

# **A comparison of legislation about wine-making additives and processes**

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Assignment submitted in partial requirement for the Cape Wine Master Diploma

February 2006

# Abstract

This document presents a comparison of legislation about the additives and processes that can be used in winemaking, which are collectively known as oenological practices. It considers five jurisdictions: South Africa, Australia, New Zealand, the United States and the European Union. The comparison covers the different styles of legislation, details of which oenological practices are permitted, the relationship between legislation about quality and that about oenological practices, regimes that limit additive use such as organic wine production and environmentally-friendly wine production (specifically the South African Integrated Production of Wine Scheme), regulation of wine importation, multilateral and EU bilateral wine trade agreements, and labelling of additives.

The comparison shows that some basic practices such as alcohol increase by addition of substances, sweetening and deacidification and/or acidification are common to all five jurisdictions. For most functions of additives, the legislation of each jurisdiction permits some substance or process to achieve that function. Two major functions for which there are differences are type of wooding permitted, and the addition of flavour extracted from grapes and colouring. There are also differences in the specific additives and processes that are permitted.

There are a number of different approaches for the import of wine from requiring imported wine to use the same oenological practices as the wines of the country into which it is imported, to the EU's approach of bilateral wine trade agreements with individual countries that cover permitted oenological practices, and the multilateral Mutual Acceptance Agreement on Oenological Practices. In terms of labelling of additives, all jurisdictions will soon require labelling of sulphites and Australia and New Zealand require the labelling of additional allergens.

**Note on recent legislative changes:** This document reflects the state of the legislation as at July 2005. It should be noted that the European Union legislation was amended by Council Regulation (EC) No 2165/2005 of 20 December 2005. This regulation now permits the use (under conditions to be determined) of oak chips, dimethyl dicarbonate for microbiological stabilisation, plant proteins for clarification, and L-ascorbic acid addition to must. Additionally, South African Government Notice No R77 of 3 February 2006 now permits the addition of ammonium sulphate, argon, diammonium glycerophosphate, evaporated milk, gold flakes, hydrogen peroxide, metatartaric acid, milk, phytates and potassium bicarbonate to wine, and the removal of water from wine using reverse osmosis.

# Acknowledgments

To Marilyn Copper and Margaret Fry, thank you for your mentoring and reasoned advice.

To my group of (Gauteng-based) CWM candidates, Rudolph Erasmus, Karen Green, Chris de Klerk, Caryn White, Andrew Forbes and András Salamon, it's been fun at times and interesting at others, and often both. Thank you for your support and enthusiasm.

To my life partner, András Salamon, love and thanks for your support and encouragement during this process that seemed endless at times. Your proofreading was invaluable (and any remaining mistakes are purely my own).

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# 1. Introduction

This document considers legislation about the additives and processes used in viticulture. Additives range from substances that are added to increase the alcoholic strength of the wine, such as sugar, to substances that are added to ensure or enhance the stability of the final product, such as fining materials. Processes cover activities such as filtration to more recently developed techniques such as reverse osmosis which can be used to remove water from must, extract flavour from must or remove alcohol from wine.

The substances that are added during winemaking together the various processes that wine undergoes, some of which remove substances from wine or must, are also referred to as *oenological practices*. In this document I will use both terms.

The comparison of legislation cannot be done in isolation from the culture of wine: our understanding of what wine is, determines what we believe is acceptable in the winemaking process. Of course, there is no single belief – as will be discussed in this document. To some extent, legislation is an embodiment of what a particular country or jurisdiction believes is right. The legislation presented in this document shows that different countries and regions approach the legislation of winemaking from different starting points, as well as different understandings of what is important. Although the legislation provides a view on what is allowed in a particular country or region, individuals may still disagree with that legislation. There are two ways in which to disagree – one is to break the laws, and the other is to lobby for the laws to change. I will discuss the issue of change further in the final chapter of this document when I consider what the future trends might be. The violation of laws will be considered in the second chapter when I look at the history of additives.

This topic is currently relevant in the South African situation when we consider the events relating to Sauvignon Blanc and flavourants that have been reported in the press starting in late 2003. This document presents an assessment of where South African legislation stands relative to other major wine producing nations and regions. The entities chosen are Australia and New Zealand, as they are both competitors with South Africa in terms of wine trade, and additionally their legislative approach is interesting as it is based on food safety; the European Union (EU), which is both a competitor as well as a major export destination for South Africa; and the United States of America (USA), for the same reasons as the EU. Fortunately, due to the Internet and the World Wide Web (WWW), obtaining legislation

has become a much simpler process today as compared with 10 or more years ago, and all legislation is freely available except for in the case of South Africa where some is only available through subscription services. The choice of jurisdictions has also been influenced by language – it has not been possible to obtain English translations of the laws of non-English speaking countries.

## 1.1 Scope and contribution

The scope of this investigation of legislation has been limited to oenological practices. During my reading of the laws, it is clear that there are many other fascinating topics, especially legislation relating to geographical definitions and viticultural practices such as irrigation but these are beyond the scope of this document. Legislation also specifies the levels of certain substances in wines. Examples are alcohol, sulphur dioxide, volatile acidity and various metals. The details of the acceptable levels for various substances will not be considered here for reasons of space, except for a short discussion of sulphur dioxide when considering organic wine production and labelling of additives.

This document concentrates on considering types of additives, the reasons for their acceptance or prohibition relating to health, function and how they relate to the definition of wine; the actual legislation and a comparison of the details of the legislation together with an assessment of the differences found. When considering the legislation, related issues that arise are trade, specifically the import of wine, interaction with legislation for quality wine production, regulation of organic and environmentally-friendly wine, and finally legislation about the labelling of additives. This document is based on the legislation as at July 2005. For a comment on subsequent changes, see page ii.

The document concentrates on still dry, off-dry and semi-sweet wines (this categorisation is discussed further in Section 5.3). It only refers to other types of wines when necessary to explain a particular point. This document does not address the issue of genetically modified organisms except briefly in the final chapter. When considering how wine is defined, it is clear there are many debates that relate to authenticity and terroir but unfortunately these are beyond the scope of the document, and will only be briefly mentioned. It has also not been possible to cover detection or traceability in detail.

The major contribution of this document is a presentation and comparison of the winemaking legislation of five jurisdictions. The comparison illustrates that all five jurisdictions allow such form of alcohol increase through the addition of concentrated must before or during fermentation, sweetening, deacidification and acidification (there are parts of the EU for which either acidification or deacidification

but not both are permitted). For each function an additive can play, most jurisdictions allow something to fulfil that function although there are exceptions. Other contributions are an assessment of the style of legislation, the lack of relationship between legislation for quality wine and that for oenological practices, an overview of organic and environmentally-friendly winemaking, a discussion of regulations about the import of wine as well as EU bilateral treaties and the World Wine Trade Group multilateral agreement, a comparison of additive labelling regulations and finally some thoughts on what the future holds.

## 1.2 Document outline

**Chapter 2** provides background on the topic of additives. It starts with a brief history of additives, then considers misuse of additives and how this can be detected. It also provides an original three-level classification of additives, considering health, definition of wine and function of additive. Since the definition of wine is a large topic, it appears in **Chapter 3** which investigates both legal, philosophical and cultural definitions.

**Chapter 4** starts to consider the legislation of the five jurisdictions considered in this document. It first introduces the methodology used. It identifies the legislation that is relevant, and the style of the legislation. The final section in this chapter compares the different legislative styles and discusses reasons for these differences.

**Chapter 5** gives a detailed comparison of the legislation dealing with additives. It starts by reviewing other prior comparisons, and then it proceeds to compare the different laws by considering the functions of the different additives, as well as technological processes such as reverse osmosis that may be permitted in some circumstances.

