

## ENARTIS NEWS

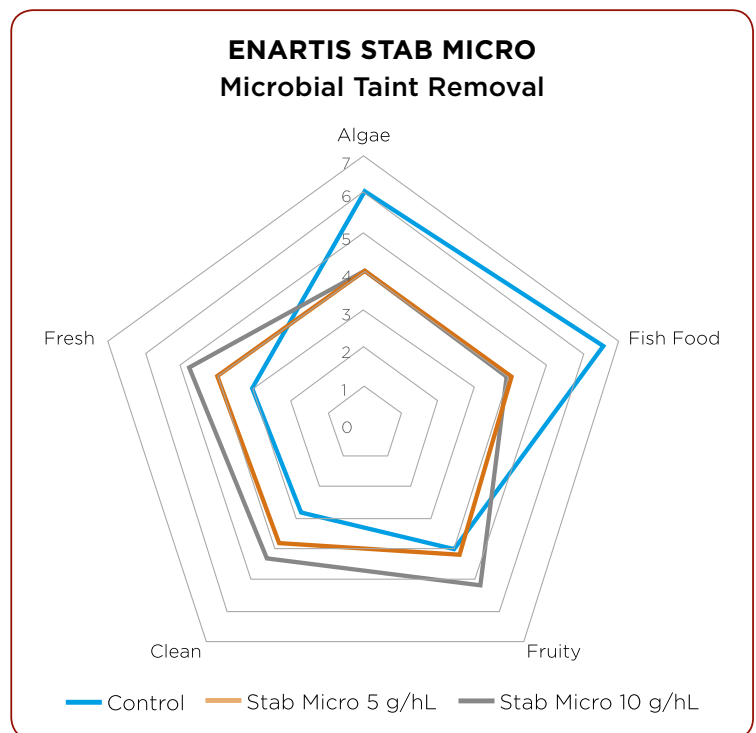
### TIPS FOR A SUCCESSFUL FINING

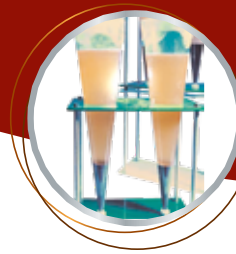
Fining agents can be used for many purposes in winemaking, including clarification, filterability improvement, prevention of haze and sediment formation, organoleptic profile and wine colour adjustment, and removal of undesirable elements. The fining process is therefore a crucial stage in the production of all wine types. Knowing which products to use and how to use them, will enable you to successfully achieve the goal.

#### WHY USE FINING AGENTS

Fining agents are materials added to wine or juice for the purpose of:

- Clarification and filterability improvement
- Stabilisation against haze and sediment formation
- Metal removal to protect wine from oxidation and premature ageing
- Organoleptic profile improvement
- Colour adjustment
- Treatment of oxidation
- Removal of undesirable elements from wine such as off-flavours, excessive tannin or spoilage microorganisms





## THE PROCESS OF FINING

Each fining agent has specific properties and reacts with various wine constituents depending on its origin, density of charge, molecular weight and chemical properties. Product preparation, temperature, pH, metal content of wine and previous fining treatments are factors that can influence the effectiveness of fining.

Fining involves two crucial reactions:

*Flocculation*: molecular interactions based on charge, chemical bonds, absorption or adsorption of compounds and formation of flocculates.

*Sedimentation*: flocculates formed are not soluble and heavier than wine/juice. They settle with time.

## FINING AGENTS

Many compounds can be used as fining agents in winemaking. They can be classified according to their origin (organic, inorganic or from synthesis), their charge at wine pH (positive or negative), their oenological effect (corrective, stabilising, clarification agents).

FINING AGENT	CHARGE AT WINE pH	ORIGIN	ALLERGENICITY
Bentonite	-	inorganic	
Carbon		organic	
Chitosan	+	organic	
Egg albumin	+	organic	allergenic
Gelatine	+	organic	
Isinglass	+	organic	non-allergenic for wine
Plant proteins	+	organic	
Potassium caseinate	+	organic	allergenic
PVI/PVP	-	synthesis	
PVPP		synthesis	
Silica	-	inorganic	



## FINING AGENTS OF ORGANIC ORIGIN

**Gelatines** are obtained from the partial hydrolysis of collagen contained in animal bones and skin. Often used to improve clarification and reduce phenolic compounds responsible for dryness, bitterness and astringency, gelatine effects and applications can vary depending on the type of hydrolysis (isoelectric point), degree of hydrolysis (molecular weight) and charge density.

