

ENARTIS NEWS FAQ ON WINE FINING

WHY FINING?

Fining agents can be used for many purposes in winemaking, including clarification, filterability improvement, prevention of haze and sediment formation, organoleptic profile improvement, color adjustment and removal of undesirable elements or flavors. The fining process is therefore a crucial stage in the production of all wine types.

HOW DOES FINING WORK?

Each fining agent has specific properties and reacts with various wine constituents depending on its origin, density of charge, molecular weight and chemical properties.

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.

WHAT ARE THE MAIN FACTORS THAT INFLUENCE FINING EFFECTIVENESS?

Product preparation and addition, temperature, pH, wine redox potential and previous fining treatments are factors that can influence the effectiveness of fining.

HOW TO CHOOSE THE RIGHT FINING AGENT

Bench trials are essential to determine what fining agents to use and their dosages. To set up bench trials, follow these steps:

- Prepare fining agent solution in water as recommended on the technical data sheet. For liquid products, use solution as is or dilute, if necessary.
- Label each sample bottle. Keep one untreated sample as a control.
- Fill samples with wine and leave some space for the addition.
- Add the fining agent solution.
- Mix immediately after addition. Top each bottle with wine and mix again.
- Store wine at winery temperature for settling (usually 1-2 days).
- Evaluate the results (turbidity, volume of lees, color, sensory, stability, etc.)

HOW TO EVALUATE FINING RESULTS

Depending on the goal, several parameters can be used to evaluate the results of a fining treatment: turbidity, volume of lees, filterability, color intensity and hue, color stability, protein stability, sensory quality, metal content, etc. Whatever the reason for treatment, any fining agent has an impact on wine sensory quality. For this reason, tasting must always be part of the final evaluation.

PARAMETER	TYPE OF ANALYSIS
Clarity	Turbidimeter
Color	Absorbance at 420, 520, 620 nm
Polyphenols	Absorbance at 280 nm
Filterability	Fouling index or Vmax
Protein stability	Heat test
Color stability	Refrigeration test

WHEN USING MORE THAN ONE FINING AGENT, WHAT IS THE RIGHT ORDER OF ADDITION?

There many different opinions about the correct order of addition of fining agents, however a guideline can probably be found by answering the following question: what is the goal? Let's take a white wine as an example. If the goal of fining is to improve protein stability, adding bentonite first

improves its stabilizing effect. Gelatin can be added as a co-fining agent to improve wine clarity. However, if the main goal is to reduce wine phenolic content, gelatin addition first and bentonite as second is recommended. If the goal is just to improve clarity, it's better to use the corrective agents (PVPP, carbon and potassium caseinate) first, then the negative-charged fining agents and lastly, the positive ones. Always allow one or two hours to elapse between additions

FINING AGENT	CHARGE AT WINE pH	ORIGIN	ALLERGEN STATUS
Bentonite	-	inorganic	
Carbon		organic	
Chitosan	+	organic	
Egg albumin	+	organic	allergenic
Gelatin	+	organic	
Isinglass	+	organic	non-allergenic for wine
Plant proteins	+	organic	
Potassium caseinate	+	organic	allergenic
PVI-PVP	-	synthetic	
PVPP		synthetic	
Silica	-	inorganic	

WHAT IS THE CORRECT WAY OF INCORPORATING FINING AGENTS INTO WINE OR MUST?

Fining agents are very fast in reacting with wine compounds. For this reason they should be dispersed throughout the entire volume of wine or juice immediately, otherwise they are likely to finish coagulating before completely mixed with the liquid, thus reducing their effectiveness. Systems to aid complete dispersal are essential. If possible, incorporate finings using a Venturi tube or dosing pump during pump-over or racking. Avoid prolonged use of mechanical stirrers, which can delay the flocculation process.

CAN I STORE FINING SOLUTIONS FOR A FEW DAYS?

Fining solutions must be used immediately after preparation (allowing only for swelling times, if applicable). If solutions need to be used over two or more days, add 2 g/L of potassium metabisulfite to the solution to inhibit microbial growth. Never store prepared solutions for more than one week.

HOW LONG CAN FINING AGENTS REMAIN IN WINE?

Gelatin, casein and egg albumin should not remain in wine for more than 10-15 days. Isinglass can remain 3-4 weeks. Bentonite, silica sol, chitosan and PVPP can remain in wine for a longer time.

ARE ALL BENTONITES THE SAME?

There are several types of bentonite in the market. Their enological properties and application mainly depend on the nature of the main exchangeable cation: sodium bentonites are the most effective in removing proteins; calcium bentonites have a better clarifying effect.

Enartis Bentonites (4 drops more efficient; 1 drop less efficient)						
	Kind of Bentonite	Physical Form	Swelling Capability	Protein Removal	Clarification Activity	Lees Compaction
BENTOLIT SUPER	Calcium bentonite sodium activated	Powder	♦♦	♦♦	♦♦♦	♦♦♦
PHARMABENT	Calcium bentonite sodium activated Pharmaceutical quality	Granulated	♦♦♦♦	♦♦♦♦	♦	♦
PLUXBENTON N	Natural sodium bentonite	Granulated	♦♦♦	♦♦♦	♦♦	♦♦
PLUXCOMPACT	Calcium bentonite sodium activated	Granulated	♦	♦	♦♦♦♦	♦♦♦♦

ARE ALL GELATIN PRODUCTS THE SAME?

