

Positioning Goat Meat in the U.S. Meat Market: Evidence from Sensory Quality Attribute Analysis

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Abstract

This study examines how intrinsic sensory attributes of goat meat influence consumer acceptance and purchase behavior in the United States. Consumers evaluated barbecued goat meat based on appearance, juiciness, texture, flavor, and aftertaste using a 9-point hedonic scale. Factor, cluster, and regression analyses identified three key sensory dimensions: meat quality, meat validation, and appearance. Two consumer segments emerged, differing in emphasis on experiential versus visual attributes. Age, gender, and education significantly affected sensory ratings, whereas income had limited influence. Production attributes, including local, grass-fed, organic, and genetically modified labels, also shaped evaluations, highlighting opportunities to position goat meat as a sustainable protein alternative.

Keywords: cluster analysis, consumer preferences, factor analysis, goat meat, hedonic scales, meat quality, regression, sensory evaluation

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Introduction

The U.S. meat market is traditionally dominated by beef, poultry, and pork, whereas mutton and goat meat constitute only a small share of national consumption (Kantor and Blazejczyk, 2022). Increasing awareness of the environmental impacts of livestock production and heightened public health concerns have motivated consumers to seek more sustainable and nutritious alternatives. High consumption of conventional red meat has been associated with cardiovascular disease, certain cancers, and obesity (Godfray et al., 2018), which has contributed to a rising interest in healthier protein choices.

Most of the demand for goat meat in the United States comes from the immigrant population. Demand for many U.S. citizen consumers is low, as many do not buy goat meat because they fear the flavor will not match what they know (Guerrero et al., 2014). However, in a survey by Nelson et al. (2004), most respondents rated the flavor of goat meat better than or the same as beef, and half rated it better than pork. Guerrero et al. (2014) found that lamb was preferred over goat because the respondents were accustomed to it, but there was no statistical difference between the two meats. On the other hand, McMillin and Brock (2005) stated that higher fat content led to more intense flavor, which is considered less desirable. Therefore, a lower-fat goat meat alternative would have a more acceptable flavor to the American consumer.

Goat production confers several ecological advantages, including relatively lower greenhouse gas emissions compared with cattle, strong adaptability to marginal environments, and ecosystem benefits, such as weed control and biodiversity enhancement (Gutiérrez-Peña et al., 2019; Rahimi et al., 2022). Despite these benefits, mainstreaming goat meat in the U.S. market depends on understanding how its sensory attributes align with consumer expectations. Sensory evaluation allows direct measurement of consumer reactions to actual products, in contrast to discrete choice experiments that rely on hypothetical scenarios and emphasize credence attributes (Palma, Johnson, and Anderson, 2019).

Meat quality remains a fundamental driver of satisfaction and purchase behavior. Attributes such as texture, flavor, juiciness, and appearance are central to quality perception and reflect variations in production systems and processing conditions. Understanding how consumers evaluate these characteristics is essential for developing targeted marketing strategies and product positioning.

This study contributes to the emerging literature on alternative red meats by applying a comprehensive sensory analysis of barbecued goat meat. Our objectives are threefold:

- i. Identify dominant sensory dimensions that shape consumer perceptions of goat meat;
- ii. Classify consumers into market segments based on their sensory preferences; and
- iii. Examine how sociodemographic characteristics, health beliefs, and production system perceptions influence evaluations of goat meat's sensory attributes.

The insights generated provide implications for market expansion strategies and opportunities to position goat meat as a high-quality, sustainable protein option for U.S. consumers.

Data and Methodology

Sensory Evaluation Procedure

A sensory evaluation instrument was developed jointly by researchers at Missouri State University and Fort Valley State University. The study protocol received Institutional Review Board (IRB) approval. Data were collected at the 2024 Sunbelt Ag Expo in Moultrie, Georgia, attended by approximately 50,000 visitors. A total of 120 participants were randomly recruited over three days. All participants completed informed consent procedures before participating.

Participants sampled standardized servings of lightly seasoned, professionally prepared barbecued goat meat. Five intrinsic attributes—appearance, juiciness, texture, flavor, and aftertaste—were rated on a 9-point hedonic scale. Following the tasting, participants completed a questionnaire covering demographic information, health and nutritional perceptions, production system preferences, and prior exposure to goat meat.

Empirical Analysis

The empirical analysis of this research was conducted in multiple phases. First, the principal components factor analysis (PCA) was used to reduce the five sensory variables into latent factors/dimensions. In the second stage, standardized factor scores (identified in stage one) were subjected to a two-stage cluster analysis identifying clusters of respondents with similar perceptions of the sensory variables. Finally, regression analysis was used to explore the relationship between the sensory dimensions and the socioeconomic and value attributes of the consumers, including demographics, household characteristics, health and nutritional perceptions, production system preferences, and prior tasting experience.

