



EFFECT OF WEIGHT AT FATTENING ON CARCASS TRAITS OF AWASSI LAMBS

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ABSTRACT

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This study was conducted to study the effect of different initial body weights of Awassi Lambs used for fattening and its outcome on growth and some carcass characteristics, 15 Awassi lambs were divided into 3 groups which differed in their initial body weight, first group was (22.00 ± 0.22 kg), second group was (29.80 ± 1.21 kg), and the third group was (34.20 ± 0.66 kg). All lambs were fed the same ration which consisted of barley, wheat bran and soybean meal, the ration had 14.39 % crude protein and 2499 Kcal/kg of metabolized energy. Results showed a significant decrease ($P < 0.05$) in the average daily weight gain and total average weight gain in the third group which had the higher initial body weight when compared with first group which had the lowest initial body weight, the results also showed that using lambs with low initial weights in the first group caused a significant decrease ($P < 0.05$) in carcass weight as compared with the second and third groups which had lambs fattened with higher initial weights 18.76 kg , 24.63 kg and 25.25 kg for the three groups respectively. Total fat percentage of the carcass decreased significantly in the second group 15.83% in comparison with the first group 17.29% and the third group 18.68%, Total fat percentage was also significantly lower in the first group 2.741kg compared with the third group 4.047kg.

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INTRODUCTION

In any fattening procedure there are many factors that affect the productive performance and carcass characteristics of lambs like age, sex, initial body weight, and the age of slaughtering (Guerrero *et al.*, 2013), (Santos *et al.*, 2007), in addition to other environmental factors like the type of feeding and breeding system.

The age and weight at fattening are considered to be one of the most important factors, which affect feed conversation rate and productive performance in lambs (Demircan, 2008) due to their relation with growth completion and deposition of different tissues, as it is known that young lambs (3 -4 months of age) with low initial body weights (20 -25) kg have high feed conversation rates which contributes to a quick tissue deposition and slaughtering weight, also their carcasses are considered to be of good quality , because of its high content of unsaturated fatty acids and quality of meat, but due to the incomplete growth of the skeletal system of these animals they will soon start to deposit high quantities of fat throughout the body which is considered to be a trait not preferred by the consumer, who would like to obtain the most amount of lean and protein which has a high nutritional value, as well as that fat deposition in the carcass is related to the decrease of feed conversation rate (Lawrie and Ledward,

2006),(Aksoy and Ulutas 2015), otherwise when fattening animals with high initial body weight and age usually results to a more consistent and symmetric carcasses in terms of muscle and fat content (Bicer *et al.*, 1995) but with a lower feed conversation rate when compared to animals fattened at a younger age. So for the importance of this subject to both the producer and consumer this research was designed to study the effect of using different weights at fattening and its outcome on productive performance and some carcass traits in Awassi lambs.

MATERIALS AND METHODS

This study was conducted at Animal Production’s Sheep Field at the College of Agriculture and Forestry/ University of Mosul, to study the effect of using different weights at fattening and its outcome on productive performance and some carcass traits in Awassi lambs. 15 Awassi Lambs were divided into 3 groups which differed in their initial weight, first group was (22.00 ± 0.22 kg), second group was (29.80 ± 1.21kg), and the third group was (34.20 ± 0.66 kg). All lambs were fed (*ad libitum*) on the same ration which consists of barley, wheat bran and soybean meal, as shown in Table (1). The ration was served in two meals, first meal was served at morning 8:00 AM and the second meal was given at afternoon 4:00 PM, remaining feed was collected from the feeders every morning and weighed to determine the amount of feed intake, the lambs had free access to clean cold drinking water and mineral salt blocks throughout the study period. At the end of this study which lasted for 90 days, animals were weighed for two consecutive days to obtain the final body weight before slaughtering, animals were deprived from feed for 12 hours before slaughtering, after slaughtering hot carcass weight and carcass parts weight were recorded, carcass was divided in to two symmetrical halves and measurements of the rib eye muscle and the thickness of subcutaneous fat between the ribs (12, 13) obtained according to Jacob and Calnan (2018). also total carcass fat (body, bowel, tail fat) weights were recorded.

