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Effect of dietary protein on lipid profile and testosterone of Karadi male lambs

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***Abstract*---**The experiment was conducted at a private farm located in Shakal village belonging to Kalar district, 150 kilometers South-East of Sulaimani city, from the 1st of September 2021to to the 1st of December 2021, and used 12 individual karadi male lambs. were used to study biochemical changes in blood parameters (lipid profile and testosterone).as affected by concentrate diets containing two different levels of dietary crude protein (CP) (sunflower and soybean meal), two-level (low, high). Concentrate diets were offered to lambs at a rate of 3% of live Body weight (BW) in addition to barley straw add liptum, Results showed that Increasing and decreasing levels and sources of dietary protein had no significant dif¬ference (P>0.05) on lipid profile(low-density lipoprotein, high-density lipoproteins, cholesterol, triglyceride (TG)), were not affected by the addition of sunflower and soybean meal in feeding lamb. but the testosterone significantly different levels and source (P<0.05).at the first period .first time The lambs of the (T2) and (T4) showed significantly (0.257 ± 0.118 b), (0.146 ± 0.075 b) Respectively as compared to(T1) (1.533 ± 0.156 a). At the second time, the lambs of the (T3) showed significantly (0.177 ± 0.087 b) compared to (T1) (1.525 ± 0.294 a). at the third time The lambs of the (T2), (T3), and (T4) showed significantly (0.346 ± 0.210 b), (0.375 ± 0.265b), and(0.316 ± 0.179b) respectively compared to(T1) (2.020 ± 0.278 a). In the second period significantly different levels and source (P<0.05).at the first time the lambs of the(T1),(T3), and (T4) showed significantly (1.517 ± 0.334 b),(2.050 ± 1.117 b), and (0.541 ± 0.475b) respectively compared to (T2)(4.717 ± 0.565 a).

***Keywords*---**male lamb, sunflower meal, soybean meal, biochemical parameter.

Introduction

Studies with Karadi male lambs an inverse relationship between quantity and quality of dietary protein and blood cholesterol, This relationship suggests that the quantity and possibly the source of dietary protein can influence lipid metabolism by altering the synthetic rates of specific lipid constituents. The Karadi breed, which accounts for 18-20% of the Iraqi sheep population, is indigenous to the Kurdistan region of Iraq's northern mountains, villages, and undulating dry farming plains (Alkass et al.,2013). Karadi lambs are white with black open faces and pendulous ears. The black color frequently extends to the shoulders and other parts of the body (Alkass et al.,2013). Sunflower seed meal, after soybean meal, cottonseed meal, and canola cake, is the fourth-largest source of protein for animal feed (Anderson and Lardy,2002). Due to the low-calorie content of the substance, it is known that soybean meal inclusion in diets increases as sunflower meal inclusion does (Rezaei & Hafezian 2007).

Sunflower meal has a lower crude protein content than meals made from other oilseeds, such as soybean, canola, or cottonseed (NAS, 2016). Aquaculture species have traditionally used soybean as a source of protein in their feed, but as its use among other animal consumers and even humans is on the rise, this could pose a danger to the sustainability of aquaculture production (Azaza et al., 2009; Tacon and Metian, 2008). Pea grain (P) and sunflower cake were used to partially replace soy meal (SFC), (Cholesterol, HDL, LDL, and triglyceride levels) (Antunović et al,2019). Serum biochemical markers included triglycerides, alkaline phosphatase, creatine kinase, and glutamyl transferase (GGT), as well as cholesterol, high-density lipoprotein (HDL), low-density lipoprotein (LDL), and triglycerides (Zvonko et al,.2021). There were no discernible differences in triglyceride levels between the various regimens (AlMallah,2007).

Because they raise LDL cholesterol, saturated fatty acids from C12:0 to C16:0 are known for their hypercholesterolemic impact (Ohlsson, 2010). These fatty acids raise blood LDL cholesterol when consumed in increasing amounts, while UFAs have the opposite effect (Fernandez and West, 2005). The purpose of this study was to compare the effects of two dietary protein levels on testosterone levels, testicular characteristics, and semen quality in pubertal Kivircik ram lambs (ÖZKAN et al,2007). This decrease in serum testosterone is the result of impaired steroidogenesis in testicular Leydig cells caused by isoflavones. (Akingbemi et al, 2007). the objective of the study was to determine the effects of the source and level of dietary protein on the lipid profile and testosterone of Karadi male lambs.

