



Effect of Feeding Green and Concentrates Fodders on Arabi Lamb's Performance

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Abstract: The present study was conducted at University of Basrah during August 10 to November 23, 2020. A total of 20 Arabi lambs aged 4-5 months and weighted 24-27 kg were randomly and equally distributed on five nutritional groups. The lambs of the first group were fed 100% green fodder (alfalfa + sorghum) and an *ad libitum* straw, the second 75% green fodder with 25% concentrated fodder, the third 50% green fodder with 50% concentrated fodder, the fourth 25% green fodder with 75% of concentrated fodder, while the fifth (control group) was fed 100% concentrated feed with *ad libitum* hay. The ration was fed twice a day (in the morning and afternoon). The water was freely provided. Lambs were fed various diets for 21 days to acclimatize. After acclimatization, body weights were measured every 15 days after the initial weight. Growth rate, feed intake and feed conversion ratio were taken throughout the study period. Samples of rumen content were withdrawn at the end of the study to estimate pH, total bacterial count and cellulolytic bacteria. Body weight at the different stages of the study was affected by the type of diet, as the lambs of second, third and fourth treatments obtained the highest daily weight gain rate and the highest overall weight gain (14.38, 10.67, 12.86 kg respectively). These groups also exhibited a significant superiority in the amount of daily feed intake (1036, 942, and 957 g/day respectively) and the best feed conversion ratio (7.756, 9.00, 8,086 kg) at the end of the experiment.

Keywords: Arabi lambs, Alfalfa, Sorghum, Concentrate feed, Weight, Feed consumption

Livestock occupy an important and essential role in the national economy of any country and a basic support in achieving food security. The development of livestock is required to meet the growing need on animal production to provide balanced food for people and improve the economic condition. Therefore, it has become necessary to focus on its development in order to improve livestock and attention must be paid on improving animal feed, since feeding costs occupy the largest part in the costs of animal feeding as they occupy 65-70% of total costs (Lazim et al 2012). As a result of the scarcity of forage crops and the increase in demand for them by producers due to the decrease the areas of lands cultivated with fodder crops, climatic fluctuations and scarcity of rain and all have led the increase in their prices of fodder crops in meeting the needs of animals' nutrition. These fodder crops are used as green fodder or hay, or they are made in the form of hay or silage. Roughage fodder contains a high levels of slow digesting materials (exceeds 18%) and is divided into two parts, the green fodder that contain 75% of moisture and the second is the dry fodder that contain 10-15% of moisture (Nefzaoui and Termanini 2013). Several studies were conducted regarding roughage fodder (green and dry). Naik et al (2014) observed high performance of lambs supplemented with green fodder was due to the ability of green fodder to provide the nutrients necessary for growth, and it is also rich source of bioactive enzymes that improve

the performance of livestock. Ata (2016) also found a significant superiority for fed based on green barley and concentrated fodder (38: 62) over the group that fed 100% concentrate in the average amount of feed intake daily. These differences attributed to the type and the quality of in the feed intake. Hegab and Mohmoud (2019) showed that one of the most important determinants of feeding roughages is both ADF and NDF was a significant correlation between ADF and NDF content with each of the protein, ether extract, nitrogen-free extract and cellulose digestion rates. In view of the scarcity of studies in the field of feeding lambs on feed mixtures (concentrate and green fodder) and their effect on the parameters of maintenance and production, study was carried out to determine benefits on this type of feeding in southern Iraq.

MATERIAL AND METHODS

The experiment was conducted during August 10 to November 23 (105 days) at University of Basrah. The of 3-4 months old 20 Arabi male lambs with an average weight of 26±3 kg were used. T1, T2, T3, T4, and T5 were used to classify the lambs into five feeding groups, each with four lambs. Lambs of the first group were fed 100% green fodder (alfalfa + sorghum), the second 75% green fodder (alfalfa + white corn) with 25% concentrated fodder and the third 50% green fodder (alfalfa + sorghum) with 50% concentrated

fodder and the fourth 25% fodder Green (alfalfa + sorghum) with 75% concentrated feed, while the fifth (control group) implemented 100% concentrated feed with free straw. The lambs were left for 15 days for adaptation. They were weighed every 15 days since the start of the study. The feed is introduced twice a day, one at 8:00 a.m. and the other at 4:00 p.m. in addition to free access to the water. All lambs were routinely vet checked and vaccination programs chemical components of concentrate diet, sorghum and alfalfa (Table 1). Daily growth rate was calculated.

