Techniques in

HOME WINEMAKING

The Comprehensive Guide to Making Château-Style Wines

Daniel Pambianchi

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FOREWORD

The journey from grape to glass is filled with many key decisions for any winemaker. Every step of the way a winemaker has to pick from among a host of different techniques to create their dream wine. Luckily for hobby winemakers, Daniel Pambianchi is around as a guide through the often-confusing world of winemaking. In every issue of *WineMaker Magazine* since 2000 Daniel has helped hobby winemakers better understand how to make better wine with his "Techniques" column. From testing the fresh grapes before crush all the way to bottling, Daniel has covered the full spectrum of techniques you need in a clear, easy-to-understand way over the years. Daniel has a real skill in breaking down complex information into laymen's language that at the same time doesn't water down the subject. In fact, *WineMaker Magazine's* readers have always given Daniel high marks in annual surveys and mention his skill of making all techniques and winemaking science, no matter how advanced and difficult, simple and comprehensible. Just like *WineMaker* readers have found out when reading Daniel's articles, you will get straightforward, practical techniques and learn skills you can put to use in your home winery in the pages that follow.

In the years since the first edition of *Techniques in Home Winemaking* was published Daniel has tirelessly added to his winemaking knowledge. He continues to write his "Techniques" column in the magazine as well as judging our annual wine competition. Behind the scenes at the magazine, he acts as our Technical Editor reviewing every article we publish for technical accuracy and keeping up on new trends and information in the winemaking world. Outside of the magazine, he has taken his award-winning home winemaking hobby to the next level by now becoming an award-winning professional winemaker. His Maleta Estate Winery in Niagara-on-the-Lake, Ontario is garnering critical praise as Daniel continues to discover new techniques in winemaking and to offer advice from which one can benefit by reading his book. This new edition of his *Techniques in Home Winemaking*

incorporates this wealth of knowledge and all the latest information and experience that Daniel has to share.

In our offices at *WineMaker Magazine* and winemakermag.com, earlier editions of Daniel's *Techniques in Home Winemaking* are dog-eared and show the wear and tear of constant use as we refer back again and again to answer some winemaking question we might have when working on a story. I'm thrilled now with this new edition I can get my hands on some fresh copies with plenty of fresh new content to replace those worn out earlier editions. Enjoy Daniel's book as it helps you enjoy the fun and satisfying world of hobby winemaking.

Brad Ring
Publisher, *WineMaker Magazine*

PREFACE

The subject of wine comprises three major areas: Viticulture, enology, and wine appreciation. Viticulture and enology are the sciences and practices of grape growing and winemaking, respectively. Wine appreciation includes tasting – for the purpose of evaluating wine and to convey that assessment to wine enthusiasts – and drinking. This book specifically deals with the science and practice of winemaking, or enology. Consult Appendix E for a list of references available for further reading on viticulture and wine appreciation.

The objectives of this book, then, are to introduce winemaking techniques and products – updated to reflect what is currently available on the market – to novice home winemakers while providing serious and advanced amateur winemakers with proven and practical techniques to produce premium-quality wines that are virtually indistinguishable from their professional counterparts. On occasions, when experimenting or when the year's crop has produced low or average quality grapes, home winemakers will have to make use of techniques and products described herein to "correct" the wine. Correction is required to achieve balance among aromas, flavors, body, taste and color in the finished wine. Ultimately, wine is best enjoyed when it is well balanced.

Techniques and products include the use of various winemaking equipment, enological chemicals and ingredients, and vinification (the conversion of grape juice into wine by fermentation) techniques and procedures. The ability to produce a good to superior wine under adverse conditions depends on one's knowledge and experience of these techniques and products. Experienced winemakers will know how to vinify must (grape juice) into wine through the various stages such that the probability of faults in the finished wine is greatly reduced. Home winemakers are encouraged to experiment to decide which techniques produce a desired wine style.

How to use this book

This book can first be read to learn about the science, principles and practices of home winemaking, and wine analysis. It can then serve as a reference textbook for analytical procedures, to determine quantities of ingredients to be added, to review specific advice on winemaking procedures, and to determine the root cause when encountering problems.

