EL CENTRO COLLEGE
Food and Hospitality Services Institute

RSTO 1319 – Enology and Viticulture

CLASS NOTES: How Wines are Made (4)

- To predict a harvest day, the grape grower begins taking readings of sugar levels and acidity levels. To these technical readings the growers must also use their judgment to determine the point of ripeness of the fruit for the wine the want to make. So those Merlot grapes tastes like Merlot fruit, etc. Furthermore for red wine grapes tannin development is crucial. You cannot pick red wine grapes by sugar level alone – you may have unresolved tannins that were unripe thus toppling the balance we need to achieve the desired wine. In North America, the Brix scale expresses the sugar content of the grape as a percent of the liquids total weight.

- In the English speaking world we refer to the harvesting of grapes as a the **vintage-** a French word which means, "wine harvest." It means that when we say a wine is a 2002 vintage all the grapes used to make it were harvested in 2002. Be aware that not all wines are made from a single harvest. The wines that do not have a vintage date are known as **non-vintage (NV)** wine sand are usually a blend from different years of harvest.

- There are four major influences on the final wine product:
  (a) The grape variety
  (b) The climate in the vineyard
  (c) The soil in the vineyard
  (d) The skills of the winemaker and the agricultural practices of the wine grower.

- Once harvested the grapes are taken to the pressing or the crushing stages, this depends on whether they are being made into red or white wines.
- **Chaptalization:** In some cooler climates, weather patterns cause sugar levels lowered than desired to be found in the mature grapes. This means the wine will not achieve the desired alcohol level. In some countries such as France and Germany, it is permissible to add regular beet or cane sugar to the must just before or during fermentation. This sugar addition is known as **chaptalization –** it is intended to promote a higher level of alcohol in the wine. It is not intended to produce sweet wines.
  This practice is forbidden in Italy, Spain, Australia, California and other countries/regions. Some countries like Italy, allows for dried grapes to be added to the fermented liquid during fermentation. This practice is known as the **governo process.** This causes the wine to referent – increase its alcohol content and create a richer**,** smoother texture and full body.

- **Yeast.** The principal activity of the yeast is to convert the sugar molecules into alcohol and carbon dioxide. This is a natural process but it can also be an induced process. Winemakers must decide, based on the grapes at hand, whether to allow the natural yeast to do its part or to use a pure selected strain of yeast. To control the activity of natural yeast, if a selected strain is used, winemakers use **sulfites.**
- Sulfites are antibacterial agents, preventing the wine from turning into vinegar. They inhibit yeasts, preventing sweet wine from fermenting tin the bottle. They are antioxidants, keeping the wine and untainted by oxygen=air=the enemy of wine.
- Organic wines do not contain sulfites, but they are prone to early spoilage after the bottle is opened.
- The term **"Contain Sulfites**" is on the bottle of many wines, because the US Congress in 1988 passed a law requiring that the phrase be placed on the label of wines containing more than 10 parts per million of sulfites. Considering that 10 to 20 parts per million of sulfites occur naturally in wine – it includes just about every wine.

- Actually sulfites range from about 100 to 150 parts per million and the legal maximum is 350. Sweet wines have the most sulfites and dry red wines have the least.

- During fermentation the temperature of the liquid is controlled. If temperatures rise above 90°F or fall below 38℉ fermentation is likely to stop, as yeasts stop functioning at extreme temperatures.

- **Tannins-** they are present in grape skins. Different grape varieties contain different concentration of tannins in the skin, and red grape varieties contain more tannins than white grape varieties. Tannins are also present in the seeds and stems of grapes as well as, in wooden barrels used for fermenting or aging wine. (Actually in the wood of the barrels.)

- Tannins are useful for two main reasons:
  (a) They are natural preservatives allowing wines to age.
  (b) They act as clarifying agents-with any proteins used as **fining** agents to clarify wines. Also this characteristic helps us match red wines with protein rich foods and accentuate the fruit flavor of the wine.

  Tannins do influence the taste of wines.

- **Grape Acids.** There are three major acids found in grapes – the actual amount varies from variety to variety and from climate to climate. These three acids are:
  (a) Tartaric – found in grapes
  (b) Malic -- found in fruits such as green apples
  (c) Citric – found in fruits such as lemon, oranges, etc

- Acid amounts may be controlled by either adding an acid or by decreasing the level of acidity by physical or chemical means.

- One major method used to reduce acidity is the process known as **malolactic fermentation.** This is a natural process or may be an induced process during or after fermentation. The result is that malic acid is converted into lactic acid (the acid found in dairy products-yogurt) by adding bacteria strains to the wine. The result is that the sharp, harsh, malic acid is converted into the soother lactic acid and the total acidity of the wine is reduced. Most red wines and some chardonnays go through this process naturally.