**Isinglass** is a form of collagen obtained from the dried swim bladders of fish. Used to improve brilliance, clarity and filterability of wine, it also reduces monomers and smaller polyphenolic compounds responsible for wine bitterness. Isinglass is usually used as a final touch before bottling but also in wines that are difficult to clarify for the presence of glucans and neutral pectins.

**Potassium Caseinate** is the major protein in milk. Very reactive with polyphenols and iron (Fe), potassium caseinate is mainly used to prevent or treat oxidation. It is also used to reduce browning, bitterness and off-flavours (good “sponge” effect). At wine pH, it precipitates alone without the need of other flocculation aids.

**Plant proteins** obtained from pea or from potato, they are the vegan alternative to the classic animal proteins. They are quite good for improving juice and wine clarity. Pea protein helps to remove iron and increase wine resistance to oxidation. Potato protein removes polyphenols and reduces wine astringency.

**Chitosan** is a fining agent with antimicrobial effect. It removes pro-oxidant metals (Fe and Cu), polyphenols, volatile phenols, sulphur compounds and wine spoilage microorganisms (bacteria, non-Saccharomyces and moulds).

**Egg albumin** is produced from filtered and dried egg white. It is used to reduce astringency without spoiling wine structure and to improve clarity. At pH above 3.6, its charge is significantly reduced and, as a consequence, its effectiveness.

**Carbon** is produced by anaerobic combustion of wood followed by chemical or steam activation. It has a high porosity that is able to fix colour compounds (micro-pores) or aromatic compounds (meso-pores) in an irreversible way. As well as for deodorisation and discolouration, it can be used for removing ochratoxin and is the cure of severe oxidation.



## FINING AGENTS OF INORGANIC ORIGIN

**Bentonite:** Depending on its composition, bentonites can have different properties and act differently regarding their ability to remove proteins and colour compounds, the volume of lees produced and its aromatic impact.

**Silica sol** is the colloidal solution of amorphous silica. It is usually used in conjunction with fining proteins to accelerate their precipitation, prevent over-fining (fining protein residues in wine) and improve clarification.

## FINING AGENTS FROM SYNTHESIS

**Polyvinylpolypyrrolidone or PVPP** specifically binds with low molecular weight polyphenols responsible for oxidation, browning, pinking and bitterness.

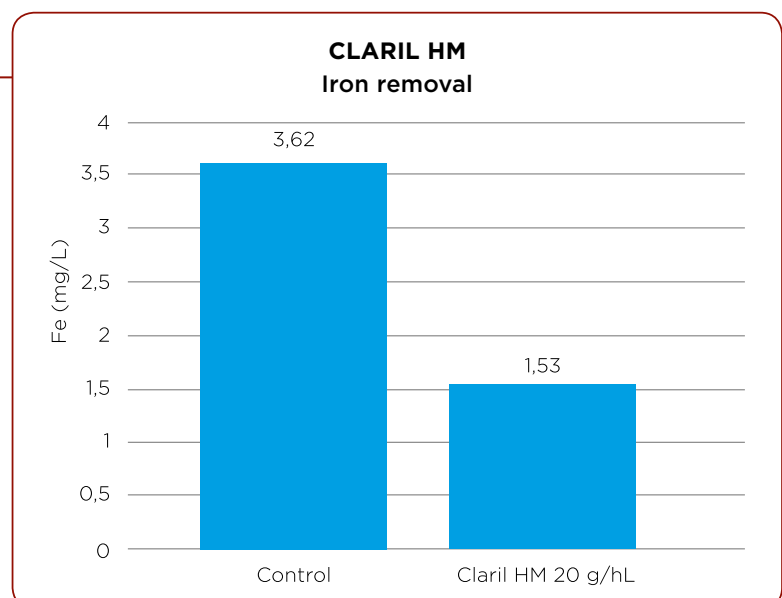
**Copolymers of vinylimidazole and vinylpyrrolidone or PVI/PVP** are capable of removing metals in wine such as copper (Cu), iron (Fe) and aluminium (Al). PVI/PVP also has the ability to bind with phenolic compounds, substrates of oxidative reactions.

