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Influence of selenium species in aquaculture feeds on the selenium status of farmed rainbow trout

Simon Godin, Stéphanie Fontagné-Dicharry, Maïté Bueno, Philippe Tacon,
Brice Bouyssière, Françoise Médale

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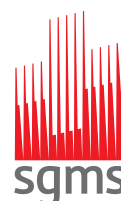
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ABSTRACT BOOK

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ThPS36-40 / Enhanced aroma profiling by GC-TOF MS with variable-energy electron ionisation

Laura McGregor¹, Leonhard Pollack², Luca Calamai³, Steve Smith¹, Nick Bukowski¹

¹Markes International, ²Markes International GmbH, ³Università degli Studi di Firenze

Aroma profiles, such as those for wine, contain a wide variety of components at a range of concentrations. Detection and identification of important keynote compounds with a low odour threshold and compounds responsible for off-odours is a challenging prospect.

Gas chromatography coupled with time-of-flight mass spectrometry (GC-TOF MS) is an ideal choice for such analyses. Fast acquisition speeds, full-range spectra and low detection limits allow trace components, including adulterants, to be identified even within the most challenging of matrices. Novel data-mining software for the pairwise comparison of complex chromatograms is described, allowing such minor differences to be readily distinguished.

An additional complication in the analysis of aroma profiles is the differentiation of isomeric compounds, such as the monoterpenes. Select-eV, a revolutionary variable-energy electron ionisation technology, has been developed to solve this problem by enabling fast and simple switching between hard and soft electron ionisation with no inherent loss in sensitivity. Select-eV provides enhanced molecular ions and reduced fragmentation to aid speciation of challenging compounds.

This poster describes the combination of GC-TOFMS with Select-eV ionisation and novel data mining tools for rapid and reliable aroma profiling.

ThPS36-41 / GC-MS volatile profiles of ground spice from Hungary extracted by HS-SPME compared with distillation techniques

László Lelik, Mariann Csóka, Mária Amtmann, Kornél Korány
Corvinus University of Budapest

Four different SPME fibres (Polyacrylate, PDMS, Carboxen-PDMS, PDMS-DVB) and two distillation techniques (common steam distillation and Likens-Nickerson SDE) were applied to extract the volatile constituents of a special quality sweet, ground red pepper sample. Obviously, the preparation methods produced substantially different scent aromagrams recorded with GC-MS. Each procedure showed individual characters. The two distillation methods were proved to be the most effective ones considering both the number and the sum of the peak intensities expressed in the undecanol-1 internal standard (ISTD). Extracted and identified compounds were methyl esters of open chain acids, terpenes, sesquiterpenes, carotenoid derivatives and the benzene relative components were the most intense. Among the SPME fibres, PDMS-DVB showed the highest general sensitivity in the chemical classes. Among the fruity and sweet nuance bearing “lacton” and “furans” in the high smell activity categories Carboxen-PDMS seems acceptably good. The PDMS fibre is not really proper for red paprika scent analysis and Polyacrylate practically can not be used at all. Comparison of the SPME and distillation results permits to recognize and circumscribe what artefacts, if any, were induced by the distillation steps of the sample preparation procedure.

ThPS36-43 / Influence of selenium species in aquaculture feeds on the selenium status of farmed rainbow trout

Simon Godin¹, Stéphanie Fontagné-Dicharry², Maité Bueno¹, Philippe Tacon³, Brice Bouyssière¹, Françoise Médale²

¹LCABIE, Université de Pau et des Pays de l'Adour, IPREM UMR CNRS 5254, ²INRA, UR1067 Nutrition, Métabolisme, Aquaculture, ³Lesaffre Feed Additives

Introduction

The important development of aquaculture in the last decades has induced a significant rise in the use of aquaculture feeds. Due to the finite availability of fishmeal and fish oil, these traditional major ingredients of fish diets can no longer meet the growing demand. There is therefore an increasing interest in the development of a sustainable aquaculture using feeds based on plant products[1]. In order to match requirements of fish, a supplementation of these alternative feeds is often necessary. This is particularly true for micronutrients such as selenium (Se) which is essential to several metabolic functions like cellular redox status regulation[2]. Assessment of the efficiency of such supplementation is most often performed by measuring total concentration of selenium, but it is nowadays known that a more accurate evaluation of the metabolism is obtained by processing speciation of selenium[3]. Consequently, the aim of this work was to evaluate the inputs of selenium speciation in fish nutrition studies and the added value in studying metabolic utilization of selenium depending on the chemical form of Se brought through supplementation in fish diets.

Methods

Two feeding trials were performed in an experimental fish farm comparing different feeds and supplementations, as well as farming conditions. Total selenium determination and selenium speciation were carried out in both feeds and fish. Total selenium was measured after acid digestion by using inductively coupled plasma mass spectrometry (ICP MS). Selenium speciation was performed by the use of several extractions followed by liquid chromatography coupled to ICP MS measurements.

Results

Quantification of total selenium in feeds and fish tissues brought out significant differences. Selenoamino acids determination was able to differentiate forms of dietary supplementation and allowed for comparison of the use of selenium. Selenium metabolites were found in different tissue and levels were compared.

Conclusions

Speciation of selenium in such feeding trials allows for accurate comparison of different supplementations through metabolism evaluation. In particular, selenocysteine determination reflects the actual use of selenium and its expression through selenoproteins.

Novel Aspect

Selenium speciation takes one step further the results of a feeding trial and clearly brings new informations in comparison to the classic determination of total selenium usually performed.

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[3] K. Bierla, M. Dernovics, V. Vacchina, J. Szpunar, G. Bertin, and R. Lobinski, *Analytical and bioanalytical chemistry*, 2008, vol. 390, pp 1789–1798.