MARTIN VIALATTE

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TANNINS

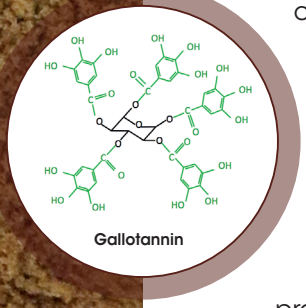
TECHNOLOGICAL GUIDE

To fully understand the use of tannins it is above all necessary to understand their properties and their significance for musts and wines.

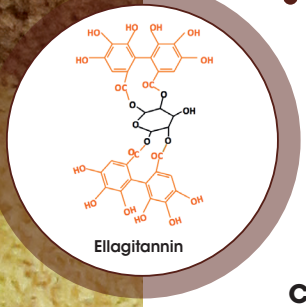
Oenological tannins are derived from several botanical species, the oldest of which are the oak apple, chestnut wood and oak wood. In addition, other tannin-rich species can be used, such as grape skin and seeds, tea leaves, artichokes and many others.

To extract tannins, only water and/or alcohol are used according to the Oenological Codex. It is the proportion of water and/or alcohol used, together with the extraction temperature, that makes it possible to obtain the best extraction yields and select certain specific tannin structures (for example, low, medium or high polymerisation in the case of tannin extraction from grape seeds).

The first factor that differentiates tannins is the chemical family to which each tannin belongs. Each family is characterised by a specific chemical structure that governs their properties. There are three families:

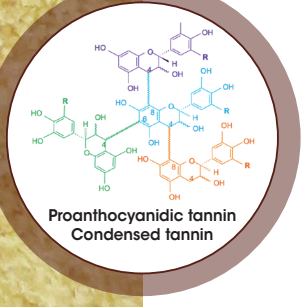

Gallotannin

- **GALLOTANNINS**


Ellagitannin

- **ELLAGITANNINS**

These two families are also called hydrolysable tannins since they break down in the presence of acids and heat, giving respectively gallic acid and ellagic acid.


Proanthocyanidic tannin
Condensed tannin

- **PROANTHOCYANIDIC TANNINS, ALSO CALLED CONDENSED TANNINS.**

Tannins can thus be classified according to their different botanical origins.

SOURCES OF GALLOTANNINS ARE:
oak apples (historically the first source) and tara, whose tannins are derived from the fruit.

SOURCES OF ELLAGITANNINS ARE:
chestnut wood and oak wood.

SOURCES OF PROANTHOCYANIDIC OR CONDENSED TANNINS ARE:
grape skins and seeds, quebracho, mimosa, tea, etc.

A second factor is the chemical structure of the different families, which governs the principal oenological properties of tannins.

1 The presence of many alcohol functional groups (OH) as well as an important number of double carbon bonds (C=C) gives them a strong ability to oxidise and therefore consume and trap any oxygen that may be present in the environment. Following this rule, families of tannins can be classified according to their increasing antioxidant and oxygen-consuming capacity.

It should however be noted that the gallotannin family is a tannin family that is frequently very bitter (due to the presence of gallic acid in the molecule). As a result, this property should be taken into account when using them in musts and wines. Gallotannins are often used on musts since they precipitate out and are not found in the wine. On wines, they are used at low doses.

Gallotannins > Ellagitannins > Proanthocyanidic tannins

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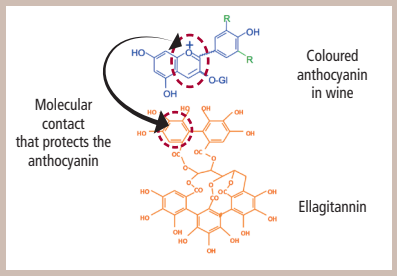
2 The presence of a phenolic structure (in other words, the presence of carbon rings) in the molecule allows the formation of copigmentation bonding, in other words the formation of stacked structures (like puff pastry). Such stacking is characterized by low-energy bonds, meaning that this structure is reversible and not long-lasting. When tannins are used at the beginning of vinification, the anthocyanins (colour) are thus protected from oxidative breakdown and are then permanently stabilised.



The bonds in the stacked structure are all the stronger when the carbon rings are aligned. The different families can be classified in order of increasing interaction force in these structures, and therefore in their increasing capacity to protect the anthocyanins during vinification.

