



How to fine-tune your wine

Fining agents help remove undesirable elements or compounds to improve the quality of wine. Fining is not just used in wines for bottle preparation, in some cases there are more benefits from early fining rather than later in the life of a wine.

Early fining is most important in the correction of obvious flaws, for example: harsh and unbalanced mouthfeel, off aromas and flavors caused by the wine's reductive or oxidative state, and even the removal of microbial organisms. For the most part, early fining will allow the wine to age properly while limiting further treatments that could be needed prior to bottling.

The main purpose of fining:

- Clarification
- Stabilization against haze and sediment formation
- Improving organoleptic properties

Mechanism of action

The mechanisms of action in fining are diverse and depend on the nature of the fining agent. These interactions can be based on charge, formation of chemical bonds, and/or absorption or adsorption of compounds. When added to wine, fining agents usually form a colloidal dispersion. Depending on the electrical charge of the fining agent molecules when dispersed in wine, the colloids may be classified as being either electropositive (e.g. protein fining agents such as gelatins) or electronegative (e.g. tannin, bentonite, silica sol).

These interactions lead to the formation of two important processes that need to happen in sequence: first, flocculation (the aggregation of two or more macromolecules) then sedimentation (when the flocculated materials settle to the bottom of the tank).

Research on interactions between tannin and gelatin have shown that other factors are important in flocculation and sedimentation. When particles with opposite electrical charges are attracted to each other by electrostatic interaction, a dehydration phenomenon takes place on the outer surface of the aggregated particles (or micelles).

The presence of Na^+ , K^+ , Ca^{2+} , Mg^{2+} and especially Fe^{3+} cations is indispensable for this phenomenon to occur. This will lead to hydrophobic interaction between the aggregated particles which then leads to their precipitation.

How fining agents work

The fining process involves two stages:

1. Flocculation (the aggregation of two or more macromolecules)
2. Sedimentation and clarification (when the flocculated materials settle to the bottom of the tank)



Co-fining (Flocculation aids)

When fining white, rosé or other low tannin wines, some protein-based fining agents, particularly gelatin and isinglass, which have a positive electric charge, require the addition of negatively charged colloids in order to ensure complete flocculation and, eventually, precipitation. Such negatively charged flocculation aids include: tannin, silica sol and bentonite.

Testing and evaluating fining agents

Trials are essential for evaluating the efficacy of a treatment. Fining agents and concentration ranges used in a trial can be selected on the basis of the change that is desired in the wine. It is important to test several rates and select the lowest dosage needed to achieve the desired effect in order to avoid over-fining.

For fining trials intended to modify the organoleptic status of the product, the most important test of all is a properly conducted sensory evaluation of the fined samples against an untreated control. Additionally, there are several tests that winemakers can use to cross reference with their sensory evaluation (see table 1).

ANALYTICAL EVALUATION (table 1)

PARAMETER	TYPE OF ANALYSIS
CLARITY	Turbidimeter or naked eye
COLOR	Abs. 420, 520, 620 nm (color intensity, hue)
POLYPHENOLS	Abs. 280 nm
FILTERABILITY	Fouling index and/or V. max
PROTEIN STABILITY	Heat test
OVERFINING	Addition of tannin

Things to consider when using Fining Agents

- All fining agents must be added very evenly to the volume of wine (or must) that is being treated. If possible, incorporate fining agents using a Venturi tube or dosing pump during pump-over or racking.
- Avoid prolonged use of mechanical stirrers, which can delay the flocculation process.
- When flocculation aids are used, the following order of addition should be used: tannin must always be added before gelatin, 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.
 - If there is a risk of over-fining with protein fining agents, always end the sequence with bentonite.
- Always allow one or two hours to elapse between additions.
- 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.



- Protein fining agents should not remain in the 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.
- Avoid temperature differentials in tanks to which fining agents have been added - these create convective movements within the tank that delay the settling of lees.
- Protein fining agents work best at low temperatures: 10°C for gelatin and up to 5°C for isinglass.
- Bentonite works best at temperatures higher than 10°C (50°F)
- Chitosan must be in suspension for 1 hour or more to optimize treatment.

FINING AGENTS: WHAT TO USE WHEN (table 2)

EFFECT	ACTIVE INGREDIENT	PRODUCT	EFFECTIVENESS
Remove oxidation	PVPP	Stabyl	🍷🍷🍷
	Potassium Caseinate	Protoclar	🍷🍷🍷
	Blends	Protomix AF Combistab AF	🍷🍷🍷
	Plant Protein	Plantis AF Plantis AF-P	🍷🍷
Clarification	Gelatin	Hydroclar 30	🍷🍷
	Plant Protein	Plantis AF Plantis AF-P	🍷🍷
Reduction of astringency	Gelatin	Hydroclar 30	🍷🍷🍷 (Foretaste)
	Plant Protein	Plantis AF Plantis AF-P	🍷🍷
	Egg Albumin	Blancoll	🍷🍷🍷 (Global tannic sensation)
Reduction of bitterness	PVPP	Stabyl	🍷🍷
	Blends	Combistab AF	🍷🍷
	Plant Protein	Plantis AF Plantis AF-P	🍷🍷
Catechins removal	PVPP	Stabyl	🍷🍷🍷
	Blends	Combistab AF Protomix AF	🍷🍷
	Potassium Caseinate	Protoclar	🍷🍷
	Plant Protein	Plantis AF Plantis AF-P	🍷🍷
Metal removal (copper and iron)	Chitosan	Stab Micro M	🍷🍷



EFFECT	ACTIVE INGREDIENT	PRODUCT	EFFECTIVENESS
Remove volatile phenols	Carbon	Fenol Free	🍷🍷🍷
	Chitosan	Stab Micro /M	🍷🍷
Elimination of reduction	Copper	Revelarom	🍷🍷🍷
Remove the herbaceous notes	PVPP	Stabyl	🍷🍷🍷
	Potassium Caseinate	Protoclar	🍷🍷🍷
	Blend	Combistab AF	🍷🍷🍷
Prevent pinking	PVPP	Stabyl	🍷🍷🍷
	Potassium Caseinate	Protoclar	🍷🍷🍷
	Blend	Combistab AF	🍷🍷

Allergen-Free Fining Agent

Enartis has created a line of clarifying and fining agents that are allergen free and can be used as alternatives to albumin, casein or potassium caseinate and are suitable for the production of wines to be consumed by vegetarians and vegans.

ALLERGEN FREE FINING AGENTS (table 3)

PRODUCT	COMPOSITION	EFFECT
ALTERNATIVE TO CASEIN		
PROTOMIX AF	Complex of bentonite, PVPP, plant protein and cellulose	Clarification of musts while simultaneously removing oxidizing and oxidizable polyphenolic substances along with proteins responsible for wine instability. It can also be used during alcoholic fermentation to detoxify musts and enhance the metabolic activity of yeast.
COMBISTAB AF	Complex of PVPP, plant protein and amorphous silica	Prevention and cure of oxidation and pinking, as well as the reduction of bitterness. Designed for winemakers who prefer to manage bentonite additions separately.
PLANTIS AF	Pure plant protein	Fining agent made of pure plant protein that is gluten free. Recommended for the treatment of oxidized and oxidizable wines, it is also effective in removing iron.