**Chapter 6** presents a consideration of additive regulations and regulations about quality, as well as cost of additives, and how these interact. It then considers two specific regulatory mechanisms that may link quality and restrictions on additives, namely organic winemaking and environmentally-friendly winemaking.

**Chapter 7** looks at how regulations on additives affects the trade in wine between countries, by first considering importation laws, and then European Union bilateral treaties, and the World Wine Trade Group multilateral treaty. The chapter ends with a comparison of how additives are noted on packaging in the five jurisdictions.

**Chapter 8** suggests some future trends in the area of additives, particularly with respect to France, and draws some conclusions from the document.

Legislative references and references appear in two separate chapters. **Appen-**

**dices A to E** present summaries of the legislation of the five jurisdictions as they relate to additives and processes, and **Appendix F** gives an overview of the various treaties on wine trade as they relate to additives and processes. The document ends with an index of winemaking substances and processes.

### 1.3 Spelling, legislative references and terminology

In the legislation from the different regions, different spellings are used (for example, *gelatin* versus *gelatine*), and even within a single country, different spellings can be used. The policy taken here is that when legislation is being referred to directly or being quoted, then the original spelling given will be used. However, in the rest of the text given here, consistent South African English spelling will be used.

This document references a substantial amount of legislation. Each country has standard ways to cite legislation, however I have chosen to use my own scheme as I believe this will lead to a clearer document, and because the target audience of this document is not legally trained. Legislation references are given after the conclusion chapter, and details of the referencing scheme are given there. Citations to the literature are done by using a combination of author name and year of publication.

Due to space constraints, it is not possible to provide a full discussion of each additive and its use. Hence, this document assumes a moderate level of understanding of oenological practices and the terminology used. For background on additives in winemaking, please consult Ribéreau-Gayon et al. (2000b), Peynaud (1984), Rankine (1998) or Bird (2000). Some of the terms used in the legislation will be defined in the relevant appendices. Note that both “l” and “L” are used for “litre” in the legislation referred to in this document.

### 1.4 Legal disclaimer

The material contained in this document is provided for informational purposes only. The application of laws can vary widely based on the specific facts involved. Hence, this document should not be used as a substitute for legal advice.

## **2. Background**

### **2.1 Introduction**

Additives have been used in wine since at least Roman times, if not longer. The first section of the chapter considers the history of additives, as well as some events from the history of their misuse. Additives can be used in the process of winemaking for various reasons, and they can be excluded for various reasons. This chapter provides a classification of these additives, together with an explanation of two of the levels in the classification hierarchy. The remaining level which relates to how wine is defined is discussed in the following chapter.

### **2.2 History of additives**

Since the earliest days of winemaking, the issue of preservation has been important, as well as how to improve wine and how to hide its faults. To preserve wine, various approaches were tried such as adding aromatic substances from plants, including resins; adding salts and gypsum; concentrating the wine and preventing air from reaching the wine by using oil (Juban 2000). The use of sulphur for preserving wine has been known since Roman times (Robinson 1999, p. 673). Advances in chemistry since the time of Jean-Antoine Chaptal who published his treatise on wine in 1801 (Robinson 1999, p. 154) have led to a better understanding of winemaking and ways to preserve, improve and deal with faults (Juban 2000).

As the making of wine became better understood, what was accepted as wine became more important, and hence it became possible to determine what it meant for a wine to be adulterated (Juban 2000). Legislation was introduced to describe what is required for a beverage to be called wine. Laws around winemaking have varied over time – a specific practice may have been illegal at some times or in some countries and legal at others (Robinson 1999, p. 3).

Examples of ways in which wine could be adulterated (Robinson 1999, p. 4) are adding water, adding other (usually cheaper) substances such as spirits or other wine, adding substances to fix faulty wines such as milk, mustard, ashes, nettles and lead (which prevents wine from becoming vinegary and makes it taste sweeter, but which is unfortunately poisonous (Robinson 1999, p. 400)). Alternatively the beverage could be called wine, but actually be made with fruits other than grapes to add flavour or for cheaper production, or it could be made from raisins – something

that is often done in home winemaking (Robinson 1999, p. 4).

Today, laws are very specific about what wine is, and how it can be made, and this is the focus of this document. Since the use of additives is legislated, laws can be broken, and the next section highlights some of the more recent examples.

### **2.2.1 Misuse of additives**

For the purposes of this discussion, misuse can be classified into two major categories – that which breaks laws and does not injure human health, and that which breaks laws and injures human health.

The major example, in the last century, where people were seriously injured and died is the methanol-based “Barbera”. This “wine” was made from odds and ends of wine together with methanol in Italy in 1985, and resulted in the deaths of 20 people while others went blind. Surprisingly, this did not have a large impact on Italian sales but it did take a while for Barbera to recover its reputation (James 2004a). More recently in 1999, during the BSE (bovine spongiform encephalopathy, popularly known as “mad cow disease”) crisis, one hundred thousand bottles of wine from the Rhône was seized on the grounds that they may have been fined with dried cows’ blood, a practice banned in the EU from 1997 onwards (The Times 1999). For people who are seriously allergic to sulphur dioxide, the 2002 Creston Bay Cabernet Sauvignon from Australia was potentially dangerous, and was withdrawn for sulphur dioxide levels up to 17 times the permitted level (Styles 2003).

In terms of misuse without serious health implications, there have been a number of examples since the turn of the century. In 2000, glycol was found in low-end Alsace wine leading to the wines’ withdrawal and not much else (Gebler 2000). This presumably was diethylene glycol, since ethylene glycol is toxic. In 2004, there were rumours of a cover-up of a scandal about additives in Bulgarian wine (Gebler 2004) and watered down Bulgarian wines were found on sale in 2003 (Sofia News Agency 2003). The UK Wine Standards Board is currently investigating Spanish wines with added sucrose, alcohol and water (Gregory 2004). An investigation into very cheap wines in South Africa showed that some of these wines had added water as well as artificial sweeteners (NAMC 2002).

In 2000, two unhappy employees accused an Australian winery of adding silver nitrate to their wines to improve aroma (Grape 2000). On further testing, it was found that some of the exported wines of Kingston Estate Wines contained silver nitrate, but at levels lower than the maximum allowed for drinking water (Truss 2000) so the addition although illegal was not harmful to human health. The winery was fined, its future production was tested for the additive and it was audited to ensure it complied with all wine laws. Additionally, the whole industry was to be checked for the use of this product (Truss 2000).

Probably the most well-known scandal is the Austrian “anti-freeze” scandal. In 1985, it was discovered that some Austrian wines contained diethylene glycol which gave the wines more body and made them taste sweeter (Robinson 1999, p. 50). This revelation led to a drop in the demand for Austrian wine outside Austria, and a move to stricter wine laws (Robinson 1999, p. 50). The additive which is used as anti-freeze does not harm people but is illegal (not to be confused with ethylene glycol which is also used as anti-freeze and is poisonous) so the health aspects were not serious. The addition was discovered after a red flag was raised by a tax official who could not understand why a wine producer was claiming for VAT spent on diethylene glycol (James 2004a). Some German wines were also found to have low concentrations of diethylene glycol indicating that they had been illegally blended with the adulterated Austrian wines, but this had a limited effect on the German market (Robinson 1999, p. 50). Additionally, Japanese wines were also found to be contaminated with diethylene glycol from blending of Austrian wines, permitted by weaker laws on origin labelling (Seeman 1986).

