

Edited by  
Alfonso V. Cornejo  
Rosario Muñoz  
Ramón González



# Molecular Wine Microbiology



# Molecular Wine Microbiology

**Aline Lonvaud, Linda F. Bisson**



## **Molecular Wine Microbiology:**

**Molecular Wine Microbiology** Alfonso V. Carrascosa Santiago, Rosario Munoz, Ramon Gonzalez Garcia, 2011-05-23  
Molecular Wine Microbiology features rigorous scientific content written at a level comprehensible for wine professionals as well as advanced students. It includes information on production and spoilage issues, the microbial groups relevant for wine production and microbial wine safety. Microbiology has long been recognized as a key tool in studying wine production; however, only recently have wine microbiology studies been addressed at a molecular level, increasing the understanding of how microbiology impacts not only the flavor quality of the wine but also its safety. Understanding at a molecular level how a starter culture can impact ethanol, glycerol, volatile phenols, mannoproteins, biogenic amines, or ochratoxin A of a wine are just some of the core points that must be considered in order to achieve maximum consumer acceptability while addressing safety concerns during processing and storage. While other books offer insights into the technological aspects of enology, this book is written by expert microbiologists who explore the positive and negative impacts of gene function in the production of wine from a microbiological point of view. Winner of the 2012 Jury Award in Enology from the International Organisation of Vine and Wine. Presents the most current methods of studying the microbiology of wine. Includes latest identification and typing methods, reducing identification time from days and weeks to minutes and hours. Provides important knowledge about the impact of microbiological factors at the molecular level for reduction of wine spoilage and increased wine quality and safety.

*Wine Microbiology* K. C. Fugelsang, 1997. This reference is designed to meet the practical needs of winery personnel working in the areas of microbiological surveillance and quality control. Topics covered include microbiology in the vineyard, pre-fermentation processing and sanitation.

*Wine Microbiology and Biotechnology* Graham H. Fleet, 1993-01-01. Wine Microbiology and Biotechnology presents developments in fermentation technology, enzyme technology, and technologies for the genetic engineering of microorganisms in a single volume. The book emphasizes the diversity of microorganisms associated with the winemaking process and broadens the discussion of winemaking to include more modern concepts of biotechnology and molecular biology. In each chapter, recognized authorities in their field link the scientific fundamentals of microbiology, biochemistry, and biotechnology to the practical aspects of wine production and quality. They also provide relevant historical background and offer directions for future research.

*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 patterns, 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

### **Yeasts in the Production of Wine**

Patrizia Romano, Maurizio Ciani, Graham H. Fleet, 2019-09-16 It is well established that certain strains of yeasts are suitable for transforming grape sugars into alcohol while other yeast strains are not suitable for grape fermentations Recent progress has clearly demonstrated that the sensory profile of a wine is characteristic of each vine cultivated and the quality and technological characteristics of the final product varies considerably due to the strains which have performed and or dominated the fermentation process Because of their technological properties wine yeast strains differ significantly in their fermentation performance and in their contribution to the final bouquet and quality of wine such as useful enzymatic activities and production of secondary compounds related both to wine organoleptic quality and human health The wine industry is greatly interested in wine yeast strains with a range of specialized properties but as the expression of these properties differs with the type and style of wine to be made the actual trend is in the use of selected strains which are more appropriate to optimize grape quality Additionally wine quality can be influenced by the potential growth and activity of undesirable yeast species considered spoilage yeasts which cause sluggish and stuck fermentation and detrimental taste and aroma in the wine

