Nosespace of dark chocolates differing in sensory characteristics using PTR-TOF-MS and link to flavour perception through simultaneous Temporal Dominance of Sensations (TDS)

Zoé Deuscher, Isabelle Andriot, Sylvie Cordelle, Marie Repoux, Renaud Boulanger, Hélène Labouré, Pascal Schlich, Jean-Luc Le Quéré

HAL Id: hal-02932164
https://hal.inrae.fr/hal-02932164

Submitted on 7 Sep 2020

Nosespace of dark chocolates differing in sensory characteristics using PTR-TOF-MS and link to flavour perception through simultaneous Temporal Dominance of Sensations (TDS)

Zoé Deuscher, Isabelle Andriot, Sylvie Cordelle, Marie Repoux, Renaud Boulanger, Hélène Labouré, Pascal Schlich, JEAN-LUC LE QUERE

INRA, Centre des Sciences du Goût et de l'Alimentation (CSGA), 17 rue Sully, F-21065 Dijon, France, jean-luc.le-quere@inra.fr

Aroma of dark chocolate depends on process and cocoa origin and variety. Repeated sensory analyses of standardized chocolates produced from various cocoa beans using a standard fabrication process allowed classifying them in four sensory categories. These categories were confirmed in a PTR-MS analysis of the volatilome of 206 chocolate samples [1]. The objective here was to study the nosespace of a subset of chocolates simultaneously with their temporal profile to better explain the sensory categorization at a perception level.

A Temporal Dominance of Sensations (TDS) evaluation of 8 chocolates (2 selected per category) was done in triplicate by 12 subjects while the aroma released in their nose were simultaneously collected and injected into a PTR-ToF-MS. The two sets of data were analyzed conjointly by defining an index of abundance of each detected aroma compound while a given attribute was dominant: the Abundance While Dominance (AWD) index [2].

The dynamics of perception have been considered only scarcely in comparison to simultaneous in vivo aroma release over time measured by on-line mass spectrometry (nosespace). TDS is able to dynamically capture multidimensionality of perception. The obtained TDS curves clearly differentiated the chocolates that were regrouped by sensory categories as revealed by a principal component analysis (PCA). Although in previous studies pairing nosespace and TDS various temporal links could be proposed [3], no clear relationships could be safely established due to the fact that the conclusions were mainly based on a descriptive analysis of the data conducted at panel level. Computation of the AWD indices at individual level allowed to statistically assess the differences between the products over subjects and replicates and assessed statistically the relationships between the two sets of data. Through correspondence analyses (CA) some relationships between certain aroma compounds and the sensory attributes expected to be related to them were found.

Pairing nosespace with Temporal Dominance of Sensations evaluation of dark chocolates categorized in four sensory groups provided meaningful data that could be analysed at individual level thanks to the AWD indices. Descriptive multivariate analyses of these AWD indices gave interesting clues on the relationships between the aroma compounds released in mouth and their expected perceived sensory attributes.

1. Deuscher Z., Le Quéré J.L. *et al.*, *J. Mass Spectrom.,* submitted (2018).
2. Schlich P., Le Quéré J.L. *et al.*, in Flavour Science (Taylor A.J., Mottram D.S.,Eds.), Context Products Ltd., Leicestershire (UK), 327-332 (2015).
3 Déléris I., Saint-Eve A., Dakowski F., Sémon E., Le Quéré J.L., Guillemin H., Souchon I., *Food Chem.*, 127(4), 1615-1624 (2011).