 % level .
** = Significant at 1% level .

4.2.9.2.3 Effect of CP level :

Only the internal fat % of preslaughter body weight was affected significantly ($p < 0.05$) because of C P as shown in table (42). Increasing C P level from 10 % to 16 % resulted in only one significant decrease in the Internal fat % from 0.41 % to 0.23 % , moreover not significant decreases were found in other offals except for lungs and trachea % which increased not significantly from 1.41% to 1.47 % as shown in table (41).

4.2.9.3 Carcass parameters (HCW , TW , PCW , DPA %, DPB %, BL, HW,HL, HG, CL, SL, ELL, ILL ,LTB , LTF , EMI) :

4.2.9.3.1 Effect of TDN level :

Increasing TDN level from 62 to 72 resulted in only one significant increase in fat thickness on Brisket (LTB) where it increased from 1.39 to 2.04 cm (Table 43). From table (44), there was a significant ($p < 0.05$) effect due to TDN on (LTB). However , increasing TDN level from 62 to 72 did increase not significantly many other carcass parameters such as { HCW , TW , PCW , DPA % , DPB % , BL , HW , HL , CL , SL and EMI } as shown in table (43). The increase in DPA% was exactly 6.38 % (from 44.34 % to 47.17 %) , which is in good agreement with the findings of Karnezos *et al.*, (1994) who found that supplementing grazing lambs of alfa alfa with three levels of cracked

Table (43) means ± S.E.of some carcass parameters measured on lambs fed different levels of TDN ; UREA and C P .

Item	H C W	T W	P C W	D P A %	D P B %	B L	H W	H L
TDN Level :								
62 ...	19.71± 1.69	2.59 ± 0.32	14.87 ± 1.24	44.34 ± 1.05	50.38 ± 1.23	55.75 ± 2.03	69.58 ± 1.80	72.42 ± 1.72
72 ...	24.43 ± 1.66	3.25 ± 0.44	17.72 ± 1.02	47.17 ± 1.14	51.87 ± 1.04	56.75 ± 1.46	72.75 ± 1.53	74.58 ± 1.60
UREA Level :								
With	21.13 ± 2.02	2.70 ± 0.41	15.83 ± 1.39	46.43 ± 1.18	52.08 ± 1.34	57.08 ± 2.25	69.92 ± 1.63	72.92 ± 1.68
Without	23.01 ± 1.55	3.14 ± 0.38	16.76 ± 0.99	45.09 ± 1.14	50.16 ± 0.85	55.42 ± 1.06	72.42 ± 1.76	74.08 ± 1.69
C P Level :								
10 % ...	23.12 ± 1.77	3.11 ± 0.38	16.85 ± 1.16	46.64 ± 0.88	52.37 ± 1.04	58.17 ± 2.09	71.92 ± 1.60	73.83 ± 1.71
16 % ...	21.02 ± 1.82	2.73± 0.40	15.73± 1.25	44.88 ± 1.36	49.87 ± 1.15	54.33 ± 1.12	70.42 ± 1.84	73.17 ± 1.67
Overall Mean ± S E	22.07 ± 1.26	2.92 ± 0.28	16.29 ± 0.84	45.76 ± 0.81	51.12 ± 0.8	56.25 ± 1.23	71.17 ± 1.2	73.50 ± 1.17

HCW = hot carcass weight , TW = tail weight , PCW =prime cuts weight , DPA= dressing percent (A) , DPB = dressing percent (B) , B L = body length , H W = hight at wither , H L= hight at loin

N. B . : Means with different letters are significantly different .

Table (43 - continued)

H G	C L	S L	E L L	I L L	L T B	L T F	EMI
86.67 ± 3.05	59.42 ± 1.59	43.33 ± 1.31	37.42 ± 1.55	31.75 ± 0.85	1.39 ± 0.15 A	1.21 ± 0.13	2.22 ± 0.14
91.50 ± 2.21	61.50 ± 1.38	44.21 ± 1.19	36.83 ± 1.37	31.75 ± 1.59	2.04 ± 0.26 B	1.01 ± 0.10	2.31 ± 0.16
89.08 ± 2.93	59.67 ± 1.73	42.42 ± 1.16	38.08 ± 1.92	31.92 ± 1.66	1.35 ± 0.15 A	1.02 ± 0.14	2.25 ± 0.14
89.08 ± 2.58	61.25 ± 1.23	45.13 ± 1.21	36.17 ± 0.66	31.58 ± 0.69	2.08 ± 0.25 B	1.20 ± 0.08	2.28 ± 0.16
91.50 ± 2.57	61.42 ± 1.70	45.04 ± 1.44	36.33 ± 1.78	30.33 ± 1.25	1.85 ± 0.26	1.14 ± 0.12	2.34 ± 0.19
86.67 ± 2.75	59.50 ± 1.26	42.50 ± 0.88	37.92 ± 1.00	33.17 ± 1.15	1.58± 0.20	1.08 ± 0.12	2.19 ± 0.10
89.08 ± 1.9	60.46 ± 1.05	43.77 ± 0.87	37.13 ± 1.01	31.75 ± 0.88	1.72 ± 0.16	1.11 ± 0.08	2.26 ± 0.11

