

Sensory Evaluation Techniques

Manufacturers and processors constantly ask how changing formulations, using different sources of ingredients, packaging, storage conditions and transportation affect their products. They also want to know how their products compare with competition. They also wonder sensory attributes are critical to consumer making the choice. How consistent is product from different units and batches? They would also like to know effects of new packaging on shelf life. All these can be answered using sensory analysis of food products.

Every product has unique sensory fingerprint i.e. a detailed analysis precisely identifying the perceived sensory attributes of a product and measuring it quantitatively. Learning to be quite familiar with its inherent sensory characteristics including aroma, feel, flavour, appearance and other properties, it is possible to discover and identify its unique characteristics. With that one develops ability to discriminate desirable sensory characteristics with scales for measuring. Once fully acquainted with a product, calibrated trained sensory panellists test it and generate unique sensory data 'fingerprints' for the product.

In one study with 30 potato-based snacks, 80 individual sensory characteristics were identified for measurement. Each product had unique profile separating it from others.

A peeled orange is rated about 6 or 7 for orange flavour using accepted scales whereas undiluted orange drink has a much stronger flavour, earning higher intensity score than peeled orange. Such universal scales allow testers to measure taste, smell or texture of one product in relation with those of another. One can even compare flavour intensity of a cheddar cheese in relation with the fried potato flavour of potato chip.

Attributes are scored between 0 and 15, with 0 indicating the absence of an attribute and 15 indicating very intense presence of it. Scale was established after an extensive sensory review of products that showed a certain attribute. Sensory evaluation techniques are given in ASTM Manual 26, Sensory Testing Methods, 2nd Edition, Chambers (ed.) 1996 and ASTM Manual on Descriptive Analysis Testing for Sensory Evaluation, Hootman (ed.) 1992. Using such methods, customised references can be developed for manufacturers using trained panellists providing reference standards against each product attribute. Judges use same reference standards to calibrate, standardise and measure product characteristics.

Many factors affect the scope of any descriptive analysis project. These are number of product attributes to be tested, broadness of testing, complexity of product preparation, number of panellists involved, number of replicates of each sample to be tested, physical factors such as strong tastes or aromas affecting the testing and the budget.

Ultimate Marketing Tool

Sensory analysis is the ultimate marketing tool and selling depends on a sensory experience. If a consumer does not like a product, he or she won't buy it, so the item won't be successful. One sensory analysis research centre at North Carolina State University undertaking contractual work for manufacturers and processors focuses on dairy products and ingredients, dairy ingredients applications, and how flavour varies with processing and storage.

The centre undertakes designs and implements analytical sensory tests, including difference tests, threshold tests and descriptive sensory analysis. It also designs and provides consumer panels and focus groups, performs consumer acceptability testing, offers statistical reporting and analysis, and conducts on-site workshops and panel training at plants. They develop defined sensory languages and then use them for better product understanding, links to volatile compounds and better consumer understanding.

Using descriptive analysis, consumer testing and preference mapping, the Centre analyses and documents flavour availability, variability, stability and sources of off-flavours. Instrumental analysis is also used, including GC, olfactoscopy, MS etc. relating sensory properties to chemical components. Sensory analysis is integral to food processing. There are quantitative, qualitative, objective and subjective parts to it. When proper test is applied and managed properly, it becomes a powerful and sensitive tool to optimise consumer acceptance of a product.

Avoiding Failure

Sensory analysis is essential for consumers to get the best product and for manufacturers to develop and sell the best product. Manufacturers do not want to waste money on products that consumer may reject. Cost of failure is very high. Sensory evaluation helps avoid product failure at launch and facilitates development of optimal product. Cost of research and development and marketing are rising dramatically, so it is better to make sure before launch that consumers would want the product.

Companies are blending science and creativity to clarify project objectives. Methods are used for finding relations between product looks, feel, smell, taste and sound and the consumer response. Key attributes are called drivers. These properties make consumers

like a product and help them decide about the desirability of product. Examples of such characteristics are creamy texture, pleasing taste or perceived healthfulness. After determining key attributes, sensory signals are built that consumers will find desirable.

Descriptive analysis involves documenting sensory attributes of the products with a trained panel. This helps map the products and attributes that can be used to design efficient and effective consumer research. Merging consumer understanding and product understanding using sophisticated statistical techniques creates a roadmap for developing key sensory properties that drive liking, quality and other consumer benefits. In addition, sensory analysts can guide in uncovering new product opportunities and help create products that will be liked by consumers.

Colouring Outside the Lines

Sensory researchers design new sensory methods and new ways of understanding consumers. In this it is sometimes okay to colour outside the lines instead of strictly following classical sensory methods. Creative and innovative methods become legitimate if they get successful results.

One company developed a technique called Perfect Brand that uses consumer rapid prototyping. In this method, consumers currently using the product are brought to find out reasons for liking or not liking the product. With their help the problems are fixed. Consumers learn to define product changes needed to make the product perfect. They tell the developers what sensory attributes need to be enhanced or reduced for improvement. Developers then make consumer-driven changes necessary for making the product better that is re-evaluated. The whole process allows the new product to be on the shelves within a few weeks.

A consumer lab helps developers ideate with consumers. Selected ideas are converted into real products and finally tested with independent consumers to validate the success of the ideas. There are strategic and creative ways to use consumers in sensory analysis. Sensory evaluation can be raised to new level for product development and marketing. Developers and marketers need to go further to do the right test at the right time with right people to get information leading to consumer insights for developing successful products.

From: article by Linda Leake from Food Technology August 2007.