The most relevant scandal from the point of view of South Africa, is the recent flavourant scandal. In an article published on 14 November 2003 in the South African daily newspaper, *Business Day*, Michael Fridjhon a well-known wine industry personality described the rumours circulating in the South African wine industry about the use of flavourants in Sauvignon Blanc and the fact that companies that supply wineries offer flavourants in their catalogues (Fridjhon 2003). Note that these flavourants can be legally used in coolers, also called flavoured grape liquors (Tables 6 and 10, SA Regulations). The Wine and Spirit Board responded on 18 November 2003 with a statement that they had been developing a detection method, and that it would be applied to the 2004 harvest (Wine and Spirit Board 2003). This involved taking samples of grape must to compare methoxypyrazine levels with those in the finished wine. In the cases where there were major differences in levels, an audit would be carried out in the winery (Wine and Spirit Board 2004). Three wines from the KWV were found to contain flavourants and two winemakers were dismissed. In the one case, green peppers had been used and in the other case, synthetic flavourants (Morris 2004). Although neither of the additives were harmful to human health, they were both illegal in terms of South African wine legislation.

There is also misuse which could be viewed as bending the laws rather than breaking them. An example is the use of reverse osmosis in Europe which is permitted for must concentration but not for wine concentration. Italian winemaker, Sebastiano Castiglione of Agricole Querciabella has claimed that most reverse osmosis in the EU is done illegally because it is applied to remove water from the wine after fermentation as opposed to being used for must concentration before fermentation, which is legal (Beckett 2003).



In California, the addition of water is a big issue. Unlike the federal winemaking regulations which permit water addition for a variety of reasons, the state laws of California are much more restrictive, and only permit the minimum water required to facilitate a normal fermentation (see Section 5.3.5 and Appendix D for more details). This regulation was re-interpreted in 2002 by the California Department of Health Services to mean “no water in excess of that needed to prevent a fermentation from sticking, but that goes to complete dryness within a reasonable time period under normal winemaking conditions”<sup>1</sup>. This re-interpretation was motivated by a desire to avoid stuck fermentation caused by the “field dehydration” (raisining) of grapes. Water can also be used to reduce alcohol levels to produce more elegant wines and addition for this reason is not permitted within the legislation, however it is difficult to distinguish between the two practices (Andrews 2005). It is claimed that this “watering back” is common and that much of the wine produced in California has had water added before or during fermentation (Andrews 2005).

### 2.2.2 Detection and analysis

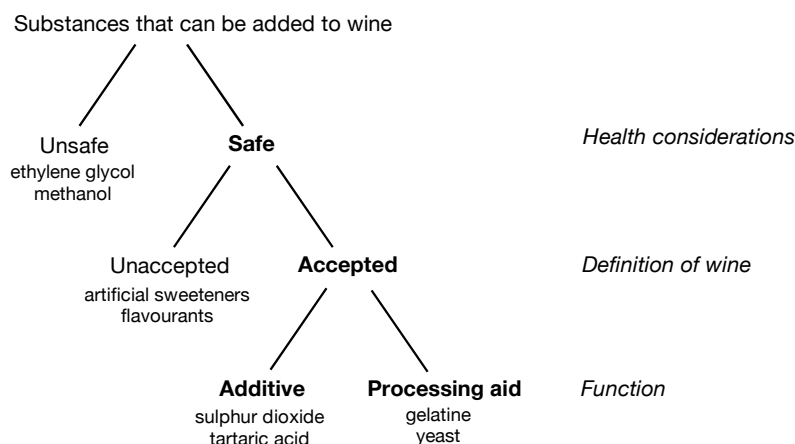
Addition of illegal substances is not easy to detect, and different substances need to be checked with different tests. There are tests for addition of water, sugar, organic acids, colourants and synthetic flavourants. These tests use various techniques including isotope ratio mass spectrometry (water, sugar and organic acids), nuclear magnetic resonance (sugar, organic acids and synthetic flavourants), high pressure liquid chromatography (colourants) and gas chromatography together with isotope ratio mass spectrometry (synthetic flavourants) (Martin et al. 1995, p. 408). These are not fast or cheap tests. Other practices for which there are tests are addition of mineral acids such as sulphuric acid, and industrial glycerol (Motteux 2003).

Many of the bodies that certify wine do test for the presence of certain chemicals, or require an analysis from an approved laboratory. This analysis typically concentrates on the substances for which there are specified maximum levels in legislation such as alcohol (ethanol), methanol, sulphur dioxide, volatile acidity and metals. Many of these levels are set for health reasons, with some more for aesthetic reasons such as volatile acidity, and some for definitional and labelling reasons such as alcohol. For reasons of cost-effectiveness, it makes sense to prioritise testing for harmful substances over testing for unapproved substances with no health implications. In most of the cases, listed above, misuse was not directly found by the application of testing – often someone being prepared to speak out led to testing.

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<sup>1</sup>Letter from James M. Waddell, Acting Chief, Food and Drug Branch, Department of Health Services to John A. De Luca, President and CEO, Wine Institute dated 30 April 2002, retrieved 16 July 2005 from <http://www.wineinstitute.org/communications/statistics/waterrulling.pdf>

Table 2.1: A classification of substances that can be added to wine



## 2.3 Classification

It is clear from the previous section that both historically and currently, there are specific reasons for adding substances to wines. Wine is generally assumed to be a natural product – it is often seen as just the fermented juice of grapes. However, due to the possibility of spoilage from reactions or micro-organisms and the desire for an aesthetically appealing product, a number of substances are added to wine in the production process.

It is possible to consider these additives in two ways; there are those that make the wine unsafe or unhealthy and there are those that do not do this. Considering the safe additives, they can then be categorised into two classes: those that are accepted as part of the winemaking process, and those that are not accepted as part of the process. The reasons for excluding some potential additives is that by adding these substances the beverage produced would no longer meet the requirements for wine. An example would be to add to crushed green peppers to fermenting grape juice. In many countries of the world, this would be excluded by law.

The substances that we accept for addition to wine can then be classified into two further categories: additives and processing aids. The whole classification is summarised in Table 2.1. Bold type indicates those items in the classification that can be considered for use in wine, and examples of additives are given in lower case. The first two levels of the classification can also be applied to processes. How substances are classified differs from country to country and this document will detail some of these differences. This classification will be used to structure the rest of this chapter – health considerations will be discussed in Section 2.3.1

and function in Section 2.3.2. Since the definition of wine is a broad topic, it will be considered separately in the next chapter.

### 2.3.1 Health considerations

Since wine is ingested, it should not be harmful to human health, so the addition of substances that are not considered edible is undesirable. The obvious example of such an addition to wine is the glycol scandal in Austria (as described in Section 2.2.1) where anti-freeze, definitely not something that was designed with human consumption in mind, was added to wine to sweeten it. Additionally wine should be free of contaminants which are defined as “potentially harmful substances” (Robinson 1999, p. 197). Examples are residues from chemicals used in the vineyard, substances resulting from poor hygiene practices, carbamates which are carcinogenic and can be created during winemaking, and substances that are added intentionally for purposes of fraud or adulteration (Robinson 1999, p. 197).

Note that in terms of health, we can consider substances that are added to wine, substances that are created during wine production, and substances that exist already in the grape juice that wine is made from. Processes could potentially have health implications since they could increase the levels of existing substances by concentration, or lead to the creation of new substances.

Generally, legislation does not permit the addition of harmful substances; however, such substances may be created (during blue-fining with potassium ferrocyanide) or may already exist (heavy metals), hence most wine legislation defines the maximum limits for those substances. Since this document concentrates on what can be added to wine, there will be little further detail on the harmful substances that may already exist in the wine or that may be created, but it may be necessary in some instances to consider this, since some substances such as sulphur dioxide are both added and generated during fermentation (Larue et al. 1985, as cited in Jackson (1994)). For many substances, it is not the presence or absence but the level at which it is present which determines its effect on health.

