تاثير المستويات المختلفه من المواد المركزه فى علائق الحملان الأوسيمى

٢ ـ الصفات الطبيعية والكيميائيه للذبيحة

ف ٠ فيصل ، ج ٠ عبدالحافظ

استخدم فى هذه الدراسة ٢٤ ذكرا من الأغنام الأوسيمى عمرها عام ٠ قسمت الحملان عشوائيا الى ثلاثة مجموعات متساويه هى أ ، ب ، جـ ٠ كان الوزن الأبتدائى للمجموعات الثلاثة هو ٣١,٨ ، ٣١,٤ ، ٣١,٤ كجم على الترتيب أعطيت المجموعه أ مخلوط من المواد المركزه حتى الشبع ، بينما أعطيت المجموعتين ب ، جـ ٦٠٪ ، ٤٠٪ من مستوى الشبع على الترتيب ٠ بالاضافة الى ذلك أعطيت المجموعات الثلاثة تبن القمح حتى الشبع ٠

وفيما يلى ملخص النتائج التى أمكن الحصول عليها :ـ

١ـ فى المجموعة التى كانت تتغذى حتى الشبع وجد أن أوزان الجسم قبل الذبح والجسم فارغا والذبيحة أكبر من تلك التى للمجموعتين ب ، جـ ٠

٢ـ وجد أن أوزان كل من الرأس والجلد والأرجل والقناه الهضميه تزداد بزيادة مستوى العليقة المركزة ٠

٣ـ كانت نسبة التصافى أعلى للمجموعة أ (٥٩,٣٨٪) بالمقارنة بالمجموعة ب (٥٤,٣٥ ٪) والمجموعة جـ (٤٨,٠١٪) ٠

٤ـ زيادة نسبة المواد المركزه بالعليقة أدت الى زيادة جوهرية فى أوزان اللحم والدهن والعظم ٠

٥ـ حدثت زيادة جوهرية فى نسبة الماده الجافة ومستخلص الأثير فى اللحم بزيادة مستوى المواد المركزة فى العليقة بينما انخفضت نسبة البروتين بزيادة مستوى الطاقة فى العليقة ٠

٦ـ وجد أن لحم منطقة الكتف اقل احتواء أعلى الرطوبة وأكثر احتواء أعلى الدهن من لحم منطقتى الفخذ والقطن بينما كانت منطقة القطن أعلى فى نسبة البروتين عن كل من منطقتى الفخذ والكتف ٠

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EFFECT OF DIFFERENT CONCENTRATE LEVELS IN DIETS OF OSSIMI LAMBS

II- PHYSICAL AND CHEMICAL CHARACTERS OF THE CARCASS

(With 4 Tables and 2 Figures)

By

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SUMMARY

Twenty four growing Ossimi ram lambs aging one year were used in the present study. Lambs were distributed randomly into three equal groups A, B and C. The initial body weight was 31.8, 31.4 and 31.4 Kg for group A, B and C, respectively. Group A was fed concentrate mixture ad. lib., while other two groups B and C received only 60% and 40% of the concentrate mixture ad.lib-level. In addition, all groups were fed wheat straw ad libitum. The following results were obtained.

1- Pre-slaughter weight, empty live weight and carcass weight of animals given ad.lib- ration was significantly higher than those given either 60% or 40% of the ad.lib: level.

2- Weights of head, hide, feet and alimentary tract increased with increasing concentrate level in the ration.

3- Group A (ad.lib.) had the higher dressing percentage (59.38) compared with 54.35 and 48.01 groups B and C, respectively.

4- By increasing concentrate level in the ration, weights of lean, fat, bone and fat tail significantly increased.

5- There was a highly significant increase in dry matter and ether extract percentages of meat occurred by increasing concentrate

level, vice-versa, protein percentage decreased significantly by increasing energy level.

6- Shoulder meat contained less moisture and more fat than meat of leg and loin joints, while loin meat had higher percentage of protein than leg and shoulder meat.