### **Understanding Wine Microbiota: Challenges and Opportunities**

Aline Lonvaud, Linda F. Bisson, 2019-08-16 Wine yeast and bacteria have been extensively characterized in terms of physiological and metabolic traits largely in pure culture analyses Winemaking practices derived from this basic knowledge have undoubtedly improved wine quality Phylogenetic studies and genome comparisons in extensive collections have revealed the processes of evolution and adaptation of the two main microbial species *Saccharomyces cerevisiae* and *Oenococcus oeni* present in wine However grapes and grape juice contain a variety of microorganisms and these principal agents of fermentation are in fact part of a complex microbial community that evolves dynamically in a special niche Thanks to the new methods of analysis the complexity of the microbiota can be measured in any sample of must or wine In addition there is greater appreciation of diversity within the main species present in wine Intraspecific diversity has been evaluated in yeast and bacteria species and strains can be typed even in the mixture of selected or indigenous strains Descriptions of microbial profiles in all the regions of the world suggest that the microbiota is a significant element of terroir or regional signature It is no longer enough to simply describe what is present It is important to consider evolution physiology and metabolism taking into account microbial

interactions within the community Research in wine microbiology has also expanded our understanding of the participation and role of non *Saccharomyces* organisms in winemaking and refined knowledge on microbial spoilage However it is challenging to go from the simple description of these phenomena to their interpretation The greatest difficulty lies in analyzing the functioning of the extraordinary complex system of yeast and bacteria present during different stages of the fermentation Interactions in the very particular environment of fermenting grape induce alternations of relative populations dominances and declines with subsequent impacts on wine composition Some mechanisms have been identified or suggested but much remains to be done The recent advent of inoculation with non *Saccharomyces* in oenological practice sometimes leading to inconstant results reflects the profound gaps that exist in knowledge of the complexity of fermentation and wine microbial ecosystems Understanding how the microbial community works is expected to provide a sound basis before using fermentation helpers and starters taking into account the indigenous microbiota It will also aid in monitoring and understanding native or uninoculated fermentations that rely on the complex interactions of grape winery and fermentation biota for their aroma and flavor profile The aim of this Research Topic was to bring together current knowledge on several key aspects of wine microorganism biology i Evolution co evolution of yeasts and bacteria in their process of domestication and adaptation to the oenological niche ii Mechanisms of interactions between species and strains both on grapes and in grape must iii Metabolism and physiology of yeast and bacteria in interactions with each other and with the environment considering to what extent expected objectives typicity lower alcohol etc can be reached by using selected strains iv Development of novel technologies or approaches for the assessment of changes in a dynamic microbial community and the linking of such changes to wine flavor and aroma properties v Diversity ecology physiology and metabolism of *B. bruxellensis* Damage from this spoilage agent is not effectively prevented because we do not fully understand the biology of this species particularly in interaction with other yeast and bacteria Each chapter presents advances in these areas of study Research in wine microbiology particularly in the wine microbiome and its impacts on wine composition is enhancing our understanding of the complexities and dynamics of microbial food and beverage ecosystems 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 Fermentation** Harald Claus,2019-03-28 Wineries are facing new challenges due to actual market demands for the creation of products exhibiting more particular flavors In addition climate change has lead to the requirement for grape varieties with specific features such as convenient maturation times enhanced tolerance towards dryness osmotic stress and resistance against plant pathogens The next generation of yeast starter cultures should produce wines with an appealing sensory profile and less alcohol This Special Issue comprises actual studies addressing some of the problems and solutions for the environmental technical and consumer challenges of wine making today Development of sophisticated mass spectroscopic methods enable the identification of the major metabolite spectrum of grapes wine and deliver detailed insights in terroir and yeast specific traits Knowledge of the origin and reactions of reductive sulphur compounds facilitates the avoidance of unpleasant wine odors Innovative physical chemical treatments support effective and sustainable color extraction from red grape varieties Enological enzymes from yeasts used directly or in the form of starter cultures are promising tools to increase the juice yields color intensity and aroma of wine Natural and artificial *Saccharomyces* hybrids as well as collections of adapted wild isolates from various ecological niches will extend winemakers repertoire allowing individual fermentations Exact process control of wine fermentations by convenient computer programs will guarantee consistently high product quality **Wine Science** Ronald S. Jackson,2020-04-04 Wine Science Principles and Applications Fifth Edition delivers in depth information and expertise in a single science focused volume including all the complexities and nuances of creating a quality wine product From variety to the chemistry that transforms grape to fruit to wine the book presents sections on the most important information regarding wine laws authentication the latest technology used in wine production and expert insights into the sensory appreciation of wine and its implications in health This book is ideal for anyone seeking to understand the science that produces quality wines of every type Presents thorough explanations of viticulture and winemaking principles from grape to taste bud Addresses historical developments in wine production notably sparkling wines Provides techniques in grapevine breeding notably CRISPR Compares production methods in a framework that provides insights into the advantages and disadvantages of each **Acetic Acid Bacteria** Ilkin Yucel Sengun,2017-06-28 This book written by leading international authorities in the field covers all the basic and applied aspects of acetic acid bacteria It describes the importance of acetic acid bacteria in food industry by giving information on the microbiological properties of fermented foods as well as production procedures Special attention is given to vinegar and cocoa which are the most familiar and extensively used industrial applications of acetic acid bacteria This book is an essential reference to all scientists technologists engineers students and all those working in the field of food science and technology *Science and Technology of Fruit Wine Production* Maria R. Kosseva,V.K. Joshi,P.S.

