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Effect of Feeding Awassi Lambs after Weaning with Protected Methionine on Productive Performance and Carcass Traits

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ABSTRACT

Protected amino acids especially methionine and lysine are considered one of the most important additives to the feed of high growth or production animals and the response may depend or affected by the balance between the amino acids and energy requirements. Local Awassi lambs (6 to 9 months of age) in the previous studies showed altered responses to the feeding protected protein. The current study aimed to investigate the effect of protected methionine to the feed of lambs after weaning on growth and carcass traits. Ten Awassi lambs were used in this study ages 4 to 5 months and average body weights 22.81±0.48, lambs were divided into two treatments and fed using *ad-libitum* system at two meals daily on control diet in the first treatment or with addition 5 g/lamb/day of protected methionine in the second treatment. Our result was showed that feeding Awassi lambs with protected methionine directly after weaning decreased feed intake, final body weight, total gain as compared with control, but carcass traits such as hot carcass weight, dressing percentage, rib-eye muscle area and subcutaneous fat thickness were not affected.

Key words: Awassi lambs, Carcass traits, Growth, Protected methionine.

Feed additives at the present time represent an important part of the ruminant diet's components for their role in improving feed digestion, utilization and promoting growth, the mechanism of their effect varies depending on the type of additive, but most participate in regulating the rumen environment, reducing methane production and improving the efficiency of energy utilization Al-Jaf and Del, (2019) and Kiran and Deswal, (2020), protected amino acids are considered one of the most important food additives for ruminants and the response to amino acid supplement depends on the balance between the amino acids intake and requirements for production and the physiological state of the animal Rathwa *et al*. (2022). Methionine and lysine consider the most important protected amino acids that supplement ruminants diets and may replace by protected proteins when it is unavailable or expensive sources to compensate for the needs of amino acids (Stover *et al.,* 2017). The use of protected amino acids in feeding animals in Iraq is restricted due to the dependence of breeders in feeding on locally available sources of feed, especially grains and its byproducts. results of many studies that have been conducted using protected proteins in ruminants nutrition gave good response in milk production or its components and lambs growth (Kasim *et al*., 2019 and Dey *et al.,* 2020). We hypothesized this study to investigate the effect of adding the protected amino acids methionine and lysine on the productive performance of Awassi lambs.

Ten Awassi lambs ages were 4 to 5 months and average body weights 22.81±0.48 were used in this study, lambs were housed in the Barn of the College of Agriculture and Forestry, University of Mosul- Iraq, from the period 15/7/2019 to 15/10/2019, lambs were allocated into two treatments, the first was fed on control diet and the second fed with additive 5 g/lamb/day of protected methionine (MetaSmart, Manufactured by Kemin Company, Poland), lambs in both treatments were fed ad-libitum two times daily on the basal diet consist mainly of barley grain, wheat bran and soybean meal (Table 1), first meal was given at 8:00 am while the second meal was given at 4:00 pm and the daily feed intake was recorded lambs were supplied with fresh water and mineral salt blocks along the period of study, chemical composition of basal diet was measured laboratory as described by (AOAC, 2000), with exception energy value was calculated according (Alkhawaja *et al.,*1978). At the last day of the study lambs were fasted for 18 hours and slaughtered, weights of hot carcass, edible parts and carcass fats were recorded, Carcasses were split into two parts, eye-muscle area and subcutaneous fat were measured from the left side of the carcass between the ribs 12th and13th according to (Maddock *et al.,* 2013). Statistical analysis of data was done by computer using complete randomized design CRD with general linear model (Anonymous, 2001) and the significance of differences between means was determined by Duncan Multiple Test (1955).