Proanthocyanidic tannins (except for tannins derived from grapes*) **> Ellagitannins > Gallotannins**

That is why the only tannins able to stabilise colour permanently are tannins of the proanthocyanidic or condensed family derived from grape skins and seeds.

Permanent stabilisation of colour = **proanthocyanidic or condensed tannins derived from grapes SOLELY**

N.B. *: Tannins derived from grapes have an alcohol functional group (OH) at a strategic position in the carbon ring. The presence in grape tannins of this alcohol functional group (OH), which is absent in other botanical species, makes the carbon ring particularly reactive. This allows the formation of covalent bonds between the grape tannins and the anthocyanins, which permanently stabilises the colour.

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3 The ability of different tannin families to affect the wine's redox potential makes it possible to limit strong oxidation (appearance of ethanal notes in the wine) as well as strong reduction (appearance of notes of cabbage, rubber, etc.). This is the case for the ellagitannin family to which oak tannins belong.

A specific technique: **MICRO-OXYGENATION** with OENO2

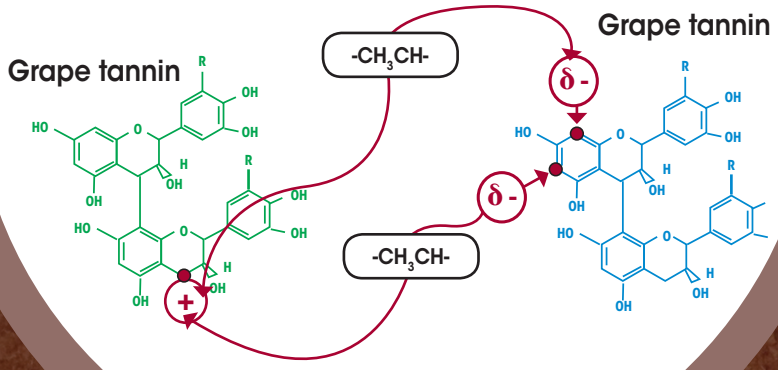
This technique consists in supplying pure oxygen in controlled amounts over time. This is a first-rate tool and supplements the use of tannins for stabilisation of colour and 'maturation' of tannins. This is because, although uncontrolled input of oxygen can lead to organoleptic 'disasters' in wines, targeted, controlled input of molecular oxygen can accelerate polymerisation of tannins and anthocyanins in wine. Input of oxygen causes oxidation of the polyphenols (tannins) in quinone, producing a molecule of hydrogen peroxide (H_2O_2). The hydrogen peroxide oxidises alcohol molecules to ethanal molecules, molecules that are then bound by the tannins forming ethanal bridges. These bridges encourage the formation of covalent bonds between the tannins and/or anthocyanins, which in the case of a tannin-tannin reaction leads to less hardness and astringency in the tannins in the wine, and in the case of a reaction between anthocyanins and tannins to stabilisation of colour. It is important to note here that these reactions can only take place with tannins derived from grapes that are endogenous (those naturally present in the wine) or exogenous (those supplied in the form of tannins from grape seeds or skins). In no way can other tannins derived from other botanical species react in this way.

1st stage:
In an oxidising environment the tannins oxidise, forming quinones and hydrogen peroxide (H_2O_2)

$$H_2O_2 + CH_3CH_2OH \xrightarrow{\text{Oxidation}} CH_3CHO + 2H_2O$$

Ethanol → Ethanal

2nd stage:
The ethanal formed then forms ethyl bridges ($-CH_3CH-$) between the tannin molecules



Formation of a new, more highly polymerised grape tannin

As a result of our knowledge and expertise regarding these various properties, Martin Vialatte has formulated specific tannin preparations in order to meet the challenges facing winemakers.

A very detailed analysis of these challenges has enabled Martin Vialatte to select and adjust optimum combinations of tannin families as well as their botanical origins, thus making use of their most valuable properties.

Presentation of two specific tannins in the Martin Vialatte range

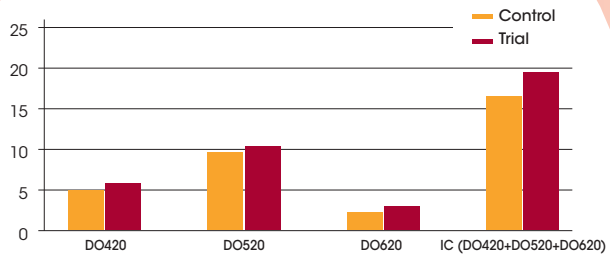
SUBLIRED and SUBLISTAB are two tannin blends specifically developed for the production of modern red wines characterised by intense fruitiness, a strong red colour and a supple tannin structure.