INTRODUCTION

Work on the effect of energy levels in the diet on lamb carcass measurements has been conducted (NOBLE et al., 1966; GLIMP et al., 1968; SHELTON et al., 1969; AREHART and BANBURY, 1973). Most researchers were in agreement that increasing energy levels in the diet usually resulted in greater fat deposition. On the other hand, REID et al., (1968) stated that diet has very little effect on carcass composition when lambs are slaughtered at a constant weight. However, MAHYUDDIN (1977) found that increased slaughter weight caused an increase in dressing percentage, quality grade, fat measurements and carcass ether extract, but a decrease in the percentage of carcass moisture and protein.

Many extensive studies have been resported on the effect of energy level in the diet on carcass measurements of beef, but data concerning lamb carcass measurements are still limited. The present study was conducted to investigate the effect of different concentrate levels on physical and chemical characters of Ossimi lambs carcasses.

MATERIALS AND METHODS

Twenty four growing Ossimi ram lambs aging one year were used in this study. Lambs were distributed randomly according

to body weight into three groups (8 animals each). Groups were designed as A. B and C. The average initial body weight was 31.8, 31.4 and 31.4 Kg for groups A, B and C, respectively. This experiment had been carried out at the animal production experimental station, Faculty of Agriculture, University of Assiut and extended for six months.

Group A was fed concentrate mixture ad.lib., while the other two groups B and C reveived only 60% and 40% of the concentrate mixture ad.lib. level, respectively. In addition, all groups were fed wheat straw ad-libitum. In ad.lib. feeding system,the feeding stuffs were offered to the animals in relatively larger amounts than the animals would consume. The remainder of each feeding stuffs was weighed in order to obtain the adjusted amount of the food consumed per head daily. The ad.lib. feeding level (group A) was tested every week and the other two levels were accordingly adjusted.

The high-energy concentrate mixture consisted of the following percentages, decorticated cotton seed meal 40, corn 20, rice bran 20,wheat bran 17, calcium carbonate 2 and commercial salt 1. The chemical composition of wheat straw and concentrate mixture are presented in following table.

Food	D.M.	O.M.	C.P.	E.E.	C.F.	N.F.E.	Ash
wheat straw	88.32	75.35	1.44	2.06	29.18	42.67	12.97
Conc. mix.	88.08	77.76	23.12	6.5	4.24	43.9	10.32

At the start of the experiment, animals were drenched for the internal parasites. Lambs were kept tied in a semi-open shed and were individually fed. Water was available at all times.

At the end of the experiment, animals left fasting for 24 hours perior to killing and pre-slaughter live weight was estimated. Slaughtering followed according to Islamic Rites. When bleeding was completed, the animals were skinned and dressed out. The weight of head, hide, feet and certain offal parts, including the alimentary tract and its contents was recorded. The whole carcasses were chilled for 24 hours and then weighed.Subjective assessments of carcass composition or bone, fat and lean contents were also carried out.

Meat samples were taken from leg,loin and shoulder joints for chemical analysis. Site of joints was determined according to the procedure described by TIMON and MAURICE (1965). Chemical analysis were carried out according to A.O.A.C. METHODS (1965) to determine dry matter, intramascular fat (ether extract) and protein.

Statistical analysis of the data were made according to SNEDECOR (1962). The significance of group differences was tested by DUNCAN'S multiple range test (1955).

RESULTS AND DISCUSSION

Slaughter traits:

A sammary of slaughter characters data is given in table (1). These results show that the average pre-slaughter weight of animals given ad.lib. ration (group A) was higher than those given either 60% or 40% of the adlibitum level (group B and C). Considering the pre-slaughter weight of group A as 100%, the corresponding values for groups B and C will be 85.52% and 76.27%, respectively. Similar trend was found for empty live weight and chilled carcass weight. Statisical analysis (Table 1) showed that the differences between treatments

were highly significant (P $\leq$ 0.01).

Data presented in table (1) indicated that concentrate level in lamb's rations had a significant effect (P $\leq$ 0.05) on full and empty weights of alimentary tract. It is interesting to note that, animals of group C (40% concentrates) had the heavier full alimentary tract than the other two groups (A & B). On the other hand, results show that weight of empty alimentary tract was increased by increasing the level of concentrate mixture in the ration. Differences in contents of alimentary tract may be attributed to the amount of roughage eaten by different groups. Information from present study illustrated that animals fed on low level of concentrates consumed more roughages (Table 1).STOBO (1964) found an association in calves between fiber content of the diet and rumen fill.

