“Enology Essentials” Principles of Wine Production

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2025 FWGGA Annual Conference

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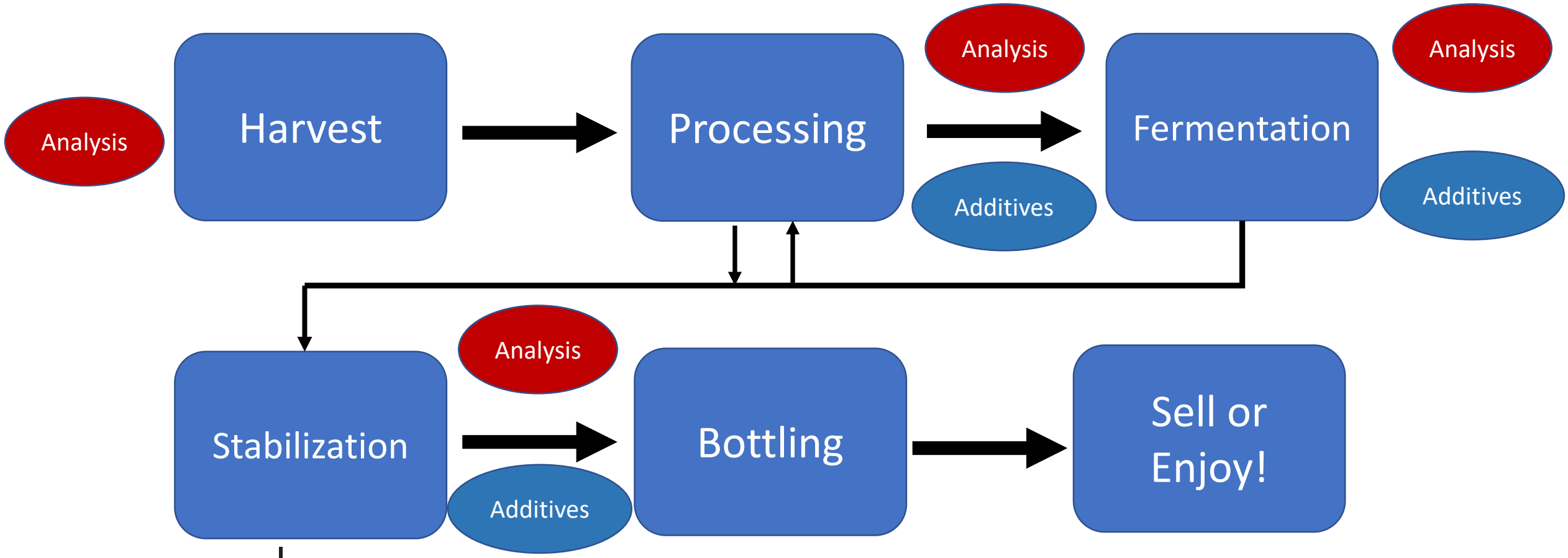
Winemaking Process Overview



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Pre-Test: True or False ?

1. Optimal pH of juice should be greater than 3.6
2. White and rose' winemaking usually involve extended skin maceration
3. Malolactic fermentation is completed by yeast
4. Potassium metabisulfite is a fining agent
5. Bottling is best immediately after filtration

Harvesting

- We monitor the grapes for pH, acidity, and soluble solids to determine optimal time for harvest
- pH: 3.1-3.5
- Acidity: 4 – 8 (g/L TAE)
- Soluble Solids: 15 – 18 (%brix)
- Harvest season runs from August-September
- We collect approximately 100-200 lbs. for producing one batch of experimental wine which will make 5-10 gallons of wine
- Berries can be harvested by hand or mechanization

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Processing Equipment

- After harvest, the grapes are processed into juice by using equipment:

- Crusher/Destemmer- “Crushes” berries and removes them from the stem (rachis)

