EFFECT OF FEED BLOCKS CONTAINING DIFFERENT PERCENTAGES OF SUNFLOWER MEAL ON THE PRODUCTIVE PERFORMANCE AND CARCASS TRAITS FOR AWASSI LAMBS

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ABSTRACT

This study was conducted on 28 Awassi lambs with age of (3-4 months), with an initial weight of (24.510 kg) in order to study of the use of different percentages from feed blocks of the sunflower, for the purpose of fattening Awassi lambs and their effect on the productive performance and some traits of the carcass. The lambs were randomly distributed to four groups. The four groups were fed freely on the feed blocks as a concentrated diet, which were homogeneous in terms of protein and energy, and differed by containing it different percentages of the sunflower meal, where they were (0%, 6%, 12%, 18%) for the first, second and third and fourth, respectively, and continued for 91 days. The results showed no significant effect ($P\leq0.05$) in the final weight between the four treatments where the final weight ranged between (44.171 and 48.243 kg), the average of Total weight gain between (19.657 and 23.7 kg) and the daily increase ranged between (0.216 to 0.260 kg). It was found that the best Feed Conversion Efficiency (FCE) was for the group that ate the feed blocks which contained on 18% of the sunflower meal, which amounted of (6.101 kg feed.kg^{-1} weight gain), and there were no significant differences in the weight of the hot carcass, the percentage of dressing, Rib Eye Muscle Area and the residues of eaten and uneaten carcass and the amount of intake from dry matter, While recorded a significant ($P\leq0.05$) differences in the averages weight of the shoulder where the highest weight was in the first treatment compared to the second treatment, The weight of rump was significantly excelled ($P\leq0.05$) for the fourth treatment, which recorded the highest weight compared to the second and the first, and the third and the second compared to the first. The weight of the half neck recorded significant increase ($P\leq0.05$) for the third treatment compared to the first, second and fourth, while there were no significant differences in the weights of Thigh, chest, fore shank and flank. In the economic sense, the best type of feed blocks was in the fourth treatment because it was economically better to produce 1 kg from live weight between the treatments, followed by the first, second and third treatment, and priority the total average of Total weight gain was in the first and fourth treatment compared to other treatments.

*Research paper from MSc thesis for second author

1. INTRODUCTION

Animals in Iraq suffer from a significant shortage of feed products as well as rising their prices, especially in winter season (5). where the sheep formed about 63.86% of the country's total livestock population, which estimates by (7,722,375 heads) in 2008. Slaughter from it annually about 25% (2). In addition to what the person consumed from the meat, the requirements of the local market, the economic conditions experienced by the country, poor production and high prices led to a decrease in the number of sheep, the rising prices of food materials and consequently the rise of production cost per kilogram of live weight. where the costs of feeding for a small or large project form about 60-70% from the costs of the production process. For all the previous reasons, thinking turned to looking for new sources that have not been used before and widely in the feeding of sheep in the country to replace traditional feed sources because they

are not available in sufficient quantities to meet the need of existing animals and the rising of their prices. One of these sources is the meal of the sunflower that rich with protein (4). This yield from the seeds of the sunflower plant (*Helanthus annuus* L.) has become a good and effective alternative to ruminants because of its high levels of energy and protein, and because of their effects, which are still the focus of many researchers (22). Economides and Koumas, (16) found that it is palatability materials for lambs. In Iraq, the weight of the Iraqi lambs is often based on concentrated diets, which contain high percentages of barley or wheat, as well as hay, which are high in price, whether local or imported, and also are substances that compete with humans in their food. The aim was to find cheaper alternative feed alternatives with the introducing of modern techniques in the manufacture and management of these feeds such as feed blocks to reduce the costs and waste associated with the projects that follow the traditional systems of fattening. Al-Qaisi (6) indicated that feed mixtures manufactured in the form of feed blocks are homogeneous and have a higher nutritional value than those in feed mixtures give to animal. Therefore, this study aims to the following:

1- Determination the effect of the feed blocks containing different proportions from the meal of the sunflower on the growth and traits of the carcass.
2- Evaluation of the feed blocks containing different proportions of the sunflower as a substitute for the traditional form of feed.

