RESEARCH OPINIONS IN ANIMAL & VETERINARY SCIENCES
ISSN 2221-1896
www.roavs.com

Assessment of meat quality of local lamb breeds in Tunisia

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Abstract

In Tunisia, the marketing of lamb is in the majority of farmers after weaning at relatively low weight. Thus, it was deemed necessary to conduct a test of fattening lambs Tunisian landraces (Barbarine (BGQ), fine Tail from the west (QFO) Black Thibar (NT) and Sicilo-Sarde (SS) after weaning to evaluate their growth performance and determine the quality of carcasses and meat. To do so, four uniform lots of lambs (age and weight) were conducted simultaneously in two months and fed with oat hay *ad libitum* supplemented with 300g of concentrate/day/lamb. It was clear from this work that the lambs of the breed Black Thibar had better daily growth (87.5g vs. 64.2; 66.3, 72.6 respectively for the QFO, BGQ and SS), feed efficiency (5.94). The quality of meat (6.89% fat) and pieces of the first category (leg, the net and found the square (53.43%). To enjoy optimum production of red meat, it is strongly recommended that fattened lambs after weaning with diets tailored to the farming area where profitability is better and food is available.

Keywords: Carcass, Fattening, Growth, Lamb, Local Breeds, Meat

Introduction

The red meat industry is very diverse and plays an important role in the Tunisian agricultural and food sector (Belhaj, 1998). The productivity of this sector is still insufficient in the face of increasing demand. The reduction of grassland caused by the transformation of production systems and its submission to climatic accentuates the deficit of fodder. Meat sheep are a major economic challenge since their production, consumption and trade they generate affects the lives of various socio-professional categories (Hamrouni et al., 1995). For this, the fattening of lamb's remains a source of income you wants (Bozzolo et al., 1993). It is within this context that we conducted this experiment to compare the suitability for sheep fattening lambs of meat breeds of local breeds (BGQ, NT and QFO) lambs and dairy SS while seeking the race best suited to this type of farming perspective growth and meat quality.

Materials and Methods

To conduct the test, twenty-eight lambs Barbarine, fine tail from the west, black Thibar and Sicilo-Sarde divided into four lots of seven (7) subjects each, homogeneous according to weight (14.44 ± 2.62 kg, 14.6 ± 2.66 kg, 14.78 ± 2.78 kg, 14.31 ± 3.39 kg) and age (118 ± 7.38 days; 105 ± 19.13 days , 119 ± 8.01days and 125 ± 21.36 days) were used.

Lambs of the four lots were fed a common core consisting of oat hay at will except for the last two weeks because of lack of available hay on the farm was distributed to wheat straw. They were supplemented with concentrate 300g/lamb/dayay. The water was distributed at will. The chemical composition of foods is given in Table 1.
Energy values of food and protein expressed in UFL/kg DM and PDIE, PDIN g/kg DM were derived by applying the formula Sauvant (1981).

UFL / kg DM = (1.218 (100 - water - MM) + 0.11 CP - 1.81 CB + 1.26 FAT) / 100
PDIE = 5.14 CP - (4.8 * CP* 0.4) - 0.8 CB + 68.8 OM/100
PDIN = 7.44 CP - (2 * CP * 0.4) + 1.2 OM/100

The lambs wee housed in pens with an area 5.07 m2 (0.83 m^2/lamb) belonging to the farm at the School of Higher Education in Agriculture in Mateur equipped with racks for coarse food and feeders for the concentrated feed, with a seat at the table of 0.21 m.

Voluntarily ingested quantities of dry hay were determined each day by the difference between the amount distributed and one denied. The lambs were weighed on an empty stomach once a week to monitor weight and to determine average daily gain (GMQ) and feed efficiency which is the ratio between the amount of food ingested and the gain weight.

Table 1: Chemical composition of aliments (% DM) and nutritive values of foods

	Oat hay	Straw	Concentrate
DM (%)	85.45	92.86	90
CP	6.4	5.2	16.2
OM	89.6	92.5	91.4
CB	39.4	38.6	6
UFL /kg DM	0.54	0.56	0.91
PDIE (g/kg DM)	53	54.5	56
PDIN (g/kg DM)	44.3	36	79

After the feeding period and to study the quality of carcasses, two lambs at random from each lot were slaughtered, bled and skinned. The elements of the fifth quarter (head, skin, feet and offal) were weighed. The rumen and intestines were weighed full and empty in order to determine the empty body weight (PVV). The carcasses were weighed hot (PCC) and after 36 hours, placed in a cold room at a temperature of 10° C to calculate the rate of soil drainage and make the appropriate measurements (Flamant and Gabina., 1986).