- Press- Separates the juice from the skins to produce pomace

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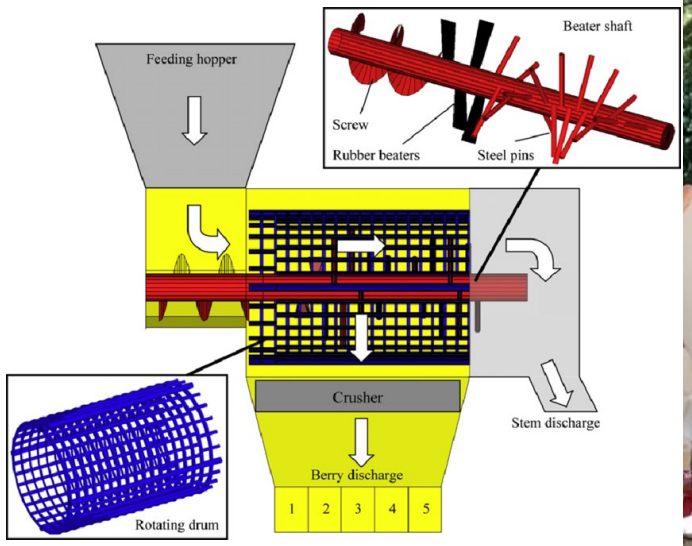
Crushing the grapes

- Chill berries before processing
- Load the berries into the crusher
- For muscadines, the destemmer can be removed.
- Collect crush in buckets underneath the crusher
- Add additives such as SO2, tannins, and enzymes immediately
- Reds can be inoculated after reaching 17 C
- Whites need to be pressed



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Pressing the grapes

- Grapes should be cool to prevent excess browning
- Stems should be removed
- Option to collect separate press fractions depending on style of wine making
- Low pressure is optimal
- Immediately after pressing bring the juice, cool to rack or bring to 17 C for fermentation

Basket Press

'Hydro' Press

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Fermentation

Alcoholic Fermentation

- Metabolic conversion of sugar into alcohol by yeast; Saccharomyces cerevisiae

*Red wine ferments on the skins
*White wine fermentation does not include skin maceration

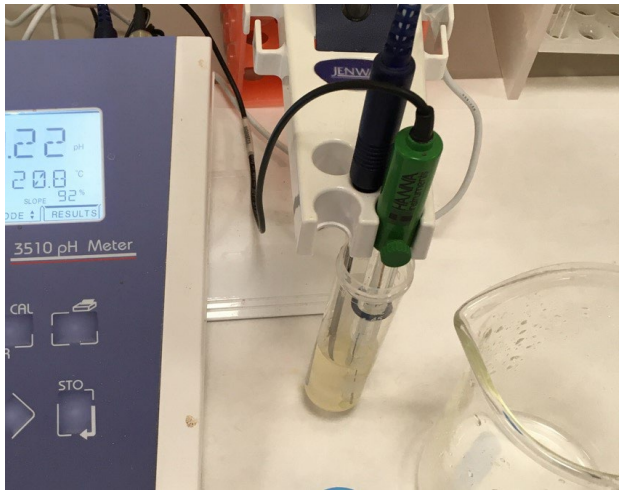
Malolactic Fermentation

- Metabolic conversion of Malic acid into Lactic Acid by bacteria;

*Desired in reds, not desired in whites.

Analysis

1. Specific Gravity
2. pH
3. Titratable Acidity
4. Sulfur Dioxide (Free & Total)
5. Malic and Lactic Acid



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Blending

- Purpose: overcoming defects, enhancing complexity, or adjusting characteristics
- Can occur at any time in winemaking process; field blending, or after fermentation
- Varietals require at least 75% of labeled variety
- Some blends may cause stabilization issues

