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EFFECT OF WINTER SHEARING AND LEVEL OF ENERGY AND PROTEIN ON GROWTH AND CARCASS CHARACTERISTICS IN AWASSI LAMBS

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ABSTRACT

48 Awassi lambs, 7-8 months old, 34.30 ± 0.75 kg average weight,were used to study the effect of winter shearing and level of energy and protein on growth and carcass quality of Awassi lambs. The animals were divided randomly into four different groups,each group contained 6 animals .The lambs were offered concentrate diets at a rate of 2% of live body weight consisted of high energy and protein (group1),low energy and high protein(group2), high energy and low protein (group3),low energy and low protein (group4).Each group of concentrate diet was divided into two sub group of shorn and unshorn lambs. Fresh alfalfa was offered ad libitum, and the experiment lasted for 3 months. Average daily gains were 199.68 and 162.00gm /lamb /day for shorn and unshorn lambs (group1),178.00and 169.33gm /lamb /day for shorn and unshorn lambs (group2) , and 172.17 and 135.17 gm /lamb /day and 172.17 and 174.00 gm /lamb /day for shorn and unshorn lambs (group3 and 4 respectively). Hot carcass weights (27.025 and 27.300 kg), (25.825 and 25.925kg), (28.800 and 27.750 kg) and (28.300 and26.975kg)for shorn and unshorn lambs for groups1,2,3and4 respectively. This indicates that shearing in winter did not significantly affect growth and carcass weights beside of the economical utilization of wool product in winter.

INTRODUCTION

In Iraq like most of other countries with hot climate, sheep usually shorn in summer (April– May) to reduce heat stress, control the external parasites and utilize wool as a source of income. Shearing of lambs before fattening increase feed intake (Vipondal et,al)(14), increase the growth and fattening (10). Shearing pregnant ewes at winter increase their lambs' birth weights and milk production. Increase wool growth rate of some lambs need to shorn them in winter out of shearing season (summer) to make animals more comfortable. Moreover there is a direct effect of nutrition type such as level of energy and protein on growth and carcass quality (Carrasco et al.,) (4) as a result of muscles growth and fat deposit in meat (3). In Iraq there is no research regarding the study of the effect of lambs winter shearing on growth rate and carcass quality .The aim of this study was to investigate the effect of winter Shearing (cold season) on growth rate and carcass quality of Awassi male lambs.

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MATERIALS AND METHODS

Location and climate of the study area

This study was carried out over a 3 months period from 7/ 11/2007 to 7/2/2008 after shearing at cold season (November) at the State Board for Agricultural Researches / Mosul / Iraq .Forty eight Awassi male lambs 7-8 months old, with an average initial weight of 34.30 ± 0.75 kg were used in this experiment .The lambs were randomly divided in to four diet groups , the each diet groups was sub divided into two sub groups with shorn and unshorn lambs .shearing lambs was conducted using hand shearing scissors ,All groups were offered the concentrates diets at 2% of live body weight and twice daily as fallowing :

Ration 1 (R1): high level of energy and protein
Ration 2 (R2): low level of energy and high level of protein
Ration 3 (R3): high level of energy and low level of protein
Ration 4 (R4) low level of energy and protein

The animals kept as groups feeding .At the beginning of the adjustment period ,they were treated against internal and external parasites .Fresh alfalfa was offered ad libitum.

Chemical composition

Crude protein (CP), crude fiber (CF), ether extract (EE) and ash content of the rations were carried out as described by Al-Khawaja et.al.(1)

Table 1: Components of the experimental diets

Ingredients%	Experimental diets			
	R1	R2	R3	R4
Barley	25	30	22	46
Wheat bran	2	25	3	20
Yellow corn	54	5	70	7
Soybean meal	15	14	1	1
Barley straw	2	24	2	24
Limestone	1	1	1	1
Common salt	1	1	1	1

Table 2: chemical composition of the feed ingredients (% of dry matter)

item	Ingredients				
	Barley	Wheat bran	Yellow corn	Soybean Meal	Barley straw
DM	89.40	90.10	87.00	91.00	90.00
Ash	2.80	6.10	1.30	6.20	7.80
OM	86.60	84.00	85.70	84.80	82.20
EE	1.90	4.50	4.00	4.90	1.60
CP	12.70	16.40	8.90	44.00	3.70
CF	5.40	10.00	2.00	5.90	37.70
NFE	66.60	53.10	70.80	30.00	41.00