Chapters are presented in a logical order by first providing an introduction to winemaking and necessary winemaking equipment. A thorough discussion of must and wine analysis serves as a foundation to understanding winemaking and vinification procedures. A solid working knowledge of sugar and alcohol measurements, acidity, pH, sulfur dioxide levels and phenolic compounds is necessary to be able to produce the highest quality wine according to one's desired wine style. Detailed descriptions of winemaking procedures are then presented in the general order that these are performed from fermentation to aging and bottling.

When used as a reference textbook, readers can consult any chapter or section as these have been laid out independently of one another. This also allows winemakers to pick and choose procedures according to the desired wine style. For example, the section on malolactic fermentation can be skipped entirely if this type of fermentation is not desired. Likewise, the chapter on oak barrels may be skipped if not oak-aging wine although alternatives to barrels are discussed.

Specifically:

Chapter 1 provides an overview of winemaking and winemaking terminology, the various wine types and styles that home winemakers can produce, and the available grape juice varieties. Pros and cons of winemaking from grapes, juice and concentrate are discussed. Winemaking flowcharts are presented to illustrate the complete processes from grape crushing to fermentation to bottling.

Chapter 2 describes all the necessary equipment for home winemaking and instructions on its proper use for producing premium wines. The importance of cleaning and sanitizing all equipment and of maintaining a sanitized environment throughout the winemaking cycle is also explained.

Chapters 3 deals with the analysis and control of musts and wines – specifically, sugar and alcohol, acidity and pH, sulfur dioxide, and phenolic components – which are key in producing the best wines. This chapter explains the significance of measuring and controlling these components and their role in winemaking.

Chapter 4 discusses vinification and winemaking procedures essential to producing premium wines, from crushing and destemming – or, must preparation, in the case of juice or concentrate – to stabilization. Other procedures include maceration, micro-oxygenation, delestage, pressing, and alcoholic and malolactic fermentations.

Chapter 5 details clarification procedures, namely, racking, fining and filtration. These are discussed separately so that winemakers can decide which method(s) to adopt to produce a desired wine style. Clarification by fining and/or by filtration remain much-debated topics. This chapter provides pros and cons of each process to allow winemakers to make their own choice.

Chapter 6 describes physical, chemical and microbial stabilization processes and products key to ensuring that wines remain stable once bottled, and how to screen for spoilage organisms that may affect the quality of wine. The all-important topic on stabilizing filtration – better known as membrane filtration, or (though inappropriate) sterile filtration – is described in detail.

Chapter 7 provides guidelines on the traditional art and process of blending wines. The practice of blending wines has existed since the early days of winemaking and is still used in modern winemaking in spite of the popularity of varietals (wines from single grape varieties). Blending allows winemakers to take advantage of the individual grape variety characteristics to produce more complex, interesting wines and to achieve balance among components, namely, sweetness, acidity, alcohol, body, aromas, and flavors.

Chapter 8 describes the use, conditioning or preparation and maintenance of oak barrels in winemaking, and how to ferment and age wine in barrels. Barrel spoilage problems, their treatments and preventive measures are also discussed. Alternatives to oak barrels for imparting oak aromas are presented. And if you are a handy person skilled in woodworking, you will enjoy the section on barrel reconditioning and extending the life of your barrels.

Chapter 9 describes the necessary equipment required for bottling wine as well as various techniques used to increase bottling efficiency.

Chapters 10, 11, 12 and 13 provide step-by-step instructions on the production of Pinot Noir wine from grapes, sparkling wine, Port and Icewines, respectively, making use of techniques introduced in earlier chapters.

Chapter 14 provides a comprehensive guide and quick reference chart for troubleshooting the most common vinification problems that home winemakers may come across, and techniques used to resolve them. This is undoubtedly one of the most

important chapters because things don't always proceed according to plans.

Chapter 15 outlines the proper design and construction of a small home winery and cellar that will serve your winemaking and cellaring needs. Planning and building instructions will help you set up that perfect environment for your wines.

Appendix A lists conversion factors between Metric, US and Imperial systems for relevant measurements.

Appendix B provides a handy conversion table for converting between Specific Gravity, Brix % sugar (wt/vol) and potential alcohol, as well as tables to correct hydrometer readings taken at different temperatures than the instrument's calibration temperature.