As will be described in the following chapters, the legislation of Australia and New Zealand is strongly based on health considerations, specifically food safety.

### 2.3.2 Function of addition

Accepted additives can be classified by function into processing aids and food additives. This distinction is made within the Australian and New Zealand legislation which is focussed on food standards, but not in the South African legislation. The Codex Alimentarius Commission<sup>2</sup> (which is the international food safety standards

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<sup>2</sup><http://www.codexalimentarius.net>

body associated with the World Trade Organisation<sup>3</sup>) makes the following definitions.

“Food additive means any substance not normally consumed as a food by itself and not normally used as a typical ingredient of the food, whether or not it has nutritive value, the intentional addition of which to food for a technological (including organoleptic) purpose in the manufacture, processing, preparation, treatment, packing, packaging, transport or holding of such food results, or may be reasonably expected to result, (directly or indirectly) in it or its by-products becoming a component of or otherwise affecting the characteristics of such foods. The term does not include ‘contaminants’ or substances added to food for maintaining or improving nutritional qualities.” (FAO/WHO 2001, p. 41)

“Processing aid means any substance or material, not including apparatus or utensils, and not consumed as a food ingredient by itself, intentionally used in the processing of raw materials, foods or its ingredients, to fulfil a certain technological purpose during treatment or processing and which may result in the non-intentional but unavoidable presence of residues or derivatives in the final product.” (FAO/WHO 2001, p. 43)

The User Guide to Standard 1.3.1 of Food Standards Australia New Zealand<sup>4</sup> FSANZ (2001) makes the following distinction between additives and processing aids:

“Processing aids are another set of food additives that may be added during manufacture but which do not perform a technological function in the final food. . . . Often processing aids are no longer present in the final food at all, having been removed at some step before the food is ready for use. Sometimes the same substance can be used either as a processing aid or a food additive.” (FSANZ 2001, p.7)

Standard 1.3.3 emphasises that a processing aid must be used

“at the lowest level necessary to achieve a function in the processing of that food, irrespective of any maximum permitted level specified.” (Clause 1, FSANZ Standard 1.3.3)

In summary, both food additives and processing aids are not normally consumed as food themselves and are added to perform specific technological functions. The main difference between the two is that food additives have a technological function

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<sup>3</sup><http://www.wto.org>

<sup>4</sup><http://www.foodstandards.gov.au>

in the final food, whereas processing aids do not – their function occurs during the treatment of the food. However, residues or derivatives of processing aids may remain in the final food. Appendices B and C illustrate how the different winemaking additives are divided into the two categories in the legislation of Australia and New Zealand.

## **2.4 Conclusion**

This chapter has presented some background on additives, including a brief history and some examples of how laws regarding additives have been contravened. Establishing contravention of laws by detection is time-consuming and costly, and often the decision is to focus on substances that are harmful. These distinctions lead to a classification of additives, based on health considerations, how wine is defined and the role the substance added plays in the production process – whether it plays a role only in production (such as yeast or nitrogen) or whether it plays a role in the final product (such as sulphur dioxide or tartaric acid). The next chapter considers how wine is defined.

## 3. The definition of wine

### 3.1 Introduction

In the previous chapter, additives were classified by reason for use. One of the categories in the classification relates to how wine is defined. This chapter looks at this issue in detail by starting with the legal definition of wine, and then considering other approaches to definition. This is a topic about which much has been written, covering issues such as industrial versus artisanal winemaking, how wine is labelled and consumer awareness of the issues.

### 3.2 Legal definitions

A first approach to considering how wine is defined is to consider how it is defined legally. The definitions from the five jurisdictions considered in this document are now given. The South African legislation defines wine as follows.

“(1) Wine shall

- (a) be produced from fresh grapes of a prescribed cultivar that are in such a condition that, after having been pressed, alcoholic fermentation can occur in the undiluted juice thereof;
- (b) be produced by
  - (i) the alcoholic fermentation, in accordance with generally accepted cellar practices, of the juice of such fresh grapes; and
  - (ii) completing or terminating such alcoholic fermentation; or
  - (iii) the addition of a prescribed spirit derived from grapes, to the juice of such fresh grapes; and
- (c) be produced in such a manner that it complies with the prescribed requirements for wine or a particular prescribed class thereof.” (Section 5(1), Act 60 of 1989)

Section 1 of Act 60 of 1989 states that grapes “means fruit of plants of *Vitis vinifera*.”

New Zealand and Australia share the following definition (although they appear in different parts of the Australian and New Zealand Food Standards Code).

“[W]ine means the product of the complete or partial fermentation of fresh grapes, or a mixture of that product and products derived solely from grapes.” (Standard 2.7.4, p. 1 and Standard 4.5.1, p. 1)

The definition used in the USA federal regulations is very broad and must be qualified with the word “grape” to make it specific.

“*Wine*. When used without qualification, the term includes every kind (class and type) of product produced on bonded wine premises from grapes, other fruit (including berries), or other suitable agricultural products and containing not more than 24 percent of alcohol by volume. The term includes all imitation, other than standard, or artificial wine and compounds sold as wine.” (§24.10, Title 27)

Finally, the EU defines wine as follows.

“*Wine*: the product obtained exclusively from the total or partial alcoholic fermentation of fresh grapes, whether or not crushed, or of grape must.” (Annex I, Regulation No 1493/1999)

Clearly the USA has the widest definition as it covers any wine made from fruit or vegetables, as well as various products that would not be considered wine under different legislation. The South African definition uses clause (c) to tie the definition to the rest of the legislation.

The South African, Australian, New Zealand and EU definitions refer specifically to “fresh grapes”, with the EU definition referring to grape must which is defined as “the liquid product obtained naturally or by physical processes from fresh grapes” (Annex I, Regulation No 1493/1999). The Australian and New Zealand definition also permits the addition of any grape product, which differentiates this definition from that of the South African and EU definitions.

These distinctions are interesting but do not give significant insight into what wine is when considering what is added or removed. Hence, in the next section, the debates about what wine is in light of the substances added to it, and the processes performed on it are considered.

### 3.3 What is wine?

Since the focus of this document is additives and processes in winemaking, this section will start with a consideration of the different positions that can be taken with respect to these practices. The most common of these is a position that considers motivations for additives. The first subsection will consider different motivations and their bases, such as improving or making a good product, not deceiving the

consumer, obtaining a marketing advantage, the importance of place, and the level of technology used. Next, the different legislative approaches and their effects will be considered. Finally, since demand ultimately affects how wine is produced, various aspects of the market will be considered, including the different types of wines sold, as well as consumer perceptions and requirements, the effect of related products such as wine coolers, and whether labelling could clarify understanding of products.

Goode (2005) identifies four positions with respect to adding substances to wine.

1. "Anything goes" (within the bounds of health).
2. "Add nothing" (which can lead to a very short-lived product if no sulphur dioxide is used).
3. "Add as little as possible".
4. "The in-between position".

The first three are self-explanatory. The last one is based on the idea that "cheating" such as adding flavourants, should not be allowed but that any lawful and disclosed techniques are fine – they are "merely tools, and tools can be used well or they can be used badly" (Goode 2005, p. 25).

The add-as-little-as-possible position is also seen in the approach that "wine is made in the vineyard not the cellar" (Robinson 1999, p. 763) with the winemaker doing as little intervention as possible. Easthope notes that a winemaker trying make a wine that expresses its terroir would "normally be less protective with regard to oxygen, and more circumspect with additives and ameliorants" (Easthope 2003, p. 21), and that commercial imperatives can result instead in an emphasis on styles of wine that do not reflect the terroir (Easthope 2003). Some varieties such as Sauvignon Blanc or Riesling may also lend themselves to fewer additives because of the nature of their usual vinification, and hence can be more expressive of terroir (Rossouw 2005).

