WINE WITH LOW OR ZERO SO_2 ADDITION?

enartis

SO_2 ALTERNATIVES

SO_2 is one of the most controversial additives currently used in the wine industry. Numerous attempts have been made to find alternatives as effective and healthy for human consumption. With the recent approval of products such as chitosan and PVI/PVP, it is now easier to replace sulphur dioxide.
Enartis offers alternative options able to replace SO_2 for its antioxidant, antioxidasic and antimicrobial activities and produce quality, low or SO_2 -free wines.

ALTERNATIVES TO SO_2 FOR THE ANTOXIDANT ACTIVITY

Wine oxidation is a complex mechanism that starts with the activation of dissolved oxygen into free radicals by copper and iron. Then, these free radicals involve wine compounds such as polyphenols, ethanol, aromatic compounds, and organic acids, into chain redox reactions, resulting in wine oxidation. Tannins, glutathione, ascorbic acid, citric acid, activated chitosan, and co-polymers of vinylimidazole and vinylpyrrolidone (PVI/PVP) can block this chain of chemical reactions and avoid wine oxidation.

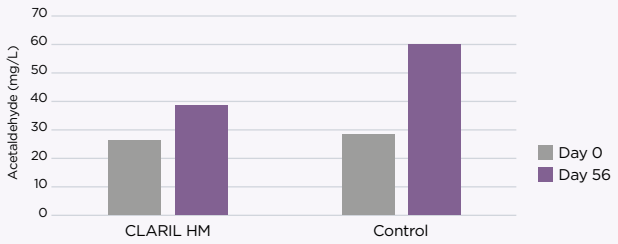
ALTERNATIVES TO SO_2 FOR THE ANTIOXIDASIC ACTIVITY

Juice oxidation is caused by enzymatic reactions. Polyphenols oxidase (PPO or Tyrosinase) in healthy grapes and laccase produced by *Botrytis*, in presence of oxygen turn polyphenols into quinones, strong oxidants responsible for juice browning. Copper is an element necessary for the activity of these enzymes.
PVI/PVP and activated chitosan can reduce polyphenol oxidase activity by removing copper.

ALTERNATIVES TO SO_2 FOR THE ANTIMICROBIAL ACTIVITY

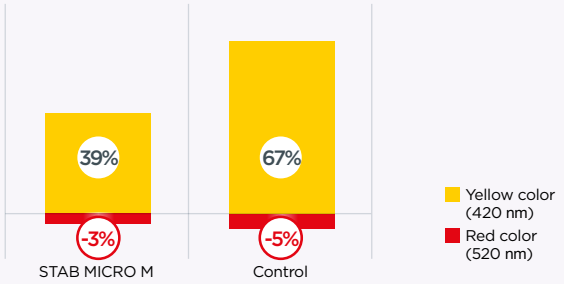
Activated chitosan is an antimicrobial fining agent that can be used during the entire winemaking process to control spoilage microorganisms. Contrary to SO_2, activated chitosan is an allergen-free substance and its antimicrobial activity is not really influenced by wine or juice pH. It can be used to control non-*Saccharomyces* yeast, bacteria and molds, including *Botrytis* and its spores.

CLARIL HM limits the increase of acetaldehyde



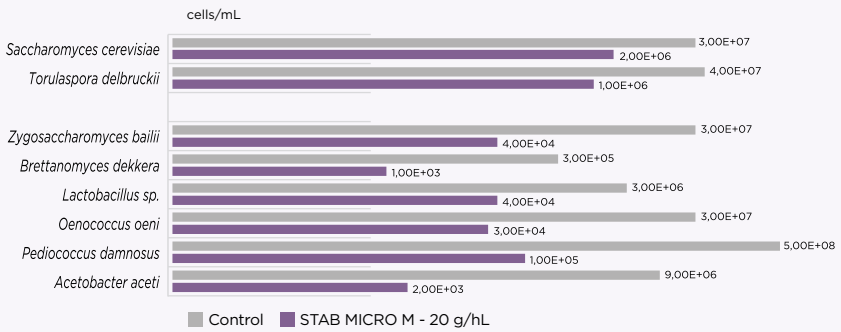
Bottled white wine stored for 4 weeks in stressful conditions.
Analytical control was done at the time of bottling and after 8 weeks. The wine treated with CLARIL HM shows an increase of acetaldehyde significantly lower than the control.

