2021 Online Dairy Education Series

Evaluating Sensory Properties of Dairy Products

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12:30 PM to 2:30 PM

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Sensory materials list to participate in the smell and taste exercises.

Sweet solutions: (can make up in disposable plastic or paper cups)

2 teaspoons of sugar in a cup of spring water (sweet 1)

5 teaspoons of sugar in a cup of spring water (sweet 2)

Salt solutions:

A pinch of salt in a cup of spring water (salt 1)

¼ teaspoon of salt in a cup of water (salt 2)

Sour solutions:

½ teaspoon of vinegar (cider is preferred but any will work) in a cup of spring water (sour 1)

1 ½ teaspoons of vinegar in a cup of spring water (sour 2)

A. Cranberry juice or apple sauce

B. Cold unsweetened black tea or IPA beer

C. Spicy mustard or hot sauce

D. Tic Tac candy: any flavor (I will use peppermint)

E. Spice Drops flavored gum drops (Walmart, Great Value brand or any store brand)

F. LifeSaver candy (wintergreen or peppermint flavor) or any mint candy

G. Dairy products:

Milk (no-fat, low fat, full fat, and grass-fed)

Cheese (American (white or yellow), local cheddar (sharp or other), and artisan cheese)

Yogurt (plain and fruit flavored)

A word about safety:

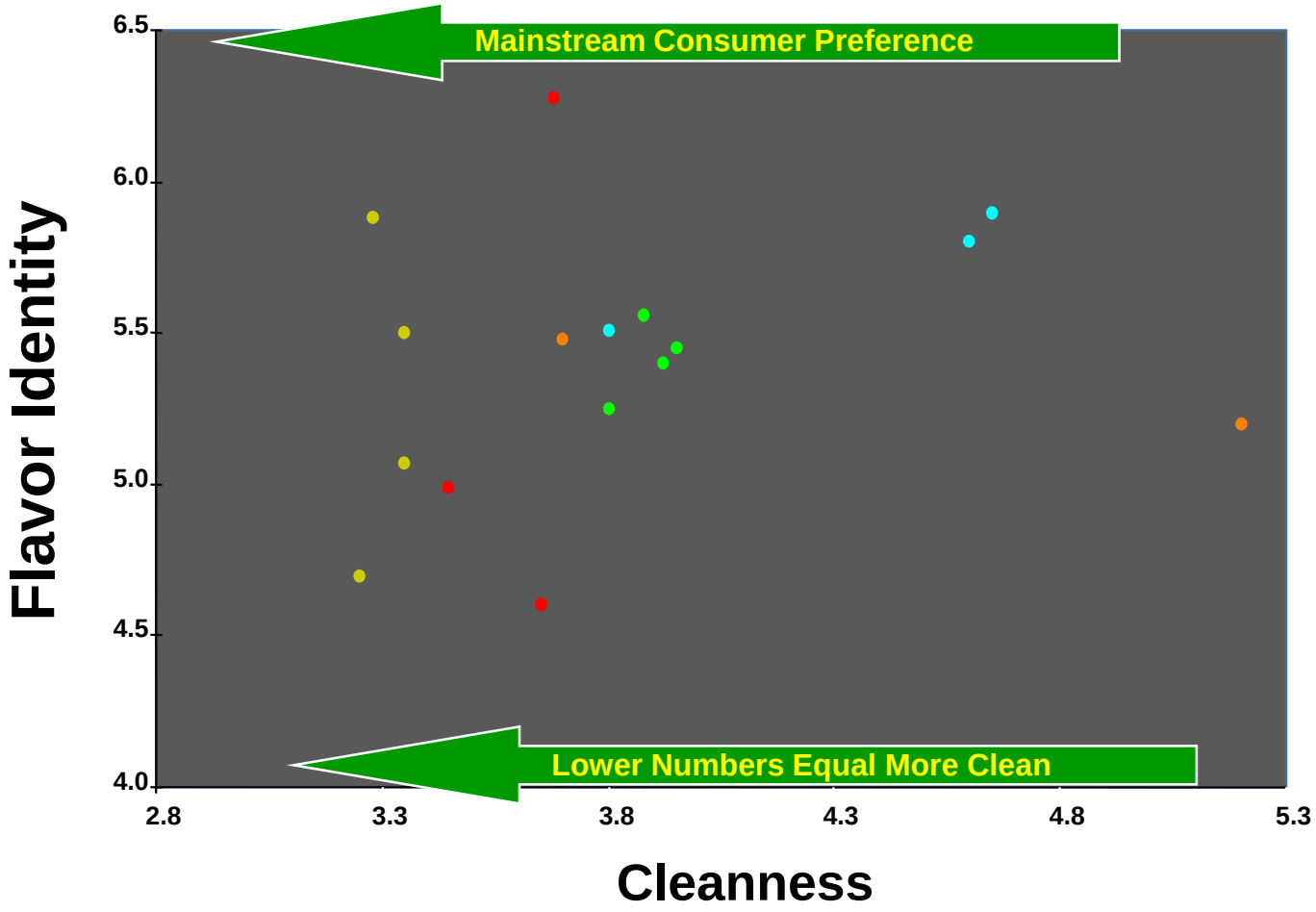
- Our highest priority is the health and well being of the tasters
- Everything must be safe to smell and taste
- We take Covid-19 seriously and take every possible precaution to ensure taster safety. We recommend that you do the same.
- We worry about allergies, so be careful
- Smell and taste as little of each product as you need
- Never taste samples that you do not know the entire history of, such as product returns and complaints