Table 3: Chemical composition of the experimental diets(% of dry matter)

Item	Rations			
	R1	R2	R3	R4
DM	89.58	88.04	88.22	87.45
Ash	2.37	4.30	1.93	4.53
OM	87.21	83.74	86.29	82.92
EE	3.69	2.97	3.48	2.49
CP	14.95	15.40	10.03	10.69
CF	16.10	14.50	7.80	13.73
NFE	52.48	50.87	64.98	56.01
*ME	11.09	10.62	11.77	10.58

*ME (MJ/Kg DM) =0.12 CP + 0.31 EE +0.05 CF + 0.14 NFE (MAFF,1975) (9)

Slaughtering procedure and measurements

At the end of 3 months of feeding trial, all lambs were slaughtered after fasting for 12 h. Hot carcass of each animal was weighted immediately. The weights of internal organs were recorded, rumen contents were calculated as the difference between the full and empty rumen. Carcass were chilled at 2°C for 24 h and then weighed to determine the dressing percentages and cold carcass weights(6) .

Statistical analysis

Data were analyzed as a completely randomized design experiment using the General Linear Model procedures of SAS (11) ,The least significant differences were determined according to (13).

RUSTLES AND DISCUSSION

Live body weight (LBW) and body weight gain (DBWG)

Effect of rations

Regarding for lambs body daily weight gain (Table 4),significant differences ($p < 0.05$) were observed in daily body weight gain between R1 and R3,However both R1and R3 did not significant different with R2 and R4 , indicating that the lambs in R1 consumed all their need of energy and protein compared with lambs of other rations. These results agreed with those of Sayed(12) who studied the feeding high dietary energy for lambs, high dietary protein affected the dry matter and crude protein digestibility, therefore, increased the growth and performance. It could be concluded that the high dietary energy and protein producted the best performance of the lamb. No significant differences observed in empty body weight between rations

Effect of shearing

Effect of shearing showed significant ($p < 0.05$) different in DBWG between shorn (181.17g/lamb/d)and unshorn (168.39g/lamb/d),where no significant differences observed in final body weight , total weight gains and empty body weight.

Effect of interaction between ration and shearing

There were no significant differences in final body weights (kg) between all groups , However significant differences ($p < 0.05$) were noticed in total body weight (kg) and daily body weight gains between R1(shorn and unshorn lambs) and R3 (unshorn lambs) other hand ,R1(shorn and unshorn lambs) showed no significant differences with all other groups in total body weight , daily body weight gains and empty body weight.

Carcass characteristics

Effect of rations

Carcass characteristics of lambs presented in Table 5. Hot and cold Carcass weights were not significantly different between rations. Similarly there were no differences in dressing % 3 and dressing % 4. Conversely there were significant differences ($p < 0.05$) in dressing % 1 (R1) and dressing % 2 (R1 and R3) compared to other lambs fed R3 and R3 diet tended to be higher than that of R2 and R4 lambs due to high level of energy in R1 and R4. Lambs fed R2 diet had significant lower ($p < 0.05$) interior fat (kg) than R3 (Table 6),fat tail (kg) increased significantly ($p < 0.05$) in R4 compared with R2 as show in Table 6.

Effect of shearing

Shorn lambs tended to be slightly more weight in hot and cold carcass weight than unshorn lambs, but there were no significant differences between the two other, then also there were no significant differences in dressing 3, dressing 4, interior fat (kg) and fat tail (kg), however, shorn lambs found to be significant higher ($P \leq 0.05$) in dressing (1) and dressing (2) compared to unshorn lambs. This result agreed with (Cam et, al) (2)whom found that winter shearing increased hot carcass yield and dressing percentage.

It was concluded that shearing male lambs in winter can have a beneficial effect on daily weight gain and dressing percentage without affecting performance. Winter shearing increases lamb birth weight by 0.6 kg and reduced lamb age at slaughter by approximately two weeks (Keady and Hanrahan) (7),(8).

Effect of interaction between ration and shearing

There is no significant differences between the interaction of ration and shearing in hot carcass wt. (kg), cold carcass wt (kg) , dressing % 3, dressing %4 (Table 3) and interior fat (kg) (Table 5).There were higher value ($p< 0.05$) of dressing % 1 at R1 (shorn lambs) and R3 (shorn lambs),compared with R2 and R4 (unshorn lambs) , However greater dressing % 2 in R3 (shorn) and lower in R2 (shorn and unshorn lambs) and R4 (unshorn lambs) were observed.