HG = heart girth , C L = carcass length , S L =shoulder length , ELL = external leg length
ILL =internal leg length , LTB = fat thickness of brisket , LTF = fat thickness at flank
EMI = eye muscle index .

Table (44) Analysis of Variance of some Carcass parameters measured on lambs fed different levels of T D N ; U R E A and C P .

S. O. V.	df	H C W		T W		P C W		D P A %		D P B %		B L		H W		H L	
		MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F
T D N	1	133.5	3.36	2.63	1.24	48.9	2.72	48.1	3.41	13.39	1.18	6	0.14	60.2	1.64	28.17	0.77
U R E A	1	21.15	0.53	1.17	0.55	5.21	0.29	10.9	0.77	22.22	1.96	16.7	0.39	37.5	1.02	8.17	0.22
C P	1	26.52	0.67	0.85	0.4	7.53	0.42	18.8	1.33	37.36	3.3	88.2	2.07	13.5	0.37	2.67	0.07
TDN X Urea	1	0.43	0.01	0.27	0.13	0	0	1.72	0.12	0.0001	0	4.17	0.1	2.67	0.07	2.67	0.07
TDN X C P	1	55.08	1.38	2.19	1.03	39.8	2.22	20.8	1.47	39.1	3.46	6	0.14	66.7	1.82	88.17	2.41
Urea X C P	1	0.38	0.01	4E-04	0	0.25	0.01	16.2	1.15	35.59	3.15	24	0.56	2.67	0.07	0.17	0.
TDNXUreaX CP	1	1.15	0.03	0.58	0.27	0.72	0.04	21.8	1.55	26.67	2.36	4.17	0.1	28.2	0.77	42.67	1.17
ERROR	16	39.78		2.13		18		14.1		11.31		42.6		36.6		36.58	

* =Significant at 5 % level .

** = Significant at 1 % level .

Table (44 - continued)

HG		CL		SL		ELL		ILL		LTB		LTF		EMI	
MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F	MS	F
140.17	1.46	26.04	0.81	4.59	0.27	2.04	0.13	0	0	2.54	6.34*	0.24	1.38	0.05	0.19
0	0	15.04	0.47	44.01	2.61	22.04	1.44	0.67	0.05	3.23	8.07*	0.2	1.16	0.01	0.02
140.17	1.46	22.04	0.69	38.76	2.3	15.04	0.98	48.17	3.83	0.43	1.07	0.03	0.15	0.14	0.55
2.67	0.03	0.04	0	6.51	0.39	92.04	6 .0*	4.17	0.33	0.08	0.2	0.03	0.15	1.08	4.13
60.17	0.62	22.04	0.69	3.76	0.22	45.38	2.96	24	1.91	0.14	0.34	0.14	0.78	0.001	0
112.67	1.17	2.04	0.06	6.51	0.39	9.38	0.61	112.67	8.95**	0.11	0.27	0.24	1.38	0.07	0.26
16.67	0.17	12.04	0.38	41.34	2.45	135.38	8.83**	37.5	2.98	1.6	4	0.002	0.01	0.62	2.38
96.33		32.04		16.84		15.33		12.58		0.4		0.17		0.26	

maize [0 , 123 and 247 g / head / day] , resulted in an increase of dressing percentage values by 6 % . However , for (ELL and LTF) from table (43) increasing TDN level resulted in a non significant decrease .

4.2.9.3.2 Effect of Urea level :

Urea had only one significant ($p < 0.05$) effect on (LTB) fat thickness of Brisket (Table 44) , where it decreased significantly the mean value from 2.08 to 1.35 cm (Table 43) . Urea non significantly the mean values of { DPA % , DPB % , BL , ELL , and ILL } as shown in table (43) . The same result was found by Saxena *et al.*, (1971) and Bhattacharya and Pervez (1973) supported this trend , but this result differed with findings of Abdel Hafiz and EL-Hommosi (1982) , and Popanov (1970) who did not find any significant effect of urea on dressing percent .