Materials and Method

Used 12 individual kara di male lambs. Karadi male lambs weight 28 kg and were 5 months old, 3 months post-lambing, lambs were divided randomly and equally into four groups (3 lambs for each group). Feeding the lambs two different sources of crud protein sunflower and soybean meal and feeding two levels of dietary Crud protein (14.01, 19.96) each level offered to lambs at the rate of 3% of live BW in addition to barley straw add liptum. Chemical analysis for ingredients including CP. Blood samples from lambs were taken from lambs at the three-period, first period (1 day), the second period (45day), and at the third pieriod (90days) at the

(1) day and (90)day take blood from lambs(9-11ml) (morning, noon, evening) because the test of testosterone at two periods first research and at the end of the research.at the after 6 am, 12 pm, 6 pm but at the (45)days take (5ml) blood at the morning from via jugular vein puncture using disposable needles and vacutainer tubes which were immediately placed in the refrigerator, After that Blood samples were centrifuged (3000 rpm) for (20 min) to separate the coagulated blood cells from the serum and stored at -20 Co until analysis was perfumed. Auto Hematology Analyzer by (cobas311) to determine Lipid profile (LDL, HDL, Cholesterol, triglycerides), Hormone Testosterone. Data obtained was Statistical analysis system - XLstat. (2016) program was used for data analysis.The influence of dietary protein meals on growth performance and various blood profiles of kara di male lambs were investigated using the Complete Randomized Design (CRD). Duncan's (1955) To identify the significant differences between means, various range tests were used. Chemical analysis of ingredients for C.P showed table(1), and The composition of concentrate dites(%).

Table 1
Chemical analysis of ingredients for C.P

Ingredients	C.P%
Sunflower Meal	48
Soybean Meal	48
Barley	11
Wheat	14.5
Corn	8
Bran	15.5

Analysis of ingredients at the commercial and industrial ArbiI feed

Table 2
The composition of concentrate dites(%)

Level of CP %	14.01	14.01	19.96	19.96
Treatments	T1	T2	T3	T4
Ingredients				
Sunflower Meal	----------	7.6	----------	24.3
Soybean Meal	7.6	----------	24.3	----------
Barley	27	27	25	25
Wheat	7	7	7	7
Corn	35.5	35.5	29.7	29.7
Bran	23	23	14	14

Results and Discussion

Biochemical parameter: lipid profile

Results showed that there was no significant difference ($P<0.05$) between source and level of lipid profile in blood serum (HDL, LDL, triglyceride (TG), cholesterol). Result showed in table (3),Table (4),Table(5),Table(6) respectively . The goal of the

current study was to determine the impact of blood or formaldehyde treatment at different concentrations (50 and 100 percent) on the following biochemical blood parameters: Blood Total Protein (BTP) and Blood Cholesterol (BCH) in Lambs Fed Fattening Diets(Ibrahim,2021). Because they raise LDL cholesterol, saturated fatty acids from C12:0 to C16:0 are known for their hypercholesterolemic impact(Ohlsson, 2010). here were no discernible differences in triglyceride levels between the various treatments(AlMallah,2007). During mammalian folliculogenesis, the HDL appears to be the predominant lipoprotein particle in the follicular fluid (Reaven *et al.*, 1998). It is well established that HDL and LDL deliver cholesterol to the corpus luteum as a substrate for progesterone synthesis as well as to moderate reactive free radicals, thereby, limiting oxidative damage of ovarian cells (Decossin *et al.*, 1995; Reaven *et al.*, 1998).

Increasing dietary CP had no discernible impact on BTG (Miner, *et al.,*1990). Similar to our findings, which showed that samples taken from lambs fed diets high in CP showed no significant variations in BTG concentrations, but significant ($P<0.01$) differences were found (Dosky,2007).It has been suggested (Coccodrilli,*et al,*1970) As compared to animals on low-protein diets, calves offered high-protein rations have a metabolic system that causes a more rapid turnover of the body's natural mevalonic acid pool, increasing the turnover of blood cholesterol. There was no discernible difference between the groups' final body weights when rats were fed either cholesterol plus olive oil or cholesterol plus soybean oil, but the LDL-C level of the rats fed cholesterol + soybean oil was more than twice as high as that of the rats fed cholesterol + olive oil (Duavy *et al*,2017). SFO and SBO diets may result in cholesterol issues since ,in the current study, mice fed these diets had the lowest HDL-C/LDL-C ratios (Duavy *et al.* 2017).