A few words about Sensory Habits and Hygiene:

- Observing good sensory hygiene is critical to sensory panel success. A sensory panel requires more control than the most sophisticated laboratory in the world
- Avoid using products with a fragrance on days that you plan to smell and taste:
  - Perfume and Aftershave
  - Fragrant soaps and shampoo
  - Fragrant detergents

- Wash hands frequently with water and minimal soap and avoid paper towels just prior to panels
- No smoking immediately prior to sensory panels
- No eating or drinking within 30 minutes of a sensory panel
- Do not brush your teeth with 60 minutes of a sensory panel and avoid breath mints and flavored gum.

Aroma and Flavor matter.



Understanding that aroma and flavor matter, and how, will help build and maintain stronger customer relationships and support sustained success in the market.

The quality of ingredients such as milk affects both of these key sensory dimensions.

The four "Pillars of Success" for dairy products include critical sensory knowledge.

Communicating a promise/image of an appealing product

Delivering the sensory experience the customer wants

Doing it Consistently

Producing and distributing the dairy product at the right price

The four "Pillars of Success" drive initial purchase of dairy products, consumption, and repeat sales that lead to sustained market share and profit.

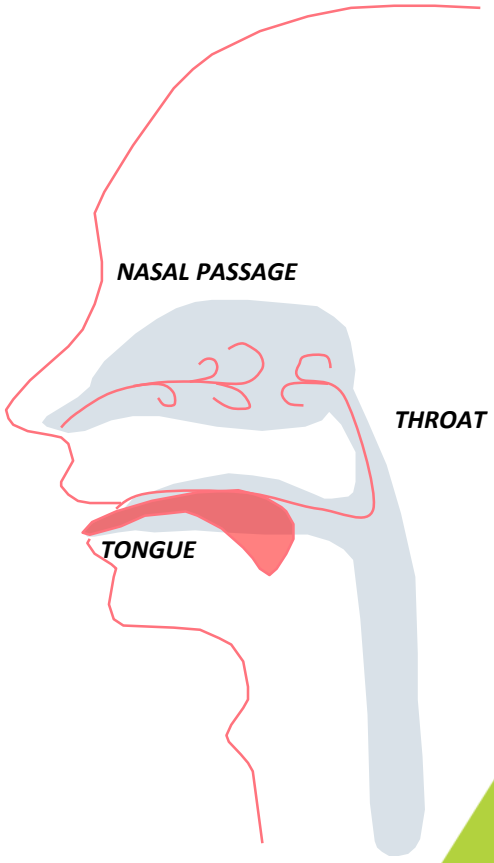
The Flavor Leadership Criteria (FLC) are a set of five sensory categories that define market leadership.

