

No [Ox]



**The natural solution**  
for resisting oxidation

# Oxidation of Wine

Oxidation of wine remains one of the major problems in oenology this century. It is estimated that nearly 50% of wine faults are associated with this phenomenon<sup>1</sup>. The table below summarises the situation :

	↘ 2006	↘ 2007	↘ 2008
Total faults %	7,1	NA	5,9
Corked	27,8	29,7	31,1
<i>Brettanomyces</i>	10,6	12,8	16,8
Oxidation	24,3	22,9	19,1
<i>Sulphuretted</i>	29,2	26,5	28,9

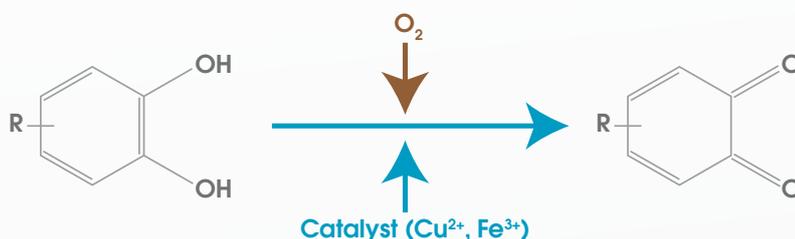
Oxidation of wine always results in a loss of cleanness and fruitiness ('faded' wines, 'lacking freshness', etc.) with the appearance of bitter notes and browning of wines (see photo opposite). This goes against the expectations of today's consumers: fresh, crisp, clean wines with a floral or fruity expression, true to the original product.

The mechanisms explaining oxidation are well described in the literature<sup>2</sup>. Whether in the must or the wine, the mechanisms as well as the molecules involved are similar.

Three entities contribute to oxidative deterioration: **polyphenols** (and more particularly ortho-diphenols that are linked with the appearance of browning<sup>3</sup>), **oxygen** and **catalysts**.



Catalysts may be chemical (cupric or ferric salts) or biological (polyphenol-oxidases, for example laccases, are enzymes that use copper; without catalysts, the oxidation of polyphenols is unlikely).



All these reactions contribute to the formation of derivatives participating in reducing fruity or floral notes and the appearance of heavier notes (honeyed, preserves, etc.).

Anti-oxidant properties in the broader sense can be associated with any activity reducing the factors listed above and particularly the transition metals **copper** and **iron** as well as **polyphenols**.

# No[Ox]

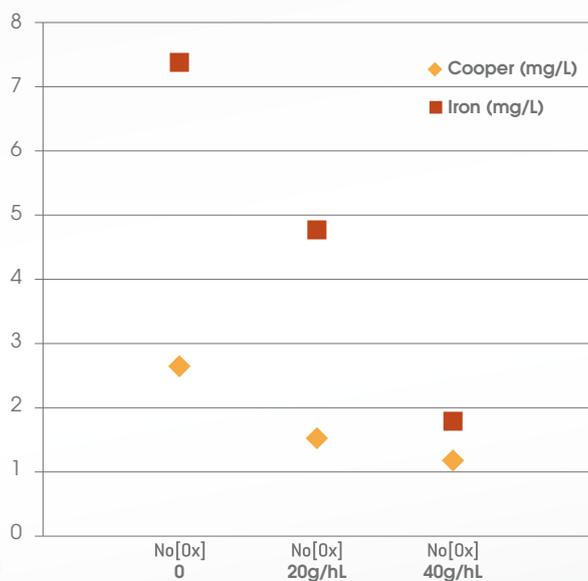
# combats oxidation

No[Ox] is a unique and innovative technological aid, made from plant polysaccharides, free from allergenic or synthetic products. Its effectiveness and fast action combat oxidative by-products, both in the must and in the wine, while preserving the intrinsic qualities of the initial product.

No[Ox] eliminates the brown colour that causing visual deterioration of wine. It softens caramel and madeira notes, giving the wine freshness and eliminates plant and bitter notes often associated with oxidation problems.



