Sensory Evaluation

Composition of Wine

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Components of Wine

- Water: 70-80%
- Alcohol
- Acids
- Polyphenols
- Sugars
- Carbon Dioxide/CO2

Acids in Wine

Tartaric Acid: the strongest acid

-Specific to grapes, rarely found in nature

Malic Acid: most prevalent in unripe grapes

Degrades as the grape ripens but remains at high levels in certain varieties and with certain climates/soils

Can be degraded by lactic acid bacteria and turned to lactic acid through malo-lactic fermentation

Together account for 90% of grapes acidity

Benefits of Acid

- Helps in stabilizing color
- React with alcohol to form esters (aromas)
- Uplift aromas and flavors in the wine
- Enhance wine’s ageing potential
- Help to prevent microbial spoilage
- Balances residual sugar
- Brightens wine’s reflectivity

ph: Measuring acid

Strength of acid is measured in pH units in grapes

- p – power
- H – Hydrogen ion concentration
- The property that gives a solution it’s acidity

- Generally: the lower the pH the stronger the acid
- pH usually ranges between 2.5 and 4.0 in wine
- For every decrease of 1 unit on the pH scale – strength of acidity increases 10 times.
- Potassium ions replace Hydrogen ions as the berry ripens and acids decrease
- Generally values between 3.2 and 3.8 are more protective and anti-microbial in wine

pH measures the quantity of acids present, and the strength of the acids

Wine pH depends on three main factors:

- the total amount of acid present,
- the ratio of malic acid to tartaric acid
- and the amount of potassium present

Generally wines that contain lower acidity and an excess of potassium show higher pH values.

Wines with more tartaric acid, less malic acid, and less potassium generally have lower pH values.

low pH in wine

- Sulphur dioxide tends to be more effective as an antimicrobial agent
- Inhibites bacterial growth
- Improves the taste of the finished wine
- Increases the acid – can be balancing to the wine

pH of approximately 3.4 - 3.8 can provide balance in red wines

pH for white wines is effective when it is slightly lower (3.0-3.5)

Typical Acidity in Wine

- Dry White Wine – 6.5 g/l – 7.5 g/l
- Sweet White Wine – 7.0 g/l – 10.g/l
- Dry Red Wine – 6.0 g/l – 7.0 g/l
- Sweet Red Wine – 6.5 g/l – 9.0 g/l
- Fortified Wines – 5.0 g/l – 6.0 g/l

Organoleptic Characteristics of Acids

Visual:

Gives brilliance, reflective quality

Olfactif:

Usually not perceivable but malic acid reminds of green apple, sometimes a citrus note is detected

Taste:

Has an acidic flavor, tart and mouth drying leading to salivation

Tactile sensation:

Felt on side of the tongue, plus salivation, mouth watering sensation

Your teeth may feel squeeky

Malolactic fermentation:

Adds creamy, buttery notes, plus added body/texture

Sugar

Mostly glucose and fructose

Found in varying degrees in finished wine

(Brix x 0.55/.56 = potential alcohol)

Converted to alcohol through fermentation

Glucose ferments faster than fructose

Fructose is almost twice as sweet as glucose

If detectable, characterized as

Residual Sugar listed as grams per liter (g/l)

Specific to wine type:

Dry wine: less than 4 g/l (EU standards)

Sweet wine: can be up to and beyond 50

Sugar in Ripe Grapes

The sugar content of the juice of ripe grapes can vary greatly - 150 to 260 g/L (late harvest can be higher)

- In unripe berries, glucose is the predominant sugar.
- At the ripening stage, glucose and fructose are generally present in equal amounts
- In ripe grape varieties, there are variations in the glucose to fructose ratio
- In overripe grapes, the concentration of fructose exceeds that of glucose.
  - Chardonnay is classified as a high fructose variety
  - Chenin blanc is a high glucose variety

BRIX

Degrees Brix (symbol °Bx)

The unit °Brix is the percentage of sugar by weight in a liquid.

It represents grams of sugar per 100 grams of juice, or grams of sugar per 100 ml of juice.

- Brix x .55 = potential alcohol % by volume

The measurement of sugar in the grape will determine how much alcohol that wine will potentially make

It's the winemaking decision about converting all of the sugar into alcohol.

