صفات الذبيحه والمكونات الثانوية لها فى حملان الأوسيمى والخليطه وعلاقتها بوزن الجسم قبل الذبح مباشرة

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أجرى هذا البحث على حملان الأوسيمى والجيل الأول الناتج من خلط ذكور الرحمانى مع أناث الأوسيمى. وكانت الحملان فى عمر ١٠ شهور وذلك لدراسة تأثير أختلاف مجموعة النوع والوزن قبل الذبح مباشرة على صفات الذبيحة وصفات مكونات الذبح الثانوية non-carcass وكان من نتائج هذا البحث.

١- زيادة أوزان كل من الذبيحة - القلب - الرئتين والقصبة الهوائية - الرأس - الأرجل الأربعة - القناة الهضمية فارغة - دهن المنديل - نسبة التصافى للحملان الخليطة بالمقارنة بوزن الذبيحة ونفس الأعضاء لحملان الأوسيمى وكانت الزيادة معنوية عند مستوى ٥٪ بالنسبة لبعض الأعضاء، ١٪ للبعض الأخر.

٢- زيادة أوزان الذبيحة - الكبد - الرئتين والقصبة الهوائية - الرأس - الأرجل الأربعة - القناة الهضمية فارغة - الأعضاء التناسلية - نسبة الدهن للحملان الأوسيمى ذات الوزن أكبر من ٣٥ كجم بالمقارنة بوزن الذبيحة ونفس الأعضاء للحملان الأوسيمى ذات الوزن أقل من ٣٥ كجم. وكانت الزيادة معنوية عند مستوى ٥٪ بالنسبة لبعض الأعضاء، ١٪ للبعض الأخر.

٣- زيادة أوزان الذبيحة - الكبد - القلب - الرئتين والقصبة الهوائية - الرأس - الجلد والجزة - الأرجل الأربعة - عظمة المدفع الأمامية - القناة الهضمية فارغة - دهن المنديل - الأعضاء التناسلية للحملان الخليطة ذات الوزن أكبر من ٤٠ كجم بالمقارنة بوزن الذبيحة ونفس الأعضاء للحملان الخليطة ذات الوزن أقل من ٤٠ كجم. وكانت الزيادة معنوية عند مستوى ٥٪ بالنسبة لبعض الأعضاء، ١٪ للبعض الأخر.

٤- كان معامل التلازم المعدل بين وزن الحملان قبل الذبح مباشرة وكل من وزن الذبيحة ٠,٩٣، ونسبة التصافى يتراوح بين ٠,١٧٤-٠,٢٣٢ ونسبة اللحم المئوية ٠,٠٨٧.

٥- كان معامل التلازم المعدل بين وزن الذبيحة وكل من نسبة الدهن المئوية ٠,٦٠٤، وزن الكبد -الرئتين - القصبة الهوائية - الرأس - الجلد + الجزة - القلب - الطحال - القناة الهضمية فارغة يتراوح بين ٠,١٦٥-٠,٤٦٣.

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Table (3): Correlation coefficients between pre-slaughter weight (Adjusted) and hot carcass weight, killing-out % and lean %.

Carcass traits	Pre-slaughter weight
Hot carcass weight (kg)	0.930**
Killing out A %	0.232
Killing out B %	0.174
Lean %	0.087

where: ** = P < 0.01.

Table (4): Correlation coefficients between hot carcass weight (adjusted) and the non-carcass traits.

Non-carcass traits	Hot carcass weight (kg)
Fat % (Tallow)	0.604**
Liver weight (kg)	0.443**
Heart weight (kg)	0.238
Spleen weight (gm)	0.260
Lung and Trachea wt. (kg)	0.401**
Head weight (kg)	0.326*
Fleece + skin weight (kg)	0.463**
Digestive tract empty (kg)	0.165

where: * = P < 0.05 and ** = P < 0.01.

Table (5): Prediction equation of hot carcass weight, killing-out A%, killing out B%, and lean % by using pre-slaughter weight (adjusted).