Urea also decreased non significantly mean values of { HCW , TW , PCW , HW , HL , CL , SL , LTF and EMI } as shown in table (43). Saxena *et al.*, (1971) had the same findings about [HW , and HG] and added that rations could be evaluated quit well by measuring HG which was similar to weight gains in determining treatment effects .

However , Muller *et al.*, (1971) reported that urea had no significant effect on linear body measurements .

4.2.9.3.3 Effect of CP level :

From tables (43) and (44) , increasing CP level from 10% to 16 % decreased but non significantly the mean values of { HCW , TW , PCW , BL , HW , HL , HG , CL ,SL ,LTB ,LTF , EMI , DPA% and DPB % } . These results are in good agreement with the findings of Craddock *et al.*,(1974) found no significant effect of increasing CP level on carcass parameters .

4.2.9.4. Carcass parameters (EBW , HF, KF, PC % ,SCW andE M):

4.2.9.4.1 Effect of TDN level :

Increasing TDN level from 62 to72 increased significantly ($p < 0.05$) each of kidney fat (KF) mean value from 0.025 to 0.057 kg respectively and eye muscle area (EM)mean value from11.88 to15.96 Cm2 respectively as shown in tables(45)and(46).Saxena *et al.*,(1971) indicated that lambs fed alkali treated wheat straw (TS) had higher eye muscle area than the corresponding groups on untreated wheat straw (S) whether ration contained SBM [9.68 vs. 7.61 cm2] or urea [8.07 vs. 7.36 cm2] or Diammonium Phosphate[7.81 vs.5.81 cm2] respectively and in the same order , they added that probably was caused by the greater digested DM of (TS) rations . However , increasing TDN level from 62 to 72 did increase non significantly the mean values of {EBW,HF and SCW} as shown in table (45) .

Table (45) Means ± S.E. of some carcass parameters of lambs fed different levels of TDN ; UREA and C P .

Item	E B W	H F	K F	P C %	S C W	E M
TDN Level :						
62 ...	39.00± 2.96	0.016± 0.003	0.025± 0.005 a	75.63± 0.76	4.84 ± 0.48	11.88± 0.80 a
72 ...	46.78± 2.52	0.026± 0.005	0.057± 0.011 b	73.18± 1.06	6.71 ± 0.68	15.96± 1.59 b
Urea Level:						
With	40.27± 3.31	0.019± 0.003	0.038± 0.010	75.53± 1.02	5.30 ±0.68	12.10 ±1.03 a
Without	45.51± 2.38	0.023 ±0.017	0.044 ±0.009	73.28 ±0.84	6.25 ±0.59	15.74 ±1.51 b
C P Level :						
10 % ...	44.21 ±3.12	0.027 ±0.005 a	0.041 ±0.006	73.53 ±1.12	6.27± 0.67	14.43± 1.61
16 % ...	41.57± 2.80	0.015± 0.002 b	0.041± 0.012	75.28± 0.76	5.28± 0.60	13.41± 1.14
Overall Mean ± S E	42.89 ±2.07	0.021± 0.003	0.041± 0.007	74.41± 0.69	5.77± 0.45	13.92± 0.97

EBW= empty body weight , HF = heart fat , KF = kidneys fat , PC % = prime cuts % , SCW = secondary cuts weight , EM = eye muscle area .

Means with different letters are significantly different .

Table (46) Analysis of Variance of some carcass parameters of lambs fed different levels of TDN ; UREA and C P .

S. O. V.	df	E B W MS	F	H F MS	F	K F MS	F	P C % MS	F	S C W MS	F	E M MS	F
T D N	1	363.326	3.5	0.0005	3.1	0.0062	5.9*	35.991	4	20.802	4.3	100.042	6.1*
UREA	1	164.955	1.6	0.0001	0.7	0.0003	0.3	30.443	3.4	5.37	1.1	79.207	4.8*
C P	1	42.135	0.4	0.001	5.9*	0.000001	0	18.365	2	5.792	1.2	6.202	0.4
TDN Xurea	1	1.602	0.02	0.00006	0.4	0.00002	0.01	3.167	0.4	0.362	0.1	38.002	2.3
TDN X C P	1	114.756	1.1	0.00007	0.4	0.0016	1.5	9.961	1.1	1.232	0.3	11.207	0.7
Urea X C P	1	23.96	0.2	0.00002	0.1	0.0002	0.2	16.824	1.9	1.239	0.3	3.375	0.2
TDN XUreaXCP	1	1.633	0.02	0.0001	0.6	0.0005	0.5	0.293	0.03	0.049	0.01	16.667	1.02
ERROR	16	102.851		0.00016		0.0011		9.048		4.807		16.418	

EBW =empty body weight , H F = heart fat , K F = kidneys fat , P C % = prime cuts % ,
SCW = secondary cuts weight , E M = eye muscle area .
* =Significant at 5 % level .
** = Significant at 1 % level .