There is general agreement that healthy grapes picked at the correct time will need fewer additives, particularly less sulphur dioxide, but that some additives are necessary to ensure a good wine because one seldom gets grapes that are exactly perfect, hence they may need acidification or chaptalisation (Halliday and Johnson 1992). Beyond this, there is a debate about what additives should be used. There tends to be a division of practices and additives into traditional, hence accepted, such as oak barrels; and new, such as reverse osmosis, which are seen as less acceptable (Goode 2005). The next section considers how the reason behind an additive affects its acceptance.



### 3.3.1 Motivation for additives

An immediate difference in the usage of additives is whether the additive is to improve or to deceive. Additions or practices that improve the wines or reduce flaws, are seen as different to those that are done to cut costs or mislead the consumer, and there is a difference between adding water to improve a very ripe wine, versus using water to stretch wine for profit (Goode 2005). Another example of additive use for the wrong reasons would be the use of cheaper but illegal acid, such as sulphuric acid which is cheaper than tartaric, malic or citric acid (Motteux 2005). It is not always simple to separate additives on the basis of “improving” versus “fraudulent”. For example, using oak chips and micro-oxygenation is much cheaper than oak barrels, and is argued to have a similar effect (Nel 2001). Many accept this practice, and would only consider it to be deceptive if the wine was sold as barrel-matured.

Even with the argument that if an additive improves the wine, there should be no reason not to use it, there may be other reasons to reject the additive. Greg de Bruyn CWM argues that chaptalisation should be used in South Africa, and that it is a more neutral intervention than acidification which can be noticeable in the finished wine (de Bruyn 2000). A counterargument from Peter Gebler CWM is that wine is perceived as a natural product and that it is in the industry's interest for wine not to become an industrial product. Additionally, it could be used as a selling point for South African wines that our climate is such that few additives are needed (Gebler 2001).

Practices can look similar on the surface, but still result in divergence of opinions. For example, Linley Schultz, head of winemaking at Distell, views Sauvignon Blanc wine made from fully ripe grapes with the addition of pyrazines extracted from unripe Sauvignon blanc grapes as perfectly natural (Matthews 2004a), whereas other people may consider this unacceptable, but may find making Sauvignon Blanc from mixture of ripe and earlier-picked grapes acceptable.

The type of wine that the addition is made to can also determine people's opinions. Randall Grahm of Bonny Doon in California believes that the use of new techniques depends on the context; for a vin de table or a New World Wine, making the best wine possible with the techniques available is appropriate, but for an appellation wine from the Old World, typicity is required and vintage variations should not be removed (Goode 2002). Ernst Loosen of Weingut Dr Loosen in the Mosel, is more negative since he views things such as must concentrators as leading to homogenised, over-extracted wines (Goode 2002).

Another way of looking at this divide is to consider additions that are necessary for a “good clean” wine versus those that are “cosmetic”, adding colouring or flavourings (James 2000). This point leads to debates about the use of oak in

winemaking, as well as how it is used. A number of commentators have noted that wood is just a permitted flavourant, particularly if it is done without actual barrels, or with heavily toasted or new barrels (James 2005; Rand 2005). Tim James CWM emphasises that the argument against heavy wooding is not based on a rejection of the technique as nontraditional, but because of the other effects of the practice, such as hiding other flavours of wine, overwhelming terroir, and causing dried-out wines (James 2002).

From this discussion, it is clear that there are different motivations for using or shunning various additives. The actual rules for winemaking in a country are captured by the appropriate legislation. The next section will present some comments on the different legislative approaches and their effect on the wine industry.

### **3.3.2 Effects of legislative approaches**

Gregan and Battaglione (2002) argue that one of the reasons for the success of the Australian and New Zealand wine industries is because their less onerous legislation, which is based around health, safety and prevention of consumer deception, allows for the fast adoption of new technologies, which in turn leads to better quality more cheaply. A counter-argument is that technological solutions such as adding acidity and other manipulations are applied more readily in New World countries, rather than traditional solutions that are likely to be viticultural, and more non-interventionist (James 2000). Linley Schultz argues for a “commercially aware, open-minded approach to regulation” (Schultz 2004, slide 33) based on common sense, and considers the fragmentation of the South African industry a problem compared to Australia where the five largest companies together with representatives of the rest of the industry to “guide the industry in a sensible manner to the overall benefit of the industry” (Schultz 2004, slide 32).

Jefford, on the other hand, argues for the benefits of the more rigorous French legislation and describes how it protects the intellectual property represented by an appellation, which belongs to the community that produces wine in that appellation. He also suggests that there may be explanations for what appear to be contradictions. For example, using plastic to stop rain reaching the roots of vines is an unacceptable modification of terroir, whereas must concentrate emphasises terroir (Jefford 2002).

Juban considers the global picture for wine legislation in light of removal of barriers to trade between countries, and he asks on what grounds an oenological practice with no health implications can be prohibited – the only other options for restricting trade are to prevent deception or on environmental grounds. He emphasises the multiple definitions of wine, and how countries without a culture of winemaking such as China, may have very general laws on additives. In his opinion, it

is not clear how a single standard can be obtained, but some solution is necessary for a successful and transparent trade in wine between countries (Juban 2000).

This section has highlighted different legislative approaches and some of their advantages and disadvantages. The following sections consider the consumers, starting with the different types of wine that are made for different price points, and then continuing with how consumer perceptions as well as preferences may affect the usage of additives in wine.

### 3.3.3 Types of wine

It has to be accepted that there currently are different types of wine made (when considering how they are produced). They are made to be sold at different prices and with different consumers in mind. Some wines are made by a process that is more industrial than that used for others. There are reasons for this – bulk production can typically reduce costs of production (James 2000), and more commercial, mass-produced wines need a level of stability that can be foregone in other wines, as the commercial wine may undergo rougher treatment after sale, such as being left in a car (Halliday and Johnson 1992).

There is concern that wines are becoming homogeneous and made to the same formula (Cannavan 2003). Jancis Robinson MW has described this as “more wines than ever, less choice than ever” (Rose 2003), and Hugo Rose MW is concerned that regional identity and terroir are being lost (Rose 2003). This homogenisation affects all levels of the wine industry. Many wines are being made cheaply in a particular style to meet a specific price point. But homogeneity is also happening at the higher end of the market which is perceived to be resistant to price point pressures.

For example, Bordeaux wines are becoming overextracted with low acid (Cannavan 2003). Michael Fridjhon comments that as far as he knows, “amongst the First Growths of the Médoc only Chateau Margaux steadfastly refuses to use” must concentrators (Fridjhon 2004, p. 6). Some blame consultants such as Michel Rolland, and it is claimed that he “erases” terroir with micro-oxygenation, reverse osmosis and 200% new wood (Lechmere 2005).

There is a concern that these trends are leading to a more industrial product. The more industrial, non-terroir wines that are produced, the more pressure there will be on the places that make terroir-based wine, and in the longer run, those wines may be lost altogether: “... one day when you want to taste true wine, we will find that no-one makes it anymore” (Fridjhon 2004, p. 7)

Since consumer demand to a large extent determines what types and styles of wines are produced, the next section considers consumers and their understanding of wine as a product.

### 3.3.4 Consumer awareness and preferences

It has been argued that consumer demand will determine the type of wine made. However, it is not clear whether consumers are aware of how wine is made, especially if they have the belief that wine is a mostly natural product (Goode 2005). Michael Fridjhon argues that consumer trust is betrayed whenever producers of mass-style wine use the reputation of wine as natural and crafted to sell their essentially industrial mass-production wines (Fridjhon 2004).

