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Effects of pasture type on carcass and meat characteristics of kid goats

S. Smeti[1,2,*], O. Slimeni[1,2], H. Hajji[1,3], I. Mekki[1,3], M. Mahouachi[4], F. Saadani[5] and N. Atti[1]

[1]Laboratoire de Production Animale et Fourragères, INRAT 2049 Ariana (Tunisia)
[2]Faculté des Sciences de Bizerte, Bizerte (Tunisia)
[3]INAT, 43 avenue Charles Nicole Tunis (Tunisia)
[4]ESAK, Le Kef (Tunisia)
[5]ODYCEPANO (Tunisia)
*e-mail: sam_fsb@live.fr

Abstract. The aim of this experiment was to study the effect of the feeding system in two mountain areas from the Tunisian Northwest (Bahra and Ain Draham) on the carcass and meat characteristics of goats. In the region of Ain Draham, characterized by mountainous terrain and soil unsuitable for crops, goats grazed natural forests with dominance of woody species. While in the region of Bahra, grazing pasture is based on herbaceous and goats were supplemented with concentrate and hay. At the age of five months, ten goats from each region were slaughtered. Body weight at slaughter (SBW) of kids was affected by the pasture type (17.7 and 21.8 kg for Ain Draham and Bahra, respectively). Also, higher carcass weight and higher dressing percentage were recorded for goats from Bahra. Similarly, the skin, head and feet weights were higher for this group; these organs are strongly correlated to the SBW which was higher for Bahra region. However, chemical composition of goats' meat (dry matter, proteins and lipids) was similar for goats from both regions. In conclusion, the concentrate supplementation to the herbaceous pasture resulted in higher SBW and carcass weight without effect on meat composition.

Keywords. Pasture – Tunisian goats – Carcass – Meat.

Effets du type de pâturage sur les caractéristiques de la carcasse et de la viande des chevreaux

Résumé. *Le but de cette expérience était d'étudier l'effet du système d'alimentation dans deux zones du nord-ouest tunisien (Bahra et Ain Draham) sur les caractéristiques de la carcasse et de la viande de chevreaux. Dans la région d'Ain Draham, caractérisée par un terrain et un sol impropre aux cultures, les chevreaux pâturent les forêts naturelles dominées par les espèces ligneuses. Alors que dans la région de Bahra, le pâturage est basé sur les herbacées avec complémentation par l'aliment concentré et du foin. À l'âge de 5 mois, dix chevreaux de chaque région ont été abattus. Le poids vif à l'abattage des chevreaux a été affecté par le type de pâturage (17,7 et 21,8 kg respectivement pour Ain Draham et Bahra). En outre, le poids de la carcasse et le rendement commercial des chevreaux de Bahra ont été plus élevés que ceux d'Ain Draham. De même, les poids de la peau, de la tête et des pieds étaient plus élevés pour les chevreaux de Bahra; le poids de ces organes étant fortement corrélé au poids vif à l'abattage qui était plus élevé pour la région Bahra. Cependant, la composition chimique de la viande (matière sèche, protéines et lipides) était similaire pour les chèvres des deux régions. En conclusion, le pâturage des herbacées complémenté par l'aliment concentré a augmenté le poids vif à l'abattage et le poids de la carcasse des chevreaux sans aucun effet sur la composition de la viande.*

Mots-clés. *Type de pâturage – Chevreaux – Carcasse – Composition de la viande.*

I – Introduction

The demand for goat meat exceeds supplies in many parts of the world (Singh *et al*., 2006**)** and especially in the Mediterranean countries where goat meat is an important part of breeders' incomes. Goat meat is considered to be relatively lean with a low percentage of fat (Webb *et al*., 2005). Information on the origin of animals and their production system has become important

criteria for consumers' choices. Therefore, the producer may sort to employ production systems that provide acceptable carcass and meat quality (Warren *et al*., 2008) and maintain healthy products for consumers.

Therefore, the aim of this experiment was to study the effect of the feeding system in two mountain areas from the Tunisian Northwest (Bahra and Ain Draham) on the carcass and meat characteristics of kid goats.

II – Material and methods

1. Animals and rearing system

The study was carried out during summer (June-August) in two mountain areas from the Tunisian Northwest (Bahra and Ain Draham). Ain Draham is a mountainous region dominated by natural forests. The feeding system in this region is based mainly on grazing forest plants. While, in Bahra region, the feeding system is based on herbaceous pasture supplemented with concentrate (barley) and oats hay. At the age of five months, ten male goats from each region (local breed) were slaughtered.

