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Improving some growth characteristics, quantitative and qualitative characteristics of carcass meat of male Awassi lambs by using palm oil

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Abstract: The purpose of the study was to examine the effects of adding palm oil (PO) to the treatments on the growth and quantitative characteristics of the meat of male Awassi lambs. As (12) Awassi males were used locally, their ages ranged between 4-4.5 months, with an average live weight of 22.16 ± 0.85 kg.

Throughout the characteristics, the animal weights were noted weekly (120 days). Up to the conclusion of the study period, all lambs were killed, skinned, and hollowed out. These were the outcomes:

The amount of total intake of concentrated feed was substantially higher ($P < 0.01$) in the treatments containing 4 and 6% (PO) and T1 than in the treatment containing 2%. (PO). In the same context, the treatment containing 6% (PO) and T1 also outperformed the treatment containing 2% (PO) highly significantly ($P < 0.01$) in the daily intake of concentrated feed, While the (PO) treatments recorded a highly significant decrease ($P < 0.01$) in the total intake of hay feed when compared to (T1), In the same context, the (PO) treatments recorded a highly significant decrease ($P < 0.01$) in the total and daily intake of concentrated and (T1).

When compared to T1, the end weight, daily weight gain, and overall weight gain all showed extremely significant superiority ($P < 0.01$) for the fourth treatment. All study criteria have seen an improvement in feed conversion efficiency.

• When compared to T1, the treatments (PO) (the third and fourth) significantly outperformed ($P < 0.01$) T1 In terms of average final weight, empty body weight, and the percentage of dressings based on hot and cold carcass weight. In the same vein, the fourth treatment significantly outperformed ($P < 0.01$) T1 and the other (PO) treatments in terms of carcass weight based on hot and cold weight.

• The treatment containing 6% (PO) had a highly significant superiority ($P < 0.01$) in the thickness of the fat layer compared to the other study treatments, and the treatment containing 6% (PO) had a highly significant superiority ($P < 0.01$) in the characteristic of ocular muscle area, including control, compared to the treatment containing 4% (PO).

Keywords: palm oil, lamb growth, rumen fermentation, carcass characteristics, quantity and quality of meat of male Awassi camels.

تحسين بعض صفات النمو والصفات الكمية والنوعية للحوم ذبائح ذكور الحملان العواسية باستعمال زيت النخيل

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المستخلص: استهدفت الدراسة متابعة المعاملات المضاف اليه زيت النخيل(PO) وتأثيرها في تحسين بعض صفات النمو والصفات الكمية للحوم في ذكور الحملان العواسية ، اذ تم استعمال (12) ذكرا عواسيا محليا تراوحت اعمارهم بين 4-4.5 شهرا وبمتوسط وزن حي 22.16 ± 0.85 كغم ،.تم تسجيل أوزان الحيوانات أسبوعيا طيلة مدة الدراسة(120 يوماً). تم ذبح جميع الحملان وسلخها وتجويفها حتى نهاية فترة الدراسة حيث: تفوقت المعاملات الحاوية 4 و6% (PO) تفوقا عاليا معنويا (P<0.01) في كمية المتناول الكلي من العلف المركز مقارنة مع المعاملة الحاوية على 2% (PO) وبنفس السياق ايضا تفوقت المعاملة الحاوية 6% (PO) تفوقا عاليا معنويا (P<0.01) في المتناول اليومي من العلف المركز مقارنة مع المعاملة الحاوية على 2% (PO) ، بينما سجلت معاملات (PO) انخفاضا عاليا معنويا (P<0.01) في المتناول الكلي من العلف الخشن مقارنة ب(T1) ، وبنفس السياق سجلت معاملات (PO) انخفاضا عاليا معنويا(P<0.01) في مجموع المتناول اليومي والكلي من العلف المركز والخشن (ماعدا المعاملة الحاوية على 4% (PO)) مقارنة مع (T1) .

فقد سجلت المعاملة الرابعة تفوقا عاليا معنويا(P<0.01) في صفة الوزن النهائي والزيادة الوزنية اليومية والكلية مقارنة مع T1. وقد اتخذت كفاءة التحويل الغذائي تحسننا في كافة معاملات الدراسة.