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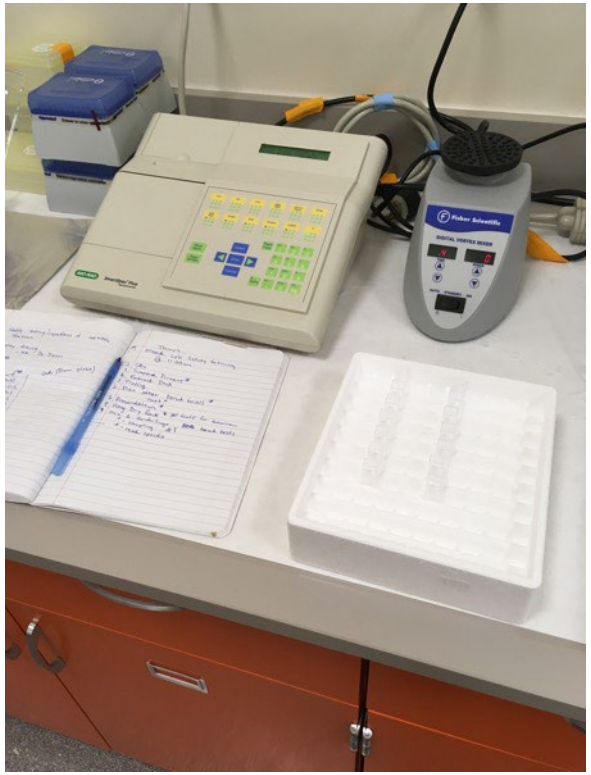
Benchtop Testing



- Testing blends and dosage on small scale
- Sensory and spectrophotometric analysis
- Choose the best dosage and continue forward
- Let settle for up to two weeks, then rack

Common Wine Additives

1. Acids- Citric, Tartaric, Malic, Acid Blend?
2. Enzymes- Pectinase, cellulases, B-glucanases, lysozyme,
3. Preservatives- Sulfur Dioxide, Sorbic Acid,
4. Oak & Enological Tannins- Color preservation, enhances aging, & prevents browning
5. Benchtop Testing- Get right dosage before adding to entire batch

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Stabilization and Clarification

- Static Racking
  - Transfer of clarified wine with pump or siphon
- Fining
  - Addition of clarifying agents
- Filtration
  - Removes suspended particles and microorganisms

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Racking

- ‘Transfer of wine above its solid sediments (lees)’
  - You can use gravity or a pump
- Lees can be composed of many different things including yeast, bacteria, proteins, tartrates.
- Racking can be done before, and several times post fermentation
- Introduce lowest amount of oxygen as possible
- Always keep tanks full after racking
- Practice good sanitation
- Analyze afterwards

