TECHNICAL NEWSLETTER

Fining

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. In certain situations, early fining will allow the wine to age properly while limiting further treatments that could be needed prior to bottling.

The main purposes of fining:
- ✓ Clarification
- ✓ Stabilization against haze and sediment formation
- ✓ Improving organoleptic properties

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)

Mechanism of action

The mechanisms of action in fining are diverse and depend on the chemical nature of the fining agent. These interactions can be based on charge, formation of chemical bond, and/or absorption or adsorption of compounds, but mainly two processes are involved that need to happen in sequence: first, flocculation and then sedimentation.

In the case of protein-based fining agents, particles with negative electrical charges are attracted by electrostatic interaction to the positively charged proteins (flocculation). The dehydration phenomena that takes place on the outer surface of the aggregated particles also plays a part. This effect, which is influenced by metal ions and alcohol, allows hydrophobic interactions to occur between the particles, aiding sedimentation.

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).

Table 1 ANALYTICAL EVALUATION

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

Table 2 Fining Agents "What to use and when to use"

EFFECT	ACTIVE INGREDINET	PRODUCT - RATE	EFFECTIVENESS
Elimination of oxidized color	Carbon	**BLACK PF**	**++++**
	Caseinate	**PROTOCLAR**	**+++**
	PVPP	**STABYL**	**+++**
	Bentonite, PVPP, caseinate	**CLARIL SP**	**+++**
Clarification	Med- high MW gelatin	**CLARGEL PULVICLAR S GOLDENCLAR INSTANT**	**++++**
	Med MW gelatin	**HYDROCLAR 30**	**++**
	Low MW gelatin	**HYDROCLAR 45**	**+**
	Fish gelatin	**FINEGEL**	**++**
	Isinglass	**FINECOLL**	**+++**
Reduction of astringency	Low MW gelatin	**HYDROCLAR 45**	**++++ (Forefront)**
	Med MW gelatin	**HYDROCLAR 30**	**+++**
	Med MW gelatin	**CLARGEL PULVICLAR**	**++ (End palate)**
	Egg albumin	**BLANCOLL**	**+++ (Global tannic sensation)**
	High MW gelatin	**GOLDENCLAR INSTANT**	**+++ (Global tannic sensation)**
	Plant proteins	**PLANTIS AF**	**++**
Reduction of bitterness	Caseinate	**PROTOCLAR**	**+++**
	PVPP	**STABYL**	**+++**
	Isinglass	**FINECOLL**	**++**
	Bentonite, PVPP, caseinate	**CLARIL SP**	**++**
	Plant proteins	**PLANTIS AF**	**++**
Tannin & polyphenols removal	Low MW gelatin	**HYDROCLAR 45**	**+++**
	High MW gelatin	**CLARGEL PULVICLAR S GOLDENCLAR INSTANT**	**++**
	Egg albumin	**BLANCOLL**	**++**
	Isinglass	**FINECOLL**	**+**
	PVPP	**STABYL**	**+++**
Removal of proteins	Bentonite	**PLUXBENTON N PLUXCOMPACT BENTOLIT SUPER**	**+++ ++ ++**
	Tannins	**TAN CLAR**	**+**
Metal Removal Iron	Caseinate Plant proteins Blends	**PROTOCLAR PLANTIS AF CLARIL SP**	**++**
Metal Removal (Copper and Iron)	PVI-PVP and Blends with PVI-PVP	**STABYL PVI-PVP PRO XP, PRO FT**	**+++**

- All fining agents must be added 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 (50°F) for gelatin and up to 5°C (41°F) for isinglass.

- Bentonite works best at temperatures higher than 10°C (50°F)

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ALLERGEN-FREE FINING AGENTS, AVAILABLE OPTIONS

Although the TTB has not yet issued a mandatory labeling requiement for wines produced using allergenic additives, wines that are made or sold in the European Union must list all allergen-derived additives, specifically, products derived from milk and eggs. For this reason, Enartis has developed a range of products that can effectively replace albumin, casein and potassium caseinate. These products are blends of coadjuncts that ensure constant results compared to the use of individual fining agents.

Table 3 Allergen Free Fining Agents

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.
CLARIL AF	Complex of bentonite, PVPP, plant protein and silica	Removes phenolic compounds responsible for the oxidation of color and aromas, as well as the formation of bitter compounds. Bentonite in the formulation increases protein stability and guarantees good clarification.
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.
ALTERNATIVE TO EGG ALBUMIN		
GOLDENCLAR INSTANT	High MW gelatin	As shown in studies conducted on the interaction of animal gelatin with phenolic components of wine, Goldenclar Instant appears to act on the same tannin fraction removed by egg albumin. Goldenclar Instant is recommended as an alternative to egg albumin in the treatment of aged red wines to decrease astringency without affecting balance

If you have any questions, or would like to get samples to set-up fining trials please give us a call at (707) 838-6312.