THE BEGINNER'S GUIDE TO MAKING WINE FROM JUICE AND GRAPES

BY THE SAME AUTHOR

Modern Home Winemaking
A Guide to Making Consistently Great Wines

Techniques in Home Winemaking
The Comprehensive Guide to Making Château-Style Wines

Kit Winemaking
The Illustrated Beginner's Guide to Making Wine from Concentrate

Wine Myths, Facts & Snobberies
81 Questions & Answers on the Science and Enjoyment of Wine

THE BEGINNER'S GUIDE TO MAKING WINE FROM JUICE AND GRAPES

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Additives, processing aids, reagents and other products and chemicals referenced in this book have applications in winemaking, wine analysis, and sanitization. With care and caution, these can be safely used in home winemaking although some may be unsafe or may pose a health hazard if not used in the recommended concentrations or if used by unskilled winemakers.

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References to winemaking supplies from various manufacturers or vendors are included to illustrate typical use of these supplies from companies whose products are the most prevalent in the home winemaking market. The use of these references and all trademarks and copyrighted material from cited manufacturers, suppliers, wholesalers, retailers, distributors or other constitute neither sponsorship nor affiliation of these companies with the author, editors and publisher, or with this book. Companies have not paid any promotional fees to have their names and/or products listed here.

Contents

Foreword

I first started making wine in 1963 when I found Grandma's recipe for dandelion wine. I went to the hardware store, bought my first hydrometer, and set out excitedly to make my first batch of wine! It turned out cloudy and harsh, but as soon as fermentation was done my friends and I drank every drop and loved it. As I look back it was a proud moment!

Home winemaking knowledge was very limited six decades ago. No internet, no home computers, no social media to reach out to other amateur winemakers. I wasn't even able to find a book on the subject in the library, though a few did exist.

Hobby winemakers today have access to a wealth of information, all at our fingertips. But it was through several mentors, including Daniel Pambianchi, that my knowledge and enthusiasm has grown, along with the quality of my wines, which have become some of my best ever! Daniel's mentorship in our social media groups and his extensive writings have helped home winemakers make far better wines. He explains the science behind the craft. We can better understand and appreciate the reasons for using wine additives and processing equipment, and making better, more informed decisions.

When I read reviews on Daniel's first book, *Techniques in Home Winemaking*, I bought a copy and read every word! It is very well-written and understandable, but I had to read it more than once. There's so much great and valuable information in it and it is one of my go-to reference books for winemaking!

Daniel has since published *Modern Home Winemaking*, a comprehensive guide for seasoned and advanced winemakers. Those who desire to delve into the technical aspects and learn modern techniques will be thrilled to have this guide.

The Beginner's Guide to Making Wine from Juice and Grapes—Daniel's new book—makes it easy for beginners to venture into making their first and following batches of wine. Daniel introduces all aspects of home winemaking, including the use of additives and processing equipment, basic wine analysis to monitor and ensure quality, along with detailed instructions for making white, rosé and red wines from juice and grapes. I sure wish I had this book 60 years ago! I know you will enjoy Daniel's new book!

Wade Clark
March 2024

Wade Clark is a respected authority on all aspects of home winemaking. He has been a significant contributor to the very successful internet-based group, WinePress.US, as well as helping the popular Home Made Wine Making Facebook group grow to over 54,000 members. He lives in Port Barre, Louisiana.

Icons Used in This Book

Throughout this guide, you will find notes, warnings, tips, and other important information highlighted with the following icons to draw specific attention to important points.

A short explanation or additional information that you may find useful.

A warning which, if not observed, can result in unexpected or undesirable outcomes or become a health hazard.

A useful practical tip that can improve efficiency or simplify a certain procedure.

Specific advice or instructions for performing a procedure to avoid potential problems.

Glossary

The winemaking vocabulary is quite expansive, and many terms are used interchangeably, often incorrectly, or are used differently by winemakers. Here you will find short definitions of many key words used in this book, as used by home winemakers. The terms are defined in greater detail in relevant chapters.

Wine is usually defined broadly as a fermented beverage from any raw material, such as grapes, fruit, vegetables and flowers, which contains primarily sugar but also starch. In this book, "wine" refers to fermented beverages made from grapes or grape derivatives, that is, fresh juice, sterile juice that has been processed to be shelf-stable, and concentrate.

Words in italics within definitions refer to terms defined elsewhere in this glossary.

A

Acetaldehyde: A volatile substance formed in small amounts by *yeast* metabolism during *alcoholic fermentation*. It is also formed by *oxidation* of *ethanol* and where it can impart a strong bruised-apple smell, a clear sign of advanced oxidative spoilage.

Acetic acid: A volatile acid with a distinct vinegar smell. It is the major acid in *volatile acidity (VA)*.

Acetobacter: Acetic acid bacteria responsible for *acetic acid* and *volatile acidity (VA)* in wine that has been overly exposed to oxygen.

Acidification: The process of adding one or more acids to increase the *acidity* of *must* or wine.

Acidity: The general term used to describe the tart, sour taste from the combined effects of all acids in wine. It also refers to *total acidity (TA)*, which is measured by simple laboratory analysis.

Additive: A substance, such as a *fining* agent or *sulfur dioxide (SO_2)*, added to *must* or wine, which remains in the wine. Compare to *processing aid*.

Aging: Bulk aging refers to the time spent by wine in carboys from the end of the *alcoholic fermentation* to bottling. Bottle aging refers to the time spent by wine in bottles until consumed. Aging potential is an estimate of how long a wine can be expected to age before its quality starts declining.

Airlock: A device used on a *carboy* to allow *carbon dioxide (CO_2)* gas to escape during fermentation and aging while keeping air (oxygen), dust and other elements out.

Alcoholic fermentation: The conversion of fermentable sugars—glucose and fructose—into alcohol (*ethanol*) and *carbon dioxide (CO_2)* gas by *yeast*.