Statistical analysis

The results were statistically analyzed using computer program (SAS, 2009) using CRD complete random design under comparison between averages to determine the significance using Duncan multiple range (Duncan 1955).

Table (1): Components percentages and chemical analysis of the ration.

Ingredient	Percentage %
Barley (crushed)	70
Wheat bran	18
Soybean meal	7
Wheat straw (Hay)	3.5
Salt	1
Lime stone	0.5
Chemical analysis	
Dry matter	91.26 %
Organic matter	90.70 %
Crude protein	14.39 %
Ether extract	2.32 %
Crude fiber	7.96 %
Metabolized energy	2499 Kcal/kg

The components of ration were laboratory evaluated according to (A.O.A.C, 2000)

RESULTS AND DISCUSSION

Table (2) shows the effect of initial body weight at fattening on growth and feed conversion rate of Awassi lambs. Final weight of the third group was significantly higher ($P < 0.05$) than first group but no significant difference was recorded from second group (47.10, 38.70 and 45.25kg) respectively. Average total weight gain decreased significantly in third group 12.90 kg when compared to the first group 16.70kg and mathematically high when compared with the second group 15.45kg, Average daily weight gain decreased significantly ($P < 0.05$) in the first and second group as compared with the third group (0.190, 0.170 and 0.140) kg/day respectively. Feed conversion rate decreased when the initial body weights became higher which was clearly seen among the three groups (5.92, 6.41 and 7.67kg) feed/kg.wG respectively.

The increased weights of lambs at fattening (Initial body weight) led to a decrease in weight gain and this may be due to the decrease of feed conversion rate in the groups, this result was in agreement with results obtained by (Conque *et al.*, 2003, (Khoshnow, 2009), (Sultan *et al.*, 2012) and (Noori and Sultan, 2020), as they indicated that using animals with lower weights when fattening (initial body weight) led to higher average weight gain compared with using animals which had high initial body weight.

Table (2): the effect of initial body weight at fattening on growth and feed conversion rate of Awassi Lambs

Traits	T1	T2	T3
Initial body weight kg	22.00 ± 0.22	29.80 ± 1.21	34.20 ± 0.66
Final weight kg	38.70 ± 1.38 b	45.25 ± 1.32 a	47.10 ± 0.69 a
Total weight gain kg	16.70 ± 1.52 a	15.45 ± 0.46 ab	12.90 ± 0.29 b
Daily weight gain kg	0.190 ± 0.01 a	0.170 ± 0.01 a	0.140 ± 0.00 b
Feed conversion rate kg feed/kg weight gain	5.92	6.41	7.67

Horizontal letters differ significantly ($p \leq 0.05$)

Results shown in Table (3) indicates a significant decrease ($P < 0.05$) in the hot carcass average weight in the first group 18.76 kg compared to the second and third groups 24.63, 25.25 kg respectively, dressing percentage was higher in the second and third groups by an increase percentage (11.97%, 10.86%) respectively compared with the first group as dressing percentage (48.43, 54.23 and 53.69%) respectively but this increase didn't reach significance.

Rib eye muscle area values were close in the first and second groups (16.27, 16.76 cm²) respectively and increased to 18.06 cm² in the third group but were not significant. thickness of subcutaneous fat also had no significant differences among the three groups (0.83, 0.88 and 0.73cm) respectively as it was clear that the third group recorded the lowest value and this result comes consistent with previous studies that showed an inverse relation between the thickness of subcutaneous fat and the area of the Rib eye muscle (Maddock *et al.*, 2013). The significant increase in carcass weights in the second and third groups are an inevitable result due to weight increase at slaughtering (Final weights) and dressing percentage in comparison with the first group. Rajkumar *et al.*, (2014) showed that an increase in weight at slaughtering led