STAB MICRO M reduces the effect of laccase



Color difference pre- and 4 hours post- laccase addition

STAB MICRO M controls the main wine spoilage microbes



WHITE AND ROSÉ VINIFICATION

WINEMAKING PHASE	PRODUCT	COMPOSITION	ACTIONS
GRAPES AND MUSTS	Tan Antibotrytis or Tan Arom	Tan Antibotrytis: Blend of gallic, digallic and ellagic tannins Tan Arom: Blend of gallic, digallic tannins and inactivated yeast with sulphur amino acids	• Reduction of dissolved oxygen • Reduces oxidasic enzymes activities • Blocks radicals
	Claril SP	Bentonite, PVPP, potassium caseinate, cellulose	• Removal of catechins • Removal of iron
	Stab Micro M	Activated chitosan	• Removal of spoilage microbes • Removal of catechins • Removal of iron and copper • Reduction of laccase and PPO activity
FERMENTATION	Pro FT	Pro FT: Inactivated yeast rich in sulphur amino acids and mannoproteins + PVI/PVP	• Removal of copper and iron • Removal of catechins • Reduction of laccase and PPO activity
	Top Essence or ES 181	Active dry yeast	• Low SO_2-producing yeast strains
WINE MATURATION	Surlì One and Stab SLI	Surlì One: Inactivated yeast Stab SLI: Inactivated yeast + PVPP + oak tannin	• Reduction of dissolved oxygen • Removal of catechins • Stabilisation of wine redox potential
	Claril HM	PVI/PVP, activated chitosan	• Removal of iron and copper • Removal of catechins
	Tan SLI	Ellagic tannin from untoasted American oak	• Blocks radicals • Stabilisation of wine redox potential
	Stab Micro M	Activated chitosan	• Removal of spoilage microbes • Removal of catechins • Removal of iron and copper
BOTTLING	Tan SLI	Ellagic tannin from untoasted American oak	• Blocks radicals • Stabilizes wine redox potential
	Citrostab rH	KMBS, ascorbic acid, citric acid, gallic tannin	• Blocks radicals • Prevention of pinking

RED VINIFICATION

WINEMAKING PHASE	PRODUCT	COMPOSITION	EFFECTS
GRAPES AND MUSTS	Tan Antibotrytis or Tan Rouge	Tan Antibotrytis: Blend of gallic, digallic and ellagic tannins Tan Rouge: Condensed tannin, chestnut tannin and gallic tannin	• Reduction of dissolved oxygen • Reduces oxidasic enzymes activities • Blocks radicals
	Stab Micro M	Activated chitosan	• Removal of spoilage microbes • Removal of catechins • Removal of iron and copper • Reduction of laccase and PPO activity
FERMENTATION	ES 488 or WS	Selected dry yeast	• Low SO_2-producing yeast strains
WINE MATURATION	Surlì One and Stab SLI	Surlì One: Inactivated yeast Stab SLI: Inactivated yeast + PVPP + oak tannin	• Removal of dissolved oxygen • Removal of catechins • Stabilisation of wine redox potential
	Claril HM	PVI/PVP, activated chitosan	• Removal of iron and copper • Removal of catechins
	Tan SLI	Ellagic tannin from untoasted American oak	• Blocks radicals • Stabilisation of wine redox potential
	Stab Micro M	Activated chitosan	• Removal of spoilage microbes • Removal of catechins • Removal of iron and copper
BOTTLING	Tan SLI	Ellagic tannin from untoasted American oak	• Blocks radicals
	Citrostab rH	KMBS, ascorbic acid, citric acid, gallic tannin	• Blocks radicals

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