Results and Discussion

Table 1 presents the means, standard deviations, and factor loadings from the principal component analysis (PCA) obtained after a Varimax rotation of sensory variables. The factor/dimensions were ranked in order of the variance explained and labeled to reflect the latent stimulus. Descriptive statistics indicate high consumer ratings across all sensory attributes, with appearance, juiciness, texture, and flavor averaging close to 8 on the 9-point scale. Aftertaste exhibited slightly greater variation. These results suggest broad sensory appeal of goat meat among sampled consumers. Three sensory dimensions were identified for goat meat consumption.

**Table 1: Summary Statistics for Physical Attributes and Varimax Rotated Factor Loadings
Component Matrix: Sensory Evaluation Dimensions**

	Mean	Standard Deviation	Meat Quality Factor 1	Meat Validation Factor 2	Grilling Factor 3
JUICENESS	8.08	1.174	.909		
TEXTURE	7.88	1.393	.716		
AFTERFTASTE	7.52	1.919		.930	
FLAVOR	8.11	1.390		.625	
APPEARANCE	8.20	1.021			.944
Percentage of total variance explained			36	30	23

Meat Quality (Factor 1)

Goat meat quality is dominated by juiciness and texture (with loadings .91 and .72). This dimension, which captures immediate sensation, signals potential acceptance and purchase of goat meat. Goat meat tenderness and mouthfeel here are linked to consumer satisfaction. It is the largest factor, accounting for 36% of the error variance.

Meat Validation (Factor 2)

This factor with factor loadings of .63 and .93 for flavor and aftertaste, respectively, accounts for 30% of the error variance. This factor reflects the lingering taste experiences and overall satisfaction attributes influenced by volatile compounds and cooking processes and strongly predict repeat consumption.

Appearance Cue (Factor 3)

This factor loaded highly on meat appearance (.94), reflecting visual appeal and perceived grilling quality. Since visual cues often drive initial expectations, this dimension influences consumers' readiness to try goat meat. The factor accounted for 23% of the error variance. Approximately 80% of respondents rated appearance positively.

Cluster Analysis

Two distinct segments emerged. The first cluster, which is identified as the meat validation segment, where 77% of goat meat consumers for those consumers who highly rated juiciness, texture, flavor and aftertaste. These goat meat consumers' bracket represents the primary target group for sensory-based marketing. Comprising 23% of the market segment were those goat consumers considering meat appearance as important. Based on this segment, marketing of goat meat based on display and product aesthetics may be preferable marketing approaches.

Regression Analysis

The regression results of the relationship between the sensory dimensions and the socioeconomic and value attributes of the consumers was carried out on the three dimensions. Important findings of this analysis are summarized below. Overall model fit statistics indicate strong explanatory power for the meat quality and meat validation models ($p < 0.05$).

The meat quality dimension was positively influenced by consumers' preference for locally produced goat meat and presence of children in households. Regarding preference for organic production, male respondents and primary shoppers responded negatively. The meat validation dimension (the intricate taste feeling of what lingers in the mouth after chewing and swallowing the meat) was positively impacted by prior taste of goat meat, presence of children in a household, and importance of low cholesterol. In contrast, the variables that negatively impacted meat validation were gender (male), type of shopper (primary), and household income (medium). Finally, high education attainment impacted the appearance dimension of goat meat positively, and organic production impacted it negatively.

Study Conclusions and Implications

This study had three primary objectives: (i) to identify the dominant sensory dimensions shaping consumer perceptions of goat meat; (ii) to segment consumers based on sensory preferences; and (iii) to examine how sociodemographic characteristics and value orientations influence sensory evaluations. The findings indicate that market entry and expansion strategies for goat meat can be effectively structured around three key sensory dimensions: meat quality (juiciness and texture), meat validation (flavor and aftertaste), and appearance.

The results reveal clear market segmentation. A majority of consumers prioritized experiential attributes, particularly juiciness, texture, and flavor, suggesting that distribution and promotional strategies should emphasize eating quality, taste satisfaction, and the potential for repeat consumption. A smaller but meaningful segment placed greater importance on visual appeal, indicating opportunities for targeted retail merchandising, packaging enhancements, and improved product presentation within food distribution channels.

Regression analysis further demonstrated that sociodemographic and value-based characteristics significantly shape sensory perceptions. Positive evaluations were associated with preferences for locally produced meat, prior tasting experience, the presence of children in the household, and health considerations, such as low cholesterol. In contrast, gender, income level, and preferences for organic production showed mixed effects across sensory dimensions. These findings provide actionable insights for food distributors, retailers, and producers seeking to position goat meat within mainstream U.S. markets.

A key limitation of this research is that data were collected exclusively from attendees at the Sunbelt Ag Expo, who may not be fully representative of the broader U.S. consumer population. Consequently, future research should incorporate more diverse and nationally representative

samples. Additional studies should also examine multiple cooking methods, cultural influences, labeling strategies, and direct comparisons with beef, pork, and lamb to further clarify goat meat's competitive positioning and market opportunities in the United States.

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