Fining Agents

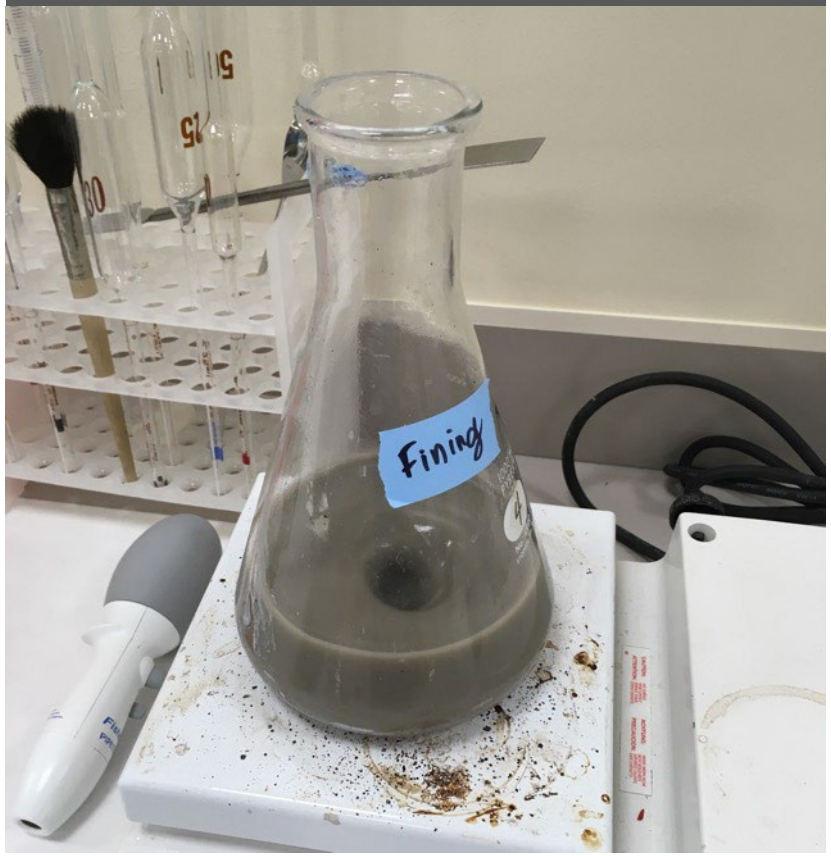


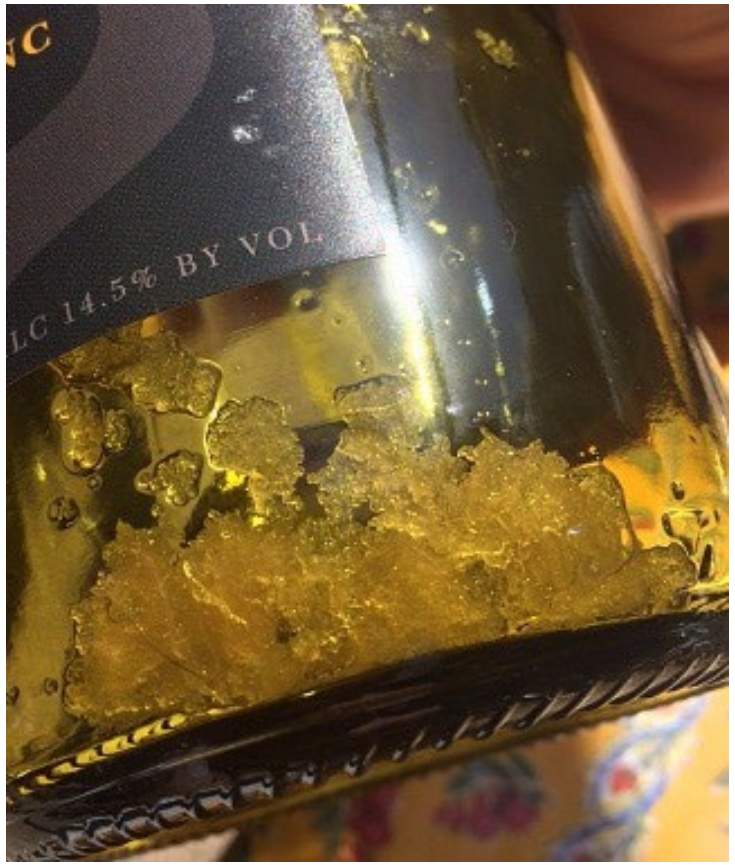
TABLE 1. The most important fining agents used during winemaking.

Fining agent	Product form	Purpose	Preparation (Dosage)
Active carbon	Powder or granules	Removal of undesirable colour and flavour	None. (0.1 - 0.4 g/l)
Bentonite	Powder or granules	Removal of protein. Often in combination with gelatine.	Allow to swell overnight. Mix with lukewarm water before adding. (0.1 - 1.0 g/l)
Egg white	Eggs or albumin powder	Fining of red wine. Reduces tartness in red wines.	Separate yolk and white of egg. Dissolve in 0.5% table salt solution or Dissolve albumin powder in 0.5% table salt solution. (3 eggs/200 litres or 0.1 - 0.5 g/l albumin)
Gelatine	Powder	Reduction of tartness in red wines. Often in combination with bentonite and silicasol.	Leave to swell overnight in cold water. Dissolve the next day by heating water. (0.05 - 0.15 g/l)
Casein	Milk or powder	Reduces bitter taste in wine.	Dissolve in alkaline warm water that contains one third of the casein weight's potassium carbonate. (0.05 - 0.3 g/l)
PVPP *Polyclar AT*	Powder	Prevents browning and pinking in white wines.	Dissolve in a small amount of wine. (0.2 - 0.5 g/l)
Silicasol *Kieselsol* *Baykisol*	Aqueous solution	Accelerates fining lees. Often used after gelatine fining.	None. (0.06 - 0.2 g/l)
Isinglass	Ground or unground isinglass strips	Reduces tartness and bitterness.	According to product prescriptions. (0.02 - 0.1 g/l)

