# Enological Tannins and Their Use in Wine

What differentiates a great wine from a good wine? Without narrowing in on a particular wine style, we could say that aroma, bouquet, fruit flavors, structure and mouthfeel all play a role, but one underlying common thread is "balance". The goal of every winemaker is to achieve the right balance between alcohol, acidity, sweetness, tannic structure and roundness. There is an arsenal of enological tools available to winemakers which can help them to achieve this delicate balance: a wide range of enzymes; yeast and bacteria strains; fining agents and select inactivated yeast (SIY) products, to name a few. One of the hottest topics at present is the use of enological tannins, which have made a recent resurgence in the wine industry. Winemakers are rediscovering the enological benefits of tannins and their positive impact on wine quality.

**What is a tannin?**

The term tannin originated in the leather industry from the process of curing hides into leather (tanning). The plant materials used in this process contain polyphenols that react with proteins in the hide, resulting in a toughened leather material. In a similar manner, tannins react with the proteins in our saliva and cause a drying sensation in our mouths that we perceive as astringency and, in some cases, bitterness. A "tannic" wine leaves a dry feeling on our tongues, similar to strong tea or coffee which are also high in tannin concentration. Astringency, bitterness and acidity are terms that are often confused and misused in wine evaluations. Sue Langstaff, Vinquiry's sensory scientist, teaches in her *Introduction to Sensory Evaluation* workshops to distinguish among astringency, bitterness and acidity by using model chemical solutions. She demonstrates that acidity is perceived as a sour or tart sensation with an increase of saliva production as your mouth "waters" to attempt to neutralize the acid. Bitterness is also a taste, and is perceived on the back of your tongue and in your throat. Astringency is not a "taste", but rather a drying, constricting tactile sensation. High acidity can also be perceived as astringent.

In wine, tannins are defined chemically as polymers of phenolic compounds, flavanoids and non-flavanoids. Tannins derived from flavanoids are naturally present in the grape skins, seeds and stems, with the latter two sources yielding the most astringency. Non-flavanoid tannins come from the pulp of the grape and can also be extracted from oak sources (barrels, staves, chips) during fermentation and aging. Enological tannins can also be classified as either hyrolyzable or condensed (proanthocyanidic) tannins. Hydrolyzable tannins include gallic tannins and ellagic tannins. Gallic tannins are derived from Oak gall nuts or Tara while ellagic tannins are oak or chestnut derivatives. Condensed tannins that are grape-derived may come from white or red skins or seeds. Another source of condensed tannins is Quebracho. Some tannin products on the market are mixtures of both hydrolyzable and condensed tannins.

**Sources of Tannins**

Tannins are naturally present to varying degrees in the grapes, based on cultivar and harvest conditions, and can be imparted with oak contact during vinification and aging. Employing different maceration strategies, skin and seed contact time, fermentation

temperature variation, and oak programs, will yield wines with varying degrees of tannin concentration and intensity. Enological tannins actually added in winemaking are sourced from five primary botanical origins: grape, oak, chestnut, Tara and Quebracho. Presumably the most obscure in terms of household name recognition are Tara and Quebracho. Tara is a South American bean whose pod is rich in gallic tannins and Quebracho is a tree from South America. The molecular structure of Quebracho tannins is very similar to that of grape tannins, making them a desirable alternative to consider comparatively because they are much less expensive to produce than grape tannins.

**The Role of Tannins in Wine**

Tannins have numerous functional properties in wine. They have antiradical, antioxidant and antioxidase activity - notably against Botrytis. They are involved in wine aging, both in terms of longevity potential as well as "quickness" to bottle as we've seen in some globally-competitive production styles. They also promote color stabilization in red wines. Color stabilization is enhanced by the formation of acetaldehyde bridges between proanthocyanidic tannins and anthocyanins. These stable bonds result in both the tannins and the anthocyanins (which are otherwise relatively unstable) remaining in solution. Because of tannins' interaction with proteins, they can have a positive impact on a wine's protein stability and are often used as a cofining agent with gelatin products. Tannins bind with polysaccharides (or colloids) which contributes "structure" and influences the perception of mouthfeel and roundness in both white and red wines. Tannins can also protect against reductive tastes and are often utilized in red wine fermentations to help alleviate "green" or herbaceous characteristics. Finally, because of both their various interactions in wine and their respective sensory properties, tannins can positively influence the aromatic qualities of white and red wines.

It is clear that with the various binding affinities of tannins, their varying degrees of polymerization and origins, as well as a plethora of production styles, there is no simple recipe for tannin management! That being said, there are many situations that warrant evaluating different tannins for enhancing wine quality and in some cases for last-ditch-effort "rescue" missions.

**So, Which do you Use?**

The first question is whether you need tannins at all. The second issue is which to use, and how much. There are a handful of tannin suppliers in North America offering an overwhelming array of tannin products. At Vinquiry, we are proud to distribute the Martin-Vialatte range of tannin products. Figure/Chart 1 represents the tannin products offered by Vinquiry and generally describes their applications.

In a future article, we will present some case studies for using our tannin products in different wine styles and situations. We will provide some examples of using tannins with other products, like enzymes, SIY's, and fining agents, illustrating how these products work synergistically to achieve "balance" and structure, or to correct for deficiencies. A third article will review techniques for evaluating different tannin products' characteristics and ideas for conducting trials.

For further information about the different tannin products offered by Vinquiry, please visit www.Vinquiry.com or call our main office at (707)838-6312.