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Animal growth and feed intake

The results in (Table 2) were indicated that feeding lambs with additive protective methionine significantly lower (P≤0.05) final body weight 37.68 kg as compared control 40.25 kg, this was reflection of the decrease in the daily and total gain 0.165 kg/day and 14.93 kg as compared control 0.203 kg/day and 17.37 kg. the reduction in feed intake in additive treatment 0.860 kg/day may be the cause of the decrease in body weight. However, it is noted that feed efficiency was increased by 12.23% in lambs fed with protected methionine 5.184 kg feed/kg gain as compared control 5.818 feed/kg gain, we suggest that the decrease in feed consumption was the reason for the improvement in feed efficiency, Tayeb (2008) demonstrates that 20% restriction of feed intake lowers weight gain but enhances feed efficiency due to increase digestibility. Several studies showed that protected methionine did not affect in weight gain or feed efficiency Ren Ao *et al.* (2019); Niroumand *et al.* (2020); Li *et al.* (2020) and Chen *et al.* (2021).

Carcass traits

Data of carcass traits are present in (Table 3). The differences were not reach to significant in hot carcass weight 19.58 and 18.73 kg, dressing percentage 48.61 and 48.15%, rib-eye muscle area 16.34 and 16.02 cm^2, fat thickness tend to decrease but not significantly in protected methionine treatment 0.81 cm as compared control 1.01 cm. Fat tail decrease (p<0.05) to 2.04 kg in protected methionine treatment than control 3.39 kg, conversely kidney fat was higher in protected methionine treatment 0.079 kg than control treatment 0.066 kg while mesenteric fat was nearest in the two treatments 0.409 and 0.431 kg respectively, likewise no significant differences were noted in the non-carcass component. Our result was agreement with data of Obiedat *et al.* (2008); Wang *et al.* (2018) and Chen *et al.* (2021) they report that feeding with protected methionine did not affect in carcass characteristics with a decrease in fat tail in lambs, in contrast with Li *et al.* (2020) indicated that feeding with rumen protected methionine led to significant increase in carcass fat.

Table 1: Ingredients and chemical composition of basal diet.

Feed stuffs	Percentage
Ground barley grain	70
Wheat bran	18
Soybean meal	7
Wheat straw	3.5
Urea	0.5
Sodium chloride and limestone	1
Chemical analysis % of dry matter	
Dry matter	91.36
Organic matter	90.70
Crud protein	14.39
Ether extract	2.32
Crud fiber	7.96
Metabolizable energy MJ/kg	10.46

Table 2: Effect of protected methionine on growth and feed efficiency.

Traits	Control	Protected methionine
Initial weight kg	22.87±0.89	22.75±0.52
Final weight kg	40.25±0.87^a	37.68±0.74^b
Daily gain kg/day	0.203±0.01^a	0.165±0.01^b
Total gain kg	17.37±0.89^a	14.93±0.41^b
Feed intake kg/day	1.123	0.860
Feed intake per kg of gain	5.818	5.184

Values in the same raw with different superscripts differ (p<0.05).

Table 3: Effect of protected methionine on carcass measurements.

Traits	Control	Protected methionine
Hot carcass weight kg.	19.58±0.78	18.73±0.73
Dressing yield % BW.	48.61±1.54	48.15±1.22
Rib-eye muscle area cm^2.	16.34±0.71	16.02±0.58
Subcutaneous fat thickness cm.	1.01±0.11	0.81±0.14
Tail fat kg.	3.39±0.25^a	2.04±0.05^b
Mesenteric fat kg.	0.409±0.01	0.431±0.03
Kidney fat kg.	0.066±0.00^b	0.079±0.00^a
Non carcass components		
Liver weight kg.	0.65±0.02	0.68±0.05
Spleen weight kg.	0.061±0.00	0.060±0.00
Kidney weight kg.	0.111±0.01	0.12±0.01
Heart weight kg.	0.132±0.00	0.141±0.01
Lungs and trachea weight kg.	0.462±0.03	0.445±0.02
Testis weight kg.	0.209±0.03	0.220±0.03

Values in the same raw with different superscripts differ (p<0.05).

CONCLUSION

The present study indicates that supplementation Awassi lambs with protected methionine directly after weaning may led to reduce feed intake for an unclear reason, but in general, it has a positive effect in reducing body fat deposition and producing more quality carcasses. There is a need to conduct other studies to clarify the effect of protected methionine on fat deposition and production performance at higher weights at slaughter and at older ages.

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