Sensory Evaluation of Milk

Kerry E. Kaylegian, Ph.D.
kek14@psu.edu
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Sensory Evaluation is...

The use of all 5 senses to gather information

- Taste
- Smell
- Sight
- Touch
- Hearing

- conscious or unconscious
- informal or formal
- subjective or objective
# Sensory Analysis - Consumers

<table>
<thead>
<tr>
<th>When</th>
<th>Why</th>
<th>Where</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time of Purchase</td>
<td>Do I want to purchase this product (brand)?</td>
<td>At the point of sale</td>
</tr>
<tr>
<td>Time of Consumption</td>
<td>Do I want to eat this?</td>
<td>Home, restaurant, shop, etc.</td>
</tr>
<tr>
<td></td>
<td>Do I want to purchase this again?</td>
<td></td>
</tr>
</tbody>
</table>

**Penn State Extension**
## Sensory Analysis - Manufacturers

<table>
<thead>
<tr>
<th>When</th>
<th>Why</th>
<th>Where</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Development</td>
<td>Does the product meet:</td>
<td>Lab (R&amp;D/QC)</td>
</tr>
<tr>
<td></td>
<td>market requirements?</td>
<td>Sensory Lab</td>
</tr>
<tr>
<td></td>
<td>production capabilities?</td>
<td>On-Site</td>
</tr>
<tr>
<td></td>
<td>consumer expectations?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>consumer preferences?</td>
<td></td>
</tr>
<tr>
<td>Production (ingredients)</td>
<td>Do incoming ingredients meet specifications?</td>
<td>Lab (QC)</td>
</tr>
<tr>
<td>(processing)</td>
<td></td>
<td>Production Floor</td>
</tr>
<tr>
<td>Production (shelf life)</td>
<td>Is the product within manufacturing specifications?</td>
<td>Lab (QC)</td>
</tr>
<tr>
<td></td>
<td>Is daily production consistent?</td>
<td>Sensory Lab</td>
</tr>
<tr>
<td></td>
<td>Troubleshooting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Does product maintain integrity throughout shelf life?</td>
<td>Lab (QC/R&amp;D)</td>
</tr>
</tbody>
</table>

Penn State **Extension**
Sensory Tests

• Quality
  – what defects are in this product compared to the ideal?
  – often scored (values vary)
  – may be pass/fail

• Affective (hedonic)
  – how much do I like this?
  – 7 or 9 point scale, dislike very much to like very much

• Descriptive
  – how do samples differ in characteristics?
  – trained descriptive panels

• Discrimination
  – are these samples the same?
  – triangle test; duo-trio test
Using Your Senses

• Sight
  – packaging
  – product in container
  – product out of container
  – product volume
  – color
  – texture
  – uniformity
  – defects
Using Your Senses

• Smell
  – pleasant
  – not pleasant
  – characteristic of the product
  – volatile aromas
Using Your Senses

• Touch
  – hands, fingers, utensils
  – tongue, mouth
  – “mouthfeel”
  – texture
    • soft, hard
    • smooth, rough, gritty
    • chewy, sticky, slippery
Using Your Senses

• Taste
  – tongue (taste buds)
  – basic tastes
    sweet    bitter
    sour    umami
    salty
  – other sensations
    burning (pepper)
    cooling (menthol)
    fizzing (carbonation)
Taste \neq \text{Flavor}

\text{Flavor} = \text{Taste} + \text{Aroma} \quad (+ \text{Sensation})

\text{Sequence}
- \text{First}
- \text{Middle}
- \text{End}
- \text{Aftertaste}
Using Your Senses

• Hearing
  – crispy
  – crunchy
  – snap
Steps in the Sensory Evaluation of Milk

1. Look
2. Smell
3. Taste
   Evaluate for flavor, texture, sensations
4. Spit
5. Think
6. Score
## MARKING INSTRUCTIONS

- Improper marks:
  - ERASE CHANGES CLEANLY AND COMPLETELY
  - DO NOT MAKE ANY STRAY MARKS

## CRITICISMS

### FLAVOR

<table>
<thead>
<tr>
<th>Criticism</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acid</td>
<td></td>
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<td>2. Bitter</td>
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<td>3. Cooked</td>
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<td>4. Feed</td>
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<tr>
<td>5. Fermented/Fermenty</td>
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<td>6. Flat</td>
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<td>7. Foreign</td>
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<td>8. Garlic/onion</td>
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<td>9. Lacks freshness</td>
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<tr>
<td>10. Malt</td>
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<tr>
<td>11. Odored - Light</td>
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<tr>
<td>12. Odored - Rancid</td>
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<tr>
<td>13. Rancid</td>
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<tr>
<td>14. Salty</td>
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<tr>
<td>15. Unclean</td>
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### BODY AND TEXTURE

<table>
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<tr>
<th>Criticism</th>
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<th>2</th>
<th>3</th>
<th>4</th>
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<th>8</th>
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<tbody>
<tr>
<td>No criticism</td>
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### APPEARANCE AND COLOR

<table>
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<tr>
<th>Criticism</th>
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<th>4</th>
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<th>6</th>
<th>7</th>
<th>8</th>
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<tbody>
<tr>
<td>No criticism</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### SAMPLE NUMBER

This page contains the marking instructions and tables for evaluating milk samples based on various criteria such as flavor, body and texture, and appearance and color.
Flavor Attributes of Milk

- acid
- bitter
- cooked
- feed
- fermented/fruity
- flat
- foreign
- garlic/onion
- lacks freshness
- malty
- oxidized – light
- oxidized - metal
- putrid
- rancid
- salty
- unclean
Off-Flavors in Milk

