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DATA SHEET

ESSENTIAL ANTIOXIDANT

TANNINS

Protecting musts and wines from oxidation
(hydrolysable tannin of galle walnut).

TANINNOV

ŒNOLOGICAL APPLICATIONS

ESSENTIAL ANTIOXIDANT is a new tannin of exceptional œnological quality. Obtained from a selection which takes into account both technical and organoleptic impact, this gallic tannin:

- is one of the leading 'antioxidant potentials' on the market.

- features great tannic richness, making it an extremely pure tannin.

- on account of its composition, does not add any bitterness or astringency when used in recommended dosages.

INSTRUCTIONS FOR USE

Disperse **ESSENTIAL ANTIOXIDANT** in 10 times its weight of warm water (40°C), shake the preparation until a uniform solution is obtained. Stir the solution into the wine or must during a process of mixing by pumping over or stirring until thoroughly homogenized.

DOSE RATE

- White and rosé must: from 3 to 6 g/hL
- On botrytised harvests: from 5 to 10 g/hL
- On finished wine: from 1 to 4 g/hL

Precise dosage will be validated by prior laboratory tests.

PACKAGING AND STORAGE

- 1 kg, 25 kg

To be kept in a dry, well-ventilated, odour-free place, at a temperature of between 5 and 25°C.

Once opened, the product must be used rapidly.

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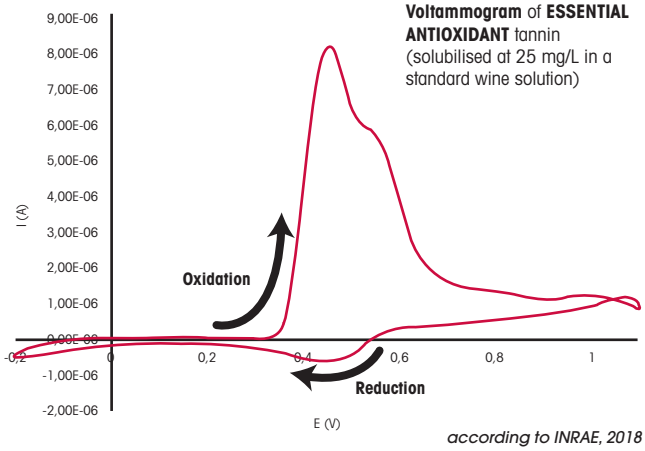
The anti-oxidant activity of tannins has been known and described for a long time. Within the scope of our TANINNOV project, with the expertise of UMR Sciences Pour l'Oenologie (INRAE, Montpellier SupAgro, University of Montpellier), we have determined this property in a quantitative way by an electrochemical technique, cyclic voltammetry, which makes it possible to quantify the antioxidant capacity of tannins as well as obtain the signature of their botanical origin.



Voltammogram of **ESSENTIAL ANTIOXIDANT** tannin (solubilised at 25 mg/L in a standard wine solution)

