FOOD SCIENCE
FACT SHEET

Institute of Food Science + Technology ifst



SHEET NUMBER 9

This Food Science Fact Sheet is one of a series compiled by Institute of Food Science and Technology, providing clear, concise and scientifically reliable information on key food science topics for consumers.

Sensory and Consumer Science

How do food companies ensure they produce products people want?

Sensory and consumer science measures and analyses reactions to many products you buy, use and consume, including food and beverages. It uses five senses - sight, smell, taste, hearing and touch.
As a scientific discipline, it applies experimental design and statistics with the aims of providing consistent measurements.

Sensory and consumer science helps food scientists to improve and maintain characteristics of food and drink products such as flavour, taste and texture. This ensures products are well-liked and fit for purpose, so people enjoy and purchase them again.

It's a key part of the product development process. Consumers and sensory panellists are involved at every stage, from concept to the final product. Products need to be of good quality when they are made, purchased from the supermarket and are being consumed. Sensory testing enables understanding of manufacturing changes, supply chain and storage effects to ensure people continue to enjoy products all the way up to their 'best before' dates.

Who's involved in sensory testing?

An expert sensory panel is usually made up of 8 to 14 people, known as assessors, panellists or judges. They are selected based on their ability to perceive tastes and aromas, differentiate between products and accurately describe what they perceive.

Training panellists to work together and evaluate products in reproducible ways can take weeks or even months depending on the methods used. Once trained, they can assess products and produce data that is as precise as that obtained from scientific instruments. They are trained and managed by a sensory panel leader, who also monitors the performance of each panellist.

Larger food companies have dedicated sensory panels who can work up to 5 days a week. These panellists are paid specialists. Smaller companies may screen and train specific employees as a company sensory panel, to be used as and when required.

Expert sensory panellists are so expert that they are never asked whether they like a product. Their training and levels of sensitivity mean they notice things about a product a typical consumer may not. When companies want to know how much people like something, or how likely they will be to buy it, they speak to actual or potential consumers of the product.

Sensory analysis and consumer research can also be used together, to better understand what drives consumer liking of a product. The combination can explore ways to enhance recipes and processes to achieve this.

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Sensory analysis and consumer research can be used to understand more about a set of products, to see if there is a difference when there's a recipe change, or to see if a new development is preferred.

For example:

- How do these different varieties of apples compare to each other in terms of taste and texture?
- What's the ideal level of sugar in this drink to ensure people enjoy it, while meeting UK Government requirements?
- How long can this tomato soup be kept before it starts to lose some of its flavour? What is the best before date?

Where do people evaluate products?

Expert panels usually take place in a controlled environment. This is often in sensory booths, designed to minimise outside influences, but can potentially be in any location which is free from distractions. Consumer research can take place in so-called 'hall tests' or 'central location tests', which simply means people come to one location to evaluate products. Sometimes people test products in their own homes, known as 'home use tests'. This can also give extra information on how people use products in their own homes.

Why is it more than just tasting?

The way a product is perceived relies on the interaction of our senses, so often more than just the taste or flavour is evaluated.

Flavour is a combination of taste, aroma (smell) and sensation in the mouth.

Taste is primarily perceived on the tongue, although there are taste buds throughout the mouth and even in other parts of the body. It arises from an interaction of taste molecules (in the food or drink) with taste receptors (in taste buds).

Today five basic tastes are generally recognised: **sweet** (e.g. sugar or confectionary); **sour** (e.g. lemon juice or vinegar); **bitter** (e.g. coffee or tonic water); **salt** (e.g. table salt or ready salted crisps) and **umami** (e.g. soy sauce or parmesan cheese).

Recently, new basic tastes have been proposed including metallic, fat and carbonation. There is some genetic evidence they belong with the basic tastes, but it can only be confirmed if the mechanism (e.g. receptors on the tongue) can be proved.

Smell or aroma is detected by receptors in the nose. Aroma molecules can enter the nasal cavity from the front i.e. the nostrils when you sniff - this is what you typically think of as your sense of smell. They can also enter the nose via the back of the mouth, for example when a food is chewed, or a drink is swallowed.

The senses of taste and smell work closely together.

Why is it more than just tasting?

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For example, the flavour of a strawberry comes from the combination of the sweet and acidic tastes, plus the strawberry aroma molecules.

Mouthfeel is an important part of food and beverage evaluation. All products interact in some way, but it is most noticeable for: spiciness (e.g. chillies); astringency (e.g. strong tea); cooling (e.g. menthol or mint); mouthdrying (e.g. crackers); creaminess (e.g. full fat yogurt); tingly or bubbly (e.g. carbonated drinks).

This explains why drinks taste so different when they have lost their carbonation, often appearing stronger and sweeter.

Colour and appearance can also affect perception. For example, a deeper red colour in a strawberry jelly may result in a stronger perception of strawberry flavour. For this reason, sensory panels can take place in conditions where different coloured lighting is used to hide colour differences between samples.

The other senses of **texture and sound** also affect the reaction to the product, for example if a food is not as crisp as expected, it might be assumed to be of poorer quality, or stale.

Why do companies use people to evaluate products?

Put simply, humans are better at evaluating food and drink products.

Other approaches using analytical instruments have been tried over the years, with the aim of making testing cheaper and/or more efficient. Some of these findings are now used in combination with sensory results – for example the pH can be measured and linked to the acidic taste, or the sugar level can be compared to the sweetness perception. The latest developments around artificial noses and tongues move these on even more.

However, human perception is affected by many factors that are difficult to replicate in a machine. Instruments also can't tell us what they like, or what a 'good' product looks like. This means for the foreseeable future people are at the core of sensory testing and consumer research.