Flavor Leadership Criteria for Dairy Products	
1 **Aromatic Identity**	◆ Immediate impact of identifying dairy flavor
2 **Amplitude**	◆ Rapid development of balanced, full flavor
3 **Mouthfeel**	◆ Compatible mouthfeel factors
4 **Off-notes**	◆ No “off” flavors.
5 **Aftertaste**	◆ Short and clean aftertaste

We need to focus on the end users, customers, to succeed, and we must use the FLC to understand what they want dairy products to smell and taste like.

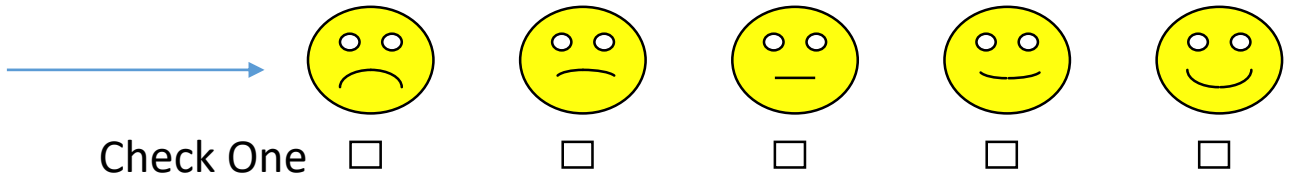
The human nose is more sensitive than any instrument in the world. Analytical chemistry only tells part of the story.

Chemical Name	100% Threshold Concentration (ppb)	Reported Range from Literature (ppb)
Acetone	100,000	200–200,000
Toluene	2,100	21–69,000
n-Butanol	150	50–990,000
Pyridine	21	0.2–10,000
Methyl Mercaptan	2.1	0.00015–500
Ethyl Mercaptan	1.0	0.01–18,000
Dimethyl sulfide	1	0.2–150
Butyric acid	1	0.0007–10
O-Cresol	0.63	.01–20,000,000
Hydrogen sulfide	0.47	0.07–1,500
Trimethylamine	0.21	0.2–2,000
Dodecanethiol	0.1	.0001
o-Chlorophenol	0.10	—
p-Chlorophenol	0.01	—
o-Iodophenol	0.001	—
Methyl Indole	—	0.0001–50

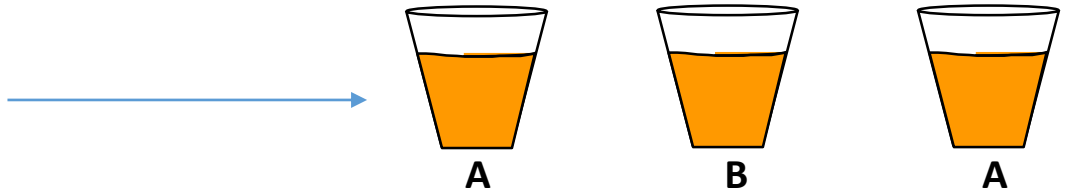


There are four major types of sensory testing methods:

- Affective tests (hedonic)



- Difference tests (triangle)

