

 WILEY

# HANDBOOK OF ENOLOGY

Volume 1

*The Microbiology of Wine and Vinifications*

SECOND EDITION

P. Ribéreau-Gayon  
D. Dubourdieu  
B. Donèche  
A. Lonvaud



# Handbook Of Enology Vol 1 The Microbiology Of Wine And Vinifications

**Antonio Morata**





## **Handbook Of Enology Vol 1 The Microbiology Of Wine And Vinifications:**

**Handbook of Enology, Volume 1** Pascal Ribéreau-Gayon, Denis Dubourdieu, B. Donèche, A. Lonvaud, 2006-05-01 The Microbiology volume of the new revised and updated Handbook of Enology focuses on the vinification process It describes how yeasts work and how they can be influenced to achieve better results It continues to look at the metabolism of lactic acid bacteria and of acetic acid bacteria and again how can they be treated to avoid disasters in the winemaking process and how to achieve optimal results The last chapters in the book deal with the use of sulfur dioxide the grape and its maturation process harvest and pre fermentation treatment and the basis of red white and speciality wine making The result is the ultimate text and reference on the science and technology of the vinification process understanding and dealing with yeasts and bacteria involved in the transformation from grape to wine A must for all serious students and practitioners involved in winemaking

**Handbook of Enology, Volume 1** Pascal Ribéreau-Gayon, Denis Dubourdieu, Bernard B. Donèche, Aline A. Lonvaud, 2021-04-13 As an applied science enology is a collection of knowledge from the fundamental sciences including chemistry biochemistry microbiology bioengineering psychophysics cognitive psychology etc and nourished by empirical observations The approach used in the Handbook of Enology is thus the same It aims to provide practitioners winemakers technicians and enology students with foundational knowledge and the most recent research results This knowledge can be used to contribute to a better definition of the quality of grapes and wine a greater understanding of chemical and microbiological parameters with the aim of ensuring satisfactory fermentations and predicting the evolution of wines a 7th better mastery of wine stabilization processes As a result the purpose of this publication is to guide readers in their thought processes with a view to preserving and optimizing the identity and taste of wine and its aging potential This third English edition of The Handbook of Enology is an enhanced translation from the 7th French 2017 edition and is published in print as individual themed volumes and as a two volume set describing aspects of winemaking using a detailed scientific approach The authors who are highly respected enologists examine winemaking processes theorizing what constitutes a perfect technique and the proper combination of components necessary to produce a quality vintage They also illustrate methodologies of common problems revealing the mechanism behind the disorder thus enabling a diagnosis and solution

**Volume 1 The Microbiology of Wine and Vinifications** addresses the first phase of winemaking to produce an unfinished wine grading grape quality and maturation yeast biology then adding it to the grape crush and monitoring its growth during vinification and identifying and correcting undesired conditions such as unbalanced lactic and acetic acid production use of sulfur dioxide and alternatives etc Coverage includes Wine microbiology Yeasts Yeast metabolism The conditions for the development of yeasts Lactic acid bacteria their metabolism and their development in wine Acetic bacteria The use of sulfur dioxide in the treatment of musts and wines Products and processes acting in addition to sulfur dioxide Winemaking The grape and its maturation Harvesting and processing of grapes after harvest Vinification in red and white wine making The



target audience includes advanced viticulture and enology students professors and researchers and practicing grape growers and vintners *Handbook of Enology, Volume 1* Pascal Ribéreau-Gayon, Denis Dubourdieu, B. Donèche, A.

