

Sensory Lab-Dairy and Jerky Products

Include cups for tasting, spoons, toothpicks, napkins

Dairy:

Yogurt

Whole milk

Skim milk

Cheddar cheese

Parmesan cheese

Cottage cheese

UHT milk

Tofu (optional)

Jerky:

Commercial (store-bought)

Jerky from lab (oven dried vs. dehydrator dried; different flavors (ex. teriyaki, spicy, mesquite))

Talking Points-Dairy

I. **Comparison of Food Products Based on the Types of Milk and Precipitation from the Chemistry Laboratory**

- These products illustrate foods that were manufactured using the different types of protein precipitation conducted in the laboratory

- Milk contains 2 types of proteins – caseins and serum (whey) proteins. The caseins are the proteins that precipitate, the whey proteins will stay dissolved in the milk

- Milk proteins can precipitate by 2 different mechanisms – acid or enzyme

a. Part 1. Precipitation of casein from milk with an acid (vinegar)

Yogurt

- acid precipitation is a function of changing the net charge on the protein, by adding acid and changing the electrical attraction of the protein strands to each other. The isoelectric point of casein is pH 4.6, the point at which the proteins can interact with each other and form a network.

- when the acid gel is formed the protein strands link together and trap liquid within the network, yielding a soft gel

- during the manufacture of yogurt there is no loss of whey; for every 10 pounds of milk you get 10 pounds of yogurt

- because the gel is soft, when you break it the liquid can leak out of the gel network – this is why you sometimes see a clearish liquid in yogurt containers before they are stirred, this liquid is the whey (and contains beneficial proteins, so it should be eaten)

b. Part 2. Enzymatic coagulation of the casein from milk with rennet

Mild Cheddar Cheese

- enzymatic coagulation of milk involves the action of an enzyme cleaving the protein strands and allowing for protein interaction and network formation

- rennet contains the enzyme chymosin, which cleaves a very specific bond in milk proteins, separating a fragment of protein from the casein micelle

- after the protein fragment is cleaved, the micelles can interact with each other and form a firm network

- when enzymes are used to form milk gels, the resulting gel is firmer and liquid (whey) is expelled

- for every 10 pounds of milk you get 1 pound of cheese and 9 pounds of whey

c. Part 3. Coagulation of protein from soymilk using a salt (magnesium sulfate)

Firm Tofu

- I didn't talk much about the chemistry behind tofu production since it was covered in the lecture, this was just an opportunity for people to taste plain tofu (most never have) and compare the texture of the tofu with the yogurt and cheese

II. Comparison of Types of Milks

Whole Milk (3.3% fat)

Soy Milk (1.7% fat)

- This section is just a chance for a side-by-side comparison of dairy milk with soymilk; which most people have never done
- Sometimes I read the ingredient declaration of the milks to show people that dairy milk contains milk and might be vitamin D fortified, whereas there are many ingredients (including sugar) in soymilk, particularly if you are using a flavored (e.g., vanilla) soymilk.
- you can ask for comments from the audience to see what they think

III. Comparison of Cheddar Cheese (Not all Cheddar is the same!)

- Again, this section is a chance for a side-by-side comparison of different ages of cheeses, which is something most people don't do.

- mild Cheddar is young (1 – 3 months) and sharp Cheddars are older (usually >9 months); sharp cheeses can age for quite a while, often 3 – 5 yrs (I've had a 15 yr old Cheddar)

- there are many nuances in make procedures for Cheddar that can tweak the product depending on how it is going to be used (e.g., shredding, melting, table cheese) and what flavor profile is desired

Mild Cheddar

- younger
- softer in body
- not as much flavor developed

Sharp Cheddar

- older cheese
- firmer in body
- flavor develops during aging due to microbial metabolism and breakdown of fats and proteins

Sensory Evaluation Worksheet

- I. Comparison of Food Products Based on the Types of Milk and Precipitation from the Chemistry Laboratory
 - a. Part 1. Precipitation of casein from milk with an acid (vinegar)
Yogurt
 - b. Part 2. Enzymatic coagulation of the casein from milk with rennet
Mild Cheddar Cheese
 - c. Part 3. Coagulation of protein from soymilk using a salt (magnesium sulfate)
Firm Tofu
- II. Comparison of Types of Milks
A chance for a side-by-side comparison of dairy milk with soymilk
 - Whole Milk (3.3% fat)
 - Skim Milk
 - Soy Milk (1.7% fat)
- III. Comparison of Cheddar Cheese (Not all Cheddar is the same!)
 - Mild Cheddar
 - Sharp Cheddar
- IV. Jerky
 - Dehydrator
 - Oven
 - Commercial