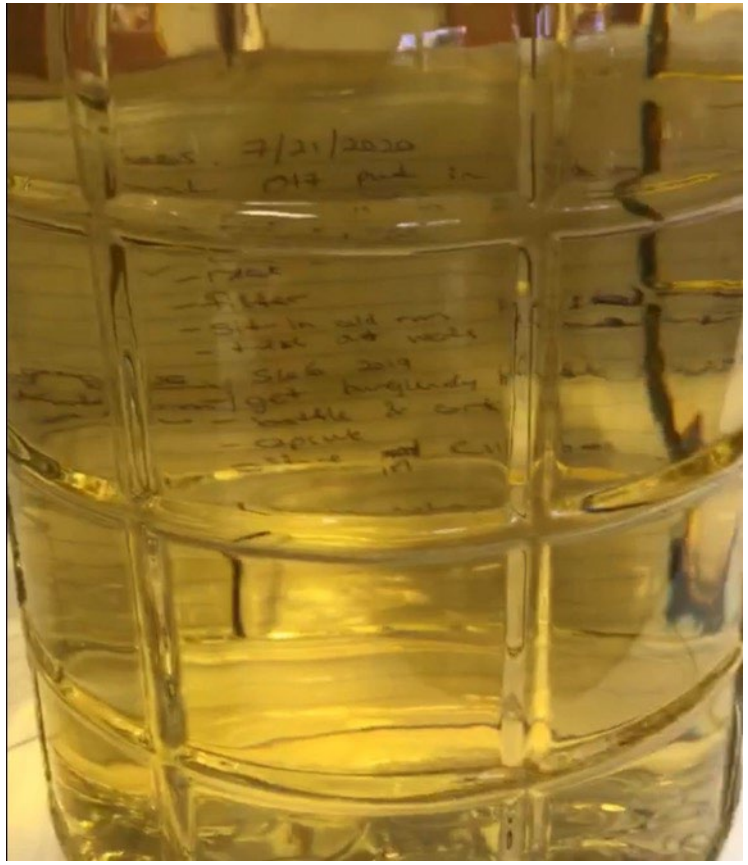
https://www.wineland.co.za/tips-for-cellar-workers-fining-of-juice-and-wine/

Cold Stabilization

- Potassium Tartrate may form from cold storage/shipping
- Wineries try to prevent using cold stabilization



Filtration



- Different pore sizes
- Removes any remaining solid compounds
- May remove yeast and bacterial cells
- Will cause some aeration so its better to let sit for a couple of days before bottling

Bottling

- Must ensure the wine is stable; no bubbles or haze.
- Different options for packaging:
- Bottles: glass or plastic
- Closures: traditional, compound, synthetic, screwcaps.
- Affects how much oxygen goes into the bottle.

Post-Test: True or False ?

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Questions??

Please contact me if you are interested or need assistance with winemaking, growing grapes, or our academic programs

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*Upcoming workshop!!!

February 12th-

Winter Vineyard and Winemaking BMP Workshop
FAMU Center for Viticulture and Small Fruit Research
9am - 12pm

Topics will include pruning, vineyard management, winemaking top 10 dos and don’ts, and pesticide applicator safety CEUs

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