Only the Prime cuts weight percent (PC%) decreased non significantly from 75.63 % to 73.18 % by increasing TDN level from 62 to 72 respectively (Table 45) .

4.2.9.4.2 Effect of Urea level :

Urea decreased significantly ($p < 0.05$) only eye muscle area mean value (E M) from 15.73 to 12.10 Cm2 as shown in tables (45) and (46) . This result is in good agreement with findings of Thompson *et al.*, (1967) who indicated that the mean values of eye muscle area of steers were 69.1 , 67 .1 and 67.1 Cm2 for urea ration , fat ration and both fat and urea ration respectively , but differed with the findings of Boling *et al.*, (1970) who reported that there was no effect on rib- eye muscle area , or its fat cover of steers fed on urea .The same trend of result was reported by Bhattacharya and Pervez (1973) who found that values of *Longissimus dorsi* area were not significantly different (8.20 vs.7.93 Cm2) for control (soya bean meal)lambs group and urea (1.5 %) supplemented group respectively. However , urea did decrease non significantly each of (EBW) from 45.51 to 40.27 kg ; (HF) from 0.023 to 0.019 kg ; (SCW) from 6.25 to 5.30 kg and (KF) from 0.044 to 0.038 kg as shown in table(45). The same result was found by Thompson *et al.*,(1967) who reported that kidney fat % mean values of steers were 2.4 % , 2.6 % and 2.3 % for urea ration , fat ration and both

fat and urea ration respectively , but Muller *et al.*, (1971) had different result , since they found that steers fed urea had higher means of kidney fat % than those on soybean meal steers . However , urea only increased non significantly (PC %) from 73.28 to 75.53 % table (45) .

4.2.9.4.3 Effect of C P level :

The only significant ($p < 0.05$) effect of CP was that it decreased heart fat (HF) mean weight from 0.027 to 0.015 kg by increasing CP level from 10 to 16% respectively Tables (45) and (46) .

Moreover , increasing the C P level from10 to 16% decreased but non significantly the mean values of { EBW , SCW and EM } as shown in tables (45) and (46).The same result was found by Craddock *et al.*,(1974) who showed that carcass measurements of lambs were not affected by changing dietary protein level (10.5 vs. 13.5 %) , where the mean values of longissimus dorsi area were 13.68 vs. 13.78 Cm2 respectively .

The kidney fat mean value (KF) did not change a bit by increasing CP level from 10 to 16 % , but it had the same numeric value 0.041 kg as shown in table (45) . However , increasing C P level from 10 to 16 % resulted in a non significant increase in prime cuts percent (PC %) from 73.53 % to 75.28 % respectively as shown in table (45) .

4.2.9.5 Correlation coefficients of carcass traits and some body measurements :

4.2.9.5. A - Body Weight

1- The body weight had a very highly significant correlation ($p < 0.001$) with each of : Hot carcass weight(HCW) ,Tail weight (TW) , Prime cuts weight (PCW) , Carcass length (C L) Shoulder length (S L) , and Height at loin (H L) as shown in table (47) .

2- Body weight had a highly significant correlation ($p < 0.01$) with each of : Dressing percent A (DPA) , Fat thickness on eye muscle (TH) , and Fat thickness on Ribes (FTR) as shown in table (47) .

3- Body weight had a significant correlation ($p < 0.05$) with each of : Fat thickness on each of(Brisket LTB) and Flank (LTF) as shown in table (47) .

4.2.9.5. B - Body Length :

1 - Body length had a very highly significant correlation ($p < 0.001$) with each of : (HCW), (PCW) , (HL), and (CL) as shown in table (47) .

2 - Body length had a highly significant correlation ($p < 0.01$) with each of : (TW) , (DPA) , (S L) ,(TH) ,(FTR) and (LTF) as shown in table (47) .

Table (47) Correlation coefficients between Carcass traits and each of body weight and body measurements of male lambs fed different levels of TDN ; UREA and CP.

