Editorial

Improving Wine Quality and Safety

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Wine is a product that can be characterized both as a commodity but also as a luxury, depending on its price. For fine wines, quality is of the outmost importance, while notions such as safety and integrity are equally necessary for their price justification. Indeed, a premium wine should first be safe to consume, present high-quality characteristics and have the means to communicate its superiority [1]. Wine quality is linked to wine appreciation and it is thus a term easier to perceive than to describe since there is not a direct way to measure it [2]. Various parameters such as viticultural processes and practices, climatic conditions, winemaking techniques, processing methods, and ageing modalities can all have a strong effect on wine quality. Although advanced analytical methods to determine grape and wine chemical composition (such as acidity, polyphenolic and volatile content, color, etc.) exist, it is not possible to construct a predictive equation for evaluating the relative importance of each one of the factors that contribute to the final quality.

Appreciation of a wine depends on the individual's experience and it is measured by subjective and individualistic criteria. Wine faults are generally more recognizable than the positive quality parameters which tend to be more elusive. However, well-trained, and experienced wine judges agree rather consistently in their overall evaluation of a wine's quality based on clearly defined quality standards [3]. Sensory evaluation is thus the most efficient method to assess the final wine quality.

The first research work of this Special Issue by Hayward et al. [4] deals with the effect that disclosure of production methods (such as sustainable practices) would have on consumers' sensory perceptions, as well as with the attributes used by consumers to describe Nova Scotia sparkling wines. By using projective mapping and ultra-flash profiling methods, this study showed that consumers could separate the wines based on two categories of descriptors, namely fruit- and earth-like attributes. In addition, an important finding and perhaps unexpected was that disclosing the production methods did not impact the participants' sensory perceptions of the sparkling wines.

Another study of this issue by Tarasov et al. [5] also had a sensory focus, and tested the hypothesis of whether the way that a wine is cooled (slowly in a refrigerator or rapidly in an ice–water–salt solution) could affect its perceived quality. The study included the use of both triangle tests and alternative forced choice (3-AFC) tests applied on sparkling, white and red wines, and demonstrated that no perceivable differences between the quickly and slowly cooled wine samples were noticeable.

An important part of the commercial value of a wine relies on varieties and regions of origin (geographical) since wine marketing strategies focus on associating the product image and the perception of quality with a specific region and/or variety. Determination of wine authenticity is one of the most crucial issues that has gained a lot of interest internationally [1]. As adulteration of wine is an ongoing problem, there is a need for suitable analytical approaches to get more insights into the chemical composition and its changes associated with adulteration [6]. This problem was studied in the article by Aceto et al. [7], in which the development of authentication methods to distinguish among

the different wines made with Barbera variety (Barbera d'Asti and Nizza DOCG wines) was proposed. In particular, trace and ultra-trace elements of the wines were determined by inductively coupled plasma (ICP) analysis and particular emphasis was given to the lanthanides. A key conclusion resulting from processing the data by multivariate analysis showed that the oenological practices (e.g., length of barrel ageing) were more important than geographical origin for wine classification.

Another research work of this Special Issue published by Izquierdo and Saurina [8] also deals with wine classification, namely that of sparkling wines from the protected designation of origin Cava (Spain). Phenolic acid content (hydroxybenzoic and hydroxycinnamic acids, determined by HPLC) combined with chemometric analysis allowed for an excellent classification of Cava wines according to the grape varieties used for their production, but also to the blends and winemaking processes (e.g., malolactic fermentation) used. The classification models established were validated with unknown samples thus proving the potentiality for the proposed approach to be used for characterization and authentication purposes.

Only one article of this Special Issue, published by Fuentes et al. [9], focuses on the role of a viticultural aspect, namely on the study, by NIR and Machine Learning, of the impact that berry cell death can have on the development of flavors and aromas in berries and consequently wine sensory quality. The proposed approach allowed the collection of information on the dynamics of berry cell death in Pinot Noir vineyards with different climatic characteristics, and the authors proposed that this information could be used by grapegrowers and winemakers to guide berry cell death in order to modify grape and wine composition for the production of wines with specific quality traits.

Moving to the cellar, the article by Ricci et al. [10] looks at the effect of pre-fermentative application of pulsed electric field on the extractability of anthocyanins and polyphenols in early harvested Sangiovese red grapes. Given the relevance that phenolic extraction has for red wine quality [11], this project aimed at offering a technological solution to winemakers needing to harvest grapes before they reach their optimal maturity (e.g., for disease pressure, adverse climatic conditions, logistical constraints). In this context, pulsed electric field was shown to allow for an increased extraction of phenolic compounds from the skins of grapes not fully ripe, and this increased the wine's color intensity while limiting the length of maceration and consequently the potential for the extraction of unwanted compounds from the skins.

