Texture – From Universal Concepts To Universal Food Texture Scales

Texture concepts are universal in the sense that the information required to assess texture can be measured across the entire spectrum of foods, from small, hard objects to large, soft objects. The concepts are defined in a manner that allows for the evaluation of them at the attribute level or category level, using appropriate evaluation tools. The techniques can be used on any type of product, no matter the size or composition, and provide a repeatable, consistent method of evaluation.

Applying universal texture concepts to the world of foods

The Spectrum Food Texture Scales were developed specifically to be used across food products and categories and facilitate direct comparison of texture “fingerprints” both within a category (applies to apples) and across categories (applies to oranges).

Texture concepts can be broadly subdivided into three main categories:

1. Physical properties
2. Mechanical properties
3. Sensory properties

Physical properties can be further subdivided into:

- Mechanical properties (e.g., hard, dense, cohesive)
- Acoustical properties (e.g., ring/crackle, tone, size, shape of packet)
- Chemical properties (e.g., surface moisture, moisture release or absorption, moisture of mass)

These concepts can be leveraged universally in the world of consumer products. The concept of hardness, for example, defined as the force required to attain a given deformation, applies to categories as disparate as rock, marble, and cheese.

Methodology

Data Mining Approach

In order to better understand the defining texture spaces among food products, three main categories were chosen:

- Crisps & Chips
- Crackers & Nuts
- Meat Products

The concept of hardness, for example, defined as the force required to attain a given deformation, such as force to compress between molars, force to compress face to face through with fingers, and so forth. The instrument allows identifying areas of differentiation & overlap among very diverse categories and facilitate direct comparison of texture ‘fingerprints’ both within a category (applies to apples) and across categories (applies to oranges). The Sensory Spectrum expert food panel, trained in the Spectrum Descriptive Analysis method, evaluated 12-18 products from each category.

Uniformity of Compression/Chew is a category differentiator

The measurements of compression force required to bite or chew completely through samples using the panelists, and the degree to which the meat feels dry/crunchy between perceptions of taste.

At the attribute level, the instrument shows enough sensitivity to highlight large differences among individual products as in the case of chicken / pork hot dogs vs. beef sausage as well as much smaller differences in the case of chicken / pork hot dogs vs. beef hot dog.

At the attribute level, some individual texture scales clearly define a product category, while others exhibit large within category variability.