Winemaking Analysis

Why and What to Test

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Today’s Presentation!

- **Who We are and What We Do**
- **Why Analyze**
- **When to Analysis**

Home Wine Lab

- We are a local laboratory specializing in routine wine analysis at reasonable prices.

We offer the following:

- Free Advice
- Next Day Results
- Courier Service
- Drop Off Locations:
  (Old Possum Brewery/ Shone Farm / Sonoma Mission Gardens)
- Society Discount (10%)

www.homewinelab.com **(707) 978-4109** **info@homewinelab.com**

How we check your wine?

We use traditional analytical methods for checking your wine.

Aeration-Oxidation-Distillation Apparatus

Automated Spectrometer

Cash Still

Instrument	Analysis
Digital Density Meter	Brix
Benchtop pH Meter	pH
Autotitrator	Titratable Acidity
Automated Spectrometer	Residual Sugar, L-Malic Acid, Yeast Assimilable Nitrogen
Electric Ebulliometer	Alcohol (Ethanol)
Aeration-Oxidation Apparatus	Free and Total Sulfur Dioxide
Cash Still	Volatile Acidity

Why is Analysis Important?

Best tools you have for winemaking are your senses.

Analysis is the best way to confirm your senses are correct!

Reduce Risk of Spoilage: Preventing Unwanted Characteristics

Hydrogen Sulfide (H2S) is the Rotten Egg Odor

Over Sulfuring

Brettanomyces: Band-Aid, Barnyard, Sweaty Saddle

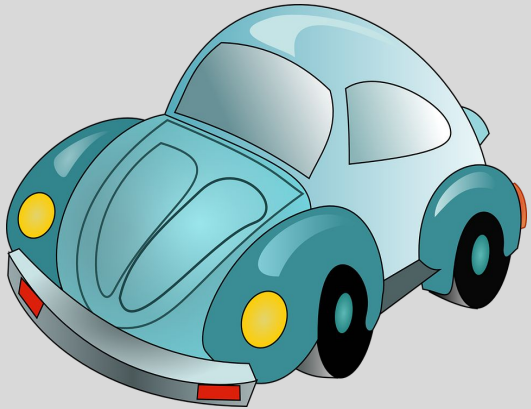
Oxidation

Volatile Acidity (VA): Vinegar or Nail Polish

Providing Numbers for Reproducibility

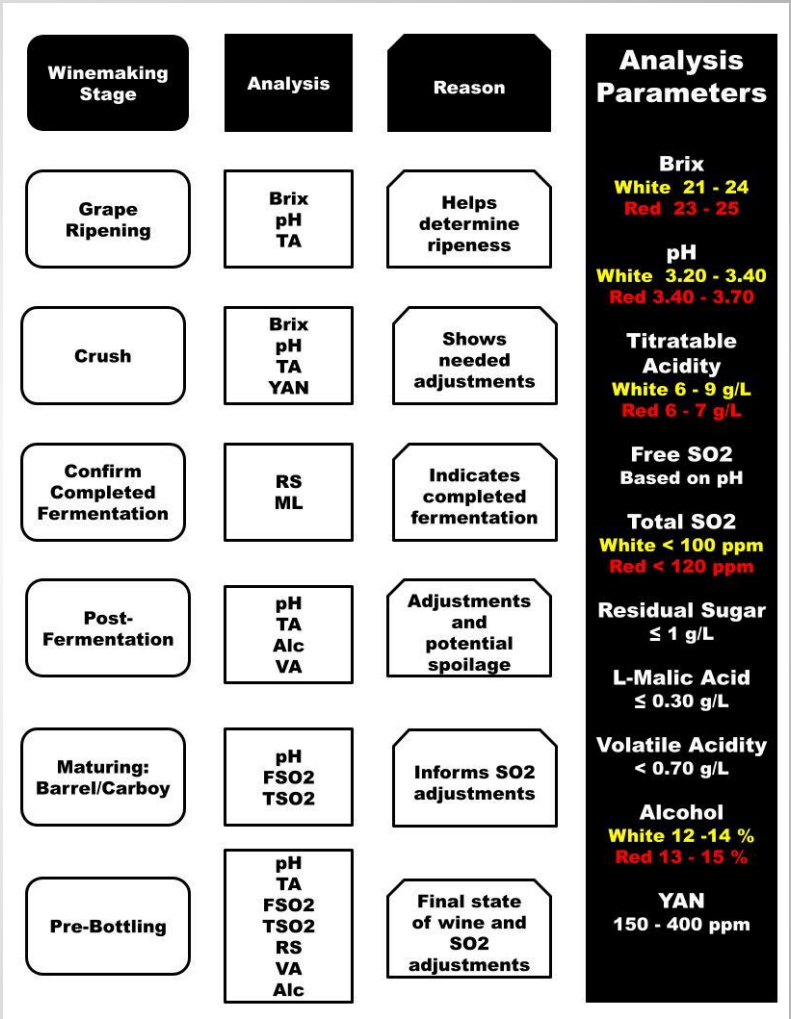
- It’s not hard to make wine, but to make wine that you enjoy can be difficult.