An online survey by South African Wine magazine found that of those responding, 52% were totally against the addition of flavourants, 37% thought additives were acceptable as long as the wine was labelled as such, and 11% didn't care (Wine 2005). This survey indicates that consumers with some wine knowledge were either against the use of flavourants altogether, or against their use in a deceptive manner. As the survey did not consider legal additives, it is not possible to determine more general opinions on additives. It is not clear whether consumers understand the link between the different additives and processes used and the final cost of the wine. As mentioned in the previous section, too many consumers making the choice for cheaper wines could shift the balance too far in the direction of wine as an industrial product. Hence, choice is important – honesty and clear labelling allow consumers to make a choice of what they want (James 2000; Goode 2005) and could also alert them to the implicit choices they are making.

With more debate about how wine is made, there is more awareness in France and Germany amongst consumers about the practices used, and as a result of this some consumer groups regard must concentration as not natural (European Commission 2004). This is somewhat ironic as direct must concentration can be seen as a more natural process because it does not involve the addition of substances (European Commission 2004). Prices for German Qualitätswein mit Prädikat (QmP) (for which pre-fermentation additions to increase alcohol are not permitted) are higher than those of other quality wines in Germany (European Commission 2004). This indicates that consumers perceive these wines to be of higher quality, but it is not clear whether this is due to perceptions of the processes used.

Changes in labelling laws can lead to consumer confusion. In Australia, the introduction of labelling of preservatives such as sulphur dioxide led to consumers believe that these additives were a new addition to the wine, and not an existing ingredient newly required to appear on the label. Additionally, consumers claimed to detect a difference between the labelled and unlabelled product when there was no difference (Halliday and Johnson 1992). Since South Africa has recently moved to indicating the presence of sulphites in wine, it will be interesting to see if something similar happens here. An expectation on the part of consumers that wine is natural may make the wine industry reluctant to list ingredients on labels (Goode 2005).

Allan Mullins CWM who selects wines for South African retailers Woolworths, comments that the most relevant additive for consumers is sulphur dioxide, and there is demand for wine with low levels (Lloyd 2004b). Woolworths released a 2004 Organic Chenin Black from Stellar Winery that had no added sulphur dioxide and a sell-by date of February 2005. Other low sulphur dioxide wines in South Africa are sparkling: Krone Borealis Méthode Cap Classique has small amounts added with the dosage, and Villiera's Brut Natural Chardonnay Cap Classique has no added sulphur dioxide (James 2004b).

Although there is some information to support the fact that consumers are aware, there has been little research into how sensitive consumers are to these issues (Lloyd 2004b). In countries such the United Kingdom, consumers are becoming more aware of how food is produced, and information about how wine is produced could change consumers' perceptions and choices. A possible downside is that consumers may now become aware of the additives that are used in wine, and hence will not be prepared to pay the premium wine can demand because of its perceived naturalness.

### **3.3.5 Products related to wine**

Many countries allow for the production of wine products that are based on wine, but have added flavours and possibly alcohol or water, for example, wine coolers in South Africa and vermouth in France. These products, however, cannot legally be called wine. Low-alcohol wine coolers were developed in the USA in the 1990s, and were allowed to be labelled with a grape variety even though the wine only contained a small portion of wine made from this grape, but this practice is now outlawed (Matthews 2004a). In South Africa, some large producers were selling wine cooler products labelled with grape varieties which is illegal in South Africa since grape variety names can only appear on wine. This practice has now been stopped (Grape 2004).

Patrick Matthews, the author of "Real Wine: the Rediscovery of Natural Wine-making" argues that the introduction of these coolers had led indirectly to the use of flavourants in real wine, and that "the industry will be hoping that the genie can be coaxed back into the bottle" (Matthews 2004b).

An unanswered question is how or whether consumers are able to distinguish between wine and wine coolers, or whether they see them as very similar products. The next section addresses the issue of labelling and whether clear declaration is a solution.

### 3.3.6 Labelling

Many commentators suggest a different approach to labelling wines as a solution to the definition of wine and how it is made. For example, Michael Fridjhon has suggested adding to labels in a large typeface, “flavour enhanced” for wines made with enhancers such as “oak chips and staves, micro-oxygenation, reverse osmosis and must concentration” (Fridjhon 2004, p. 7), and “flavourant added” for any flavour added whether it be oak essence or green pepper (Fridjhon 2004). Tim James CWM suggests that there is nothing wrong with the industrial products made from grapes, but that they should not be called wine, and should have a full ingredient list on the label (James 2005). Jancis Robinson MW suggests that cheap wines with flavours should be called “flavoured wines” (Lloyd 2004b). Professor Larry Locksin of the University of South Australia suggests that any addition be indicated clearly on the label so that consumers are aware of it (Lloyd 2004b).

In light of the questions raised above as to whether consumers fully understand the differences between products, or the implications of choosing cheaper wines, it is not clear how labelling in this manner would affect consumers. There is an argument that making consumers aware of the type of manipulation may lead consumers to make different choices when buying wine.

As mentioned in the section considering types of wine, there is also a concern that more expensive wines are becoming less of a natural product with more technological processes being applied, such as must concentration and reverse osmosis, to create the sort of “monster” wines that are praised by some parts of the wine press. This leads to considerations of authenticity (which in turn relates back to the issue of terroir). At the CWG (Cape Winemakers Guild) Seminar on Authenticity held in 2004, Michael Fridjhon suggested that it may require some producers to start indicating on their back labels which processes they have not used as a way to indicate the authenticity of their product, since authenticity is partly about what producers choose *not* to do rather than what they do (Cape Winemakers Guild 2004). This is similar to food producers wishing to label their food as free of preservatives or MSG.

## 3.4 Conclusion

Clearly, there are many different opinions, from those that focus on using technology to make the best product possible to those that focus on more traditional approaches, and use tradition as a way to assess how to go forward. Consumers also play a role since they determine demand, and indirectly how wine is made. The general consensus is that consumers are often unaware, and hence believe that they are buying a natural product. A greater awareness may lead to more in-

formed consumer choice and this may be beneficial to the wine industry, at least for those producers who do not take a totally technological approach.

More research is required to identify how consumers perceive wine to be made, and to gauge their understanding of the additives and processes used, as well as to find out their reaction to information about ingredients and labelling.

## 4. The legislation

### 4.1 Introduction

This chapter starts by discussing the methodology that was used in investigating the legislation. It then proceeds to describe the legislation chosen for comparison. The choice was made to cover countries and regions that compete with South Africa in terms of wine exports, as well as countries and regions that are destinations for South African exports. Additionally, it was necessary that the legislation be easily available, and available in English. Using these criteria, the countries and regions to be considered are South Africa, the European Union, Australia, New Zealand and the United States of America.

It may have been possible to obtain legislation for Canada and the United Kingdom; however, this has not been pursued. The reason for excluding Canada is because it is a fairly small player in the global wine business, and its inclusion would not have added much. The United Kingdom is a member of the European Union and for that reason it does not appear to be that useful to consider its legislation in detail; additionally it does not have a large wine production and has limited export of wine.

### 4.2 Methodology

The methodology taken here is to identify the relevant legislation, and then through a close reading of it, to extract the parts that relate to oenological practices (bearing in mind that these may not be located in only one part of the legislation). Identification of the relevant legislation was achieved both by finding websites of legislation as well as by finding websites of bodies involved in wine, such as the Wine Institute<sup>1</sup> of California and the Australian Wine and Brandy Company<sup>2</sup>. These organisations often have links to the relevant legislative webpage or their own commentaries on the laws. Most countries considered have websites of laws, for example the EU has a comprehensive legal website called EUR-Lex<sup>3</sup>.