2. MATERIALS AND METHODS

The study was conducted in an animal field in Duhok province, Sumel district, for the period from 11/4/2017 to 9/7/2017. Twenty-eight local goats of the Awassi strain were used in this experiment, with an average initial weight amounted of (24.510 kg), with 3-4 months age, it was purchased from the local market in the Sumel district, and then transferred to the prepared barn for this purpose. The animals were kept under veterinary supervision, they were given the necessary vaccinations and treatments. All lambs were subjected to periodic medical examination during the experiment period in the health care and preventive program. where included giving it the vaccine of (intrauteroximia) with one dose of (2 ml / head), Ultra-8D type, Turkish origin at the beginning of the experiment, The vaccination was repeated after 1 month and the animals were vaccinated against the internal and external parasites using the Ivermectin vaccine with one dose of (1 ml / head), Super Samavectin type, with Syrian origin and The vaccination was reinstated after 8 days. The lambs were introduced in a preliminary period to be adapted on the four diets for a period of 15 days. Then the animals were weighed for two consecutive days before the feed for the morning meal and took the average of two weight and considered that the average of initial weight, The lambs were randomized to four groups with (7) lambs for each group, taking into consideration that the groups were close in term of their weights and there were no significant differences between the averages of initial weight between the groups. The lambs were placed in four half open barns with (4 x 9 m) dimensions are equipped with metal feeders and stainless steel drinking water tanks with dimensions of (600 x 50 x 40 cm). It was equipped with saline molds available for lambs that were available throughout the experiment. The diets were prepared and manufactured in a small feed blocks form. Where all the used materials were crushed in the diet, including the sunflower meal, were mixed well using an advanced feed factory that is automatically managed by computer. It is then re-squeezed into small feed blocks without the use of adhesives and preservatives for the feed ingredients, and then packed with special bags for feed marked and numbered according to the treatments with weight of (50 kg per bag), and then transferred to the feed store in the prepared animal field mainly for this purpose. These diets were used in the fattening of the Awassi lambs as shown in Table (1) and these diets

were uniform in the levels of energy and protein and differed by containing it different percentages of the sunflower meal, where the first contained 0% of the sun flower meal, while the second contained 6% and the third 12% and the fourth 18%,The ad libitium system was used for all four groups and the diet gave on two meals a day, the first morning at 6 am and the evening at 6 pm. After the distribution of the lambs on the experimental treatments, the feed was provided in limited quantities until the arrival of the animals to the point of satiety, The quantities were gradually increased as the experiment progressed and the remaining fodder was collected for each group before the addition of the other meal and its weight using an electronic balance for the daily feed intake. The data were recorded in special records for each treatment. The lambs were weighed weekly by a special electronic balance before the morning meal. The lambs were weighed at the end of the experiment before slaughtering after stop supplying the feed for 12 hours and this weight was considered the final weight where at the end of the experiment four lambs were slaughtered from each group in a place prepared for this purpose after starving the lambs for 12 hours, and recording the weights of the lambs before conducting the slaughter directly, After the slaughter, the weight of the hot carcass and some carcass residues (head, feet, skin, and Tripe) , The weight of the liver, lungs, visceral fat, kidney fat, heart fat and tail fat. The total weight of the full digestive system was also recorded for the purpose of determining the empty body weight to determine the percentage of the dressing based on empty weight. The carcass was divided into two halves (left and right) and the left half was cut into the main pieces, which included the thigh, shoulder, rib region and rump cut. The secondary pieces were the fore shank and flank, the chest and the neck, which were cut according to the method of (Al-Jalili and Al-Qus (1); Cuthbertson et al., (13)). Fat thickness was measured on the rib (12) above the ocular muscle using Varniar. The percentage of dressing was calculated using the equation indicated by (Al-Jalili and Al-Qus (1)). The weight of the hot carcass was adopted due to the lack of a refrigerator for the cooling of carcasses.

Table 1: Components and chemical analysis for the used diets in the fattening Awassi lambs.