- Having knowledge about the chemical makeup of your wine can help you achieve the style you want.

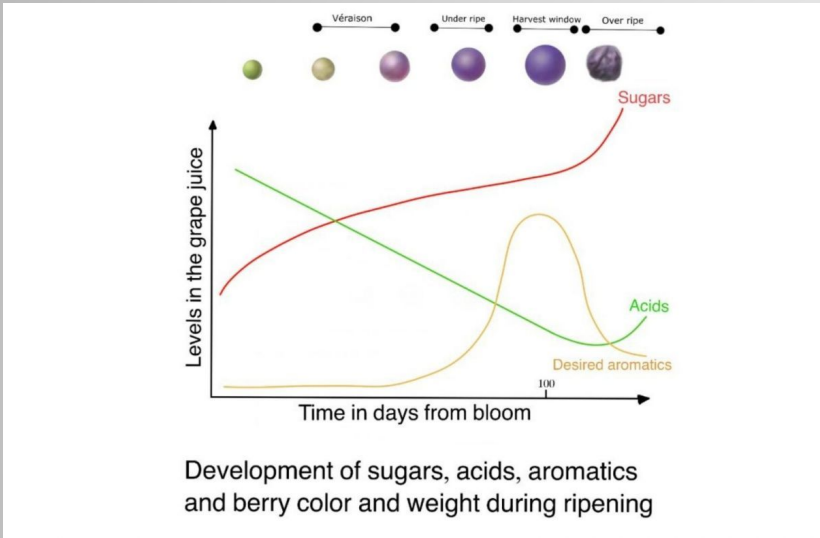


Wine Analysis Chart

- Major Winemaking Stages in Chronological Order
- Recommend Analysis for Each Stage
- Reason for Analysis
- Recommend Parameters for Each Type of Analysis



Grape Ripening



Development of sugars, acids, aromatics and berry color and weight during ripening

Visual Inspection:
Color Change (Veraison), Skin Soften, Seeds Turn Green to Brown

Chemical:
Brix = Increasing; TA = Decreasing;
pH = Increasing

Winemaking Stage	Analysis	Reason
Grape Ripening	Brix pH TA	Helps determine ripeness
Crush	Brix pH TA YAN	Shows needed adjustments
Confirm Completed Fermentation	RS ML	Indicates completed fermentation
Post-Fermentation	pH TA Alc VA	Adjustments and potential spoilage
Maturing: Barrel/Carboy	pH FSO2 TSO2	Informs SO2 adjustments
Pre-Bottling	pH TA FSO2 TSO2 RS VA Alc	Final state of wine and SO2 adjustments

Analysis Parameters

Brix
White 21 - 24
Red 23 - 25

pH
White 3.20 - 3.40
Red 3.40 - 3.70

Titratable Acidity
White 6 - 9 g/L
Red 6 - 7 g/L

Free SO2
Based on pH

Total SO2
White < 100 ppm
Red < 120 ppm

Residual Sugar
≤ 1 g/L

L-Malic Acid
≤ 0.30 g/L

Volatile Acidity
< 0.70 g/L

Alcohol
White 12 -14 %
Red 13 - 15 %

YAN
150 - 400 ppm

Crush

Visual:
Clean (No Bunch Rot, Skin Breakage, Raisining)

Chemical:
Homogenous Sample (Brix, pH, TA)
Nutrient Level (YAN = Amino Nitrogen & Ammonia)

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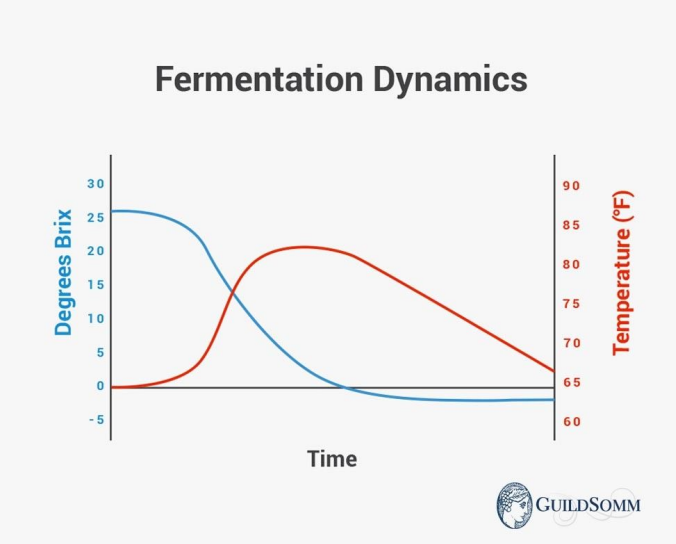
YAN

