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The Effect of Moringa Oleifera Administration on Productive Performance in Local Awassi Male Lambs

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Abstract

The present study focus of the livestock industry in increased feed efficiency, which can be achieved by feed supplementation because it is high in crude protein and almost free of important secondary compounds, there is evidence that Moringa oleifera improves the quality of sheep products., Moringa oleifera could take the place of maize meal in livestock supplementation plans. Therefore, the purpose of this experiment was to determine how daily administration of Moringa seed extract to lambs affected their weight gain as well as their blood plasma levels of glucose, protein, and urea. Ten awassi male lambs (18.656 kg is the average beginning body weight) were allocated at random into two groups of five lambs. They were accommodated for 21 days before starting, All animals were fed barley grain daily at 2.5% of their body weight per head, The feeding schedule was changed every two weeks based on weight, the first group serving as the control group whereas the second group administered orally, once, daily of 50mg/kg M.oleifera seed extract (MOSE) for twelve weeks with measurements of the parameters taking place every two weeks to determine: Cholesterol, Triglycerides, Glucose, Blood urea, and Body weight measurements will be obtained every two week. The result shows decrease in concentration of blood glucose, cholestrol, Triglyceride and urea while there were significant (P <0.05) increase in body weight in MOSE (A28.40±1.85b) compare with control group (CON) .

Keywords: *Moringa Oleifera, protein, livestock.*

Introduction

The primary objectives of animal nutritionists and microbiologists are to increase feed utilization and productive performance of ruminants through improving animal health and feed utilization as well as by changing the microbial ecosystem and ruminal function consequently numerous research have investigated the potential of various plants to improve the uptake of nutrients and growth efficiency of developing farm animals (Abdelnour et al 2021; Kumar et al,2022; Mohammed et al.,2022; Wu, 2022). It is commonly known that several dietary issues can change the various sheep breeds' meat quality (Badee and Hidaka, 2014; 5 Francisco et al., 2015, Zhang et al, 2022,) . Protein, minerals, and vitamins are abundant in Moringa oleifera, a nutritional and therapeutic tree species (Alsaraf et al., 2016, Shah et al., 2016, Al Masruri et al.,2022; Khudaer et al.2016), consequently has high antioxidant potential (Al-Hussaini and Alsaadawi,2013; Farhan et al.,2021; Stohs and Hartman, 2015;Verma et al., 2009) which is helps to enhance growth performance (Warastomo et al., 2021; Pandey et al., 2022), metabolites in the blood (Akanmu et al., 2020; EL-Hedainy et al., 2020), antibacterial effect (Al-Azzawi ,2018). Since the leaves and pods of the Moringa tree are packed with essential

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nutrients, both humans and animals frequently consume them (Soliva et al., 2005; Babiker et al.,2017, Hassan and Umar ,2004). There is few information on the impact of an aqueous M.oleifera extract on feed effectiveness therefore, the current study set out to investigate the impact of administering the aqueous extract orally at 50mg/kg body weight dose on nutritional consumption and physiological effects in lambs.

Material and Methods

1. The experiment's location and date and Lambs Management.

From January 9, 2022, to April 30, 2022, this research was conducted at the Field– College of Veterinary Medicine/University of Baghdad.All lambs were given ear tags numbers before the trial began. employing ear tags and were kept under veterinary control.continually and monitored by the preventive system to ensure clinical safety. All lambs received all preventive treatments, including a 21-day adaptation period to the farm environment and a subcutaneous (s/c) injection of ivermectin (0.5ml/lamb) to prevent external parasites. To protect them against the effects of internal parasite infection, all lambs received oral doses of the anthelmintic worminex (2ml/lambs), which were repeated after two weeks.

2. plant extraction

Using a pestle and mortar, the kernel of dried seeds was manually dehulled and ground into a powder and all observable damage to the seeds was removed.. Powdered seeds were mixed with distilled water in a ratio of 1 seed (200 mg) per 10 mL of distilled water based on (Alves et al, 2019). The entire mixture was agitated for 60 minutes with a magnetic stirrer at room temperature (25 C), and thereafter filtered using Whatman No. 1 filter paper The Moringa oleifera seed extract (MOSE) was Evaporated by incubation at 37°C. Weekly preparation and storage of the extract at 4 °C for daily usage.

