Journal of Biology, Agriculture and Healthcare
ISSN 2224-3208 (Paper) ISSN 2225-093X (Online)
Vol.4, No.11, 2014

Fattening and Some Carcass Characteristics of Karadi Lambs Raised on Concentrate or Pasture

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Abstract
Fourteen weaned Karadi lambs (4-5 months old) and weighing 26.5±0.33 Kg were used to evaluate the effect of feeding on concentrate or on pasture with free access to barley on fattening and some carcass characteristics. Lambs were slaughtered when each individual lamb reached its designated body weight (35 kg). Significantly ($p<0.05$) average daily gain in weight was higher in the lambs maintained on concentrate (140.11±10.48) compared to those fed on pasture and supplemented with barely (88.23±13.20). There was no significant differences between the two groups for dressing percentage, all cuts of the carcass and edible and non edible organs, while lambs fed on concentrate exhibited thicker fat over L. dorsi muscle and had greater rib eye area compared to lambs kept on pasture and supplemented with barely.

Introduction

Sheep are the major farm animals in Iraq, and the greatest portion of income comes from the sale of lambs and mutton (Juma & Alkass, 2000). The traditional pattern of fattening lambs in the country depends primarily on grazing natural pastures and cereal stubble. Also, occasionally feeders depend on barely and straw in feeding lots, for a period of 3-4 months.

It was found that weight gain is higher in lambs grazing diet which was supplemented with concentrates and is more economical than intensive fattening based on concentrate only (Warner and Sharrow, 1984). Therefore, the objective of this study was to determine the influence of different fattening methods on slaughter and some carcass traits of Karadi lambs.

Materials and Methods

The experiment was carried out at the Animal Production Farm, Faculty of Agriculture and Forestry, University of Duhok. Fourteen karadi lambs, 4-5 month-old and weighing 26.5±0.33 kg were randomly allotted to two feeding systems. Animals in the first group were kept indoors with free access to concentrate contained 14.1 % CP and 2718 Kcal ME/kg dry matter (Table 1). Feed was offered at 8:00 am and 4:00 pm. Animals in the second group were grazed for 8 hrs a day and had a free access to barley. Lambs were weighed at weekly intervals.

Animals were slaughtered when each individual lamb reached its designated slaughter body weight (35 kg). Feed was withheld overnight with free access of water and animals were weighed and slaughtered according to muslim way.

The dressed carcass comprised the body after removing the skin, head, fore feet, hind feet and the visceral. Kidney and pelvic fat were retained in the carcass, hot carcass weight and weight of head, skin, and visceral organs includes heart, liver, lungs with trachea and spleen were recorded. The gastrointestinal tract was weighed, emptied, washed and reweighed to facilitate calculation of empty body weight by subtracting the weight of the gut content from the slaughter weight, omental, mesenteric and cardiac fat was separated immediately after slaughter and weighed. After chilling the carcass at 2-4ºC for 24hrs, cold carcass was weighed, and then kidney, pelvic and channel fat was removed and weighed separately. The carcass was split along the vertebral column into left and right halves using an electric saw. The right half was separated into eight whole sale cuts (leg, loin, rack, shoulder, fore shank, neck, breast and flank). The area of longissimus dorsi muscle at the 12^{th} was determined by tracing the muscle on semi transparent waxed paper, and the area was measured by a placom digital planometer KP-92N. Fat thickness over the midpoint of L-dorsi muscle perpendicularly was recorded by using Caliper device.

The data obtained was analyzed by using the GLM (General Linear Model) within SAS (2001) program as in the following model:

$Yij = \mu + Ti + eij$

Where:

Yij = Observational value of jth animal.

μ = Overall mean

Ti = Effect of treatment

Eij = Experimental error assumed to be NID with (0, $\sigma 2$ e).

Table (1): Ingredients and chemical composition of experimental diet:

Ingredient	(%)	Chemical Composition*		
			Concentrate group	Barley/ pasture group
Barley	60	DM	93.22	95.51
Wheat Bran	15	Crude Protein	14.11	12.30
Barley Straw	10	Starch	41.0	44.91
Corn	13.5	Crude fiber	12.60	6.26
Salt	0.5	Ether Extract	2.85	2.33
Limestone	0.5	Ash	5.92	4.04
Vitamin	0.5	Energy (ME) Mcal/kg	2718	2931

* Spectrometer. Mpa (Seria number 1510) opus version 65Buid:6,5.97 VANO group laboratory Erbil/ Iraq.

RESULTS AND DISCUSSION

Growth performance

The findings related to growth performance (initial and final weights, fattening period, average daily gain and feed conversion rate of karadi lambs maintained under two different feeding regimes are given in Table (2). Result revealed that average daily gain in weight was significantly ($P<0.05$) higher in the lambs maintained on concentrate (140.11gm) compared to those fed on pasture and supplemented with barely (88.23gm). The average daily gain obtained in this trail is lower than the values of Alkass et al. (1987) and Sefeedin & Alkass (2009) who observed an average daily gain of 0.184 and 0.250 g, respectively. The lower gain in the present work might be due to genetic variation as well as the experiment was conducted at summer season. Similarly, it was found that the average daily gain was significantly higher in concentrate supplemented lambs in comparison to solely grazed lambs (Malisetty & Yerradoddi, 2013) or grazed animals supplemented with barely (AL- Doori, 2006). The period required to attain lambs their prescribed slaughter weight (35kg) is significantly ($P<0.01$) shorter (69.25± 5.79 day) for lambs fed on concentrate compared to those raised on pasture (102.28±7.29days).