Weight of internal organs

Effect of rations

For the main effects of dietary levels ,there were no significant differences observed between the rations in weights of lung and trachea ,heart, testicles and kidney (Table 7) .Spleen weights were higher ($p< 0.05$) in R1 and lower in R2. Liver weights higher ($p< 0.05$) in R3 and lower in R2.

Effect of shearing

Significant difference ($p< 0.05$) was found in liver weight of shorn lambs compared with unshorn lambs, and there were no significant differences in weights of lung, trachea, spleen, kidney, heart and testicles.

Effect of interaction between ration and shearing

As shown in table 7, there were no significant differences in lung and trachea and testicles weights between the interaction of ration and shearing. Whereas spleen weights were significantly ($p< 0.05$) higher than R1 (unshorn) and R2 (shorn and unshorn). Kidney weights in R3 (shorn and unshorn) were significantly ($p< 0.05$) increased compared with R4 (shorn) .In addition ,heart weights of R1 (shorn) and R4 (unshorn) were significantly ($p< 0.05$) higher than R2 (shorn) ,R3 (unshorn) and R4 (shorn) .

Carcass offal's weights

Effect of rations

There were no significant differences among rations in head weights (Table 8), Whereas the weights of feet and skin were significantly increased ($p< 0.05$) in R1 compared with other ration groups. Empty rumen weights in R4 significantly ($p< 0.05$) increased compared with R1 , Moreover ,there were significant increase ($p< 0.05$) in full rumen weights in R2 and R4 compared with R1 and R3.

Effect of shearing

Unshorn lambs showed heavier (p< 0.05) skin weight compared with shorn lambs(Table8).However ,the other carcass byproduct weights were not significantly different .

Effect of interaction between ration and shearing

As shown in Table 8, higher feet weight (p< 0.05) for R1 (unshorn) than for R2,R3 and R4 (shorn). Also heavier skin weight (p< 0.05) was observed for R1 (unshorn) and R4 (unshorn) compared to R1 (shorn),R2 (shorn and unshorn) ,R3 (shorn) and R4 (shorn) .Heavier empty rumen weights (p< 0.05)in R4 (unshorn) compared with R1 (shorn and unshorn) was observed . Full rumen weights in R4 (shorn and unshorn) was significantly (p< 0.05) higher compared with R1 (shorn and unshorn) and R3 (shorn), Moreover ,There were significant increase (p< 0.05) in rumen contents in R2 (shorn) and R4 (shorn) compared with all other groups except for R2 (unshorn), Head weight showed no significant differences among all groups of lambs.

The results of this experiment indicated that it is more beneficial for the farmers to shear lambs in winter to benefit the wool and make animals more comfortable without affecting the performance of lambs.

Table4: Effect of dietary level of energy and protein and shearing and their interactions on live body weight and weight gain.

Level of dietary energy and protein	Items				
	Initial body weight (kg)	Final body weight (kg)	Total weight gain (kg)	Daily weight Gain (kg)	Empty Body (%)
Ration 1	34.36±1.24	52.27±2.06	17.91±0.66	199.00±2.21 a	93.47 ±0.48
Ration 2	34.54±0.65	50.50±1.51	15.96±0.73	177.33±2.90ab	91.70 ±0.39
Ration 3	34.17±0.98	48.17±1.87	14.00±0.59	155.55±1.93b	95.24 ±1.07
Ration 4	34.13±1.23	49.75±1.50	15.62±0.75	173.56±0.76ab	93.51±0.65 NS
Effect of shearing					
Shorn	33.29±1.02	49.50±2.51	16.08±1.02	181.17±1.45	93.670 ±1.11
Unshorn	35.35±0.79	50.52±1.27	15.15±1.04	168.30±1.94	93.289 ± 0.42NS
Effect of interaction between ration and shearing					
Ration 1 (Shorn)	33.17±0.95	51.00±3.56	17.66± 0.68.a	196.23±2.57$_a$	94.508 ±0.55
Ration 1 (Unshorn)	35.80±1.06	53.80±1.93	18.00±0.55 a	162.00±1.66a	92.433 ±0.23
Ration 2 (Shorn)	33.33±1.03	49.33±3.17	15.67±0.79 ab	178.00±1.47ab	91.644 ±0.49
Ration 2 (Unshorn)	35.75±0.88	50.66±0.62	15.25±0.88 ab	169.33±1.28ab	91.755 ±0.68
Ration 3 (Shorn)	33.33±1.31	48.83±2.72	15.50±0.91 ab	172.17±1.89ab	96.265 ±2.39
Ration 3 (Unshorn)	35.00±0.96	47.50±1.25	12.17± 0.59b	135.17±1.45b	94.214 ±0.23
Ration 4 (Shorn)	33.33±1.43	48.83±2.78	15.50±0.65 ab	172.17±1.09ab	92.263 ±0.26
Ration 4 (Unshorn)	34.92±1.07	50.66±1.54	15.67±0.73 ab	174.00±1.18ab	94.753 ±0.94NS