Appendix C provides a winemaking log chart that can be used to record all winemaking and vinification activities. Keeping records of a wine's progress and treatments is key to successful winemaking.

Appendix D provides a summary chart of winemaking ingredients and chemicals, and concentrations presented throughout this book. It can be used as a quick-reference guide.

Appendix E lists some recommended reading to learn more about grapes, winery technology, the chemistry of vinification, analytical methods in winemaking and oak barrel maintenance.

The following table can be used as a guideline to determine which sections of this book are recommended for you based on your level of expertise, knowledge and skills.

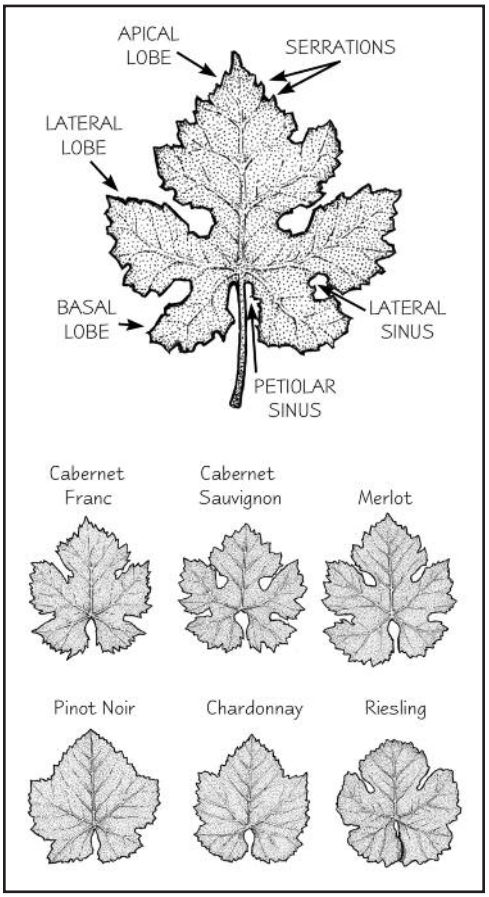

Figure 1-4: Vine leaf terminology and common leaf shapes[1]

Ideally, there should be no leaves with grapes when shipped or picked up from a local market; however, if there is at least one leaf, examine its morphology – shape, size, number of lobes, shape and size of serrations, etc. – to get some clues about variety. Each vine species within a genus is characterized by common traits, particularly when it comes to leaf shape, illustrated in Figure 1-4, which is easiest to examine, albeit not always obvious. For example, *V. vinifera* varieties typically have a five-lobe leaf, but to the untrained eye, that simple count is not always easy. Then, each variety within a species is characterized by a specific petiolar sinus, lateral sinus, and shape of serrations.

Leaf morphology alone cannot provide a definitive answer on variety as it can vary even for leaves from the same vine. This is also very difficult to assess by an untrained eye, so study hard and long.

At this point, bunch, berry and leaf morphologies for any variety should be easily described and compared to data from grape variety handbooks. For example, the following would be typical descriptions for Pinot Noir, Cabernet Sauvignon, and Chardonnay varieties. A picture of grape bunches and leaves for each are provided in Figure 1-5, 1-6 and 1-7, respectively.

Pinot Noir
Grape bunch: small; conical
Berry: small; spherical
Skin: very thin; light colored
Leaf: deep petiolar sinus; shallow lateral sinuses

[1]See footnote, page 36

Table 1-1
California *V. vinifera* white grape varieties

Grape variety	Types & styles	Main characteristics	Acidity	Affinity for oak	Aging potential	Quality
Chardonnay	Dry Sparkling	High alcohol Fruity aroma Buttery texture	Moderate	Excellent	Very good	Excellent
Chenin Blanc	Dry Sweet Sparkling	High sugar content High acidity	High	Poor	Excellent (for sweet wines)	Very good
Colombard	Dry	Low alcohol	High	Poor	Poor	Average
Gewürztraminer	Dry Sweet Icewine Sparkling	High alcohol Spicy aroma and taste Deep color	Low	Good	Good	Good
Muscat	Dry Fortified Sweet Sparkling	High sugar content Grapey aroma	Moderate	Good	Poor	Good
Palomino	Dry Icewine Fortified	Low sugar content Oxidizes quickly	Low	Not recommended	Poor	Average