تفوق معاملات (PO) (الثالثة والرابعة) تفوقا عاليا معنويا(P<0.01) في معدل الوزن النهائي ووزن الجسم الفارغ وفي نسبة التصافي على أساس وزن الذبيحة الحار والبارد مقارنة مع T1 ، وبنفس السياق تفوقت المعاملة الرابعة تفوقا عاليا معنويا(P<0.01) في وزن الذبيحة على أساس الوزن الحار والبارد مقارنة مع (T1) وبقية معاملات (PO) .

تفوقت المعاملات الحاوية 6% (PO) تفوقا عاليا معنويا (P<0.01) في صفة مساحة العضلة العينية وبضمنها السيطرة مقارنة مع المعاملة الحاوية على 4% (PO) ، وبنفس السياق تفوقت المعاملات الحاوية 6% (PO) تفوقا عاليا معنويا (P<0.01) في صفة سمك طبقة الدهن مقارنة ببقية معاملات الدراسة.

الكلمات المفتاحية: زيت النخيل، نمو الحملان، تخمرات الكرش، صفات الذبيحة، الكمية والنوعية للحم وذكور الجملان العواسية.

Introduction

The amount of animal protein consumed every day is a gauge of a country's civilization and development (1). Because it includes a significant amount of high-quality protein, including all the essential amino acids the body need to function and a high digestibility coefficient, red meat is one of the most significant sources of this protein (2). The body may easily absorb it since it contains a group of vitamin B vitamins, a few minerals, and vital fatty acids (3). According to data released by the International Agricultural Food Organization, the demand for red meat consumption has increased over the past few years in Iraq due to the country's high per capita standard of living, as well as the country's consumers' high levels of health and cultural awareness. However, the average annual per capita consumption of red meat in Iraq was 5.69 kg, compared to 2.94 kg in Asia and 34.28 kg in Europe (4). The lack of concentrated feed, its high cost, and the poor quality of the rough feed used to feed these animals are the biggest obstacles to the growth of the red meat industry (ruminants). These issues and obstacles also contributed to the decline in the productivity of meat animals in general (5). Therefore, studies in the Arab world in general and Iraq in particular, have tended to research a variety of methods, all of which aim to address the issue of investing in fodder materials used in feeding the meat produced from these animals is of great quality and has a high nutritional value (6), Lately, studies and research have concentrated on finding new strategies to improve the quality of low-grade rough feed (7). Several scientists employed chemical techniques to enhance subpar feed. used papyrus reeds (8), corn cobs (9) and firewood (10) as fuel. (11), (12), and (13) refer to rice straw, palm fronds, and sugar beet pomace, respectively. local ruminants with high efficiency in the context of further improving conversion efficiency. Whereas other researchers fed ruminants directly with biological materials, (14) fed buffalo calves with growth promoter, (15) fed lambs with growth promoter, (16) fed sheep with mushrooms, and (17) fed sheep with sedge reed and barley straw. Awassi lambs were fed various amounts of palm oil in Iraq thanks to a team of researchers' effective scientific efforts (18–19). This vegetable oil was also applied to domestic chicken, demonstrating its effectiveness and capacity to enhance a several of crucial and beneficial traits of chicken (20). In reality, using palm oil to feed domestic chicken has produced positive results (21) and understand the degree of its impact on palm oil in feeding Awassi sheep, the objectives of the study centered on the following points:

- Utilizing various amounts of palm oil to figure out the ideal amount and how it affects how qualitative meat is produced.
- Researching the effects of palm oil on weight gain.
- Investigating various quantitative and qualitative aspects of carcass features.

Materials and Methods

Study plan

To investigate the effects of adding various levels of palm oil by 0,2, 4 and 6% to concentrated feed on productive performance and some characteristics of Awassi lamb carcasses, this study was carried out in the sheep field of the Department of Animal Production / College of Agriculture - University of Tikrit from 5/2/2022 to 20/6/2022.

