Sensory Evaluation

Wine 3
Introduction to Enology

Tonight’s Lecture

- Homework
- Sensory Evaluation
- Why we taste wine
- Difficulties in evaluating wine
- How to taste wine analytically
- How the senses respond to wine
- How wines are judged

Homework 1

- You need to adjust 7000 gallons of dry, sterile filtered Chardonnay to 0.8 PPM Molecular SO₂
- Current analysis:
  - 15 PPM Free SO₂ by Ripper
  - 30 PPM Total SO₂ by Ripper
  - pH 3.30

Homework 1

- Since it is clean wine we will assume 2/3 of the sulfur dioxide that is added will go to free SO₂.
- At a pH of 3.30 a free SO₂ of 26 PPM will have a Molecular SO₂ of 0.8 PPM (from chart)
- Conversion factor = 0.0066

Homework 1

- Acid addition, 10,000 gallons of Sauvignon Blanc juice is has a pH of 3.6 and you want to lower it to 3.4, how much tartaric acid do you add?
- How much in grams?
- How much in pounds?
Remember 1 gram/Liter lowers pH by about 0.1

Homework 2

- 26 PPM (desired SO₂) - 15 PPM (current SO₂) = 11 PPM
- 11 PPM / 0.67 = 16.5 PPM to be added
- (7000 Gal.) (16.5 PPM) (0.0066) = 762 gm PMBS
Homework 2

2 grams/Liter will lower pH by about 0.2

(10,000 gal)(3.78 L/Gal) = 37,800 Liters

(37,800 L)(2 grams/L) = 75,600 grams

75,600 grams = 75.6 kilograms

(75.6 kilograms)(2.204 #/Kg) = 166.62#

Sensory Evaluation

- Sensory evaluation is a method of using the senses to taste critically and determine the physical and chemical attributes of a wine.
- In other words, to try to explain what a wine tastes like.
- Hopefully without taking the enjoyment out of tasting it!

Wine appreciation

- Learning to taste wine is like learning to appreciate music; it consists of increasing sensitivity and developing a critical faculty.
- You don’t have to be able to read music to like a song but the more you understand about music the more you will be able to appreciate the experience.

Hedonic vs. Analytical

- Hedonic tasting is simply drinking some wine with friends or with a good meal for the pure enjoyment of it.
- Analytical tasting is useful for winemakers as well as other wine professionals. It is the processes of using your senses to critically evaluate a wine.

Tasting wine, it’s why we are all here

- We drink wine rather than water because it gives pleasure to our senses.

Hedonic vs. Analytical

- Both have there place but tonight we will concentrate on analytical tasting.
**Tasting like a Winemaker**

- People taste (drink) wine because it tastes good.
- Most people don’t think too much about wine, they just need to know what they like.
- Winemakers drink wine because they like it, but they taste wine to get information.

- When a winemaker tastes they are looking for:
  - How good is the wine? Do I like it?
  - What about this wine makes it taste good to me?
  - What winemaking practices are responsible for the way it tastes.
  - How could I have made it better.
  - Remember, you can ruin a wine (or a dinner party) by talking about it too much.

**Sensory Evaluation**

- **Sensory evaluation**, critical tasting using the senses to determine the attributes of a wine and to explain what it tastes like.
- **The senses are incredibly sensitive** and can detect some flavor compounds as low as several parts per trillion.
- 1 part per trillion is equal to 1 drop in 20 Olympic sized pools!

**Points to consider**

- There are some instruments, such as gas chromatograph mass-spectrometers, can detect and quantify the various naturally occurring chemicals in wine but there is still no method of interrupting the data in a way that can accurately describe the overall flavor.

**Points to consider**

- The setting you taste in is very important also, it should be well lit with natural, incandescent, or wide spectrum fluorescent light and it should be at a comfortable temperature with no distracting noises, smells or activity.