Feeds materials	First treatment	Second treatment	Third treatment	Four treatment
Barley	45	40	45	35
wheat Bran	35	40	31	20
Sunflower meal	0	6	12	18
Local yellow corn	10	10	10	25
Soybeans meal	8	2	0	0
Food salt	1	1	1	1
limestone	1	1	1	1
Total	100	100	100	100
The calculated chemical analysis*				
Crude protein (%)	14.94	14.71	15.07	15.91
Dietary energy (kCal / kg)	2691	2650	2613	2652
Ash (%)	5.8	5	5.01	5.07
Humidity (%)	10.88	10.72	10.58	10.87
Fat (%)	2.18	1.97	2.01	2.13
Fiber (%)	7.39	8.55	9.39	8.26
NDF (%) **	27.516	30.56	29.612	26.628
ADF (%) **	8.464	10.184	10.836	10.874

The actual laboratory analysis for the diets.

* According (Al-Khawaja et al. (3)).

The data were analyzed according to the Completely randomized design (CRD) using the following mathematical model:

$$Y_{ij} = \mu + t_i + e_{ij}$$

where:

Yij = View value j belonging to the treatment i

μ = The general average of the studied trait.

Ti = The effect of treatment i

eij = The random error.

The averages of results tested by the Duncan's Multiple Range Test (14) at a 5% or 1% probability level by applying the SAS program.

3. RESULTS AND DISCUSSION

1) The effect of the using feed block containing different percentages of the sunflower meal on the consumed quantities of feed compounds for Awassi lambs.

Table (2) shows no significant differences in the consumed quantities from whole and daily feed, the consumed of dry matter, the consumed protein and the consumed energy among the four diets. where the consumed quantities from total feed during the experiment period amounted of (1068.43, 1060.11, 1010.37 and 1012.3 kg), and the daily consuming quantities from feed amounted (1.677, 1.664, 1.586, 1.586 kg / head / day), dry matter was (1.494, 1.485, 1.418 and 1.413 kg /Dry matter/ lambs/ day), the consumed protein (250, 244, 239, 252 g / head/ day), the consumed energy (4512, 4409, 4144 and 4206 kcal / day / day) for the four treatments containing (0%, 6%, 12%, 18% Sunflower meal), respectively. These results agree with the results of (Dutta et al., (15); Irshaid et al., (17) where they did not notice any significant decrease in the consumed quantities of dry matter in the diets that contained on the sunflower meal, These results did not agree with (Alves et al., (11); Yunnus et al. (29)) where they found a significant decrease in the consumed in the treatments that contained the sunflower meal.

** statistically.

Table 2: Effect of the using of feed blocks containing different percentages of the sunflower meal and its effect on the intake from food compounds

Treatments	Total amount of consumed feed (kg)	Amount of feed consumed (kg / head / day)	The consumed dry matter (kg / head / day)	The consumed protein (g / head / day)	The consumed energy (kcal / head / day)
First	1068.43	1.677	1.4945	250	4512
Second	1060.11	1.664	1.4856	244	4409
Third	1010.37	1.586	1.4182	239	4144
Fourth	1012.30	1.586	1.4136	252	4206

2) The use of feed blocks containing different percentage of sunflower meal and their impact on the total weight gain.

The results of this study showed no significant differences in the averages of primary weight, final weight, whole and daily increase in weight, and feed conversion efficiency as shown in Table (3). where the average of total weight gain amounted of (23.671, 19.657, 20.486, 23.700 kg) for the four treatment, respectively. The final weight did not record any significant difference (48.243, 44.171, 44.943, 48.2 kg) for the four treatments, respectively, Although there were clear differences in favor of the first two treatments (0%) and the fourth (18%) compared to the

