

Extreme dry-aging (110 days) of longissimus lumborum from 5-years old cow: Sensory approach using "Check all that applies" (CATA)

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Introduction: Dry-aging muscles from beef cattle is a common practise owing to the benefits of this practise on sensory attributes such as tenderness, aroma and flavour (Huff-Lonergan et al., 2010). Duration of aging is yet limited by the growth of microorganisms that may spoil meat surface and cause some safety concerns (Terjung et al., 2021). Furthermore, it is ignored the extent to which the application of extended aging to beef muscles, which is a common practise nowadays in certain catering and restaurant business, provides actual benefits in terms of sensory properties and consumer acceptability. To deliver some evidence on all these hypotheses, the present project was designed to investigate the impact of an extreme dry-aging on the sensory properties and consumer acceptability of loins from 5-y.o. cows.

Material and methods: Muscles longissimus lumborum (n=3) from 5 y.o. cows (Avileña x Charolais) were used for this assay. Animals were raised in a semi-extensive system and fed on pasture and a commercial cereal-based feed. At slaughter (650 kg, live weight), muscles were collected from animals while lumbar vertebrae and all coverage fat was left to remain during the whole aging period. After 48 h of cold airing (+ 4°C), meat pieces were hung on a drying chamber (0-3 °C/80% relative humidity) for 105 days (d). Subsequent procedures were carried with muscles from animals with equivalent genetic and feeding backgrounds slaughter 1 month apart. No-aged control muscles (only subjected to the 48 h cold airing) were also collected. Like this, cow muscles longissimus lumborum dry-aged for 0, 45, 75 and 105 d (n=3, per group) were eventually freed from fat and bones to obtain 2 cm-thickness stakes. Stakes were cooked in a griddle (350 °C/ 2 min each side) and immediately processed for sensory evaluation at sensory booths at the Culinary and Hotel Management School from Mérida (Spain). Fifty consumers (aged 18-66 of both genders) participated in a "Check All That Applies" sensory test as described in de Carvalho et al. (2020). In addition, they were requested to express their acceptability (7-points hedonic-scale). Drivers of liking and disliking were calculated. Data was analysed using XLSTAT version 2021.2 in accordance to de Carvalho et al. (2020).

Results: A correspondence analysis (Factor #1 and #2 account for 90.2% of variance) of the samples aged for 0, 45, 75 and 105 d and their sensory attributes, shows that CATA analysis enable a clear discrimination of samples according to the length of the dry-aging. Non-aged cow muscles (0d) were positioned in the upper-right quadrant and in an opposite position with respect to aged muscles (all of them in the left-hand of F#1). Muscles aged for 45 and 75 days were close to each other in the lower-left quadrant and defined by sensory attributes such as tenderness, juiciness, and umami, griddle, and roasted flavours. 105 d-aged muscles were located in the upper-left quadrant of the map and defined by cured and nuts flavours. Aged meats were significantly preferred over non-aged meat while the drivers of liking were different depending on the duration of the aging. Some consumers liked 110 d-aged meat for their distinctive flavours to nuts and cured meat, while some others liked 75 and 45d-aged samples principally for their pleasant rheological properties (juiciness and tenderness) and perception of recognisable and intense pleasant flavours to umami and griddle. In this study, juiciness and tenderness were the most influential drivers of liking while toughness was the main driver of disliking.

Conclusion: According to our results, aging muscles from these animals for longer than 45 days provides no benefits in terms of rheological properties (which was confirmed by a Warner-Bratzler analysis; data not shown) and the development of unusual flavours to nuts or cured meat, at extended aging periods, may not be appreciated by all consumers.

Literature:

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The financial support from:

1. "FEDER/Ministerio de Ciencia, Innovación y Universidades-Agencia Estatal de Investigación" through the Project: AGL2017-84586-R
2. "Gobierno de Extremadura (Consejería de Economía e Infraestructuras)" and „FEDER (Fondo Europeo de Desarrollo Regional, Una manera de hacer Europa)" through the grants a) GR18104- and b) IB20103 is acknowledged.