**Tasting Etiquette**

- Be careful not to do anything that can interfere with the smell of the wine such as smoking, or wearing perfume or after-shave.
- Keep your opinions to yourself until everyone is finished tasting.
- Show up on time, arriving late distracts everyone.
**Tasting Etiquette**
- No lipstick, it is difficult to get off crystal glassware.
- Don’t rinse your glass with water in between wines unless you are going from red to white or have a spoiled wine.

**The Proper Glass**
- Glassware must be clean without any residual soap.
- A proper glass for sensory evaluation should be 8 to 14 oz and have no decoration.
- The lip is slightly curved in to hold in the aroma and prevent spilling while swirling.
- Does not matter if its crystal or glass.

**The Proper Glass**
- Stemmed
- Stemless

**Methods of sensory evaluation Component vs. Qualitative**
- **Component tasting**, usually not concerned with the overall quality of a wine but instead concentrating on the individual attributes of a wine, isolating and quantifying them (is something there, and if so, how much?).
  - Acid level
  - Sweetness
  - Oak Level

**Methods of sensory evaluation Component vs. Qualitative**
- **Qualitative tasting**, concerned with the overall taste of a wine. Looking at all the different attributes of a wine both separately and together, and how appropriate it is to the wine being made.
  - Types of flavors
  - Balance

**Difficulties in evaluating wines**
- Many problems present themselves when attempting sensory evaluation because the taster is trying to quantify an inherently subjective experience.
  - Thresholds
  - Training
  - Preference
  - Fatigue
Thresholds

- **Thresholds** or sensitivities differ between people.
- Sugar thresholds range from 0.3% to 1.2%
- Sulfur dioxide ranges from 0.6 to 1.0 PPM molecular SO₂
- PTC Tasting
- **Differences** between how people describe the same flavors and aromas.

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Differences between how people describe flavors

- **Example:** Common smells for Zinfandel are black pepper and blackberries so standards can be made to train judges.
- Blackberry, add 1-2 crushed fresh or frozen blackberries to 25 ml of neutral red wine.
- Black Pepper, add 2 to 3 grains of ground pepper.
- **Component analysis** is leaning what the different substances of wine are and how to identify them by taste: acid, sugar, alcohol, etc.
- A standard wine can be made with different levels of these compounds for training.
**Difficulties in wine evaluation ~ Preference**

- Differences between the preferences of people, hard to combat because "there's no accounting for taste"
- With more experience tastes often change. And there is nothing wrong with different people liking different things.
- After all your first cup of coffee probably wasn't a double espresso.

**Difficulties in evaluating wines ~ Fatigue**

- Fatigue loss of concentration
  - Do not taste when you are tired and taste in a non-distracting situation.
  - When you have a lot of wines to taste be sure to spit.

**Difficulties in evaluating wines ~ Fatigue**

- Sensory evaluation booths

**Difficulties in evaluating wines ~ Fatigue**

- Tannin build up, on repeated sips of the same tannin level taste more and more astringent.
  - Rinsing your mouth with water and having plain crackers or French bread between tastes.
  - Rare roast beef, olives (not vinegar cured), pectin solution, all work for more astringent wines.

**Difficulties in evaluating wines ~ Fatigue**

- Smell is more accurate than taste and does not fatigue as readily.
- First impressions can be most accurate, but aroma can change over time. Take your time, concentrate, and note your impressions.
- Often unpleasant volatile aromas will "blow off" after a few minutes.

**Sequence of Evaluations:**

- Visual, nose, and then by mouth, then spit.
- Done in this order tasting is less fatiguing and more accurate.
Order of tasting

- Taste wines with subtle flavor before wines with robust flavor
- Wines with subtle taste before those with robust taste
- White wines before red wines
- Dry wines before sweet wines
- Light-bodied wines before full-bodied wines
- Young wines before older wines
- Table wines before dessert or fortified wines

The proper setting for tasting wine

Not shown - spit cup

Be sure to taste blind

Visual

- Examine for clarity, color, viscosity (tears or legs), mousse (bubbles in sparkling wine)
- Tears, formed by the evaporation of water and alcohol

Clarity

Hold up to light source (natural or incandescent the best)

- Brilliant - sparkling clear.
- Clear - free of visible solids but not sparkling.
- Dull - haze but no solids.
- Cloudy - large amounts of suspended solids.
- Precipitated - visible deposit (sediment).

