SENSORY ANALYSIS OF ICE CREAM

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Rhino Foods, Inc.
How to Enjoy Eating Ice Cream …
Sensory Analysis

**sensory**
/sənˈsərē/

*adjective*
relating to sensation or the physical senses; transmitted or perceived by the senses.
"sensory input"

**analysis**
/əˈnaləsis/

*noun*
noun: analysis; plural noun: analyses

detailed examination of the elements or structure of something, typically as a basis for discussion or interpretation.
"statistical analysis"
*synonyms:* examination, investigation, inspection, survey, study, scrutiny; More

- the process of separating something into its constituent elements.
The Senses
The Sense of **Sight**

- **Appearance:**
  - Recognition
  - Appealing
  - Interesting

Importance to Ice Cream

- Critical
- Important
- Low Impact
- Relevant
- No Relevance

Sensory Analysis of Ice Cream
Sense of **Hearing**

- **Sound:**
  - Recognition
  - Crunch Factor
  - Interesting

Importance to Ice Cream

- **Critical**
- **Important**
- **Low Impact**
- **Relevant**
- **No Relevance**
Sense of **Taste**

- **Mouth Appeal:**
  - Sweet
  - Sour
  - Bitter
  - Salt
  - Umami

- **Aftertaste**
Sense of Touch

- **Mouth Feel:**
  - Temperature
  - Fat Melt
  - Ice Crystallization
  - Density
  - Inclusion Texture

Importance to Ice Cream

- Critical
- Important
- Low Impact
- Relevant
- No Relevance
Sense of **Smell**

- **Aroma:**
  - Last Sense Used for Ice Cream
  - Post Melt in Mouth
  - Contributes Majority of Flavor
  - Impacts Emotions Most
Analysis

• Senses are highly subjective
  • Personal based on preferences, experiences, and context
  • Conscious vs Subconscious influence on satisfaction

• Analysis – Objectifying the Subjective
  • More accurate
  • More reliable
  • More actionable
Sensory Analysis of Ice Cream
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April 10th, 2018
Sensory Analysis of Ice Cream

• **Purpose** – Why do we do it?

• **Modes** – Who does it, and what’s the difference?

• **Methods** – What are the professional techniques?

• **Scoring & Language** – Objectifying the subjective

• **Attributes vs Defects** – What is good from what is bad?

• **Applications** – When do you do which mode and method?

• **Developing Industry Standards** – What’s next?
Purposes of Sensory Evaluation

- **Benchmark to Standards** – Ensuring the product meets expectations

- **Competitive/Comparative Analysis** – How good is it relative to others

- **Product Development** – Discovering new standards

- **Cost/Value Optimization** – Can we make it as good for less?
Benchmark to Standards

- Where an identified Standard – *usually represented by a benchmark sample* – is compared to the subject and a determination is made as to whether they match.
- Usually these evaluations are done either with experts or when critical questions arise, they are done “blind.”
Competitive/Comparative Analysis

- Needs to have a defined scope
  - Same product family?
  - Alternative products?
  - Some other attribute: example, “Most Innovative”
- The analysis method should be structured, and “judges” briefed on the context of the evaluation criteria
Comparative/Competitive Analysis
Product Development

• Does the Product Satisfy Intent?
• Clearly defined use, targeted consumer, meet a market goal
• Product extension or innovation?
• Product brief with descriptions of intended attributes
Cost Value/Optimization

• When Finance and Purchasing are Driving the Boat
Cost Value/Optimization

- What lower cost ingredients or less expensive processing can be used that consumers *won’t notice*?
- Burden of Proof on the sensory results
Modes of Sensory Analysis

- **Expert Panelists** – Competencies and Applications

- **Trained Assessors** – Selection, Onboarding & Management of Panels

- **Consumer Intercepts** – Best Use and Limits
Consumer Intercepts

- Market Research Tool
- Matching Products to Psychographics
- Measuring the Market Potential
Trained Assessors

- Selected pool of consumer representatives
- Trained in sensory analysis systems, methods, and language
Expert Panelists

- Sensory Professionals
- Product Experts
- Calibrated regularly
Methods of Sensory Analysis

- Chosen to support the purpose of the analysis:
  - Objectifying the Subjective, Answering the ?’s
- Tools and Space Requirements
- Training & Prerequisites
- Test Design, Scheduling & Preparation
- The Evaluation
- Analysis & Reporting of Results
Tools and Space Requirements

• A pantry full of cups, bowls, scoops, plates, spoons, labels, scoring forms and pens
• The preparation equipment – freezer space, scoops, counter tops
• The Sensory Space – to booth or not to booth?
Training & Prerequisites