Means in the same column with different letters are statistically different (p< 0.05)

Table5: Effect of dietary level of energy and protein and shearing and their interactions on carcass characteristics.

Level of Dietary level of energy and Protein	Items					
	Hot Carcass Wt (kg)	Cold Carcass Wt (kg)	Dressing (%) 1	Dressing (%) 2	Dressing (%) 3	Dressing (%)4
Ration 1	27.163 ±1.30	26.200 ±1.26	54.471 ±0.63 a	52.54 ±0.69 a	57.889 ±0.71	55.826 ±0.71
Ration 2	25.875 ±o.87	25.000 ± o.84	52.370 ±0.77 b	50.595 ± 0.74b	56.571 ±0.88	54.654 ±0.84
Ration 3	28.275 ±o.81	28.013 ±0.75	53.335 ±0.76 ab	52.838 ± 0.55a	56.205 ±1.56	55.686 ±1.47
Ration 4	27.638 ±1.14	27.275 ±1.14	52.076 ±0.50 b	51.505 ±0.55 b	55.834 ±0.63	55.025 ± 0.65
Effect of shearing						
Shorn	27.488±o.81	26.806±0.80	53.891±0.55a	52.539±0.55a	57.514±0.87	56.069±0.87
Unshorn	26.988±o.69	26.438±0.70	52.235±0.39b	51.200±0.35b	55.74±0.41	54.562±0.28
Effect of interaction between ration and shearing						
Ration 1 (Shorn)	27.025±1.96	26.200±1.86	54.980±1.11a	53.315±0.1.05ab	58.200±1.46	56.45±1.33
Ration 1 (Unshorn)	27.300±1.95	26.200±1.86	53.875±0.65ab	51.765±0.86ab	57.577±0.39	55.22±0.59
Ration 2 (Shorn)	25.825±2.01	24.875±1.99	52.640±1.57ab	50.695±1.57b	56.910±1.77	54.81±1.76
Ration 2 (Unshorn)	25.925±1.82	25.125±1.79	52.100±0.48b	50.495±0.23b	56.230±0.65	54.50±0.34
Ration 3 Shorn	28.800±0.48	28.200±0.34	55.058±0.68a	53.903±0.68	57.620±2.11	56.42±2.09
Ration 3 (Unshorn)	27.750±1.36	27.825±1.37	51.613±0.53b	51.773±0.43ab	54.740±0.56	54.96±0.43
Ration 4 (Shorn)	28.300±1.00	27.950±0.87	52.888±0.34ab	52.768±0.27ab	57.330±0.29	56.62±0.22
Ration 4 (Unshorn)	26.975±1.46	26.600±1.42	51.265±0.79b*	50.768±0.98b*	54.034±0.32	53.57±0.41

Means in the same column with different letters are statistically different(p< 0.05)

Dressing 1:Hot carcass wt / live body weight × 100 , Dressing 2:cold carcass wt / live body weight × 100 , Dressing 3:Hot carcass wt / Empty body weight × 100, Dressing 4: cold carcass wt / Empty body weight × 100.

Table 6: Effect of dietary level of energy and protein and shearing and their interactions on fat deposition

Level of Dietary level of energy and Protein	Items	
	Interior Fat (kg)	Fat tail (kg)
Ration 1	3.051 ±0.37 ab	8.639 ±0.57 ab
Ration 2	2.530 ±0.34 b	6.805 ±0.52 b
Ration 3	4.164 ±0.45 a	8.517 ±0.63 ab
Ration 4	3.089 ± 0.27ab	8.724 ±0.73 a
Effect of shearing		
Shorn	3.131±0.29	8.75±0.49
Unshorn	3.286±0.29	7.59±0.39
Effect of interaction between ration and shearing		
Ration 1 (Shorn)	2.854±0.18	9.261±0.75ab
Ration 1 (Unshorn)	3.247±0.77	8.017±0.65ab
Ration 2 (Shorn)	2.607±0.51	6.765±0.92b
Ration 2 (Unshorn)	2.454±0.52	6.844±1.14b
Ration 3 Shorn	4.045±0.90	9.249±0.42ab
Ration 3 (Unshorn)	4.283±0.37	7.745±0.90ab
Ration 4 (Shorn)	3.016±0.39	9.696±1.02a
Ration 4 (Unshorn)	3.161±0.41	7.751±1.01ab