Color

- Depth (intensity of color) look through wine at a 45-degree angle.
- Hue (shade of color) tilt glass over a white background.
- Color must be appropriate to the wine type.
  - Reds are purple when young and get brick red as they age.
  - White wines very pale yellow to deep yellow gold.
  - Dessert & fruit wines have their own color ranges.
White Wine Color

1. Pinot Gris,
2. Sauvignon Blanc,
3. Marsanne / Chenin Blanc / Viognier,
4. Chardonnay,
5. Old White Wine,
6. Sherry

Red Wine Color

1. Young Cabernet,
2. Old Cabernet/Merlot,
3. Young Merlot,
4. Young Syrah,
5. Young Pinot Noir,
6. Old Pinot Noir

Wine age & Color

A one year and twenty year old white wine

Watch out for:
- Red wines, too purple (high pH) or that is brown, (oxidized or old).
- White wines, water clear (too much SO₂), or amber (oxidized or old).
- Blush wines, orange too much SO₂ or oxidized.
- Florescent lights can have a blue tint that affects color.
Don't be fooled by looks!

- Don't let you visual evaluation prejudice impressions from your other senses, just let it be a heads up on what to look out for.
- We have all experienced a food that looks appetizing but tastes awful.

Aroma

- The sense of smell is the oldest and one of the most highly developed senses.
- The sense of smell is also much more acute than the sense of taste being able to detect many more compounds at much lower concentrations.
- The human nose can identify thousands of different types of aromas, some at very low levels.

How the sense of smell works

- For a compound to have an aroma it first must be **volatile** (able to evaporate) and be carried by air.
- In the upper sinus there are two membranes called the **olfactory epithelium**, here volatile chemicals in the air react with receptor neurons located in these membranes.

How the sense of smell works

- From these membranes neurons transmit signals from the receptors to the **olfactory bulb** above the nasal cavities before being sent on to the brain where the information is processed.

Receptor Cells in the **olfactory epithelium**
How to smell wine

- Remember first impressions can be the most accurate so be prepared to concentrate. And **SWIRL AND SNIFF**

How to smell wine

- Swirling helps to get volatile compounds airborne.
- Note:
  - **Intensity**, High / Low
  - **Quality**, Clean / Dirty
  - **Character**, Types of the different smells present

Descriptive Analysis

- Smell is one of the most **evocative** senses and how we describe an aroma is usually based on how it compares to aromas we remember having smelled before.
- One of the best ways to describe the complex smell of wine is by isolating the more simple one dimensional aromas that it is made of.

Descriptive Analysis

- This is called **descriptive analysis** and many of the aromas (not all) are found in the **Wine Aroma Wheel**.
- Aroma classification is based on the type and description of the smells that are present.

Examination by Mouth

- Mechanics of tasting:
- **Taste Buds** (taste receptors) are concentrated on the tip and upper surfaces of the tongue. Different compounds in food stimulate the cells of a taste bud, which in turn send electrical impulses to the brain.
There are four Primary Tastes
- **Sweetness**, Perceived quickly, then diminishes.
- **Acidity**, perceived rapidly and persists longer.
- **Salty** perceived rapidly but not important in wine.
- **Bitterness**, slow to develop intensity increases and lingers after spitting.
- **Only three are relevant to wine!**

Other tastes
- Flavor chemists also include the tastes of both **metallic** and **umami**.
- Umami is a savory taste (MSG).
- Both of these flavors have little to do with the flavor of wine, so all you are left with is **Sweet, Sour, & Bitter**.

The Tongue-Taste Map: All Wrong
- **OUTDATED** but this has continued to appear in textbooks even though it was based on a misinterpretation of research done in the 19th century.

Sensations (feelings)
- **Temperature**: At warmer temperatures, a wine's aroma is more intense because of the greater volatility of the aromatic compounds. Cooler temperatures will give a wine a more refreshing quality, but diminishes aroma.
- On the palette, lower temperatures will diminish the perception of acidity and sweetness making the wine's bitterness and astringency more pronounced.