## No[Ox] combats tinting faults due to oxidation of wine

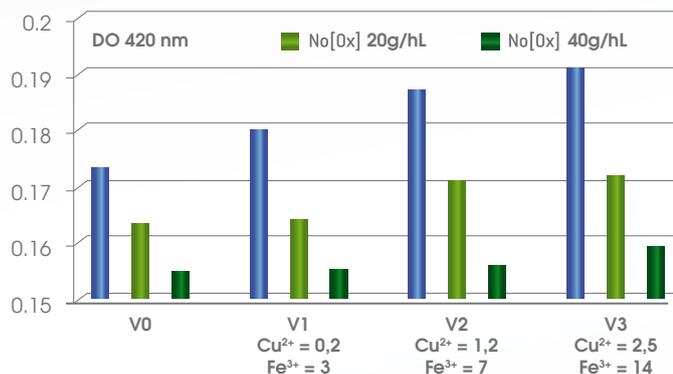


The chelating effect of fungal polysaccharides eliminates copper and iron, specific catalysts of all oxidation processes. The test below assessed the yellow tint (OD420nm) of a white wine. It demonstrates the indisputable curative action of No[Ox] on the colour of oxidised wine.

Chelating effect of No[Ox] for iron and copper in white wine.



OD 420 nm of a white wine contaminated with various doses of  $\text{Cu}^{2+}$  and  $\text{Fe}^{3+}$  and treated with various doses of No[Ox].



# ation of Wine



## No[0x] combats organoleptic faults due to oxidation of wine

No[0x] softens the bitter taste and oxidation notes in wine while preserving the sensory properties of the initial product.

Here is an example: on a blend of pinot noir and chardonnay particularly affected by oxidation. We compared the action of No[0x] against an 'allergen-free alternative' based on PVPP, plant protein and bentonite.

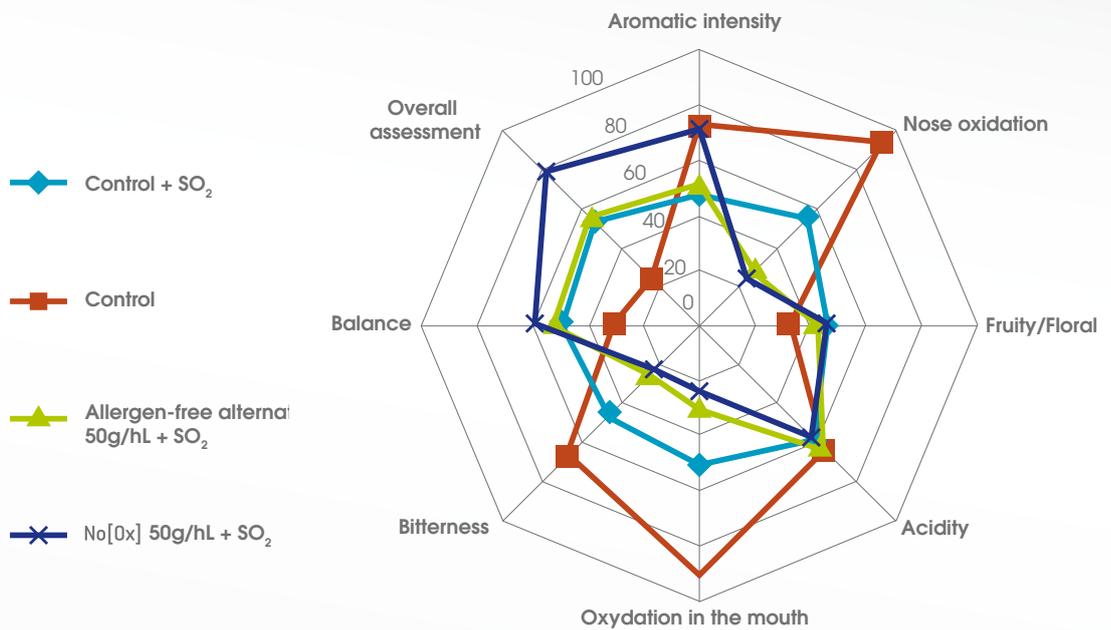
Before treatment, the wine had distinctive oxidation notes to both the nose and the mouth accompanied by a bitterness typical of intense oxidation and a lack of fruity/floral character.

Sulphur dioxide treatment (control + SO<sub>2</sub>) markedly reduced the fault although not annihilating it completely.

Each of the 2 formulations tested (No[0x] and 'allergen-free alternative') was able to change the quality of the wine from very mediocre to one appreciated by the panel.