• Initial Screening – basic recognition testing
  • Taste solutions – sweet, salt, sour, bitter, umami
  • Aroma samples – citrus, spice, herb, flower, woody, caramel
• Ability to perform procedures
  • Simulations of tests to demonstrate focus, discipline, record keeping
  • Availability when needed and commitment to perform
• Introduction to test protocols – difference, ranking, rating
• Training in descriptors – learning the language, differentiating intensity, identifying bias and preferences
• Practice, practice, practice
Test Design, Scheduling & Preparation

• Use the Scientific Method – Start with a Hypothesis
• The experimental design should be repeatable; controlling variables, detailing important steps, with the aim to yield reliable results
• Scheduling – based on need and assessor availability (…best mid-morning)
• If appropriate, make the samples “blind”
• Have the purpose, plan, test steps, tools and samples ready to go
The Placemat

- Lemon Pound Cake
- Almond Cake
- Baked Brownie
- Extruded Brownie
- Oreo Cookie Ball
- Graham Cookie
- Lemon Ginger Dough
- Almond Cake in Almond Ice Cream with Swirl
- Chocolate Tahini Cookie Dough
- Layered Brownie Cheesecake
- Graham Piece in Caramel Ice Cream
- Oreo Cookie Balls in Red Velvet Cake
The Evaluation

• Focus on the Purpose
• Objectify the Subjective as much as possible
  • Reduce bias – prohibit influence, clarify intent of the test
  • Turn the sensation into measurable data

Step 1 – Prepare the Samples
Step 2 – Orient Panelists
Step 3 – Do Analysis
Step 4 – Analyze Results
Analysis & Reporting of Results

• Ideally, results are immediate and collaboratively discussed – contributes to full acceptance and calibration
• Everyone’s Vote Counts
• Use Statistics When You Have Enough Data
• Make the Result Meaningful – What Decisions Got Made?
Scoring & Language

- The Power of Scores
- Attribute ratings – Preference & Intensity
- Scoring Scales – Ranges & Relativity
- Radar/Spider Graphs
- Descriptive Language
- Calibration of Assessors
The Power of Scores

• Scoring makes the right brain talk to the left brain
  - translating the subjective into the objective
• Creates data that can be analyzed, trended, graphed, and shared
Attribute Ratings – Preference & Intensity

Preference

- Flavor Profile –
  - Fruity
  - Caramel
  - Plain vs Complex
  - Spicy
- Texture
  - Density
  - Crunchy vs Fudgy

Intensity

- Flavor Profile -
  - Strength of Vanilla Note
  - Chocolate Bitterness
  - Amount of Inclusions
  - Amount of Spice
- Texture
  Gummy – Chewy – Fudgy – Crunchy
Scoring Scales – Ranges & Relativity

• Benchmark to Standard

• Comparative/Competitive Scoring
Radar/Spider Graphs – Mapping It

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Calibration of Assessors

• Necessary for Benchmark to Standards and other QC purposes
• Calibration – like results between sensory assessors
  • Similar language
  • Consistent Scoring
• Practice, Practice and Practice **Together**

![Calibration Scales](image)
Attributes vs Defects

- Specifications as conformance boundaries
- Traits and Taints
- Objective Measurements
- Subjective Observations
Applications of Sensory Evaluation

• Benchmarking

• Comparative Testing

• Quality Compliance to Standards
Developing Industry Standards

• Universal Scoring Form(s)
• Training of the Industry
• Standard Applications
• Certification Programs
• Consumer & Media Acceptance
Judging the Ice Cream Competition

- The Scoring Sheet
- The Attributes
- Summing it Up and Rankings
## The Scoring Sheet

### Competitive Ice Cream Sensory Scoring Sheet

Score each of the 5 attributes -5 to 5, add 50 points to sum score

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<th></th>
<th>Appearance</th>
<th>Flavor</th>
<th>Texture</th>
<th>Balance</th>
<th>Overall</th>
<th>Sum Score</th>
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Use of the Scale

• “0” is ‘Average’ Score, a quality you would generally expect, no better, no worse.
• “10” is once in a lifetime quality, never had better, just totally extraordinary, out of this world, an epiphany.

-10 -5 0 5 10

• “-10” is awful, worst you have ever had, makes you sad for humanity that something like this could even be made.
The Attributes

• Appearance – How does it look? Appetizing, Interesting?

• Flavor – How does it taste and smell? Is it delicious?

• Texture – How does it feel? If it has inclusions, are they a good texture?

• Balance – How is the composition? Is it complex or simple, and if so, is it muddy or elegant?

• Overall – How does the whole package work together. These are bonus points for total execution.
Judging Ice Cream

• What is the Purpose of the Competition?
• Are your scores preference based, and if so, for whom?
• Be a sensory professional:
  ➢ Minimize Bias
  ➢ Focus and Pace Yourself
  ➢ Trust your Senses
  ➢ Be Diligent in Your Scoring
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