

Consumer response towards skatole and androstenone in meat from entire males

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Introduction: Androstenone (AND) and skatole (SKA) are considered the main compounds responsible for boar taint in meat from entire male pigs (Patterson, 1968). Meat with boar taint is declared unfit for human consumption due to organoleptic anomalies, particularly pronounced sexual odour, according to EU legislation (No. 854/2004). A sorting limit for the compounds can prevent the most boar-tainted meat from reaching the market.

The purpose of the study was to determine the effect of SKA and AND on consumer response and to estimate the risk of dislike at different levels. Furthermore, the experiment was set up to validate a previously established model for setting a sorting limit in the meat for AND and SKA (Christensen, et al., 2019). This trial was conducted on a larger number of consumers.

Materials and methods: The survey included a representative number of people from Denmark who regularly eat pork. The study was conducted at the Danish Technological Institute's locations in Taastrup and Aarhus in October - November 2019.

579 consumers assessed liking of boneless chops from 16 castrates and from 50 entire males with variable content of SKA (between 0.02 and 1.00 ppm) and AND (between 0.4 and 9.2 ppm) measured in back fat. Both males and castrates were selected within a weight range of 82-94 kg slaughter weight. The pH measured the loin for both males and castrates was between 5.45 and 5.80. The consumers were asked "how much did you like the chop?" and were asked to rate it on a 15 cm unstructured line scale ranging from "do not like at all" to "like very much". For illustration of possible sorting limits, a threshold, on the 15 cm liking scale, was defined such that consumer evaluations of liking below the threshold were taken as expressions of dislike or dissatisfaction, while consumer evaluations of liking above the threshold were taken as expressions of liking or satisfaction. The risk of consumer expressions of dislike was modelled as a function of the concentrations of SKA and AND.

In addition, consumer sensitivity to AND was measured. To investigate consumer sensitivity, a method developed by Göttingen University using sniffing paper sticks was used (Meier-Dinkel, Sharifi, et al., 2013). The paper sticks were prepared using a solution of AND of 20 µg/g. Consumers were presented with a total of 9 sticks, 3 of which the AND solution were added. Two similar blank samples and one sample with AND were placed in each row. The order of the position of the odd sample was randomized between consumers. If all three triangles with the concentration of AND were correct, the consumer was categorized as being sensitive.

As a supplement, participants were asked to answer a questionnaire covering their eating habits and use of pork as well as demographic factors.

To determine the specific sensory properties of the chops a sensory descriptive analysis was performed by a trained sensory panel in January 2020. This was done by performing a sensory descriptive analysis (ASTM_NML 13, 1992; ISO 4121, 2003; ISO 13299, 2003) on one sample from each animal using a trained sensory panel of nine assessors to determine the specific sensory properties of the meat products.

Results: Consumers preferred meat from castrates, however a considerable variation in their evaluation was found both when tasting meat from castrates and from entire males with varying content of SKA and AND. A large variation was also observed among the consumers sensitive to AND (36 %). Both SKA ($P < 0.001$) and AND ($P = 0.002$) resulted in a decreased liking with SKA having the greatest impact. An interaction between AND and SKA was found ($P < 0.001$), in which liking - at low SKA levels - showed a positive correlation with increasing AND level.

Liking was also significantly influenced by other factors. Tenderness was the most important attribute for liking independently of AND and SKA level. The serving order of the chops also had an impact on liking, with the latest servings resulting in the highest liking score. Age group of the consumer also effected liking, with a decreased liking the older consumers were. Furthermore, the consumers sensitive to AND were, as expected, more critical in their evaluation. However, the impact of age and sensitivity were less than that of AND and SKA content.

To sum up the most important properties to the consumers when eating chops were (in order of priority):

- 1) Tenderness
- 2) Skatol content, interaction between AND and SKA and serving order
- 3) AND content
- 4) Sensitivity to AND
- 5) Age group

When modelling the risk of consumer expressions of dislike, it was not possible to validate the previously established model for setting a sorting limit. The study did not provide a stable model for predicting consumers' risk of a dislike. On the contrary, the study showed that there are major uncertainties associated with defining sorting criteria for sorting male pigs based on consumer data.

Conclusions: The study emphasizes that setting a sorting limit based on consumer evaluations is associated with great uncertainty. In this study, the huge variation in consumer liking in combination with the other dependencies meant that the effect of sorting was diminished (Bonnichsen & Mørch, 2020).

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Literature:

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