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A guide for the selection of suitable sensory methods

Sensory assessors and/or consumers are often used to confirm the suitability and/or acceptability of newly (re-)formulated products. Given reduced lead times associated with product development initiatives, robust but rapid and cost-effective evaluation methods are required.

Referring to a series of recent case studies, this white paper presents and compares several sensory methods, which the industry may want to consider for the evaluation of very small to large sets of products.

The sensory methods include: Campden BRI Free Description (FD), Campden BRI Training Rating Method (TRM), Campden BRI Rapid Attribute Profiling (RAP - a shorter version of the well-known and traditional QDA[®] approach), Campden BRI Relative Profiling (RP), Consensus Profiling (CP), Pivot© Profile (PP), Flash Profile (FP), Ranking Descriptive Analysis (RDA), Free Sorting (FS), Descendant Hierarchical Free Sorting (DHFS), Projective Mapping (PM), Group/Consensus Projective Mapping (G-PM), Polarised Projective Mapping (PPM), Triadic-PSP (T-PSP) and Polarised Sensory Positioning (PSP).

For some insight into the practical implementation but also advantages and drawbacks of each of the above methods, the reader is referred to *An evaluation of traditional and novel sensory and consumer methods suitable for product characterisation: sensory methods* Parts 1 and 2 – R&D Reports 414 and 423, which are available on the project web page at www.campdenbri.co.uk/research/product-characterisation.php

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INTRODUCTION

An ongoing 3-year research project is examining a selection of traditional and novel (or less often used) sensory and consumer methods to support the product development process. It focuses on where/how these methods can be applied and their practical advantages and drawbacks, as well as how the data collected can be processed and how the outputs obtained may appear.

To evaluate their appropriateness relative to the number of samples to be assessed and the project objectives, the methods have been assessed within 4 'scenarios' (Table 1) using various recipes of mature cheddar cheese (standard, fat reduced, organic and lactose-free).

Table 1 – Typical applications / contexts of use for the sensory methods investigated

1-sample scenario (unique product)	2-sample scenario (small set of products)
<p>E.g. assessment of a current or new product</p> <p>Common Descriptive approach:</p> <ul style="list-style-type: none"> - Campden BRI Free Description (FD) <p>Alternative Descriptive approaches:</p> <ul style="list-style-type: none"> - Campden BRI Training Rating Method (TRM) - Consensus Profiling (CP) 	<p>E.g. assessment of a current or standard product vs. a new or reformulated product, or of an internal product vs. a competitor product</p> <p>Common Descriptive approach:</p> <ul style="list-style-type: none"> - Campden BRI Rapid Attribute Profiling (RAP = shorter QDA® version) <p>Alternative 'Comparative-Descriptive' approaches:</p> <ul style="list-style-type: none"> - Pivot© Profile (PP) - Campden BRI Relative Profiling (RP)
5-sample scenario (moderately large set of products)	8-sample scenario (large set of products)
<p>E.g. assessment of a current or standard product vs. a series of prototypes or competitor products</p> <p>Common Descriptive approach:</p> <ul style="list-style-type: none"> - Campden BRI Rapid Attribute Profiling (RAP = shorter QDA® version) <p>Alternative Descriptive approaches:</p> <ul style="list-style-type: none"> - Flash Profile (FP) - Ranking Descriptive Analysis (RDA) - Consensus Profiling (CP) <p>Alternative 'Comparative-Descriptive' approaches:</p> <ul style="list-style-type: none"> - Pivot© Profile (PP) - Campden BRI Relative Profiling (RP) 	<p>E.g. assessment of current or standard product(s) vs. a large number of prototypes or competitor products</p> <p>Common Descriptive approach:</p> <ul style="list-style-type: none"> - Campden BRI Rapid Attribute Profiling (RAP = shorter QDA® version) <p>Alternative Holistic approaches:</p> <ul style="list-style-type: none"> - Free Sorting (FS) - Descendant Hierarchical Free Sorting (DHFS) - Projective Mapping (PM) - Campden BRI Group Projective Mapping (G-PM) <p>Alternative 'Comparative-Holistic' approaches:</p> <ul style="list-style-type: none"> - Polarised Projective Mapping (PPM) - Polarised Sensory Positioning (PSP) - Triadic-PSP (T-PSP)

SENSORY METHODS

The sensory methods investigated as part of the 4 ‘scenarios’ can be classified into 3 main categories, for which there can be some overlap (Table 2):

- **Descriptive methods**, in which the sensory perception is described, or described and quantified (attribute intensities) for each sample;
- **Comparative methods**, in which one or several test samples are compared to one reference sample for specific attributes (‘Comparative-Descriptive’ type) or to several reference samples (called ‘poles’) on an overall basis (‘Comparative-Holistic’ type);
- **Holistic methods**, in which the key characteristics but also the key similarities and differences between a large number of samples are identified.