Cold carcasses were then each divided into two half-carcasses symmetrical, the left was cut into seven anatomical regions, weighed one by one. For the analysis of meat, triceps brachii Capus longum shoulder was subjected to a complete analysis for the determination of dry matter (DM), mineral matter (MM), lipid (FAT), dosage collagen and pigment, and the determination of protein content.

Statistical Analysis

The race effect on growth performance and ability worm is subjected to analysis of variance. Means were compared by a Student test (T) (SAS, 1989):

$Y = \mu + R + ei, j$

Where Y: Measured parameter

μ: overall mean

R: effect race, i = 1, 2, 3 and 4

$e_{i,j}$: residual error

Results and Discussion

The evolution of weekly intake of dry matter (g/kg) according to race is represented in Figure 1. It emerges that the amounts of dry matter of the basal diet ingested by lambs of different breeds are comparable over the first three weeks. From the 4th week, increased intake was noticed in lambs Black Thibar with an average of 378g, the difference between these and the other lots is much clearer during the last week experimental, which was found 0.64 kg DM ingested by lambs NT per day per head, against 0.48, 0.45 and 0.44 kg DM / day / head respectively QFO breeds, BGQ and SS.

Statistical analysis reveals that the average amounts of dry matter voluntarily ingested by lambs Black Thibar were significantly higher ($P<0.05$) than other breeds. This result is consistent with that of Atti and Haj Taieb (1989) who worked on local breeds of lambs, fattened at the trough and reported that lambs Black Thibar ingest more than others.

Figure 2 shows that no difference in weight between lambs of different breeds with a slight superiority for Lambs (NT) have reached a weight of 24.67 kg at the end of the experiment cons 23.7; 22.12 and 23.25 kg respectively for lambs QFO, BGQ and SS showed a weight gain similar to that of beef breeds.

Quotidient the average gain (GMQ) ranges from 49.52, 58.57, 35.71 and 85.71 g /day and a maximum of 122.85, 111.42, 146.19 and 148.57 g /day respectively for lambs QFO, BGQ, SS and NT. The comparison of averages showed that there was no significant difference ($P>0.05$) between different breeds with superior observed in lambs (NT) (87.5 g/day). This trend can be explained by the significant growth rate of

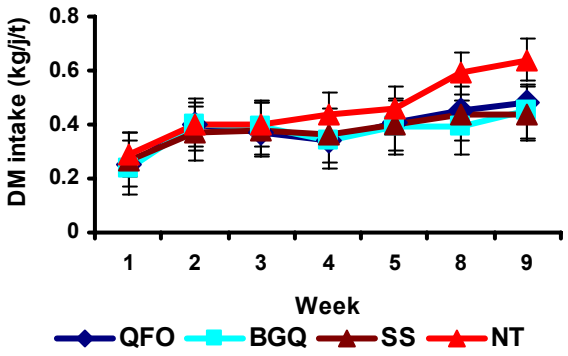

Fig. 1: Evolution of the ingestion of dry matter (kg / kg) based on race

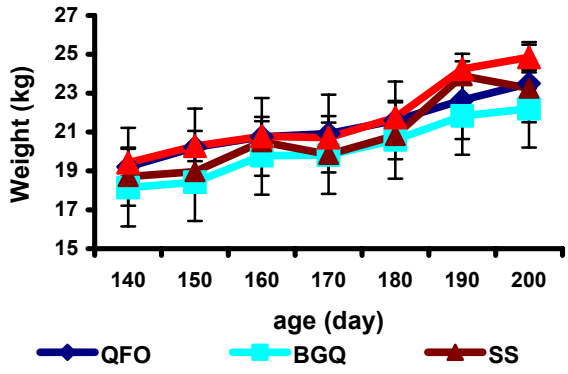

Fig. 2: Evolution of average live weight (kg) depending on the breed

the Quotidient the average gain (GMQ) ranges from 49.52, 58.57, 35.71 and 85.71 g / d and a maximum of 122.85, 111.42, 146.19 and 148.57 g/dayay respectively for lambs QFO, BGQ, SS and NT. The comparison of averages showed that there was no significant difference (P> 0.05) between different breeds with superior observed in lambs (NT) (87.5 g/dayay). This trend can be explained by the significant growth rate of the breed (NT) (Atti and Haj Taieb, 1989). Regarding race (SS), its growth performance is comparable or even superior to those of beef breeds with average daily gain of 72.6 g/dayay, against 64.2 and 66.3 g/dayay respectively for the QFO and BGQ. This shows that the lambs of the Sicilo-Sarde dairy breeds are suitable for farming.

