VégéConso

Consumer Perceptions and Expectations in Chain Management of Fruit & Vegetable Quality ?

Release of the results of research of the COSIVEG programme

13 - 14 JANUARY 2014 IN ANGERS

VEGEPOLYS · ESA · Oniris · Région PAYS DE LA LOIRE · AUDENCIA NANTES · AGRO CAMPUS OUEST · INRA · Ctifl · ua université angers

Innovative methods measuring Sensory interactions

Carole Prost[*a,d,] Pauline Poinot[a,d], Mathilde Charles[a,c,d,e], Gaëlle Arvisenet[a,d], Florence Texier[a,d], Laurent Lethuaut[a,d], Emira Mehinagic[c,d], Evelyne Vigneau[b,d]

[a] ONIRIS, Nantes-Atlantic College of Veterinary Medicine and Food Science, UMR GEPEA CNRS 6144, Food Aroma Research Group, Nantes F-44322, France
[b] ONIRIS, Nantes-Atlantic College of Veterinary Medicine and Food Science, USC INRA 1124, Sensometrics and Chemometrics Laboratory, Nantes F-44322, France
[c] GROUPE ESA, Research Unit GRAPPE, Angers, F-49007, France
[d] LUNAM University Nantes Angers Le Mans, France
[e] Department of Food Quality and Nutrition, Research and Innovation Centre, Fondazione Edmund Mach, Trento, Italy.

*Corresponding author

Full name: Carole PROST
Postal address: ONIRIS, Nantes-Atlantic College of Veterinary Medicine and Food Science,
                    UMR GEPEA CNRS 6144, Food Aroma Research Group, Rue de la géraudière,
                    BP 82225, Nantes F-44322, France
Phone number: +33-2-51-78-55-17
E-mail address: carole.prost@oniris-nantes.fr

Keywords

Cross modal interactions, aroma, taste, texture, volatile compounds, sensory analysis, artificial mouth, fruits

How consumer's food acceptance can be explained by the interactions between aroma, taste and texture during the consumption of real foods like apples

Abstract

In-mouth perception of food is complex and due to a tricky combination of aroma, taste and texture perceptions. Together, these three modalities are key factors that determine consumer's food acceptance. Whereas lots of studies had been done to study cross-modal interactions between aroma, taste and texture perception in food, few of them had been able to determine the relative contribution of each modality to the global perception of complex food products without using model food matrices [1]. Our study deals with the development of two original concepts. The former aims to decrypt aroma, taste and texture interactions and the latter to understand their relationships with the physicochemical properties of food product.

Therefore, the relative contributions of aroma, taste and texture modalities to overall perception, as well as the interactions which can occur between them, were studied during the consumption of real foods as apples.

We developed an innovative sensory approach [2] where aroma, taste and texture perceptions were masked by using different masking agents, allowing then to omit one or several of these sensory modalities during various matching tasks. A multiblock data treatment methodology called Common Components and Specific Weights Analysis (CCSWA) [3] was used to analyse data set issued from rating and matching sensory experiments. Taste was the modality which contributed the most to the discrimination between apples. It was followed respectively by texture and aroma modalities. While taste and texture did not seem to show cross-modal interactions, a binary taste-taste interaction was shown between sweetness and acid taste. In a similar way, cross-modal interactions between olfactory and gustative perceptions were demonstrated.

To go further, the Food Aroma Research Group of ONIRIS (UMR GEPEA 6144 GEPEA) has developed an original system, named the MMS "Mouth to Nose Merging System" dedicated to establish the relationship between cognitive perception and the physicochemical properties of a food product [4]. This innovative device combines artificial mastication, aroma release with human sensory evaluation. Judges were asked to eat an apple piece, inducing texture and taste perception, while another odorant extract obtained by artificial mastication was sent to the nose of judges. This method allowed us to understand how orthonasal aroma influenced aroma, taste and texture perception. An integrative device of "in mouth simulator" named AMADEUS is also now available to analyse aroma and taste components during mastication [5].

To conclude, these whole strategies applied on apples have permitted to describe cross-modal interactions and posed hypothesis concerning their physico-chemical, physiological or cognitive origins.

References

[1] Poinot P., Arvisenet G., Ledauphin J., Gaillard J.L., Prost C. (2012). How can aroma-related cross-modal interactions be analysed? A review of current methodologies. Food Quality and Preference 28(1), 304-316.

[2] Poinot, P., Arvisenet, G., Texier, F., Lethuaut, L., Mehinagic, E., Vigneau, E. and Prost C. (2011). Use of sense masking to study sensory modalities singly: Interest for the understanding of apple in-mouth perception. Food Quality and Preference, 22 (6) 573-580.

[3] Qannari, E. M., Wakeling, I., Courcoux, P., & MacFie, J. M. (2000). Defining the underlying sensory dimensions. Food Quality and Preference, 11, 151–154.

[4] Charles, M., Poinot, P., Texier, F., Arvisenet, G., Vigneau, E., Mehinagic, E., Prost, C. (2012). The "Mouth to Nose Merging System": a novel approach to study the impact of odour on other sensory perception. Food Quality and Preference, 28(1), 264-270.

[5] Brevet FRANCE 2013. Bouche artificielle pour l'étude des phénomènes-physico-chimiques et/ou biologiques lors de la mastication et procédé d'analyse des composés liquides et volatils, mettant en œuvre une telle bouche artificielle. Inventeurs : Cataneo C., Lethuaut L., Sorin A., Guilloux M., Lebail A., Prost C. (ONIRIS)