

# Winemaking BMP: Pre-Fermentation Techniques for Improved Wine Quality

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# Presentation overview

1. Timing harvest
2. Withering
3. Processing
4. Press Fractions
5. Additives
6. Static Racking
7. Adjustments
8. Inoculation



# Timing Harvest

- Track Soluble Solids, Titratable Acidity & pH to determine best time to harvest by randomly sampling a minimum of 100 berries at a time.
- When ready, harvest early in the morning to keep the berries cool.
- If possible, allow to cool in refrigeration before processing.

INCREASE IN SOLUBLE SOLIDS DURING RIPENING



DECREASE IN ACIDITY DURING RIPENING



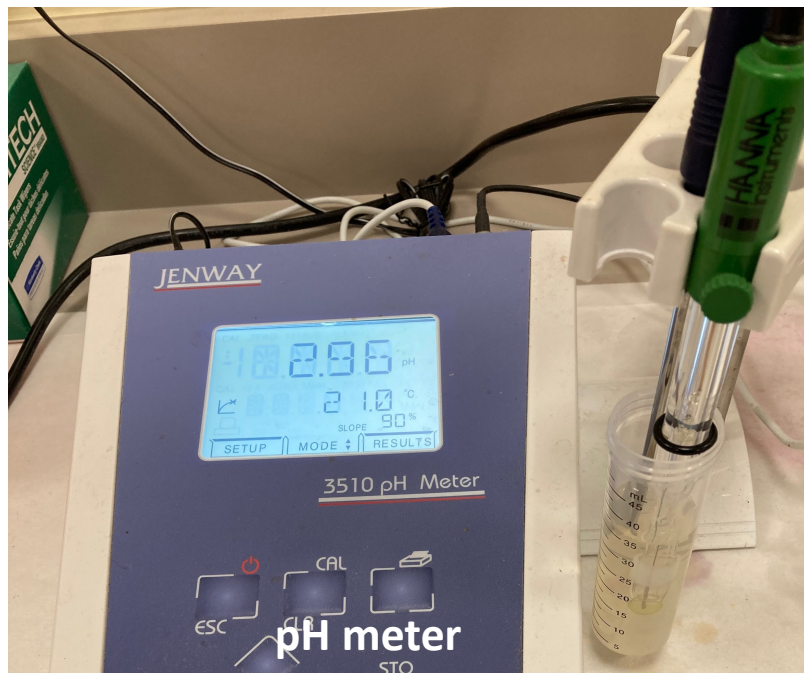
INCREASE IN PH DURING RIPENING



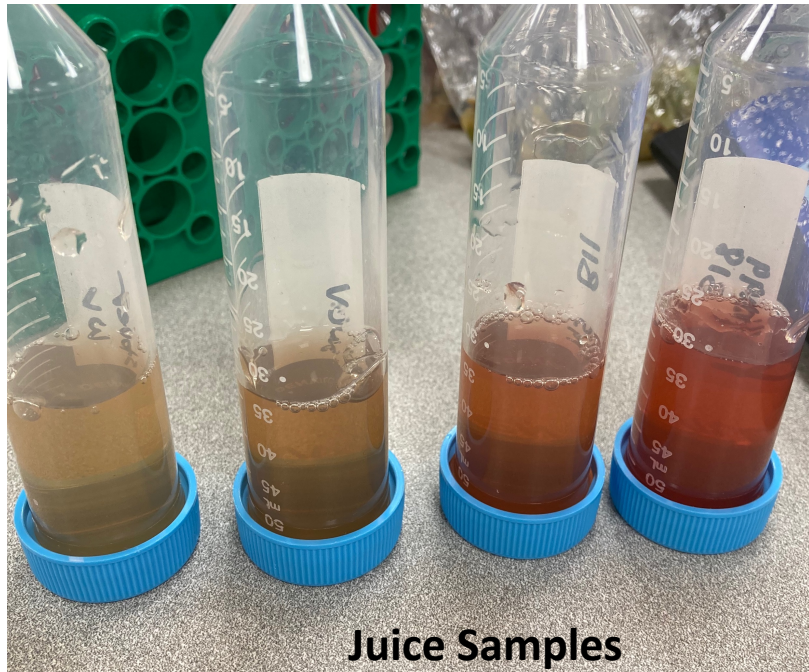




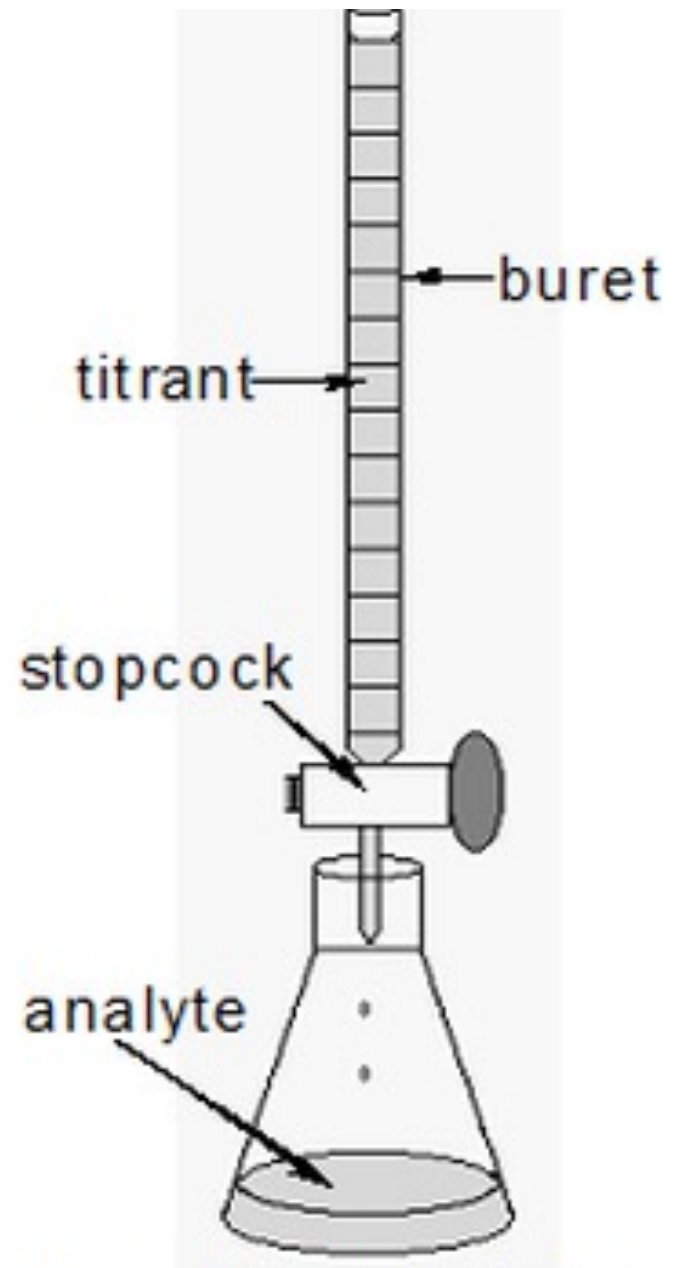
**Berry Samples**



**Refractometer**



**Juice Samples**

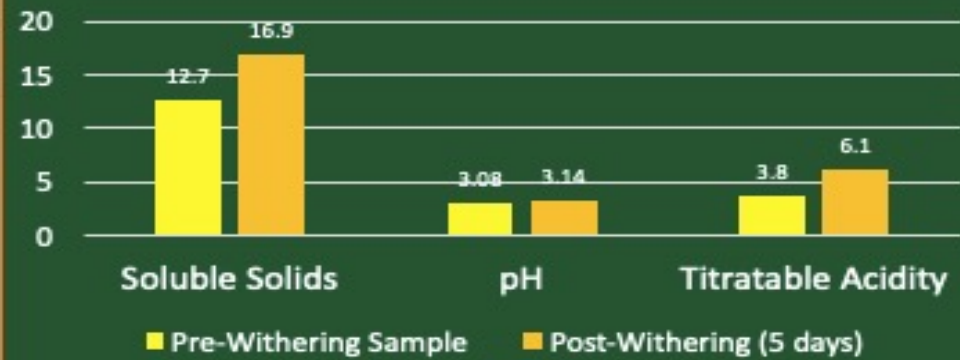


**Figure 1: Titration Setup**

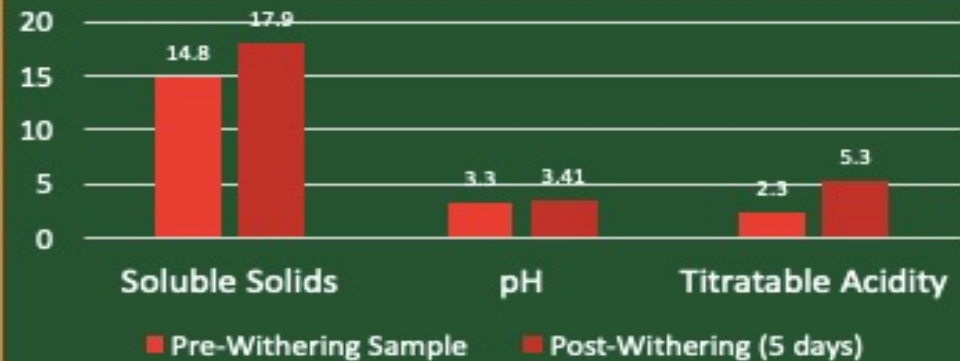


