

# Characterisation of Novel Technology for Boar Taint Detection

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## Introduction

Boar taint is the term given to the unfavourable flavour and aroma sometimes experienced with pork meat. The two primary compounds responsible for boar taint are skatole and androstenone.

Currently there is no EU approved method to test for boar taint online in abattoirs (Haugen *et al.*, 2012). Therefore, there is a real industrial need for technology which can rapidly detect taint compounds with high specificity and sensitivity without any sample preparation.

## Experimental

To validate our novel sensor, samples must be analysed by both a well-established analytical technique such as gas chromatography (GC) and our novel sensor technology.

A Perkin Elmer Clarus 580 gas chromatograph linked to a nitrogen specific detector was used for skatole determination. The GC method uses a split injection, an oven temperature programme, and a CP-Wax 57 CB column with helium as the carrier gas.

The analyte 3-methylindole (skatole) and the internal standard 5-methylindole were obtained from Sigma Aldrich (Dorset, UK). Standards were prepared by dissolving the required mass in a known volume of HPLC grade acetonitrile.

The preparation method for adipose tissue samples uses a microwave to liquefy the tissue, 0.1 mL of liquid fat placed in 1 ml of hexane, after vigorously shaking 1 ml of acetonitrile is added to the solution and vigorously shaken again. The sample is then centrifuged at 2000 rpm for 15 minutes, the upper layer removed and 0.5 ml of the remaining sample is combined with the internal standard (0.5 µg/ml).

## Results

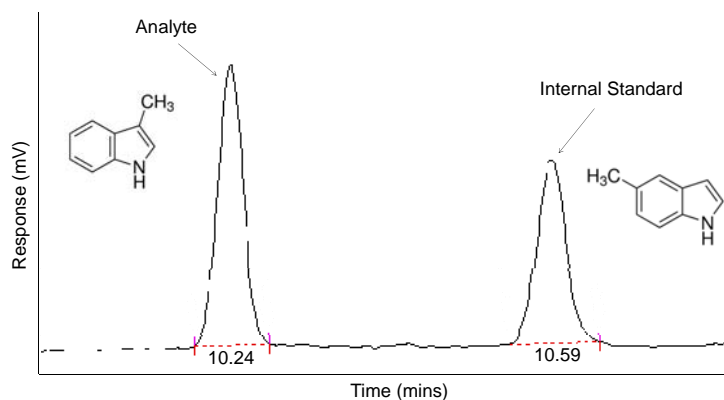


Figure 1. Typical gas chromatographic separation of 3-methylindole and 5-methylindole using a nitrogen specific detector

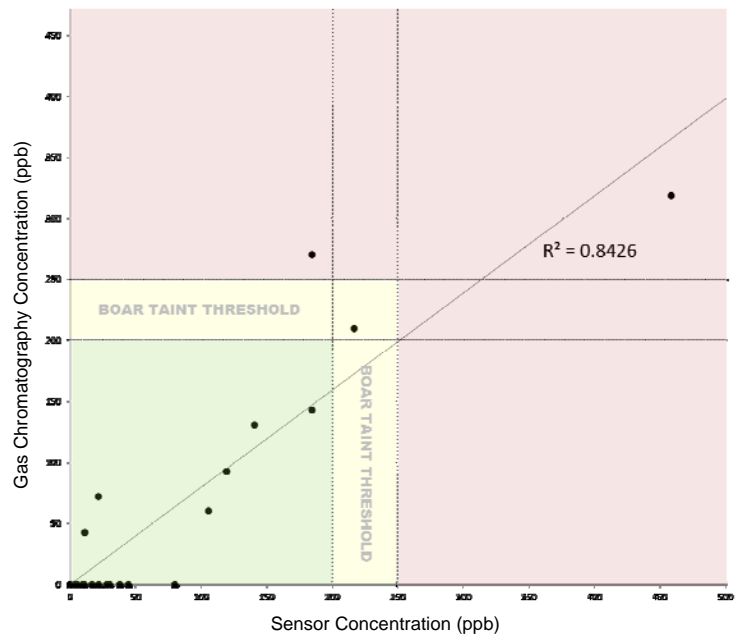


Figure 2. Preliminary correlation plot for skatole sensor validation via gas chromatographic method

## Conclusions

The typical chromatogram in Figure 1 shows good separation of skatole and the internal standard. The internal standard method for quantification allows for the elimination of any manual injecting errors. The detector used in conjunction with the GC specifically measures compounds containing nitrogen which reduces background signal and improves quantification of peaks.

The preliminary data displayed in Figure 2 shows a good correlation for skatole concentrations in adipose tissue between the sensor and the gas chromatographic response, with an  $R^2$  value of 0.843.

Advantages of the novel sensor over conventional methods such as gas chromatography:

- Analysis performed in minutes compared to hours
- No sample preparation required instead of hours of labour intensive preparation with a solvent extraction
- Can be integrated into a hand held device whereas traditional methods use large laboratory based instrumentation.

## Future Work

- Further adipose tissue samples to be analysed for skatole levels
- Validation method for the analysis of androstenone recently developed; data collection currently on-going
- Analysis of both the compounds in samples from different breeds of pigs to help determine the genetic role played in boar taint prevalence.

## Reference

- Haugen, Brunius, & Zamaratskaia (2012) *Meat Science*, 90, 9-19.