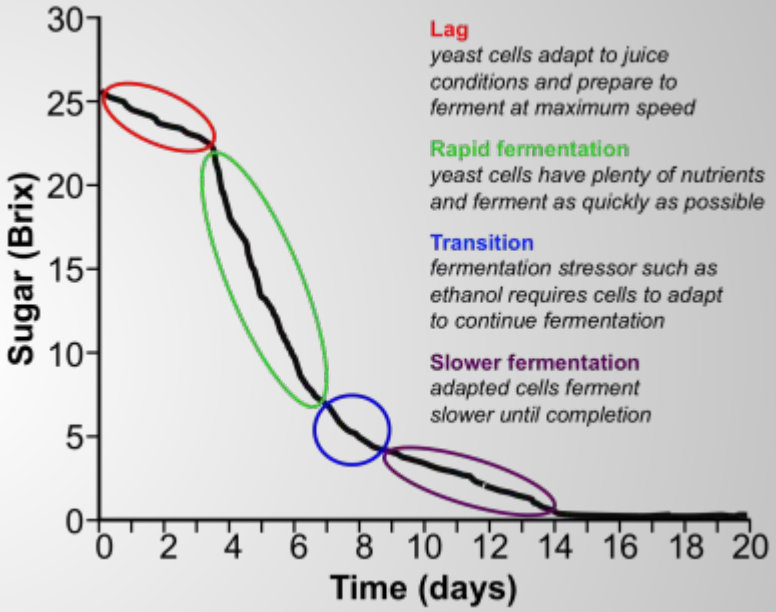
°Brix of must or juice	Target YAN concentration (mg/L)
21	200
23	250
25	300
27	350

Lack of Nitrogen:
Sluggish Fermentation, Off-Odors (H_2S), Stuck Fermentation

Too Much Nitrogen:
Production of Acetate Ester (Nail Polish Aroma), Leftover Food for Bacteria

Fermentation





Visual Inspection:
CO_2 Production (Rise in Cap) (Bubbles)

*** Add Nutrients Between 18 to 13° Brix**

Chemical:
Brix = Decreasing; Temperature = Increasing (not above 90 F)

Confirm Completed Fermentation

Visual Inspection:
Cap Dropping (Sinking Skins)

Chemical:
Brix Stop Moving (Same for 2-3 days in a row)
Temperature = Decreases

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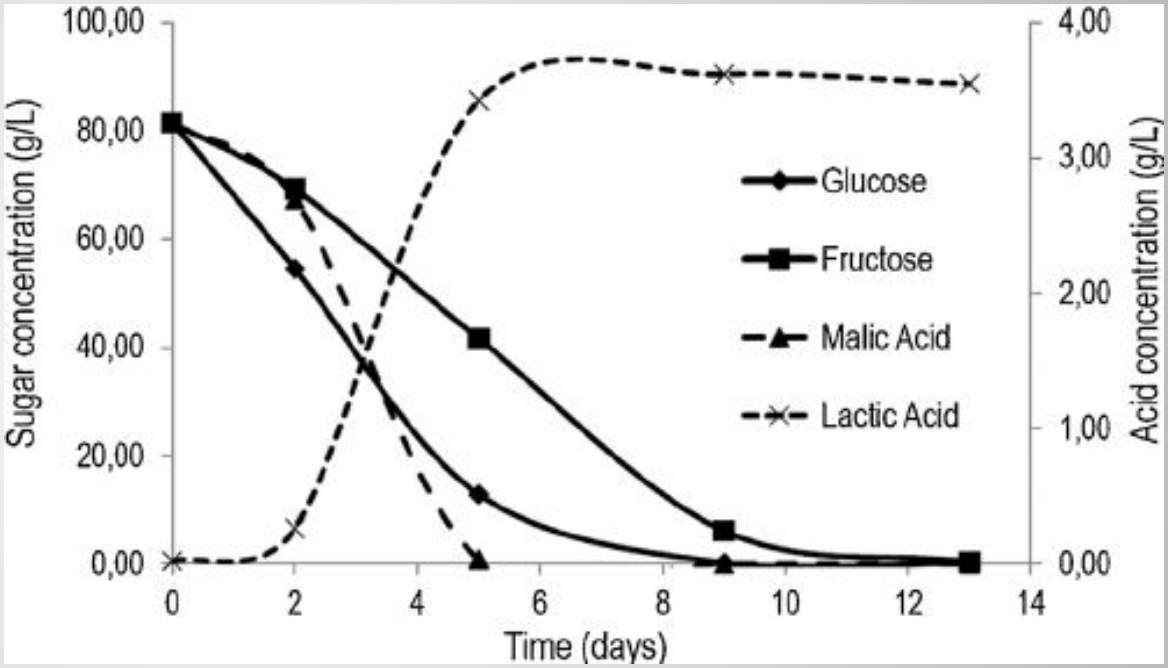
Primary & Secondary Fermentations