# Withering

Changes in Vinification Properties of Withering Carlos Berries



Changes in Vinification Properties of Withering Noble Berries





# Processing Considerations

During processing, winemakers want to reduce:

1. **Oxidation**- enzymatic (polyphenol oxidase) and non-enzymatic browning of phenolic compounds cause browning.
2. **microbial spoilage**- growth of spoilage bacteria and yeast can cause off-flavors.
3. **extraction of excessive tannins**- phenolic compounds from seeds and stems that increase astringency and sensation of dryness.

Different processing equipment and strategies can result in different quality juice/must based on soluble solids, acidity, pH, and phenolic content.



# Processing Equipment

## Crusher/Destemmer

- 1. Crusher/Destemmer-** Berries are first crushed by rollers then stems are separated from the berries. Most common for hobbyist and small wineries. Cheapest option.
- 2. Destemmer/Crusher-** Stems are separated from berries before being crushed by rollers. This results in less extraction of tannins from the stems. Most expensive option.
- 3. Destemmer-only-** Stems are separated from the berry violently which barely breaks the skins. Less extraction of tannins compared to Crusher/Destemmer. Moderately expensive.



# PROFESSIONAL DESTEMMER & DESTEMMER/CRUSHERS



**NEW!** Stainless Motorized Destemmer Only with Screw Feed & Must Pump



**NEW!** Jolly 40MV Destemmer/ Crusher With Speed Control



**NEW!** Jolly 60MV Destemmer/ Crusher With Speed Control  
*A commercial quality machine for the small winery on a budget*





# Processing Equipment

## Press types

Two main types of presses; Batch & Continuous

- 1. Batch presses** process one 'batch' at a time. One batch = one cycle. Batch presses include Basket, Membrane/Bladder, & Screw Presses. More time consuming but can produce different fractions of juice.
- 2. Continuous presses** continuously process without stopping. The continuous screw press is the most common continuous press used. More efficient for processing larger quantities but all fractions are mixed.

