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Effects of the kidding season and sex on the growth and leg-tissue composition of kid goats of the Murciano-Granadina breed under natural lactation

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SUMMARY – With the goal of establishing a Quality Assurance System and thus enabling the obtention of a Quality Certificate for goat-kid carcasses of the Murciano-Granadina breed, a series of experiments was carried out in which the animals were fed by their dams under a natural regime. The aim of the experiments was to determine, on the one hand, the characteristics of the composition of the animal carcass that determine its quality and, on the other, the possible effects produced on the growth and development of animals by the implicated factors. An analysis was made of the possible effects of the kidding season (autumn vs spring) and of the sex of the kid goats on growth rate (g/day), in an experimental group of 36 kid-goats (18 per season, 9 male and 9 female). All the animals were fed by their dams until they attained the size at which they would be killed (8 ± 1 kg), after which the effects of the above factors on the tissue composition and intramuscular fat content of the leg were analysed. The conclusions drawn from the results obtained are that the animals, in general, presented good growth and development with better results produced by the animals reared in the autumn. Nevertheless, and taking into account the factors involved, the amount of the body fat depended on the type of fat deposit in question.

Keywords: Quality recognition, composition of the carcass, kid goat, Murciano-Granadina breed.

RESUME – "Effets de la saison de mise bas et du sexe sur la croissance et la composition tissulaire du gigot de chevreaux de race Murciano-Granadina en lactation naturelle". Dans le but d'implanter un Système de Qualité afin d'obtenir un Certificat de Qualité pour la carcasse et la viande du chevreau espagnol de la race Murciano-Granadina, on a réalisé plusieurs essais expérimentaux avec des animaux allaités par leur mère, pour définir les caractéristiques de composition de la carcasse et de la viande qui en déterminent la qualité ainsi que les effets sur la croissance et le développement des animaux. On a analysé les effets possibles de la saison de mise bas (automne ou printemps) et du sexe (mâles ou femelles) sur la croissance (g/jour). Pour cela, on a établi un lot expérimental de 36 animaux (18 animaux pour chaque période : 9 mâles et 9 femelles). Tous les animaux ont été allaités par leur mère jusqu'à atteindre un poids à l'abattage de 8 ± 1 kg pour déterminer les facteurs qui ont un effet sur la composition tissulaire de la jambe. A partir des résultats obtenus dans cette étude, on peut conclure que les animaux ont présenté en général un bon développement et une croissance qui paraissent plus favorables en automne. Toutefois, compte tenu des effets étudiés, l'état d'engraissement et la composition se trouvent affectés par le type de dépôt de gras.

Most-clés : Marque de qualité, composition de la carcasse, chevreau de race Murciano-Granadina.

Introduction

The characteristics of the stock-rearing system of the Murciano-Granadina lactating kid goat make it feasible to seek a Quality Recognition Certificate for this breed. On the basis of the information available on growth and development of the animal (Ruiz Mariscal, 1991; Sanz Sampelayo *et al.*, 1990), the necessary features of the stock-rearing system and the type of carcass and of meat produced must be established. The nutritional composition and value of this breed are aspects on which this potential Quality Certificate could be based. The goal sought is to establish a basis for the production of kid goats from selected dams fed on grass, forage, and cereal and leguminous-based diet, totally free of additives, in order to obtain kid goat meat that

would be natural and of the highest possible quality. With this in mind, here we present data of growth rate and tissue composition of the carcass legs as well as of the intramuscular fat of kid goats according to their kidding season and sex.

Material and methods

With this purpose in mind, an experiment was carried out using 36 kid goats; 18 (9 male and 9 female) from autumn kidding season and 18 (9 male and 9 female) from spring kidding season. These animals were from twin kidding. Before and after kidding, the kid goat's dams were fed in both kidding season, with the same diet, being this a standard diet based on natural feeds. The minimum birth weight was 2.7 ± 0.3 kg. Kid goats were suckled by their dams until they reached a live weight of 8 ± 1 kg, being then slaughtered. The newborn kid goats remained with their dams all day. Together with the weight at birth, the live weight of the kid goats was determined two times at week. When kid goats reached the slaughter weight they were killed by section of the jugular vein in the neck. After slaughter, the skin, feet, all internal organs and the head were removed being obtained the leg from the left side of the carcass. The legs were separated by physical dissection into muscle, cover fat, intermuscular fat and bone. In order to calculate the intramuscular fat, the dry matter of the muscle was determined by lyophilization and the fat content by extraction with a chloroformo-methanol mixture (2:1, v/v).

A statistical analysis was made of the results obtained, using Statgraphics (1991) software, based on a 2x2 (kidding season – sex) factorial design, with the corresponding analysis of the variance, taking the birth weight of each animal as the covariance factor. Together with the independent effects of the two factors, the possible significance of the interaction between these two was calculated.

Results and discussion

Table 1 shows the mean values obtained for the variables analysed, together with the results of the statistical analysis performed. The covariance factor was only significant ($P < 0.05$) in relation to the percentage of muscle and bone in the leg. The growth rate (g/day) and the percentages of muscle were affected by the kidding season ($P < 0.05$); thus, the growth rate was higher in the autumn, while the opposite was true for the proportion of muscle. The sex of the animal had a significant effect ($P < 0.05$) both on the proportion of muscle and on the quantity of intramuscular fat, the values being higher among the female animals. In no case was the interaction between factors (kidding season x sex) significant ($P > 0.05$). Additionally, there was a tendency ($P = 0.08$) for the percentage of intermuscular fat in the leg to be greater among the male animals; this was observed in the interaction effect recorded for the spring kidding season ($P = 0.10$).

The values of growth rate resulted higher for the animals born in autumn. This agrees with previous results obtained in the same breed. Ruiz Mariscal (1991) attributes this to the effect of different environmental conditions. In general, the results obtained in this study were very similar to the best ones found in different studies in which particularly, it was analysed the effect of different rearing methods on growth and development of this kind of animals (Sanz Sampelayo *et al.*, 1987; Ruiz Mariscal, 1991). In this sense, it is possible to underline the intramuscular fat content here detected. It is well known that the gustative quality of the meat depends to a great extent on this aspect of its composition.

Conclusions

From the results obtained here, it is possible to conclude that according to the feeding of the dams and the rearing system performed for the kid goats, all these showed a high growth rate and an appropriated development. With the goal of obtaining a Quality Certificate, this information has to be completed with overall data concerning sensorial analysis.

Table 1. Effects of the kidding season and of the sex of the animals on the growth rate (g/day) tissue proportions (%) and intramuscular fat content (% DM) of the leg of the carcass in the kid goats

	Autumn		Spring		RSD	Level of significance			
	Male	Female	Male	Female		Covariance	Kidding season (K)	Sex (S)	KxS
Growth rate	176.1	170.2	154.8	152.9	19.3	NS	**	NS	NS
Leg tissue proportions									
Muscle	56.75	58.96	59.39	60.78	1.7	**	***	**	NS
Cover fat	4.98	4.95	5.80	4.58	1.0	NS	NS	NS	NS
Intermuscular fat	2.08	1.83	1.93	1.76	0.4	NS	NS	NS	NS
Bone	28.42	26.60	27.18	26.40	1.9	**	NS	NS	SN
Intramuscular fat	12.03	13.75	12.01	14.32	1.5	NS	NS	**	NS

RSD: Residual standard deviation; NS: Not significant; **: P<0.01; ***: P<0.001.

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