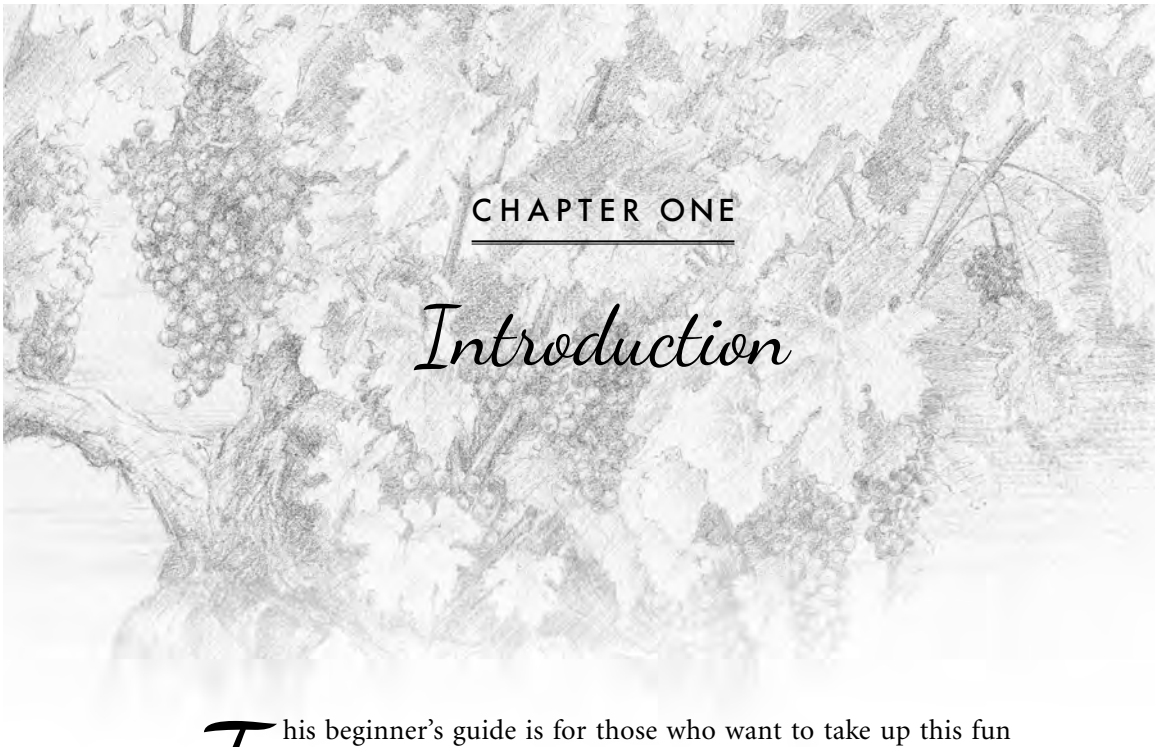
Amelioration: The practice of adding water to *must* for the purpose of lowering the initial sugar level or acidity, i.e., *Specific Gravity (SG)* or *total acidity (TA)*, respectively.

Anthocyanins: The color pigment molecules, belonging to the broad class of compounds known as *polyphenols*, found in red grape skins and the pulp of certain varieties—called *teinturiers*—that give red and rosé wines their color.

Aromas: A term used here to describe all positive odors that can be smelled in wine, i.e., aromas from grapes, from *yeast* metabolism, and from *aging*.

Astringency: A tactile sensation of dryness and roughness on the palate caused by wine *tannins* binding with saliva proteins when we taste and drink red wine. Compare to *bitterness*.

Autolysis: The breakdown of dead *yeast* cells, or *lees*, as *alcoholic fermentation* nears completion.



CHAPTER ONE

Introduction

This beginner's guide is for those who want to take up this fun hobby and start making wine at home from juice or grapes—great wine that you can proudly call your own.

This guide teaches you the fundamentals of winemaking and walks you through the process in very practical terms, from processing grapes to fermenting juice and readying wine for bottling. It's not a recipe book. But there are specific chapters with step-by-step instructions for making white, rosé, and red wine from juice or grapes, including a comprehensive troubleshooting guide for when something does not go quite as expected or when you run into a problem.

You'll need to learn only some basic wine science: that is, what are specific gravity, acidity, and pH and how to measure these not only for making great wine but for doing so consistently. Sulfur dioxide (SO_2), too, is important, albeit a more advanced subject. You won't need to understand the science of SO_2 here, but you'll still find specific instructions on how and when to add sulfite, if you so choose, to protect your wine from spoilage.

As you gain experience and confidence and want to explore more advanced winemaking, wine analysis, and troubleshooting techniques, and perhaps learn some of the wine chemistry behind it all, you can consult my book *Modern Home Winemaking: A Guide to Making Consistently Great Wines* (Véhicule Press, 2021). You'll also find additional information and

downloadable tools on my website, ModernHomeWinemaking.com, to help you with various winemaking calculations.

ABOUT BATCH SIZES

There are two standard batch sizes in home winemaking: a 5-gallon (19-liter) carboy and a 6-gallon (23-liter) carboy. The former is more common, and therefore, all instructions and additives presented here are for making 5-gal (19-L) batches. Since you'll need to ferment in a larger carboy and you'll also "lose" some wine during various operations that require you to top up a carboy, you'll need to start with a 6-gal (23-L) carboy to finish with 5 gal (19 L) of wine in a 5-gal carboy … and perhaps a touch more. You'll find in Chapter SIX (pp. 102–103) a description of how to manage these volumes. You can easily scale up these volumes and instructions as you grow your hobby.

THE PASSION OF HOME WINEMAKING

I remember, when I was a very young kid, how my Italian parents, who had lived through the Second World War, would make their own prosciutto, *lonza* and other *salumi* (cured meat), *salsiccia* (Italian sausage), and fresh, handmade pasta and would grow their own vegetables in their small backyard garden. And, of course, my dad made his own wine. They had learned and grown up to be self-sufficient, to do as much as possible themselves.

Of these traditions, winemaking is the main one I have carried forward since my childhood. I was always fascinated by the process of crushing grapes. Come fall, I would get all excited when my dad would go to the local market and bring back a truckload of Alicante. It was almost always Alicante Bouschet. I would insist on working the crusher—the manual kind, of course—and lament the blisters the next morning. There was something special and magical about the whole process, because I didn't understand how grapes transformed into this mysterious beverage called wine. My dad would simply say, "*Lascialo bollire*," just "let it boil," his generation's layman's way of saying, "Let it ferment." And he added nothing, "*ma no*," no additives or preservatives. Fermentation would last seven days

CHAPTER TWO

What Equipment Do I Need?

As you begin your journey into making wine, you'll need some basic equipment, and that may be all if you'll be making a single batch at a time from juice. If you want to make wine from grapes, then you'll need to invest in the equipment to crush and press grapes. Once you decide to scale up your production, consider upgrading with tools that will greatly simplify your winemaking.