Absorbed

Bacterial

Chemical
Absorbed Flavors in Milk

• Characteristic Flavors
  - barny
  - cowy
  - feed
  - foreign
  - musty
  - weedy
  - unclean

• Sources
  - before, during, after milking
  - milk left uncovered in refrigerator, cooler, or cold room with other odor producing food
Bacterial Flavors in Milk

• Characteristic Flavors
  acid
  fermented/fruity
  lacks freshness
  malty
  putrid
  unclean

• Sources
  – improper cooling
  – bacteria in milk due to improper cleaning or sanitizing
  – external contamination
Chemical Flavors in Milk

• Characteristic Flavors
  - foreign
  - lacks freshness
  - medicinal
  - oxidized – metal
  - oxidized – sunlight
  - rancid

• Sources
  - before and after milking
  - poor handling
  - exposure to light, oxygen, metals
  - exposure to sanitizer (improper chemical use)
Flavor Attributes of Cultured Dairy Products

- astringent
- bitter
- chalky
- cheesy
- coarse (harsh)
- cooked
- fermented/fruity
- flat
- foreign
- high acetaldehyde (green)
- high acid
- high diacetyl
- high flavoring
- high intensity sweeteners
- lacks culture flavor
- lacks fine flavor
- lacks flavoring
- lacks freshness
- low acid
- low flavoring
- low sweetness
- metallic
- old ingredient
- oxidized
- rancid
- salty (too high)
- sauerkraut-like
- stabilizer/emulsifier
- sweet
- unclean
- unnatural flavor
- vinegar-like
- yeasty
- whey

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Sensory Attributes - Yogurt

• **Appearance & Color**
  - atypical color
  - color leaching
  - excess fruit
  - free whey
  - lacks fruit
  - lumpy
  - shrunken

• **Body & Texture**
  - gel-like
  - grainy
  - ropy
  - too firm
  - weak
Sensory Attributes – Cottage Cheese

• **Appearance & Color**
  - free cream
  - free whey
  - lacks cream
  - matted
  - shattered curd

• **Body & Texture**
  - firm/rubbery
  - mealy/grainy
  - overstabilized
  - pasty
  - weak/soft
Sensory Attributes – Sour Cream

- **Appearance & Color**
  - churned fat
  - dull (lacks gloss)
  - lacks uniformity
  - unnatural color
  - wheyed-off (syneresis)

- **Body & Texture**
  - curdy
  - gassy
  - grainy/gritty
  - lumpy
  - too firm
    - (overstabilized)
  - too thin (weak)
Sensory Attributes - Buttermilk

• **Appearance & Color**
  - churned fat
  - dull (lacks gloss)
  - lacks uniformity
  - unnatural color
  - wheyed-off (syneresis)

• **Body & Texture**
  - curdy
  - gassy
  - grainy/gritty
  - lumpy
  - too firm
  - too thin (weak)
# Cheddar Cheese Grading

Very Slight, Slight, Definite, Pronounced

<table>
<thead>
<tr>
<th>Flavor</th>
<th>Body &amp; Texture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed Old Milk</td>
<td>Curdy</td>
</tr>
<tr>
<td>Acid Weedy</td>
<td>Coarse</td>
</tr>
<tr>
<td>Flat Onion</td>
<td>Open</td>
</tr>
<tr>
<td>Bitter Barny</td>
<td>Sweet Holes</td>
</tr>
<tr>
<td>Fruity Lipase</td>
<td>Short</td>
</tr>
<tr>
<td>Utensil Sulfide</td>
<td>Mealy</td>
</tr>
<tr>
<td>Metallic</td>
<td>Weak</td>
</tr>
<tr>
<td>Sour</td>
<td>Pasty</td>
</tr>
<tr>
<td>Whey-taint</td>
<td>Crumbly</td>
</tr>
<tr>
<td>Yeasty</td>
<td></td>
</tr>
<tr>
<td>Malty</td>
<td></td>
</tr>
</tbody>
</table>
## Cheddar Cheese Grading

Very Slight, Slight, Definite, Pronounced

<table>
<thead>
<tr>
<th><strong>Color</strong></th>
<th><strong>Finish &amp; Appearance</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Seamy</td>
<td>Soiled Surface</td>
</tr>
<tr>
<td>Wavy</td>
<td>Surface Mold</td>
</tr>
<tr>
<td>Acid-cut</td>
<td>Mold Under</td>
</tr>
<tr>
<td>Unnatural</td>
<td>Wraper/Covering/Bandages</td>
</tr>
<tr>
<td>Mottled</td>
<td>Rough Surface</td>
</tr>
<tr>
<td>Salt Spots</td>
<td>Irregular Bandaging</td>
</tr>
<tr>
<td>Dull or Faded</td>
<td>Lopsided</td>
</tr>
<tr>
<td>Bleached Surface</td>
<td>High Edges</td>
</tr>
<tr>
<td></td>
<td>Huffed</td>
</tr>
<tr>
<td></td>
<td>Defective Coating</td>
</tr>
<tr>
<td></td>
<td>Cracks in Rind</td>
</tr>
<tr>
<td></td>
<td>Checked Rind</td>
</tr>
</tbody>
</table>
Resources

• The Sensory Evaluation of Dairy Products

• Collegiate Dairy Products Evaluation Contest Score Cards
  milk, yogurt, ice cream, cottage cheese, cheddar cheese, butter
Resources

- Guidelines for Preventing Off-Flavors and Rancid Flavors in Milk

- Troubleshooting Milk Flavor Problems
  http://extension.psu.edu/animals/dairy/health/nutrition/nutrition-and-feeding/troubleshooting-guides/troubleshooting-milk-flavor-problems