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Carcass and Sensory Characteristic Differences Between Ram and Wether Lambs of Light, Medium, and Heavy Slaughter Weights

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Objectives

American lambs are often over-finished and lack consistent quality. It has been suggested that leaving male lambs intact can decrease USDA Yield Grade (carcass fatness) and improve growth efficiency. However, ram lamb carcasses are underutilized because of potential issues, the most crucial being off-flavor. We studied the effects of castration and slaughter weight on growth, carcass, and sensory characteristics to determine if ram lamb growth and efficiency can be advantageous without detriment to eating satisfaction.

Materials and Methods

Dorset lambs ($n = 20$) were randomly assigned to either ram or wether treatment group (10 rams, 10 wethers). Lambs assigned to the wether group were castrated within the first 7 d after birth and all lambs were fed the same grain-based diet for the duration of the study. Animals were balanced for mean age and 90 d weight and assigned to appropriate slaughter group. Targeted end live weights for slaughter designation were light (55 kg), medium (66 kg), and heavy (77 kg) classifications. Lambs were harvested in 3 weight groups, light (55 ± 1.5 kg; $n = 6$), medium (66 ± 1.3 kg; $n = 8$), and heavy (78 ± 1.5 kg; $n = 6$), with an even distribution of ram and wether in each group. Following harvest, carcasses were chilled for 2 d at 2°C, fabricated, and primal cut yields were recorded. Boneless legs were wet aged for 14 d, ground and formed into 1 oz. patties for sensory analysis. Untrained panelists ($n = 107$) evaluated meat sensory characteristics. Three samples of light, 4 samples of medium, and 3 samples of heavy weight lambs were served each day, and serve order was randomized. The Mixed procedure of SAS (SAS Inst. Inc., Cary, NC) was used to evaluate fixed effects

of sex ($n = 2$), slaughter weight ($n = 3$), and their interaction as well as random effects of sensory characteristics including panelist, day, and sample.

Results

Supporting our hypothesis, ram lambs exhibited greater ($P < 0.05$) ADG throughout the trial period when compared to wethers, and lambs in all 3 weight groups had similar ($P > 0.05$) ADG. Ram lambs had more desirable ($P < 0.05$) leg scores, larger ($P < 0.05$) ribeye areas and less ($P < 0.05$) backfat than wethers. Ram lambs also had lower ($P < 0.05$) USDA Yield Grades and better ($P < 0.05$) USDA Quality Grades than wethers. Sensory evaluation determined that meat from ram lambs had greater ($P < 0.05$) lamb flavor intensity than wethers, and meat from wether lambs had greater ($P < 0.05$) overall liking than ram lambs. Interestingly, the more intense lamb flavor found in ram lambs aligned closer ($P < 0.05$) to the preferred lamb flavor profile for consumers. Lamb originating from rams had greater ($P < 0.05$) off-flavor intensity scores than wethers, and heavy weight lambs had greater ($P < 0.05$) off-flavor intensity scores than light/medium weight lambs. Furthermore, there were no ($P > 0.05$) texture liking or juiciness intensity differences based on sex or slaughter weight.

Conclusion

Intact ram lambs provide the sheep industry an opportunity to improve growth, increase muscularity, and decrease USDA Yield Grade while providing a satisfactory eating experience. Ram lamb flavor intensity was more preferred by consumers, yet, compounding of advanced physiological maturity and harvesting intact rams increased incidence of off-flavors.