Study animals

Twelve male Awassi sheep lambs with average weights of 22.16± 0.85 kg were employed. Their ages varied from 4 to 4.5 months when they were purchased from neighborhood markets, and they were given numbers before being moved to the fields of the Department of Animal Production in the College of Agriculture at the University of Tikrit. To get rid of the leftovers from the previous ration, they were accustomed to eating the Experimental ration for two weeks (the introductory period). Weekly, the amounts of concentrated feed provided were adjusted based on the new weight of each lamb, and alfalfa hay (dried feed) was freely given to the lambs throughout the study period.

Preparation of feed materials experimental rations, and feed system

The Department of Animal Production / College of Agriculture - University of Tikrit's feed plant processed the raw components for the trial diets using equipment it had obtained from nearby markets. For the second, third, and fourth treatments, palm oil was added at rates of 2, 4 and 6%. (T2, T3 and T4). As seen in Table 1, the initial treatment (control) did not involve addition. Every day, palm oil is combined with concentrated feed by melting the fats on a heat source, turning them into a liquid form, and combining the resulting mixture with the feed. According to procedure (22) the concentrated feed was given to the four treatments at a rate of 3% of the live body weight, with alfalfa hay being given.

Table (- 1). Percentages of experimental diet components from raw materials (%) .

Diets / Item	T1 %	T2 %	T3 %	T4 %
Black barley	48	48	48	48
Wheat bran	30	32	34	36
Yellow corn	12	8	4	-

Diets / Item	T1 %	T2 %	T3 %	T4 %
Soybean meal	8	8	8	8
Palm oil	0	2	4	6
Vitamins and salts	2	2	2	2
Total	100	100	100	100

T1:Control diet without addition , T2: Diet with 2% addition palm oil, T3: Diet with 4% addition palm oil and T4: Diet with 6% addition palm oil .

Preparing animals pens and supplies

The four 4.5 × 4.5 m group misleading cages in which the food system was applied following each of the study treatments were used to house the study animals. over the research period.

The duration of the experiment, the procedure of slaughtering and taking measurement

After the 120-day study period, the animals were killed after being fasted for 12 hours as previously mentioned. Their final weights were recorded right before slaughter, and after the carcasses had been cleaned, skinned (the skin was removed), and hollowed out, they were allowed to cool for 24 hours in a cool room at a temperature of 4 °C. Carcasses were subjected to some qualitative and quantitative evaluations.

Growth trial

The following aspects of this study were included: • The consumption of concentrated feed and hay, as well as the intake of various nutrients based on dry matter.

- The average daily weight gain (g/day) (total weight gain divided by the experiment's duration in days).
- Lambs' overall weight gain rate (kg) (final weight - initial weight).
- Feed conversion efficiency, or the ratio of daily weight gain to feed consumption.

Slaughter trial

Following the conclusion of the trial, all research animals were slaughter, and their meal was withheld for twelve hours while they had access to water. Record the weight of the live animal before and after the slaughtering process, as well as the weight of the following organs: the head, limbs, skin, spleen, testicles, liver, heart, lungs, and bronchi; kidneys; the digestive system full; the digestive system empty; the kidneys and intestinal fat; the heart; and the rumen. Moreover, the following measurements were made:

Carcass measurements

Some carcass measurements are taken after slaughter and they include:

Hot carcass weight

A disc scale of the type (NOBEFL) with a capacity of weighing kilograms was used to measure the carcass' weight 30 minutes after the killing operation (50 kg X 200 grams).

Cold carcass weight

The corpse was weighed using a disc balance of the type (NOBEFL) with a capacity of 50 kg X 200 grams after being slaughtered for (24) hours and kept at a cooling temperature of 4 °C .

Empty body weight

Subtract the weight of the animal before slaughter from the weight of the digestive and urinal contents to determine the empty body weight .