THE ESSENTIALS

To make a standard batch of wine using juice or concentrate from a kit, you really only need some very basic, inexpensive equipment. Home winemaking supply shops sell a basic starter kit (Figure 2.1) that may include the following:

- **7.9-gal (30-L) food-grade pail** and **lid** for fermenting juice with or without grape solids. This is commonly referred to as a *primary fermentor* in home winemaking. The pail should be of food-grade HDPE (plastic code 02).
- **6-gal (23-L) carboy** (also known as *demijohn*) as a primary fermentor and **5-gal (19-L) carboy** as a *secondary fermentor* for completing fermentation and for storing and aging wine. Carboys can be of glass or PET (plastic code 01).

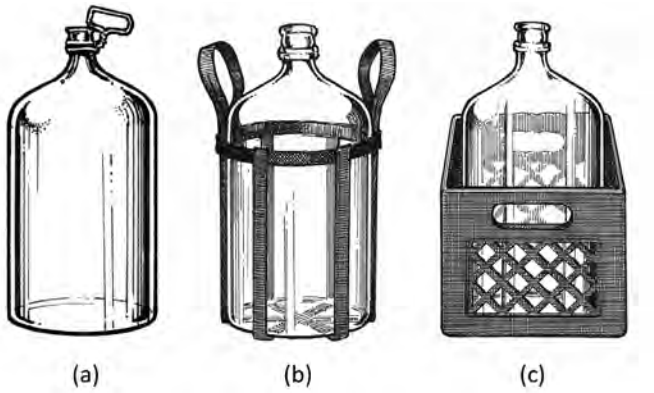


Figure 2.2: a) Carboy handle; b) carboy carrier strap; and c) carboy in milk crate

duced from the fermentation, and to monitor fermentation progress. Triple-scale means that the hydrometer measures the amount of sugar using three scales: Specific Gravity (SG), °Brix units, and Potential Alcohol (PA). These measurements are described in Chapter FIVE.

Buy an extra hydrometer for backup; sooner or later, you'll likely break one, and you don't want to be caught actively fermenting without measuring sugar consumption progress. Alternatively, look for one made of rugged plastic, such as the Herculometer, which won't break as glass hydrometers do.

- **Airlock** and **no. 7 bung** (stopper). An airlock is a one-way valve that allows gas generated during fermentation to escape out of the carboy and which also protects wine from impurities in the surrounding air. The most common types are the S-type and 3-piece wet airlocks (Figure 2.3) with a no. 7 rubber or silicone bung. Airlocks are filled with a sulfite solution or even vodka to form a barrier between wine and the external environment.

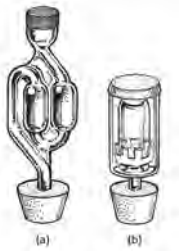


Figure 2.3: a) S-type wet airlock; b) 3-piece wet airlock

- ⅜-inch **racking cane** with an **anti-dregs tip** plus a **siphon hose** with a **flow-control clamp** (Figure 2.1) for racking wine from one fermentor to another. The anti-dregs tip avoids sucking up sediment during racking when done carefully.

CHAPTER THREE

Cleaning and Sanitizing Equipment

Repeated cleaning and sanitizing can seem like daunting tasks, but these are absolutely necessary and must be performed diligently and rigorously. Inadequately cleaned or sanitized equipment can affect quality or cause outright spoilage of juice or wine. Everything—carboys, racking cane, stirring spoon, hoses, pump, anything that will come into contact with juice or wine—must be thoroughly cleaned and properly sanitized to avoid contamination and possible spoilage. These are two separate, non-interchangeable steps—both are needed.

CLEANING

Cleaning involves removing contaminants or residues, like grape fragments, dried juice, soil and dust from the surface of equipment and from every nook and cranny in preparation for sanitizing. This is done by applying mechanical or physical force, such as water pressure or using a scrubbing device, and a suitable cleaning agent and lukewarm water, possibly hot water to deal with stubborn residues.

The most common cleaning agents for winemaking applications, and particularly for removing stubborn red wine stains, are sodium carbonate and sodium percarbonate (the stuff found in many household cleaners and laundry detergents), or commercial products that contain either and which you'll find at your local home winemaking supply store, such as:

CHAPTER FOUR

Additives, Additives, Additives! Why So Many Additives?

There are many, many additives and processing aids which can be used in modern winemaking to improve efficiency or speed up certain tasks, deal with specific problems, and improve wine quality. (Refer to the GLOSSARY or the section CAN I MAKE NATURAL WINES—WITHOUT ANY ADDITIVES OR PRESERVATIVES? in Chapter ONE for definitions of the terms "additives" and "processing aids" and why the distinction.)

This chapter lists the most common additives and processing aids, categorized by their main winemaking use, which you'll find at your local home winemaking supply store. Short descriptions will help familiarize yourself with their intended application, so that you can decide if these are appropriate for your use, for example, if you're vegan and wanting to avoid animal-derived additives; you'll find more details on these additives in relevant chapters.

Be sure to read product instructions and additional information in this guide on how to introduce these additives into wine; some may need to be dissolved in water or rehydrated before use to allow swelling, while other additives that dissolve well can be stirred directly into wine. We'll keep it very simple in this guide; all recommended amounts to be added are given in teaspoon (tsp), tablespoon (tbsp) and cup measurements for treating a standard-size carboy.

As for water, if your municipal water is good, good enough to drink unfiltered, and not hard, i.e., it does not have a high mineral content, then

CHAPTER FIVE

Basic Wine Analysis and Adjustments

You can make great wines, consistently, with only a basic knowledge of wine chemistry and minimal wine analysis. You can avoid problems by doing some simple, routine checks of fermentation progress and acidity. It's always easier to monitor wine and make adjustments, when needed, as opposed to running into problems and dealing with flawed or even spoiled wine.

This chapter deals with the three most important aspects of managing quality in your winemaking: specific gravity, acidity and sulfur dioxide. It describes how to measure sugar levels in juice, how to make adjustments to get to a desired alcohol level, how to monitor fermentation progress and confirm completion, and how to evaluate and adjust acidity and pH for better-balanced wine.

Sulfur dioxide (SO_2) is a more advanced topic and requires equally advanced techniques and equipment, but this guide provides practical advice to help you manage sulfites without the burden of getting into the technical analysis. Once you become more comfortable with this topic and you're ready to tackle the science of it all, you can read about SO_2 chemistry in *Modern Home Winemaking*.

This chapter is the most challenging, and you'll likely have to return to it occasionally. That's okay as concepts will become clearer once you start making wine and measuring the various parameters.