Lonvaud, 2006-02-03 The Microbiology volume of the new revised and updated Handbook of Enology focuses on the vinification process It describes how yeasts work and how they can be influenced to achieve better results It continues to look at the metabolism of lactic acid bacteria and of acetic acid bacteria and again how can they be treated to avoid disasters in the winemaking process and how to achieve optimal results The last chapters in the book deal with the use of sulfur dioxide the grape and its maturation process harvest and pre fermentation treatment and the basis of red white and speciality wine making The result is the ultimate text and reference on the science and technology of the vinification process understanding and dealing with yeasts and bacteria involved in the transformation from grape to wine A must for all serious students and practitioners involved in winemaking Handbook of Enology, Volume 1 Pascal Ribéreau-Gayon, Denis Dubourdieu, Bernard B. Donèche, Aline A. Lonvaud, 2021-03-29 As an applied science enology is a collection of knowledge from the fundamental sciences including chemistry biochemistry microbiology bioengineering psychophysics cognitive psychology etc and nourished by empirical observations The approach used in the Handbook of Enology is thus the same It aims to provide practitioners winemakers technicians and enology students with foundational knowledge and the most recent research results This knowledge can be used to contribute to a better definition of the quality of grapes and wine a greater understanding of chemical and microbiological parameters with the aim of ensuring satisfactory fermentations and predicting the evolution of wines and a better mastery of wine stabilization processes As a result the purpose of this publication is to guide readers in their thought processes with a view to preserving and optimizing the identity and taste of wine and its aging potential This third English edition of The Handbook of Enology is an enhanced translation from the 7th French 2017 edition and is published in print as individual themed volumes and as a two volume set describing aspects of winemaking using a detailed scientific approach The authors who are highly respected enologists examine winemaking processes theorizing what constitutes a perfect technique and the proper combination of components necessary to produce a quality vintage They also illustrate methodologies of common problems revealing the mechanism behind the disorder thus enabling a diagnosis and solution Volume 1 The Microbiology of Wine and Vinifications addresses the first phase of winemaking to produce an unfinished wine grading grape quality and maturation yeast biology then adding it to the grape crush and monitoring its growth during vinification and identifying and correcting undesired conditions such as unbalanced lactic and acetic acid production use of sulfur dioxide and alternatives etc Coverage includes Wine microbiology Yeasts Yeast metabolism The conditions for the development of yeasts Lactic acid bacteria their metabolism and their development in wine Acetic bacteria The use of sulfur dioxide in the treatment of musts and wines Products and processes acting in addition to sulfur dioxide Winemaking The grape and its maturation Harvesting and processing of grapes after harvest Vinification in red



and white wine making The target audience includes advanced viticulture and enology students professors and researchers and practicing grape growers and vintners *Handbook of Enology, The Microbiology of Wine and Vinifications* Pascal Ribéreau-Gayon, 2000-04-21 For centuries the transformation of grapes into wine has been the focus of much scientific research but it was not until the nineteenth century that the role of yeasts in alcoholic fermentation was discovered Since this discovery the findings of chemists biochemists and microbiologists have led to controlled conditions in winemaking producing more varied and higher quality wines *Handbook of Enology Volume 1 The Microbiology of Wine and Vinifications* uniquely combines scientific knowledge with the description of day to day work in the first stages of winemaking from grape picking to the end of the fermentation processes It discusses the scientific basics and technological problems of wine making and the resulting consequences for the practitioner providing an authoritative and complete reference manual for both the winemaker and the student This text will be invaluable to winemakers students of enology or vinification and chemists interested in winemaking *Handbook of Alcoholic Beverages, 2 Volume Set* Alan J. Buglass, 2011-02-14 **HANDBOOK OF ALCOHOLIC BEVERAGES** A comprehensive two volume set that describes the science and technology involved in the production and analysis of alcoholic beverages **HANDBOOK OF ALCOHOLIC BEVERAGES** Technical Analytical and Nutritional Aspects At the heart of all alcoholic beverages is the process of fermentation particularly alcoholic fermentation whereby sugars are converted to ethanol and many other minor products The *Handbook of Alcoholic Beverages* tracks the major fermentation process and the major chemical physical and technical processes that accompany the production of the world s most familiar alcoholic drinks Indigenous beverages and small scale production are also covered to a significant extent The overall approach is multidisciplinary reflecting the true nature of the subject Thus aspects of biochemistry biology including microbiology chemistry health science nutrition physics and technology are all necessarily involved but the emphasis is on chemistry in many areas of the book Emphasis is also on more recent developments and innovations but there is sufficient background for less experienced readers The approach is unified in that although different beverages are dealt with in different chapters there is extensive cross referencing and comparison between the subjects of each chapter Appropriate for food professionals working in the development and manufacture of alcohol based drinks as well as academic and industrial researchers involved in the development of testing methods for the analysis and regulation of alcohol in the drinks industry Divided into five parts this comprehensive two volume work presents **INTRODUCTION BACKGROUND AND HISTORY** a simple introduction to the history and development of alcohol and some recent trends and developments **FERMENTED BEVERAGES BEERS CIDERS WINES AND RELATED DRINKS** the latest innovations and aspects of the different fermentation processes used in beer wine cider liqueur wines fruit wines low alcohol and related beverages **SPIRITS** covers distillation methods and stills used in the production of whisky cereal and cane based spirits brandy fruit spirits and liqueurs **ANALYTICAL METHODS** covering the monitoring of processes in the production of alcoholic beverages as well as