The consumption index average is four lots of approximately 6.73, 6.5, 5.94 and 7.91 kg DM/kg weight gain, respectively, for lots QFO, BGQ, NT and SS has the lowest food efficiency. Statistical analysis showed a better feed efficiency for lambs Black Thibar confirming its suitability for fattening sheep. This is consistent with the results developed by Atti and Haj Taieb (1989).

The results of various weights and yields obtained from slaughtered lambs are summarized in Table 2. It appears that the lambs (NT) the average hot carcass weight (PCC) the lowest (10.8) to its content of digestive tract the highest (25.6% of body weight) while the race BGQ presents the average weight of the hot carcass and cold without the most important statistical difference (P>0.05). These results are passed on to business performance. However, for true performance, it is more important in breeds QFO and SS as well as the averages are statistically similar (P>0.05).

Carcass conformation can be determined through various measurements to determine their morphological characteristics (Boccard and Dumont., 1976). Indeed, the index of compactness of the leg is the same for different races , in addition, the carcasses of lambs QFO are shorter because they had the lowest carcass compactness index.

A major consideration is allocated to the tissue composition of the carcass because of its importance in determining the value of butchery carcasses. The dissection of the different regions of the carcass showed that lambs Black Thibar offer the least greasy meat 0. 72 kg of FAT, equivalent to 6.89% of total carcass weight. These results are similar to those found by Atti and Haj Taieb (1989) which showed that this race has the best growth and less fat. Statistical analysis reveals that there are no significant differences (P>0.05) between different batches of carcasses as percentages of muscle and bone (Table 3).

The meat quality was studied through its chemical composition, the quality of its tissue (tenderness) and rich in myoglobin (color). Indeed, the muscle is the least fat of lambs (NT) with a percentage of fat (BF) compared to dry matter of 2.22%. For cons, the highest content was recorded in the QFO (3.85%). The percentage of mineral matter is the highest found in meat from lambs (NT) with a value of 5.25% against 4.64, 4.93 and 4.69% respectively for the QFO breeds, BGQ and SS.

The assay results of pigmentation (Table 4) showed superiority of the content of iron in myoglobin and in the race (SS) without statistical difference (P>0.05). As regards the tenderness of the meat is judged by the detection of collagen content in muscle meat from lambs (SS) is softer compared to other breeds with an average grade of 5.63 mg collagen/g fresh muscle cons 5.21; 4.76 and 5.1 respectively for lambs QFO, BGQ and NT.

Table 2: Weights and carcass yield

	QFO	BGQ	NT	SS
P.C.C (kg)	11.75^{NS}	12.05^{NS}	10.8^{NS}	11.17^{NS}
P.C.F (kg)	11.5^{NS}	11.87^{NS}	10.55^{NS}	10.97^{NS}
Business performance	44.23^{NS}	46.11^{NS}	37.51^{NS}	45.49^{NS}
Return true	56.35^{NS}	54.52^{NS}	51.24^{NS}	56.29^{NS}
% loss by bleeding	2.12^{NS}	1.45^{NS}	2.31^{NS}	1.78^{NS}

NS: non significant differences (P> 0.05)

Table 3: Composition of carcass tissue

	QFO	BGQ	NT	SS
% Muscle	64.05^{NS}	64.08^{NS}	64.74^{NS}	67.92^{NS}
% FAT	12.53^{NS}	9.9^{NS}	6.89^{NS}	9.19^{NS}
% Bone	20.28^{NS}	19.13^{NS}	20.26^{NS}	20.02^{NS}

NS: non significant differences (P>0.05)

Table 4: Levels of muscle myoglobin and heme iron

	QFO	BGQ	NT	SS
Myoglobin (mg/g muscle)	2.7^{NS}	2.24^{NS}	2.83^{NS}	3.17^{NS}
Iron (µg/g fresh muscle)	0.008^{NS}	0.007^{NS}	0009^{NS}	0.010^{NS}

NS: non significant (P>0.05)

Conclusion

Through this study, we can say that the breed of sheep best suited is the Black Race, Thibar because its growth rate and meat quality were better. The fattening of lambs milk can also be regarded as a source of income for the farmer. Finally, it is recommended to conduct further tests with a large staff to better characterize the growth performance and meat quality of lambs of local sheep breeds.

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