other two treatments (6%) and the third (12% from the sunflower), Similar results were obtained by (Kuttar et al., (8)) where observed that there were differences in the averages of whole and daily weight gain in favor of the treatment, which contained the sunflower meal with percentage of 15%. These results didn't agree with what (Alves et al., (11)) found In the lambs, where four treatments were used, the soybeans were replaced by 12% in the first treatment with castor seeds in the second treatment and the sunflower in the third and the sunflower seeds in the fourth Where obtained a highly significant differences in the weight gain for the lambs amounted to (14.8, 12.9, 11.6, 9.18 kg), respectively. This results agree with (Suleiman (9)) where there were significant differences in favor of the group that fed on 25% of the sunflower compared to 25% of cotton seeds meal in the Awassi males, While Santos-Silva et al., (26) did not find significant differences in the averages of weight gain in their study on the Merino Branco ram lambs, which fed on the two treatments; first containing 30% of the sunflower seeds and the second on 10% of the sun flower meal. The reason for the absence of significant differences in weight gain (daily, whole) on the balance of the diets well and metabolic in terms of energy and protein. For feed conversion efficiency, Table (3) shows that the nutrition was collective where the results were not statistically significant which gave (6.44, 7.70, 7.04, 6.10 kg consumed feed / kg weight gain) for the four treatments, respectively. The best feed conversion efficiency of the fourth treatment (18%) compared to the first treatments (0%), the second (6%) and the third (12%) of the sunflower meal. These results agree with what (Suleiman found (9)) found that the addition of the sunflower meal with ratio of 25% in the fattening diets for Awassi lambs which gave the feed conversion efficiency amounted of (3.97) compared to (4.64) for feeding on cotton meal. Kuttar et al., (8) obtained a clear statistical difference for treatment which containing of 15% from the sunflower meal which amounted of 5.65, 5.06, 4.64 and 4.97 for the four treatments, respectively, who used four different treatments with the ratio of the sunflower meal (10, 15, 20, 25 %) in fattening of Awassi lambs for four treatments, respectively. These results differed with (Yunnus et al. (29)), who compared between the sunflower meal and the cotton seed meal in the fattening lambs; where used the levels of (0,12, 24, 36) for the four treatments, respectively from the sunflower meal and the cotton seed meal where the differences were significant for diets which containing (24.5% and 36%) from the sunflower meal which amounted of (5.15, 5.87, 8.66, 10.04) for the four treatments, respectively compared to cotton seeds meal, The results of this study did not agree with the results of (Khalid et al., (18); Mirza et al., (23); Suliman and Babiker (28)) Where found no significant differences in the feed conversion efficiency.

Table 3: Effect of the using of feed blocks containing different percentages of the sunflower meal in the weight gain (whole and daily) and the feed conversion efficiency for Awassi lambs. (General average ± standard error)

Treatments	Primary weight (Kg)	Final weight (Kg)	Total weight gain (kg)	Daily weight gain (Kg)	Feed conversion efficiency (Kg feed / kg weight gain)
First	± 24.571 0.527	± 48.243 1.615	± 23.672 1.450	± 0.260 0.015	6.44
Second	± 24.514 0.438	± 44.171 1.962	± 19.657 1.943	± 0.216 0.021	7.70
Third	± 24.457 0.397	± 44.943 1.707	± 20.486 1.988	± 0.225 0.021	7.04
Fourth	± 24.500	± 48.200	± 23.700	± 0.260	6.10

	0.483	1.425	1.591	0.017	

3) The effect of the using feed block containing different percentages of the sunflower meal and their effect in some traits of carcass for Awassi lambs.

Table (4) indicates that there are no significant differences in the weight of the hot carcass where these weights amounted of (25.675, 24.813, 23.213, 24.838 kg) for the four treatments, respectively. These results agree with (Kuttar et al., (8)); Majewaska et al.,(20); Naser (24); Ruzic-Muslic et al., (25); Suliman and Babiker (28)) Who did not notice significant differences in the weight of the carcass when using different percentages of sunflower meal as a protein source in fattening diets of Ruminants, but differed with (Alves et al., (2016) where the differences were significant in the weight of the hot carcass where the weights amounted of (15.9, 14.2, 14.1, 12.6 kg) for the four treatments, respectively. The reason may be due to the convergence the averages of final animal weights at slaughter, where the weight of the carcass is strongly correlated with the final weight of the lambs, Which may be one of the important reasons affecting the weight of the sacrifice indicated by (Al-mawla (7)) that there is a positive correlation between the weight of the carcass and the final weight, amounting of (0.99). As for the percentage of dressing, The results showed in Table (4) that there were no significant differences in the averages percentage of dressing based on the hot weight for the lambs groups, where the percentage amounted of (52.759, 52.604, 52.726, 52.589%) for the four treatments, respectively. These results agree with (Naser (24); Ruzic-Muslic et al., (25); Suliman, and Babiker (28) who did not notice significant differences in the percentage of dressing when using different percentages of sunflower meal as a protein source in ruminant fattening diets.