From present results, it could be noted that alimentary tract full account for 10.41, 12.80 and 20.08% of live weight for groups A, B and C, respectively. REID et al. (1963) showed that the contents of the gastrointestinal tract account for up to 30% of live weight, depending on the nutritional regime.

Data in table (1) also indicate that, concentrate level had a significant effect on head, hide and feet weights.Their weights increased by increasing concentrate level in the ration.Similar trend was found for other offals except for heart weight which the difference due to treatments was not significant. PRESCOT (1969) reported that head of lamb not affected significantly by plane of nutrition, he added that the unrestricted entire lambs had proportionately heavier pelts than the castrates, but these differences were less marked in the lambs that had been subjected to a period of feed restriction.

Dressing percentage:-

Present results illustrate that deressing percentage significantly increased by increasing concentrate level in the diet (Table 1).A positive factor in favour of the ad.lib- concentrate treatment (group A) is the higher dressing percentage (59.38%) compared with 54.35% and 48.01% for the 60% and 40% of the ad.lib. level, respectively. These result may be attributed to: firstly, the increase of alimentary tract contents by increasing roughage level in the ration(Table 1).Secondaly, the increase of fat deposition by increasing the concentrate level. Similar results were reported by STOBO (1964) who found an association in calves between fiber content of the diet and rumen fill which in adult animals; would result in large differences in dressing percentage. PRESTON et al. (1963) reported that an increase in energy concentration is known to rise dressing percentage.

O'DONOVAN and GHADAKI (1973) working on kallakui lambs, using diets containing different levels of wheat straw, found that the 10% straw treatments is the higher dressing percentage (54.4) compared 53.5 and 53.1 for the 20% and 30% straw levels.

Carcass components:

The average weights and percentages of different components of carcasses from lambs fed on rations contained different levels of concentrates are presented in table (2) and figures 1 & 2. It is clear from present data that weights of different carcass components increase significantly by increasing concentrate level in the ration. Considering component weights of group C (40% x ad.lib.) as 100, the corresponding figures for

groups A (ad.lib.)and B(60% x ad.lib.)will be 136.39%,121.09%; 498.80%, 192.90%; 123.37%, 109.95; 344.92% and 237.23% for lean,dissectable fat, bone and fat tail weights, respectively. It is quite clear that the large effect of concentrate level was on fatty tissue while it had small effect on bony tissue.

It is interesting to note that carcasses of group C had higher percentages of lean and bone than other two groups which received more concentrates. On the other hand, precentages of dissectable fat and fat tail increase with increasing concentrate level in the ration. Similar results were reported by SWAN and LAMBING (1967), who diluted cereal diets with ground straw and found that this reduced the separable fat in the carcasses as measured by complete dessection. WEISS et al. (1967) considered that increasing carcass fatness with decreasing dietary roughage was due to a narrowing of the acetic/ propionic ratio.

Chemical composition:

Data presented in table (3) show the means and standard errors denoting the amounts of dry matter, ether extract and protein of leg, shoulder and loin meat samples of growing Ossimi lambs fed on different levels of concentrates. The present data show that the average dry matter percentages in meat samples (excluding joint effect)were 32.03 ± 1.71, 26.07 ±0.33 and 25.93 ± 0.62 for groups A, B and C, respectively. The corresponding percentages of ether extract were 14.83 ± 1.82, 7.76 ± 0.87 and 7.55±0.75. The results indicate that a highly significant ($P < 0.01$) increase (Table, 4) in dry matter and ether extract percentages of meat occured by increasing the level of concentrates in the ration. AREHART and BANBURY,

(1973) reported that increasing energy levels in the diet usually resulted in greater fat deposition. On the other hand, REID et al. (1968) stated that diet has very little effect on carcass composition when lambs are slaughtered at a constant weight.

It could be noted from table (4) that groups differences in percentages of dry matter and ether extract consist large source of variance and accounted for about 22% and 24% of the total sum of squares.

From data presented in tables 3 and 4, it is interesting to note that percentage of protein decreased significantly ($P < 0.05$) by increasing the energy level in the ration and represented a small portion of the variability (6.16 %).