## CO-FINING OR FLOCCULATION AIDS

When fining white, rosé or low-tannin wines, some protein-based fining agents (particularly gelatine and isinglass) require the addition of negatively charged colloids such as silica sol or bentonite to ensure complete flocculation and precipitation. Bentonite can be added to wines shortly after addition of gelatine to remove any residual protein left over from fining. Silica sol aids in the flocculation, and subsequently sedimentation, when utilising protein fining agents such as isinglass or potassium caseinate.

## WHY REMOVE METALS?

Through redox reactions, catalysed by transition metals such as Cu<sup>+</sup> and Fe<sup>2+</sup>, oxygen is converted into highly reactive radicals that oxidise wine organic compounds. Removing metals such as Cu<sup>+</sup> and Fe<sup>2+</sup> limits oxidation reactions, reduces reaction speed and increases wine resistance to oxidation.

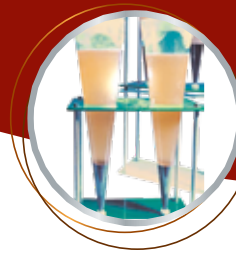




## SOME SUGGESTIONS FOR FINING PROCEDURE

- Prepare fining agent as recommended on the technical data sheet.
- Slowly incorporate fining agent to at least 1/2 of the total volume of wine using a Venturi tube or dosing pump.
- When flocculation aids are used, the following order of addition should be followed: tannin must always be added before gelatine, if possible one day earlier; bentonite and silica sol should be added before protein fining agents when treating free-run must and wine, and after protein fining agents when treating pressed must and wine.
- Protein fining agents should not remain in the wine for more than 10-15 days in the case of gelatine, casein and egg albumin, and 3-4 weeks in the case of isinglass.
- Protein-based fining agents work best at temperatures < 15°C.
- Bentonite works best at temperatures > 10°C.

PRODUCT	COMPOSITION	SOLVENT	RATIO PRODUCT/WATER	TIME OF HYDRATION
<b>Blancoll</b>	Egg albumin	Cold water	1:20	
<b>Claril HM</b>	Activated chitosan and PVI/PVP	Water or wine	1:20	1 hr at about 20°C
<b>Claril SP</b>	K caseinate, PVPP and bentonite	Cold water	1:10	3-6 hr
<b>Combistab AF</b>	Pea protein, PVPP and silica	Cold water	1:10	1 hr
<b>Fenol Free</b>	Activated carbon	Water or wine	q.s.	
<b>Finecoll</b>	Isinglass	Cold water	1:100	1-2 hr
<b>Green Gelatina</b>	Hot soluble gelatine	Water at 40°C	1:20	
<b>Neoclar AF</b>	Bentonite, gelatine and carbon	Cold water	1:10	
<b>Plantis AF</b>	Pea protein	Cold water	1:10	
<b>Pluxcompact</b>	Calcium bentonite	Cold water	1:10	3-6 hr
<b>Stab Micro</b>	Activated chitosan	Cold water	1:20	
<b>Stab Micro M</b>	Activated chitosan + yeast hulls	Cold water	1:20	
<b>Stabyl</b>	PVPP	Water at 40°C	1:5	1 hr
<b>Stabyl Met</b>	PVI/PVP and silica	Water at 20°C	1:5	1 hr



## HOW TO CHOOSE THE RIGHT FINING AGENT

ACTION	ENARTIS OPTIONS
Metal removal	CLARIL HM - STABYL MET
Unstable colour removal	PLUXCOMPACT
Clarification	FINECOLL - GREEN GELATINA - BLANCOLL
Reduce astringency	HYDROCLAR 45 - HYDROCLAR 30 - GREEN GELATINA - BLANCOLL
Reduce bitterness	FINECOLL - STABYL - PLANTIS AF - COMBISTAB AF - CLARIL SP
Treat oxidation	STABYL - PLANTIS AF - COMBISTAB AF - CLARIL SP
Eliminate sulphur off-aroma	NEOCLAR AF - STAB MICRO (M)
Treat microbial taint	FENOL FREE - STAB MICRO (M)
Treat smoke taint	FENOL FREE - STAB MICRO (M)
Protein removal	PLUXCOMPACT