Dressing percentage

The percentage of purification was computed in two different ways, **the first** of which was concerning the animal's weight before slaughter and used the calculation shown below .

$$\text{Dressing percentage (\%)} = \frac{\text{Cold carcass weight}}{\text{Animal weight before slaughter}} \text{ X } 100 \qquad (23)$$

The second for the empty body weight was calculated by the following equation

$$\text{Dressing percentage (\%)} = \frac{\text{Cold carcass weight}}{\text{Empty body weight}} X\ 100 \qquad (23)$$

Fat thickness

Fat thickness was measured with a Vernier Caliper at the dorsal area of the spine between the twelfth and thirteenth ribs above the (-longissimus dorsi) muscle

Rib eye area

The dorsal ocular muscle, also known as the Longissimus Dorsi, was measured by cutting a cross-section of the muscle in the region between the twelfth and thirteenth ribs, printing the muscle's outer borders on specialized transparent wax paper (Transparent Paper), and then adding the two measured areas together. left-hand side.

Statistical analysis

To determine the impact of fat from chicken slaughterhouses and its effect on weights and quantitative and qualitative characteristics (chemical analysis) of carcasses, the data was statistically analyzed by using a factorial experiment in a completely randomized design (CRD):

$$Yij=\mu+Ti+Eij$$

Where :

Yij = value observed (j) in the diet (i).

μ = the general average value of all observations.

Ti = effect of coefficients and this represents the effect of addition of palm oil.

Eij = the value of the random experimental error of the experimental unit, which is normally and independently distributed with an average

year equal to zero and variance equal to 2δ e

The data were analyzed using the general linear model (GLM) in the statistical analysis system (24) and the Multiple Range Test Duncan (25), which was used to identify the significant differences between the studied variables' means at the probability level of 0.01

Results &Discussion

Growth trial

Feed intake for dry matter

The findings of the statistical study showed what would happen to the dry intake of concentrated feed, rough feed, and the combined intake of concentrated and rough feed if palm oil were added in amounts of 0, 2, 4, and 6%. The treatment containing 2% of palm oil averaged 102.960 and 0.858 kg, while the treatments containing 4% and 6% of palm oil averaged 104.400 and 0.870 kg and 105.720 and 0.881 kg, respectively, and the treatment that did not add any palm oil showed a highly significant decrease ($P < 0.01$) among the treatments. The results of Table 2 revealed a significantly significant decrease ($P < 0.01$) between palm oil (control), which averaged 104.880 and 0.874 kg, respectively. These findings conflict with the researcher's conclusion (26) that adding 0 or 6% of palm oil to the feed of cow calves resulted in a highly significant increase in the calves' daily and cumulative intake of concentrated and coarse fodder. The daily intake of hay feed averaged 0.309 kg for the treatment containing 2% palm oil, 0.304 kg for the treatment containing 4% palm oil, and 0.301 kg for the treatment containing 6% palm oil, compared to In the treatment to which oil was not added, which averaged 0.327 kg, respectively. and between which there was no discernible change; Similarly, it was discovered the researcher (27) added 0 and 6.8% palm oil to Holstein cows' meals, but there were no appreciable differences for matter they consumed daily . The results of Table 3 also revealed that there were highly significant differences ($P < 0.01$) in the 2, 4, and 6% palm oil treatments, as these treatments recorded a highly significant decrease ($P < 0.01$) in the amount of intake of total and daily dry matter (for concentrated and hay feed), with averages of 140,040 and 1,167 kg, 140,880 and 1,174 kg, and 141,840 and 1,182 kg, respectively, compared to the treatment to which no fat was added According to (28), adding 20 g of palm oil per kg of dry matter to feed did not significantly alter the amount of feed consumed daily for the diets of Holstein dairy cows. According to Table 2, the treatments with palm oil at rates of 4 and 6%, including the control treatment, ($P < 0.01$) outperformed the treatment with 2% in terms of dry matter intake overall and daily ($P < 0.01$). (concentrated feed). The control treatment likewise outperformed the other oil treatments in terms of the total consumption of hay feed and total and daily intake of total feed. Due to the addition of lipids to the food, the fermentation mechanism in the rumen may have been damaged, which could account for the poor dry matter intake seen in this study (29). The researcher (30) demonstrated that the type of sinter and food composition affect the detrimental effect

of fatty acids on the rumen microbiota (30). Because the experimental diets are essentially balanced in terms of energy and the addition of fats provides the diet with energy, essential fatty acids, and fat-soluble vitamins, the fixed chemical mechanisms that control the intake of dry matter were unaffected by the addition of animal fats or oils added in this study as an energy source (31).

