White Wine

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Wine making is an

Art

and a

Science

Successful Wine Making

Success is predicated upon:

- Having a plan and being prepared
- Obtaining the best fruit possible
- Have excellent sanitation procedures
- Understanding what’s going on, from the harvest to the bottle
- Following through
- Keeping records

Evolution of White Wine

Fermentation

Maturation

Aging

White Wine from Grapes

The fundamental differences between

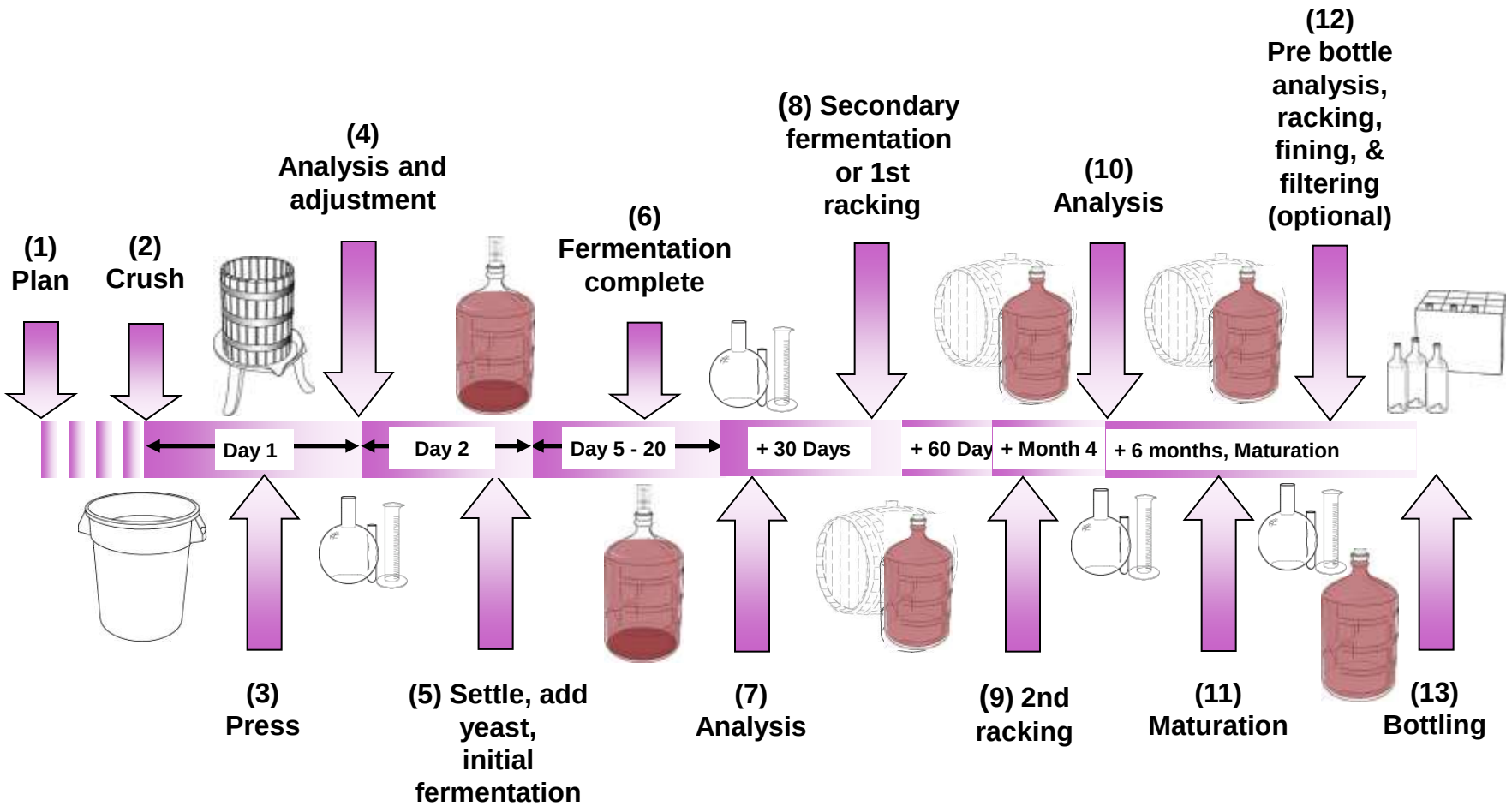
Red Wine & White Wine

? ?