Traits	Prediction equations
Hot carcass weight	$Y = 16.93 + 0.51^{***} (X_1 - 37.48)$
Killing-out A %	$Y = 47.00 + 0.09 (X_1 - 37.48)$
Killing-out B %	$Y = 53.90 + 0.07 (X_1 - 37.48)$
Lean %	$Y = 68.50 + 0.03 (X_1 - 37.48)$

The means of hot carcass, lean and fat and of all non- carcass components of crossbred lambs, having pre-slaughter weight more than 40 kg exceeded the means of the cross lambs having less than 40 kg, while the means of killing-out % were nearly the same. The deposition of fat as skirt fat (206.91 vs 115.18 gm) and caul fat (126.36 vs 60.45 gm), and the weights of head (3.13 vs 2.23 kg), digestive tract empty (3.11 vs 2.32 kg) and reproductive organs scortal fat (422.64 vs 216. 36 gm) were markedly more in crossbred lambs having body weight more than 40 kg. Butterfield *et al.* (1983) reported that the effect of small and large mature size was significant ($P<0.01$) on the weights of heart, trachea, liver, spleen and penis + bladder, while the effect was non-significant on lung and head weight.

Table (3 & 4) show that adjusted pre-slaughter weight was highly and positively ($P<0.01$) correlated with hot carcass weight, moderately and positively with killing-out % and low with lean %. This agrees with the findinges of Ibrahim *et al.* (1991) with Ossimi, Rahmani and their crosses, who reported that the correlation between live body weight and hot carcass weight were high and positive ($P<0.01$) as the values were 0.98, 0.98 and 0.97 respectively at 6 months of age. They added that the correlation coefficients between live body weight and each of killing-out % and lean % were low and negative at 6, 8 and 10 months of age. Also, Snowder *et al.* (1994) found that the correlation coefficients between slaughter weight and each of carcass weight and dressing % were 0.97 and 0.38, respectively.

Adjusted hot carcass was highly and positively ($P<0.01$) correlated with fat % (Tallow) and moderately and positively correlated with the weight of liver, lung & trachea, head, fleece + skin, heart, spleen and digestive tract empty as the coefficients ranged from 0.165 to 0.463.

Prediction equations calculated from linear regression values (Table. 5) were developed to predict carcass traits using independent variable pre-slaughter weight (Adjusted). The linear regression coefficients of hot carcass weight showed that for each additional one kilogramme of body weight just before salughter, the weights of hot carcass increased by 510 gm. This result shows that the pre-slaughter weight was quite satisfactory for predicting the weight of hot carcass and the correlation between them was 0.93.

Table (2): F-ratio and significance for factors affecting hot carcass weight, killing out %, lean % and non-carcass (by-products) component weight in lambs.

S.O.V.	d.f.	Hot carcass weight kg (HC)	Killing out A% (KOPA)	Killing out B% (KOPB)	Lean % (LP)	Fat % (FP)	Liver weight kg (LW)	Heart weight kg (HW)	Spleen weight (gm) (SW)	Lung and Trachea weight (kg) (LT)	Head weight (kg) (HD)	Fleece ± skin weight (kg) (FW)	Four feet weight (kg) (FF)	Fore cannon bone wt. (kg) (FC)	Digestive tract empty (kg) (DT)	Caul (comental) fat (gm) (CF)	Skirt diaphragm (gm) (S)	Reproductive organs testis ± penis (gm) (R)
Breed group	1	12.364 ***	2.699	4.884 *	0.497	1.021	0.016	9.246 **	1.287	18.390 ***	8.144 **	2.671	10.417 **	0.801	5.514 *	0.080	3.997 *	0.350
Pre-slaughter weight within Ossimi	1	38.827 ***	3.033	2.288	2.247	7.392 **	11.880 **	3.542	3.419	22.792 ***	11.727 ***	3.377	8.150 **	2.306	18.230 ***	0.637	1.154	27.710 ***
Pre-slaughter weight within Crossbred	1	41.752 ***	0.065	0.174	2.849	0.136	4.411 *	35.036 ***	1.713	21.802 ***	24.358 ***	6.893 **	16.259 ***	8.324 **	22.922 ***	3.131	12.878 ***	53.237 ***
Residual d.f.	40																	
Residual M.S.		6.1942	7.7557	8.3903	4.8858	11.070	0.0164	0.0004	637.64	0.0069	0.1840	0.9815	0.0175	0.0018	0.1529	7630.2	3593.4	4395.8

where: * = P < 0.05, ** = P < 0.01 and *** = P < 0.001.

Table (1): Least squares means and standard errors for factors affecting on hot carcass weight, killing out %, lean % and non-carcass (by-products) component weights in lambs.