However, wines treated using the 'allergen-free alternative' formulation were scored as being too weak, too hollow and unbalanced, unlike treatment with No[0x] which fully preserved the sensory characteristics of the wine.

Blind tasting performed by a panel of 8 experts. **7 panellists preferred the No[0x] test.**



*The overall assessment of the tasters was clear.*

*7 out of 8 panellists identified No[0x] as the better formulation.*

# IOC has developed the new Qi range of biotechnology solutions in order to produce wines in a natural way.

Qi

Qi : a range of genetically unmodified, non-allergenic, non-artificial, totally healthy products of vegetable origin that respect your wines.

No[Ox] : The natural Qi solution that combats oxidation by-products in wines.

No[Ox]

## Vegetals biopolymers: new preventive and curative bio-tools for natural wine-making

Modern oenology is seeking ever-healthier treatments to match consumers' expectations. So demand to use **non-allergenic, non-synthetic and non-animal formulations** is booming.

### Vegetals polysaccharides as new biotechnologies:

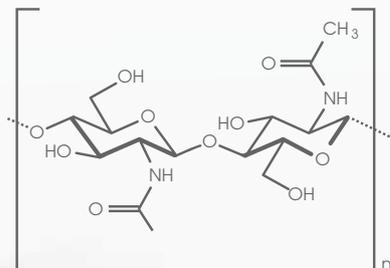
Among the polysaccharides beneficial to Man, chitin and its main derivatives chitosan and chitin-glucan are becoming increasingly important. A great many studies have been carried out on these biopolymers over the last twenty years. Practically all fields of industrial applications are affected, from pharmaceuticals to food-processing, including the environment, agriculture, textiles, paper-making and cosmetics.

The use of these biopolymers in oenology is recent. They are finding diverse applications such as fining in the broader sense of the term (pre-clarification, reducing unstable colloids, etc.)<sup>1-3</sup>, reducing undesirable micro-organisms such as *Brettanomyces*<sup>6-7</sup> and capturing heavy metals<sup>8-9</sup>.

Permitted as oenological practice by OIV [International Organisation of Vine and Wine] in 2009 and by the European Union in December 2010, these new biotechnologies are covered by several patent applications by the company KitoZyme.

### Vegetals polysaccharides are friendly to health and the environment:

These biopolymers are biodegradable and bio-resorbable, two essential properties in these times when protecting the environment and human health play an important role. Furthermore, these products offered for oenology are plant-based, ensuring they are completely **non-allergenic**.



# No[Ox] in practice

Disperse **No[Ox]** in 10 times its volume of water or wine while stirring for about one hour.

Add the suspension to the must or wine from the top of the tank and mix by pumping over a volume equivalent to that of the tank.

Decant after the preparation has settled completely (about 16 hours to settle in must, between one and two weeks in wine).

**Applied to must:** 30 to 80 g/hL

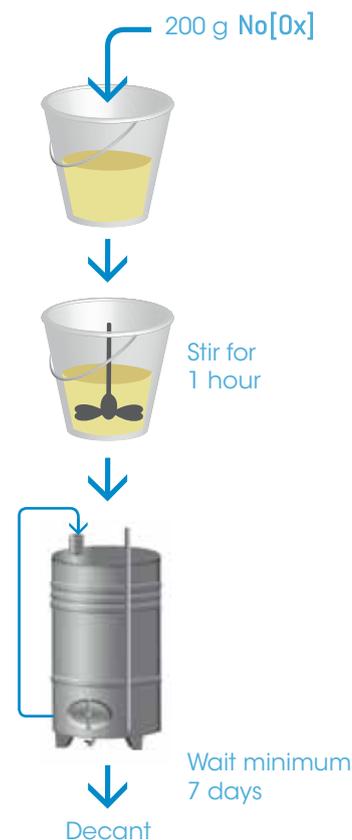
Preliminary tests are recommended to adjust the dose.

The best time to treat is pre-fermentation.

**Applied to wine:** 20 to 60 g/hL

Preliminary tests are needed to determine the exact doses to use for a new balance of the wine.

The best time to treat is after malo-lactic fermentation or at blending before bottling.



## BIBLIOGRAPHY

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