- **Aging.** The wine maker has choices. The wine can be left in the original container in which it was fermented or the wine can be moved into clean containers.
  Here are some options**:**

(a) Stainless steel Containers	**(b) Small Wooden Barrels**
Light to medium white wines	Usually fuller, richer wines
Crisp, clear style	more rounded, softer
Simple aromatic fruit flavor	more complex, multidimensional

- **The barrel**-usually made from wood and the recommended wood is oak. Experts differ, but he majority recommend French Oak. Others suggest American oak, or Italian oak, or Slovenian oak. The term for the French oak barrel is **Barrique,** and has a capacity of 60 gallons or 225 liters.
- **Clarification:** To attain clear wines free of any particle and haze wines are clarified. There are several methods:
  (1) Racking-moving product from one container to another
  (2) Fining-adding a catalytic agent to precipitate solids to the bottom and then racking
  (3) Refrigeration-encourages much of the solids to fall to the bottom and then racking.
  (4) Centrifuge-pertains to a method where the wine is spun at high speeds and thus remove all solids out of the wine.
  (5) Filtration-pumping the wine through a series of cellulose pads.
- There is no total agreement on centrifuge and filtration, in as much as, critics charge that these two processes remove color and flavor components from the wine.

- **Stabilization:** Once fermentation is completed, the new table wine begins its transformation from a cloudy, yeasty, unstable and perhaps bitter liquid that cannot be stored very long to the familiar clear appetizing beverages we all expect. Stabilization is the process that transforms the cloudy liquid to the clear beverage. When stabilization is complete, the wine will remain clear and unchanged in odor and flavor under conditions defined by the wine maker.
  (a) A wine is **heat stable,** when it can be exposed to high temperatures and not become cloudy. Fining-a clarifying method is used- with special clay, which protects the wine from being hazy when exposed to heat and light.
  (b) When subjected to temperatures of 32°F or below wine may form crystals. To make wines **cold-stable**, they are chilled to 25-27°F for two to four weeks and then the crystals are filtered out.

- **Bottling** is a highly mechanized process at most wineries large or small. Empty wine bottles are washed rinsed and sterilized. Then they are filled with an inert gas, often purified nitrogen, before being filled with wine and corked. Usually corks are pre-treated with sulfites because they can carry spoilage yeast that can cause even the finest wines to have a pungent off odor. The bottles are then decorated with their labels; their corked mouths are covered with protective capsules-or protective wax- and are put in their boxes upside down or on their sides for bottle aging.

How other wines are made

- **Sweet wine.** A sweet wine is one, which has residual (unfermented) sugar. The great sweet wines of the world such as the Sauternes (France) derive their sweetness from natural grape sugars that were present in he grape at harvest. No sweetener of any kind is added.

The principal strategies used for sweet wine production are:
(a) Controlled fermentation-the wine maker halts fermentation before all the natural sugar present has been converted into alcohol

(b) Reserved juices-the juice of the pressed grapes, but not fermented is sterilized. It is then added to the wine to achieve sweetness

(c) Late harvest-by leaving grapes on the vine for an extended period, the sugars become more concentrated and the grapes develop richer, riper flavors. These grapes may even become shriveled-causing even more concentration of sugar. As a result wines made from these grapes are more viscous and intensely sweet, with high levels of residual sugar.

(d) Raisins-in many parts of the world grapes are picked and then allowed to rasinate by placing them on drying mats or racks before fermentation. The resulting wines are noticeable more viscous and high in residual sugar.

(e) Botrytis-a mold known as botrytis develops on the grapes. The food for the mold are sugars inside the grape. The water in the grape evaporates through the microscopic holes caused by the mold and the grape dehydrates on the vine.
The result is a grape that contains an extremely high concentration of sugars; acids and flavors, in such reduced quantity of liquid. The right climatic conditions must exist and the mold must develop only on fully ripened grapes. The best wines are made from white wine grapes-of certain varieties such as:
Riesling in Germany, Australia and the USA
Semillion in Sauternes (France) and Australia
Sauvignon Blanc-especially in Sauternes, Australia and the USA
Chenin Blanc in the Loire (France)
Vidal and Vignoles (hybrids) in the eastern USA

(f) Icewine-the grapes have to be fully ripe and clean, with no mold or breakage in the skin. The objective is to allow the grapes to be frozen on the vine. The harvest takes place I the mid December in the early hours of the morning.

- **Fortified Wines**
  The alcohol content has been strengthen, or fortified, by adding a high alcohol spirit or wine.

- The difference between adding the spirit and adding the spirit after fermentation is the difference between a sweet fortified wine and a dry one.
- **Porto-** has the spirit added during fermentation
- **Sherry**-the spirit is added after fermentation
- The reason for this fortification is to stabilize and preserve the wines. Some argue that the wines used to produce these fortified wines were not of the highest quality and that fortification is used to improve them.

- **Aromatized wines**
  These are fortified wines with herbs and spices added. Barks, roots, and flowers may be used.
  Examples are Vermouths, Dubonet, and Lillet.
  Some argue that he wines used to produce aromatized wines were not of the highest quality and that aromatizing them is used to improve them.