First the structure and basis for the legislation was considered, and this appears in the current chapter. Then using an understanding of winemaking, the legislation

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<sup>1</sup><http://www.wineinstitute.org>

<sup>2</sup><http://www.awbc.com.au>

<sup>3</sup><http://europa.eu.int/eur-lex/lex/>



was read and the relevant parts reproduced in the Appendices. The comparison in Chapter 5 is structured by considering how the material on winemaking is presented in textbooks, and this was then used as the basis for the comparison. Due to a desire to highlight the important differences, it was decided to take a narrative approach to discussing the differences. This is supported by tables describing the comparison. Section 5.4 summarises the comparison and Section 5.5 considers South Africa.

The rest of the document then considers some other legal and regulatory issues including quality wine production, organic and environmentally-friendly production of wine, both of which take a stricter approach to additives; trade legislation and agreements; and legislation regarding labelling of additives. This material has been collated from legislation and also commentary on legislation.

This chapter now proceeds with identification and description of the legislation of the five jurisdictions. Specific details of legislation about oenological practices are covered in the following chapter.

### **4.3 South Africa**

The South African legislation appears in the Liquor Products Act, Act 60 of 1989, the Regulations promulgated under Section 27 of this act, and the Wine of Origin Scheme promulgated under Section 14 of this act. The Regulations have been amended a number of times with the most significant amendments occurring in 2003. Section 5 of the Act defines wine and Section 27 makes provision for the promulgation of regulations about the processes that can be used in the making of liquor products. In the Regulations, Sections 27, 30 and 31 and Tables 6 and 7 are the most relevant, describing the substances that may be added to and removed from liquor products. Extracts from these tables that pertain to wine are presented in Appendix A. Part 3 of the regulations cover import requirements.

The Wine of Origin Scheme (promulgated under Section 14 of the Act) requires that for all wines made under this scheme, records must be kept of any addition to, removal from or treatment of the must of wine (Section 17(1)(b), SA WOS). Additionally, permission must be obtained to be allowed to press grapes (Section 15, SA WOS).

The Wine and Spirit Board is the body established by the Liquor Products Act to administer the Wine of Origin Scheme and to advise and make recommendations to the Minister of Agriculture about legislation relating to the Act. Currently, SAWIS<sup>4</sup> (South African Wine Industry Information and Systems) manages the control function of the board in terms of the Wine of Origin Scheme.

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<sup>4</sup>[www.sawis.co.za](http://www.sawis.co.za)

There appears to be in general no specification of the quality of the additives in the South African legislation. Charl Theron, member of the Wine and Spirit Board, comments that they are approved in generic form in the legislation (Lloyd 2004b).

### 4.3.1 Type of legislation

The South African legislation describes what is permitted in terms of addition and removal of substances, and anything that is not permitted is forbidden. South African legislation is also fairly general in many cases, for example, it specifies enzymes without specifying which. With respect to removal of substances (which often involves the addition of substances), the means of removal is specified. For example, ion exchange resins can be used to remove tartrates from some liquor products, but in the case of wine, only pasteurisation, cold stabilisation, or treatments with potassium bitartrate or tartaric acid are permitted to remove tartrates. The South African legislation about wine is part of the general liquor products legislation.

## 4.4 Australia

The Australian legislation that deals with additives and processing aids for wine is found in the Australia New Zealand Food Standards Code, specifically Standard 4.5.1 *Wine Production Requirements (Australia only)* (which was previously called Standard 4.1.1) (AWBC 2004). Although Australia and New Zealand have jointly developed these standards, some of the Standards apply to Australia only, and Standard 4.5.1 is an example of this type of standard. Both countries are bound by Standard 1.3.4 *Identity and Purity*. This standard covers the quality of substances added to food, and matches international regulations.

The reason for these two different standards relates to the 1994 EU-Australia agreement on wine which describes oenological practices that are acceptable for Australian wines that will be sold in the EU (FSANZ 2002). It was decided not to impose these standards on New Zealand as these could become barriers to trade, and it was not possible to include the provisions of the agreement in the Australian Wine and Brandy Corporation Act as it does not cover all wine made in Australia, hence the construction of an Australia-only standard (FSANZ 2002). This measure is meant to be temporary until a better approach can be found.

Clauses 3 and 4 of Standard 4.5.1 deal with additives and processing aids used in winemaking (for definitions and differences between additives and processing aids, see Section 2.3.2). Each clause has an associated table of accepted substances and these tables are reproduced in Appendix B. The Table to Clause 3 lists substances that can be used in the production of wine, and the Table to Clause 4

lists processing aids. These tables have been modified since the standard was established, with the most significant modification in July 2003 where some products have changed categories, for example both potassium hydrogen tartrate and thiamin hydrochloride have changed from additives to processing aids. Carbon dioxide is now included in both categories. Other substances that have been added to the table of processing aids are collagen, cupric citrate on a bentonite base and plant proteins that are classified as food.

New additives and aids can be approved through a specific process laid down by Food Standards Australia New Zealand (FSANZ 2005).

#### 4.4.1 Type of legislation

Australia (and New Zealand) are the only jurisdictions considered here where the requirements appear as part of general food standards legislation.

As with the South African legislation, the standards forbid what is not expressly allowed, and this is a reasonable approach to take from a food standards point of view. They take a different approach to South African legislation by considering two different classes: substances that can be added and processing aids (see Section 2.3.2 for the differences between these). A focus on food additives and processing aids ignores processes that require no addition, and it appears that additive-free technologies such as reverse osmosis cannot be catered for within this legislation.

Standard 4.5.1 is only six pages long, and is written in a very straightforward manner, making it easily comprehensible.

An appealing aspect of the approach taken within food standards in Australia and New Zealand is the availability (and easy availability via the Web) of the motivations behind the changes in standards. These motivations are given either in applications from the public or in proposals from Food Standards Australia New Zealand (FSANZ 2005).

## 4.5 New Zealand

In comparison to Australia, New Zealand is bound by Standard 2.7.4 *Wine and Wine Product*, as well as Standard 1.3.1 *Food Additives* (specifically Section 14.2.2 *Wine, sparkling wine and fortified wine* in Schedule 1) and Standard 1.3.3 *Processing Aids* (Bell Gully 2005). These standards also apply to wine imported into Australia and New Zealand. Details are presented in Appendix C.

This legislation is the most difficult to work with because it is not based on one document, and it can be difficult to determine if the addition of a given processing aid is permitted. However, since a processing aid does not fulfil a technological

function in the final food, this precludes the use of flavourings. See the comments in the section above about Australia for a description of the type of legislation.

## 4.6 United States of America

The USA federal legislation appears in Title 27 *Alcohol, Tobacco Products and Firearms* of the Federal Code of Regulations. State level legislation is beyond the scope of this document although a few comments will be made on California law as it has some significant differences to federal law with respect to sugar and water. The most relevant section of the federal legislation is Part 24 *Wine* which covers bonded wine premises, the production of wine, taxes and records. The sections of specific interest to winemaking are §24.246 *Materials authorized for the treatment of wine and juice* and §24.248 *Processes authorized for the treatment of wine, juice, and distilling material*, but there are also other relevant sections. §24.249 *Experimentation with new treating material or process* and §24.250 *Application for use of new treating material or process* describes how permission can be obtained to experiment with new materials and processes. There are also sections that deal with recordkeeping.

### 4.6.1 Type of legislation

The legislation is detailed and covers both what can be added and the processes that can be used. It is fairly difficult to read – for example, §24.178 which covers amelioration gives fine details of when it is acceptable. The presentation in Appendix D is by necessity a summary of the legislation.

