

The sensory quality of meat from intact and castrated male lambs

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Objectives: Ram (intact male) lambs receive a discounted price at many abattoirs due to additional processing requirements and perceived sensorial defect, when compared to wether (castrated male) lambs. However, increased consumer awareness of animal welfare may influence the production systems for lamb, and subsequent demand. This could evolve into the penalisation of meat from wether lambs, if consumers (and the major stakeholders) decide the castration of lambs is unwarranted. There is an imperative, therefore, to understand the effect of castration on lamb meat quality to support industry and maintain market access. This study compared the sensory properties of ram and wether lambs, using a consumer sensory panel to score flavour, juiciness, tenderness, and overall liking.

Materials and Methods: A total of 50 crossbred (composite) lambs were slaughtered as a single flock at a commercial Australian abattoir. Half of these animals were ram lambs and the other half wether lambs, selected so that both groups were stratified by final curfew liveweight. Wether lambs were castrated using the Numnuts® system ~3.5 months prior to slaughter, otherwise the husbandry and dietary practices were standard for both groups. Carcasses were prepared in accordance with standard industry practice and at 24 h postslaughter, the *longissimus lumborum* muscles (LL) were collected. These were vacuum packaged and aged for 5 d under refrigeration.

Approval was provided by the Charles Sturt University Human Research Ethics Committee (H22006). The method of Thompson et al. (2005) was applied to the sensory analysis of samples. Specifically, 5 slices of 1 cm depth were removed from each right-side LL. These were to be halved upon cooking so that each sample could be tasted by 10 different consumers. Each consumer tasted 8 samples and this equated to 64 consumers volunteering to participate in 3 sensory panels (1 of 20 and 2 of 22 consumers). Lamb status (ram vs. wether) was balanced across each sensory panel and each consumer.

Samples were thawed under refrigeration for 24 h, before being tested. These were cooked to an internal temperature of 71 °C using clam shell grill (GR-4A, Cuisinart Griddler, USA) that was set to 220 ± 10 °C. Cooked samples were immediately halved and served warm. Consumer scores were recorded on unstructured 100 mm line scales, labelled with: 'not tender' vs. 'extremely tender'; 'not juicy' vs. 'extremely juicy'; 'dislike flavour extremely' vs. 'like flavour extremely'; and 'dislike extremely overall' vs. 'like extremely overall'. Categorical ranks of lamb meat quality were recorded: 1. Awful; 2. Unsatisfactory; 3. Good everyday quality; 4. Better than everyday quality; or 5. Premium quality.

Data were analysed using Genstat (21st edition, VSN International Ltd., www.vsn.co.uk). Linear mixed models fitted with the fixed effects of lamb status and the random effects of sensory panel, consumer, animal, sample slice, tasting order, and their interactions. The level of significance was set at 5% and nonsignificant terms were dropped from the final models.

Results and Discussion: Consumer's scored the meat from wethers to be more tender and of greater overall liking than the meat from ram lambs ($P < 0.05$). This preference did not equate to a negative opinion for the sensorial properties of ram meat, with consumer scores > 50% for flavour, juiciness, tenderness, and overall liking. Furthermore, ram and wether lamb meat was considered to be of 'good everyday quality'. Together, these findings confirm the results of past research (Gkarane et al. 2017; Purchas et al. 1979) and demonstrate that modern ram lambs achieve marketable weights at a younger age, therefore, before unappealing flavours and malodours can intensify (Gravador et al. 2018). The selection of lambs was stratified by liveweight and this could have suppressed the effect of lamb status on intramuscular fat content, an important contributor to the sensorial appeal of lamb meat (Holman & Hopkins 2021). In addition, the use of alternative cooking methods, meat products, post-slaughter storage conditions, or a trained sensory panel may have contributed to the detection of differences between wether and ram lambs. This information would complement the current study.

Conclusions: This study demonstrates that ram lambs can produce meat of satisfactory eating quality, but the meat from wether lambs was considered to be more tender and overall better by the untrained panellists. This information will have value when industry addresses quality and welfare conditions potentially imposed onto lamb meat products.

References:

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