Table 4: Effect of the using of feed blocks containing different percentages of the sunflower meal in some traits of carcass for Awassi lambs (General average ± standard error)

Treatments	Weight of hot carcass (kg)	The percentage of dressing (%)	Rib Eye Muscle Area (cm^2)
First	0.675 ± 25.675	1.497 ± 52.759	0.460 ± 16.035
Second	1.365 ± 24.813	0.705 ± 52.604	0.291 ± 15.925
Third	0.275 ± 23.213	1.609 ± 52.726	0.432 ± 15.783
Fourth	0.381 ± 24.838	1.724 ± 52.586	0.137 ± 15.325

The results indicated that there were no significant differences in the Rib Eye Muscle Area for the four treatments as shown in Table (4), where the average of the Rib Eye Muscle Area amounted of (16,035, 15.925, 15.783, 15.325 cm^2) for the four treatments, respectively, These results agree with (Kuttar et al., (8); Naser (24)) but differed with (Suliman and Babiker (28)) where they found significant differences in the Rib Eye Muscle Area in favor of the fourth treatment, which contained 30% of the sunflower meal. where the averages for this traits amounted of (13.95 and 15.32 cm^2) for the four treatments, respectively compared with other treatments that used other protein sources that did not contain the sunflower meal. For the separate fat mentioned in Table (5), it represents the total fat weight, which is the sum of the separated fat (the visceral fat and tail fat), where recorded significant differences ($P \leq 0.05$) for the first treatment which recorded the highest weight for total fat amounted of (5.566 kg) compared to weights of (5.566, 4.196, 3.754, 4.414 kg) for the first, second, third and fourth treatments, respectively. The tail weight was significantly different ($P<0.05$) between the first treatment compared to the third treatment, where

amounted of (4.695, 3.650, 2.850, 3.867 kg) for the four treatments, respectively. The weight of heart fat also recorded significant differences (P <0.05) for the first treatment compared to the fourth where the weights were (0.115, 0.056, 0.070, 0.053 kg) for the four treatments, respectively. The fat weight of the kidneys was significantly higher (P <0.05) in the first treatment compared to the second and the third treatment compared to the second treatment, where the weights were (0.169, 0.095, 0.198, 0.145 kg) for the four treatments, respectively. While the weight of mesenteric fat did not record any significant differences which amounted of (0.586, 0.395, 0.636, 0.529 kg) for the four treatments, respectively, These results agree with (Yossifov et al., (30)) where found significant differences (P≤0.01) in the separate fat for the diet, which did not contain any percentage of the sunflower, While these results did not agree with (Suliman and Babiker (28)) where observed significant differences in mesenteric fat and statistical differences in total fat, where lambs feeding on the sunflower meal produced carcasses with less total fat weight but not significant, the results also differed with (Abdulla and Awawdeh (10); Santos-Silva et al., (26)) found that there were no significant differences in separate fat weights and total fat. We conclude from this that the lambs fed on the sunflower meal produced less fat than the control treatment, which makes it with best specifications because increasing the fat ratio in the slaughter is considered undesirable by the breeder and the consumer is also considered an economic loss for the production projects, The difference in the results of this trait may be due to differences diets in terms of its constituent elements and the variability of their nutritional value as well as the difference of these results may be due to different strains of lambs used in this experiment from other experiments. The results of the study showed significant differences (P≤0.05) in the average of fat thickness under skin for the fourth treatment compared to the first, second and third treatments as shown in Table (5). The value of the fat thickness under the skin amounted of (5.500, 4.250, 5.250, 3.750 kg) for the four treatments respectively, Where the highest thickness of fat in the first treatment while the lowest thickness of fat for the fourth treatment, which contained their blocks on (18%) of the sunflower. These results agree with the results of (Kocak et al., (19)) where found significant differences in the averages of fat thickness under skin between the three treatments, which were (0.6, 1.7, 1.0 mm) for the three treatments, respectively, when using 12% from the sunflower in the third treatment only. while the control treatment was free from the sunflower meal which gave the highest fat thickness compared to the rest of the other treatments, the results agree with (Kuttar et al., (8)) and Abdulla and Awawdeh (10) where there were no significant differences in fat thickness between the treatments. As for the carcass cut, Table (6) shows no significant differences in the weights of Thigh, chest, fore shank and flank, while rump weight increased significantly (P <0.05) in the fourth treatment fed (18%) compared to other treatments containing different percentages of the sunflower meal, which amounted of (0.900, 1.275, 1.300, 1.425 kg) for the four treatments, respectively. As well as in the weight of half neck was significantly higher in the third treatment compared to the first, second and fourth, which amounted of (0.825, 0.800, 1.187, 0.765 kg) for the four treatments, respectively. The weight of the shoulder was significantly higher in the first treatment compared to the second treatment, Where the weights were (1.763, 1.413, 1.562, 1.688 kg) for the four treatments, respectively, These results agree with (Alves et al., (11)) where the researcher observed significant differences in the averages of shoulder weight, which amounted of (1.43, 1.27, 1.24, 1.14 kg) for the four treatments, respectively. The weight of the neck also had a significant difference where their weights amounted of (0.79, 0.72, 0.67, 0.67 kg) for the four treatments, respectively. The weight of rump, which recorded a significant difference where their weights amounted of (0.75, 0.64, 0.65, 0.59 kg) for the four treatments,

