Certificates of Analysis and Wine Authenticity

1. Introduction

Wine authenticity is of great importance throughout the wine supply chain and market. Consumers need to have confidence that what is claimed on the label is accurate in relation to the contents of the container. Reputable producers' businesses may be threatened if they are undercut in the marketplace by products that make false claims related to authenticity. Conversely, it is equally important that a legitimate product is not miscategorised as fraudulent. Finally, there may be revenue implications for the administration of excise taxes for products that are deliberately mislabelled. It is critical, then, that steps are taken to safeguard and enhance the authenticity of wine in international trade.

It is fair to say that wine in international trade is sometimes subject to authenticity issues. These will most often affect products of higher value and will take the form of a misrepresentation of the vintage year, the grape variety or the geographic origin of the product being offered for sale.

In nearly every economy, certificates of analysis are required at some point in the trading process. Among the reasons given for these requests are that they provide assurances with regard to the following aspects of the product:

- the products pose no risk to health and safety,
- the products are truthfully described on the labels attached to the containers (authenticity)
- the products are of suitable quality.

In an earlier FIVS paper[1], the common analyses requested on certificates of analysis were reviewed and it was demonstrated that they provide no meaningful information concerning the safety of the product being traded. For this reason, it is difficult to justify the cost of the analysis and the administrative activity inherent in developing certificates of analysis if some assurance regarding food safety is the motivation.

This paper will seek to show that the common analyses requested on certificates of analysis are also unhelpful in demonstrating that products are accurately described on the labels attached.

In a separate paper, the issue of product quality will be examined in relation to the common analyses requested on certificates of analysis.

[1] FIVS (2017), Certificates of Analysis and Wine Safety. Paris, France.

It is important to remember that certificates of analysis do not function alone as attempts to ensure the safety, authenticity or quality of the product.

2. Analysis Requirement

Most analytical requirements related to certificates of analysis for wine are unsuited for establishing the authenticity of the product for the consumer since they are not related to those parameters which might be linked to wine authenticity, or may require analysis to be performed where wine by its very nature will always be compliant (e.g., in the case of specifications for absence of pathogenic micro-organisms in wine).

Requirements for certificates of analysis for various wine-importing economies around the world have included over fifty different analytes. Some examples of these include[2]:

Appearance	Hybrids	Stability at -5°C
Bacteria, cultured	Iron	Sucrose
Calories	Lead	Sugar Free Extract
Citric Acid	Limpidity	Titratable Acidity (TA)
Colour (sensory evaluation)	Methanol	Total Alcoholic Strength
Copper	Molecular Sulphur Dioxide (SO_2)	Total Dry Extract
Density	pH	Total Sugar (Reducing Sugar - Inverted)
Ethanol	Reducing Sugar	Total Sugar
Free Sulphur Dioxide (SO_2)	Remaining Extract	Total Sulphur Dioxide (SO_2)
Fungus, cultured	Sorbic Acid	Volatile Acidity (VA)
Gas Pressure at 20°C	Specific Gravity	Volume per Bottle
Glucose + Fructose (sugars)	Stability at 55°C	Yeast, cultured

These common analytes can be grouped as follows: health and safety, wine quality and legality, additive levels, typical wine parameters, microbiological and physical characteristics.

2.1 Health and Safety

As noted earlier in this document, previous work has been done that demonstrated that the analyses often requested on certificates of analysis provide no meaningful information concerning the safety of the product being traded.

The tests from this exhaustive list above which could be considered as possibly representing health or safety concerns were total sulphur dioxide (SO2), methanol and metals such as lead or copper.

Of these constituents, none can be considered to be indicators of authenticity. The concentrations found in different wines typically overlap, and the variations for vintage, geographic area or variety are not large enough to substantiate the authenticity of the wine being

[2] ETS Labs (2017), Analysis for Exports. St. Helena, California, USA.

tested. Therefore, these constituents should not be considered as effective indicators of authenticity.

2.2 Wine Quality and Legality

This group of parameters might include ethanol, methanol, volatile acidity and gas pressure. These classify wines with regard to their legal status (i.e., tax class) or are an indication of the care taken during winemaking, storage and bottling.

With regard to their suitability for authenticity verification, these constituents fall within a fairly narrow range of values, especially for ethanol and volatile acidity. It might be argued that methanol could be considered an indicator of authenticity, but if a wine were tested and found to be so high that the authenticity of the wine was in question, then the wine would exceed international recommendations for the maximum methanol content, and this would tend to render the authenticity question moot. Gas pressure is typically measured in order to classify the wine as a still wine or a sparkling wine, and despite the fact it gives some information about the carbon dioxide concentration in the wine, the gas pressure gives absolutely no indication of the authenticity of the wine.