Table 2 – Methods investigated: abbreviations, full name, protocol and classification

	Abbreviation	Full Name	Definition / Protocol
Descriptive	FD	Free Description	Assessors individually describe each sample
	TRM	Campden BRI Training Rating Method	Assessors individually rate samples for a series of agreed attributes (0-9 category scale)
	CP	Consensus Profiling	Assessors collectively rate samples for a series of agreed attributes (e.g. 0-15 category scale)
	RAP	Campden BRI Rapid Attribute Profiling	Shorter QDA® version used at Campden BRI, where assessors individually score samples for a series of agreed attributes (line scale)
	RDA	Ranking Descriptive Analysis	Like RAP, but samples are ranked instead of being scored based on the intensity of specific attributes
Comparative	FP	Flash Profile	Assessors generate their own attributes to discriminate between the samples and rank the samples based on the intensity of these attributes
	PP	Pivot© Profile	Assessors generate their own attributes to compare a series of test samples to a reference sample in terms of intensity (2-category scale)
	RP	Campden BRI Relative Profiling	Assessors individually score test samples per comparison to a reference sample for a reduced list of agreed attributes (line scale)
	PPM	Polarised Projective Mapping	Assessors individually map a large number of test samples in relation to 3 reference samples or ‘poles’
	T-PSP	Triadic-PSP	For each test sample, assessors individually select the reference sample or ‘pole’ it is the most similar to (and the reference sample it is the most different to in the complete version)
Holistic	PSP	Polarised Sensory Positioning	Assessors individually score the test samples for their degree of overall difference with 3 reference samples or ‘poles’
	FS	Free Sorting	Assessors individually split the test samples into a free number of groups based on their perceived similarities and differences
	DHFS	Descendant Hierarchical Free Sorting	Assessors individually split the test samples into successive groups based on their perceived similarities and differences
	PM	Projective Mapping	Assessors individually map the test samples based on their perceived similarities and differences
	G-PM	Campden BRI Group Projective Mapping	Assessors collectively map the test samples based on their perceived similarities and differences

KEY FINDINGS

1-sample scenario (unique product)

Our research showed that the Campden BRI Training Rating Method (TRM) and the Consensus Profiling (CP) method provided similar results, which were more in-depth than those obtained with the Free Description (FD) method typically used. Consensus was found on the sample's key flavour and texture characteristics.

2-sample scenario (small set of products)

In our research, the results obtained with the relatively new Pivot© Profile (PP) and Campden BRI Relative Profiling (RP) methods were aligned with those obtained with the common, traditional QDA®-style approach (Campden BRI Rapid Attribute Profiling or RAP) in terms of direction of the main differences.

5-sample scenario (moderately large set of products)

Confirming most of our expectations, our research showed that:

- The Consensus Profiling (CP) method provided very similar results to the common, traditional QDA®-style approach (Campden BRI Rapid Attribute Profiling or RAP);
- The Campden BRI Relative Profiling (RP), Flash Profile (FP) and Ranking Descriptive Analysis (RDA) methods provided relatively similar sample information, which was somewhat different from that obtained with the common, traditional QDA®-style approach (Campden BRI Rapid Attribute Profiling or RAP);
- The Pivot© Profile (PP) method highlighted different aspects of the samples: the results obtained with this method were poorly correlated to those obtained with the other methods investigated within this scenario (Table 1).

8-sample scenario (large set of products)