Sensations (feelings)
- Red wines are traditionally served at "room" temperature, 59° to 65°F (15° to 18°C)
- White wines are usually served at a lower temperature, 50° to 55°F (10° to 13°C)
- Sparkling wines are served around 41°F (5°C), which helps to slow the evolution of bubbles, prolonging the effervescence in the glass.
- Use the 20 minute refrigerator rule.

Sensations (feelings)
- **Viscosity**, Thickness or body. Sugar, glycerol and alcohol are the major components that contribute to the perception of a wine's body.
- **Effervescence**, Carbon dioxide (CO₂) will give a prickly sensation as well as making the wine seem a little more tart. Wine with only a small amount of CO₂ are called "spritzy".
Sensations (feelings)

* Astringency Feeling of dryness or roughness similar to a bitter taste caused by:
  - Coagulation of mucous in saliva.
  - Saliva glands are restricted (drying).
  - Tannins harden mucous tissues. Caused by astringent phenolic molecules.

* Bitterness and astringency are often confused.
  - Bitterness is a taste
  - Astringency is a sensation

Aroma by Mouth

* Different flavors (complex tastes) such as blackberry etc. are sensed by olfactory mucosa when aroma compounds go from the back of the mouth up to the sinuses.

Evolution of Tastes

* Attack, dominance of sweet tastes
* Evolution, from sweet to acid and bitter flavors
* Finish, dominance of acid & bitter flavors
* After Taste, slow tapering off of flavors

What to look for:

* Attack: pleasant or sweet tastes, body and strong flavors.
* Evolution the balance of the wine. Whites acid/sugar. Reds acid/tannin/alcohol, what aspects of the flavor stand out? If so are they good or bad.

* Finish, what flavor quality is the dominant one after swallowing? Is the wine bitter or hot?
* Aftertaste is judged by its quality, strength and duration. The hot flavor of alcohol becomes noticeable
Evaluating Wines

- The ability to critically evaluate wine is the most important skill a winemaker can have.
- It is as important as the sense of taste is to a chef.
- Wine writers, reviewers and wine competitions evaluate wines for consumers.
- The results can have a huge effect on sales.

Relative Ranking

- Ranking a group of wines by order of individual preference, simple method. It does not quantify the differences between wines very well unless there are multiple judges.
- The lower the number of the score, the more the wine was preferred by the judges.

Relative Ranking

<table>
<thead>
<tr>
<th>Wine</th>
<th>Tasting notes for relative ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
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<tr>
<td>C</td>
<td></td>
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<td>D</td>
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<td>E</td>
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</tr>
</tbody>
</table>

Tabulating the judges' scores reveals the groups preferences.

Duo-trio & Paired Comparison tests

- These tests compare a trial or experimental wine against a control.
- By using multiple judges and statistics they can be very powerful in determining if there is a difference between wines, and if so is there a preference?

Spider diagrams

- Multiple judged (preferably trained) rate wines for the intensity of various flavors.
- Can be useful in describing a wines flavor profile.
- Used for a number of beverages and foods.
Sensory Evaluation

Absolute scales

- **100 point scale**, very popular and easy to understand and you are not required to give certain amounts of points for certain attributes. First made popular by wine reviewer Robert Parker.
- The problem is that most commercial wines always score above 75, so most of the scale is not used.

**Modified Davis 20 Point Scorecard**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>2</td>
</tr>
<tr>
<td>Color</td>
<td>2</td>
</tr>
<tr>
<td>Aroma &amp; bouquet</td>
<td>6</td>
</tr>
<tr>
<td>Total Acidity</td>
<td>2</td>
</tr>
<tr>
<td>Sweetness</td>
<td>1</td>
</tr>
<tr>
<td>Body</td>
<td>1</td>
</tr>
<tr>
<td>Flavor</td>
<td>2</td>
</tr>
<tr>
<td>Bitterness</td>
<td>1</td>
</tr>
<tr>
<td>Astringency</td>
<td>1</td>
</tr>
<tr>
<td>General Quality (Fudge Factor)</td>
<td>2</td>
</tr>
</tbody>
</table>

