The effect of immunoscatration and supplementary feeding level on m. longissimus lumborum quality of farmed fallow deer (Dama dama)

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Introduction: Deer farming is playing an increasing role in modern European agriculture, with fallow deer currently being the most widely farmed cervid species. Their meat is considered to be healthy, due to its low fat and cholesterol contents, high-protein content (Bykowska, 2016), and unique flavour properties (Bureš et al., 2020). Farming deer provides a regular meat supply of uniform quality to the commercial market, in comparison to hunted deer (Kudrnáčová et al., 2018). However, their husbandry and nutrition remain unoptimized with regards to producing consistently high-quality meat. Immunocastration is a welfare-friendly husbandry method used in farm animals (Needham et al., 2017), to prevent breeding, control aggression, and improve carcass and meat quality. While this technique shows promise in addressing many husbandry issues, its effect on fallow deer nutrition and meat quality has not yet been investigated. The objective of this study was thus to establish if immunocastration, together with different levels of supplementary feeding, influenced the chemical composition and organoleptic properties of FD meat.

Material and methods: Forty male fallow deer (13 months; average live weight: 39.9kg) were randomly assigned to two groups differing in concentrate feeding level (400g or 800g /animal/day, mixture of oats, wheat and soybean meal), within two 2ha paddocks. Ten animals from each group were randomly selected and immunocastrated at the start of the study, using two subcutaneous doses of 2mL Improvac®. After 115 days, animals were slaughtered (average slaughter weight: 47.2kg; average hot carcass weight: 26.3kg). Twenty-four hours after slaughter, the longissimus lumborum muscles were removed and samples were analysed for chemical composition (moisture, protein, intramuscular fat, ash, collagen content, and collagen solubility; Bureš et al., 2020). Samples for sensory analysis were vacuum-packed and aged for 14 days at +4 °C. Following this, samples were cut into steaks (20 mm thick) and cooked on a double plate grill to an internal temperature of 70 °C. Thereafter, they were cut into 20 mm cubes and stored at 50 °C for up to 1 h until they were served to seven trained sensory panel members. Descriptive sensory analysis was performed over two sessions, using six descriptors scored on a 100mm unstructured continuous line scale (0 = very low, to 100 = very high). Data were analysed with a mixed linear model in SAS, with fixed effects of castration status and nutrition level, and their interaction, included in the model, as well as the random effects of slaughter day and assessor (for the sensory data).

Results: The meat from non-castrated fallow deer had higher protein, and lower moisture, contents than immunocastrates. The total collagen and soluble collagen, and overall flavour intensity, was affected by the interaction of castration status and nutritional level. Meat from immunocastrates showed improved tenderness and juiciness scores, whilst those animals receiving the low feed level had higher scores for grassy aroma.

Conclusions: Immunocastration improved important sensory properties of fallow deer meat, and may be considered as an appropriate husbandry tool for farmed fallow deer venison production. Feeding level should be considered when producing fallow deer meat products for consumers with differing expectations regarding the unique sensory properties associated with venison.

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