In the present study, pasture lambs consumed less barely (0.78kg/day) compared to lambs fed on concentrate (1.25kg/day). This could be due to low appetence to barely in relation to grass. As reported previously it is recognized that barely may enhance the digestion of forage matter and in turn stimulate intake (Mann and Orskov; 1975; Orskov and Fraser, 1975). Moreover, the total feed intake required to produce one kilogram live weight gain by lambs raised on concentrate or on pasture supplemented with barely was 9.26 and 7.38kg/kg, respectively (Table 2). However, the difference between them was not significant.

Table (2): Growth performance of Karadi lambs fed on concentrate or raised on pasture supplemented with barely.

Parameters	Concentrate	Pasture
Initial wt. (kg)	25.48±1.02 [a]	26.50±1.33 [a]
Final wt. (kg)	35.27±0.24 [a]	35.45±0.88 [a]
Average D G (g)	140.11±10.48 [a]	88.23±13.20 [b]
Daily Feed intake (kg)	1.25±0.05 [a]	0.78±0.02 [b]
Feed efficiency	9.26±0.75 [a]	7.38±1.09 [a]
No. of days	69.28±5.79[b]	102.28±7.29 [a]

Means bearing different denote significant differences ($P<0.05$).

Carcass characteristics

Carcass characteristics are given in Table (3). Dressing percentages are almost the same ($P<0.05$) for lambs fed on concentrate or raised on pasture and supplemented with barely either based on slaughter weight (44.38 vs.44.00%) or empty body weight (54.34 vs. 55.46%). However, the non significant differences could be due to that both treated groups are slaughtered at a similar live body weight (35kg). Although lambs fed on concentrate exhibited thicker fat over L. dorsi muscle (0.37 vs.0.26 mm) and had greater rib eye area (12.00 vs.b11.34 cm^2) compared to lambs kept on pasture and supplemented with barely; however, the difference between them lacked significance (Table 3). Also, Tatum et al. (1989) indicated that lambs fed in a feed lot produced fatter carcasses than lambs fed limited or no grain. Similarly, Au Rousseau and Vigneron (1985) reported that lambs fattened at pasture generally displayed less fatness than dry lot lambs, due to the metabolic modifications that occur in lambs with exercise.

Table (3): Carcass characteristics of Karadi lambs fed on concentrate or raised on pasture supplemented with barely.

Traits	Concentrate	Pasture
Slaughter weight (kg)	35.27±0.63 [a]	35.45±0.88 [a]
Carcass weight (Kg)	15.66±0.31 [a]	15.57±0.37 [a]
Empty body weight (kg)	28.58±0.56 [a]	28.30±0.67 [a]
Dressing percentage 1	44.38±0.66 [a]	44.00±1.04 [a]
Dressing percentage 2	54.34±0.85 [a]	55.46±0.85 [a]
Fat thickness (mm)	0.37±0.13 [a]	0.26±0.02 [a]
Rib eye area (cm²)	12.00±0.50 [a]	11.34±0.41 [a]

Means bearing different denote significant differences (P<0.05).

With the exception of fore shank, there was no differences between the two groups in terms of all cuts of the carcass (Table 4). This result is expected since the two groups are slaughtered at a same weight (35kg). Similarly, Sari et al. (2012) noticed no differences in whole sale cuts among the groups kept on pasture or raised on pasture and supplemented with 200g concentrate.

Table (4): Commercial cuts of the carcass of Karadi lambs fed on concentrate or raised on pasture supplemented with barely.

Traits	Concentrate	Pasture
Leg	25.01±0.88[a]	25.08±0.47[a]
Shoulder	14.64±0.38[a]	13.88±0.32[a]
Breast	6.76±0.37[a]	6.91±0.17[a]
Flank	5.09±0.13[a]	4.30±0.34[a]
Fore shank	4.80±0.16[b]	5.47±0.19[a]
Neck	7.64±1.07[a]	9.17±0.91[a]
Fat tail	23.54±1.26[a]	22.89±1.59[a]
Loin	6.40±0.24[a]	6.63±0.28[a]
Rack	6.07±0.44[a]	5.61±0.24[a]

Means bearing different denote significant differences (P<0.05).

Edible and non edible organs

Edible and non edible organs expressed as a proportion of empty body weights are given in Table (5). Differences between the two groups of all traits lacked significance (P<0.05). The proportions of various visceral organs reported in the present study was similar to those reported earlier for Awassi lambs (Rashid et al., 1987).

Table (5): Edible and non- edible offal's of Karadi lambs fed on concentrate or raised on pasture supplemented with barely.

Traits	Concentrate	Pasture
Skin	15.24±0.54[a]	14.27±0.69[a]
Feet	2.81±0.06[a]	2.82±0.09[a]
Head	7.03±0.40[a]	6.78±0.11[a]
Heart	0.55±0.06[a]	0.51±0.04[a]
Lung	1.57±0.11[a]	1.61±0.08[a]
Liver	2.49±0.11[a]	2.57±0.14[a]
Testes	0.33±0.03[a]	0.40±0.04[a]
Spleen	0.37±0.03[a]	0.37±0.02[a]
Kidney	0.34±0.009[a]	0.33±0.006[a]

Means bearing different denote significant differences (P<0.05).

Conclusion

It can be concluded that lambs fed concentrate had higher growth rate and required shorter period to reach the designated slaughter weight than lambs raised on pasture supplemented with barley. However, no differences exist in terms of carcass weight.

Acknowledgment: *The authors would like to thank Prof. Dr. Jalal E. AlKass, Department of Animal Production for his valuable help in reading the manuscript.*

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