Independent variable	Number	Hot carcass weight kg (HC)	Killing out A% (KOPA)	Killing out B% (KOPB)	Lean % (LP)	Fat % (FP)	Liver weight kg (LW)	Heart weight kg (HW)	Spleen weight (gm) (SW)	Lung and Trachea weight (kg) (LT)	Head weight (kg) (HD)	Fleece + skin weight (kg) (FW)	Four feet weight (kg) (FF)	Fore cannon bone wt. (kg) (FC)	Digestive tract empty (kg) (DT)	Caul (omen-tal) fat (gm) (CF)	Skirt diaphr-agm (gm) (S)	Reprod-uctive organs testes + penis (gm) (R)
Overall mean	44	16.93	47.00	53.90	68.50	10.20	0.53	0.15	60.64	0.62	2.50	3.36	0.81	0.11	2.58	97.14	143.0	313.6
		±0.38	±0.41	±0.44	±0.33	±0.50	±0.02	±0.00	±3.80	±0.01	±0.06	±0.15	±0.02	±0.01	±0.06	±13.2	±9.0	±9.9
Breed group:																		
Ossimi	22	15.61	45.80	52.30	68.90	9.60	0.53	0.14	56.32	0.57	2.31	3.12	0.75	0.11	2.44	100.9	124.9	307.7
		±0.53	±0.59	±0.62	±0.47	±0.71	±0.03	±0.00	±5.40	±0.02	±0.09	±0.21	±0.03	±0.01	±0.08	±18.6	±12.8	±14.1
Crossbred	22	18.25	48.20	55.60	68.20	10.70	0.53	0.16	64.95	0.68	2.68	3.60	0.86	0.12	2.72	93.41	161.1	319.5
		±0.53	±0.59	±0.62	±0.47	±0.71	±0.03	±0.00	±5.40	±0.02	±0.09	±0.21	±0.03	±0.01	±0.08	±18.6	±12.8	±14.1
Pre-slaughter weight within :																		
Ossimi																		
Less than 35 kg	11	12.30	44.00	50.60	70.10	7.70	0.44	0.13	46.36	0.48	2.00	2.73	0.67	0.09	2.08	86.0	111.2	233.3
		±0.75	±0.84	±0.87	±0.66	±1.00	±0.04	±0.01	±7.60	±0.03	±0.13	±0.30	±0.04	±0.01	±0.12	±26.3	±18.1	±19.9
More than 35 kg	11	18.92	47.60	53.90	67.80	11.70	0.62	0.15	66.27	0.65	2.63	3.50	0.83	0.12	2.79	115.7	138.6	382.1
		±0.75	±0.84	±0.87	±0.66	±1.00	±0.04	±0.01	±7.60	±0.03	±0.13	±0.30	±0.04	±0.01	±0.12	±26.3	±18.1	±19.9
Crossbred																		
Less than 40 kg	11	14.82	48.40	56.00	66.90	10.40	0.48	0.13	57.91	0.59	2.23	3.05	0.76	0.09	2.32	60.5	115.2	216.4
		±0.75	±0.84	±0.87	±0.67	±1.00	±0.04	±0.01	±7.60	±0.03	±0.13	±0.30	±0.04	±0.01	±0.12	±26.3	±18.1	±19.9
More than 40 kg	11	21.68	47.90	55.20	69.50	11.00	0.59	0.19	72.00	0.76	3.13	4.16	0.99	0.15	3.11	126.4	206.9	422.6
		±0.75	±0.84	±0.87	±0.67	±1.00	±0.04	±0.01	±7.60	±0.03	±0.13	±0.30	±0.04	±0.01	±0.12	±26.3	±18.1	±19.9

Linear regression equations were constructed to find out the reliability of prediction of carcass traits (Snedcor and Cochran, 1967).

RESULTS AND DISCUSSION

Tables (1 & 2) show that the differences between least squares means of carcass traits and non-carcass components studied, at 10 months of age, due to the effect of breed-group were significant ($P<0.05$, $P<0.01$ & $P<0.001$) for the weights of hot carcass, heart, lung & trachea, head, four feet, digestive tract empty, skirt diaphragm and killing out %. While due to the effect of pre-slaughter weight of each of Ossimi and crossbred lambs, the differences between means were significant ($P<0.05$, $P<0.01$ & $P<0.001$) for the weights of hot carcass, liver, lung & trachea, head, four feet, digestive tract empty and reproductive organs (testes + penis). In addition to that the effect of pre-slaughter weight of Ossimi lambs was significant ($P<0.01$) on fat % and the effect of pre-slaughter weight of crossbred lambs was significant ($P<0.01$ & $P<0.001$) on the weights of heart, fleece + skin, fore cannon bone and skirt diaphragm. These results are in agreement with the findings of Wood *et al.* (1983) who found that the effect of breed-group was significant ($P<0.01$) on killing out %, the weights of four feet and lungs & trachea. Faten, Mohamed (1986) and Layla, Bahgat (1991) reported that the effect of breed-group was significant ($P<0.01$) on the weights of hot carcass, head + 4 legs and dressing %. On the contrary, Aboul-Naga and El-Shobokshy (1974) found that the breed-group effects were significant ($P<0.01$ & $P<0.05$) on fat and lean %. Also, Wood *et al.* (1980) reported that, the effect of breed-group was not significant on carcass weight and significant ($P<0.01$) on lean caul fat %.