RESULTS AND DISCUSSION

Body weight and total weight gain: The diet had a substantial impact on body weight after 60, 90, and 105 days of the study (Table 2). After 60 days, the weight of the lambs in the second treatment (33.1 kg) exceeded the weights of the lambs in the first and fifth treatments (27.23, 29.62kg respectively). At 90 days and 105 days, the lambs in the second feeding group retained their superiority in body weight at 90 days (37.63 kg) and at final weight (40.38 kg). However,

first and fifth group recorded the low weight at 90 days (30.18 and 30.66 kg, respectively) and final weight (32.20 and 32.74 kg, respectively). These results indicate that the diets with the ideal nutrients proportions that cover the needs of the lambs have shown significantly heavier weights. The rations made of different proportions of the concentrated ration and the green fodder cover the nutrient needs of the lambs improve the rumen environment in addition to maintaining the health of the lambs (Wang et al 2005). Heagab and Mohmoud (2019) observed that green fodder plays a positive role in increasing total digestive nutrients (TDN). The feeding lambs a mix of green fodder and concentrated feed at a ratio of 65:35 has a major role in preventing acidosis, low digestibility and improve total lambs' performance. Feeding green fodder with concentrate feed resulted in a significant superiority of the mean daily weight gain of lambs in the second, third, and fourth feeding groups (159.78, 118.55, 142.89 gm/day) as compared to the first (green fodder only, 78.56 g/day) and fifth (concentrated feed only, 92.89 g/day) (Table 2). The increase may be due to the role of green fodder, which worked with the concentrated feed to supply the lambs with all their nutritional needs. These findings agree with those of Haddad and Ata (2009), Papi et al (2011) and Liu et al (2019) where combining green and concentrated fodder in various proportions increased digestible energy, protein percentage in the diet and nutrient intake, all of which had a positive impact on growth and efficiency. Furthermore, feeding green and concentrated fodder to lambs resulted in a substantial superiority in total weight gain rate for lambs in the second, third, and fourth classes, with the highest total growth rate of 14.38 and 12.86 kg, respectively, while the first and fifth groups had the lowest total growth rate of 7.07 and 8.36 kg, respectively. The existence of green fodder with the

Table 1. Chemical analysis of the concentrate and green fodder

Item	Concentrate	Sorghum	Alfalfa
Moisture	10.35	8.0	5.7
Dry matter	89.65	64.7	62.3
Crude protein	14.52	12.9	18.8
Crude fiber	16.89	13.4	15.3
Ether extract	1.82	3.7	2.4
Ash	10.35	3.0	2.2
ADF	27.19	42.7	48.6
NDF	18.21	75.7	68.3

Table 2. Lambs body weight (Kg), daily growth rate (g/day) and total growth rate (Kg)

Traits	Treatments					RLSD
	T1	T2	T3	T4	T5	
Initial weight	27.13 ±1.52	24.00 ±2.76	26.13 ±2.17	24.90 ±1.72	24.38 ±2.49	NS
Weight at 30 days	27.50 ±1.42	30.53 ±1.74	29.86 ±1.14	30.15 ±1.56	26.15 ±1.49	NS
Weight at 60 days	29.63c ±1.44	33.18a ±1.08	32.59ab ±1.77	31.39ab ±1.18	27.23c ±1.98	3.15
Weight at 90 days	30.10b ±1.38	37.63a ±1.32	35.85a ±1.72	35.49a ±1.30	30.66b ±1.92	4.87
Final weight (105 day)	32.20b ±1.62	40.38a ±1.99	36.80a ±1.66	37.46a 1.38	32.74b ±1.99	3.98
Daily growth rate	78.56c ±10.28	159.78a ±12.13	118.55b ±9.36	142.89a ±12.10	92.89c ±9.33	20.34
Total growth rate	7.07c ±0.80	14.38a ±1.12	10.67b ±1.06	12.86ab ±1.11	8.36c ±0.98	3.10