Panesar,2016-11-01 Science and Technology of Fruit Wine Production includes introductory chapters on the production of wine from fruits other than grapes including their composition chemistry role quality of raw material medicinal values quality factors bioreactor technology production optimization standardization preservation and evaluation of different wines specialty wines and brandies Wine and its related products have been consumed since ancient times not only for stimulatory and healthful properties but also as an important adjunct to the human diet by increasing satisfaction and contributing to the relaxation necessary for proper digestion and absorption of food Most wines are produced from grapes throughout the world however fruits other than grapes including apple plum peach pear berries cherries currants apricot and many others can also be profitably utilized in the production of wines The major problems in wine production however arise from the difficulty in extracting the sugar from the pulp of some of the fruits or finding that the juices obtained lack in the requisite sugar contents have higher acidity more anthocyanins or have poor fermentability The book demonstrates that the application of enzymes in juice extraction bioreactor technology and biological de acidification MLF bacteria or de acidifying yeast like *Schizosaccharomyces pombe* and others in wine production from non grape fruits needs serious consideration Focuses on producing non grape wines highlighting their flavor taste and other quality attributes including their antioxidant properties Provides a single volume resource that consolidates the research findings and developed technology employed to make wines from non grape fruits Explores options for reducing post harvest losses which are especially high in developing countries Stimulates research and development efforts in non grape wines      *Frontiers and New Trends in the Science of Fermented Food and Beverages* Rosa Lidia Solís-Oviedo,Ángel De La Cruz Pech-Canul,2019-02-20 From time immemorial fermented foods have undoubtedly contributed to the progress of modern societies Historically ferments have been present in virtually all human cultures worldwide and nowadays natives from many ancient cultures still conduct a wide variety of food fermentations using deep rooted recipes and processes Within the last four centuries scientific research has started to unravel many aspects of the biological process behind fermentations which has contributed to the improvement of many industrial processes During our journey in the research field we have always been attracted to the development of scientific research around fermentations especially autochthonous ferments a natural repository of novel biomolecules and biological processes that will positively impact on many application fields from health to food to materials      Yeast Antonio Morata,Iris Loira,2017-11-08 Yeast Industrial Applications is a book that covers applications and utilities of yeasts in food chemical energy and environmental industries collected in 12 chapters The use of yeasts in the production of metabolites enzymatic applications fermented foods microorganism controls bioethanol production and bioremediation of contaminated environments is covered showing results methodologies and processes and describing the specific role of yeasts in them The traditional yeast *Saccharomyces cerevisiae* is complemented in many applications with the use of less known non *Saccharomyces* yeasts that now are being used extensively in industry This book compiles the experience and know how of