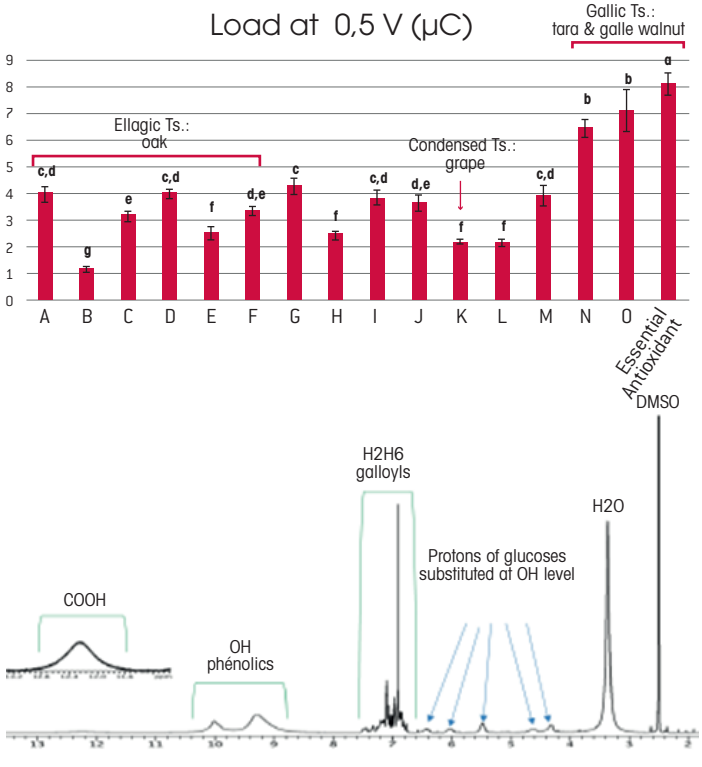
according to INRAE, 2018

When a solution containing tannins is scanned in potential, these molecules oxidise at electrode level. This results in a peak of the intensity of electric current (transfer of electrons to the electrode) on the voltammogram. Those molecules which are most easily oxidisable will oxidise at the lowest potentials. Several peaks may be obtained if there are several substances with different redox potentials. Similarly, there is reduction in the other direction. The plot obtained is characteristic of the botanical origin of the tannin under study (in this case a galle walnut tannin) and the electrical charge (area under the curve) during oxidation makes it possible to quantify the tannin's antioxidant capacity.

Within the scope of our TANINNOV project, we studied the antioxidant properties of 16 tannins, of different botanical origin, by measuring charge at 0.5V. This represents the antioxidant capacity of the most easily oxidisable polyphenols (the most reactive substances where oxidation is concerned).

In the graph opposite, out of the 3 preselected gallic tannins, one of them stands out: the **ESSENTIAL ANTIOXIDANT** tannin is the most antioxidant with a charge close to 8 μC. This property is the result of an extremely pure formulation, high in tannins, as illustrated in the ^{1}H RMN spectrum opposite.

^{1}H RMN = nuclear magnetic resonance of the proton



according to INRAE, 2018

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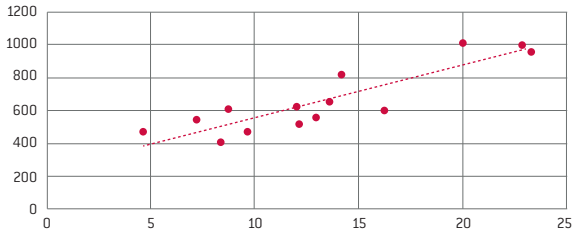
Other techniques for quantifying antioxidant properties are proposed in the literature. 'Radical trapping' techniques are used (such as DPPH, ORAC or ABTS tests) since these mimic the oxidation mechanisms that can be seen in musts or wines.

Opposite, we show the results obtained by cyclic voltammetry (total load at 1.1V corresponding to the antioxidant capacity of all polyphenols) using the ABTS method: the diagram clearly shows a correlation between the two methods.

Relation ABTS test (µM eq. Trolox) vs total load at 1,1 V (µC) R^2=0,78

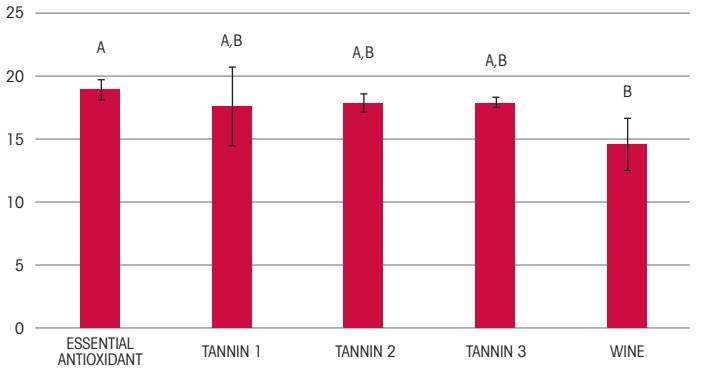


according to NRAE, 2018

In the graph below, we compare the total antioxidant capacity of three competing tannins against **ESSENTIAL ANTIOXIDANT** tannin in a Sauvignon white wine (addition of 5 g/hL in the white wine diluted subsequently 5 times in a standard wine solution). The **ESSENTIAL ANTIOXIDANT** tannin increases the antioxidant capacity as against the wine on its own. The Sauvignon wine with the addition of **ESSENTIAL ANTIOXIDANT** is therefore best protected from oxidation.

