

# Sensory Evaluation of Milk



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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

## When

## Why

## Where

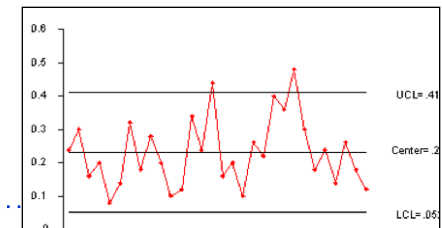
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Time of Purchase	Do I want to purchase this product (brand)?	At the point of sale
Time of Consumption	Do I want to eat this? Do I want to purchase this again?	Home, restaurant, shop, etc.



# Sensory Analysis - Manufacturers

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



**HACCP**  
**SQF**

# 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”
  - 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 ≠ Flavor

Flavor = Taste + Aroma (+ Sensation)

Sequence

First

Middle

End

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**



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

**MILK**

CONTESTANT NO.

0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
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0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9

CRITICISMS		SAMPLE NUMBERS							
		1	2	3	4	5	6	7	8
<b>FLAVOR</b>		0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5
		6 7 8 9 10	6 7 8 9 10	6 7 8 9 10	6 7 8 9 10	6 7 8 9 10	6 7 8 9 10	6 7 8 9 10	6 7 8 9 10
NO CRITICISMS	1. ACID	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2. BITTER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3. COOKED	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4. FEED	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5. FERMENTED/FLAT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	6. FLAT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	7. FOREIGN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	8. GARLIC/ONION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	9. LACKS FRESHNESS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	10. MALTY	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	11. OXIDIZED—LIGHT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	12. OXIDIZED—METAL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	13. RANCID	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	14. SALTY	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	15. UNCLEAN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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<b>BODY AND TEXTURE</b>		0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
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<b>APPEARANCE AND COLOR</b>		0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5	
		6 7 8 9 10	6 7 8 9 10	6 7 8 9 10	6 7 8 9 10	6 7 8 9 10	6 7 8 9 10	6 7 8 9 10	
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NORMAL RANGE 1-5		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# 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

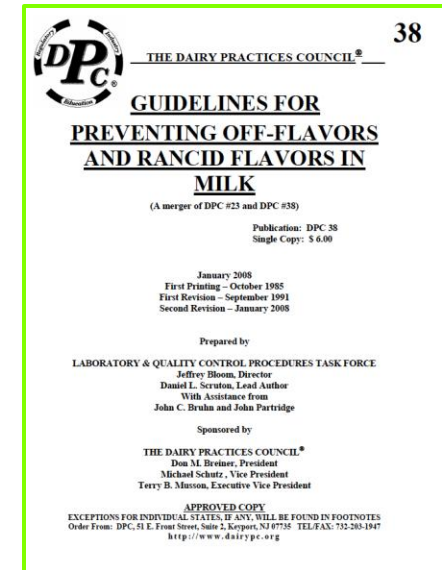


# Off-Flavors in Milk

Absorbed

Bacterial

Chemical



# Absorbed Flavors in Milk

- Characteristic Flavors

barny

musty

cowy

weedy

feed

unclean

foreign

- 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

# 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  
(overstabilized)
- too thin (weak)



# Cheddar Cheese Grading

Very Slight, Slight, Definite, Pronounced

## Flavor

Feed  
Acid  
Flat  
Bitter  
Fruity  
Utensil  
Metallic  
Sour  
Whey-taint  
Yeasty  
Malty  
Old Milk  
Weedy  
Onion  
Barny  
Lipase  
Sulfide

## Body & Texture

Curdy  
Coarse  
Open  
Sweet Holes  
Short  
Mealy  
Weak  
Pasty  
Crumbly  
Gassy  
Slitty  
Corky  
Pinny





# Cheddar Cheese Grading

Very Slight, Slight, Definite, Pronounced

## Color

Seamy  
Wavy  
Acid-cut  
Unnatural  
Mottled  
Salt Spots  
Dull or Faded  
Bleached Surface

## Finish & Appearance

Soiled Surface  
Surface Mold  
Mold Under  
Wrapper/Covering/Bandages  
Rough Surface  
Irregular Bandaging  
Lopsided  
High Edges  
Huffed  
Defective Coating  
Cracks in Rind  
Checked Rind



# Resources

- The Sensory Evaluation of Dairy Products  
Clark, S.; Costello, M.; Drake, M.; Bodyfelt, F. (Eds.), 2nd ed., 2008. Springer Publishing ([www.springer.com](http://www.springer.com))
- Collegiate Dairy Products Evaluation Contest Score Cards  
milk, yogurt, ice cream, cottage cheese, cheddar cheese, butter  
<http://www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateM&navID=CoachescornerCollegiateDairyProductsEvaluationContest&rightNav1=CoachescornerCollegiateDairyProductsEvaluationContest&topNav=&leftNav=CommodityAreas&page=DairyCoachesCorner&resultType=&acct=dgeninfo>

# Resources

- Guidelines for Preventing Off-Flavors and Rancid Flavors in Milk  
Publication DPC 38. 2008. The Dairy Practices Council, 51 E. Front Street, Suite 2, Keyport, NJ 07735, 732-203-1947, <http://www.dairypc.org>
- Troubleshooting Milk Flavor Problems  
<http://extension.psu.edu/animals/dairy/health/nutrition/nutrition-and-feeding/troubleshooting-guides/troubleshooting-milk-flavor-problems>