sample preparation chromatographic spectroscopic electrochemical physical sensory and organoleptic methods of analysis NUTRITION AND HEALTH ASPECTS RELATING TO ALCOHOLIC BEVERAGES includes a discussion on nutritional aspects both macro and micro nutrients of alcoholic beverages their ingestion absorption and catabolism the health consequences of alcohol and details of the additives and residues within the various beverages and their raw materials *Handbook of Enology, The Microbiology of Wine and Vinifications* Pascal Ribéreau-Gayon, Denis Dubourdieu, B. Donèche, A.

Lonvaud, 2000-04-21 For centuries the transformation of grapes into wine has been the focus of much scientific research but it was not until the nineteenth century that the role of yeasts in alcoholic fermentation was discovered Since this discovery the findings of chemists biochemists and microbiologists have led to controlled conditions in winemaking producing more varied and higher quality wines *Handbook of Enology Volume 1 The Microbiology of Wine and Vinifications* uniquely combines scientific knowledge with the description of day to day work in the first stages of winemaking from grape picking to the end of the fermentation processes It discusses the scientific basics and technological problems of wine making and the resulting consequences for the practitioner providing an authoritative and complete reference manual for both the winemaker and the student This text will be invaluable to winemakers students of enology or vinification and chemists interested in winemaking

**Wine Faults and Flaws** Keith Grainger, 2021-06-22 2022 Winner of the OIV Award in the Oenology category An essential guide to the faults and flaws that can affect wine Written by the award winning wine expert Keith Grainger this book provides a detailed examination and explanation of the causes and impact of the faults flaws and taints that may affect wine Each fault is discussed using the following criteria what it is how it can be detected by sensory or laboratory analysis what the cause is how it might be prevented whether an affected wine is treatable and if so how and the science applicable to the fault The incidences of faulty wines reaching the consumer are greater than would be regarded as acceptable in most other industries It is claimed that occurrences are less common today than in recent recorded history and it is true that the frequency of some faults and taints being encountered in bottle has declined in the last decade or two However incidences of certain faults and taints have increased and issues that were once unheard of now affect many wines offered for sale These include reduced aromas premature oxidation atypical ageing and very much on the rise smoke taint This book will prove invaluable to winemakers wine technologists and quality control professionals Wine critics writers educators and sommeliers will also find the topics highly relevant The wine loving consumer including wine collectors will also find the book a great resource and the basis for discussion at tastings with like minded associates Reviews I read this book avidly from cover to cover I'll dip into it for future reference as required which is how many will employ it Meanwhile I learned a great deal and it now influences how I think about wine evaluation I commend this excellent new book to you Consider it an investment Paul Howard *Wine Alchemy*