2. Measurements and analysis

Body weight at slaughter (SBW) was recorded. Skin, feet, head, red cut-down (liver, kidneys, spleen, and heart); omental fat, all fractions of the digestive tract and the hot carcass (HCW) were weighed. Samples of *Longissimus dorsi* were dried (50°C), ground (1 mm screen), and stored for subsequent analyses. DM was determined by drying at 80°C until constant weight. Mineral content was determined by ashing at 600°C for 8 h. Nitrogen was determined by Kjeldahl method (CP = N × 6.25). Meat lipids were determined by Soxhlet extraction.

3. Statistical analysis

A one-way analysis of variance for the feeding system effects on the slaughter parameters, non carcass components and chemical composition of meat using GLM procedure in SAS (1989) was applied. Then, the test Duncan was used to compare these effects (α = 0.05).

III – Results and discussion

1. Rearing system

The region of Ain Draham (northwest of Tunisia) is characterized by rugged, mountainous terrain and soil occupied by natural forests and unsuitable for crops. The herbaceous layer is almost absent throughout the year (Gasmi-Boubaker, 2005) especially during summer when this experiment was conducted. The feeding system in this region is based mainly on grazing forest plants. The main species are trees (Pinaceae and Fagaceae) and shrubs (*Erica arborea, Myrtus communis, Pistacia lentiscus*). While, in Bahra region, the feeding system is based on herbaceous pasture (ryegrass, trefoil, alfalfa) and goats were supplemented with concentrate and hay; this feeding system would result in higher nutrient supply than Ain Draham one.

2. Slaughter parameters

Slaughter body weight (SBW) of kids averaged 17.7 and 21.8 kg for Ain Draham and Bahra, respectively, with significant differences between the regions (P = 0.001). The poor feeding system

based exclusively on forest plants in Ain Draham originates this low SBW compared to that of Bahra where animals were supplemented with concentrated and hay. Statistical analysis of the HWC and the commercial dressing percentage revealed significant differences (P<0.01) between the two areas in favour to the region of Bahra (Table 1). This difference is related to the fact that these parameters are strongly correlated to the SBW itself affected by the feeding system (Atti and Khaldi, 1987; Sañudo *et al*., 1993; Mahouachi and Atti, 2005).

Table 1. Slaughter Body weight (SBW) (kg), carcass weight (kg) and dressing percent

Group	Bahra	Ain Draham	SEM	P-values
SBW (kg)	21.8	17.7	1.29	***
HCW (kg)	9.1	6.3	2.47	***
CDP (%)	41.6	35.2	10.96	***

CDP, commercial dressing percentage; HWC, hot carcass weight; SBW, slaughter body weight.

3. Non-carcass components

The pasture type tends to affect the red cut-down (Table 2). This is due to the fact that red cut-down organs are not affected by SBW (Kamalzadeh *et al.*, 1998; Atti *et al*., 2004). The skin, head and feet weights were significantly affected (P<0.01) by the pasture type; as indicated above, these weights are strongly correlated to the SBW which was higher for Bahra region. Curiously, the omental fat was significantly similar among both feeding systems although the higher value for Bahra system. It was shown that animals fed high energy level had more omental fat in absolute and relative values (Atti *et al*., 2004).

Table 2. Effect of the pasture type on non- carcass components

Group	Bahra	Ain Draham	SEM	P-values
Red cut-down (g)	387	330	20.1	NS
Skin (g)	1551	1013	85.4	***
Head (g)	1425	1114	54.6	***
Feet (g)	665	488	25.6	***
Omental fat (g)	78	55	10.9	NS

4. Chemical composition of goats' meat

The pasture type did not affect (P>0.05) the chemical composition of goats' meat (Table 3) from Bahra and Ain draham. Meat of goats from the same breed (Atti *et al*., 2004), reared in feedlot and receiving different concentrate protein content (100, 130 or 160 g/kg DM), presented more fat (11.6%) but less protein (84%) than those reported in the current study.

Table 3. Effect of the pasture type on the chemical composition of goats' meat

	Bahra	Ain Draham	SEM	P-values
RDM (%)	27.1	26.3	1.49	NS
Ash (%)	3.6	3.2	0.42	NS
Protein (% DM)	88.5	88.0	8.40	NS
Fat (% DM)	9.6	9.3	3.10	NS

IV – Conclusion

The concentrate supplementation to the herbaceous pasture resulted in higher Slaughter Body weight and carcass weight without effect on meat composition.

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