V. 1. THE MICROBIOLOGY OF WINE AND VINIFICATIONS pdf

1: Handbook of Enology, Volume 1: The Microbiology of Wine and Vinifications by Pascal RibÃ©reau-Gayo

In , the first edition of the Handbook of Enology volume 1"The microbiology of wine and vinification" provided an overview ofscientific knowledge at that time and its application in techniquescommonly used during the first stage in winemaking, from the grapeharvest to the end of the fermentation processes.

Multiplier to pass from one expression of total or volatile acidity to another viii Remarks Concerning the Expression of Certain Parameters of Must and Wine Composition expressed in acetic acid. It is rarely expressed in milliequivalents per liter. The below table also allows simple conversion from one expression to another. This measurement is always determined by physical, densimetric or refractometric analysis. The expression of the results can be given according to several scales: Presently, two systems exist Section Today, the EC recommends using Different methods varying in precision exist to calculate the TAP from a density reading. These methods take various elements of must composition into account Boulton et al. Degree Brix expresses the percentage of sugar in weight. By multiplying degree Brix by 10, the weight of sugar in 1 kg, or slightly less than 1 liter, of must is obtained. Within the alcohol range most relevant to enology, degree Brix can be multiplied by 10 and then divided by 17 to obtain a fairly good approximation of the TAP. In any case, the determination of the Brix or TAP of a must is approximate. First of all, it is not always possible to obtain a representative grape or must sample for analysis. Secondly, although physical, densimetric or refractometric measurements are extremely precise and rigorously express the sugar concentration of a sugar and water mixture, these measurements are affected by other substances released into the sample from the grape and other sources. Furthermore, the concentrations of these substances are different for every grape or grape must sample. The widespread use of selected yeast strains has lowered the sugar conversion rate. Measurements Using Visible and Ultraviolet Spectrometry The measurement of optic density, absorbance, is widely used to determine wine color Volume 2, Section 6. In these works, the optic density is noted as OD, OD yellow , OD red , OD blue or OD absorption in ultraviolet spectrum to indicate the optic density at the indicated wavelengths. Wine color intensity is expressed as: Tint is expressed as: In fact, through their passion for wine, great scientists have not only contributed to the development of practical enology but have also made discoveries in the general field of science. A forerunner of modern enology, Louis Pasteur developed simplified contagious infection models for humans and animals based on his observations of wine spoilage. The following quote clearly expresses his theory in his own words: Each applied development has lead to better control of winemaking and aging conditions and of course wine quality. In order to continue this approach, researchers and winemakers must strive to remain up to date with the latest scientific and technical developments in enology. Laborde ; Treatise on Enology J. Peynaud and ; Treatise on Enology 2 Volumes J. Peynaud and ; Wine and Winemaking E. Peynaud and ; Wine Science and Technology 4 volumes J. For an understanding of current advances in enology, the authors propose this book Handbook of Enology Volume 1: The Chemistry of Wine: Although written by researchers, the two volumes are not specifically addressed to this group. Young researchers may, however, find these books useful to help situate their research within a particular field of enology. Today, the complexity of modern enology does not permit a sole researcher to explore the entire field. These volumes are also of use to students and professionals. Theoretical interpretations as well as solutions are presented to resolve the problems encountered most often at wineries. The authors have adapted these solutions to many different situations and winemaking methods. In order to make the best use of the information contained in these works, enologists should have a broad understanding of general scientific knowledge. For example, the understanding and application of molecular biology and genetic engineering have become indispensable in the field of wine microbiology. Similarly, structural and quantitative physiochemical analysis methods such as chromatography, x NMR and mass spectrometry must now be mastered in order to explore wine chemistry. The goal of these two works was not to create an exhaustive bibliography of each subject. The authors strove to choose only the most relevant and significant publications to their particular field of research. A large number of references to French enological research has been included in these works in order to make this information available to a larger non-French-speaking