3. lambs, nutrition, and treatment

At the age of nearly 3–4 months, 10 healthy local male Awassi lambs were purchased and animals were housed at the animal field of the University of Baghdad's Veterinary College with an average body weight of 21.6 g, for a preliminary period of three weeks, the animals were given green alfalfa, hay, and tap water. The animals were in good condition and parasite-free on the inside and outside. The study lasts for 12 weeks, and the body weight was taken into consideration. The animals were maintained in cages designed for lamb and kept firmly closed. The animals were divided routinely and evenly into two groups, each of which had five lamb, the first group (G1): daily fed 2.5 % from body weight of concentrated diet /head (Table 1), and kept as control group and adjusted every two weeks depending on the weight while the second group (G2): administered orally with M.oleifera seed powder 50 mg/kg (Mahajan and Mehta 2010) once, daily for twelve weeks . Each day, all the animals will graze together for 3 to 4 hours. They will also have unlimited access to hay and green roughage during the times when they are not grazing, as well as tap water and mineral blocks. Every two weeks, the amount of concentrate diet given to each group will be changed in accordance with their body weight to ensure that the consumption is 2.5% of their body weight.

Table 1: Composition of concentration diet's ingredients:

nutritional ingredients	**%**
Barley	48
Corn	20
Soya bean	10

Wheat bran	20
premix	2
% Total	100

4. Measurements and Parameters

The trial will extend for 12 weeks, with measurements of the parameters taking place every two weeks. Blood was collected from the jugular vein of the lambs on days 0 through 14, 30, 45, 60, 75, and 90 of the growth phase. The blood was centrifuged at 3000 g for 20 minutes to separate the serum, which was then decanted and frozen (at -20 °C) until analysis to determine: Lipid profile (Cholesterol, Triglycerides, Glucose, Blood urea, and Body weight measurements will be obtained every two weeks, and weight increase estimates will be made at the conclusion of the study.

5. Statistical analysis

a result represented by its mean ±SE. SAS was used to do statistical analysis on the data (Statistical Analysis System - version 9.1). The significance of differences between means was determined using one-way ANOVA and the Least Significant Differences (LSD) post hoc test. Statistical significance is defined as (P> 0.05)

Result

1. Growth efficiency

In comparison to the control group, the overall gain in body weight BW (kg) was shown to be considerably (p> 0.05) greater in MOSE as shown in table 2

Table 2: Effect of MOSE on body weight during 60 days .

Treatment / Weeks	**MOSE**	**Control**	**LSD**
Zero time	C18.65±0.91a	B18.71±0.88a	5.57
2 week	C18.36±0.94a	B20.02±1.09a	
4 week	BC21.34±1.54a	B20.94±0.94a	
6 week	BC22.34±1.53a	AB23.26±0.32a	
8 week	AB24.66±1.66a	AB24.63±0.37a	
10 week	AB26.24±1.75b	AB26.44±0.67b	
12 week	A28.40±1.85b	A27.92±0.93b	

2. Aspects of blood's biochemistry

In comparison to MOSE groups, serum glucose was found to be considerably ((P> 0.05)) lower in Moringa oleifera seed extract (MOSE) group compared to control (CON) groups as in table (3), serum cholesterol and triglyceride was greater in CON groups (P> 0.05) followed by MOSE group as shown in table 4 and 5, serum urea N was considerably ((P> 0.05)) higher in CON group in comparison to MOSE group as shown in table 6.

Table 3: Glucose concentrations of awassi lambs administrated 50mg/kg body weight of MOSE orally.

Treatment / Weeks	MOSE	Control	LSD
Zero time	A74.38±1.17a	A74.72±0.74a	2.26
2 week	A75.22±1.02a	A74.26±0.68a	
4 week	B70.28±0.44b	A74.52±0.97a	
6 week	B68.76±0.26d	A73.68±0.94a	
8 week	C63.36±1.19d	A73.26±0.33a	
10 week	CD62.34±1.16d	A72.20±0.50a	
12 week	D59.52±0.32d	A73.64±0.29a	

Table 4: cholesterol concentrations of awassi lambs administrated 50mg/kg body weight of MOSE orally.

Treatment / Weeks	MOSE	Control	LSD
Zero time	A64.38±0.43a	B64.78±0.27a	1.11
2 week	B62.80±0.24b	B64.50±0.30a	
4 week	C59.77±0.21b	B64.30±0.36a	
6 week	D57.68±0.40c	B64.17±0.35a	
8 week	E55.99±0.30c	A66.73±0.31a	
10 week	F53.31±0.55b	A66.78±0.26a	
12 week	G51.63±0.45b	A66.91±0.26a	

Table 5: Triglyceride concentrations of awassi lambs administrated 50mg/kg body weight of MOSE orally.

