SENSORY EVALUATION

Sit back and take a break from chemistry…

The whole picture…

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What is sensory evaluation?

IFT definition: Scientific discipline through which the sensory analyst…

- Evokes
- Measures
- Analyzes
- Interprets

Human responses to stimuli as perceived through the senses

Sensory tests are designed to answer targeted questions

- *Discrimination*: Are the samples the same or different?
- *Consumer*: Do you like it or not? How much or how little?

Descriptive Analysis

using trained panels

- ***Qualitative:*** What does it taste, smell, feel, or sound like?

- ***Quantitative:*** How weak or strong is the perceived characteristic?

Flavor and oral texture descriptive analysis

Descriptive Analysis

- ***What do we taste or smell?*** Each flavor attribute is individually identified and referenced.
- ***How does it feel?*** Texture characteristics from first bite to final swallow are scored.
- ***How does it appear?*** Appearance attributes measured may include color purity, uniformity of coverage, or amount of visible seasoning.

Common Understanding using “Universal Scales”

Some companies that use universal scales to communicate globally are:

- Kellogg Company
- Pepsi/Frito Lay
- Cargill
- Coca Cola
- Schwan’s
- ConAgra

Sensory Analysis

Like learning music

- First exposure to music – wall of integrated sound
- With more exposure - increased ability to discriminate
- Later - rhythms and nuances
- Sensory terms - notes, top notes, balance

Choosing the “instrument”

- Written application to determine general state of health and applicant’s general ability to observe and describe experiences
- Acuity in identifying aromas and basic tastes, trial scaling exercises
- Personal interview to determine applicant’s long term level of interest and ability to interact with group

Calibrating the instrument

- 100 hours of basic training to learn how to measure perception by using scales and references
- Become familiar with system of dissecting foods and beverages
- Practice developing language, ballot and references
- Ballot and examine data as a group

Internship and teambuilding

Measuring perception

- 0 (absent) to 15 (very strong) scale
- Measurements are relational
- Basic tastes measured using standardized solutions (i.e., 2% NaCl)
- Flavor intensity measurements are based on ASTM scales and references
- As needed, custom references developed in house based on ASTM

- HEATED OIL: Aromatics associated with fresh vegetable oil that has been heated. References: Great Value Canola Cooking Spray 1.5, Great Value French Onion Dip 2.0, Wesson Vegetable Oil heated to 140F 2.5, Hellmann's Mayonnaise 3.5, Albertson's Ranch Dressing 3.5, Wesson Soybean oil heated to 400F 8.0.
- OLD/STALE OIL: Aromatic associated with slightly oxidized oil but is not yet painty in character.
- PAINTY/RANCID: An aromatic reminiscent of linseed oil or paint, overly oxidized oil. Example: The *aroma* of linseed oil, the *aroma* of rancid peanut oil.
- BEANY, RAW GREEN GRASSY: Flavors associated with raw soybeans and characterized as green, grassy, raw pea-like, bitter, and astringency. Reference: Arrowhead Mills soybeans, cooked, raw/green 3.0, Wild Oats Soy Joy vanilla non-dairy beverage 4.0, Arrowhead Soy Flour mixture (2 grams soy flour in 500 ml MilliQ water) 7.0.

Texture analysis measures:

- Mechanical attributes – hardness, cohesiveness, viscosity
- Geometric characteristics
  - Particle size and shape (gritty, grainy)
  - Particle shape and orientation (fibrous, crystalline
- Moisture related – dry/moist/wet
- Fat content – oily, greasy

Measured in Stages

- First, surface characteristics
- Partial Compression (for springy products)
- First Bite and/or First Chew
- Chew down
- Residual

Sample texture lexicon

FIRST CHEW – (Cut Sample into 12 equal-sized pieces – 2 vertical and 3 horizontal)

- Hardness: Measure the force required to bite completely through product with molars. References: Ritz Cracker 3.5, Olive 6.0, Pringles 8.0, Nilla Wafer 9.5.
- Moistness of Crust (1-3 chews): Measure of the perceived moistness or “wetness” of the crust after 2nd chew. References: Nilla Wafer 1.0, Ritz Cracker 3.0, Strawberry Nutrigrain Bar 7.0, Fig Newton 9.0, Pound Cake 12.0.

CHEW DOWN – (1 piece chew 9-12 times until mass is formed)

- Awareness of Grit: Measure awareness of grit within the product during chew down. Reference: Maalox Quick Dissolve Wild Berry Antacid 3.0, Tums Ultra Maximum Strength 5.0, Fig Newton 7.0

Sensory Applications

- Shelf Life
- Gold Standard Fingerprinting
- Alternate Vendor Qualification
- QA/QC
- Category Mapping
- Competitor analysis
- Troubleshooting

Establishing gold standard "fingerprint"

- Conduct consumer hedonic tests to measure overall liking and degree of tolerance for product variations.
- Conduct descriptive analysis on samples to measure acceptable and unacceptable variations from gold standard.

Case History - Fingerprinting

- Customer complaints increased –the flavor of a major global product was “different”
- 21st Sensory reviewed four years of flavor descriptive analysis data and tested current product
- Data demonstrated distinct flavor profile changes –known as “drift”
- Client showed data to ingredient supplier and ingredient supplier reworked blend until match was achieved
- Product returned to familiar gold standard flavor profile and is now monitored regularly

QA/QC sensory

Just as a pH meter is calibrated with known pH buffer solutions, the panel should be furnished with definitions and examples of what is target and what is not. After all, no one asks the pH meter if the pH is “typical” or “good.” Why should a sensory QC panel not deserve the same respect?