It was shown that increasing dietary CP from low to medium level caused a significant ($P<0.05$) rise in BCH concentration, Elevated cholesterol may be a marker of dietary lipid content or tissue catabolism (Miner, *et al,*1990). Similar results were also published by Masoero *et al.* (2006), When compared to cows fed diets containing soybean meal, they discovered that the group of cows fed a mixture comprising peas had a non-significantly reduced concentration of cholesterol activity and higher NEFA . revealed that adding sunflower meals to broilers' diets had no influence on their high or low-density lipoprotein levels, and that adding 7, 14, or 21% of full-fat sunflower seeds had no noticeable impact on their serum triglyceride levels(Selvaraj and Purushothaman,2004). Additionally, broiler chickens' serum lipid profiles were unaffected by the varying percentages of soybean meal replacement with sunflower meal (0, 25, 50, and 75 percent) (Adejumo and Williams,2006).

Table 3
Effect quality and quantity of dietary protein in karadi male lambs on H.D.L

Treatment Period	T1 Low soybean meal	T2 Low sunflower meal	T3 High soybean meal	T4 High Sunflower meal
First period	23.967 ±1.586 [a]	17.500 ± 5.050 [a]	22.800 ± 5.888 [a]	22.233 ± 1.562 [a]
Second period	22.000	26.667 ±	22.367 ±	26.700 ± 4.005 [a]

	±2.723 [a]		3.583 [a]		0.285 [a]		
Third period	23.067 8.376 [a]	±	25.150 3.148 [a]	±	24.700 2.294 [a]	±	28.167 ± 2.325 [a]

The same letters mean Nonsignificant Between all treatments (P>0.05), (P>0.01).

Table 4
Effect quality and quantity of dietary protein in karadi male lambs on L.D.L

Treatment Period	T1 Low soybean meal	T2 Low sunflower meal	T3 High soybean meal	T4 High Sunflower meal
First period	14.83 ± 1.99 [a]	14.63 ± 6.31 [a]	19.53 ± 9.5 [a]	13.90 ± 1.2 [a]
Second period	19.73 ± 1.47 [a]	26.73 ± 3.58 [a]	23.40 ± 1.95 [a]	27.50 ± 8.06 [a]
Third period	38.13 ± 14.98 [a]	27.40 ± 5.16 [a]	34.60 ± 2.9 [a]	33.90 ± 7.06 [a]

The same letters mean Nonsignificant Between all treatments (P>0.05), (P>0.01).

Table 5
Effect quality and quantity of dietary protein in karadi male lambs on Triglyceride

Treatment Period	T1 Low soybean meal	T2 Low sunflower meal	T3 High soybean meal	T4 High Sunflower meal
First period	30.5 ± 8.75 [a]	24.77 ± 1.42 [a]	23 ± 1.53 [a]	36.43 ± 14.56 [a]
Second period	18.53 ± 1.79 [a]	35.67 ± 8.01 [a]	19.8 ± 5.7 [a]	22.7± 4.2 [a]
Third period	48.1 ± 18.46 [a]	21.2 ± 1.01 [a]	32.47 ± 6.02 [a]	23.8 ± 1.2 [a]

The same letters mean Nonsignificant Between all treatments (P>0.05), (P>0.01).

Table 6
Effect of quality and quantity of dietary protein in Karadi male lambs on blood cholesterol. Ranges cholesterol (g/dl)68-99

Treatments Period	T1 Low soybean meal	T2 Low sunflower meal	T3 High soybean meal	T4 High Sunflower meal
First period	46.3 ± 2.9 [a]	41 ± 11.27 [a]	51.67 ± 13.78 [a]	48.5 ± 1.1 [a]
Second period	40.6 ± 2.89 [a]	53.3 ± 6.77 [a]	46.3 ± 3.3 [a]	53.667 ± 11.3 [a]
Third period	70.2 ± 20.9 [a]	55.5 ± 7.04 [a]	68.8 ± 5.61 [a]	64.87 ± 7.59 [a]

The same letters mean Nonsignificant Between all treatments (P>0.05), (P>0.01).