CHAPTER SIX

Fermentation—Transforming Grapes into Wine

Alcoholic fermentation is the transformation of fermentable sugars—glucose and fructose—by yeast into ethanol (ethyl alcohol) and vast amounts of carbon dioxide (CO_2) gas as the main products. Fermentation also produces a myriad of substances that give wine a multitude of aromas and flavors.

You can certainly try making natural wine, and hope that indigenous yeasts kick in and do a good job of completely fermenting sugars and producing favorable results. This can however be risky as you won't know what yeasts are present. These may not be able to ferment to typical wine alcohol levels, and may also produce undesirable results. You'll obtain much more predictable results using cultured *Saccharomyces cerevisiae* (abbreviated to *S. cerevisiae*) yeast, which you can select to match specific grape varieties and wine style objectives. Cultured yeast can withstand the harsh conditions of increasing alcohol and ferment to 16% ABV with some strains capable of reaching 18% ABV while performing consistently.

This chapter guides you in choosing an appropriate yeast, how to prepare yeast and manage nutrients for a trouble-free fermentation, and how to restart a stuck fermentation on the odd chance it happens.

CHOOSING WINE YEAST

You'll make much better wine, with greater aroma and flavor complexities, if you choose an appropriate yeast. Select one best adapted to the grape

WYEAST LABORATORIES

Yeast	Temp. range (°C)	Temp. range (°F)	Alcohol tolerance	Nutrient needs	Restart stuck ferm.[1]	Malic degradation	Types of wines: White	Rosé	Red	Recommended varieties[2,3]
Dry White/Sparkling (4021)	13–24	55–75	17%	Med			★		★	AU, CH, **CF**, CW, GW, LC, MU, PG, **PT**, SB, SV, TR
Red (4028)	13–32	55–90	14%	Med			★		★	**AG**, AL, **BB**, CB, **CF**, CH, **CM**, **CO**, **CS**, **CT**, **FR**, **GR**, **GY**, **LM**, **MA**, **ME**, **MQ**, **MV**, **NR**, **PN**, **PS**, **PV**, SB, **SC**, **SG**, SN, SV, **SY**, **TN**, **TP**, **ZF**, VI
Fruity White (4242)	13–24	55–75	12%	Med			★	★	★	CB, CH, CW, GW, **GY**, LC, MU, NI, PG, TR, Rosé
Italian Red (4244)	13–24	55–75	14%	Med					★	**BB**, **MA**, **NB**, **PV**, **SG**, **TP**
Summation Red (4267)	13–32	55–90	14%	Med			★		★	**AG**, **BB**, **BN**, **CF**, **CM**, **CO**, **CS**, **FR**, **LM**, **MA**, **ME**, **MQ**, **MV**, **NR**, **PS**, **PV**, SB, **SC**, **SG**, **SY**, **TP**, VI
Dry/Fortified (4767)	16–32	60–90	14%	Med			★		★	CB, CH, **ME**, MU, **MV**, **SG**, **TN**, **TP**, **ZF**
Sweet White (4783)	13–24	55–75	14%	Med			★			AL, AU, GW, RI, SN, SV, TR, VB
Bold Red/High Alcohol (4946)	16–29	60–85	18%	Med	★				★	**AG**, **BN**, **CN**, **CS**, **FR**, **LM**, **MF**, **MQ**, **PN**, **PS**, **PT**, **SY**, **TN**, **ZF**

NOTES

[1]Can be used for all varieties.

[2]"Rosé" means any variety that can be used for making a rosé wine.

[3]Red varieties are identified in bold.

CHAPTER SEVEN

Malolactic Fermentation — Softening a Wine's Acidity ... and More

Malolactic fermentation, often referred to as malo or simply MLF, is the conversion of naturally occurring, sharper-tasting malic acid (think green apples) into the softer, weaker lactic acid (think dairy products) by indigenous or cultured malolactic bacteria (also referred to as lactic acid bacteria). It is almost always desired in red wines to lower acidity for better balance with tannins. MLF also produces many other substances that enhance aromas and flavors. The drop in acidity and changes in aromas and flavors often don't work well in whites, with some exceptions, such as in a full-bodied, oak-style Chardonnay. This style of wine prefers less acidity and benefits from diacetyl, a uniquely favorable and well-known by-product of MLF that imparts an unmistakable buttery aroma.

If you make wine from fresh juice but which has had sulfite added, it may contain sufficient sulfur dioxide (SO_2) to inhibit malolactic bacteria and MLF. MLF can be very difficult, perhaps impossible under these circumstances, therefore inquire about how much sulfite was added or measure SO_2 if you can, and forego MLF if any significant amount was added—you'll save yourself a lot of grief.

If you make wine from kits, you can skip this chapter. Juice and concentrate in kits have been prepared to produce balanced wines. Putting kit wines through MLF can compromise quality and yield unexpected results that can be very different than the style the kit manufacturer intended.

LALLEMAND

Bacteria	Format	Addition method	Temp. range (°C)	Temp. range (°F)	Alcohol tolerance	Nutrient needs	Minimum pH	Maximum Total SO_2 (mg/L)	Diacetyl production	Restart stuck MLF	Types of wines		
											White	Rosé	Red
Enoferm Beta	Freeze-dried	Direct	14–27	57–81	15%	High	3.2	60	Seq.: High Co-inoc: Low		★	★	★
Lalvin MBR 31	Freeze-dried	Direct	13–28	55–82	14%	Med	3.1	45	High		★	★	★
Lalvin MBR VP41	Freeze-dried	Direct	16–28	61–82	16%	Low	3.1	60	Low	★	★	★	★
PN4	Freeze-dried	Direct	16–28	61–82	16%	Med	3.1	60	High				★
ML Prime	Freeze-dried	Direct	20–26	68–79	10%	Very Low	3.4	50	Very Low				★

WHITE LABS

Bacteria	Format	Addition method	Temp. range (°C)	Temp. range (°F)	Alcohol tolerance	Nutrient needs	Minimum pH	Maximum Total SO_2 (mg/L)	Diacetyl production	Restart stuck MLF	Types of wines		
											White	Rosé	Red
WLP675	Liquid	Direct	13–24	55–75	15%	Low	White: 3.1 Red: 3.3	40	Low		★	★	★

CHAPTER EIGHT

Fining Wine to a Bright, Smooth Finish

Once fermentation is complete, including malolactic fermentation (MLF) if carried out, wine is clarified either naturally or with the use of processing aids known as *clarifying agents* or *fining agents*. This part of the winemaking process is referred to as *clarification* or *fining*, although the latter term has a slightly different meaning as we'll see below.