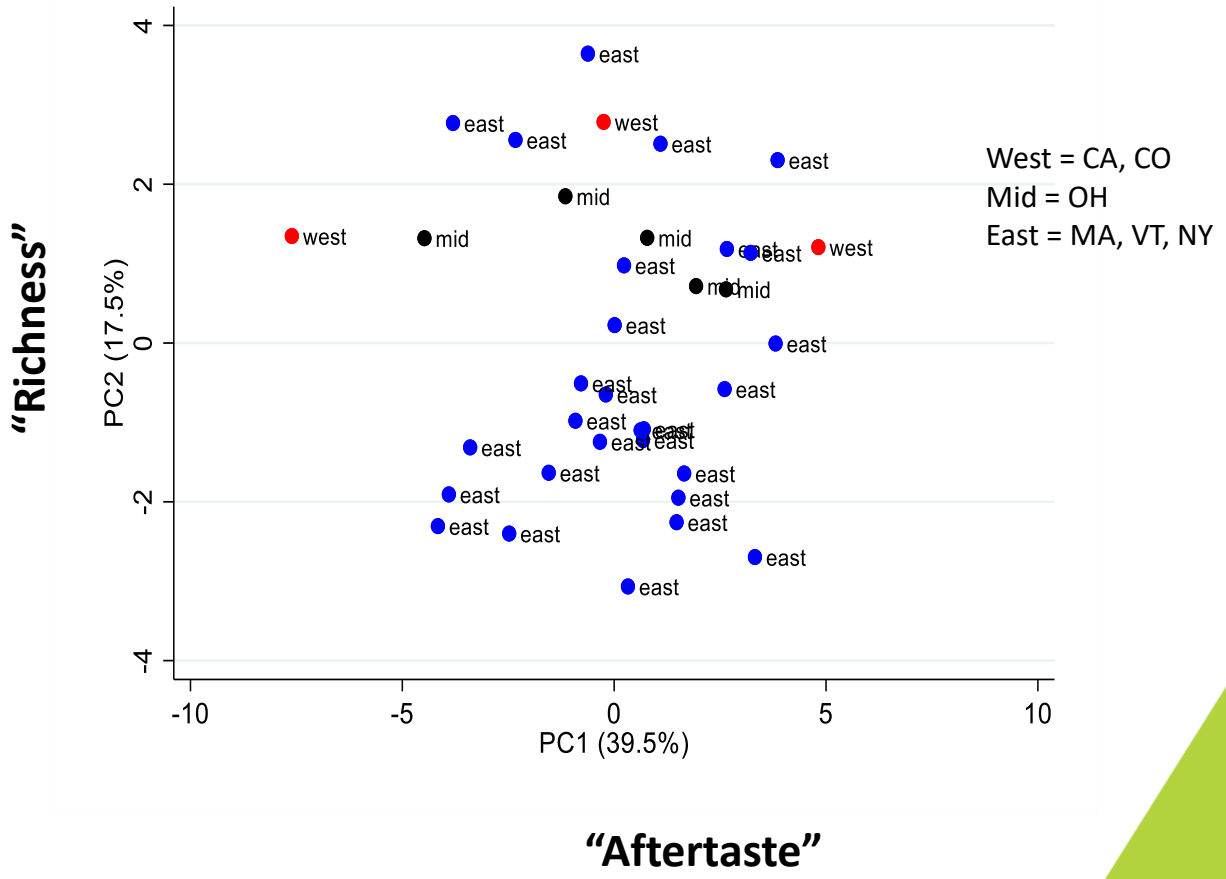


- Expert taster (cheese tasters)
- Descriptive analysis (human instrument)

The Basics of Descriptive Sensory Analysis

What is descriptive sensory analysis?

The use of people as instruments to objectively measure sensory response to stimuli



Flavor is made up of three components.

1. Basic Tastes
2. Aromatics
3. Mouthfeels

Sensory materials list to participate in the Basic Taste exercise.

Sweet solutions: (can make up in disposable plastic or paper cups)

2 teaspoons of sugar in a cup of spring water (sweet 1)

5 teaspoons of sugar in a cup of spring water (sweet 2)

Salt solutions:

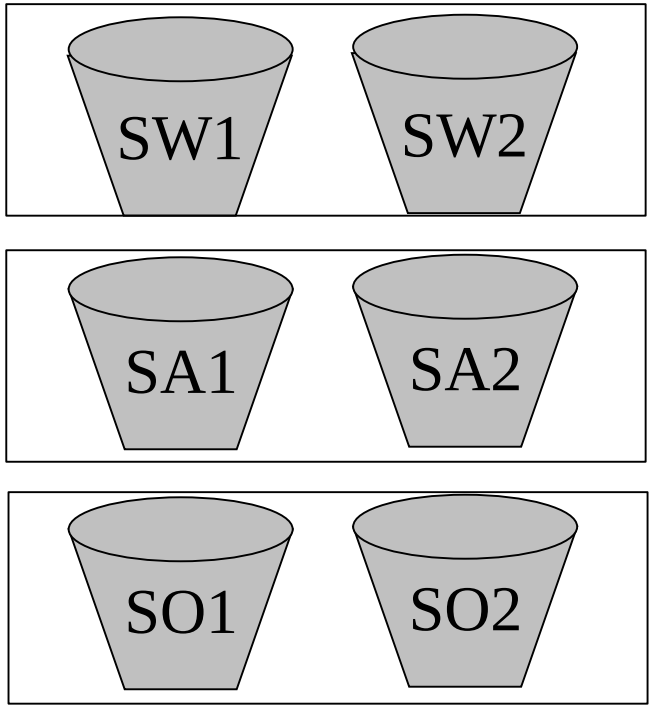
A pinch of salt in a cup of spring water (salt 1)

¼ teaspoon of salt in a cup of water (salt 2)

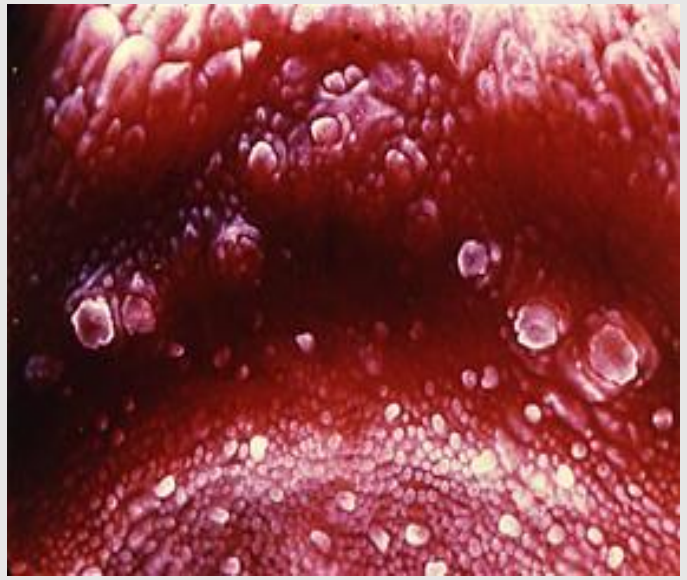
Sour solutions:

½ teaspoon of vinegar (cider is preferred but any will work) in a cup of spring water (sour 1)

1 ½ teaspoons of vinegar in a cup of spring water (sour 2)

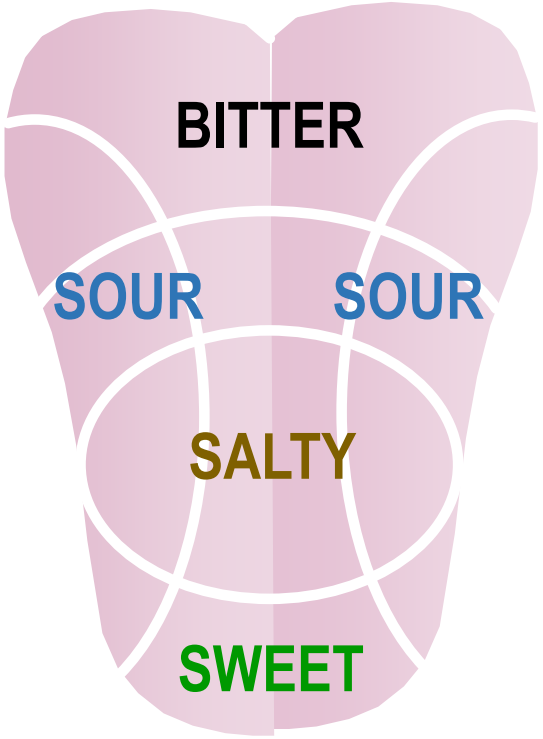


Basic Tastes are measured on the tongue by taste buds.



The taste must dissolve in the saliva in your mouth to be carried into the taste bud and detected.

Basic Tastes Where are they perceived?