respectively, The results also agreed with (Naser (24), which indicated that there were significant differences in shoulder weight which amounted of (41.14, 38.80, 36.49, 38.38 kg) for the empty body weight of the four treatments, respectively. The weight of the thigh recorded significant differences of (141.36, 148.69, 15.18 and 152.93 g.kg-1) for the empty body weight for the four treatments, respectively, While the differences were not significant for the rest of the carcasses cut such as rump, chest and ribs, The results differed with (Abdulla and Awawdeh (10)), who obtained significant differences in the weight of the main cuts of the carcass, These results agree with (Santos-Silva (26) who found no significant differences in the weights of the main cut. This may be due to different ages of animals in different studies of researchers, It is known that animals with large ages produce weights of cuts different from the animals with small ages also to the different components of the used diet and their nutrient value. For secondary carcass products (both edible and non-edible), Table (7) shows no significant differences in weights of (heart, liver, kidneys, testes, lung) for the four treatments, respectively, These results agree with (Ruzic-Muslic et al., (25) where they found no significant differences. The results also agreed with (Kocak et al. (19); Silva-Santos et al (26) While the results differed with (Suliman and Babiker (28) where they found significant differences in weight of the lung and liver for the fourth treatment of (30% of the sunflower meal), The results agree with (Nasir (24), where liver weights recorded of (37.8, 37.7, 42.2, 43.7 g / kg for empty body weight), kidneys (5.9, 5.9, 5.6, 5.7 g / kg for empty body weights) and lungs (31.5, 40.2, 34.8, 36.7 g / kg for empty body weight) for the four treatments, respectively, where the first containing 14% soybeans meal, the second 18% soybeans meal, the third the 14% sunflower meal and the fourth the 18% sunflower meal. The results presented in Table (8) indicate that there is no significant difference in the weight of the uneaten cuts (Tripe, the filled intestine , the weight of the skin, the weight of the head, the weight of the feet). These results agree with (Kocak et al. (19); Santos-Silva et al. (26), while the results differed with (Suliman and Babiker (28) who found significant differences in the averages weight of the weight of the uneaten carcass Residues (skin, head, and feet) between the four treatments, respectively.

Table 5: Effect of using different percentages of feed granules for the sunflower meal in body fat weight (kg) and fat thickness. (General average ± standard error).