Comparing the percentages of ether extract and protein, it could be concluded that the increase in fat percentage was accompanied by a decrease in protein percentage.Similar results were reported by EL-HOMMOSI and ABD-EL-HAFIZ (1978).

The interaction between treatments and joints was found to be highly significant ($P < 0.01$), indicating that level of concentrates in the lambs ration had different effects on chemical composition of the three carcass joints studied.

Excluding treatment effects,joints differed significantly ($P < 0.01$) in chemical analysis and accounted for about 23-41% of the total sum of squares.

The dry matter percentage in meat from leg, shoulder and loin averaged 24.52 ± 0.29, 33.43 ± 1.43 and 26.08 ± 0.84, respectively. The corresponding figures for ether extract were

7.39 ± 0.43, 16.09 ± 0.48 and 6.66 ± 0.77.For protein percentage the averages were 15.98 ± 0.28, 16.33 ± 0.48 and 18.28 ± 0.36 for leg, shoulder and loin, respectively.

It is clear from present results that shoulder meat contained less moisture and more fat (ether extract) than other two joints. On the other hand, loin meat had higher percentage of protein than leg and shoulder meat.VESELY and PETERS(1966) found that the amount of fat in muscle of shoulder significantly ($P < 0.01$) greater than that in muscle of loin or leg.

In comparing the slaughter weight (Table 1) and chemical analysis (Table 3), it could be noted that increase slaughter weight caused an increase in ether extract, but a decrease in moisture and protein . Similar results were reported by MAHYUDDIN (1977).

It is quite clear from present results that pre-slaughter liveweight as well as carcass weight significantly increase by increasing concentrate level in the ration. The results also provide sufficient evidence that the dissectable fat and intramuscular fat (ether extract) are the major factor affecting carcass weight. Since most consumers do not like more fat in the meat and from the economic point of view the formation of fatty tissue needs more energy in the diet with low efficiency of food conversion, it could be suggested that the more economically level for feeding growing Ossimi lambs was 60% of ad. lib. level (which is not marginal or wasteful).

Neverthless, as the carcass weight increases, there is an increase in the amount of fat in the carcass,it is suggested

that further work should be carried out to determine the suitable slaughter weight which produce high quality carcasses.

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Table 1. Effect of concentrate level in the diet on slaughter traits of growing Ossimi lambs.

Item	Treatments A	Treatments B	Treatments C	F test
No. of lambs	8	8	8	-
Final fasted wt.(kg)	53.60±2.49 a	45.69±1.76 bc	40.88±1.46 bc	**
Empty wt. (kg)	48.06±2.38 a	39.60±1.28 b	32.70±1.08 c	**
Chilled carcass wt. -kg)	31.94±1.92 a	24.83±0.95 ab	19.58±0.60 c	**
Alim. tract contents (kg)	5.58±0.28 ab	5.95±0.47 a	8.25±0.44 bc	**
Alim.tract empty (kg)	3.76±0.24 ab	3.09±0.22 abc	2.88±0.15 bc	*
Head wt. (Kg)	3.55±0.21 ab	3.24±0.10 ab	2.95±0.12 c	*
Hide wt. (kg)	4.35±0.25 a	4.04±0.17 ab	3.06±0.11 c	**
Feet wt. (kg)	1.23±0.08 a	1.25±0.04 a	0.98±0.04 bc	*
Liver wt. (kg)	928± 64 ab	656± 20 ab	588± 34 c	**
Spleen wt. (g)	90± 6	81± 4	69± 3	*
Heart wt. (g)	174± 15 a	163± 7 ab	163± 4 bc	n.s
Lungs & Trachea wt. (g)	638± 40 ab	538± 30 abc	488± 30 bc	**
Kidney wt. (g)	205± 29 a	171± 3 ab	129± 4 bc	*
Kidney Fat wt. (g)	108± 11 a	52± 4 b	28± 4 c	*
Caul fat wt. (g)	447± 69 a	178± 9 b	37± 8 c	**
Dressing %	59.38	54.35	48.01	**
Av.daily intake: Wheat strow (kg)	0.19±0.011	0.29±0.007	0.56±0.009	-
Concentrate mix.(kg)	1.65±0.031	0.99	0.66	-

*= P < 0.05. ** P < 0.01. N.S= not significant.
Multiple range test (Duncan, 1955); values having a common. letters in the same row are not significantly different.