BASIC TASTE	PERCEIVED…
SWEET	Tip of Tongue
SALTY	Front Sides of Tongue
SOUR	Back Sides of Tongue
BITTER	Back of Tongue

Note: We recognize umami as a fifth basic taste.

We can only detect basic tastes in our mouth since we only have these 5 types of taste buds.

Sensory materials list to participate in the Aromatics exercise.

LifeSaver candy (wintergreen or peppermint flavor) or any mint candy

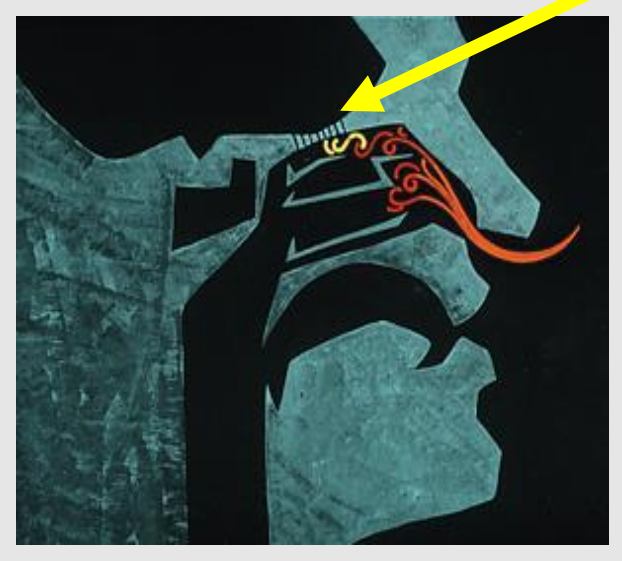
Spice Drops flavored gum drops (Walmart, Great Value brand or any store brand)

To demonstrate, hold your nose and lick the LifeSaver without letting your nose go. What do you taste?

Now let your nose go…

What happened? Aromatics have two paths they can take to be detected in the olfactory region.

Olfactory Region



Aroma aromatics travel directly through the nose, and are detected in the olfactory region of the nose.

Flavor aromatics are compounds volatized in the mouth, travel up the back passage, and are detected in the olfactory region of the nose.

You prevent aromatics from traveling up the retro nasal passage when you hold your nose closed.

Sensory materials list to participate in the Aromatics exercise.

Spice Drops flavored gum drops (Walmart, Great Value brand or any store brand)

Next, hold your nose and taste the purple candy without letting your nose go. What do you taste?

Now let your nose go…

Sensory materials list to participate in the mouthfeel exercise.

Cranberry juice or apple sauce

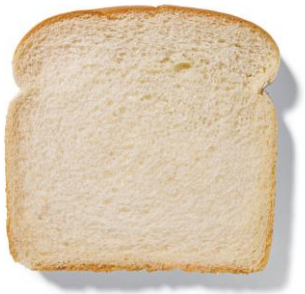
Cold unsweetened black tea or IPA beer

Spicy mustard or hot sauce

Mouthfeels describe chemical or physical sensations that are felt in the mouth, nose, or throat.

Astringent

Dry/tannin



Oily/greasy/coating

Harsh/sting

Cooling

Sensory materials list to participate in the mouthfeel exercise.

Astringent/puckering
Dry, salivating,

Dry tongue, tannin

Bite, burn, sting, harsh

Sensory materials list to participate in the order of appearance and aftertaste exercise.

Tic Tac candy: any flavor (I will use peppermint)

Order of Appearance

The order in which we detect odor and flavor characteristics using descriptive sensory analysis is called the **Order of Appearance**.

Aftertaste is a measure of the flavor detected one minute after your last taste, and includes basic tastes, aromatics, and mouthfeels.

The integrative flavor attributes include balance and fullness….

Balance is a measure of the **harmony** of flavor characteristics. It is measured on a scale of unblended to blended.

Fullness is a measure of the **complexity** of flavor of a food product. It is measured on a scale of thin to full.

Sensory materials list to participate in the dairy products smell and taste exercises.