Table (-2). Effect of adding different percentages (0, 2, 4 and 6%) of palm oil on the amount of feed intake (kg) (Average ± standard error).

Studied trait / Treatment	concentrated feed		hay feed		Total feed	
	Total intake	Daily intake	Total intake	Daily intake	Total intake	Daily intake
T_1	104.880±0.69 A	0.874±0.58 A	39.240±0.07 A	0.327±0.58 A	143.160±0.91 A	1.201±1.15 A
T_2	102.960±0.001 B	0.858±1.66 B	37.080±0.12 B	0.309±0.58 A	140.040±0.12 C	1.167±0.001 D
T_3	104.400±0.001 A	0.870±0.58 AB	36.480±0.07 C	0.304±0.58 A	140.880±0.07 BC	1.174±0.58 C
T_4	105.720±0.07 A	0.881±0.58 A	36.120±0.001 D	0.301±0. 58 A	141.840±0.07 B	1.182±0.58 B
significant	**	**	**	N.S	**	**

T1: Control diet without addition , T2: Diet with 2% addition palm oil, T3: Diet with 4% addition palm oil and T4: Diet with 6% addition palm oil .

N.S: It means that there are no highly significant differences at the probability level (P < 0.01). ** The different letters within the same column indicate that there are significant differences between the averages at a significant level (P < 0.01).

Initial and final weight

According to the study's findings (Table 3), there were no appreciable changes in the treatments for the initial weight of Awassi lambs. The final weight characteristic of Awassi lambs showed significant differences between palm oil treatments added by 0, 2, 4, and 6% to the nutritious meals, as shown in the same table. The treatment was superior to 6% of palm oil, in a highly significant way (P < 0.01), as it averaged 41.592 kg, whereas the treatment containing 2% recorded a highly significant decrease (P < 0.01) in weight. As a result, there was a significant improvement in the characteristic of the lambs' final weight. Lambs between palm oil treatments produced a final weight of 40.344 kg. As opposed to the control oil-free therapy, which averaged 36.704 kg, the treatment containing 4% of palm oil fell in the middle of the two. These findings contradicted those of (32) who found no appreciable differences in final weight when 2% fumaric acid-palm oil was added to calves' meals. The processing of all oil treatments may be to blame for this discrepancy. By including more than one source of energy into meals, there was an improvement in the rumen microbiota's activity, which had a good impact on the levels of volatile fatty acids and their hydrogenation there (33).

Total and daily weight gain &efficiency fed conversion

The results of the statistical analysis (Table 3) also demonstrated the impact of adding palm oil at a rate of 0, 2, 4, and 6% to the diets on the daily and total weight gain of Awassi lambs, as it was averaged at 165 g and 19,800 kg, respectively. However, the treatment containing 2% of palm oil recorded a highly significant reduction (P < 0.01) in the amount of daily and total increase. Similar to how the medication alone (control) reduced Very Significant (P < 0.01) daily and overall weight gain, Nevertheless, when 6% of palm oil was added as a therapy, resulted in an average of 122 g and 14.640 kg, respectively. Moreover, these findings support part of what was said by (34) who found that adding palm oil to lamb diets at a rate of 4% did not improve the daily weight growth of merino male lambs. The fluctuation in the lipid-containing food, which reflects its content of fatty acids when it is ingested and digested in the rumen as a result of the high rate of consumption of various nutrients, is the cause of the variance in the characteristic of improvement in the daily and overall weight increase Particularly, in concentrated feed, which plays a beneficial role in boosting the activity of various microorganisms in the rumen and thereby increasing the efficiency of microbial protein formation, providing the rest of the digestive system with enough nutrients from the animal, and converting the excess from maintenance into the growth of various bodily tissues, which causes daily and overall weight gain and will result in an increase in in vivo body weight (35).). The statistical analysis's findings, which are presented in Table 4, revealed that the treatment without additives resulted in a highly significant decrease (P 0.01) in the food conversion efficiency, which on average was 9.845, as opposed to treatments 2 and 6% palm oil, which on average were 7.886. These results were not identical to what occurred with (36) and (37), as the results revealed that there were considerable differences in favor of the treatment in which sinter was added at a rate of 2%, while the treatment containing 4% of the oil was midway between them. Regarding feed conversion effectiveness, Simultaneously, Researcher (38) stated that the addition of fats to the diet in high proportions affects the efficiency of the rumen's microbiota and consequently lowers the coefficient of digestion of various nutrients. In addition to the fact that the addition of sinter in moderate proportions to the diets of ruminants improves the digestion coefficient and nutritional value and may be the cause of the high energy effect of the sinter, the presence of a source of nitrogen in the diet, which It converts into pure energy and reduces the detrimental impact of fat on rumen bacteria, which was positively

