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Reduction of boar taint compounds in *Kraski prsut* through dry-curing process

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Abstract

Given that surgical castration of male pigs could be abandoned, the problem of product acceptability can become critical in dry-cured hams, especially when raw material comes from conventional pig husbandry. In this study, we have investigated 16 thighs harvested from 8 entire male fatteners that were submitted to 15 months of dry-curing process. Skatole and androstenone were determined in subcutaneous fat before (n = 8) and post processing (n = 16). After 15 months of dry-curing, markedly lower fat tissue concentrations of androstenone (36%) and skatole (20%) were determined. The reduction was independent of the level of boar taint substances.

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Keywords: entire males; androstenone; skatole; boar taint; processing; dry-cured ham

1. Introduction

According to current trends, surgical castration is likely to be abandoned[1] and raising entire male pigs may become a widespread practice in the EU. The introduction of this alternative can have negative consequences for the dry-cured ham industry, especially for producers reliant on the European markets for raw material supply. Besides the inferior raw material quality (e.g. lower fatness and water holding capacity[2,3]), boar taint presence will be the

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most problematic issue. This off-odour/flavour of meat ascribed to the accumulation of two substances, skatole and androstenone in the fatty tissue, is disfavoured by consumers[4]. Consumer acceptability depends on the level of both substances (according to Walstra et al.[5] the sensory thresholds are 0.5-1.0 μg/g fat for androstenone and 0.20-0.25 μg/g fat for skatole), content of fat (both substances are fat-soluble), processing methods (cooking, smoking) and the temperature at which the product is consumed (i.e. cold or hot). Although dry-cured ham is consumed cold (which should reduce the risk of boar taint perception), a dry-curing process itself is probably not sufficient to mask boar taint[6]. Published studies on dry-cured ham reported lower acceptability of hams produced from entire male pigs than castrates. For instance, Diestre et al.[7] found dry-cured hams to be less acceptable when androstenone levels were higher than 1.0 μg/g, while Bañon et al.[8] reported sensory identifiable boar taint in hams with 2.0 μg/g and 0.12 μg/g skatole. Despite indications that processing is a possible way to reduce boar taint[9], little is known on how, and to which extent, these compounds are reduced during the manufacturing process[10], especially in the case of dry-cured hams. The present study compared boar taint levels before and after dry-cured ham processing in order to clarify that issue.

2. Materials and methods

2.1. Ham processing

For the purpose of the study, 16 green hams were obtained from 8 entire male pigs (crosses of Landrace×Large White×Pietrain), slaughtered in commercial slaughterhouse at the age of 25 weeks and average weight of 134 kg. Hams were trimmed into a prescribed shape (average trimmed weight 12.8±1.4 kg) and processed according to the rules of the consortium for *Kraski prsut*. Shortly after, ham processing commenced; this consisted of salting (only sea salt was used, lasting for 18 days at 2-4°C), resting (at 4-6°C and 70-85% relative humidity, lasting for 11 weeks), drying and ripening phase (at 14-20°C, 60-80% relative humidity, lasting for 10 and 42 weeks, respectively), reaching 36.6% weight losses at the end of processing (460 days).

2.2. Skatole and androstenone determination

To determine the concentrations of boar taint compounds, samples of subcutaneous fat were taken from the carcasses at the slaughter line at the level of last rib, and also on hams at the end of the ripening process (central part of the ham, lateral position). Skatole and androstenone in subcutaneous fat were measured using HPLC according to the procedure of Hansen-Møller[11] modified as described in Batorek et al.[3]. Concentrations were expressed on the basis of the liquid fat. The limits of detection were 0.03 μg/g and 0.24 μg/g for skatole and androstenone, respectively.

2.3. Data analysis

Data were analyzed using the SAS statistical software (SAS Institute, Inc., Cary, USA). Regression analysis was performed using procedures REG and descriptive statistics calculated with UNIVARIATE procedure.

3. Results and discussion

In fresh subcutaneous fat, the concentrations of androstenone were in the range of 0.80 to 3.28 μg/g liquid fat (with mean value 1.54 μg/g liquid fat and median 1.24 μg/g liquid fat), whereas the concentrations of skatole were in the range of 0.03 to 0.62 μg/g liquid fat (with mean value 0.20 μg/g liquid fat and median 0.08 μg/g liquid fat). In the dry-cured ham, concentrations were lower: androstenone concentrations were in the range of 0.51 to 2.20 (mean value 0.99 μg/g liquid fat and median 0.78 μg/g liquid fat) whereas skatole concentrations were in the range of 0.03 to 0.41 (mean value 0.16 μg/g liquid and median 0.08 μg/g liquid fat). These differences denote a reduction of boar taint substances that reached, after 15 months of dry-curing process, on average 36% and 20% reduction for androstenone and skatole, respectively. Although it has been shown that certain processing procedures (for example cooking) can reduce androstenone and skatole content in meat products[9], to our knowledge there is no literature data