Wine can become perfectly clear with no special treatment other than giving it time for suspended particles to settle and form a layer at the bottom of the carboy. The wine is then separated, or *racked*, from that layer of sediment.

If you're looking to bottle your batch within just a few weeks or months, it will likely not clear sufficiently quickly on its own; you may need to degas the wine and treat it with a clarifying agent, and possibly filter it. Even after a long time aging in carboy, a wine may not clear naturally. You'll need to determine the cause and you may have no choice but to use a clarifying agent. Sometimes, a perfectly clear wine may unexpectedly become cloudy or form deposits, possibly due to a renewed fermentation or a protein instability.

This chapter describes how to degas wine, how to rack from one carboy to another, and how to choose a suitable clarifying agent when needed. Stabilization and filtration are discussed in Chapter NINE and Chapter TWELVE, respectively.

DEGASSING

Wine contains a lot of carbon dioxide (CO_2) gas after fermentation. Until reduced substantially, this gas will impede clarification, even when a clarifying agent is added.

As wine is subjected to various operations, such as racking, stirring in additives and processing aids, and filtering, and given sufficient time, CO_2 gas naturally dissipates on its own. This will occur faster at room temperature than at cooler cellar temperatures.

It's always best to let wine degas naturally, with time and patience, but if you want to accelerate this process, you can degas the wine to remove much of the remaining gas.

First let the wine settle at room temperature for 24 hours, then transfer (*rack*) the wine to a larger carboy or pail to allow for a great amount of foaming. You can degas using the handle of a long mixing spoon and lots of elbow grease, a drill-mounted lees stirrer, or better yet, a vacuum pump or compressor with one of several devices available on the market, such as the Headspace Eliminator and Gas Getter (Figure 8.1).

Degas until there is no more foaming; this should take 5 to 10 minutes to degas a standard carboy when done properly using a vacuum pump and degassing device, or about 20 minutes by manual stirring. Taste the wine as you degas and stop when you no longer detect gas on the palate—there should be no prickly sensation. Don't overdo it as you may then cause the wine to absorb oxygen, which can impact quality. A little gas is good, it adds freshness in whites and rosés, but again, there should be no prickly sensation. The same goes for reds, though you want less gas, so as not to have the acidity of CO_2 reinforce the sensation of tannins.

Always use a bung with an airlock on a carboy, at least until the wine has released all its fermentation gas. A solid bung (with no airlock) can cause overpressure and the glass carboy to explode before the bung pops out.

Figure 8.1: Degassing with a) a long mixing spoon, b) a lees stirrer, c) a Headspace Eliminator, and d) Gas Getter

RACKING

From the end of fermentation, right up until bottling, you'll need to rack wine from one carboy to another to separate out wine from the layer of sediment that has formed from natural settling or from the use of a clarifying agent.

You'll be doing several of these rackings depending on the type of wine and how soon you'll want to bottle. If you make one carboy of wine at a time, you can simply rack by gravity, but as you grow your hobby, a diaphragm or vacuum pump will come in handy (Figure 8.2).

CHAPTER NINE

Stabilizing Wine: Avoiding Faults and Spoilage

Once fermentation is complete, including malolactic fermentation (MLF) if carried out, wine is also treated to protect it against instabilities that could otherwise cause faults or spoilage. This part of the winemaking process is referred to as *stabilization*.

There can be several causes of stability issues: oxidation, renewed alcoholic fermentation due to residual sugar, spontaneous or renewed MLF due to malic acid, wine that won't clear or which has suddenly gone cloudy due to pectin or proteins, and tartrates, a crystalline sediment often found in chilled bottles of white wine. You need to process wine preventively to avoid running into any of these problems. You should also be able to troubleshoot when a problem does occur—it's not always obvious what the cause may be.

This chapter describes how to prevent these instabilities. Chapter SEVENTEEN walks you through the process of troubleshooting, identifying, and resolving these problems.

You'll often hear of "sterile filtration" as a way to mitigate refermentation problems by filtering out any remaining yeast and bacteria, but this requires equipment and expertise well beyond the means of beginners.

CHAPTER TEN

Sweetening: Balancing Acidity and Sweetness

If you are partial to sweeter-style wines, or if you have a slightly acidic wine that is just a tad too sour for your taste and you don't want to deacidify, you can simply add sugar or other sweetening agent to suit your palate and to achieve better balance. This is practice is commonly referred to as *backsweetening* in home winemaking, but we'll simply refer to it as *sweetening* here.

Sweetening is different from chaptalization. Sweetening implies the addition of a sweetening agent to a finished wine, whereas chaptalization refers to the addition of fermentable sugars to juice to raise Potential Alcohol (PA) (see the subsection *Chaptalization* in the section SPECIFIC GRAVITY AND POTENTIAL ALCOHOL in Chapter FIVE on p. 71).

Generally, it's always best to ferment a wine completely dry, i.e., SG at or below 0.995, and then sweeten, unless you prefer a sweeter-style wine with lower alcohol, in which case you would need to stop fermentation before it runs dry (see the subsection *Stopping an Active Fermentation* in the section CONDUCTING AND MONITORING FERMENTATION in Chapter SIX on p. 104).

There are many options for sweetening wine: you can add sucrose, glucose or fructose; use a wine conditioner; use reserved press-run grape juice or grape-juice concentrate in cans or from a kit; add glycerin; add honey, or brown or caramelized sugar; or, add stevia or an artificial sweetener, such sucralose or xylitol.

CHAPTER ELEVEN

Why, When and How to Blend Wines

You'll often want—or need—to blend two or more wines to remedy a deficiency, to maintain a consistent style that you like, or to create a different style altogether.

To be clear, a deficiency is not a fault, but rather, a shortcoming. Perhaps you have a weak, low-ABV wine in need of some extra oomph, and that high-ABV wine you made last season might just do the trick to create a better balanced wine. Or maybe you have an under-extracted red that needs a tannin boost to give it greater structure, more mouthfeel, and you have a full-bodied red sitting around waiting for a blending partner.