reflected in increasing the process of absorption and metabolism of the various elements present in the diet (39) from the cells of the body and thus improves the effectiveness of food conversion for lambs

Table (-3). Effect of adding different percentages (0, 2, 4 and 6%) of palm oil on daily weight gain (g/day), total weight (kg) and feed conversion efficiency (Average ± standard error).

Studied trait / Treatment	Initial weight Kg	Final weight Kg	daily weight gain g/day	Total weight Kg	Feed conversion efficiency
T_1	22.021±0.30 A	36.704±0.18 C	122±0.76 C	14.640±0.09 C	9.845±0.67 A
T_2	22.450±0.51 A	40.344±0.38 B	148±0.09 B	17.760±0.25 B	7.886±0.19 B
T_3	22.800±0.35 A	40.913±0.65 AB	157±1.50 AB	18.840±0.30 AB	7.480±0.12 BC
T_4	22.383±0.90 A	41.592±0.25 A	165±2.36 A	19.800±0.88 A	7.192±0.31 C
significant	N.S	**	**	**	**

T1: Control diet without addition , T2: Diet with 2% addition palm oil, T3: Diet with 4% addition palm oil and T4: Diet with 6% addition palm oil .

N.S: It means that there are no highly significant differences at the probability level (P < 0.01). ** The different letters within the same column indicate that there are significant differences between the averages at a significant level (P < 0.01).

Slaughter trial: Slaughter was done after the end of the experiment period, and the following measurements were taken:

Entail and empty body weight

Which, in the presence of a source of nitrogen in the diet, converts into pure energy, which lessens the harmful effect of fat on rumen bacteria, which was positively reflected in increasing the process of absorption and metabolism of the various elements present in the diet (39), which improves the effectiveness of food conversion for lambs. Perhaps the cause of the increase is the characteristic of the final body weight brought on by the addition of various lipid proportions. Perhaps the reason behind the increase in The final body weight of the lambs is improved by regulating the pH values and bringing it within the normal range. Additionally, the action of sintering is to add energy to the diets by enhancing the intake of the fodder material in addition to reducing the detrimental impact of those sinteres on the numbers of microorganisms in the rumen and thereby increasing the coefficient of dry matter digestion and feed intake (41).The results of Table 4 show that there are significant differences between the treatments, with the treatment containing 6% palm oil being superior in a highly significant way (P < 0.01), as well as the effect of adding palm oil at a rate of 0, 2, 4 and 6% to the rations on the empty body weight of Awassi lambs. These results were not consistent with those found by the researcher (42) when 3% palm oil was added to the diets of dairy animals, who had an average tare body weight of 36.439 kg. Instead, the treatment containing 4% palm oil achieved a significant superiority (P < 0.01) in empty body weight, which averaged 36.228 kg over the oil-free treatment, which averaged 32.675 kg over respectively. indicate a considerable impact on body weight when emptied. Additionally, the addition of oil responded to the rumen microbiota, which was appropriately reflected in the increase in esterification bond dissolution and the concentration of fatty acids and their hydrogenation in the rumen. The high empty body weight of the oil-containing treatments maintained the rumen pH values at high rates.