to heavier carcasses when compared to other low weight animals without having an effect on dressing percentage. There were no significant differences in the rib eye muscle area and thickness of subcutaneous fat, Aksoy and Ulutas, (2015) notified that slaughtering lambs with high final body weights led to high carcass weights but did not affect dressing percentage. Increase in weights at slaughter were associated with an increase in the thickness of subcutaneous fat and the area of the rib eye muscle, Besir *et al.*, (1995) mentioned that lambs with higher weights at slaughter led to higher dressing percentage than slaughtering lambs with lower weights, this was also notified by Toplu *et al.*, 2013 on Goat carcasses, Same results were also obtained by Bueno *et al.*, (2000) and Ekiz *et al.*, (2020), it is clear from Table (3) that the weight of the kidney fat and kidneys fat percentage decreased significantly ($P < 0.05$) in the first group which had the lower initial body weights at fattening as compared with higher weights as they were (0.073, 0.126 and 0.168kg) for the three groups respectively, while kidney fat percentage of the carcass reached (0.39, 0.49, 0.66)% respectively, the weight of offal fat was close among the groups as it reached a value of (0.442, 0.420 and 0.490) kg respectively but its percentage to the whole carcass was significantly high ($p < 0.05$) in the first group as it reached 2.37% when compared to the second and third group (1.71, 1.95%) respectively.

Tail fat weight was significantly low in the first group in comparison with highest weight recorded in the third group (2.741, 3.338 and 4.047)kg for the three groups respectively, a significant increase ($p < 0.05$) was recorded in the percentage of tail fat weight to the percentage of weight of the whole carcass in third group compared to the first and second groups as it reached (14.52, 13.62 and 16.07)% for all three groups respectively, Generally we notice a significant increase ($p < 0.05$) in the total fat percentage of the carcass in the third group 18.68% compared to the first group 17.29% and the second group 15.83%, also the first group was significantly higher than the second group.

Aksoy *et al.*, (2006) found that an increase in animal weights at slaughtering led to a significant increase in offal fat weight of the Zavot calves, Toplu *et al.*, (2013) Pointed to similar results as more offal fat weight was obtained at higher slaughtering weights, these results also come in agreement with what Rajkumar, *et al.*, (2014) showed which was a significant increase in kidney fat weight and offal weight when slaughtering weight of the animals was high, this was also confirmed by the results obtained from Aksoy and Ulutas (2015) and Bueno *et al.*, (2000) that showed a significant increase in offal fat weight as more as the slaughtering weight increased. Results in Table (4) show percentages of non-carcass parts, no significant differences were found in the percentages of kidneys, heart, lungs and testis but a significant difference was noticed in the percentage of the Liver to carcass weight, as it increased significantly ($p < 0.05$) in lambs of the first group which had low weight at fattening (low initial body weight) as it reached 3.39% compared to the second and third groups which were (2.73, 2.46)% respectively, also a significant increase ($P < 0.05$) in the percentage of the Spleen to carcass weight was noticed in the first group 0.33% in comparison with the second group 0.26% and mathematically higher than the third group, percentages of non-carcass parts in the first group was higher 8.46% compared with the second and third groups (7.85, 7.88)% respectively but did not reach significance. These results agreed with what was obtained by Aksoy *et al.*, (2006) and Rajkumar *et al.*, (2014) and Aksoy and Ulutos (2015) and Ekiz *et al.*, (2020).

Table (3): effect of initial weight at fattening on some carcass traits.