Lastly, the paper by Zhang et al. [12] outlines the influence of Cu(II) and SO_2 concentrations in Chardonnay juice or Shiraz must on the respective wine composition. The fate of these compounds was monitored at different vinification stages, as was the volatile profile of the produced wines. Key findings indicate that Cu and SO_2 concentrations in grape juice/must can have long-term implications for wine composition. In particular, the modification of the initial content of Cu and SO_2 in grape juice/must could influence positively or negatively the concentrations of different classes of volatile compounds.

To conclude, this Special Issue includes seven research articles produced by scientists operating in Canada, Australia, Spain, Italy, Greece and Germany. As introduced in this editorial, wine quality is a concept that is extremely complex, vast and not easy to define, but the studies presented in this issue have contributed to the development of our understanding in the key areas of wine production that influence the final wine quality.

References

1. Basalekou, M.; Pappas, C.; Tarantilis, P.A.; Kallithraka, S. Wine Authenticity and Traceability with the Use of FT-IR. *Beverages* **2020**, *6*, 30. [CrossRef]
2. Jackson, R.S. *Wine Science: Principles and Applications*, 3rd ed.; Elsevier Academic Press: Cambridge, MA, USA, 2008; ISBN 9780123736468.
3. Jackson, R.S. *Wine Tasting: A Professional Handbook*, 3rd ed.; Elsevier Academic Press: Cambridge, MA, USA, 2017.
4. Hayward, L.; Barton, A.; McSweeney, M.B. Investigating How the Disclosure of Production Methods Influences Consumers' Sensory Perceptions of Sparkling Wines. *Beverages* **2020**, *6*, 66. [CrossRef]
5. Tarasov, A.; Wagenitz, J.; Pfeifer, W.; Schuessler, C.; Jung, R. Cooling Shock for Bottled Wine. How Dramatic Is This before Tasting? *Beverages* **2020**, *6*, 62. [CrossRef]
6. Mayr, C.M.; De Rosso, M.; Vedova, A.D.; Flamini, R. High-Resolution Mass Spectrometry Identification of Secondary Metabolites in Four Red Grape Varieties Potentially Useful as Traceability Markers of Wines. *Beverages* **2018**, *4*, 74. [CrossRef]
7. Aceto, M.; Gulino, F.; Calà, E.; Robotti, E.; Petrozziello, M.; Tsolakis, C.; Cassino, C. Authentication and Traceability Study on *Barbera d'Asti* and *Nizza* DOCG Wines: The Role of Trace- and Ultra-Trace Elements. *Beverages* **2020**, *6*, 63. [CrossRef]
8. Izquierdo-Llopart, A.; Saurina, J. Liquid Chromatographic Approach for the Discrimination and Classification of Cava Samples Based on the Phenolic Composition Using Chemometric Methods. *Beverages* **2020**, *6*, 54. [CrossRef]
9. Fuentes, S.; Tongson, E.; Chen, J.; Viejo, C.G. A Digital Approach to Evaluate the Effect of Berry Cell Death on Pinot Noir Wines' Quality Traits and Sensory Profiles Using Non-Destructive Near-Infrared Spectroscopy. *Beverages* **2020**, *6*, 39. [CrossRef]
10. Ricci, A.; Parpinello, G.P.; Banfi, B.A.; Olivi, F.; Versari, A. Preliminary Study of the Effects of Pulsed Electric Field (PEF) Treatments in Wines Obtained from Early-Harvested Sangiovese Grapes. *Beverages* **2020**, *6*, 34. [CrossRef]
11. Gutiérrez-Escobar, R.; Aliaño-González, M.; Cantos-Villar, E. Wine Polyphenol Content and Its Influence on Wine Quality and Properties: A Review. *Molecules* **2021**, *26*, 718. [CrossRef] [PubMed]
12. Zhang, X.; Kontoudakis, N.; Blackman, J.W.; Clark, A.C. Copper(II) and Sulfur Dioxide in Chardonnay Juice and Shiraz Must: Impact on Volatile Aroma Compounds and Cu Forms in Wine. *Beverages* **2019**, *5*, 70. [CrossRef]