White and Rosé Wine

- Made from white grape juice or red grape juice
- Grapes are crushed cool, pressed to release juice
- Skins, pulp are discarded
- Sulfite often added at crush and before bottling
- Some adjustment may be required
  - sugar reduction
  - acid addition
- Fermented cool (60° F or cooler) in carboy with air lock
- Often requires clarification or fining before bottling

White Winemaking Process Flow Time Line



White and Rosé Wine
General Thoughts

- Sulfite addition is necessary
- Yeast nutrients, are required
- Pectic enzymes increase yield, improve clarity
- The best quality fruit makes the best wine
- Fermentation is kept cool to preserve aromas
- Bacterial addition if desired to increase complexity
- Whites are sensitive to oxygen → loss of fruit qualities
- Good sanitation is absolutely critical
- Whites typically consumed earlier than reds
- Keep out of sunlight until consumed

White Wine Fermentation
Some Options to Consider

- Whole cluster pressing **vs** crushed, then pressed
- Enzymes **vs** no enzymes
- Skin contact **vs** no skin contact
- Clear juice **vs** some sediment retained
- Native **vs** cultured **vs** combined yeast
- ML fermentation **vs** partial **vs** no ML
  - ML timing: diacetyl **vs** no diacetyl
- Wood **vs** no wood contact
  - Barrel fermented new oak
  - Neutral oak
- Sur lee **vs** no sediment during maturation

Whole Cluster Pressing

- Skipping the crush and pressing after de-stemming
- Grapes need to be cool and clean
- Process retains more delicate flavors
- Reduces astringency and some malic acid
- Common in sparkling wine production
- Messy, slow, not very efficient
- Lower juice yield.
- Should be conducted in an anaerobic environment

Pectic Enzymes

- Breaks down the pectin molecule
- Increases yield, extraction, and difficulty in pressing
- Promotes clarity
- Deepens color when added to crushed grapes
- SO_2 can reduce effectiveness when added together
- Reduces foaming during fermentation
- High alcohol, cool ferment temps reduces effectiveness
- Excessive dose, high ferment temps increases methanol
- Denatured by bentonite in the wine. . . and with heat and time
- Enzyme treated wine produce more compact lees
- Enzyme treated wine matures faster

Pectic Enzymes -- Application

- Add enzymes before SO_2 addition
- Add to crushed grapes to increase yield, color, clarity
- Add to juice > clarity and extraction (+/-)
- Use only fresh enzymes
- Use as directed in correct dose for the volume
- Ferment cool, not cold

Skin Contact
(Maceration)

- Promotes more varietal characteristics.
- Frees up more bound aromatics and precursors
- Increases yield (with enzymes)
- Increases phenolic load: astringency, bitterness
- Increases color extraction (+ / -)
- Best examples produced from aromatic varietals
- Wine produced with skin contact may take more time to mature

Skin Contact -- Application (Maceration)

- Select varietals with known aromatics
  - Chenin Blanc, Gewürztraminer, Muscat, Riesling, Viognier, Sauvignon Blanc
- Use only ripe, cool, clean fruit
- Chill grapes under 60°F (< 50°F better) for the duration
- Use CO_2 to blanket crushed grapes during skin contact
- Consider using enzymes to enhance extraction
- Periodically taste of the juice to monitor extraction
- Add SO_2 only after pressing and settling
- Consider running control cuveé and contact cuveés
  - 1/3 no contact, 1/3 six hours contact, 1/3 twelve hours contact
- Anticipate less fining do to increased phenolics

Clear Juice or Sediment ?

- Settling the juice is necessary for clean wine
- Separates heavy particulates, +/- 24 hours
- Some sediment is beneficial
  - Nitrogen, helps prevent stuck fermentation
  - Flavor precursors
- Too much sediment/solids
  - Supports hot, fast fermentation
  - Stresses yeast
  - Increase sulfide production, off odors
- Juice should be kept cool to cold during settling

Native vs Cultured Yeast

- Beneficial, indigenous yeast can increase aromatics and complexity
- WA does not have a great history of indigenous/native yeast fermentation
- Efficient method for producing acetic acid and ethyl acetate
- Cultured yeast is safe, low sulfide approach
- Some commercial blends include wild strains

ML: Yes, No, Maybe?