Treatment / Weeks	MOSE	Control	LSD
Zero time	A48.92±0.42a	A48.83±0.42a	1.18
2 week	B47.34±0.41bc	A48.62±0.42a	
4 week	C44.84±0.50b	A48.39±0.41a	
6 week	D41.71±0.50c	A48.24±0.38a	
8 week	E39.67±0.30c	A48.24±0.30a	
10 week	F37.51±0.34c	A48.97±0.34a	
12 week	G34.32±0.47c	A48.41±0.28a	

Table 6: Urea concentrations of awassi lambs administrated 50mg/kg body weight of MOSE orally.

Treatment / Weeks	MOSE	Control	LSD
Zero time	A43.72±0.68a	AB43.88±1.49a	4.19
2 week	A45.10±0.59a	A45.98±1.67a	
4 week	A44.53±1.40a	AB42.93±1.60a	
6 week	A40.69±1.49a	BC40.04±1.46a	
8 week	B36.41±1.62a	CD38.86±1.37a	
10 week	C31.46±0.99bc	CD37.68±1.10a	
12 week	C28.99±0.64cd	D35.56±0.99a	

Discussion

This study's key conclusion was that administering MOSE gradually had an overall comprehend better effect on lambs' average daily growth and similar to the result of other studies done by (Al-Sherwany and Alkass, 2021; Dawood and AL-Saigh, 2014; Dawood,2014) utilizing different feed additives were similar to the current findings.

Protein and micronutrients that found in M.oleifera , which is a good source of both (Su and Chen,2020). As a new, high-biological-value protein supplement for ruminants, M.oleifera may be able to ease the feeding problem, this could have been caused, at least in part, by altered rumen microbial populations and improved rumen fermentation (Salem and Makkar, 2009). Greater amounts of ruminally degradable protein found in moringa leaves, according to Makkar and Becker (1997), made it good-quality fodder that can increase milk and meat production (Nouman et al.,2014), increased the amount of nitrogen available to rumen microorganisms. Additionally, the presence of readily available carbohydrates in moringa also increased the population of microorganisms and their efficiency in using nutrients, which in turn increased the rate at which the digesta was broken down and increased feed intake. M.oleifera seeds' high protein content suggested that it was possible to use them as a livestock feed supplement (Hassan and Umar, 2004). The digestibility of dry matter, neutral detergent fiber, and organic matter (OM) was enhanced by M.oleifera extract (Damor et al, 2017), The highest levels of digestibility for dry matter (DM), organic matter (OM), crude protein (CP), and nitrogen-free extract (NFE) were attained with Moringa (Fadiyimu et al, 2010) all these factors play arole to improve weight gain in lambs The increase in average daily weight gain and final body weight after administering MOSE orally to lambs is similar to previous research (Allam et al.,2015;Hassan,2015; Kholif et al.2022)

Lambs fed with the M.oleifera diet showed a considerable reduction in serum glucose levels compared to lambs fed other diets this may be due to Moringa's reported ability to lower blood sugar levels (Khan et al.,2022),Therefore, the lower concentration of blood cholesterol in lambs fed the M.oleifera diet may be due to the lower level of serum glucose in those animals. M.oleifera rich in Phenolic compounds (Al-Shammaa, 2014; Al-Juhaimi et al.,2020; Babiker et al.,2016) wherefore the phenolic acid content of moringa is expected to have a functional influence on the lower blood cholesterol values seen in lambs fed a diet high in M.oleifera (Angulo-Bejarano et al.,2014;Kholif et al.,2018) , additionally according to reports, phytochemicals can decrease cholesterol production and absorption (Saxena et al,2013) Furthermore, glucose is one of the main precursors for the liver or small intestine to synthesize cholesterol (Iqbal et al., 2012). As a result, the lower concentration of serum cholesterol in lambs fed a diet containing M.oleifera may be due to the lower level of serum glucose in those animal, furthermore significantly lowering blood triglyceride and cholesterol levels were achieved by using M.oleifera in diets (Abdel-Raheem and Hassan, 2021).

Protein breakdown in the rumen is indicated by the serum urea-N level therefore the balanced energy-to-protein ratio, reduced protein breakdown in the rumen, and higher availability of essential amino acids lead to the urea-N level in the MOSE groups was reduced (Kumar et al., 2020, Wankhede et al.,2022). Oral treatment with Moringa oleifera might slightly alleviate poor productivity and metabolic imbalance (Khalidet al.,2020) and to create delicate and lean lamb meat (Cohen-Zinder et al.,2017)

Conclusion

Moringa, particularly M.oleifera , can thus be utilized economically for animal feeding in dry and semiarid regions where alfalfa farming is challenging owing to water constraint From other perspective oral supplementation with Moringa oleifera can somewhat improve low productivity and metabolic imbalances and tender and lean lamb flesh furthermore enhance ruminal digestion and weight gain.

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