audience. In addition, the authors have tried to convey a French and more particularly a Bordeaux perspective of enology and the art of winemaking. The role of enology is to express the characteristics of the grape specific not only to variety and vineyard practices but also maturation conditions, which are dictated by soil and climate. Certainly, these facilities do benefit the most from high performance installations and automation of operations. Yet, history has unequivocally shown that the most important enological developments in wine quality for example, malolactic fermentation have been discovered in ultra premium wines. The corresponding techniques were then applied to less prestigious products. High performance technology is indispensable for the production of great wines, since a lack of control of winemaking parameters can easily compromise their quality, which would be less of a problem with lower quality wines. Vinification describes the first phase of winemaking. It comprises all technical aspects from grape maturity and harvest to the end of alcoholic and sometimes malolactic fermentation. Aging specifically refers to the transformation of bottled wine. This distinction of two phases is certainly the result of commercial practices. Traditionally in France, a vine grower farmed the vineyard and transformed grapes into an unfinished wine. The wine merchant transferred the bulk wine to his cellars, finished the wine and marketed the product, preferentially before bottling. In countries with a more recent viticultural history, generally English speaking, the vine grower is responsible for winemaking and wine sales. For this reason, the Anglo-Saxon tradition speaks of winemaking, which covers all operations from harvest reception to bottling. In this manner, the individual operations could be linked to their particular sciences. There are of course limits to this approach. Chemical phenomena occur during vinification; the stabilization of wines during storage includes the prevention of microbial contamination. Consequently, the description of the different steps of enology does not always obey logic as precise as the titles of these works may lead to believe. For example, microbial contamination during aging and storage are covered in Volume 1. The antiseptic properties of SO2 incited the description of its use in the same volume. This line of reasoning lead to the description of the antioxidant related chemical properties of this compound in the same chapter as well as an explanation of adjuvants to sulfur dioxide: In addition, the on lees aging of white wines and the resulting chemical transformations cannot be separated from vinification and are therefore also covered in Volume 1. Finally, our understanding of phenolic compounds in red wine is based on complex chemistry. All aspects related to the nature of the Preface to the First Edition corresponding substances, their properties and their evolution during grape maturation, vinification and aging are therefore covered in Volume 2. These works only discuss the principles of equipment used for various enological operations and their effect on product quality. For example, temperature control systems, destemmers, crushers and presses as well as filters, inverse osmosis machines and ion exchangers are not described in detail. Bottling is not addressed at all. An in-depth description of enological equipment would merit a detailed work dedicated to the subject. Wine tasting, another essential role of the winemaker, is not addressed in these works. Many related publications are, however, readily available. Finally, wine analysis is an essential tool that a winemaker should master. It is, however, not covered in these works except in a few particular xi cases i. The authors thank the following people who have contributed to the creation of this work: Casas Lucas, Chapter 14, Sherry; A. Brugirard, Chapter 14, Sweet wines; J. Maujean, Chapter 14, Champagne; C. Poupot for the preparation of material in Chapters 1, 2 and 13; Miss F. LuyeTanet for her help with typing. They also thank Madame B. Masclef in particular for her important part in the typing, preparation and revision of the final manuscript. The Handbook has apparently been popular with students as an educational reference book, as well as with winemakers, as a source of practical solutions to their specific technical problems and scientific explanations of the phenomena involved. It was felt appropriate at this stage to prepare an updated, reviewed, corrected version, including the latest enological knowledge, to reflect the many new research findings in this very active field. The outline and design of both volumes remain the same. Some chapters have changed relatively little as the authors decided there had not been any significant new developments, while others have been modified much more extensively, either to clarify and improve the text, or, more usually, to include new research findings and their practical applications. Entirely new sections have been inserted in some chapters. We have made every effort to maintain the same approach as we did in the first edition, reflecting the ethos of enology research in Bordeaux. We use indisputable scientific evidence in microbiology, biochemistry, and chemistry to explain

the details of mechanisms involved in grape ripening, fermentations and other winemaking operations, aging, and stabilization. The aim is to help winemakers achieve greater control over the various stages in winemaking and choose the solution best suited to each situation. Quite remarkably, this scientific approach, most intensively applied in making the finest wines, has resulted in an enhanced capacity to bring out the full quality and character of individual terroirs. Scientific winemaking has not resulted in standardization or leveling of quality. On the contrary, by making it possible to correct defects and eliminate technical imperfections, it has revealed the specific qualities of the grapes harvested in different vineyards, directly related to the variety and terroir, more than ever before. Interest in wine in recent decades has gone beyond considerations of mere quality and taken on a truly cultural dimension. This has led some people to promote the use of a variety of techniques that do not necessarily represent significant progress in winemaking. Some of these are simply modified forms of processes that have been known for many years. Others do not have a sufficiently reliable scientific interpretation, nor are their applications clearly defined.

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[(Handbook of Enology: Microbiology of Wine and Vinifications v. 1)] [Author: Pascal Ribereau-Gayon] published on (February,) Hardcover - February 1, out of 5 stars 2 customer reviews See all 4 formats and editions Hide other formats and editions.

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