

# Sensory Quality Analysis

- People make food choices based on various factors such as cost, preference, previous experience, and what is healthy.
- Still, probably more crucially, they employ information collected through their senses: look, texture, taste, and smell.
- These sensory elements can increase a food product's appeal, demonstrate attractiveness and quality, or meet the tastes and desires of critical groups.
- **Food product sensory** analysis can give manufacturers information for product development, marketing, and other claims.
- The product characteristics are picked up by the sensory organs (eyes, nose, mouth, skin and ears) and analyzed according to various schemes.
- Sensory testing is used to evaluate food products to ensure that the consumer receives a high quality product that appeals to the senses and has been tested using scientific methods.

# Why is Sensory Evaluation In The Food Industry Important?

Sensory assessment is a necessary method in the following five categories of problems:

- Development of new products
- Cost-cutting measures
- Increasing the level of quality
- Product acceptability
- Quality assurance and control

# Sensory Evaluation Methods

- Sensory evaluation measures the reaction to stimuli resulting from the consumption of a food or food product.
- When conducting sensory analysis on food quality, it is imperative to know that there is possibility of getting wrong answers, which in turn can risk the competition of a particular food product in the market.
- Wrong information on food product could lead to miscommunication, improper decisions, wasted consumer research, and much more wasted time, effort and material costs.

# 1. Discriminative Tests

- These tests are designed to determine if a difference exists between food products.
- Discriminative tests include triangular test, duo-trio test and paired-comparison test.
- **Triangular Test** : In this test, normally three samples are involved when determining the overall difference between two products.
- Out of the three samples, two are similar and one is dissimilar. The samples must be coded with individual three-digit numbers.
- The taster is required to select the sample which is different from others.
- The tests require fewer tasters, at least 4-8 tasters are considered enough to carry single testing.

# Duo-Trio Tests

- This determines whether or not a sensory difference exists between two samples.
- There is always a reference sample and two test samples.
- Of the two test samples, one sample is identical to the reference, and the other one is the test sample.
- The panel members are asked to identify the sample that is similar to reference sample.
- Duo-trio tests are sometimes used instead of triangle tests to compare unknown differences between samples, however they are considered less efficient than triangle tests.
- At least 7-10 evaluators are recommended.

# Paired Comparison Tests

- These are applied when a difference in chemical composition of the sample which requires a sensory assessment is well known.
- Two differently coded samples are presented to each panelist at the same time and the task is to choose the sample that is perceived higher in the specified sensory attribute.
- Tasters are asked to judge the samples by comparing them without needing to rate the magnitude of the difference, for example, “are the two samples identical or different?” or “which of the two samples sugary?”.
- Compared to triangular test, paired comparison test is less tedious and frequently used for strongly flavored or complex products.
- At least 7-10 panelists as for duo-trio are recommended in this test.

## 2. Descriptive Tests

- In these tests, sensory attributes of products are characterized in order of their appearances and relative intensities are assigned.
- Descriptive tests are more comprehensive and sophisticated as compared to discriminative tests.
- It is normally performed by 6 to 15 meticulously selected and trained panelists.
- Panelists are trained to evaluate products similar to how any instrument would give a reading.
- Descriptive tests include Free Choice Profile (FCP), Quantitative Descriptive Analysis (QDA), Flavor Profile Analysis (FPA), Texture Profile Analysis (TPF) and Time Intensity Analysis (TIA).

# Free Choice Profile

- In this method, there is no prior training of the panelists, each judge decides his/her own list of attributes to label the product.
- The response computerized, then a time-intensity curve obtained for the determined attribute.
- Analysis of variance is used to analyze three parameter from the curve, namely maximum intensity, the point at which maximum is reached, and the first point at which no more perception occurs.

# Quantitative Descriptive Analysis

- This consists of progressive survey of sensory terms for a product generated by a trained sensory panelists using nontechnical language.
- Trained judges normally reach a consensus on the relative discrepancies between the samples.
- **Flavor Profile Analysis:** This is useful for identifying sample taste and odor.
- It is a technique that provides a written record of noticeable aroma of a product, flavor and aftertaste components.
- Panelists characterize individual aroma and flavor in the order perceived and assign a constant rating scale.

# Texture profile analysis:

- This has been widely applied to test solid and semisolid food products.
- Usually it involves a panel of 6-9 members; textural attributes and other evaluation procedures are established unanimously by panel members before carrying out the evaluation of the products in question.
- **Time Intensity Analysis:** This is used to estimate the change in intensity of a determined characteristic with time.
- It has the main role of determining the intensity of any descriptor term in a product with time.

# 3. Affective/ Consumer Acceptance Tests

- Affective methods are also called subjective methods.
- Normally large number of respondents is required (50-150 panelists considered adequate).
- Panelists are not trained but selected based on previous use of product, economic social level and geographical area.
- **Preference Ranking:** In this technique, three or more samples are rank-ordered with one sample being preferred over the other.
- This type of test supply information about people's likes and dislikes of a product and determine how various samples differ based on a single distinguishing attribute.

# Hedonic Rating Scale

- This is among of the widely used sensory evaluation methods that measure consumers' level of liking of food products.
- In practice there are 9-point Hedonic scale, 7-point Hedonic scale and 5-point Hedonic scale.
- The 9-point Hedonic scale range from “like extremely” to “dislike extremely”.
- Practically, not fewer than five points are recommended.

**Table 2: Summary of sensory methods**

<b>Question</b>	<b>Method</b>	<b>Types</b>
Are products different?	Discrimination test	-Triangle test -Duo-trio test -Paired comparison test
If products are different, how are they different?	Descriptive tests	-Quantitative descriptive analysis -Free choice profile -Time intensity analysis -Flavor profile analysis -Texture profile analysis
What is the acceptability of a product? Is one product preferred over another?	Affective/Acceptance	-Hedonic rating scale (5- Point, 7-Point and 9-Point Hedonic scale) -Preference ranking

# ➤ Environment for testing

- Individuals should not be distracted.
- Judgment should be made independently and separately.
- Separate individual booths with light colors, well ventilated, temperature controlled and free of foreign doors.
- Sliding doors used in large food research laboratories.
- Room other than preparation should be used for testing area.
- According to The American society for testing and materials stated, positive air pressure, filtered air, controlled temperature and lightening as key factors for sensory evaluation.
- Far away from the preparation area to avoid aroma in testing area.

## **Selecting and training of panelists:**

### **A. Selection of panel:**

- In Analytic testing, if there are fewer persons , accept anyone to serve.
- They should be in good health.
- For descriptive and discrimination testing, panelists are selected on the basis of their thresholds for basic tastes but does not been useful.
- Present actual samples to judges, replicated the samples presented to each judge and those who are able to differentiated, are retained for panel.
- For flavor profile analysis, they are asked to identify four basic tastes in water solutions, rank solutions of basic tastes in other of increasing intensity and identify at least 11 of 20 odorants.