Identification of Boar-Tainted Pork Carcasses with an Electronic Nose

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Production of entire males on a large scale is greatly hindered by the lack of objective, reliable and fast methods to detect boar tainted carcasses. In a preliminary study we showed that a mass spectrometry (MS) based electronic nose was potentially suited to detect boar tainted samples. The aim of the present study was to develop a system consisting of a MS electronic nose (Smart Nose 151, LDZ. Switzerland) coupled with an automatic-sampler pyrolyser (CDS pyroprobe AS2500 APLUS). The chemometric classification models are established against reference classifications based on HPLC determination of the principal boar taint compounds in the adipose tissue: androstenone (A), skatole (S) and indole (I).The analysis is performed by introducing 0.5 µL of liquefied fat in a capillary tube. The gas phase produced by pyrolysis at 600°C is instantaneously transferred to the ionization chamber of the MS. The generated data is recorded during 240 s by scanning between 10 to 250 amu at 50 ms/amu. The classification models were developed by multi-class SVM (Support Vector Machine) and variable selection via genetic algorithms. Over a period of 12 months, a total of 353 adipose tissue samples originating mainly from Swiss Large White and Landrace boars and barrows were analyzed. Large variations in the age and BW at slaughter, the rearing conditions and the feeding regimes were present in the set of samples. Based on sensory evaluations the reference classes were defined as: **strong** boar taint: A > 1.0 mg/kg or S, I > 0.16 mg/kg, **no** boar taint: A ≤ 0.5 mg/kg and S, I ≤ 0.16 mg/kg and **mild** boar taint: 0.5 < A ≤ 1.0 mg/kg and S, I ≤ 0.16 mg/kg. Semi-external validations, with 17 to 42% of new samples not included in the models, reveal 98% of correct identification rates of strong boar tainted samples. The results of this study confirm that a fast, reliable and objective detection of boar tainted carcasses is possible.

KEYWORDS

Boar taint detection

Electronic nose

Pyrolysis

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