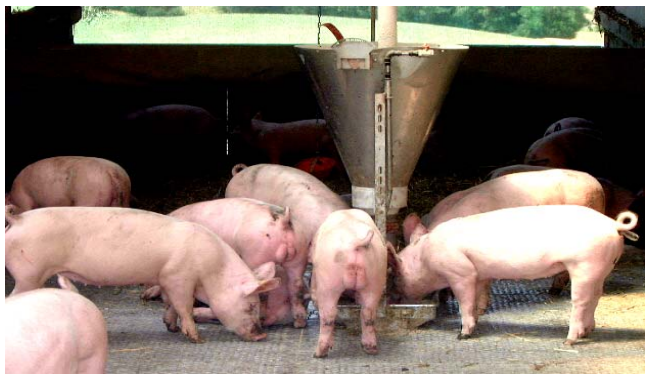
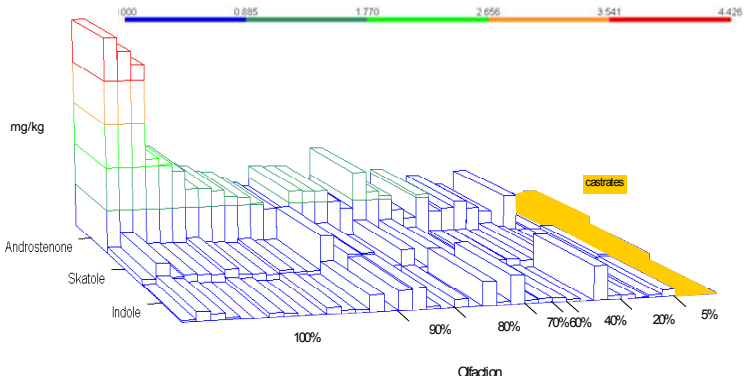
Potential of an Electronic Nose Based on Mass Spectrometry to Sort Out Boar Tainted Carcasses

S. Ampuero, P.-A. Dufey and G. Bee, Agroscope Liebefeld-Posieux, Swiss Federal Research Station for Animal Production and Dairy Products (ALP), Posieux, Fribourg, Switzerland

The Swiss parliament has decided to ban castration of piglets without anesthesia starting 2009. Rearing intact male pigs to market weight could constitute one possible alternative solution. However, the development of a reliable, fast and objective method to detect carcasses with the undesirable boar-odor is a prerequisite for boar production. An electronic nose based on mass spectrometry was evaluated for its potential to sort out boar tainted carcasses.





Matrix plot of Androstenone, Skatole and Indole back fat-concentrations, determined by HPLC in mg/kg, of 35 boars and 3 castrates. Classification of samples (x-axis) is based on the % of boar-detection by a trained panel (8-people) via olfaction of heated fat tissue.

Cross Correlations

Skatole	-		
Indole	-	0.616	
%Olfaction	0.558	-	-

Conclusions

Classification of carcasses by boar odour is feasible with a Smart Nose-pyrolysis and SPME.

Pyrolysis is faster, therefore more suitable for on-line use in a slaughterhouse.

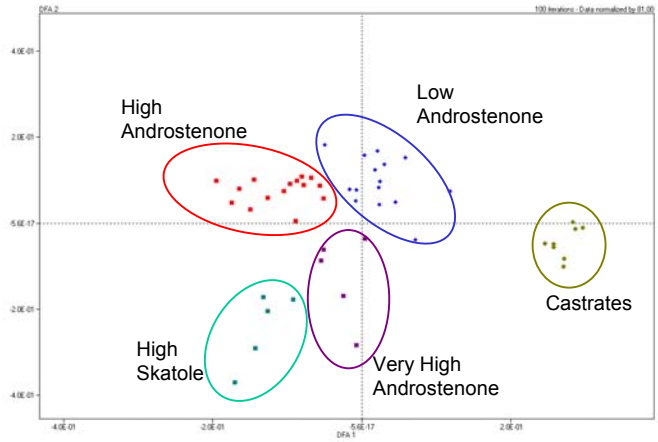
Classifications are strongly dependent on model samples. A better comprehension of the relationship between quantitative analysis and sensory responses is necessary.

Standardization methods are crucial for the pyrolysis technique.

The electronic nose (Smart Nose 151, LDZ, Switzerland) with a quadrupole mass spectrometer as a detector was tested using two different sampling techniques.

Solid phase micro-extraction: 2 g of adipose tissue sealed in a 10 mL glass vial and preheated to 90°C for 30 min was sampled with a DVB/carboxen/PDMS Supelco fiber for 1 h. Desorption occurred in the injector at 200°C for 7 min.

Pyrolysis: A few µg of melted adipose tissue were introduced in silica capillaries. Pyrolised at 700°C, Mass scanning occurred during 200 sec under slight N2 flow.



DFA model classification based on Smart Nose-pyrolysis data (mass scanning from 10 to 160 amu). 100% correct classification. Discriminating variables: 55*, 57*, 69*, 71*, 79*, 84, 85*, 89***, 90***, 91*, 93*, 94*, 111*, 124*, 130** amu (*belong to Androstenone MS, **belong to Skatole MS, ***belong to Indole MS)
98% correct classification into boar and castrate samples with Smart Nose-SPME (not shown)

Correct classification of 15 out of 23 unknown samples into two groups: low odor and strong odor (< and >1.11 ppm Androstenone). However, 5 of 8 misclassifications (false positives) agree to sensory classification (100% detection by olfaction).

S. Ampuero, P.-A. Dufey and G. Bee,
silvia.ampuero@alp.admin.ch, www.alp.admin.ch
2005 Joint ADSA-ASAS-CSAS Meeting, 7/24-28/2005

agroscope
LIEBEFELD-POSIEUX