At 10 months of age, cross lambs exceeded Ossimi lambs in most carcass traits and non-carcass components. Aboul-Naga and El-Shobokshy (1974) working on Suffolk, Ossimi crossbred and Ossimi lambs, Mabrouk *et al.* (1983) on Ossimi and their crosses with Il-de-France; Faten, Mohamed (1986) on different crosses, with different genotypes, from Ossimi, Rahmani and Finnish Landrance sheep, revealed that the crossbred lambs had heavier weights of carcass, liver, heart, spleen, lung & trachea, head, pelt and feet and lean and fat % than the purebred lambs.

The means of carcass traits and non-carcass components of Ossimi lambs having pre-slaughter weight more than 35 kg, exceeded the corresponding means of Ossimi lambs less than 35 kg., except the percentage of lean (67.8 vs 70.1%), which showed the opposite trend. The later result may be due to the high percentage of fat (11.7 vs 7.7%) and the omental (or caul) fat (111.5 vs 86.0 gm). The deposition of fat was also obtained in another internal places of the body which do not form part of the carcass, such as skirt fat (138.6 vs 111.2 gm) lying respectively in the peritonal folds of the intestinal and ileo-ruminal regminal regions of the alimentary tract.

(4 months) and were provided with grounded concentrate mixture when they reached three weeks of age.

At weaning 22 male lambs from each of Ossimi sheep and ½ Rahmani X ½ Ossimi crossbreds were assigned to a fattening experiment. These lambs were divided into groups according to their weight regardless of their breed group. Group feeding was practiced, and animals were kept indoors throughout the fattening period. Pelleted concentrate mixture (undecorticated cotton seed cakes 35%, wheat bran 33%, corn 22%, ricebran 4%, molasses 3%, calcium carbonate 2% and sodium chlroide 1%) was offered daily at a rate of 2% of the animals live body weight. While, barseem was provided *ad libitum*. Water was available all the time. Refusals and feed residues, of any, were collected and weighted each morning before supplying animals with the daily ration. The fourty four fattening lambs (22 Ossimi and 22 crossbred) were slaughtered after 24 weeks i.e. when they reached about 10 months old.

Animals were fasted 12 hours before being weighed then slaughtered and dressed out. The empty body weight was obtained by subtracting the weight of gut content from the fasted live weight. Dressing percentage was thus estimated once as a percentage of hot carcass weight relative to the pre slaughter weight (A) and another time as a percentage of the hot carcass relative to the empty body weight (B). Hot carcass weight and weight of different internal organs (such as, liver, heart, spleen, lung & trachea, digestive tract empty, cal fat and skirt diaphragm) were recorded. Also, the weights of head, reproductive organs (testes and penis), fleece + skin, four feet and fore cannon bone were recorded. Only one side of the carcass (right side) were dissected into their physical composition, lean, fat and bone for estimating lean percentage and fat percentage of the carcass.

The traits studied were analysed according to the following Model (Harvey, 1990).

$$Y_{ijk} = \mu + A_i + B_j + C_k + e_{ijk}$$

Where : μ = general mean common element to all observations,

A_i = effect due to the i th breed group,

B_j = effect due to the pre-slaughter weight within Ossimi,

C_k = effect due to the pre-slaughter weight within crossbred,

and eijk = random error particular to the ijk th observations and assumed to be independently randomly distributed (O, δ^2 e).

Simple correlation coefficients were obtained between pre-slaughter weight and each of hot carcass weight, killing-out % (A) and (B) and lean %. Also, between hot carcass weight and each of fat %, liver, heart, spleen, lung & trachea, head, fleece + skin and digestive tract empty weights.

INTRODUCTION

The effect of breed on the weights of non-carcass components is of particular interest in view of the work on pigs (Chadwick *et al.*, 1980) and cattle (Butler-Hogg and Wood, 1981) which showed that a high killing-out percentage in some breeds was specifically due to low weights of non-carcass components.

