FINISHING THE WINE: FINAL STEPS IN WINEMAKING

**STABILIZATION**

Microbial

Residual sugar

Sterile filtration

Potassium Sorbate

Velcorin

Malic acid

Malolactic fermentation

Sterile filtration

SO2 and pH

pH—free SO2—0.8 ppm molecular SO2

Brettanomyces and LAB (Lactic Acid Bacteria) and AAB (Acetic Acid Bacteria)

Chitosan for Brett (No Brett Inside)

Lysozyme for LAB and Bactiless (chitin-glucan) for LAB and AAB

Tartrate stability

Tartaric acid -> H+ + bitartrate anion-

Bitartrate anion- + Potassium+ = potassium bitartrate (cream of tartar)

Alcohol solution (wine) lowers solubility causing crystalline sediment.

Chill with cream of tartar (nucleation) to drop out crystals.

Specific mannoproteins and carboxy-methyl-cellulose (CMC)

Inhibit crystal formation.

Test first to see if it works.

May lose stability with age.

Protein stability

Protein loses solubility in alcohol solution.

Bentonite

Bentonite- + protein+  pulls protein out of solution.

Danger of stripping wine if overused.

Potential negative effect on sparkling wine bubbles.

Color stability (red and rosé wine)

Color stabilized by tannin (proanthocyanidins).

Gum arabic

Stabilizes colloidal color.

Add when wine is bottle ready.

**TEXTURE/MOUTHFEEL**

Tannin (enological)

Finishing tannins

Structure and mid-palate volume

Balance high acidity

Balance existing harsh tannins

Gum arabic and mannoprotein blends

More viscous texture

Sweet perception

Sugar and sweeteners

Balances acid, gives sweet impression

Sugar needs sterile filtration and/or sorbate addition.

Inactivated yeast

Similar effect to lees aging

Adds complexity and mouthfeel

Classed as nutrient by government

Not legal for post-fermentation addition to commercial wines.

**ACID BALANCE**

Most acid corrections to adjust pH are done early on.

TA vs. pH

Late adjustments to reduce sharpness or elevate fruit and liveliness

Deacidification

Potassium carbonate

Acidification

Tartaric acid

Cold stabilization afterwards

Malic acid

Sterile filtration afterwards

Citric acid

Sterile filtration afterwards

Additives to balance acid (see “Texture/Mouthfeel”)

Sugar, gum arabic, inactivated yeast, mannoproteins.

**FLAVOR**

Blending

Always do before stabilization.

Oak

Oak-derived finishing tannins

Oak chips and similar oak derivatives

Enzymes

Beta-glucosidase

Releases free aromatics bound to sugars, primarily terpenes.

**FINING (see “STABILIZATION”)**

White wine

Casein

Removes heavy metal haze

Removes oxidized phenolics that may cause browning, pinking or bitterness.

PVPP

Removes oxidized phenolics that may cause browning, pinking or bitterness.

Isinglass

Clarification

May use with silica gel to counterfine, speeding settling and compaction.

Gelatin

Used with silica gel for clarification (danger of over-fining).

Bentonite

Prevention of protein haze

Red wine

Gelatin

Removes large, astringent tannins

May strip flavor

Egg whites

Removes harsh tannins

Traditionally used after barrel aging on mature tannins

Reduced sulfur compounds

Copper sulfate for H2S and mercaptans

Yeast or inactivated yeast fining for low level sulfur compounds

*Reduless,* copper-impregnated yeast cells for wide range of off-sulfur compounds

Miscellaneous

TCA from winery

Casein, milk

Fresh lees, inactivated yeast

**FILTRATION**

Clarification and removal of yeast and bacteria

Depth filtration

Traps particles in complex matrix

Not absolute, variable hole size

Clarifies and polishes

Membrane filtration

Absolute, blocks all particles above guaranteed size

0.45 microns for sterile filtration to eliminate yeast and bacteria

Cross flow filtration

Tangential filtration

Although membranes are used, not considered sterile