

Sensory Analysis

brewing lecture at TU-Berlin

Christopher Weyand

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Brewing is a widespread field including the scientific discipline of sensory analysis that, for the purpose of evaluating consumer products, applies principles of experimental design and statistical analysis to the use of human senses.

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1 Main Goals

1. Comparison
2. Description
3. Preference

2 Motivation for Sensory Analysis

The panels create a link between the consumer and the product. A consumer panel is untrained and there are no conditions, whereas a descriptive panel is well trained and able to express their perceptions on a professional level. The main fields of sensory analysis are marketing and product development/research.

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2.1 Difficulties of metrological Approaches

Sensory analysis is applied to determine the quality of food, if analytical methods are not sufficient. The general impression of a beer originates from large quantities of variable parameter and environmental influences, so that it's analytical evaluation often leads to inaccuracy. Especially synergistic and overlay effects are metrologically difficult to foresee. Also the sensory impression might change based on oxidation products and minor components.

2.2 Preconditions of Sensory Analysis

- perception of taste
- reproductivity
- well defined conditions
- methodology according to purpose
- trained panel

3 Definition of Sensory Analysis

A sensory evaluation is performed to detect, identify and evaluate characteristics of products utilizing all of the sensory pathways. (olfactory, visual, gustatory, auditory, tactile)

4 Sensory Perception

This chapter describes the human senses and their usage in sensory analysis.

4.1 Gustatory Analysis

The main flavors are:

- salty
- sweet
- bitter
- sour

4.2 Olfactory Analysis

The olfactory sense offers a direct connection to our brainstem through the trigeminal nerve. Thus the signal processing of olfactory input to our brain is not located in the cerebrum. Evolutionary smelling is the first developed sense. Like bacteria communicates with semiochemicals - called quorum sensing - animals utilize special scents to find a mate or locate their enemy. Also the olfactory vomeronasal organ found in many animals lies close to the nasal bones.

The markedness of the olfactory sense deeply depends on cultural and regional influences. An asian might reject a Limburger cheese in disgust while a human raised in the western European counties enjoys it's intense fragrance.

There is a fruit in south east Asia called durio zibethinus or Durian. The smell of this fruit is very intense and some would call it smelly or even describe it as the smell of rotten onions (according to wikipedia). It's even prohibited in planes. Although Durian is a popular fruit in Asia.

4.3 Tactile Analysis

- tingling
- viscosity
- temperature

5 Testing Methods

Below follows a section about the methods of sensory testing in scientific environments. They are listed in alphabetical order.

5.1 authenticity test

Does the product meet customer expectations.

5.2 aversion test

This test is a preference test that permits just like or dislike as an answer.

5.3 blind test

The test subjects are left in the dark about the type or brand of the sample.

5.4 branded test

The branded test is the counterpart to the blind test.

5.5 descriptive testing

QDA: quantitative descriptive analysis

5.6 difference tests

Difference tests include the difference ranking test.

5.7 duo-trio test

It is to determine with which of two original samples a third sample matches.

5.8 hedonic test

Hedonic or affective tests are simple processes to determine ones preferences offering just a few options to chose from.

5.9 monadic test

The monadic test is done using just one sample and no comparison.

5.10 threshold test

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5.11 time intensity test

Refers to the behavior of sensory impressions like bitter -or tardness over time as seen in figure 1.

5.12 triangle test

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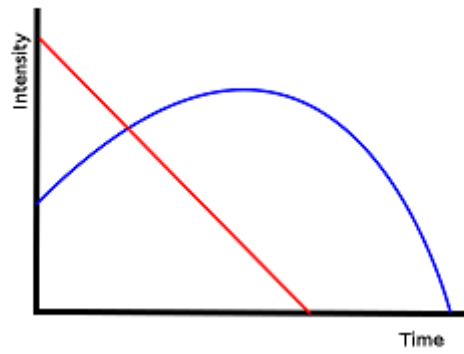


Figure 1: intensity of sensory impression over time

6 Identification of the basic Flavor Types

sweet

4.5 g/l sugar

bitter

0,7 g/l caffeine

sour

0.4 g/l citric acid

salty

0.9 g/l sodium chloride

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7 Miscellaneous

Before Sensorik you shall not:

- smoke, because nicotine is a nerve poison and the flavor substances within the smoke distort the overall gustatory perception
- eat chocolate
- use perfume
- forget to shower

7.1 Advise for relishing Brewery Products

crisp bread and water neutralizes the taste of previous samples. If there is no crisp bread in range you can also use a simple wheat bun. Also women are more sensitive to olfactory impulses. Furthermore they gustatory perceive more intense in special ways including the bitterness. This leads to aversion of bitter beer by most women. Rather useless is a sesame seed roll or something with sugar. The flavor enhancing effect of sugar leads to misinterpretations.

Waiting 20 - 30 seconds helps to regain focus and get rid of this distracting predecessor. At all cost overlay effects should be avoided. Concentration is enormously important. It enhances sensibility and prevents you from focusing on others.

7.2 About the Lecturer

Prof. Dr.-Ing. Frank-Jrgen Methner worked in research and development at Bitburger for 17 years. He took part in the creation of "Koestritzer Schwarzbier" during the 90s. At this time dark beer was rare. The only big brands were Koenig Ludwig dunkel and Guinness.

Real beer needs a foam crown. A lack of tingling or foam can not be compensated, not even with taste, temperature or visual appearance. Only true and desperate thirst is an excuse to prevent the oncoming death with a sip of foam-free beer.