Means with different letters within each row differ significantly at 0.05 level, T1= green fodder, T2=75% green fodder: 25 concentrate, T3=50% green Fodder: 50% concentrate, T4=75% green Fodder: 25% concentrate, RLSD= Revised Least Significant Differences, NS=not significant

Table 3. Feed consumption of lambs of different treatments

Traits	Treatments				
	T1	T2	T3	T4	T5
Feed consumption at 30 days (gm)	825	946	925	905	785
Feed consumption at 60 days (gm)	796	1025	1000	942	817
Feed consumption at 90 days (gm)	828	1159	1106	1065	920
Feed consumption at 105 days (gm)	878	1241	864	1124	982
Mean feed consumption (gm)	815	1036	942	957	847
Green fodder consumption (kg)	4.25	3.89	2.36	1.20	0
Concentrate consumption (gm)	0	288	523	798	941

See table 2 for details

Table 4. Feed conversion efficiency (FCR, kg feed/ kg weight gain) of lambs fed different level of concentrate and green fodder

Traits	Treatments				
	T1	T2	T3	T4	T5
FCR at 30 days	5.22	3.52	3.73	2.59	6.65
FCR at 60 days	7.96	4.29	4.65	4.36	8.60
FCR at 90 days	12.29	7.43	8.51	7.71	10.95
FCR at 105 days	11.17	7.76	9.00	8.09	10.56
Mean FCR	10.37	6.48	7.94	6.70	9.11

See table 2 for details

concentrate contributes to an increase in rumen microbial activity, which is reflected in improved nutrient digestion. This finding agreed with Tudor et al (2003). by Liu et al (2019), Wang (2015), and Haddadd and Ata (2019) where green fodder in the diet has an important role in the growth of lambs and increasing their total weight due to the nutritional value it possesses (protein, vitamins, fiber and fats).

Feed intake: The largest amount of feed was consumed by the lambs of T2 (1036 g/ day) (Table 3). The lowest quantity consumed was by the lambs of T1 and T5 (815 and 847 g/ day respectively). The difference may be attributed to the variety of the feed offered and the sufficient ratio of green to concentrated, which made it more palatable, resulting in increased consumption. Ata (2016) found significant superiority for the group fed green barley and concentrated fodder (38: 62) over the group fed 100% concentrate in the average amount of feed intake daily. These differences are attributed to the type and the quality of in the feed intake. Noaman and Shujaa (2012) on the other hand, find no effect of a 60 % concentrate and 40 % roughage diet or a 40 % concentrate to 60 % roughage diet on Awassi lamb feed intake.

Feed conversion ratio: After 60, 90, 105 days there was significant improvement in the feed conversion ratio of lambs in the T2. T1 (green fodder only) and T5 (concentrate only)

had the lowest feed conversion efficiency at 30, 60, 90, 105 days. Lambs of T3 and T4 recorded nearly similar feed conversion ratio through different times of the study. The decomposition of carbohydrates presents in various fodder (green legumes, grass, and concentrate fodder), which is accessible to the rumen microorganisms, might be the reason behind the improvement in nutrient conversion efficiency of lambs of T2, T3, and T4, compared to lambs consumed either green or concentrate feed alone. Liu et al (2019) observed the significant superiority of the feed conversion efficiency of lambs fed a diet consisting of 55% or 40% concentrate feed compared with the those fed 100%, 85% green fodder due to the high digestible energy and protein content in the diet, which leads to increase the nutrients intake and the speed of digestion, and this reflected positively on the efficiency of feed conversion ratio. Papi et al (2011), Rong et al (2014), (Al-dbisi 2019) and Al-Fahdawi (2020) also recorded higher the percentage of concentrate feed in the diet, the lower the efficiency of the feed conversion.

CONCLUSION

The addition of green fodder with concentrate e 25-75% improved lamb performance and mixed feed is better than the use of either green fodder or concentrate alone. The best

proportion of green fodder would be 75% to replace concentrate with good and cheap feed.

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