Remember: White winemaking= Press before fermentation

Red winemaking= Press after fermentation



**Pneumatic Membrane Press**



**Membrane Press / Hydro Press**

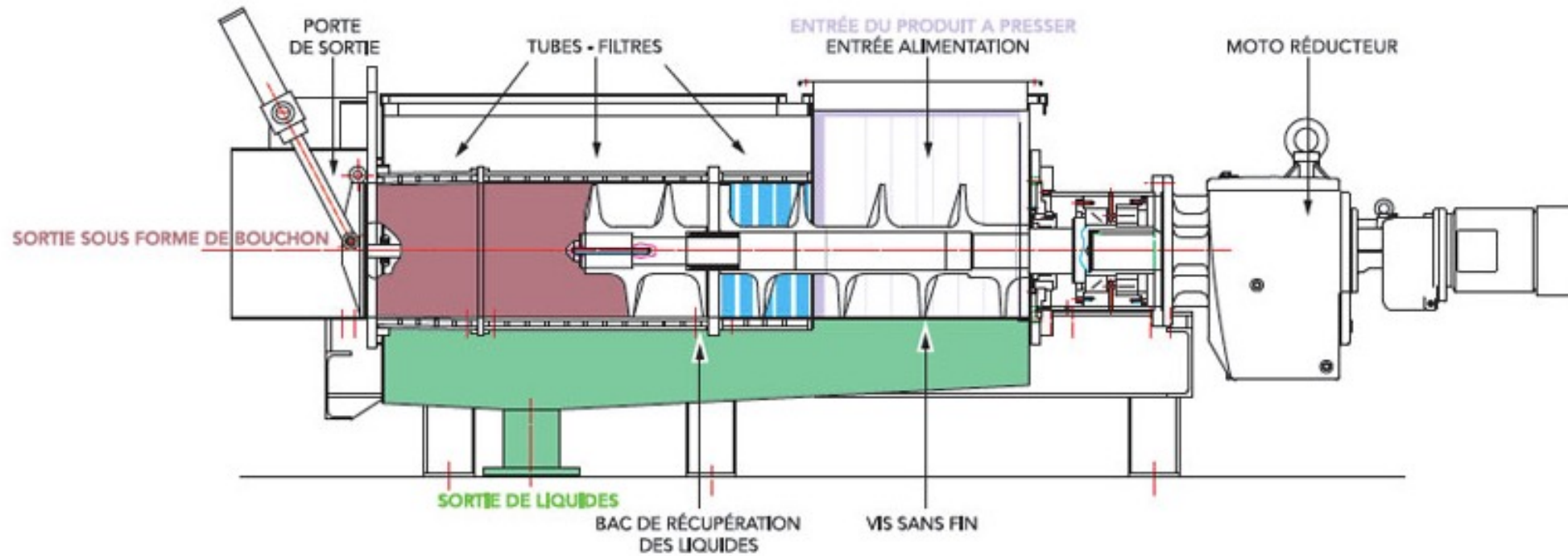


**Ratcheting Basket Press**



**Hydraulic Basket Press**





**Continuous Screw Press**

# Press Fractions

Depending on the style of press, different fractions of juice/must can be extracted from the berries based on pressure and time.

- **Free Run Juice-** highest quality juice for winemaking.
- **Pressing Fractions-** increasing phenolics (tannins and color) and decreased acidity and soluble solids with each press cycle.

Many winemakers choose to keep the free run juice separate for making premium quality wines and use the press fractions for lower quality wines or blending options to increase complexity or color.