Testosterone

Results showed testosterone significantly different between treatments (P<0.05).at the first period .first time The lambs of the (T2) and (T4) showed significantly (0.257 ± 0.118, 0.146 ± 0.075 [b]) Respectively as compared to(T1) (1.533 ± 0.156). At the second time, the lambs of the (T3) showed significantly (0.177 ± 0.087) compared to (T1) (1.525 ± 0.294 [a]). at the third time The lambs of the (T2), (T3), and (T4) showed significantly (0.346 ± 0.210, 0.375 ± 0.265 and 0.316 ± 0.179

respectively compared to(T1) (2.020 ± 0.278) result showed at (Table 7) . In the second period significantly different levels and source (P<0.05).at the first time the lambs of the(T1),(T3), and (T4) showed significantly (1.517 ± 0.334, 2.050 ± 1.117 and 0.541 ± 0.475) respectively compared to (T2)(4.717 ± 0.565) result showed at (Table8). ÖZKAN *et al*,(2007) In this report The results show that diets with equal energy levels but different protein levels have different effects on the live weight, testicular parameters, testosterone hormone con-centration and sperm parameters of the ram lambs.

The purpose of this study was to examine how testosterone, testicular parameters, and semen quality in Kivircik ram lambs during pubertal development were affected by two dietary protein levels (ÖZKAN *et al*,2007). Fatty acids have been reported to increase the production of sex hormones, especially testosterone (Esmaeili *et al.*, 2014). Foruie *et al,*(2004) reported similar findings that male lambs of the Dorper race fed diets high in protein increased in live weight and testicular parameters were higher than male lambs fed diets low in protein; however, more optimal results have been obtained from the low protein group in terms of the spermatological parameters compared to the high protein group. Abi Saab *et al,*.(1977) have reported findings that differ from those of this study, stating that investigations they carried out on 16 Baladi male goats showed that the semen volume and spermatozoa concentrations of the group fed with a high protein diet (18%) during the pubertal period were better than the group fed with a low protein diet (12%).

Raekwon *et al.* (1987) have also published comparable findings, showing that the young bulls have given two different diets that had equal calorie levels but variable protein levels had live weights and scrotum characteristics that were higher in the high protein diet group. The study of Abi Saab *et al,*.(1997) They discovered that 16 Baladi male goats fed with a high protein feed (18%) reached puberty at 22 weeks and 23.8-kilogram live weight, but those goats fed with a low protein feed (12%) reached puberty at 31 weeks and 26.7 kg live weight, which supports the findings of our study. Fourie *et al,* (2004) Aside from the outcomes of the aforementioned investigations, the findings of this study regarding live weight and testicular characteristics differ from the outcomes that other researchers have documented. According to some researchers, as the live weight of the ram lambs increases, the recommended amount of protein in the diet should drop from 18 percent to 12 percent(Andrew and Orskov,1970) and (Miller,1968).

Table 7
Effect quality and quantity of dietary protein in karadi male lambs on testosterone (first period at 1 day)

Treatment Period	T1 Low soybean meal	T2 Low sunflower meal	T3 High soybean meal	T4 High Sunflower meal
First time	1.533 ± 0.156 [a]	0.257 ± 0.118 [b]	0.705 ± 0.583 [ab]	0.146 ± 0.075 [b]
Second time	1.525 ± 0.294 [a]	0.801 ± 0.391 [ab]	0.177 ± 0.087 [b]	0.674 ± 0.538 [ab]
Third time	2.020 ± 0.278 [a]	0.346 ± 0.210 [b]	0.375 ± 0.265 [b]	0.316 ± 0.179 [b]

The different letters Mean significantly different between all treatments (P>0.05), (P>0.01).

Table 8
Effect quality and quantity of dietary protein in karadi male lambs on testosterone (second period at the end of 90 days)

Treatment Period	T1 Low soybean meal	T2 Low sunflower meal	T3 High soybean meal	T4 High Sunflower meal
First time	1.517 ± 0.334 [b]	4.717 ± 0.565 [a]	2.050 ± 1.117 [b]	0.541 ± 0.475 [b]
Second time	0.285 ± 0.132 [a]	3.180 ± 0.847 [a]	3.325 ± 1.331 [a]	3.029 ± 1.584 [a]
Third time	2.337 ± 0.695 [a]	1.643 ± 0.527 [a]	3.804 ± 1.779 [a]	3.965 ± 1.529 [a]

The different letters Mean significantly different between all treatments (P>0.05), (P>0.01).

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