Milk (no-fat, low fat, full fat, and grass-fed)

Cheese (American (white or yellow), local cheddar (sharp or other), and artisan cheese)

Yogurt (plain and fruit flavored)

How do you prepare and evaluate dairy products?

First, we must ask ourselves, “Why are we tasting?”

Note: We MUST standardize how we decide to prepare and assess samples.

- **Quality Assurance (QA)**
- **Research and Development** (R&D) (product development, optimization, and innovation)
- **Problem Solving** (customer complaints, vendor complaints, and failed QA – i.e. “Right-first-time”

We prepare and evaluate dairy samples for sensory analysis in QA and R&D, just as the customer would. We “stress” samples, change temperature, concentration, surface area, if we are trying to solve a problem.

Typically, we evaluate milk at cooler temperatures, such as 44-48°F.

Fat free milk sample:	Thin and watery, very slight fresh milk, slight sour, astringent, dry, with a very slight dry aftertaste
Low fat milk sample:	Thin, fresh milk, slight sweet and sour, astringent, dry, with a very slight dry aftertaste
Full fat milk sample:	Balanced and full bodied, fresh milk and cream, slight sweet and sour, slight-to-moderate mouth-coating, dry, slight fresh milk, with a slight mouth coating and dry aftertaste
100% grass-fed milk sample:	Full bodied, moderate fresh cream and buttery, slight sweet and sour, fatty mouth-coating, dry, slight barny, hay-like, with a slight creamy and mouth-coating aftertaste

Typically, we evaluate cheese at room temperatures, such as 70°F.

American processed cheese	Flavor: slight balance and fullness, slight sweet, sour, and salty, moderate artificial butter and cheese, slight oily, tacky/sticky mouthfeel. Aftertaste: slight oily plus MF and slight artificial buttery Texture: Tender (1st bite), smooth, moist, oily, not chewy, slight tooth packing(TP)
Vermont extra sharp cheddar	Flavor: Moderate sour and salty, moderate cheddar, slight fruity esters, slight to moderate fatty acid sour (FAS), astringent, salivating, slight bitter, moderate TP. Aftertaste: lingering sour, cheddar, FAS, TP, salty, salivating, dry/tannin, tongue sting (TS) Texture: Moderate firmness, moderate crumbly, moist, slight oily,

Typically, we evaluate cheese at room temperatures, such as 70°F.

VT Maple Sriracha Windsordale (Wensleydale)

Flavor: Moderate balance and fullness, slight sweet, slight spicy/sriracha and building, slight caramelized sweet, moderate salty, FAS cheesy (blue), slight meaty/brothy, slight red fruit esters, sour, bite and burn (B+B), TS, slight bitter, dry, TP. Aftertaste: B+B, TS, spicy, FAS/cheesy, sour, salt, salivating

Texture: Slight to moderate firmness, moist, slight crumbly, slight chewy/rubbery,

Typically, we evaluate yogurt at cooler temperatures, such as 44-48°F.

Greek non-fat yogurt, plain	Flavor: Slight to moderate balance and fullness, moderate sour, moderate FAS/yogurt, moderate astringent, slight fruity esters, slight acetic sour, moderate salivating and dry, mouth coating, chalky, bitter. Aftertaste: sour, tannin, FAS, salivating, slight bitter Texture: slight density and viscosity, easy to stir, smooth, very slight powder particulates
Greek non-fat yogurt, raspberry	Flavor: Moderate balance and fullness, moderate to strong sour, moderate cooked ripe raspberry, slight FAS/yogurt, moderate astringent, slight acetic sour, moderate salivating and dry, mouth coating, chalky, bitter. Aftertaste: sour, salivating, RFEs, tannin, dairy sour, bitter Texture: slight to moderate density and viscosity, easy to stir, smooth, slight powder and seed particulates

Things to remember about descriptive sensory analysis.

Be safe, and keep everyone tasting with you safe

Be objective and descriptive when tasting

Know why you are tasting

Know your customer

Try to consistently deliver what your customer wants

Have fun!

Thank you!

Questions and discussion