Carcass weight

According to the findings of the statistical analysis displayed in Table 5, there are significant changes in the average carcass weight (hot and cold) of Awassi lambs when palm oil is added at rates of 0, 2, 4, and 6%. The treatment containing 6% palm oil outperformed the other palm oil treatments in terms of average carcass weight (hot and cold), with rates reaching 21.464 kg and 21.028 kg, respectively, compared to the treatment containing 2% palm oil and the control treatment, with rates of 20.178 kg, 19.733 kg, and 17.989 kg, 17.459 kg, Respectively, the 4% treatment did not significantly differ in terms of arithmetic from the other palm oil treatments for the same capacity. The findings of this study are consistent with those of (44) who discovered that adding 4% palm oil to lamb diets improved the characteristics of the hot carcass weight of Malin lambs and with those of (45), who discovered that adding palm oil to lamb diets improved lamb performance. It resulted in an improvement of 5% in the Muzafarnagari type of Indian weaned lambs' hot and cold carcass weight characteristics. However the findings of this study disagree with those of (46) which demonstrated that feeding lambs diets with various amounts of palm oil 0, 3, and 6%) The characteristics of the hot and cold carcass weight of male Ojalada lambs did not differ significantly according to the results, and the reason for this improvement may be related to the added quantity of lipids that give the diets their energy. Therefore, the improvement was significant in the hot and cold carcass weight, and this may be

related to the addition of oil. The amount of cellulose and hemicellulose-decomposing bacteria increased as a result, which improved the coefficient(47), the results agreed with (48).

Dressing Percentage

Table 4's statistical analysis results show the impact of adding palm oil at rates of 2, 4, and 6% on the percentage of fat content calculated using the carcass weight (hot and cold) of Awassi lambs. It is important to note that the treatments differed significantly because they had 4, and 6%, added to them. In terms of the percentage of refining determined using carcass weight (hot and cold), palm oil had a high, significant advantage ($P < 0.01$), with rates of 51.216, 50.045, 51.869, and 50.815, respectively, compared to the (control) treatment free of additives, which had rates of 48.645 and 47.455. The therapy containing 2% palm oil did not differ significantly from the control group in any meaningful ways. The findings of this study contradict those of (49) who found that adding various percentages of palm oil—10%, 20%, 30%, and 40%—to the diets of male cows increased their chances of being refined. However, (50) found that adding various percentages of other palm oil—2%, 4%, and 6%—to the diets of male lambs—did not increase their chances of being refined until the end of the study period. These findings contrasted with those of (51) who on cluded that the addition of various amounts of palm oil—0, 10, 30, and 50%—led to a reduction in the percentage of purification of hot cow carcasses, which reached rates of 58.2% and 57.6%. respectively, and 55.5% when compared to the adult determined based on carcass weight (hot and cold). These results agreed with those of the other approach since the nutritional supplement affected both the percentage of offspring and the increase in weight of the lambs (52). Regarding the percentage of clearance determined using empty body weight, the statistical analysis's findings, which are shown in Table 4, showed that there were significant differences between each palm oil treatment and the control treatment, with the corresponding percentages reaching 55.075, 57.687, 57,707, and 53.707%. When palm oil was added at rates of 0, 2, 4, and 6%, there were significant differences between the percentages of inoculations calculated based on of live body weight and the percentage calculated based on empty body weight. This variation in the infiltration percentage is caused by differences in the content of the animals' digestive tracts (53).

Table (- 4). Effect of adding different percentages (0, 2, 4 and 6%) of palm oil on final weight (kg), empty body weight (kg), hot and cold carcass weight (kg), percentage of dressings (%) (Average ± Standard Error).