Means in the same column with different letters are statistically different (p< 0.05)

Table 7: Effect of dietary level of energy and protein and shearing and their

Level of Dietary level of energy and Protein	Weights Traits (kg)					
	Lung and Trachea	Spleen	Liver	Kidney	Heart	Testicles
Ration 1	1.4996± 0.11	0.1880±0.01a	1.5696±0.66ab	0.2374±0.01	0.3833±0.01	0.6512±0.04
Ration 2	1.3998± 0.12	0.1471±0.01b	1.4427±0.05b	0.2380±0.01	0.3554±0.1	0.5911±0.04
Ration 3	1.4377± 0.04	0.1534±0.01ab	1.6830±0.08a	0.2279±0.01	0.3614±0.01	0.5971±0.03
Ration 4	1.4090± 0.07	0.1613±0.02ab	1.5027±0.07ab	0.2280±0.01	0.3740±0.02	0.5558±0.03
Effect of shearing						
Shorn	1.4788±0.60	0.1788±0.01	1.6308±0.06a	0.2421±0.01	0.3654±0.01	0.5863±0.02
Unshorn	1.3944±0.51	0.1535±0.01	1.4682±0.03b	0.2286±0.01	0.3719±0.01	0.6112±0.05
Effect of interaction between ration and shearing						
Ration 1 (Shorn)	1.604±0.04	0.195±0.01a	1.433±0.03bc	0.236±0.01ab	0.400±0.02a	0.603±0.06
Ration 1 (unshorn)	1.395±0.11	0.182±0.01ab	1.488±0.06bc	0.239±0.01ab	0.366±0.01ab	0.649±0.06
Ration 2 (Shorn)	1.409±0.061	0.1340±0.02b	1.398±0.06c	0.237±0.01ab	0.347±0.01b	0.610±0.05
Ration 2 (Unshorn)	1.391±0.092	0.1600±0.02ab	1.804±0.10a	0.239±0.01ab	0.363±0.02ab	0.572±0.05
Ration 3 (Shorn)	1.501±0.098	0.1680±0.01ab	1.562±0.04abc	0.251±0.02a	0.374±0.01ab	0.575±0.03
Ration 3 (unshorn)	1.375±0.091	0.1390±0.01b	1.526±0.12abc	0.205±0.01a	0.349±0.02b	0.619±0.04
Ration 4 (Shorn)	1.401±0.111	0.1890±0.01ab	1.479±0.08abc	0.245±0.02b	0.340±0.02b	0.507±0.04
Ration 4 (Unshorn)	1.604±0.123	0.1340±0.01b	1.433±0.03bc	0.232±0.01ab	0.409±0.02a	0.605±0.02

Interactions on Weight of internal organs.
Means in the same column with different letters are statistically different (p< 0.05).

Table 8: Effect of dietary level of energy and protein and shearing and their interactions on Carcass byproduct weights.