**Napa Valley College 25-Point Scorecard**

- **APPEARANCE** (3 total)
  - Clarity (cloudy - clear - brilliant)
  - Color (hue)
  - Color (depth)
  - Other
- **ODOR** (7 total)
  - First impression
  - Second impression
  - Odor intensity
  - Off characters
- **TASTE** (15 total)
  - First impression
  - Middle of palate
  - Finish
  - Aroma in mouth
  - Aftersmell
  - Duration of aroma and taste
  - Taste intensity
- **FINAL SCORE** (25 total)

**Judging overall quality**

- Commercial wines are judged both by reviewers and competitions, each have their strengths and weaknesses.

Absolute scales

- **5 point scale** (Chris Benz)
  - 5 drink by it's self (I don't cook this good)
  - 4 drink after cooking all day
  - 3 bring to a party
  - 2 drink in front of the TV
  - 1 cooking wine
  - 0 dump it (life's too short for bad wine)
Reading reviews; which one do you trust?

- Look for a panel of multiple judges
- The wines **must** be tasted blind to remove prejudice
- Look for reviews that do a good job describing the attributes of the wine.
- Little or no advertising.
- Then find opinions you respect

Very few publications meet these criteria and the ones that do have very low circulation.
- For most publishers their primary goal is to sell magazines, not to give unbiased reviews.
- In spite of their limitations wine reviews can have a huge effect on sales.

Competitive Judging

- Competitions vary on how selectively they give out medals but they are generally less biased than publications.
- Awards are typically **bronze**, **silver** and **gold** medals.

Double golds are unanimous gold medal votes by a panel of judges.
- Best of class and best of show (**sometimes called sweepstakes**) are just what they say.

Competitive Judging

- Wine competitions have several factors that make them less biased:
  - Wines are **always** tasted and reviewed blind.
  - Panels consist of odd number of wine professionals from diverse backgrounds.
  - Very large groups of wine are judged against each other.

Wine competitions do have some disadvantages.
- Wines are separated by classification.
- Expensive wines are usually not judged against inexpensive wines.
- Not all wines are submitted for competition.
- A recent study showed many judges were not consistent.
Who do you believe?

- No method of wine evaluation is perfect, listen to others, but trust yourself.

Who do you believe?

Statistics

- In any tasting that is to be taken seriously, (especially when tasting experimental lots), statistics is necessary to try and add a bit of reliability to tasting results.
- They can be difficult to do so they are often skipped.

Statistics

- If the tasting you are doing is going to be used as part of an experiment or presented in a scientific journal they are mandatory because statistics allow you to prove your conclusions.

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Wine and food

- Pairing wine and food is not really part of winemaking, but if a wine is properly matched with a food, both taste better.
- This subject will not be on the test.
- Flavors can complement or clash, wine does best when it complements the food

Wine and food

- Think of wine as a seasoning or condiment to food, and like a condiment it should enhance the flavor of the dish it is served with. Match well, you do not put garlic in vanilla pudding.
- Highly rated wines often are not good matches for food. Hard to find anything that goes with bombastic 16% alcohol Cabernet.

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8 rules for matching wine with food

1) Rich foods are complemented by full-bodied wines. (tannic wines complement fatty foods)
2) Light-bodied foods are complemented by light-bodied wines.
3) Sour foods decrease the perception of acid in wine and are best paired with tart wines.
4) Sweet foods accentuate the perception of acid and are best paired with wines that are slightly sweeter than the food.

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5) Foods with fruity flavors go best with wines that also have a fruity character.
6) Spicy foods bring out the bitterness and astringency in wine and are best paired with tart, light bodied, off dry wines.
7) Salt in food decreases the perception of bitterness and astringency in wine.
8) Salty foods pair well with sparkling wine.

Next Week
- No Class
- Spring Break!
- Next lecture in two weeks
  Wine Processing & Cellar Procedures
- Make sure that you have handed back your test before you leave.