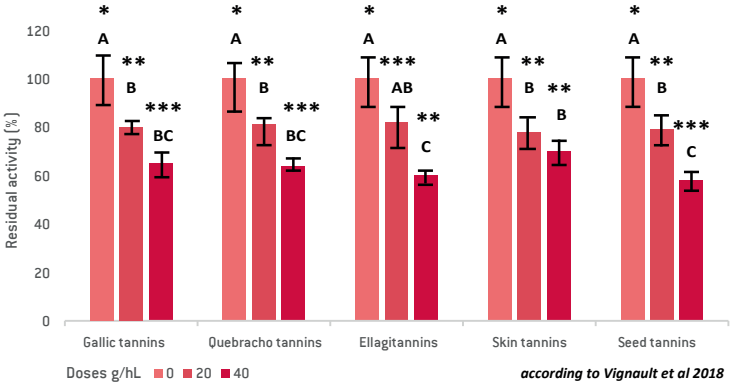
	Total charge at 1,1V (µC)	Difference tanins-white wine (A) (µC)	Gain/ white wine (%)
T. Essential ANTIOXIDANT	18,9	4,4	30
Tannin 1	17,6	3,0	21
Tannin 2	17,8	3,3	23
Tannin 3	17,9	3,3	23
White wine	14,5		

Total charge at 1,1 V (µC)



according to INRAE, 2019

Determining residual laccase activity



according to Vignault et al 2018

It has recently been shown that gallic tannins are capable of inhibiting laccase activities responsible for oxidising musts affected by *Botrytis cinerea*. Their activity is equal to tannins of other botanical origins

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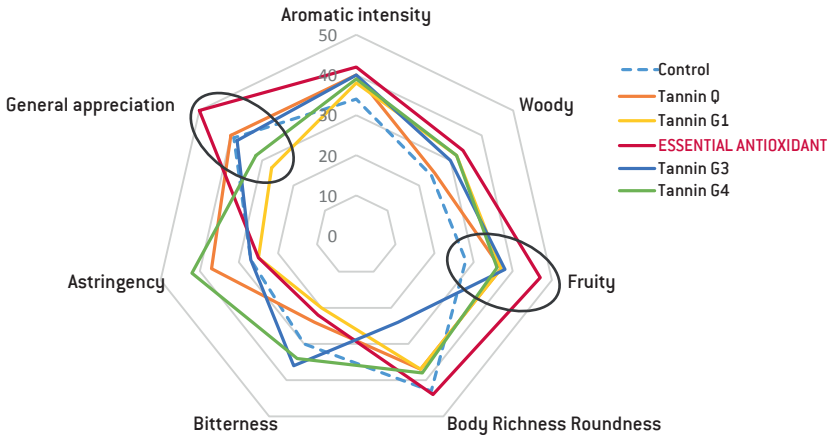
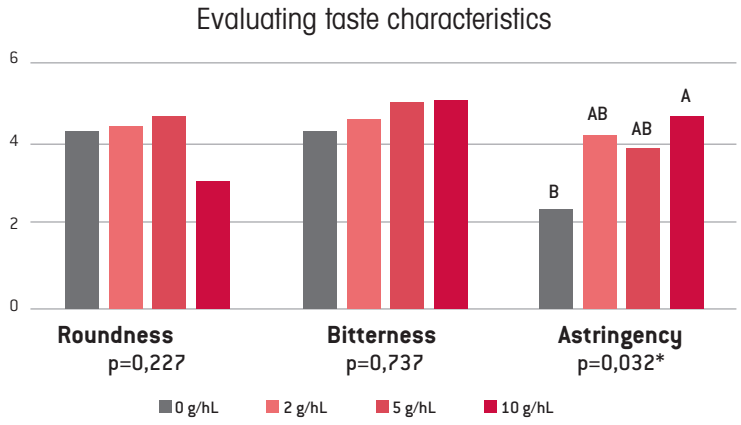
The example opposite illustrates **ESSENTIAL ANTIOXIDANT**'s interesting sensory and taste characteristics. It shows zero effect on the astringency descriptor and adds the least bitterness compared to other tannins tested. It enhances the wine's fruity notes and emerged as the panellists' preferred tannin.

Comparative tasting between 6 wines, 4 added with gallic tannins (G), 1 with quebracho tannin (Q) and the control wine.

Basic Chardonnay wine.Millésime



according to IOC, 2019



according to INRAE, 2019

Evaluating the taste characteristics of **ESSENTIAL ANTIOXIDANT** shows that this tannin has little effect on the wine's taste qualities:

- Using it at recommended dosages has no effect on the bitterness descriptor
- A significant dose of 10 g/hL shows a considerable difference on the astringency descriptor with an increase of taste sensation. With this dosage, there is a tendency towards reduced richness.

TANINNOV

As a programme dedicated to enhancing knowledge of œnological tannins, Taninnov has received the backing of France's Greater East Region and the European Community

Grand Est ALSACE CHAMPAGNE-ARDENNE LORRAINE

INRAE

Montpellier SupAgro

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