Boar taint levels and performance data in Pietrain sired crossbred males in Germany (EN-Z-EMA)

Luc Frieden[1], D. Mörlein[2], L. Meier-Dinkel[2], P. Boeker[3] & Ernst Tholen[1]

[1] Institute of Animal Science, Group of Animal Breeding and Genetic, University of Bonn, Endenicher Allee 15, 53115 Bonn, Germany ; e-mail: lfri@itw.uni-bonn.de

[2] Department of Animal Science, Georg-August-University of Göttingen, Albrecht-Thaer-Weg 3, D-37075 Göttingen, Germany; e-mail: daniel.moerlein@agr.uni-goettingen.de

[3] Institute of Agricultural Technology, Group of Technology of Crop Farming, University of Bonn, Nußallee 5, D-53115 Bonn, Germany; email: boeker@uni-bonn.de

Introduction

For centuries, pigs have been castrated surgically to prevent boar taint and to fulfill sensory consumer demands. Castration, both with and without anaesthetic, has received criticism in recent years from animal welfare groups. Alternatives to castration – e.g. fattening of entire boars – is currently discussed in many European countries.

Objectives of an ongoing national research project in Germany are:

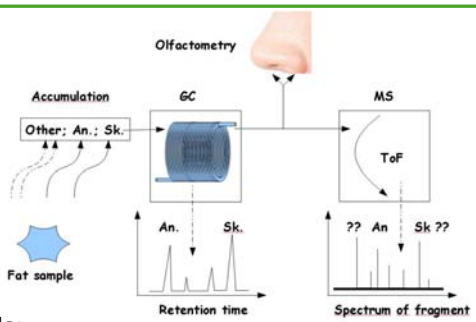
a) Analysis of the performance and frequency of carcasses having boar taint of Pietrain × F1 boars

b) Elucidation of detection methods of boar taint

c) Evaluation of genetic foundation of boar taint and its relationship to maternal and paternal fertility in order to reduce the boar taint problem within Pietrain sired crossbreds

Materials & Methods

- 1000 Pietrain × F1 entire male offspring of 100 - 150 AI boars
- ca. 500 simultaneously tested sows/castrates
- 5 testing stations, single (Nr.: 1, 2) and group (Nr.: 3, 4, 5) housing
- 2 slaughter weight groups: 85 and 95 kg



- Samples taken from loin and belly for sensorial assessment
- Backfat samples, neck region, for reference analysis / odour detection

- Chemical reference methods:
  - Skatole, indole: HPLC-FD or Stable Isotope Dilution Assay (SIDA),
  - Androstenone: GC - MS or SIDA
- Off-odor detection methods:
  - Chemo sensor array; Time of flight (ToF)-Mass spectrometry (MS) methods

First results

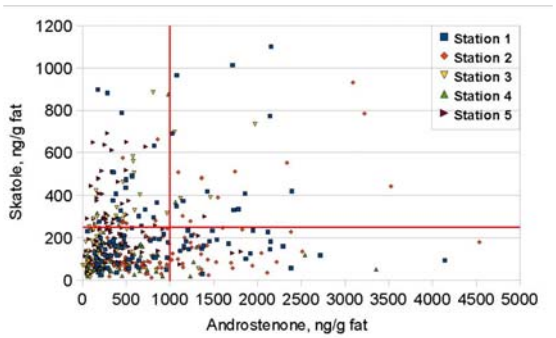


Fig. 1: Relationship between skatole and androstenone (n=467)

- Depending on the testing station the frequency of carcasses which have less than 250 ng/g fat skatole and 1000 ng/g fat androstenone ranges between 46 % and 83 % (Tab. 2).
- Variation between the results of the testing stations might be explained by housing or genetic effects (Fig. 1).
- Compared to sows, boars have better daily gain (+46 g), feed conversion (-0.09 kg) but lower meat percentage (-2.2 %) (Tab. 1).
- Weak correlations
  - between androstenone and skatole (Fig. 1)
  - between boar taint components and slaughter weight or slaughter age

Tab. 1: Performance differences between boars and sows

Traits / Gender		boars	sows
Daily gain	g	918[b*]	872[b]
Feed conversion	kg	2.25[b]	2.34[a]
Drip loss, 24h	%	3.3[a]	3.9[a]
Meat percentage, Bonner Formula	%	61.2[b]	63.4[a]
Meat percentage, belly	%	60.6[b]	62.7[a]

*Rows with different letters are significantly different ($p < 0.05$)

Tab. 2: Frequency of carcasses (%) of different thresholds for androstenone and skatole

Androstenone (ng/g fat)	< 1000	< 500	< 1000	> 1000	> 1000
Skatole (ng/g fat)	< 250	< 250	> 250	< 250	> 250
Station 1	46.0	29.0	19.0	23.0	12.0
Station 2	51.6	23.2	7.4	30.5	10.5
Station 3	68.1	54.2	25.0	1.4	5.6
Station 4	83.1	57.6	6.8	8.5	1.7
Station 5	73.0	63.1	22.7	3.5	0.7
all stations	63.4	45.6	17.1	13.5	6.0

Conclusion

The high variation in androstenone and skatole levels between testing stations indicates the possibilities to reduce boar taint. However, even the lowest percentage of pigs were above generally accepted thresholds and cannot be accepted by retailers and consumers. Reduction of slaughter weight and age will presumably not lead to reduced androstenone & skatole content. Breeding against boar taint should be successful, but the consequences for maternal fertility remains unclear. Relationship between androstenone, skatole and sensory perception is subject for further research.

This EN-Z-EMA project was financed by the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV) through the Federal Institute of Agriculture and Food (BLE).