researchers and professors from international universities and research centers      *REVOLUTIONARY ENOLOGY* DAVID SANDUA,2024-04-08 Revolutionary Enology immerses the reader in the exciting world of modern winemaking revealing how technology and innovation are transforming this ancient tradition From advanced fermentation techniques to sustainable winemaking practices the book explores the advances that are improving the quality taste and sustainability of wines With a focus on new grape varieties pest control and advanced vineyard management this work is a testament to the dynamism and creativity in contemporary enology offering a fresh and insightful look at the art and science of winemaking      *Wine Safety, Consumer Preference, and Human Health* M. Victoria Moreno-Arribas,Begoña Bartolomé Suáldea,2016-02-04 The book describes emergent investigations related to wine safety and quality showing the relationship between these concerns and consumer preferences with a special emphasis on the beneficial effects of wine on human health The first part of the book describes the most relevant aspects of wine safety emphasizing the advances offered by new technologies and biotechnological progress as well as the impact of global climate change The second part deals with consumer preferences a topic little discussed in previous texts but that has gained traction not only from the scientific point of view but also at the industrial and social level Finally the last section provides an opportunity for deeper recapitulation of the beneficial effects of wine and its components on human health including novel experimental approaches and data interpretation From the point of view of chemical and sensory complexity as well as human health wine is a model product that has been the focus of extensive research with findings over the last several years being of increasing interest to winemakers researchers and consumers      **Issues in General Food Research: 2011 Edition** ,2012-01-09 Issues in General Food Research 2011 Edition is a ScholarlyEditions eBook that delivers timely authoritative and comprehensive information about General Food Research The editors have built Issues in General Food Research 2011 Edition on the vast information databases of ScholarlyNews You can expect the information about General Food Research in this eBook to be deeper than what you can access anywhere else as well as consistently reliable authoritative informed and relevant The content of Issues in General Food Research 2011 Edition has been produced by the world s leading scientists engineers analysts research institutions and companies All of the content is from peer reviewed sources and all of it is written assembled and edited by the editors at ScholarlyEditions and available exclusively from us You now have a source you can cite with authority confidence and credibility More information is available at <http://www.ScholarlyEditions.com>      **Managing Wine Quality** Andrew G. Reynolds,2021-12-03 Managing Wine Quality Volume 2 Oenology and Wine Quality Second Edition brings together authoritative contributions from experts across the world s winemaking regions who cover yeasts fermentation enzymes and stabilization amongst other topics A new chapter covers in detail extraction technologies and wine quality Other sections cover the management of wine sensory quality with new chapters covering the management of fortified wines of Botrytized wines and of wines produced from dried grapes In addition an updated section on insect taints in wine has been widened to



cover all insects With a focus on recent studies advanced methods and a look to future technologies this fully updated edition is an essential reference for anyone involved in viticulture and oenology who wants to explore new methods understand different approaches and refine existing practices Reviews our current understanding of yeast and fermentation management as well as the effects of aging on wine quality Details alternatives to cork in bottle closing and the latest developments in the stabilization and clarification of wines Includes new chapters covering extraction technologies for wine quality and on managing the quality of a wide range of wine types including fortified and Botryized wines Provides extensively expanded coverage of insect taints and their effects on wine quality *Wine Chemistry and Biochemistry* M. Victoria

Moreno-Arribas, Carmen Polo, 2008-11-06 The aim of this book is to describe chemical and biochemical aspects of winemaking that are currently being researched The authors have selected the very best experts for each of the areas The first part of the book summarizes the most important aspects of winemaking technology and microbiology The second most extensive part deals with the different groups of compounds how these are modified during the various steps of the production process and how they affect the wine quality sensorial aspects and physiological activity etc The third section describes undesirable alterations of wines including those affecting quality and food safety Finally the treatment of data will be considered an aspect which has not yet been tackled in any other book on enology In this chapter the authors not only explain the tools available for analytical data processing but also indicate the most appropriate treatment to apply depending on the information required illustrating with examples throughout the chapter from enological literature **Phenolic Compounds**

**in Fruit Beverages** António Manuel Jordão, 2018-07-02 This book is a printed edition of the Special Issue Phenolic Compounds in Fruit Beverages that was published in *Beverages* [Handbook of Food Spoilage Yeasts](#) Tibor

Deak, 2007-11-16 Far more than a simple update and revision the *Handbook of Food Spoilage Yeasts* Second Edition extends and restructures its scope and content to include important advances in the knowledge of microbial ecology molecular biology metabolic activity and strategy for the prohibition and elimination of food borne yeasts The author incorporates new

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