

Meat quality attributes of Irish male lambs

Researchers at **TEAGASC** and UCD are looking at whether castration affects the sensory and eating quality attributes of lamb meat.

In Ireland, the practice of castrating lambs has declined over the past decade. The use of entire ram lambs in production systems is favoured, at least in part, because of their increased growth rates and ability to utilise feed more efficiently, while producing a leaner carcass. The supply of a consistent product, which consumers will repeatedly purchase, is critically important to the sheep industry. Critical characteristics include the physical appearance and tenderness of the meat, as well as taste and the absence of off-flavours. Some processors and producer groups have expressed concern that leaving male lambs entire undermines the market for lamb because consumers find the eating experience of meat from entire male lambs unsatisfactory. This paper summarises the results of a series of recently completed Teagasc–University College Dublin (UCD) studies, which compared ram and wether (castrated) lambs fed on an all-concentrate diet prior to slaughter.

Tenderness and sensory analysis

A total of 200 Scottish Blackface and Texel × Scottish Blackface lambs were identified, tagged and had their date of birth recorded on six commercial farms. Each alternate male lamb born alive was castrated using a scrotal rubber ring within 48 hours of birth. At five months of age, lambs were weighed and inspected visually on all six source farms to confirm sex and disease-free status, before being transported to the Teagasc Research Centre at Athenry.

Lambs were individually housed on expanded metal feeding pens for the indoor finishing period. Lambs were slaughtered at five points between October and April. Carcasses were graded for conformation using the EUROP scale and subcutaneous fat cover using a one to five scale (1 = low fat cover, 5 = excess fat tissue cover). The right side of each carcass was deboned at 24 hours post mortem. Steaks were cut from the loin and used for muscle colour assessment, Warner-Bratzler shear force (WBSF) tenderness measurements, total collagen content and proximate composition measurements, carcass pH and temperature measurements and sensory analysis.

Consumer acceptability

The instrumental meat quality and proximate composition results were consistent across both breed types, age at slaughter and lamb gender. Results in **Table 1** show that although subtle differences were seen in traits between genders, meat produced from both genders would be deemed acceptable. Tenderness values, which were measured by the WBSF method, indicate the force required to cut through a piece of meat and are reported in Newtons (N). This test suggests that meat from wether lambs had, on average, higher tenderness values (lower WBSF values) than meat from ram lambs; however, meat from both genders was acceptably tender. Intramuscular fat was greater in wether lambs, which may explain the increased tenderness values seen for wether lambs. Ultimate pH of the carcass was greater in ram lambs than wether lambs, but both genders produced carcasses with pH values within the acceptable range. Sensory analysis by 100 consumers (**Table 2**) also recorded minimal differences between genders and few advantages of castration from a meat quality point of view (Gkarane *et al.*, 2017). Sensory analysis showed that although meat from wether lambs scored higher for traits such as overall liking and tenderness liking, meat from ram lambs also scored as acceptable (values greater than five) and the differences recorded between both genders were minimal.

Table 1: Instrumental meat quality assessment of ram and wether lambs.

	Gender		Statistical significance
	Ram	Wether	
Proximate composition			
Intramuscular fat (%)	2.61	3.19	Higher in wethers
25-hour pH	5.65	5.52	Higher in rams
Tenderness (WBSF, N)	37.1	34.2	Higher in wethers
Cook loss (%)	29.2	28.7	Similar
Total collagen (g/kg)	2.94	2.96	Similar



Conclusion

It can be concluded that castration of lambs offers minor additional benefits in meat quality and the benefits are insufficient to compensate for the lower growth rates and lower feed conversion efficiencies of wether lambs compared to ram lambs (Claffey *et al.*, 2018). For this study consumers did not dislike meat from either castrate or ram lambs, deeming the meat from both genders to be acceptable. Therefore, the message to industry is that castration has a small effect on sensory attributes of lamb meat, though castration may still be required in some systems as a management tool.

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Table 2: Effect of gender on sensory attributes of meat from ram and wether lambs.

	Gender		Statistical significance
	Ram	Wether	
Overall liking ¹	5.8	6.3	Higher in wethers
Aroma liking ¹	5.6	5.9	
Aroma intensity ²	5.2	5.0	
Flavour liking ¹	5.8	6.2	Higher in wethers
Flavour intensity ²	5.6	5.6	
Tenderness liking ¹	6.3	6.7	Higher in wethers
Level of tenderness ³	5.9	6.2	
Juiciness liking ¹	5.9	5.9	
Level of juiciness ⁴	5.4	5.3	
Off-odour ⁵	1.4	1.2	
Off-flavour ⁵	1.7	1.1	Higher in rams

Category/intensity scales:¹1 = dislike extremely, 9 = like extremely

²1 = extremely weak, 9 = extremely strong

³1 = extremely tough, 9 = extremely tender

⁴1 = extremely dry, 9 = extremely juicy

⁵0 = not detected, 1 = extremely weak, 9 = extremely strong

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