**Bioreactor Technology in Food Processing** Rosane F. Schwan, V. K. Joshi, Disney R. Dias, 2024-11-29 *Bioreactor Technology in Food Processing* brings peculiarities specificities and



updates on bioreactors and bioprocesses related to food and beverage production The 26 chapters of this book are the result of the participation of more than 70 professionals including professors researchers and experts from the industrial sector from different countries around the world The chapters cover such topics as history classification scale up analytical tools and mathematical and kinetic models for the operation of bioreactors in the food industry In addition chapters detail the characteristics of bioreactors for the production of food bread cheese and coffee fermentation and fermented beverages beer wine distilled beverages and organic compounds such as enzymes acids aromas and pigments biocolorants among others Key Features Describes the basic and applied aspects of bioreactor in food processing Gathers information on bioreactors that is scattered in different journals and monographs as reviews and research articles Covers various types of bioreactors including stirred tank airlift photo bioreactor and disposable bioreactors Gives a broad overview of what exactly is involved in designing a bioreactor and optimizing its performance and finally their applications in the food processing industry The broad interdisciplinary approach of this book will certainly make your reading very interesting and we hope that it can contribute to knowledge and instigate creative thinking to overcome the challenges that food bioprocessing brings us

**Ayurveda in The New Millennium** D. Suresh Kumar, 2020-11-10 Ayurveda or the sacred knowledge of longevity has been practiced in India and many Asian countries since time immemorial Interest in Ayurveda started growing all over the world in the late 1970s following the Alma Ata Declaration adopted by the W H O in 1978 Ayurveda in the New Millennium Emerging Roles and Future Challenges attempts to survey the progress made in this field and to formulate a course of action to take Ayurveda through the new millennium It also identifies the many stumbling blocks that need to be removed if Ayurveda is to cater to the needs of a wider audience Features Newer insights into the history of Ayurveda Regulatory aspects of the manufacture of ayurvedic medicines Industrial production of traditional ayurvedic medicines Quality control The scientific rationale of single herb therapy Biological effects of ayurvedic formulations Optimization of ancient wisdom and newer knowledge Conservation of threatened herbs Nutraceuticals and cosmeceuticals from Ayurveda Critical view of Ayurveda in the West Direction for the Ayurveda renaissance Ayurveda in the New Millennium Emerging Roles and Future Challenges describes the strength of Ayurveda and how to usher in the Ayurveda renaissance This book will be of interest to proponents of Ayurveda and all branches of traditional and alternative medicine Experts from the fields of medicine pharmacology new drug discovery and food technology will also find it useful *White Wine Technology* Antonio Morata, 2021-09-21 White Wine Technology addresses the challenges surrounding white wine production The book explores emerging trends in modern enology including molecular tools for wine quality and analysis of modern approaches to maceration extraction alternative microorganisms for alcoholic fermentation and malolactic fermentation The book focuses on the technology and biotechnology of white wines providing a quick reference of novel ways to increase and improve overall wine production and innovation Its reviews of recent studies and technological advancements to improve grape



maturity and production and ways to control PH level make this book essential to wine producers researchers practitioners technologists and students Covers trends in in both traditional and modern enology technologies including extraction processing stabilization and ageing technologies Examines the potential impacts of climate change on wine quality Provides an overview of biotechnologies to improve wine freshness in warm areas and to manage maturity in cold climates Includes detailed information on hot topics such as the use of GMOs in wine production spoilage bacteria the management of oxidation and the production of dealcoholized wines