However! Never blend a problem wine, a spoiled wine, with a perfectly sound one, at least not if you can help it. You'll only end up with a disappointing, subpar wine. If you have a bad batch with high volatile acidity (VA), ethyl acetate, acetaldehyde or some advanced oxidation problem, accept the situation, learn from it and discard the wine. It's a tough one to swallow, pun intended. But why would you want to blend? You'll only be infecting and ruining another batch of good wine. And you would need a lot of good wine to fix a bad one.

Blending is, however, a great tool for making the same style of wine year after year, or for creating different styles of wines, wines that are greater than the sum of the parts, as the saying goes. The idea is to bring together complementary wines to take advantage of the characteristics of each varietal, without any aroma, flavor or other characteristic dominating, maintaining that all-important balance we learned about in Chapter ONE.

CHAPTER TWELVE

Should I Filter My Wines?

There is probably no winemaking topic more controversial than that of filtration. Many opine that it is not needed (and similarly for fining), that filtration strips wine of color, aromas and flavors, that it changes the character of the wine, and that natural sedimentation and time are sufficient to obtain a clear wine.

If you prefer not to filter and you tolerate some sediment, or if you drink your wines relatively young, then sure, you can forego filtration. But if you want that extra sparkle and brilliance, or if you'll be submitting wines into competitions or gifting bottles to friends and family, then filtration is the way to go.

What about color, aromas, flavors, and wine character?

Regarding color, what you're filtering is what will either stick to bottle glass or eventually sediment. If you reuse bottles, then you'll have to clean those with a special cleaner, such as percarbonate, as a simple water rinse often won't remove stubborn color stains from glass. Also, sediment in bottles is okay in reds, if not excessive, but much less tolerated in whites and rosés. As for aromas, flavors and character, filter pads and cartridges used in winemaking cannot filter such tiny molecules as to affect aromas and flavors. What is actually happening is that wine picks up a little oxygen that causes a temporary, transient change in smell and taste. It can take days, perhaps weeks, many weeks, depending on the wine, for it to return to what it was like before filtering. It's the same with bottling. And if filter

pads are not prepared properly or if filtration is poorly executed as to allow excessive oxygen to become absorbed, yes, those will irreversibly and negatively alter wine quality.

This chapter describes how to filter wine properly with no impact on quality.

You'll often hear of "sterile filtration" as a way to mitigate refermentation problems by filtering out any remaining yeast and bacteria, but this requires equipment and expertise well beyond the means of beginners.

FILTRATION EQUIPMENT

Figure 12.1 illustrates some of the more common home winemaking filtration equipment.

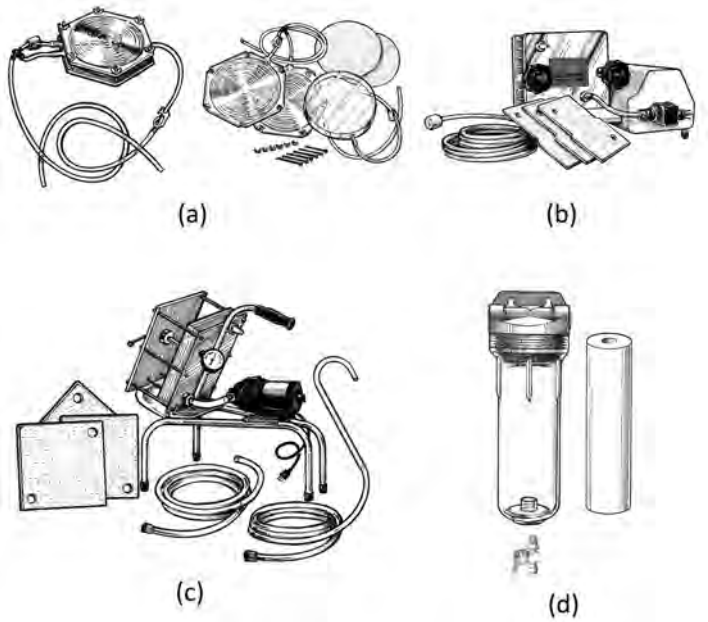


Figure 12.1: Filtration equipment: a) round plate-and-frame filter and pads; b) Buon Vino Mini Jet and filter pads; c) Buon Vino Super Jet and filter pads; and d) 10-inch filter housing and cartridge.

Filtration for small-scale home winemaking makes use of single-use, disposable filter media, namely, pads and cartridges, which filter to differ-

CHAPTER THIRTEEN

Making Bottling Fun

Bottling may seem like a simple task—prepare bottles, fill them up, cork, and, optionally, dress each with a capsule and label. A lot of planning actually goes into bottling, from making sure the wine is bottle-ready, to choosing and sourcing bottles, corks, and capsules, to designing and printing your own labels. All too often, home winemakers, and especially novices, rush to bottle only to wonder why corks are popping out, why sediment is forming, or why is the wine not tasting like it did on the day it was bottled.

First, make sure that the wine is bottle-ready. That means, it has been adequately clarified and stabilized, as well as aged so that it tastes to your liking. If you are blending two or more wines, give the blend some time "to come together," then taste it again after a few weeks or months and decide if it is bottle-ready. See Chapter ELEVEN for more information on blending.

So! Plan well ahead, source or order all your bottling needs, and only bottle when ready.

BOTTLES, CORKS, CAPSULES, AND LABELS

You need 25 standard 750-mL bottles for a 5-gal (19-L) carboy of wine, plus 25 each of corks, capsules, and labels.

Bottles

750-mL bottles with a cork finish are the easiest to source and to apply a cork to, but you can use 375-mL bottles or whatever other size you can find and that you prefer. Screw cap-type bottles require special, expensive equipment to apply the screw cap. You can reuse bottles and hand-tighten screw caps if you don't intend to age the wine for more than several months. That's because the liner under the screw cap no longer provides a perfect seal once used.

Any bottle shape (Figure 13.1) that you fancy will do, depending on how you'll store bottles. High-shouldered Bordeaux-style bottles stack nicely, Burgundy bottles less so, while tall sloping-shouldered Alsace or Hoch-style bottles don't stack very well.

Figure 13.1: Most common wine bottle shapes: a) Bordeaux; b) Burgundy; and c) Alsace or Hoch

Any glass color will do so as long as you don't expose wine to strong sources of light, which could otherwise cause wine to oxidize. You may want to use clear-glass (known as flint) bottles for whites, rosés and fruit wines to showcase their color, and use green- or brown-colored bottles for reds as these all look dark in flint bottles in any case. The darker color provides more protection in case wine is exposed to light.

If you are reusing bottles, be sure to wash them thoroughly *before* storing them away to avoid mold. Then wash again and sanitize when ready to bottle wine.

