Qualification of Ultra-flash profiling as a method for gathering sensory attributes. Comparison with conventional profiling.

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Background

Due to the cost-intensive and time-consuming conventional Descriptive Analysis, there is a great interest in alternative and fast methods to develop a sensory profile. Such an approach is represented by the young Ultra-Flash Profiling. Ultra-Flash Profiling therefore constitutes a way to provide the industry a fast method for detecting decision-making sensory data, satisfying cost and time pressure for innovative products.

Objectives

The intention of the present study was to compare the methodology of the time and cost saving declared UFP with conventional profiling, regarding the evaluation of the descriptive potential of UFP in the scope of sensory product research. The aim of the project is to identify the sensory characteristics with the conventional Descriptive Analysis conducted on ten apple juice samples. In comparison, it should be determined if Ultra-Flash Profiling is useful in understanding sensory characteristics of apple juices compared to the conventional Descriptive Analysis.

Material and Methods

Sample set

Both Ultra-Flash Profiling and conventional profiling were performed with an identical product set of 10 apple juices from the German market, including five clear and five cloudy samples.

Figure 1: Overview of the 10 included samples from German market

Ultra-Flash Profiling approach

The product set was applied by a trained panel to carry out an Ultra-Flash profile. It should be mentioned, that this panel had never worked with the product apple juice. Unlike the panels classically used in sensory analysis, this panel was not formally trained for apple juice in the beginning with a common descriptors list development. There was only one introductory session, before profiling started.

To fulfill the task a combination of UFP and Napping® positioning was used. Napping® as a recent method allows direct product comparison on a large sheet of paper. First, panellists were asked to position the products to their individual criteria on a large sheet of paper (tablecloth) according to their similarity. General rule: The closer two products are positioned, the more similar they are in the opinion of the respective panellist.

After Napping, the panellists carried out an Ultra-Flash Profiling. For this, panellists were invited to describe each juice by terms they find the most appropriate directly on the sheet. For this task, the panellists were free to use words they like and to use quantifiers (i.e. “very”, “slightly”, “weak”).

Figure 2: Napping positioning© and subsequent generation of sensory attributes within Ultra-Flash Profiling

Conventional Profiling

A second expert panel consisting of 10 experienced panellists (specialized in the profiling of product category juice) conducted classical descriptive analysis. The panel delivered sensory profiles using an agreed descriptor list of 35 attributes, comprising the sample appearance, odour, flavour , mouth feeling and aftertaste.

Data analysis

The extensive dataset from individual Napping® procedure was treated by multiple factor analysis (MFA), which resulting factor map shows the product configuration coming from the coordinates of each apple juice. An improvement compared to previous UFP research was made by simultaneously considering the individual descriptions of the 10 juices in the Napping-positioning®, using statistical method of external preference mapping. Based on that it is possible to interpret the product differences as well as their similarities. Due to the great number of individual citations (156), not all descriptors could be represented. So only terms with quotation frequency higher or equal to 6 times were kept for the analysis.

As it is usually done, the average data from the conventional profile analyzed by ANOVA and PCA.

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Key findings

The Ultra-Flash Profiling method proved to generate a huge number of sensory attributes and the expert panel was able to select relevant attributes to quantify differences between the ten apple juices. In addition the MFA map was interpretable and product positioning on tablecloth informs about their similarities and differences. Figure 3 shows the 35 most mentioned sensory attributes generated within UFP method. It is obvious, that the expert panel especially focussed on the apple intensity, fruitiness, sweetness and sourness to distinguish the juices.