Studied trait / Treatments	Entail Weight Kg	Empty body weight Kg	Carcass weight live based on Kg		Dressings percentage based on %		
			Hot weight	Chilled weight	Hot weight	Chilled weight	Empty body weight
T_1	36.704±0.18 B	32.675±0.08 B	17.989±0.09 C	17.549±0.15 B	49.012±0.15 AB	47.824±0.14 A	53.707±0.08 B
T_2	40.344±0.39 AB	35.829±0.48 AB	20.178±0.31 B	19.733±0.31 B	50.013±0.47 AB	48.884±0.49 AB	55.075±0.46 AB
T_3	40.913±0.66 A	36.228±0.19 A	20.899±0.40 AB	20.421±0.37 AB	51.040±0.14 A	49.943±0.16 A	57.687±0.19 A
T_4	41.592±0.25 A	36.439±0.27 A	21.464±0.48 A	21.028±0.48 A	51.08±0.08 A	50.554±0.07 A	57.707±0.07 A
significant	**	**	**	**	**	**	**

T1: Control diet without addition , T2: Diet with 2% addition palm oil, T3: Diet with 4% addition palm oil and T4: Diet with 6% addition palm oil .

**** The different letters within the same column indicate that there are significant differences between the averages at a significant level ($P < 0.01$).**

Rib eye muscle area

The results of Table 5 show that there is an effect in addition to a general percentage of 2, 4 and 6% to the diets in the area of the ocular muscle, which indicates that there are significant differences in the percentage of an area of 9.240 cm. The arithmetic mortality rate of the treatment was in the treatment containing 2% palm oil, as its rate reached 9.840 cm2, respectively. And others, the findings of (54) that adding fat (0, 2.1, and 4.1%) to the diets of male Angus cows did not significantly change the area of the ocular muscle were corroborated by the researcher (55) who added palm oil at a rate of 10.7% the area of the ocular muscle. The good muscularization of these carcasses, and thus the high amount of meat and muscles in the carcass.

Fat thickness

It is noted that there is a highly significant superiority ($P < 0.01$)for the treatment containing 6% palm oil in the statistical analysis's results (Table 5), which demonstrate the existence of significant differences between the palm oil treatments at rates of 2, 4, and 6% added to the rations of Awassi lambs in the thickness of the fat layer Noting that there was a highly significant superiority ($P < 0.01$) for the treatment containing 6% palm oil

in the thickness of the fat layer of Awassi lamb carcasses, where the rate was 3.43 mm, compared to the treatment containing 2% palm oil, where the average thickness of the fat layer was 1.19 mm, respectively, While there were numerical changes in the thickness of the fat layer in favor of the treatment containing 4% palm oil, these differences did not achieve significance. lamb carcasses from Awassi lambs , where the typical thickness was 2.68 mm. The results showed that there were no significant differences in the thickness of the fat layer for any treatments until the end of the experiment period, in contrast to what was concluded by (56) that the addition of palm oil at levels of 0 and 2.5% in the diets of Thai cows, while the researcher by (46) found that the addition of 3 and 6% palm oil to the diets of male Ojalada lambs did not result in significant differences in the fat layer thickness of Ojalada lambs.This leads us to the conclusion that the layer of fat in the transaction lamb carcasses with 2 and 5% fat from poultry slaughterhouses and palm oil was less thick. A good layer of fat deposition is crucial for the carcass to have the desired external shape, which gives the meat good flavor, tenderness, and juiciness, and this is reflected in the desire for these qualities. The use of lipids in farm animal diets to increase the quality of meat gives the consumer a good indicator of the impact of microbes in reducing the process of making fats in the animal's body and then the decrease in fat deposits in the animal's body (57).

Table (-5). The effect of adding different percentages (0, 2, 4 and 6%) of palm oil on the area of the ocular muscle (cm2) and the thickness of the fat layer (mm) (Average ± standard error).

Studied trait / Treatments	Rib eye muscle area Cm^2	Fat thickness mm
T_1	10.307±1.62 A	1.66±0.47 B
T_2	9.840±0.23 AB	1.19±0.11 B
T_3	9.240±0.74 B	2.68±0.82 AB
T_4	10.880±1.08 A	3.43±1.14 A
significant	**	**

T1: Control diet without addition , T2: Diet with 2% addition palm oil, T3: Diet with 4% addition palm oil and T4: Diet with 6% addition palm oil .

**** The different letters within the same column indicate that there are significant differences between the averages at a significant level (P < 0.01).**

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