Corks

The standard closure for 750-mL bottles (as well as 375- and 1.5-L bottles) is what is referred to as a size no. 9 "cork" although it can be made not only from natural cork material but also synthetic polymers.

The more general and correct terms for bottle closures are "stoppers" or "closures" as they do not imply any material as "corks" does; however, here, we'll adopt the latter as it is commonly used to refer to any type of closure, for example, "synthetic cork," used in standard, non-screw cap bottles.

CHAPTER FOURTEEN

Making a Lively White from Chardonnay

Here, we'll make a 5-gal (19-L) batch of light and refreshing, fruity dry white wine from grapes with 11%–12.5% ABV and 5–8 g/L TA that you can sweeten to taste and drink within 6–9 months. You can use fresh or sterile juice instead of grapes.

You can use any white grape variety you like. As an example, we'll use Chardonnay and ferment relatively cool, as cool as possible close to 55°F (13°C), without any oak influence so as not to detract from the fruity character we're after. If you cannot ferment at cool temperature, you may lose some of the fruity aromas. You can ferment warmer, at around 68°F (20°C), if you're partial to aromatic characteristics that some varieties such as Sauvignon Blanc and Gewürztraminer have to offer. We'll forego malolactic fermentation (MLF) so as not to drop acidity excessively and to prevent any malolactic-related by-products that may not suit this style of wine.

Be sure to process the press-run juice as quickly as possible and protect it from the elements to minimize the amount of oxygen absorbed, which could impact delicate fruity aromas.

Keep meticulous records of all your operations and measurements in a log book. You can download a log sheet at ModernHomeWinemaking.com.

CHAPTER FIFTEEN

Making a Fruity Rosé from Grenache

Here, we'll make a 5-gal (19-L) batch of medium-bodied, fruity dry rosé wine from grapes with 12%–13% ABV and 5–8 g/L TA that you can sweeten to taste and drink within 6–9 months. You can use fresh or sterile rosé juice instead of grapes.

You can use any white-fleshed, red-skinned grape variety you like. Color is extracted from skins by "macerating," that is, by soaking crushed grapes in their juice for just a short duration. If using a richly colored variety, you can skip maceration and press crushed grapes or whole-bunch grapes to avoid the risk of extracting too much color and ending up with a light red wine instead.

Aglianico, Barbera, Catawba, Grenache, Léon Millot, Merlot, Mourvèdre, Pinot Noir, Pinotage, Sangiovese, Tempranillo, and Zinfandel are all great choices for macerating while Marquette (a teinturier), Petite Sirah, and Syrah are excellent choices as well, although these should go straight to the press without any crushing and maceration.

We'll use a most popular variety, Grenache, also known as Garnacha, as an example, with a short maceration to make a medium-bodied, fruity-style rosé, and, as with our white wine in Chapter FOURTEEN, ferment relatively cool with no malolactic fermentation (MLF) and no oak influence. If you cannot ferment at cool temperature, you may lose some of the fruity aromas. You can ferment warmer, at around 68°F (20°C), if you are looking for greater varietal expression.

CHAPTER SIXTEEN

Making a Full-Bodied Red from Cabernet

Here, we'll make a 5-gal (19-L) batch of premium, full-bodied, oaked dry red wine from grapes with 13%–14.5% ABV and 4–6 g/L TA that you can start drinking in about 18 months, although it will continue improving while aging and which will reward you with greater aromas and flavors years down the road.

You can use any red-skinned grape variety you like, with either red or white flesh inside. There are many to choose from, from Aglianico to Cabernet and Merlot to Zinfandel in European varieties, and Baco Noir to Frontenac and Norton in Native American varieties and hybrids. Alicante Bouschet and Marquette are examples of red-fleshed varieties, or teinturiers.

Color is extracted from skins by "macerating," that is, by soaking crushed grapes in their juice for days or even weeks. If you prefer not to work with grapes and not have to macerate and press, you'll find fresh, ready-to-ferment red juice, and even 100% pasteurized (sterile) pure juice and concentrate with a separate crushed-grapes pack that you can add to extract more color and tannins for a fuller-bodied style.

For our example, we'll use Cabernet Sauvignon with full maceration, meaning, until fermentation completes, we'll keep the wine on the skins, ferment relatively "hot" and do lots of punchdowns (Figure 16.1) to maximize color extraction. We'll also use oak chips or sticks. These will all contribute towards making a full-bodied red with oak influence worthy of aging. Color extraction can sometimes be a challenge in this variety, especially if the fruit is underripe.

INGREDIENTS

- ☐ 100 lbs (45 kg) grapes, Cabernet Sauvignon or other red grape variety, or 6 gal (23 L) of fresh or sterile juice
- ☐ 1 lb (500 g) rice hulls (if needed for pressing)
- ☐ 2 tsp pectic enzymes
- ☐ ½ cup untoasted oak powder
- ☐ 1 tbsp grape tannins
- ☐ 1½ tsp Lallemand Opti-Red
- ☐ Two 5-g packets Lalvin RC-212 yeast (or equivalent)
- ☐ 2 tsp yeast rehydration nutrients (e.g., Go-Ferm)
- ☐ 4 tsp complex yeast nutrients (e.g., Fermaid K), to be added in two steps
- ☐ 1 tsp malolactic nutrients (e.g., Opti-Malo Plus)
- ☐ One 125-mL pack Wyeast 4007 Malolactic Culture, or one 35-mL pack of White Labs WLP675 Malolactic Culture
- ☐ 1 cup medium-toast (MT) oak chips or one (1) MT oak stick
- ☐ Potassium metabisulfite (KMS) or Campden tablets
- ☐ Kieselsol–chitosan combo pack

EQUIPMENT

- ☐ Crusher[1]
- ☐ Press[1]
- ☐ Large vat[1] e.g., 13 gal (50 L)
- ☐ 7.9-gal (30-L) pail
- ☐ 6-gal (23-L) carboy
- ☐ 5-gal (19-L) carboy
- ☐ Punchdown tool or potato masher
- ☐ Tarp
- ☐ Racking cane and hose
- ☐ Airlock and bung
- ☐ Hydrometer and test cylinder
- ☐ Floating thermometer
- ☐ Acidity test kit
- ☐ pH meter
- ☐ Paper chromatography kit
- ☐ Food-grade scoop
- ☐ Sieve
- ☐ Wine thief (or gravy baster)
- ☐ Long mixing spoon or lees stirrer
- ☐ Large funnel
- ☐ Infusion tube for oak chips
- ☐ Measuring cup
- ☐ Filtering equipment and pads/cartridges (optional)
- ☐ Bottling equipment