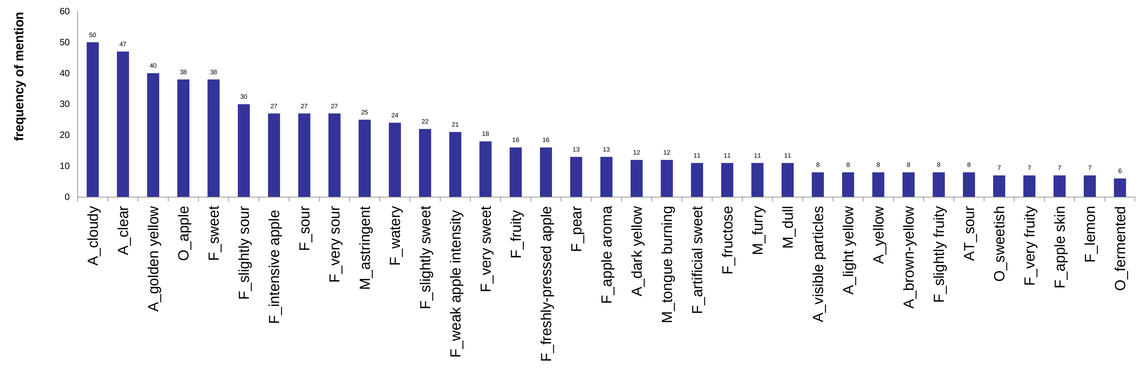

Figure 3: Overview of the sensory attributes sorted by frequency of mention

Visual inspection of the maps: Both methods are able to derive the same general sample positions. Thus, key sample similarities and differences can be measured by both methods.

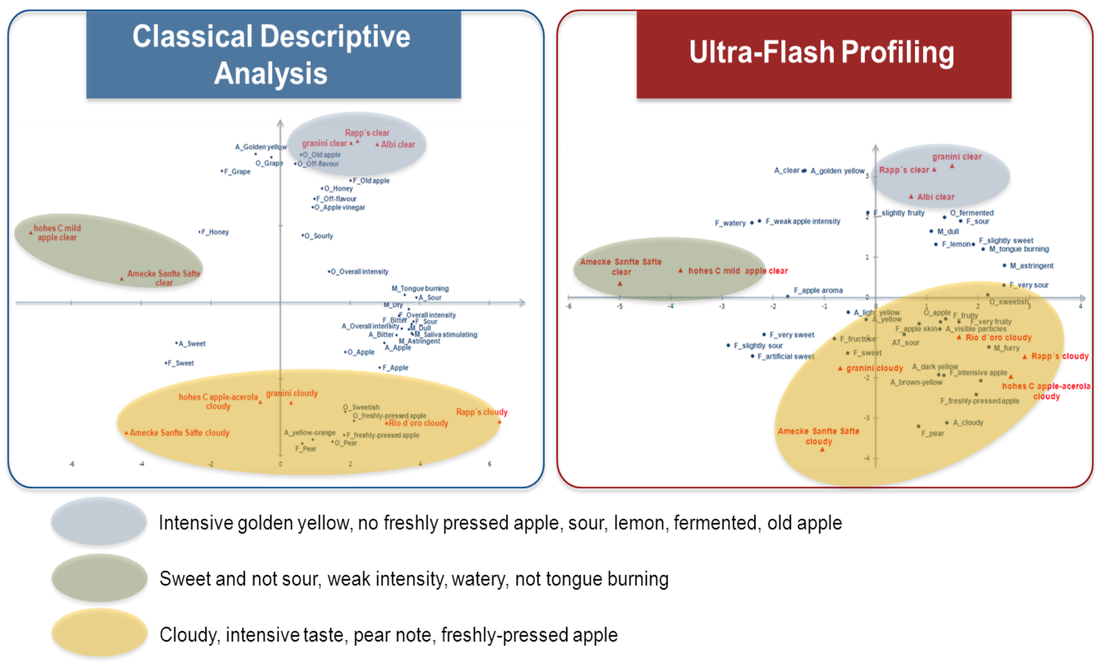

Figure 4: Comparison of maps from PCA of the conventional profile and from MFA of the Ultra-Flash profile

Ultra-Flash Profiling is an innovative way to gather general market insights and to structure a range of products according general similarities and differences.

Main finding is that UFP can be a time- and cost efficient approach if a general market overview is required and only “visual maps” are needed in order to structure available samples and let similarities and differences become obvious. Time-consuming panel training is avoided and within a one hour session an Ultra-flash profile is generated. Whereas the descriptors from conventional descriptive analysis were scored for each juice and refer to definitions, the Ultra-Flash Profiling cannot provide intensities for each descriptor since only individual impressions are gathered and then jointly analysed. Consequently, only with the conventional approaches of Descriptive Analysis it is possible to quantitatively measure small differences between samples and to provide R&D with optimization recommendations.

Conclusion

The good performance of UFP and the comparability of maps and descriptions make it a reliable method which can be recommended for obtaining a description if an accurate profile is not needed and a rough description is sufficient. Descriptive analysis is still representing a comprehensive, flexible and useful sensory method, which supplies detailed information about sensory product properties.

Within the next years it is expected that descriptive analysis expands its range of applications. To meet future challenges and to use the determined potential of innovative, descriptive methods it is of importance to continue investing into the development of sensory product research.

References:

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