Level of Dietary level of energy and Protein	Weights Trails (kg)					
	Head	Feet	Skin	Empty Rumen	Full Rumen	Rumen contents
Ration 1	6.346 ±0.16	2.247 ±0.12 a	15.197 ±0.95a	2.298 ± 0.05b	4.088 ±0.29 b	5.81 ±0.45 b
Ration 2	5.898 ±0.19	1.979 ± 0.04	11.884 ±0.45 b	2.660 ±0.18 ab	4.988 ±0.44 a	7.438 ±0.22 a
Ration 3	6.106 ±0.27	1.937 ±0.10 b	13.418 ±0.98 b	2.596 ±0.06 ab	4.600±0.24ab	6.090 ± 0.42b
Ration 4	5.995 ±0.04	2.006 ±0.13 b	11.939 ±0.62b	5.000 ±0.25 a	5.000 ±0.36 a	6.492 ±0.65 ab*
Effect of shearing						
Shorn	5.952 ±0.24	1.98 ±0.09	11.712 ±0.42 b	2.660 ±0.06	4.775 ±0.25	6.682 ±0.32
Unshorn	6.220 ±0.211	2.105 ±0.12	14.506 ±0.62 a	2.618 ±0.15	4.563 ±0.16	6.247 ±0.37
Effect of interaction between ration and shearing						
Ration 1 (Shorn)	6.258 ±0.17	2.113 ± 0.17ab	13.657 ±0.92 b	2.354 ±0.09 b	3.875 ±0.43 b	5.492 ±0.55 bc
Ration 1 (unshorn)	6.434 ±0.13	2.380 ±0.07 a	16.736 ±1.35 a	2.243 ±0.06 b	4.300 ±0.44 b	6.209 ±0.75 b
Ration 2 (Shorn)	5.676 ±0.24	2.015 ± 0.147b	11.017 ±0.48 c	2.728 ± 0.04ab	5.025 ±0.31 ab	7.612 ± 0.10a
Ration 2 (unshorn)	6.119 ±0.24	1.943 ±0.19 b	12.750 ±0.44 c	2.592 ±0.17 ab	4.950 ±0.24 ab	7.264 ± 0.40ab
Ration 3 (Shorn)	6.116 ±0.20	1.922 ±0.05 b	11.390 ±0.52 c	2.627 ±0.09 ab	4.475 ±0.42 b	5.912 ± 0.57bc
Ration 3 (unshorn)	6.096 ±0.30	1.953 ±0.07 b	15.446 ± 1.23ab	2.565 ±0.08 ab	5.725 ± 0.29ab	6.267 ± 0.68b
Ration 4 (Shorn)	5.758 ±0.50	1.856 ±0.07 b	10.786 ±0.68 c	2.932 ±0.09 ab	5.725 ±0.43 a	7.737 ± 0.26a
Ration 4 (unshorn)	6.232 ±0.32	2.146 ±0.53 ab	13.092 ±0.68 a	3.072 ± 0.55a	4.275 ±0.26 a	5.247 ± 0.94c

Means in the same column with different letters are statistically different (p< 0.05)

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تأثير الجز في الشتاء مع مستويات الطاقة والبروتين في نمو وصفات ذبائح الحملان العواسي

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الملخص

استخدم في التجربة 48 حملاً عواسياً تراوحت أعمارها بين7-8 أشهر أوزانها الابتدائية 34.30 ± 0.75 كغم وذلك لدراسة تأثير جز الحملان في فصل الشتاء مع استخدام مستويين من الطاقة ومستويين من البروتين على نموها وصفات ذبائحها، قسمت الحملان عشوائيا إلى مجموعتين رئيسيتين متساويتين :مجموعة جز صوفها و مجموعة لم يجز صوفها، ثم قسمت الحيوانات التي جز صوفها إلى أربع مجاميع متساوية وكذلك قسمت الحيوانات التي لم يجز صوفها إلى أربع مجاميع أيضا. غذيت المجاميع الأربعة المجزوزة وغير المجزوزة على أربع علائق وهي (العليقة الأولى) عالية الطاقة وعالية البروتين و(العليقة الثانية) واطئة الطاقة عالية البروتين (العليقة الثالثة) عالية الطاقة واطئة البروتين (العليقة الرابعة) واطئة الطاقة واطئة البروتين. قدم العلف المركز بنسبة 2% من وزن الجسم الحي كما قدم الجت الطازج بصورة حرة ،استمرت التجربة لمدة 3 أشهر. أظهرت النتائج إن معدل الزيادة الوزنية اليومية كانت 199.68 و162.00غم/يوم/حمل للحملان المجزوزة وغير المجزوزة على التوالي (المجموعة الأولى) و178.00 و169.33غم/يوم/حمل للحملان المجزوزة وغير المجزوزة على التوالي (المجموعة الثانية) و172.17 و135.17 غم/يوم/حمل و172.17 و174.00 غم/يوم /حمل للحملان المجزوزة وغير المجزوزة (العليقة الثالثة والرابعة على التوالي). بلغ وزن الذبيحة الحار (27.025 و27.300) و(25.825 و 25.925) و(28.800 و 27.750) و(28.300 و 26.975) كغم للحملان المجزوزة وغير المجزوزة المغذاة في العلائق الأربعة على التوالي وهذا يشير إلى إن الجز في الشتاء لا يؤثر بشكل معنوي على نمو وصفات ذبائح الحملان وان تغذية الحملان بطاقة عالية يعطي نتائج أفضل سواء أكانت الحملان مجزوزة أم غير مجزوزة.

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