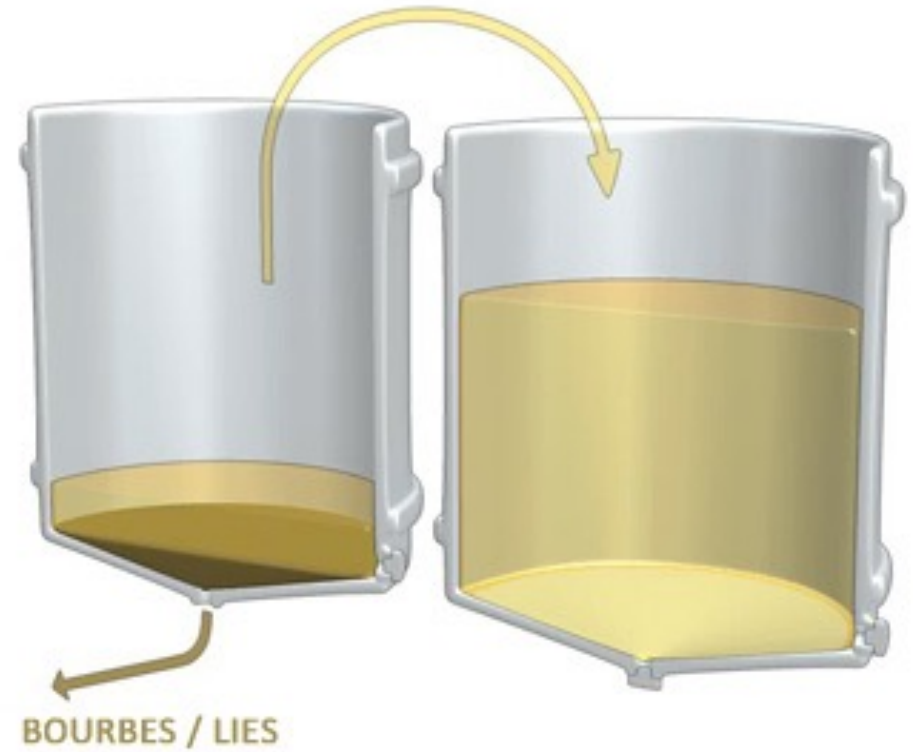


# Additives

- **Sulfur Dioxide (SO<sub>2</sub>)**- antimicrobial and antioxidant additive to reduce browning and discourage the growth of yeast and bacteria. Add approximately 40 ppm during processing and continue to add periodically based on analysis.
- **Fining Compounds**- Bentonite, PVPP, & Vegetal Proteins, can be used to fine the juice prior to fermentation.
- **Enological Tannins**- increase aging qualities, stabilize color, and contribute to mouthfeel.
- **Enzyme Treatments**- Pectolytic enzymes, lysozyme, B-glucanase

# Static Racking

- **Static Racking**- the process of clarifying by moving the layer of clear juice or wine from its sediments.
- The sediment also referred to as 'lees' can be made up of many things including proteins, bacteria, yeast, tartrates, or other suspended solids from crushing and pressing.





# Adjustments

- **Acidity-** Depending on desired style, the juice can be adjusted by blending or adding tartaric acid, malic acid, citric acid, or an “acid blend”. Calcium Carbonate can be added to decrease acidity, but it is not recommended.
- **Yeast Assimilable Nitrogen (YAN)-** Nitrogen is the most limiting nutrient for yeast growth. Can be adjusted by adding Diammonium Phosphate (DAP) or amino acids and peptides derived from autolyzed yeast cells.
- **Chaptalization-** Sugar content (soluble solids) determines the final alcohol content in the wine. Many cases the sugar content needs to be increased to result in the appropriate alcohol level.

# Inoculation

- **Yeast Rehydration and Inoculation-**

Dried winemaking yeast perform better when rehydrated according to the manufacture. Typically, it involves adding the dry yeast to warm water (~40C) with yeast nutrients. Don't mix it up and allow to acclimate to room temperature before adding to the juice/must.

- **Alcoholic Fermentation-**

Check the temperature and specific gravity of the fermentation regularly. Ideal temperature is 18 C. Once specific gravity is below 1.000 and stabilizes, fermentation is complete and can be racked. The clarifying process can now begin





## References

- Margalit, Y. (2003). *Winery Technology & Operations: A handbook for small wineries*. Wine Appreciation Guild.
- Zoecklein, B. W., Fugelsang, K. C., Gump, B. H., & Nury, F. S. (2010). *Wine Analysis and production*. Kluwer Academic.

# Questions?