Some wine with residual sugar will have lower alcohol as a result of stopped fermentation

Organoleptic Characteristics of Sugar

Visual: increased viscosity, increased potential alcohol in finished wine (tears)

Olfactif: Contributes to “ripe or honeyed” aromas but not necessarily detectable

Taste: Has a sweet flavor, rich mouth feel and increased palate weight

Increased heaviness/fatness if unbalanced

Alcohol

Mostly ethanol with small amounts of methyl alcohol

- 7 to 16% by volume (can be fortified up to 20%)
- Issued from fermentation – *Chaptalization can increase alcohol by volume
- Usually - lower if residual sugar is present but can vary with the variety and from a hot climate or picked late.
- Alcohol sweetens and can balance acid
- Alcohol can add bitterness
- Alcohol can balance tannins but add to bitterness

* Chaptalization - adding sugar to the must to increase alcohol

Organoleptic Characteristics of Alcohol

Visual:

contributes to tears and

viscosity when combined

with glycerol

Nose: Tactile sensation – burning of the nostrils

Taste:

In high quantity, contributes

to sweetness

Contributes to mouthfeel

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Polyphenols/Phenolic Compounds

Extracted mainly from grape skins, seeds and stems

Group of chemical compounds that affect color, texture, astringency and bitterness

The phenolic compounds responsible for color are:

Anthocyanins – found in pulp cells under the skins of black grapes

200 to 500 mg/l in red wines

Tannins: Large phenolic compounds that determine body and astringency.

They act as antioxidants and preservatives

They are precursors to aromatic compounds when wines are aged

1 to 3g/l in red wines

Can also be found in very small quantity in whites

(20-30mg/l) if matured in oak barrels due to wood tannins

Tannins are very complex compounds

Tannins are large molecules and are yellow, brown and red colored.

Tannins **FEEL** astringent and **TASTE** bitter.

During processing and aging, the tannins polymerize leading to increased molecular size.

In time… continual increase in molecular size makes these compounds insoluble and, consequently, they precipitate, and the wine's astringency decreases.

Organoleptic Characteristics of Polyphenols

Visual: responsible for the color of wine

Varying levels are specific to each varietal

As wine ages, tannins polymerize and form sediments for red wines resulting in a lighter color

WITH AGE - Colors will deepen for whites and become paler in red wines

Nose: Grape tannins can have earthy-green aromas

Oak tannins will have smoky, charred aromas of wood.

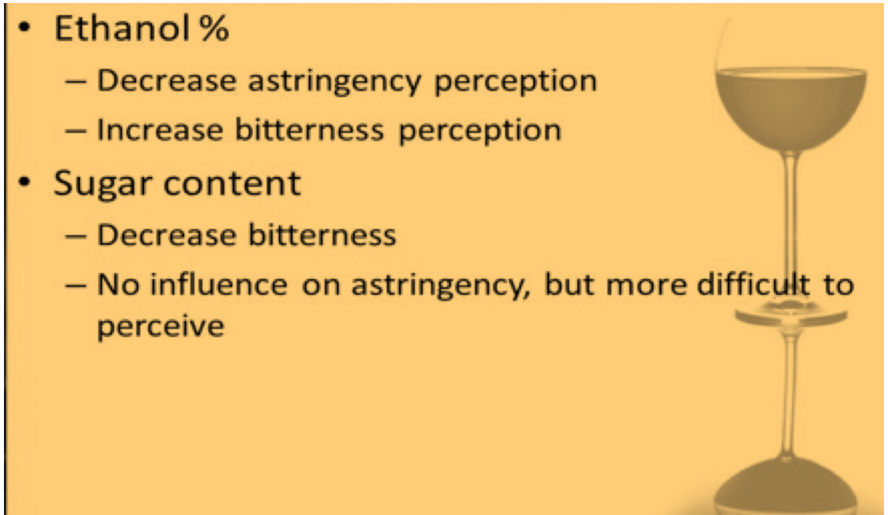
Taste: responsible for the astringency of wine

Astringency vs. Bitterness

Characterized by these sensations:

- Constriction of sides of cheeks and gums
- Dusty, roughing sensation on teeth and gums
- Drying sensation
- Can taste bitter

Bitterness is a flavor – not a feeling like Astringency



Carbon Dioxide

Two forms:

- **Dissolved** (carbonic acids) detectable at 600mg/l
- **Free**: slight fizz to large bubbles, over 1000mg/l

Organoleptic Characteristics of CO_2

Visual: bubbles

Olfactif: enhances and uplifts the aromas

Taste: has an acidic/tart flavor

Tactile Sensation: prickle on the tongue and a roughing of the mucus membrane