Table 2. Effect of concentrate level in the diet on carcass components of growing ussimi lambs.

Item	Treatments A	Treatments B	Treatments C	F test
No. of carcasses	8	8	8	
Lean: Wt. (kg)	ab 19.180±1.062	ab 17.029±0.689	c 14.063±0.879	**
%	a 60.70	b 67.11	c 70.20	**
Fat: Wt. (kg)	a 4.988±0.651	bc 1.929±0.207	bc 1.000±0.167	**
%	a 14.08	b 7.41	c 4.65	**
Bone: Wt. (kg)	a 4.488±0.049	bc 4.000±0.143	bc 3.638±0.136	**
%	ab 13.99	ab 15.77	c 17.99	**
Fat tail: Wt. (kg)	a 3.363±0.444	b 2.313±0.205	c 0.975±0.089	**
%	ab 10.07	ab 8.44	c 4.86	**

** = P < 0.01

percentages relate to chilled carcass weight.

Multiple range test (Duncan, 1955); values having a common letters in the same row are not significantly different.

Table (3). Effect of concentrate level in the diet on chemical composition of leg, loin and shoulder joints of growing Ossimi lambs.

Item	Leg Treatments			Loin Treatments			Shoulder Treatments		
	A	B	C	A	B	C	A	B	C
% Dry matter	24.18	24.27	25.10	24.60	24.14	29.50	29.01	29.80	41.48
SE ±	0.28	0.28	0.79	0.49	0.63	1.94	1.22	1.03	1.98
% Protein	16.70	16.03	15.22	18.68	17.96	18.23	16.94	16.95	15.10
SE ±	0.35	0.29	0.63	0.33	0.63	0.86	0.58	0.91	0.87
% Ether extract	6.62	6.65	8.90	4.81	4.93	10.24	11.21	11.70	25.36
SE ±	0.32	0.55	0.97	0.60	0.43	1.58	1.40	1.86	2.30

Table 4. Analysis of variance for effect of concentrate level in the diet on chemical composition of leg, loin and shoulder joints of growing Ossimi lambs.

S.O.V.	D.F.	Mean squares		
		Dry matter %	Protein%%	Ether extract %
Treatments (T)	2	298.435**	9.695*	412.499**
		(22.15)	(6.16)	(24.42)
Joints (J)	2	557.250**	37.105**	660.608**
		(41.35)	(23.56)	(39.10)
T X J	4	82.85**	13.705**	97.051**
		(12.29)	(17.40)	(11.49)
Error	63	10.355	2.644	13.405
		(24.21)	(52.88)	(24.99)

* = P $\angle$ 0.05 ** = P $\angle$ 0.01

Figures shown innparentheses are the components of variance (V %) attributed to each source of variation.