Gelatins can have very different average molecular weights. High molecular weight gelatins have a better clarifying effect while low molecular weight gelatins are more efficient in removing tannins.

WHY REMOVE METALS?

Through redox reactions, catalyzed by transition metals such as Cu^+ and Fe^{2+} , oxygen is converted into highly reactive radicals that oxidize wine organic compounds. Removing metals such as Cu^+ and Fe^{2+} limits oxidation reactions, reduces reaction speed and increases wine resistance to oxidation.

WHY DID THE LAB TRIAL WORK BUT FINING AT INDUSTRIAL SCALE DID NOT?

If at winery scale the result of the treatment is inferior to the one obtained in the lab, this may be due to:

- A very different wine temperature. Ideal temperature is between 13 and 15°C. Lower temperatures can slow down the sedimentation of some fining agents like bentonite, for example. Higher temperature can encourage microbial

activity onset and production of CO_2 .

- Absence of grounding of the fining tank. In this case the tank becomes like a battery with a positive and a negative pole that, attracting particles with opposite charge, are going to interfere with fining agent precipitation.

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.
- Protein fining agents should not remain in wine for more than 10-15 days in the case of gelatin, casein and egg albumin, and 3-4 weeks in the case of isinglass.
- 13-15°C is the ideal temperature for fast and complete precipitation of the majority of fining agents.
- Avoid temperature differentials in the fining tank. These create convective movements within the tank that delay the settling of lees.
- Ground the tank in order to avoid accumulation of charges that can interfere with fining agent sedimentation.

Enartis products in powder form: instructions for their correct preparation

Product	Composition	Solvent	Ratio Product/water	Time of hydration
ATOCLAR M	LMW gelatin	Cold water	1:10	
BENTOLIT SUPER	Sodium bentonite	Cold water	1:20	3-6 hrs
BLACK PF	Carbon	Cold water	q.s.	
CLARIL AF	Bentonite, pea protein, PVPP	Cold water	1:10	
CLARIL HM	Activated chitosan and PVI-PVP	Water or wine	1:20	1 hr at about 20°C
CLARIL QY	Inactivated yeast, chitosan	Cold water	1:10	
COMBISTAB AF	Pea protein, PVPP and silica	Cold water	1:10	1 hr
EnartisGreen GELATINA	Hot soluble gelatin	Water 40°C	1:20	
EnartisStab MICRO	Activated chitosan	Cold water	1:20	
EnartisStab MICRO M	Activated chitosan + yeast hulls	Cold water	1:20	
ENOBBLACK PERLAGE	Activated carbon	Water or wine	q.s.	
FENOL FREE	Activated carbon	Water or wine	q.s.	
GOLDENCLAR INSTANT	HMW gelatin	Cold water	1:20	
NEOCLAR AF	Bentonite, gelatin and carbon	Cold water	1:10	
PHARMABENT	Sodium bentonite	Cold water	1:20	1 hr
PLANTIS AF	Pea protein	Cold water	1:10	
PLANTIS AF-P	Potato protein	Cold water	1:10	
PLANTIS AF-Q	Pea protein and activated chitosan	Cold water	1:10	
PLUXBENTON	Sodium bentonite	Cold water	1:20	3-6 hrs
PLUXCOMPACT	Calcium bentonite	Cold water	1:10	3-6 hrs
PULVICLAR S	HMW gelatin	Water 40°C	1:20	
REVELAROM	Bentonite, gelatin, copper salt	Cold water	1:20	1 hr
STABYL (G)	PVPP	Water 40°C	1:10	1 hr
STABYL MET	PVI-PVP and silica	Water 20°C	1:20	1 hr at about 20°C

How to select the correct fining agent

ACTION	ENARTIS OPTIONS
Metal removal	CLARIL HM - STABYL MET
Unstable color removal	PLUXCOMPACT - NEOCLAR AF - CLARIL QY
Clarification	EnartisGreen GELATINA - ATOCLAR M - HYDROCLAR 45 - HYDROCLAR 30 - PULVICLAR S - GOLDENCLAR INSTANT
Reduce astringency	HYDROCLAR 45 - HYDROCLAR 30 - GREEN GELATINA - ATOCLAR M - PULVICLAR S - GOLDENCLAR INSTANT - CLARIL QY
Reduce bitterness	STABYL - PLANTIS AF - COMBISTAB AF - CLARIL AF
Treat oxidation	STABYL - PLANTIS AF - COMBISTAB AF - CLARIL AF - BLACK PF - PLANTIS AF-P
Eliminate sulfur off-aroma	NEOCLAR AF - EnartisStab MICRO M - REVELAROM
Treat microbial taint	FENOL FREE - EnartisStab MICRO M
Treat smoke taint	FENOL FREE - EnartisStab MICRO M
Protein removal	PLUXCOMPACT - BENTOLIT SUPER - PLUXBENTON N - PHARMABENT

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