

At-line boar taint classification by means of Rapid Evaporative Ionisation Mass Spectrometry (REIMS)

Lieselot Y. Hemeryck¹, Anneleen I. Decloedt¹, Julia Balog², Steve Huysman¹, Margot De Spiegeleer¹, Jella Wauters¹, Steven Pringle³, Aurelien Boland⁴, Sara Stead³, Lynn Vanhaecke^{1,5,*}

¹ Ghent University, Faculty of Veterinary Medicine, Lab. for Chemical Analysis, Merelbeke, Belgium

² Waters Research Centre, Budapest, Hungary

³ Waters Corporation, Wilmslow, United Kingdom

⁴ Waters Corporation, Zellik, Belgium

⁵ Queen's University, Institute for Global Food Security, Belfast, United Kingdom

* lynn.vanhaecke@ugent.be

Increasing awareness of animal welfare has led to a European incentive to ban the surgical castration of piglets. A valid alternative for castration is the rearing of entire male pigs, but this allows the (re)occurrence of boar taint, an off-odour in meat from entire boars [1]. Hence, due to adverse consumer reactions to pork with boar taint, the rearing of entire boars requires valid boar taint mitigation strategies. However, the introduction of Rapid Evaporative Ionisation MS (REIMS) offers compelling perspectives for the rapid as well as accurate at-line detection of boar taint by significantly reducing analysis time and workload, yet enhancing research output and efficiency [2].

In this study, REIMS was used as a direct analysis technique to train predictive models for identification of boar taint above the odour threshold (based on sensory (soldering iron method) as well as chemical analysis (UHPLC-HRMS analysis of indole, skatole and androstenone levels) [3]. Adipose tissue was sampled using a prototype bipolar handheld sampling device connected directly to a Xevo G2-XS Q-TOF system equipped with REIMS source (Fig. 1).

The results demonstrate that untargeted mass spectrometric profiling in negative ionisation mode enables the construction of predictive models using LiveID, AMX and Simca ($Q^2 = 0.547$, $R^2Y = 0.652$ and $p = 0$) for the classification of carcasses according to boar taint status based on alterations in lipid profiles. As REIMS eliminates sample pre-treatment with analysis taking < 10 seconds, it offers significant potential as the first technique enabling accurate *in-situ* detection of boar taint. REIMS is a promising and highly innovative tool for several types of food quality and safety applications, furthermore allowing us to move state-of-the-art equipment and applications from bench to production site.

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References:

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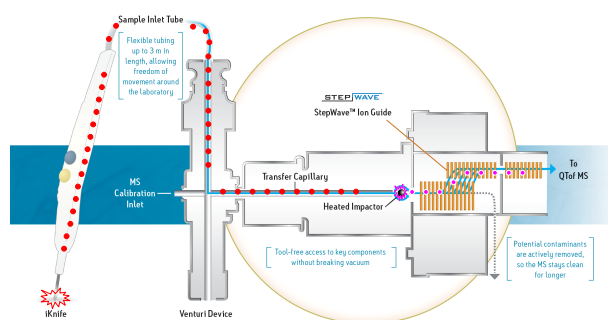


Fig.1. Schematic overview of the REIMS platform.