Traits	T1	T2	T3
Hot Carcass Weight kg	18.76 ± 0.70 b	24.63 ± 1.70 a	25.25 ± 0.91 a
Dressing Percentage %	48.43 ± 0.15 a	54.23 ± 2.37 a	53.69 ± 2.05 a
Rib eye muscle area cm ²	16.27 ± 0.633 a	16.76 ± 0.535 a	18.06 ± 0.806 a
Subcutaneous fat Thickness cm	0.836 ± 0.146 a	0.880 ± 0.079 a	0.738 ± 0.061 a
Kidney Fat kg	0.073 ± 0.004 b	0.126 ± 0.033 ab	0.168 ± 0.00 a
Percentage of Kidney Fat %	0.39 ± 0.031 b	0.49 ± 0.052 b	0.66 ± 0.020 a
Offal Fat kg	0.442 ± 0.020 a	0.420 ± 0.037 a	0.490 ± 0.036 a
Offal Fat percentage %	2.37 ± 0.070 a	1.71 ± 0.117 b	1.95 ± 0.035 b
Tail Fat kg	2.741 ± 0.357 b	3.338 ± 0.371 ab	4.047 ± 0.306 a
Tail Fat percentage %	14.52 ± 0.53 b	13.62 ± 0.59 b	16.07 ± 0.25 a
Total Fat percentage %	17.29 ± 0.45 b	15.83 ± 0.55 c	18.68 ± 0.24 a

Horizontal letters differ significantly (p<0.05)

Table (4): effect of initial body weight at fattening on percentages of non-carcass edible parts to carcass weight.

Traits	T1	T2	T3
Liver %	3.39 ± 0.187 a	2.73 ± 0.233 b	2.46 ± 0.169 b
Kidneys %	0.54 ± 0.021 a	0.55 ± 0.056 a	0.49 ± 0.043 a
Spleen %	0.33 ± 0.016 a	0.26 ± 0.024 b	0.29 ± 0.017 ab
Heart %	0.73 ± 0.056 a	0.75 ± 0.065 a	0.88 ± 0.070 a
Lungs %	2.39 ± 0.194 a	2.39 ± 0.214 a	2.43 ± 0.185 a
Testis %	1.06 ± 0.177 a	1.15 ± 0.141 a	1.30 ± 0.061 a
Sum of percentages of edible parts	8.46 ± 0.565 a	7.85 ± 0.441 a	7.88 ± 0.302 a

Horizontal letters differ significantly (p≤0.05)

CONCLUSION

Results obtained from this study showed clearly that using Lambs for fattening which have high Initial body weights ranged between 30 – 35 kg will give carcasses that are high in weight due to the increase in dressing percentage, also fat content in the carcasses was relatively low compared with carcasses obtained from animals fattened at lower weights 20 -25 kg.

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تأثير الوزن عند التسمين في صفات ذبائح الحملان العواسية

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الخلاصة

أجريت الدراسة لمعرفة تأثير اختلاف الوزن الابتدائي عند التسمين في النمو وبعض صفات الذبيحة في الحملان العواسية واستخدم في الدراسة 15 حمل عواسيا، قسمت الحملان الى ثلاث مجاميع مختلفة في معدل وزنها الابتدائي، حيث كانت الأولى (0,25 ± 22,00) كغم والثانية (1,28 ± 29,8) كغم والثالثة (34,20 ± 0,66) كغم، غذيت الحملان على عليقة واحدة تكونت من الشعير ونخالة الحنطة وكسبة فول الصويا وبلغ محتواها من البروتين الخام 14,39 % وطاقة ايضية 2499 كيلو سعرة/ كغم علف. أوضحت النتائج ان معدل الزيادة الوزنية والكلية انخفض معنوياً ($P \leq 0.05$) في المعاملة ذات الوزن المرتفع في المعاملة الثالثة مقارنة بالمعاملة الأولى ذات الوزن المنخفض كذلك فان تسمين الحملان بأوزان منخفضة في المعاملة الأولى أعطت ذبائح بوزن منخفض معنوياً ($P \leq 0.05$) مقارنة بالحملان المسمنة بأوزان اعلى في المعاملتين الثانية والثالثة 18,76 ، 24,63 ، 25,25 كغم على التوالي، تبين كذلك ان نسبة الدهن الكلي بالذبيحة كان منخفضاً معنوياً ($P \leq 0.05$) في المعاملة الثانية 15,83 % مقارنة بالمعاملتين الأولى والثالثة 17,29 و 18,68 % على التوالي كما كانت منخفضة معنوياً في المعاملة الأولى مقارنة بالثالثة .

الكلمات الدالة: الوزن الابتدائي، النمو، صفات الذبيحة، التسمين.

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