CONSUMER SENSORY EVALUATION OF MEAT FROM GROWING RABBITS FED DIET CONTAINING MULBERRY LEAVES

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I. INTRODUCTION

The nutritional profile of rabbit meat, when compared with other species, is characterized by relatively higher protein content, higher proportions of *n*-3 fatty acids, and low amounts of intramuscular fat, cholesterol and sodium, thus indicating that its consumption may provide health benefits to consumers [1]. With regard to the sensory characteristics, studies on consumer preferences found mixed results. People who consume rabbit meat think it has a pleasant delicate flavour and was tender. On the contrary, consumers who avoid rabbit meat judge it to have an unpleasant taste [2]. The main cause of refusal is its typical taste of wild meat, partially due to the fat content [3].

Morus alba is a fast growing, small to medium sized deciduous mulberry tree. Mulberry leaves are rich in nutrients and have a large number of unique bioactive substances, which can be used as high-quality livestock feed. Moreover, mulberry leaves are rich in aldehydes, alcohols, esters and ketones, which are the main characteristic compounds of meat flavour, so that feeding rabbits mulberry leaf could improve the composition of fatty acids in the meat, which in turn could enhance the flavour. Maintaining meat quality is essential to sustainable livestock management. Therefore, identifying alternative feed materials while considering consumer acceptance is crucial. Based on these considerations, this study was conducted to investigate the effect of the mulberry leaf meal supplementation in dietary concentrate on rabbit meat sensory quality.

II. MATERIALS AND METHODS

A total of 480 weaned, 45-days-old, crossbred rabbits (Hycole × Grimaud) were randomly allotted to 60 cages. All the rabbits were fed, *ad libitum*, the same commercial feed during the grower phase. For the finisher phase, two isonitrogenous, isolipidic, and isoenergetic dietary treatments were provided: 1) control diet (C) and 2) experimental diet including 10% of mulberry leaf meal (MLM). At 89 days of age, 30 animals/diet, representative of all the replications, were slaughtered. The *Longissimus thoracis et lumborum* (LTL) muscles were removed from both sides and used for meat proximate composition and sensory analysis. Water (W), crude protein (CP), ether extract (EE) and ash (A) contents were determined according to official AOAC methods. Sixty untrained assessors, regular rabbit meat eaters and free of food allergies, were recruited. The LTL muscle was cooked without salt or spice on a double plate grill to an internal temperature of 72°C and cut into 1.0 cm bite-size cubes. Samples were identified with a random three-digit number and randomly placed on a 2-compartment plate. Consumers were asked to rate the overall liking of meat and the liking of colour, tenderness, juiciness, and flavour, using the 9-point hedonic scale (1 = dislike extremely and 9 = like extremely). In addition, they were asked to assess, using the 5-point Just About Right (JAR) bipolar scale, the appropriateness of: colour (1 = too much light, 2 = too light, 3 = just about right, 4 = too dark, 5 = too much dark); tenderness (1 = too much tough to 5 = too much tender); juiciness (1 = too much dry to 5 = too much juicy); of flavour (1 = too much weak to 5 = too much strong). Before starting the test, consumers were given verbal instructions regarding the linear hedonic scale and the bipolar JAR scale and were asked to read and sign an informed consent form. The JAR results were combined with the overall liking scores and a Penalty Analysis (PA) was conducted to

highlight the attributes that have a high or significant impact on the overall liking. An attribute was considered significant when respondent percentage was higher than 20% and the penalty score (drop in overall liking) was higher than 1 [5]. Statistical analysis was performed using the XLSTAT Statistical Software (Addinsoft, New York, NY, USA). P values ≤ 0.05 were considered statistically significant.

III. RESULTS AND DISCUSSION

Dietary MLM inclusion did not influence W, CP and A contents of meat, but led to lower EE when compared to the C meat (0.85% *vs* 1.21%; $P < 0.01$). As reported by Wang et al. [4], bioactive constituents from mulberry could repress fat deposition probably through elevating leptin-stimulated lipolysis. The Wilcoxon signed rank test showed no statistically significant differences for all the sensory attributes and overall liking between the two groups. In general, consumers liked the meat of both diets, as samples were rated above 6 ("like it slightly") with the only exception of the MLM meat colour (approximately 7 – "like it moderately") and the C meat juiciness (approximately 5 – "neither like it nor dislike it"). Most of the panellists rated C meat as JAR for colour (71.67%), tenderness (61.67%), and flavour (50%), while it was perceived as "too dry" for 76.67% of them. The most troublesome attribute of the C meat was tenderness. Indeed, 30% of the participants penalized it for being "too tough", with an overall penalty of 1.812 from the liking score ($P<0.05$). Regarding the MLM meat, the JAR frequencies of colour (75.00%) was similar to that highlighted for the C diet. The PA revealed that tenderness, juiciness, and flavour were the most troublesome attributes of the MLM meat. In fact, consumers strongly penalized it as being "too tough" (33.33% of answers), "too dry" (71.67%) and "too bland" in flavour (26.67%). The mean drops were significantly different from 0, and so was the overall penalty (1.077, 1.400 and 1.389 points from the liking score for tenderness, juiciness and flavour, respectively). Therefore, the meat from the MLM group exhibited lower levels of juiciness and flavour when compared to that of C group. In general, intramuscular fat positively influences meat sensory quality attributes, whereas a low amount of fat induces a less positive response.

IV. CONCLUSION

The fat content in rabbit meat was significantly reduced by inclusion of MLM in the diet. As a consequence, the MLM treatment slightly negatively affected the palatability characteristics of meat. However, this result has a less pronounced effect on product's overall quality.

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