EARLY AND RELIABLE DETECTION OF BOAR TAINT AND ITS GENETIC PREDISPOSITION

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Introduction

Pork products originating from intact male pigs may have a distinct and unpleasant odour, flavour or taste, commonly known as boar taint. It is mainly perceived when the fat fraction in the meat is heated. Two principal compounds are presumed to cause this phenomenon, although the extent of their contribution to boar taint is still disputed: androstenone (male sex hormone) and skatole (metabolite of amino acid tryptophan).

As boar taint is an unwanted characteristic in the pork industry, it has to be avoided. However, welfare issues rise, as surgical castration is the most common and widespread method to eliminate this phenomenon. Governments have become more aware of these animal welfare concerns and are responding by adjusting legislation. This leads to a demand for the development of alternative solutions to surgical castration.

Several alternatives (e.g. immunocastration, chemical castration) are currently being investigated but are not ready yet for implementation in practice. As legislation prohibiting castration is pending in Belgium, focus is drawn on the development of reduction and detection methods to prevent boar tainted meat or meat products from reaching the consumer, rendering the production of intact males possible.

The purpose of this research project is to find a reliable method to reduce the occurrence of boar taint and to timely detect the presence of this abnormal odour, rendering surgical castration unnecessary and thereby enhancing animal welfare and making the production of entire male pigs possible.

Materials and Methods

The research will focus on three main strategies:

1. Reducing boar taint by altering management strategies. In a series of experiments the effects of various feed ingredients, of genotype in conjunction with slaughter weight, and of hygiene status on the presence of boar taint in the meat and fat will be investigated. Meat and fat samples will be taken, vacuum packed and stored at -18°C until analysis. Presence of boar taint will be assessed by a consumer panel, and linked to the results of both an expert panel and laboratory analyses of specific boar taint components using liquid chromatography-mass spectrometry (LC-MS).

2. Finding a predictor that will permit a swift detection of boar taint in live animals. This would make timely identification of pigs prone to develop boar taint possible, allowing us to take specific measures (immunocastration, early slaughtering) to prevent these animals from developing this taint. Hence, we will investigate whether the intensity of boar taint can be predicted by measuring the development of physical parameters, by observing the behaviour as well as by other measurements such as skin lesions and hygiene status.

For this purpose, a total of 102 animals will be observed for 24 h every fortnight using a camera line-up and a video-recording system. These video images will be analysed using The Observer (Noldus Information Technology) during which aggressive, sexual and social behaviour will be scored. Every fortnight, testis size of each boar will be measured using callipers and skin lesions and hygienic status will be scored.

3. Post-mortem detection of boar taint to prevent boar-tainted meat from reaching the consumer. Several detection systems will be implemented to determine whether or not boar taint is present in meat or fat samples. A threshold level for the acceptability of boar taint will be established for the Belgian consumer, by presenting the meat samples to a consumer panel. The reasons for acceptance or rejection of the meat by the consumer panel will be elucidated further by presenting the meat to an expert panel that is trained to detect and characterise boar taint compounds. The presence of skatole, indole and androstenone levels will be quantified at the Faculty of Veterinary Medicine of the University of Ghent (BE) using a LC-MS technique. The assessments by the consumer panel will also function to fine-tune electronic noses and to train sniffer pigs to detect boar taint in meat or fat samples. A test-setup has been build and clicker training is used to teach the sniffer pigs how to use the experimental set-up to indicate tainted meat. Different types of electronic noses will be investigated and fine-tuned for the post-mortem detection of boar taint in meat and fat samples or on the slaughter line by the Royal Veterinary and Agricultural University (KVL), Copenhagen (DK) in cooperation with Matforsk, Ås (NO). Finally, the soldering iron method will be implemented in the slaughter line and evaluated for provisioning of an indicative value of the intensity of boar taint.

Results and Discussion

This project started in June 2005 and will take 4 years to complete. The sniffer pigs are currently being trained. Observations of behaviour and related measurements in fattening pigs are being carried out in order to detect differences between boars that develop boar taint and boars that do not. The experiment with the different dietary ingredients has just finished and samples have been taken to perform analyses as described above. The expert panel has been trained and consumer and expert panel evaluation of meat and fat samples of the 111 pigs from this experiment will start soon.

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