

INFLUENCE OF BREED AND THE PRESENCE OF LAMB ON CONSUMER ACCEPTABILITY OF KID MEAT

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INTRODUCTION

Goat meat is almost universally acceptable, but with cultural traditions and social economic conditions influencing consumer preference (Casey et al., 2003). Differences in meat characteristics and the preference for lamb over goat can be attributed to inherent differences between the two species. Goat carcasses are usually smaller with less fat cover than sheep carcasses at comparable ages and sexes. Their higher collagen content with lower solubility than sheep meat could explain the lower preference for goat meat (Sheradin et al., 2003). Although goat's meat is not favoured in some countries, the demand for this product exceeds supply in many regions. These regions account for more than 90% of the goat world population. In Spain, the production of goat meat is a suckling kid that is sold around Christmas, competing in the market with a suckling lamb and other products. The problem has led to a product of inconsistent quality and a general lack of synchrony between market preferences and product supply. The aim of this work was to assess whether there is an existing effect of breed on the consumer acceptability of kid meat and if this preference is modified by the presence of lamb.

MATERIAL AND METHODS

A total of 60 suckling animals, entire male, were used comprising five Spanish breeds of goats (Moncaína, MO, Blanca Celtibérica, BC, Negra Serrana, NS, and Pirenaica, PI, meat purpose, and Murciano-Granadina, MG, dairy purpose) and one of lamb (Churra, CH). All animals were reared in the farms of origin in commercial conditions, throughout the country (Moncaína and Pirenaica in Aragón; Blanca Celtibérica in Extremadura; Negra Serrana and Murciano-Granadina in Andalucía, and Churra in Castilla-León) using common husbandry practices, slaughtered with less than 30-35 days of age in local licensed abattoirs and sent them in refrigerated transport to the lab 24 hours post mortem. The *m. longissimus dors lumborum* from the left side was dissected, vacuum packaged and kept at 4°C until reaching three days of ageing, and then frozen and kept at -18°C. Samples were thawed at 4°C for 24h prior to the analysis at the facilities of the University of Zaragoza. Meat was grilled until reaching an internal temperature of 70°C. Then, the cooked muscle was cut into 8 portions (free of visible connective tissue), which were wrapped in aluminium foil and identified with a single three-digit code. Samples were kept warm until consumer evaluation. Sensory tests involved 120 consumers divided in groups of eight selected by sex and range of age (Table 1). Consumer tests were performed in a controlled sensory analysis laboratory with individual booths equipped with red light to mask any meat colour differences. In each session, consumers received different sets of six samples representing the six different breeds. Meat was served following a randomised design for order and carry over effects (Macfie *et al.*, 1989). Consumers evaluated three different attributes for each sample: tenderness, flavour and overall acceptabilities using an 8-point scale ranging from like extremely until dislike extremely. Data were analysed using SPSS, 13.0.1 (2004) for Windows. A Cluster analysis was carried out in order to group consumers with similar preferences according to acceptability. The significance of effects was obtained using General Linear Model Procedures. Means and standard deviations were computed for every variable. In all cases multiple mean comparisons were assessed by the Tukey test.

RESULTS AND DISCUSSION

Lower scores were given for PI and BC goat meat. The rates in overall acceptability were probably associated to flavour quality and major toughness perception. Results indicated there was a detectable difference between goat meat and beef, the latter was given lower scores for hardness. The higher collagen content in goat meat (Sheradin et al., 2003) and intramuscular fat could explain the difference on texture perception.

Cluster analysis (Table 3) grouped consumers according to their preferences. Preference for any of the breeds differed significantly ($p < 0.01$) in 4 consumer groups. The most important cluster (including 94 consumers) was cluster 4 (consumers who preferred MG, a dairy breed); cluster 3 comprised those consumers who rejected PI, cluster 2 were formed by consumers preferring lamb vs goat, and, finally, cluster 1 was composed by those consumers whose scored BC and MG breeds as the less preferred. If cluster results are analysed in depth, the largest group of consumers (cluster 4; 78.3% of consumers) preferred MG, whilst only 3.3% of consumers rejected it (cluster 1) and only 11.7% of participants (cluster 3) scored MG below 5 on an eight point scale. Consequently, MG had the best acceptance for most consumers, as seen in Table 2, even if the overall acceptability of lamb was higher, although not significantly different (Table 2).

CONCLUSIONS

In conclusion, goat meat from suckling kids had a good overall acceptability, more than 4 points in an 8-point scale, comparable to high quality products. Differences between goat breeds are evident, being lighter from dairy breeds kids preferred. Lamb effect may be related to a better tenderness perception, so preference seems to be related to better flavour and tenderness perception. However, different groups of consumers may have different preferences.

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Table 1. Consumer's characteristics (n=120)

	%
≤ 29 years old	20.0
30-44 years old	33.3
45-59 years old	31.7
≥ 60 years old	15.0
Female	50.0
Male	50.0

Table 2. Means and standard error of overall, flavour and tenderness acceptabilities scores in kid and lamb meat (consumer's panel=120)

	MO	PI	CH	MG	NS	BC	S.E.	Sig ^(*)
Overall Acceptability	5,63 ^b	5,03 ^a	5,54 ^b	5,79 ^b	5,62 ^b	5,14 ^a	0,1351	***
Flavour acceptability	5,86 ^b	5,31 ^a	5,50 ^a	5,78 ^b	5,85 ^b	5,43 ^a	0,1343	**
Tenderness acceptability	5,45 ^{bc}	4,49 ^a	5,94 ^c	5,72 ^{bc}	5,26 ^b	4,75 ^a	0,1468	***

a-c: Different superscripts represent significant differences among goat breeds and lamb; ^(*) NS, not significant; (p>0,05); *(p<0,05); ** (p<0,01); *** (p<0,001)

S.E: Standard Error

Mo= Moncaína; Pi=Pirenaica; Ch=Churra lamb; MG=Murciano Granadina; NS=Negra Serrana; BC= Blanca Celtibérica

Table 3. Means and standard error (S.E.) of different consumer groups for overall acceptability of kid and lamb meat

	Number of consumers	%	MO	PI	CH	MG	NS	BC	S.E.	Sig ^(*)
Cluster 1	4	3,33	6,25 ^b	5,75 ^{ab}	5,00 ^{ab}	2,75 ^{ab}	4,00 ^{ab}	2,25 ^a	0,791	**
Cluster 2	8	6,67	5,50 ^a	6,13 ^{ab}	8,00 ^b	7,00 ^{ab}	7,38 ^{ab}	6,75 ^{ab}	0,518	**
Cluster 3	14	11,67	5,14 ^b	2,71 ^a	4,79 ^b	4,71 ^b	4,79 ^b	4,00 ^{ab}	0,445	**
Cluster 4	94	78,33	5,70 ^{ab}	5,24 ^a	5,47 ^{ab}	5,98 ^b	5,67 ^{ab}	5,29 ^{ab}	0,137	***

a-c: Different superscripts represent significant differences among goat breeds and lamb; ^(*) NS, not significant; (p>0,05); *(p<0,05); ** (p<0,01); *** (p<0,001)

S.E.: Standard Error

Mo= Moncaína; Pi=Pirenaica; Ch=Churra lamb; MG=Murciano Granadina; NS=Negra Serrana; BC= Blanca Celtibérica

⁽¹⁾ Overall acceptability using an 8-point scale: 1= dislike extremely; 8= like extremely