Kirton *et al.* (1972) have lighted the importance of knowledge of the likely yields of various organs to the planning of processing plants so that adequate provision can be made for these valuable by-products of the meat industry. In addition, Doornenbal and Tong (1981) have emphasized the need for a knowledge of the relationship between the weight of an organ and the weight of the body in nutritional, biological and medical studies. Geay (1978), working with cattle, showed that a knowledge of the changes in the weights of visceral organs was essential to a proper understanding of the factors affecting yields of carcass from live weight for animals of various types.

Kraybill *et al.* (1954), Kirton (1957) and Johnson (1979), have investigated the use of the weights of non-carcass parts of the animal to predict the weights of carcass structures. Most studies have examined the relative rates of fat deposition in the carcass depots (Kempster, 1980). In sheep wood *et al.* (1980) showed that intermuscular fat was early maturing and omental, kidney plus channel and sub-cutaneous fat were late maturing.

The regression coefficients of carcass weight on slaughter weights of different breeds were estimated by Shraby and Suleiman (1988), to predict regression lines for Barbary, Turkish Merino cross, Awassi and Nagdi breeds of sheep. These equations allow consumers to predict carcass weight and dressing percentage from slaughter weight to each breed.

The aim of the present study is to determine:

1- The effect of breed group and pre-slaughter weight on carcass weight, killing-out%, lean % and non-carcass component weights in lambs.
2- The correlation coefficients between pre-slaughter weight (adjusted) and killing-out % and lean %, and the correlation coefficient between hot carcass weight (adjusted) and the non-carcass traits.
3- Prediction of some carcass traits using pre-slaughter weight.

MATERIALS AND METHODS

The experimental work was carried out at the sheep Experimental Farm of the Faculty of Agriculutre at Moshtohor, Zagazig University (Benha Branch). Animals of Ossimi and the F_1 cross between Rahmani males and Ossimi ewes were used. Animals of breeding stock were allowed to graze Egyptian clover during winter months, while in summer, they were fed clover hay and supplied with pelleted concentrates mixture. Lambs were left with their dams till weaning

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CARCASS TRAITS AND NON-CARCASS COMPONENTS WEIGHT OF OSSIMI AND CROSSBRED LAMBS IN RELATION TO PRE-SLAUGHTER WEIGHT

BY

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ABSTRACT

Lambs from two breed-groups (Ossimi and ½ Rahmani + ½ Ossimi crossbred) at 10 months of age, were used to determine the effect of breed group and pre-slaughter weight on carcass traits and non-carcass (by-product) components.

Cross lambs exceeded significantly ($P<0.05$, $P<0.01$ and $P<0.001$) Ossimi lambs in the weights of hot carcass, heart, lung & trachea, head, four feet, digestive tract empty, skirt diaphragm and killing out %.

The means of the weights of hot carcass, liver, lung & trachea, head, four feet, digestive tract empty, reproductive organs and fat % of Ossimi lambs having pre-slaughter weight more than 35 kg exceeded significantly ($P<0.01$ and $P<0.001$) the corresponding means of Ossimi lambs having less than 35 kg.

The means of the weights of hot carcass, liver, heart, lung & trachea, head, fleece + skin, four feet, fore cannon bone, digestive tract empty, skirt diaphragm and reproductive organs of cross lambs having more than 40 kg, exceeded significantly ($P<0.05$, $P<0.01$ and $P<0.001$) the corresponding means of cross lambs having less than 40 kg.

Adjusted pre-slaughter weight was highly and positively ($P<0.01$) correlated with hot carcass weight (0.93), moderately and positively with killing out % (0.174 & 0.232) and low with lean % (0.087).

Adjusted hot carcass was highly and positively ($P<0.01$) correlated with fat % (Tallow) (0.604) and moderately and positively correlated with the weights of liver, lung and trachea, head, fleece + skin, heart, spleen and digestive tract empty as the coefficients ranged from 0.165 to 0.463

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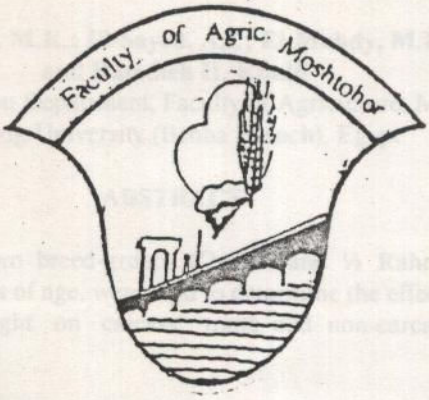

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