2.3 Additive Levels

The compounds that make up this group include citric acid, copper and sorbate (sorbic acid). These are added to wine in very small, and very specific, amounts and only when needed. To find them in wine would not give any sort of indication as to whether or not a wine was authentic. Therefore, to require them for a certificate of analysis in order to show authenticity would not be appropriate. Similarly, their presence on a certificate of analysis would not indicate that a wine could be considered to be fraudulent.

2.4 Microbiological

At times, economies request microbiological testing to be included for a certificate of analysis. The microorganisms that are requested often include yeast, bacteria and fungus. It should be noted that yeast is technically a fungus, so these two determinations are actually the same. Since yeast and bacteria are both used in the winemaking process, to find them in a bottle of wine, particularly for an unfiltered wine, would not be surprising. Conversely, for a wine that is sterile filtered during the bottling process, these microbes would not usually be found. It is for these reasons that neither the presence nor absence of these microbes would provide information regarding the authenticity of a wine.

2.5 Physical Characteristics

Physical characteristics are yet another class of tests which have little bearing on wine authenticity. This group includes appearance, colour, limpidity (clarity) and stability. These tests can be quite subjective, and when these criteria are applied to wine to determine authenticity, there is opportunity for wines to be mischaracterised. Applying a subjective set of criteria to a wine denies the winemaker the opportunity to create a wine in the style which is either in fashion in the marketplace, or more importantly, the ability to make a wine in a traditional style in the area of origin of the wine. Grape growing, winemaking, and aging conditions can have profound impacts on these characteristics and to use physical characteristics such as these to judge the

authenticity of a wine is highly questionable.

2.6 Typical Wine Parameters

It has been claimed that many of the analyses for typical wine parameters which are very commonly performed on wine could be used for verification of authenticity. These analyses could include pH, acidity, sugars and the like. The rationale for this testing is that the amounts that would be present would indicate whether or not a wine was truly an “authentic wine”. There are two main flaws to this thinking. The first is that although the range of typical values for these compounds is fairly well defined, the range due to differences in grape growing or winemaking can be quite large. The second flaw is that these ranges are quite well known, and it would be quite easy for the unethical trader to add constituents to wine so that they fall within normal ranges. In fact, many researchers use a “model wine solution” for their experiments, so that they have an easily prepared, very controlled system. The instructions for the preparation of these solutions can be found in many academic papers and researched on the internet, so utilizing this type of testing to determine authenticity would be ineffective.

3. Overall Rationale for Analytical Certificates

In summary, the components of the exhaustive list of test parameters sourced from economies throughout the world are by their very nature not related to wine authenticity. Indeed, even the highly sophisticated methods of analysis that have been developed to assess authenticity in relation to wine vintage, varietal or origin tend to be significantly flawed when applied to commercial wines where some degree of blending of wines with different vintage, variety and/or origin is almost always permitted in regulations.

It follows that any of the analytes enumerated here that an economy may require for a certificate of analysis could not ensure that wine consumers are not misled when purchasing a product. Even alcohol, which is the sole analytical requirement specified by some international trade destinations, is usually required to be declared on the label of the bottle, as well as in the documentation accompanying the consignment. The rational conclusion to this study of wine analytes would be that, from the perspective of authenticity, there is not a need for certificates of analysis for international wine trade.

4. Conclusions

Certificates of analysis are often demanded to allow products to enter an economy’s market. Reasons given for these demands include providing assurance that the products pose no risk to the health and safety and to demonstrate that the products meet local regulatory and commercial requirements. It has been demonstrated previously that the common analyses requested on certificates of analysis provide no meaningful information concerning the safety of the product being traded.

As noted earlier, it is important to remember that certificates of analysis do not function alone as attempts to ensure the safety, authenticity or quality of the product. It is conceivable that systems that range from simple (lot codes) or the more complex (label integrity programs) could provide a higher level of confidence for authenticity.

It has been suggested that the test results reported on a certificate of analysis could provide assurance that the product is authentic. In this paper, we have shown that the common analyses requested on certificates of analysis cannot demonstrate authenticity of a product. It could be said that “you cannot test quality into a product”, and as we have shown here, you cannot test authenticity into a product, either. If the test results cannot provide meaningful information on either safety or authenticity, it follows then, that a certificate of analysis for wine is probably unnecessary.

FIVS is an international federation serving trade associations and companies in the alcohol beverage industry from around the world. It provides a forum for its members to work collaboratively on legal and policy issues and communicates Federation views to national governments and international organisations.