Descriptive Flavor Profiling and Temporal Dominance of Sensation (TDS) of Reduced Sodium Cereal

C. P. Perozzi, L. Dooley, J. Seighman and S.V. Kirkmeyer
Givaudan Flavors Corp., Cincinnati, Ohio 45216, USA, collette.perozzi@givaudan.com

Introduction

- In recent years manufacturers have been reducing sodium in their products to satisfy consumer demands and government guidelines for maximum levels in processed foods.
- Sodium reduction not only affects the saltiness perception of the product, but also the character, intensity and temporal display of many of that product's flavor attributes. Typically key flavor attributes decrease in intensity and the flavor becomes unbalanced.
- Traditional descriptive profiling does not capture the entire experience. When combined with a temporal tool like temporal dominance of sensation (TDS), it is much more effective.

Materials & Methods

Products

- Full sodium cereal
- 20% reduced cereal

Descriptive Profiling

- Quantitative Flavor Profiling (QFP) methodology
- Givaudan trained panel profiled the products using a 100-pt scale that ranged from 0 = none to 100 = intense
- Evaluated flavor attributes only using Givaudan's global Sense It™ language
- Results were analyzed using ANOVA at the 95% confidence level

Temporal Dominance of Sensation (TDS)

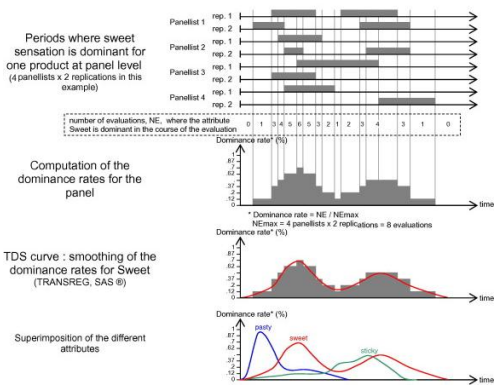
- Givaudan trained panel selected six key flavor attributes and identified the dominant one along a time continuum from 0 to 120 seconds
- Data collection began when the panelist first put the sample in the mouth
- Product was manipulated for 10 seconds before swallowing
- Two replications were performed
- Data was collected in FIZZ and analyzed at the 95% confidence level

What did we ask the panel?

Click on the attribute that is dominant at any given point in time.



How did we construct the curves?



Temporal Dominance of Sensations: Construction of the TDS curves and comparison with time-intensity
Pineau, N.; Schlich, P.; Cordelle, S.; Mathonnière, C.; Issanchou, S.; Imbert, A.; Rogeaux, M.; Etiévant, P.; Köster, E.P.
Food Quality and Preference 20 (2009)6. - ISSN 0950-3293 - p. 450 - 455.

Results

Figure 1 . Descriptive Profiles of Flavored Cereal

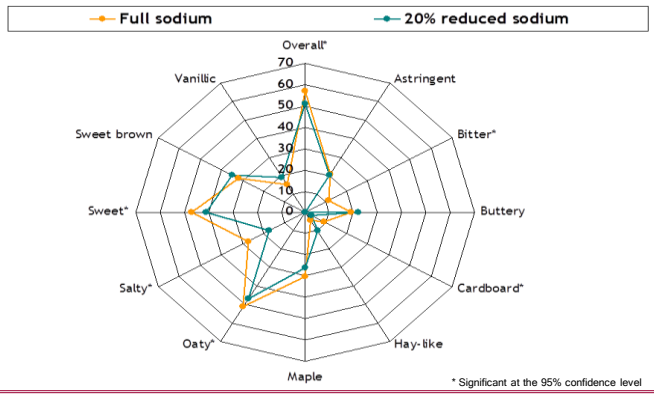


Figure 2 . TDS Profile of Full Sodium Flavored Cereal

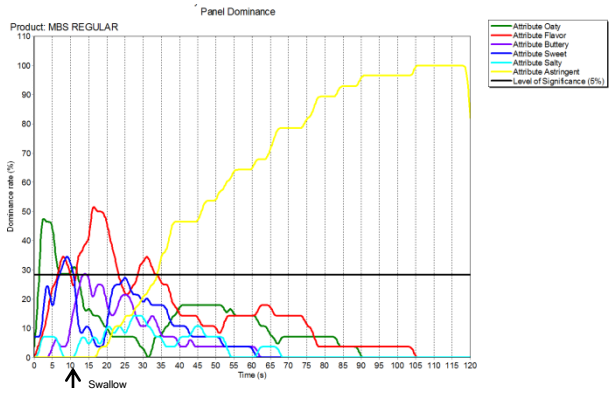
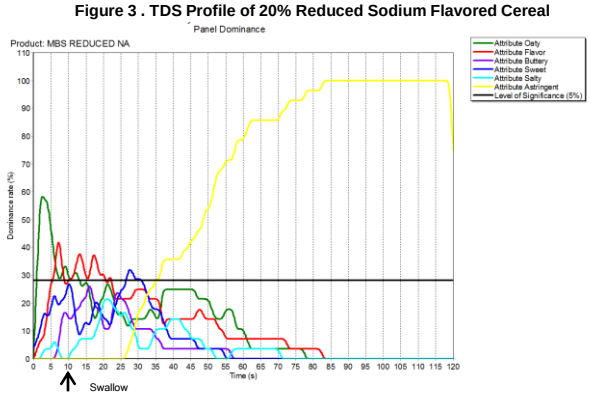


Figure 3 . TDS Profile of 20% Reduced Sodium Flavored Cereal



- Reduced Sodium was lower in oaty, but oaty and/or flavor were dominant in this product during the initial 20 - 25 sec. In contrast, oaty was only dominant in Full Sodium for the first 5 sec. It was quickly replaced by sweet and flavor.
- Reducing sodium supressed sweet perception. Additionally, sweet was dominant in Full Sodium at 5 sec, but not until 25 sec in Reduced Sodium.
- Full sodium was higher in salty, but salty was never dominant in either product.
- Reducing sodium diminished the flavor impact. Additionally, flavor had a lower dominance rate and duration in Reduced Sodium.

Conclusions

The combination of descriptive profiling and TDS was more effective at illustrating the effect of sodium reduction on the flavor perception of the cereal than descriptive profiling alone. Although Reduced Sodium was less salty, this was not as noticeable during consumption as the fact that the profile was primarily oaty with suppressed sweetness and flavor. As a result, the team put more focus on enhancing the sweetness and flavor of the cereal in their reformulation efforts.