- ML fermentation exchanges freshness for complexity
- Stabilizes the wine: Malic » Lactic acid
- Not a wise decision for high malic varietals
  - Riesling, Gewurztraminer
- ML can be prevented or stopped with enzymes
- ML fermentation produces diacetyl (buttery overtones)
  - Yeast metabolize diacetyl during fermentation
  - ML fermentation started after yeast fermentation retains diacetyl
- Typically conducted with barrel maturation
- Never add Sorbate and ML (2-ethoxyhexa-3,5-diene) 100ppt

ML Strategy

- Wine with an expression of fresh, bright acid, clean fruit
  - avoid ML, add sulfite, rack off of all sediment
- Wine with complexity, softer acid profile
  - introduce ML during fermentation
  - do not add sulfite until ML is complete
- Wine similar to above with buttery notes
  - introduce ML culture after 2nd racking, post fermentation
- Partial ML
  - Monitor ML activity with chromatography
  - add lysozyme to kill lacto bacillus
  - add sulfite

Nutrients

- Critical for predictable fermentation
- Too little nutrient
  - can stress yeast
  - > chance of stuck fermentation
  - > sulfide production
  - > residual sugar and spoilage
- Too much nutrient increases
  - Can increase fermentation temperature
  - Reduces aromatics
  - > risks of spoilage from residual nitrogen

Nutrients

- Use complex nutrient rather than DAP
- DAP encourages a rapid fermentation
- Best to know the YAN for the grapes.
  - Provides a balanced dose
- Add yeast in at least two dosages
  - Lag period – two days post yeast inoculation
  - Early fermentation, 4 days post inoculation
- Do not add yeast and nutrients simultaneously

Sur Lie and Bâtonnage

- Literally: “in the lees” and “stirring”
- Achieving a stylistic goal maturing wine on lees:
  - enhances structure, increases mouth-feel
  - adds extra body, viscosity
  - increases the aromatic complexity, length of finish
- Occasional stirring (2x/month) suspends lees
  - reduces potential reduction (lees absorb O_2)
  - releases yeast components
- Often conducted in concert with ML fermentation
- Proceeds for 6 to 8 months depending on barrel size
- Limited number of grape varietals benefit

Sur Lie and Bâtonnage

When yeast decay they contribute/liberate

- polysaccharides which produce a roundness, volume, to the palate
- nutrients that can assist the growth of malolactic bacteria
- esters resulting in combined sweet/spicy/fruit aromas
- organic acids that can enhance flavors and complex aromas
- a sweetness when binding with wood phenols
- components that can assist in natural fining
- organic compounds that soften the impact of oak tannins

Sur Lie and Bâtonnage

- Requires separating fine lees from gross lees to be successful
- Stirring tends to enhance the characteristics of sur lie ageing
  - diminishes fruitiness
  - slightly reduces wood/oak influence
- Typical schedule:
  - once/ week for a month
  - then every 2 week for 2 months
  - then one a month for up tp 6 months
- Yeast autolysis (decay) without stirring can create yeasty aromas
- The process is prone to sulfides from reduction

Strategies to Control Oxidation

- Use inert gas to blanket wine making processes
  - When racking juice
  - When racking wine to remove sediment post fermentation
  - When racking to blend or to bottle
- Use inert gas CO_2, dry ice, nitrogen, argon when racking
- Avoid too much sediment, results in reduction,
- Avoid over dosing with SO_2
- Avoid lengthy barrel maturation > acetaldehyde

Clarification, Fining, Filtration

- Stabilizing
  - no residual sugar, malic acid, nutrients
  - protein haze
  - bi-Tartrate precipitation
- Fining (reduce protein haze)
  - reduces or removes protein
  - Usually employs a – charged fining agent
  - proteins cannot be filtered out
- Filtering
  - removes suspended particulates
  - removes some flavors, aroma and mouth-feel
  - introduces oxygen

When to Bottle

- In glass, when the wine is stable
  - No residual sugar,
  - No residual nutrients,
  - No malic acid without a means to control
- Long term storage in carboys is a recipe for disaster
- Maturation in a barrel, depends on
  - Size: activity is inversely proportional to size
  - Stave grain: tighter grain = more O_2 exchange
  - Age: new oak imparts more extracts
  - Stylistic goals

Questions ?