Winemaking V. K. Joshi,Ramesh C. Ray,2021-02-09 Wine is one of the oldest forms of alcoholic beverages known to man Estimates date its origins back to 6000 B C Ever since it has occupied a significant role in our lives be it for consumption social virtues therapeutic value its flavoring in foods etc A study of wine production and the technology of winemaking is thus imperative The preparation of wine involves steps from harvesting the grapes fermenting the must maturing the wine stabilizing it finally to getting the bottled wine to consumers The variety of cultivars methods of production and style of wine along with presentation and consumption pattern add to the complexity of winemaking In the past couple of decades there have been major technological advances in wine production in the areas of cultivation of grapes biochemistry and methods of production of different types of wines usage of analytical techniques has enabled us to produce higher quality wine The technological inputs of a table wine dessert wine or sparkling wine are different and has significance to the consumer The role played by the killer yeast recombinant DNA technology application of enzyme technology and new analytical methods of wine evaluation all call for a comprehensive review of the advances made This comprehensive volume provides a holistic view of the basics and applied aspects of wine production and technology The book comprises production steps dotted with the latest trends or the innovations in the fields It draws upon the expertise of leading researchers in the wine making worldwide

**Advances in Grape and Wine Biotechnology** Antonio Morata,Iris Loira,2019-09-04 Advances in Grape and Wine Biotechnology is a collection of fifteen chapters that addresses different issues related to the technological and biotechnological management of vineyards and winemaking It focuses on recent advances in the field of viticulture with interesting topics such as the development of a microvine model for research purposes the mechanisms of cultivar adaptation and evolution in a climate change scenario and the consequences of vine water deficit on yield components Other topics include the metabolic profiling of different *Saccharomyces* and non *Saccharomyces* yeast species and their contribution in modulating the sensory quality of wines produced in warm regions the use of new natural and sustainable fining agents and available physical methods to reduce alcohol content This volume will be of great interest to researchers and vine or wine professionals

*Chemistry and Biology of Winemaking* Ian S Hornsey,2015-10-09 Someone once said that wine is a mixture of chemistry biology and psychology It has certainly fascinated people over the centuries and without a doubt been enjoyed by many Indeed from its serendipitous roots as an attempt to store fruit wine has been woven into the fabric of society from its use in religion to today s sophisticated products sampled over a meal The Chemistry and



Biology of Winemaking not only discusses the science of winemaking but also aims to provide the reader with a wider appreciation of the impact of oenology on human society Beginning with a history of wine the book discusses a wide range of topics with particular emphasis on the organisms involved Starting with the role of yeast in fermentation it goes on to discuss so called killer yeasts lactic acid bacteria and the role that genetically modified organisms may have in the future This book is ideal for anyone interested in the process of winemaking and will be of particular use for those with an interest in the chemical and biological sciences

*Solar Energy in the Winemaking Industry* Mervyn Smyth,James Russell,Tony Milanowski,2011-08-03 *Solar Energy in the Winemaking Industry* fully documents all aspects of the modern solar winery beginning with the main drivers environmental economic and political and detailing the current winemaking industry and solar technologies available It details the various energy demands in the winemaking process from harvest to bottling and beyond *Solar Energy in the Winemaking Industry* catalogues the range of wineries globally that have installed a substantial solar collecting system and uses case study material to give the reader an appreciation of the diversity of solar winery facilities From large industrial style wineries to boutique family run wineries from new state of the art facilities to 15th century palaces the application for solar is limitless The book deals finally with the physical design installation and operation of the solar system within the winery environment detailing the equipment methodologies processes and concerns that must be addressed in their creation This presents the reader with a range of solar design and system options including generic system type installation mounting arrangements operation different module and inverter components and configurations connection and finance Owners managers and planners involved in the design building or management of a winemaking facility will derive particular benefit from *Solar Energy in the Winemaking Industry* but it will also be of interest to anyone with an interest in the wine or solar industries

**Biology of Microorganisms on Grapes, in Must and in Wine** Helmut König,Gottfried Uden,Jürgen Fröhlich,2017-11-01 The second edition of the book begins with the description of the diversity of wine related microorganisms followed by an outline of their primary and energy metabolism Subsequently important aspects of the secondary metabolism are dealt with since these activities have an impact on wine quality and off flavour formation Then chapters about stimulating and inhibitory growth factors follow This knowledge is helpful for the growth management of different microbial species The next chapters focus on the application of the consolidated findings of molecular biology and regulation the functioning of regulatory cellular networks leading to a better understanding of the phenotypic behaviour of the microbes in general and especially of the starter cultures as well as of stimulatory and inhibitory cell cell interactions during wine making In the last part of the book a compilation of modern methods complete the understanding of microbial processes during the conversion of must to wine This broad range of topics about the biology of the microbes involved in the vinification process could be provided in one book only because of the input of many experts from different wine growing countries