[1]Not required if using juice

SUPPLIES

- ☐ Cleaner and sanitizer
- ☐ 25 bottles
- ☐ 25 corks
- ☐ 25 capsules
- ☐ 25 labels

Figure 16.1: Punching down the cap

To help stabilize color and also to build structure, we'll make use of Opti-Red, a Lallemand specific inactivated yeast product (see the section on COLOR STABILITY, MOUTHFEEL, AND OAK in Chapter FOUR), which you should be able to find repackaged in a small format—it's worth looking for it. We'll also reduce acidity by malolactic fermentation (MLF), which we'll launch sequentially after completion of alcoholic fermentation and pressing. We'll also let the wine degas naturally using time and normal processing operations. Since we're going for a totally dry style here, we won't sweeten.

Keep meticulous records of all your operations and measurements in a log book. You can download a log sheet at ModernHomeWinemaking.com.

STEP 1 – CRUSHING

ⓘ ***If using fresh or sterile juice, go to STEP 2 – JUICE ANALYSIS AND ADJUSTMENTS***

ⓘ ***Work in an area with ambient temperature at around 68°F (20°C).***

☐ **1.1** Clean and sanitize all equipment, tools, and fermentors.

☐ **1.2** Remove any leaves and other debris still in the grapes. Crush the grapes into a large vat and remove as many stems as possible as you crush.

☐ **1.3** Dissolve 2 tsp pectic enzymes in 100 mL of *cold* water, distribute over the load of crushed grapes and mix well with a punchdown tool (or potato masher). Place a heavy tarp or lid on the vat or fermentor to protect from the elements and to keep fruit flies out. Wait 6–8 hours to allow the pectic enzymes to do their work before proceeding to step 1.4.

CHAPTER SEVENTEEN

Dealing with Problems

All winemakers, aspiring and seasoned ones alike, will have to deal with a problem wine, flawed or spoiled, at some point. It happens!

Your approach to fixing a problem will depend on how soon you realize the wine has a flaw or fault, identifying the exact nature of the defect, including possible root causes and solutions, how quickly you take action to remedy the problem, and if the wine is even salvageable.

This chapter describes how to go about identifying and fixing some of the most common wine defects, complex ones too, and how to avoid them in the first place.

It's not always easy or straightforward. Call upon an experienced winemaking friend if you can't pinpoint the problem or root cause and ask for advice or guidance, or consult ModernHomeWinemaking.com for additional information and more advanced tips. If the wine is beyond repair, don't be tempted to blend it with a perfectly sound wine—the result will be an inferior wine. It definitely hurts to have to dump the wine down the drain after investing so much time and money, but it can be unhealthy to stubbornly drink it anyway.

MY WINE HAS TURNED A BROWNISH COLOR

Oxidation is by far the most common winemaking problem. It manifests itself in different ways and to different extents, but the first visual cue of a problem is the color turning darker, progressively toward brown.

What Causes the Problem

All wines oxidize—and at a rate based on the type of wine and storage conditions. But when wine is exposed to oxygen and remains unprotected, it will soon turn darkish. White wines are significantly more fragile and more susceptible to oxidation and will turn a progressively browner color, similar to sherry (a Spanish fortified wine which is purposely allowed to oxidize), whereas reds will first take on orange hues and then progressively turn browner.

Oxygen and oxidation are the culprits. Oxidation causes certain "good" wine compounds to oxidize and transform into "bad" compounds that can affect color, aromas, flavors, and overall quality. Common causes of oxidation include:

- Too much headspace
- Excessive exposure to air during processing
- Insufficient sulfite, sulfur dioxide (SO_2)
- A defective or poor airlock/bung while wine is still in carboys, or a defective or poor cork if it's in bottles
- High storage temperature
- Storage in oxygen-permeable carboys, such as the blue ones for bottled water that are made from polycarbonate plastic instead of PET.

Oxidation can happen in juice, too, when it is overly exposed to oxygen, although in such a case, it is caused by enzymes that can be easily inhibited with sulfite.

How to Assess the Problem

First determine if the oxidation is limited to browning, as it can also cause other problems such as acetic acid and volatile acidity (VA), ethyl acetate, and acetaldehyde, if not halted. These are described below.

Pour some wine in a glass, hold it up against a source of light, and evaluate the color. Then swirl the glass, smell the wine, and repeat a couple of times. Take a sip and taste, and repeat.

If the wine smells and tastes good and it's just a matter of color, then you've detected the problem early and you'll be able to fix it. From the list above, identify the root cause.

How to Fix

You have to act quickly—as soon as you identify the problem and root cause—to limit further damage if the wine is still in carboys.

If a white wine is uncharacteristically turning amber but is not giving off any foul aromas or flavors, add sulfite immediately. Dissolve ½ tsp potassium metabisulfite or 8 crushed Campden tablets in 100 mL of cool water and stir into the carboy. Then treat with casein, followed by PVPP, making sure to top up the carboy. Rack when completely settled and clear and bottle as soon as possible. Consume the wine without aging—it will likely not improve.

If a red wine is turning orange or has some browning but no foul aromas or flavors, simply add sulfite at the same rate, bottle, and consume.

How to Prevent

Implement and follow sound winemaking practices to prevent oxidation:

- Avoid excessive exposure to air during processing
- Process wine as gently as possible
- Top up carboys
- Use sulfite and add regularly as recommended
- Verify the integrity of all equipment, particularly airlocks and bungs
- Use good-quality no. 9 corks for bottling
- Store wine in a cool cellar or area, ideally around 55°F (13°C)
- Invest in the necessary equipment to measure free SO_2 and become familiar with managing and adjusting free SO_2.

MY WINE SMELLS LIKE VINEGAR

Vinegar is acetic acid, which yeast produces in tiny amounts that contribute to a wine's aromas and flavors. This means that acetic acid is always present in wine, but if you can smell it, this points to a problem, possibly another type of oxidation problem known as volatile acidity, or VA.

Inexperienced tasters and novice winemakers often do not recognize VA. We also all have different detection thresholds, so sometimes you won't detect it early. As VA increases, it can reach a point where the wine becomes spoiled and is best discarded.

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Where there are multiple page entries, page numbers in **bold** type indicate the most important and relevant references.

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