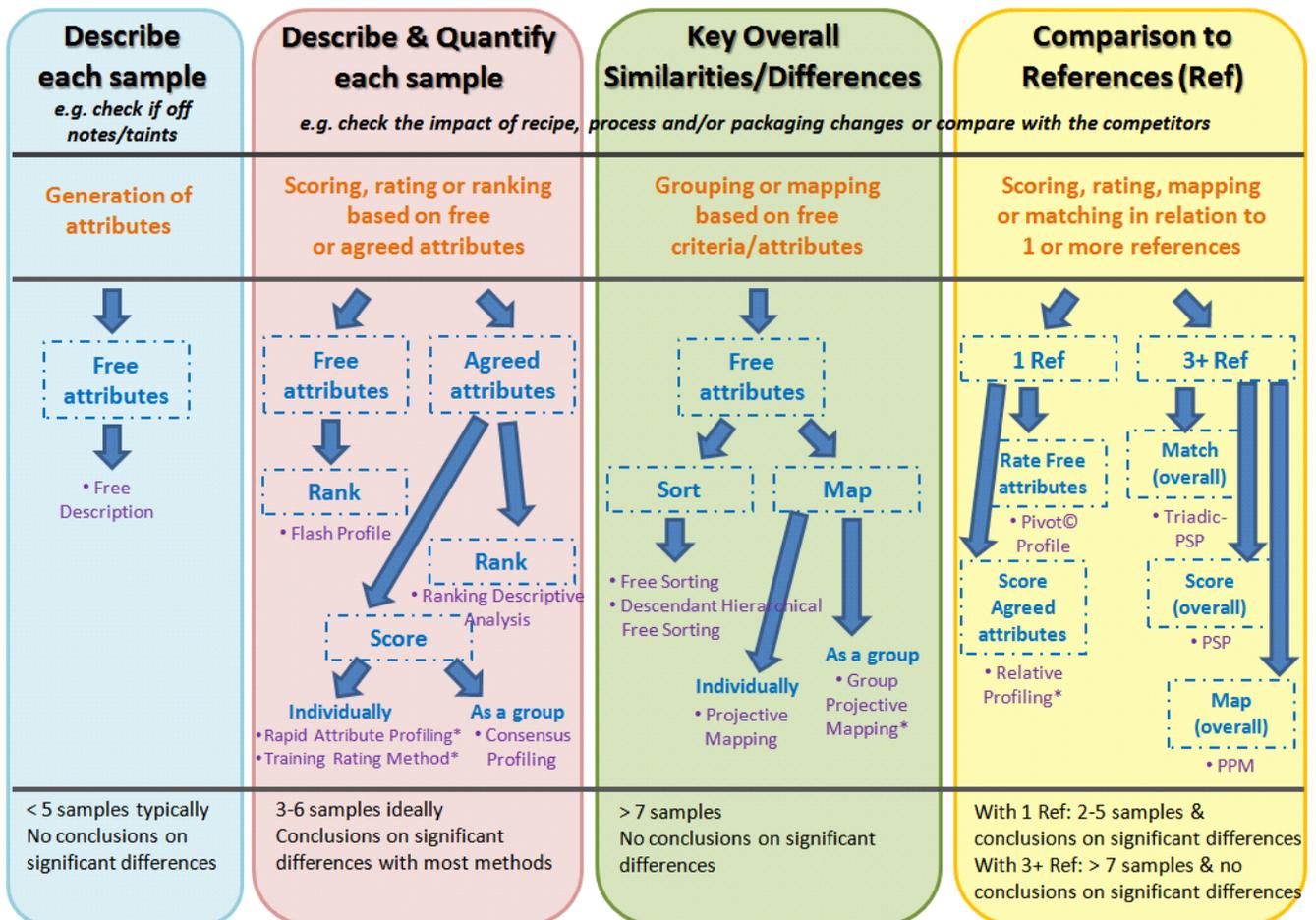
Our case studies showed that:

- Descriptive (QDA®-style Campden BRI Rapid Attribute Profiling or RAP) and Holistic (the two Free Sorting variants and two Projective Mapping variants investigated) methods provided a similar 'picture' of the samples;
- Descriptive (QDA®-style Campden BRI Rapid Attribute Profiling or RAP) and 'Comparative-Holistic' (PPM, Triadic-PSP and PSP investigated) methods provided quite a different picture of the samples;
- Holistic (the two Free Sorting variants and two Projective Mapping variants investigated) and 'Comparative-Holistic' (PPM, Triadic-PSP and PSP investigated) methods provided a very different picture of the samples.
- Amongst the 'Comparative-Holistic' methods (which have been rather popular recently), the PSP and Triadic-PSP methods produced similar results, which were found to be quite different to those obtained with the PPM method – in disagreement with some of the literature findings (limited to date).

DECISION GUIDE

A decision tree is provided below (Figure 1), which you may find helpful in deciding which method to use depending on your objectives and the approach you wish to take with your sensory panel:

Figure 1 – Method decision tree



Legend: Needs/objectives in black / Approach in orange / Sub-approach in blue / Methods in purple (* Campden BRI own)

An evaluation of traditional and novel sensory and consumer methods suitable for product characterisation: sensory methods parts 1 and 2 (RD414 and RD423) provide other practical considerations if you are thinking of using one of these methods.

GOING FORWARD

This short document has hopefully provided you with a quick snapshot of the various methods which we could offer you (using our own internal expert sensory panel) or help you deploy within your organisation. Please get in touch if you would like to know more about sensory (or consumer) methods.

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