SUBLISTAB protects colour through the copigmentation effect and maintains optimum redox potential, while **SUBLIRED** preserves the aromatic component and permanently stabilises colour. **SUBLISTAB** and **SUBLIRED** work in synergy.

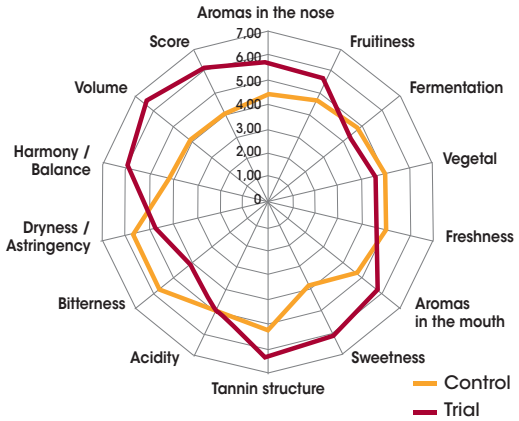
To obtain this style of wine, winemakers often make use of thermovinification processes so as to obtain very coloured, fruity and supple wines. If this process is not accompanied by the appropriate tannins there is a risk that it can lead to a loss of colour related to a deficiency of tannins during vinification. Reduction notes may also appear, especially if thermovinification is carried out on reducing grape varieties such as Syrah, Gamay, Pinot noir, etc.

Below, we show the result of a tannin addition trial on a Cabernet Sauvignon wine that has undergone thermovinification. **SUBLISTAB** and **SUBLIRED** were added at the start of vinification at respective doses of 20 g/hL and 10 g/hL. Alcoholic fermentation lasted eight days. Analyses were carried out on the wine at the end of alcoholic fermentation following racking and stabilisation with SO_2.

Impact on colour of a tannin addition trial (20 g/hl SUBLISTAB + 10 g/hl SUBLIRED) during fermentation of a wine that has undergone thermovinification.



Impact on taste of a tannin addition trial (20/hL SUBLISTAB + 10 g/hL SUBLIRED) uring fermentation of a wine that has undergone thermovinification.



MARTIN VIALATTE SOLUTIONS

GALLOTANNINS

VITANIL B

VITANIL B is made up of tannins from tara pods (a leguminous tree found in South America). It is a gallotannin extracted with alcohol, and is perfectly suited for fining white wines. On must, **VITANIL B** plays a role in racking and clarification by reacting with excess proteins. It eliminates, among other substances, natural grape oxidases (tyrosinase and laccase secreted by Botrytis).

Packaging: 1 kg

Application rate: On must: 10 to 20 g/hL - On wine: 2 to 10 g/hL

TANIGAL

TANIGAL is an oak gall tannin intended for the clarification and fining of white wines. **TANIGAL** plays a role in racking and clarification by binding the proteins in musts and wines. It preserves the organoleptic properties and structure of the wine. **TANIGAL** is essential in white wines when fining with a moderately hydrolysed gelatin (GELISOL). **TANIGAL** is also used for clarifying bottled sparkling wines produced in the traditional manner.

Packaging: 1 and 25 kg

Application rate: 2 to 8 g/hL

ELLAGITANNINS

TANIXEL

TANIXEL is a pure chestnut tannin, which can be added during the wine-making phase but also during the ageing phase of red wine.
TANIXEL protects color and participates in the organoleptic balance of red wines by providing structure while reacting strongly to must and wine proteins.

Packaging: 1 kg, 12.5 kg

Application rate: 5 to 50 g/hL

SUBLI'OAK

SUBLI'OAK reveals the potential of red, white and sweet wines. **SUBLI'OAK** develops the aromatic complexity and fruit notes while providing roundness, volume and structure. **SUBLI'OAK** reveals vanilla and subtle roasting notes and removes the vegetal and bitter character. **SUBLI'OAK** provides freshness.

Packaging: 500 g

Application rate: 1 to 50 g/hL

VITANIL OAK

VITANIL OAK is a purified oak tannin which protects the coloring matter from oxidation and reinforces wine structure. **VITANIL OAK** develops roundness and wine harmony. **VITANIL OAK** limits reduction phenomena during ageing.