Carcass Traits	Body Weight B W	Body Length B L	Heart Girth H G	Hight at Wither H W
Hot carcass weight H C W	0.97 ***	0.71 ***	0.86 ***	0.80 ***
Tail Weight T W	0.85 ***	0.60 **	0.75 ***	0.80 ***
Prime Cuts Weight P C W	0.96 ***	0.73 ***	0.85 ***	0.80 ***
Dressing percent A D P A %	0.59 **	0.52**	0.61 **	0.59 **
Dressing Percent B D P B %	0.39	0.4	0.39	0.40 .
Hight at Loin H L	0.86 ***	0.75 ***	0.83 ***	0.89 ***
Carcass Length C L	0.92 ***	0.70 ***	0.77 ***	0.65 ***
Shoulder Length S L	0.81 ***	0.62 **	0.68 ***	0.61 **
External Leg Length E L L	0.22	0.24	0.18	0.09 .
Internal Leg Length I L L	0.34	0.11	0.33	0.36 .
Fat Thickness L.D. T H	0.53 **	0.54 **	0.53 **	0.32 .
FatThickness Ribes F T R	0.57 **	0.59 **	0.67 ***	0.49 *
Fat Thick.Brisket L T B	0.50 *	0.21	0.4	0.32 .
Fat ThicknessFlank L T F	0.49 *	0.53 **	0.46 *	0.49 *
Eye Muscle Index E M I	-0.26	-0.22	-0.14	- 0.14 .

* = Significant at 5 % level .
** = Significant at 1 % level .
*** = Significant at 0.1 % level .

4.2.9.5. C - Heart Girth :

1 - Heart girth had a very highly significant correlation ($p < 0.001$) with each of : (HCW) , (TW) ,(PCW) ,(H L) , (C L) , (S L) and (FTR) as shown in table (47) .

2 - Heart girth had a highly significant correlation ($p < 0.01$) with each of : (DPA) and (TH) table (47) .

3 - Heart girth had only a significant correlation ($p < 0.05$) with (LTF) as shown in table (47) .

4.2.9.5.D - Height at Wither :

1 - Height at wither had a very highly significant correlation($p < 0.001$) with each of : (HCW) , (T W) , (PCW) , (H L) and (C L) table (47) .

2 - Height at wither had a highly significant correlation ($p < 0.01$) with each of : (DPA) and (S L) table (47).

3 - Height at wither had a significant correlation ($p < 0.05$) with each of : (FTR) and (LTF) as shown in table (47) .

4.2.9.6 Correlation coefficients between Total Body Water (TBWE %) and some carcass parameters , and also Plasma Creatinine (Cr) :

Correlation coefficients between Total Body Water at end of experiment (TBWE %) [being the base of computing all other body components BF % , B P % , B Ash %] , eye muscle area (EM) and

Table (48) Correlation coefficients between body components at end of experiment and some carcass traits and plasma (Cr) of lambs fed different levels of TDN , UREA and C P .

Carcass Traits	TBWE%	BF %	BP %	BASh %	E M
Hot carcass weight HCW	0.05	-0.1	0.05	0.06	0.79 ***
Empty body weight E B W	0.11	-0.15	0.11	0.11	0.77 ***
Eye Muscle Area E M	-0.27	0.23	-0.27	-0.27	
Eye muscle index E M I	0.02	0.003	0.02	0.02	0.48 *
Creatinine (Cr)	0.14	-0.11	0.15	0.14	-0.25
FAT %	0.28	-0.31	0.28	0.28	0.52 **
Lean weight % (LW %)	-0.11	0.16	-0.11	-0.11	-0.12
Bone weight % (BOW%)	-0.31	0.31	-0.31	-0.31	-0.47
Prime cuts %(PC%)	-0.26	0.3	-0.26	-0.26	0.56 **
Dressing % (A)(DPA%)	-0.1	0.04	-0.1	-0.1	0.58 **
Dressing %(B) (DPB %)	-0.19	0.16	-0.19	-0.19	0.38

N. B. : TBWE%= total body water % at end ; BF% = body fat % at end ; BP =body protein % at end ; Bash % =body ash % at end and Cr = plasma creatinine .

* = Significant at 5 % level .

** = Significant at 1 % level .

*** = Significant at 0.1 % level .

each of HCW, EBW,EM , EMI , plasma (Cr) ,[FAT % , LW % , BOW % which are physical components of eye muscle] , PC % , DPA % and DPB % were calculated . Only eye muscle area(EM) had significant ($p < 0.001$) correlation with each of HCW and EBW . Besides , EM also had significant ($p < 0.01$) correlation with each of FAT % of eye muscle , PC % and DPA % (Table 48) . Moreover , EM had a significant ($p < 0.05$) correlation with EMI as shown in table (48) . Total body water (TBW %) or any of body components computed BF % , BP % and B Ash % exhibited no significant correlation with any of carcass parameters as shown in table (48) . From table (48) the correlation coefficient between B P% and plasma (Cr) was not significant which differed with findings of Fekry (1984) .