**Wine Microbiology** Kenneth C. Fugelsang,2007 *Concise Encyclopedia of*



*Science and Technology of Wine* V. K. Joshi, 2021-07-21 When asking the question what is wine there are various ways to answer Wine is extolled as a food a social lubricant an antimicrobial and antioxidant and a product of immense economic significance But there is more to it than that When did humans first start producing wine and what are its different varieties Are wines nutritious or have any therapeutic values do they have any role in health or are they simply intoxicating beverages How are their qualities determined or marketed and how are these associated with tourism Concise Encyclopedia of Science and Technology of Wine attempts to answer all these questions and more This book reveals state of the art technology of winemaking describing various wine regions of the world and different cultivars used in winemaking It examines microbiology biochemistry and engineering in the context of wine production The sensory qualities of wine and brandy are explored and the composition nutritive and therapeutic values and toxicity are summarized Selected references at the end of each chapter provide ample opportunity for additional study Key Features Elaborates on the recent trends of control and modeling of wine and the techniques used in the production of different wines and brandies Focuses on the application of biotechnology especially genetic engineering of yeast bioreactor technological concepts enzymology microbiology killer yeast stuck and sluggish fermentation etc Illustrates the biochemical basis of wine production including malolactic fermentation Examines marketing tourism and the present status of the wine industry Concise Encyclopedia of Science and Technology of Wine contains the most comprehensive yet still succinct collection of information on the science and technology of winemaking With 45 chapters contributed by leading experts in their fields it is an indispensable treatise offering extensive details of the processes of winemaking The book is an incomparable resource for oenologists food scientists biotechnologists postharvest technologists biochemists fermentation technologists nutritionists chemical engineers microbiologists toxicologists organic chemists and the undergraduate and postgraduate students of these disciplines *Improving Sustainable Viticulture and Winemaking Practices* J. Miguel Costa, Sofia Catarino, Jose M. Escalona, Piergiorgio Comuzzo, 2022-03-19 Improving Sustainable Practices in Viticulture and Enology provides an up to date view on the major issues concerning the sustainability of the wine supply chain The book describes problems and solutions on the use of inputs e g water energy and emphasizes the roles and limitations of implementing circularity in the sector It identifies some of the most relevant metrics while pinpointing the most critical issues concerning the environmental impacts of wine s supply chain vineyards wineries trading This is a novel reference to help the industry excel in production while improving current environmental practices Professionals in industry academics environmentalists and anyone interested in gaining knowledge in sustainable solutions and practices in viticulture and wine production will find this resource indispensable Suggests and discusses solutions to overcome challenges imposed by adverse climate conditions Presents innovative technologies that have an impact on the efficiency of resources and recycling Includes technological tools for more precise monitoring and management in the wine supply chain **Enological Repercussions of Non-Saccharomyces Species 2.0** Antonio



Morata,2021-04-15 The use of non *Saccharomyces* yeast species is currently a biotechnology trend in enology for which they are being broadly used to improve the sensory profile of wines because they affect aroma color and mouthfeel They have become a powerful biotool to modulate the influence of global warming on grape varieties helping to maintain the acidity decrease the alcoholic degree stabilize wine color and increase freshness In cool climates some non *Saccharomyces* can promote demalication or color stability by the formation of stable derived pigments Additionally non *Saccharomyces* yeasts open new possibilities in biocontrol for removing spoilage yeast and bacteria or molds that can produce and release mycotoxins and thereby help in reducing applied SO<sub>2</sub> levels



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