COMPARISON OF THREE METHODOLOGIES TO IDENTIFY DRIVERS OF LIKING OF MILK DESSERTS

Gastón Ares, Cecilia Barreiro, Ana Giménez, Adriana Gámbaro

Sensory Evaluation
Food Science and Technology Department
School of Chemistry
Universidad de la República
Montevideo, Uruguay
INTRODUCTION

• Understanding how consumers perceive food products is critical for food companies.

• Food companies need information about which sensory characteristics consumers expect to find in the product, i.e. which sensory attributes drive consumer liking.

• Preference mapping techniques have been widely used to answer this question.
• One of the limitations of these techniques is that they assume that consumers and trained assessors perceive the products in the same way.

• An alternative could be to gather information about consumers’ perception of the product using open ended questions.

• ten Kleij & Musters (2003) allowed consumers to voluntarily write down comments after their evaluations.
OBJECTIVES

• Evaluate the use of an open-ended question to identify drivers of liking of milk desserts

• Compare results to those obtained using internal and external preference mapping techniques
Eight milk desserts with different texture and flavour characteristics were formulated following a $L_8^{27}$ Taguchi design.

Milk desserts were prepared using powdered milk and tap water.

Five two-level variables were considered:
- Starch
- Carragenan
- Vanilla
- Sugar
- Milk fat concentration

<table>
<thead>
<tr>
<th>Sample</th>
<th>Starch</th>
<th>Vanilla</th>
<th>Sugar</th>
<th>Carragenan</th>
<th>Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>4.2%</td>
<td>0.1%</td>
<td>8%</td>
<td>0%</td>
<td>3.2%</td>
</tr>
<tr>
<td>II</td>
<td>4.2%</td>
<td>0.1%</td>
<td>12%</td>
<td>0.02%</td>
<td>0%</td>
</tr>
<tr>
<td>III</td>
<td>4.2%</td>
<td>0.25%</td>
<td>8%</td>
<td>0.02%</td>
<td>0%</td>
</tr>
<tr>
<td>IV</td>
<td>4.2%</td>
<td>0.25%</td>
<td>12%</td>
<td>0</td>
<td>3.2%</td>
</tr>
<tr>
<td>V</td>
<td>5.2%</td>
<td>0.1%</td>
<td>8%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>VI</td>
<td>5.2%</td>
<td>0.1%</td>
<td>12%</td>
<td>0.02%</td>
<td>3.2%</td>
</tr>
<tr>
<td>VII</td>
<td>5.2%</td>
<td>0.25%</td>
<td>8%</td>
<td>0.02%</td>
<td>3.2%</td>
</tr>
<tr>
<td>VIII</td>
<td>5.2%</td>
<td>0.25%</td>
<td>12%</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>
Trained assessors panel

- A panel of 8 assessors characterized the texture and flavour of the samples using Quantitative Descriptive Analysis.

- The assessors evaluated the following attributes:
  - Sweetness
  - Milky flavour
  - Vanilla flavour
  - Thickness
  - Creaminess
  - Melting
  - Density
  - Stickiness
  - Mouth coating

- Unstructured 10-cm-long scales anchored with “nil” and “high” were used to describe attribute intensity.
Consumer panel

- A consumer study was carried out with 80 consumers.
- Consumers evaluated the overall acceptability of the desserts using a 9-point hedonic scale.
- They were also asked to provide up to four words to describe each dessert.

Sample N°

How much do you like this milk dessert?

- Dislike extremely
- Neither like nor dislike
- Like extremely

Mention up to 4 words you would use to describe this milk dessert

__________________________________________________________
Data analysis

- Analysis of variance
- Principal component analysis of trained assessors’ data
- Internal preference mapping
- External preference mapping
- Analysis of open-ended question:
  - Qualitative analysis of elicited terms
  - Correspondence analysis
## RESULTS

### Acceptability scores

<table>
<thead>
<tr>
<th>Sample</th>
<th>Mean acceptability score</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>4.7&lt;sup&gt;b,c&lt;/sup&gt;</td>
</tr>
<tr>
<td>II</td>
<td>5.2&lt;sup&gt;b,c&lt;/sup&gt;</td>
</tr>
<tr>
<td>III</td>
<td>4.0&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>IV</td>
<td>5.7&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>V</td>
<td>4.4&lt;sup&gt;c,d&lt;/sup&gt;</td>
</tr>
<tr>
<td>VI</td>
<td>6.9&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>VII</td>
<td>6.6&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>VIII</td>
<td>4.1&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
</tbody>
</table>
RESULTS

Internal preference mapping

Drivers of liking:
- Creaminess
- Thickness
- Mouth-coating
- Stickiness
- Density
Principal component analysis of trained assessors’ data

- PC1 was mainly related to texture attributes
- PC2 was correlated to flavour attributes
- Samples were sorted into 4 groups
External preference mapping

- Creaminess
- Thickness
- Mouth-coating
- Stickiness
## Open ended question

<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delicious</td>
<td>Delicious, I like it, Nice, Tasty</td>
<td>210</td>
</tr>
<tr>
<td>Thick</td>
<td>Thick, consistent, viscous</td>
<td>138</td>
</tr>
<tr>
<td>Disgusting</td>
<td>Disgusting, I don’t like it</td>
<td>84</td>
</tr>
<tr>
<td>Creamy</td>
<td>Creamy, Very creamy</td>
<td>84</td>
</tr>
<tr>
<td>Sweet</td>
<td>Sweet, Very Sweet</td>
<td>84</td>
</tr>
<tr>
<td>Not very tasty</td>
<td>Not very tasty, Not tasty enough</td>
<td>78</td>
</tr>
<tr>
<td>Milky flavour</td>
<td>Milky, Milky flavour</td>
<td>76</td>
</tr>
<tr>
<td>Soft</td>
<td>Soft</td>
<td>70</td>
</tr>
<tr>
<td>Not thick</td>
<td>Not thick, Not thick enough, Runny</td>
<td>56</td>
</tr>
<tr>
<td>Airy</td>
<td>Airy, With bubbles</td>
<td>42</td>
</tr>
<tr>
<td>Nice flavour</td>
<td>Good flavour, Nice flavour</td>
<td>38</td>
</tr>
<tr>
<td>Awful flavour</td>
<td>Awful flavour, Bad flavour</td>
<td>10</td>
</tr>
</tbody>
</table>

- Responses to the open-ended question identified liked and disliked samples, as well as the sensory attributes responsible for consumers’ preferences.
Drivers of liking:
- Creaminess
- Thickness
- Flavour

Drivers of disliking:
- Milky flavour
- Not thick enough
CONCLUSIONS

• The use of an open-ended question asking consumers to describe the samples provided an interesting insight into consumers’ perception.

• This technique could be useful to identify terms for other methodologies.

• Further research is necessary to evaluate the applicability of this technique for the identification of drivers of liking of more complex food products.
ACKNOWLEDGMENTS

- Organizing Committee of Sensometrics 2008
- Sensory Science Scholarship Fund and GlaxoSmithKline Consumer Healthcare for the Rose Marie Pangborn Sensory Scholarship
- To the assessors and the consumers who participated in the study
THANK YOU VERY MUCH FOR YOUR KIND ATTENTION!