Primary Fermentation = Glucose/ Fructose

Secondary Fermentation = Malic Acid

Ensure both fermenations reach safe concentration levels to prevent future problems.



Chemical:
Residual Sugar (G+F) = at or below 1 g/L
L-Malic Acid = at or below 0.30 g/L

Post-Fermentation

Visual Inspection:
Taste Like Wine (Not Sweet, Too Tart, Vinegar Aroma)
Chemical:
pH and TA = Stability/ Preference; VA = Spoilage;
Alcohol = Matches Intention (Benchmark)

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Maturing: Barrel/ Carboy

Prevent spoilage by monitoring and maintaining effective SO2 levels

Chemical:
Free & Total SO2 = Maintaining Effective Levels
pH = Determines Target Free SO2 Level

* Volatile Acidity = Monitor Occasionally

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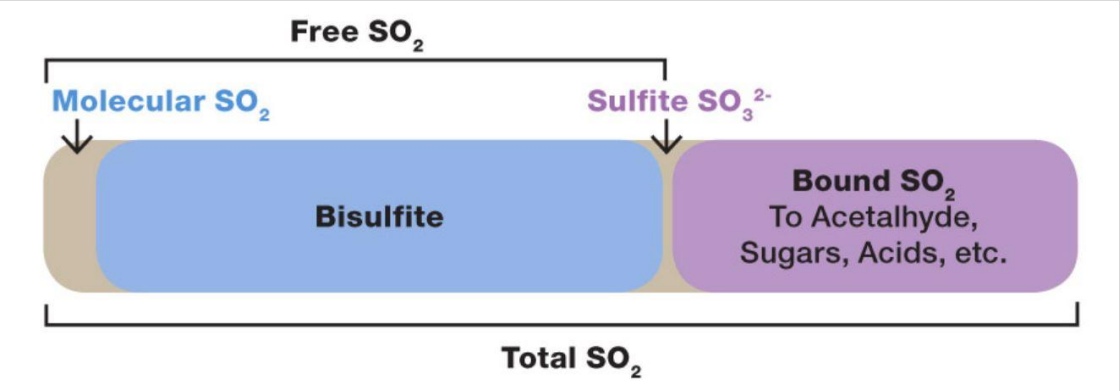
How Does SO2 Work?

Free SO2:

- Active form that contributes to wine's stability



Bound SO2:

- Inactive form that doesn't have any antioxidant or antimicrobial activity

Total SO2:

- Free and Bound SO2 added together

SO2 Chart

Free SO2 = Active Part of SO2

pH = Affects equilibrium of cells; lower pH means higher percentage of molecular SO2 effectiveness

Molecular SO2 = Only part that is antimicrobial; small part of Free SO2

***Sensory Effects: Too Much!!!**

- **Chemical Taste (> 100 ppm Total)**
- **Burnt Matchstick Smell**
    - **> 0.8 to 1 ppm molecular SO2**

pH	White Wine 0.8 ppm molecular SO_2	Red Wine 0.5 ppm molecular SO_2
3	13	8
3.05	15	9
3.1	16	10
3.15	19	12
3.2	21	13
3.25	23	15
3.3	26	16
3.35	29	18
3.4	32	20
3.45	37	23
3.5	40	25
3.55	46	29
3.6	50	31
3.65	57	36
3.7	63	39
3.75	72	45
3.8	79	49
3.85	91	57
3.9	99	62

▲ **FIGURE a** Amount of "free SO_2" Required to Obtain the Correct Amount of Molecular SO_2 Concentration as a Function of pH in White and Red Wine.

Pre-Bottling

Last chance to change anything!

Reproducibility: reference point for future vintages

Final SO2 Adjustment: Add 5 ppm Extra

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Thank You!

10% Discount on All Analysis for Winemaking Societies