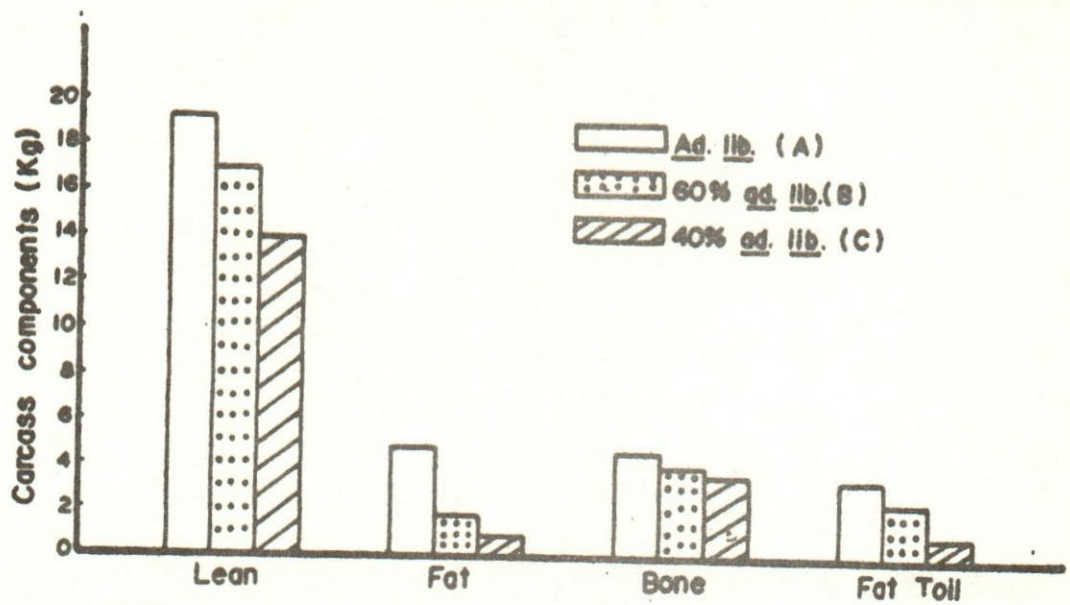

Fig.(1) Mean values of carcass components (Kg) of Ossimi lambs fed on different levels of concentrates.

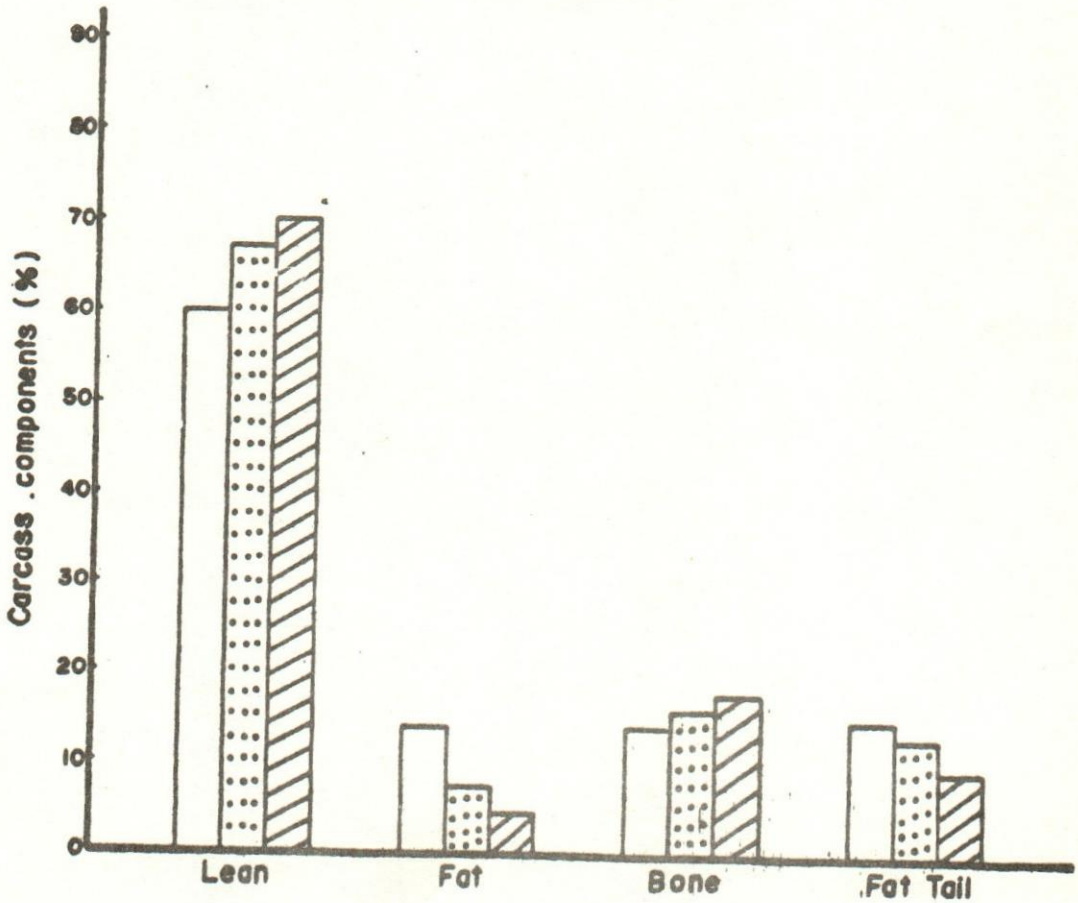

Fig.(2) Mean values of carcass components (%) of Ossimi lambs fed on different levels of concentrates.