Packaging: 500 g and 10 kg

Application rate: On harvest: 5 to 10 g/100 kg - On wine: 5 to 15 g/hL

CONDENSED TANNINS

SUBLIPROTECT

SUBLIPROTECT is a complex of grape tannins and inactive dry yeasts. This tannin contributes to balance in the mouth and a feeling of freshness. It prepares wines for maturation in barrels. **SUBLIPROTECT** strengthens resistance to oxidation and preserves redox potential.

Packaging: 1 kg

Application rate: 5 to 20 g/hL

SUBLISTAB

SUBLISTAB is a blend of ellagiques and proanthocyanidiques tanins weakly polymerized, **SUBLISTAB** was specifically developed for protecting and definitively stabilizing wine color. This is a top choice tannin for thermo-vinification type procedures.

Packaging: 1 kg

Application rate: 10 to 40 g/hL

SUBLIFRESH

A specific preparation of proanthocyanidic tannins and gallotannins, **SUBLIFRESH** is formulated in order to refresh and enhance aromatic perception of white and rosé wines. It can be used on musts and wines.

Packaging: 1 kg

Application rate: 2 to 15 g/hL

SUBLIWHITE

SUBLIWHITE is a blend of grape tannins selected for their antioxidant character and yeast derivatives. Experiments carried out over several years have enabled to develop **SUBLIWHITE**, a product adapted to white wine-making. **SUBLIWHITE** preserves the yellow-green color and enables an optimized clarification of white wine following alcoholic fermentation. It develops a fruity, floral and fresh character nose. **SUBLIWHITE** provides roundness, structure and a unique balance for wine tasting and removes any vegetal character.

Packaging: 1 kg and 5 kg

Application rate: 5 to 15 g/hL

SUBLIRED

A preparation of proanthocyanidic tannins, **SUBLIRED** was specifically developed for the preservation and enhancement of fruity-type aromas. A premium tannin, **SUBLIRED** can be used for the production of modern, fruity, supple wines.

Packaging: 1 kg

Application rate: 2 to 15 g/hL

TANIPEPIN

TANIPEPIN is a pure grape seed tannin adapted to red wine-making. By its very nature, it is efficient for promoting « tannin-anthocyanin » complexes thus enabling the good stabilization of the color of red wines. Presented in granulated form it facilitates and improves its implementation in the wine cellar. In addition **TANIPEPIN** improves the antioxidant capacity and the good evolution of wine. It reinforces wine balance by providing a supplement to the tannin structure while limiting oxidase action. **TANIPEPIN** participates in the protein stability of white and rosé wines.

Packaging: 500 g

Application rate: On harvest: 5 to 15 g/100 kg - On must: 5 to 10 g/hL
On wine: 1 to 15 g/hL

SUBLITAN VINIF

SUBLITAN VINIF promotes the clarification and stabilization of red wine. It participates in making livelier colored red wine, less oxidized and more balanced. **SUBLITAN VINIF** has antioxidant capacity and protects the coloring matter by co-pigmentation and against reduction flavors.

Packaging: 1 kg and 5 kg

Application rate: On harvest: 10 to 40 g/100 kg

PROANTHOCYANIDIC TANNINS

VITANIL VR

VITANIL VR is essentially made up of proanthocyanidin-type condensed tannins. **VITANIL VR** acts in synergy with wine tannins to provide optimum stabilization of coloring matter. It protects anthocyanins from oxidation.

Packaging: 1 kg and 10 kg

Application rate: On harvest: 15 to 25 g/100 kg - On must: 10 to 20 g/hL
On wine: 5 to 10 g/hL

TANIRAISIN

Due to its specific production method, **TANIRAISIN** conserves the natural properties of grape skin tannins selected for their quality. As such, these highly reactive tannins will interact with other macromolecules found in wine.These multiple interactions have a positive impact on wine. **TANIRAISIN** has a clarification role (ideal supplement for fining). It promotes the stabilization of color (by forming tannin-anthocyanin stable complexes) and improves the organoleptic balance. **TANIRAISIN** likewise has a reinforced protective action against oxidation (anti-oxidant effect of polyphenols).

Packaging: 500 g

Application rate: On harvest: 10 to 30 g/100 kg - On must: 5 to 15 g/hL
On wine: 3 to 20 g/hL

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