BOOK OF ABSTRACTS

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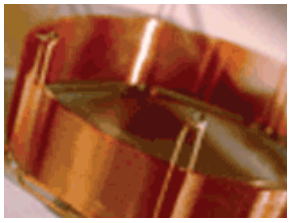

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FLAVOUR SIGNIFICANT COMPOUNDS

E1
UTILIZATION OF FREEZEFRAME® TECHNOLOGY TO CAPTURE KEY FRESHNESS AROMA COMPOUNDS IN SAVORY FOODSTUFF

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In order to capture key freshness imparting molecules Givaudan developed FreezeFrame® technology. This technology uses liquid nitrogen to freeze the sample and preserve molecules that would normally be lost rapidly through evaporation, oxidation or enzymatic degradation, thus maintaining the integrity of the fragile freshness metabolome of the sample. While the sample defrosts under a protective nitrogen atmosphere the volatile constituents are continuously collected using refined trapping techniques and analysed via GC-MS and GC-Olfactometry. In the past this method was applied to a range of fruits enabling both fragrance and flavour creation to capture the freshest aspects of the fruits.
Current savory flavour creation tools often use aromatic essential oils to create herb or spice profiles; however, due to the production process these oils lack the volatile molecules that provide freshness. In order to create savoury flavours imparting 'freshly-chopped' freshness, the FreezeFrame® approach was applied to a range of savory foods such as basil and onion. Comparing the analysis of the basil and onion essential oils with the analysis of the headspace samples obtained using the FreezeFrame® approach and with GC-O information key differences in the aroma profile can be highlighted.
The basil FreezeFrame® headspace sample collected during the first 20 min contains many fresh, volatile monoterpenes such as myrcene, α- or β-pinene, eluting before 35 min in the GC analysis, the basil FreezeFrame® headspace sample subsequently collected between 20 and 40 min shows already a shift towards less volatile and fresh compounds and the basil oil sample is dominated by compounds eluting after 35 min such as γ-cadinene, T-cadinol (heavy woody) or cubenol (spicy herbal) and contains little of the typical green, fresh, citrus, herbaceous notes which characterize the fresh profile of basil.
Comparing the onion FreezeFrame® headspace sample with the essential oil highlights the presence of green, fresh, alliaceous notes in the headspace sample resulting from compounds such as propyl mercaptan, propyl thioacetate or methyl propyl disulfide. The oil sample shows mainly compounds eluting after 35 min missing therefore the freshness imparting compounds and is dominated by sulfurous, cooked alliaceous notes evoked by compounds such as methyl propyl trisulfide.
The better in-depth understanding of the freshness metabolome of savory foods enables flavour creation to develop fresher and more authentic profiles. Quantitative Flavour Profiling was conducted with a trained sensory panel to compare tomato soup flavoured with either a basil flavour based on essential oils or a new freshness flavour based on FreezeFrame®. This revealed clear differences in the sensory profiles. The soup containing the FreezeFrame® flavour showed significantly more 'basil fresh' and significantly less 'cooked tomato' base characteristics.

Keywords: *FreezeFrame®, freshness, basil, onion*

E2
VOLATILE FINGERPRINT BY SPME-GC-FID TO DISCRIMINATE OLIVE TREE VARIETIES INFECTED BY XYLELLA FASTIDIOSA

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Xylella fastidiosa is a Gram-negative, plant-pathogenic bacterium that causes diseases in different plant species [1]. This phytopathogen can be vectored in the foregut of sharpshooter leafhoppers, which feed on the sap of the plant xylem. This plague is causing severe damages in Italian economy whose olive/oil industry is a primary asset, and in the European Union, which is facing the first confirmed record in its territory of this pathogen [2,3].
It is noted that the VOCs emitted by plants are a very complex mixture of several hundreds of components that play an important role in trophic relations in diverse ecosystems and provide important cues for insects in their search for hosts. Moreover, these compounds may work out as direct and indirect plant defense and to attract insects for pollination [4]. For this reason, a headspace solid-phase microextraction/gas chromatography-spectrometry (HS-SPME-GC-MS) technique was proposed to highlight VOC composition differences between twigs coming from healthy and *Xf* infected olive trees.
Four different fibers (polydimethylsiloxane, Carboxen/polydimethylsiloxane divinylbenzene/Carboxen/polydimethylsiloxane, and polydimethylsiloxane/ divinylbenzene StableFlex) were tested and GC-MS conditions were evaluated in order to optimize the number of VOC detected by the proposed method. Finally, differences between samples healthy and *Xf* infected were analyzed by means of a chemometric analysis (PCA, T-test and F-test).
A total of 152 compounds were identified in the analyzed samples: 3 acids, 9 esters, 17 alcohols, 46 methyl esters, 11 other esters, 14 aldehydes, 24 hydrocarbons, 26 terpene derivates, 2 amides, 4 aromatics, 3 furanes and 5 ketones. The results obtained showed in the infected twigs the formation of new methyl esters, a lower content of carbonylic compounds (ketones and aldehydes) and a higher content of hydrocarbons, indicating new metabolites produced by the interaction host/plant that can be involved in the defensive mechanism paths of the olive tree and/or in the infective action of *Xf*. Furthermore, the statistical analysis, which highlights differences among healthy and *Xf* infected trees, has been used to set-up a quick, easy and solvent-free screening method to evaluate the presence of *Xf* in olive trees.

[1] H. A. Arcuri et al., Biochem. Biophys. Res. Commun. 2004, 320 (3), 979–991.
[2] G. P. Martelli et al., Eur. J. Plant Pathol. 2016, 144 (2), 235–243.
[3] L. Bsso et al., Biol. Invasions 2016, 18 (6), 1759–1768.
[4] E. Ranieri et al., Arthropod Struct. Dev. 2016, 45 (5), 432–439.

Keywords: *Xylella fastidiosa, volatiles, olive tree, SPME-GC-MS, chemometric analysis*
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