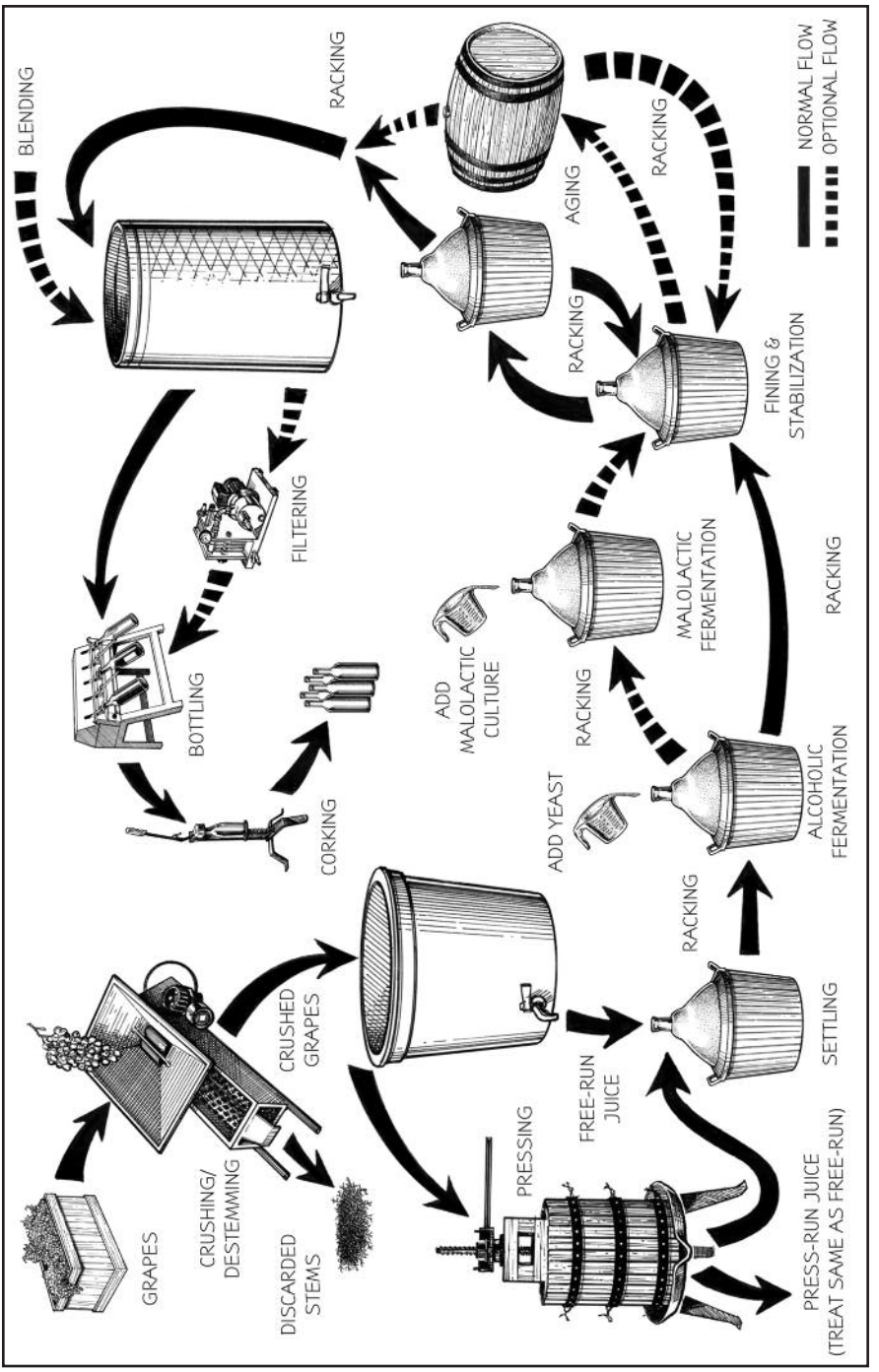

Figure 1-10: White winemaking from grapes – process flowchart

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