Treatments	Tail Weight *	Weight of mesenteric fat	Weight of heart fat	Weight of kidney fat	Total fat weight *	Fat thickness (mm) *
First	± a 4.695 0.349	0.148 ± 0.586	±a 0.115 0.031	± a 0.169 0.029	± a 5.566 0.300	± a 5.500 0.645
Second	± ab 3.650 0.644	0.117 ± 0.395	± ab 0.056 0.004	± b 0.095 0.009	± b 4.196 0.714	± ab 4.250 0.250
Third	± b 2.850 0.073	0.147 ± 0.636	± ab 0.070 0.018	± a 0.198 0.009	± b 3.754 0.227	±a 5.250 0.478
Fourth	± ab 3.687 0.261	0.078 ± 0.529	± b 0.053 0.001	± ab 0.145 0.026	ab 4.414 0.188 ±	± b 3.750 0.250

* The vertically different letters indicate significant differences at the probability level of 0.05.

Table 6: Effect of the using of feed blocks containing different percentages of the sunflower meal and their effect on the weights of the main and secondary cuts for the carcass (General average ± standard error)

Treatments	Weight of half carcass	Weight of the thigh	Shoulder weight *	Weight of half neck *	Chest weight	Weight of fore shank	Weight of flank	Weight of rump*
First	10.285 0.255 ±	3.150 0.028 ±	a 1.763 0.106±	0.825 b 0.047±	2.375 0.062±	0.712 0.091±	0.560 0.024±	0.900 c 0.040±
Second	9.714 0.584 ±	2.900 0.177 ±	b 1.413 0.042±	0.800 b 0.040±	2.113 0.288±	0.725 0.062±	0.488 0.042±	1.275 b 0.047±
Third	9.938 0.184±	2.887 0.119 ±	1.562 ab 0.085±	1.187 a 0.139±	1.849 0.086±	0.725 0.025±	0.428 0.066±	1.300 ab 0.040±
Fourth	10.300 0.124 ±	3.015 0.012 ±	1.688 ab 0.104±	0.764 b 0.076±	2.295 0.056±	0.713 ± 0.012	0.400 0.070±	1.425 a 0.047±

* The vertically different letters indicate significant differences at the probability level of (P≤0.05).

Table 7: Effect of the using of feed blocks containing different percentages of the sunflower meal and their effect on the some eaten carcass residues (General average ± standard error)

Treatments	Heart weight	Liver weight	Weight of the kidneys	The weight of the testicles	Weight of the lungs
First	± 0.206 0.037	± 1.014 0.268	0.039 ± 0.156	0.082 ± 0.483	0.050 ± 0.507
Second	± 0.204 0.045	± 0.974 0.214	0.033 ± 0.147	0.099 ± 0.443	0.030 ± 0.613
Third	± 0.255 0.042	± 0.959 0.148	0.036 ± 0.156	0.044 ± 0.460	0.69 ± 0.589
Fourth	± 0.216 0.051	± 1.056 0.253	0.026 ± 0.145	0.087 ± 0.458	0.092 ± 0.711

Table 8: Effect of the using of feed blocks containing different percentages of the sunflower meal and their effect on the some uneaten carcass residues (General average ± standard error)

Treatments	Weight of the tripe and intestines	Weight of skin	Weight of head	Weight of feet
First	0.096 ± 7.887	0.351 ± 6.150	0.126 ± 2.77	0.047 ± 1.075
Second	0.500 ± 6.937	0.628 ± 5.600	0.176 ± 2.500	0.070 ± 1.000
Third	0.296 ± 7.787	0.092 ± 5.825	0.064 ± 2.750	0.055 ± 1.037
Fourth	0.113 ± 7.450	0.151 ± 5.387	0.145 ± 2.575	0.024 ± 0.995

We conclude from the results of this study that the best feed conversion efficiency was in favor of treatment containing 18% of the sunflower meal. While the two treatments that containing (6% and 12%) of the sunflower meal had the lowest percentage of total fat in the carcass

compared to the control treatments (0%), and the fourth treatment (18% sunflower meal) in which the fat percentage was significantly higher, The second treatments (6% sunflower meal) and the fourth (18% sunflower meal) also recorded the lowest percentage of fat thickness and this is required commercially. It was also found that the first treatment (0%) and the fourth (18%) obtained the highest average of total weight gain for lambs at the end of the experiment. On the other hand, it was observed that the technique of using the feed blocks in the fattening lambs was easy in the administration of the provision of feed and raise it and a few amount of waste.

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