## 4.7 European Union

The major components of the European legislation appears in Council Regulation No 1493/1999 on the common organisation of the market in wine, and Commission Regulation No 1622/2000 on the common organisation of the market in wine and establishing a Community code of oenological practices and processes, with Regulation 1622/2000 giving more specific details of the implementation of Regulation 1493/1999. These regulations are relatively recent, and were promulgated partly to bring regulations into one document, as opposed to the previous status quo where they appeared in a number of different pieces of legislation.

The relevant parts of the Regulation 1493/1999 are Title V (Articles 42 to 46) *Oenological Practices and Processes*, and associated annexes, Annex IV *List of Authorised Oenological Practices and Processes* and Annex V *Limits and Conditions for Certain Oenological Practices*. The most important parts of Regulation

1622/2000 are Title II (Articles 5 to 18) *Oenological Practices and Processes*, Title II (Articles 22 to 39) *Oenological Practices* which covers enrichment, acidification, deacidification, and sweetening, and Title III *Experimental Use of New Oenological Practices*. The most relevant annexes are Annexes IV to XI. Annex V(G) details the notification and recordkeeping required for certain practices.

Regulation 1493/1999 allows for Member States to impose stricter requirements on oenological practices and processes for certain wine types such as quality wines psr (produced in specific regions) (Article 42(4), EC Reg No 1493/1999).

Regulation 1493/1999 also divides the European Union grape-growing areas into a number of zones: Zones A, B, C I a), C I b), C II, C III a) and C III b). Zone A covers the coolest regions and C III b) the warmest. These zones are used to determine which oenological practices apply (Annex III, EC Reg No 1493/1999). The details of the EU legislation are summarised in Appendix E.

#### 4.7.1 Type of legislation

In comparison to the Australian and New Zealand legislation which is food standards based, the EU legislation deals with wine specifically, which is unsurprising considering that many of the countries that make up the EU are those typically described as Old World wine making countries, and there is much tradition around winemaking. The EU legislative documents start with a motivation for the legislation before presenting the actual legislation.

The legislation relates most additives to a specific function in the winemaking process. It specifically forbids that which is not authorised by the legislation.

### 4.8 Comparison of legislation styles

Different jurisdictions have different locations within their legal framework for their wine legislation. The legislation for Australia and New Zealand is part of general food and safety legislation, and this affects their approach to legislation. In South Africa and the USA, the legislation falls under the general legislation about alcohol, although in the USA this legislation also includes tobacco and firearms (although currently alcohol is administered with tobacco by the Alcohol and Tobacco Tax and Trade Bureau, part of the USA Department of the Treasury) whereas this association is not made in South Africa. On the other hand, the EU treats wine as a distinct and special product that needs its own legislation – this is understandable since wine production is a major agricultural activity in many European countries, particularly France, Italy and Spain, and their legislation is aimed not only at the production of wine but also at managing the common wine market.

The main aim of all the legislation is to describe what is permitted, and explicitly states that what is not permitted is forbidden. This makes sense whether one is directed by a health and safety emphasis or by a desire to restrict the production of wine to certain acceptable techniques and protect markets. The main differences are in what practices are allowed, and the conditions under which they are allowed.

Hence, a difference in legislation is the amount of detail that is given: the reasons for adding the substance, and at what stage of the winemaking process it can be added. Australia and New Zealand essentially limit this to describing what is a food additive and what is a processing aid, and omit processes. South Africa has some conditions of use, as well as describing the wine style it is applicable to (for example, some additives are not allowed for noble late harvest wines, see Tables A.1–A.4). A major distinction between the South African legislation and the EU and USA legislation is that it specifies what can be added and what can be removed, rather than specifying processes. Specific processes are described under the conditions for removal. Both the European and the American legislation is specific about what a particular additive can be used for, and also describes processes.

There are also differences in the level of specification, for example, in the EU legislation detailed specifications taking 2 pages are given for lactic bacteria (Annex VIII, EC Reg No 1622/2000), and the USA legislation specifies *Leuconostoc oenos*. In comparison, the South Africa legislation states “malolactic fermentation bacteria” and the Australian legislation states “cultures of micro-organisms”.

## 4.9 Conclusion

This chapter has highlighted the sources of legislation for the different jurisdictions, and given a broad overview of differences in style of the legislation. The next chapter considers the various additives and processes in detail.

## **5. Comparison of legislation**

### **5.1 Introduction**

This chapter compares in some detail the legislation from the five jurisdictions – Australia, New Zealand, South Africa, the United States of America and the European Union. It starts by considering previously published comparisons. The aim here is not to compare in minute detail but to give a broad overview, hence the chapter will proceed by considering categories of additives, as opposed to individual additives. One level of detail that will not be considered is permitted limits of substances.

For summaries of the legislation, refer to Appendices A to E. Any part of the legislation that appears in an appendix will not be cited. However, if legislation is mentioned that is not given in an appendix, an explicit citation to its source will be given.

The chapter concludes with an assessment of the differences, as well as a short discussion on how the South African regulations differ from the other legislation.

### **5.2 Other comparisons**

Comparisons can be divided into two groups – those that have appeared in magazines, and those that are more academic in focus. The magazine articles are more general in tone, and do not consider the legislation of other countries in detail, for example, see Lloyd (2004a,b) and James (2000). Two detailed comparisons are discussed in the following two sections.

#### **5.2.1 Comparison of EU, USA and OIV regulations**

The most comprehensive article is that by Juban (2000), in which the author compares three different frameworks (EU law, USA law and OIV standards) for wine-making and identifies differences. Before discussing the comparison, some information about the International Organisation of Vine and Wine<sup>1</sup>(OIV) is required.

The OIV is an intergovernmental organisation dealing with grape and wine production which can make recommendations to countries that are members but has no standing in law. Of the five jurisdictions considered in this document, Australia,

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<sup>1</sup><http://www.oiv.org>

New Zealand and South Africa are members, and the EU and USA are not. All the EU states are members except the United Kingdom which is an observer, and Estonia, Latvia, Lithuania and Poland which are not members.

The OIV considers standards for winemaking additives and practices, and publishes these. It aims to harmonise regulations and assist in mutual recognition of practices. It works with other bodies such as the FAO/WHO Codex Alimentarius Commission<sup>2</sup> which sets international food safety standards for the World Trade Organisation<sup>3</sup> (WTO). For a report on some of the interaction between the Codex Alimentarius Commission and the OIV, see Juban (2004) which reports on the effects of separating wine into two categories – grape wine and wine not made from grapes – and how this affects the additives permitted.

The OIV standards are published as the Codex Œnologique International. Juban (2000) emphasises that it is not a list of regulations as it contains practices that are not permitted in some countries. For example, Resolution Oeno 28/2004 deals with plant proteins extracted from wheat and peas for fining of musts and wines, although these are not permitted in the EU or South Africa (OIV 2004).

Juban (2000) compares the regulations of the EU and the USA, and the standards of the OIV, and identifies four categories.

1. Oenological practices admitted by all three (which are obviously not problematic from a regulatory point of view).
2. Practices admitted by the EU and the USA, but not the OIV (such as kaolin, potassium caseinate, thiamin hydrochloride and various enrichment and sweetening additions).
3. Practices admitted by either the OIV and the EU, or the OIV and the USA, but not all three (for example, metatartaric acid – OIV and EU, lactic and malic acid, antifoaming agents – OIV and USA).
4. Practices admitted by only one of OIV, EU and USA (for example, fresh lees – EU, potassium carbonate acid – OIV, spinning cone column and ferrous sulphate – USA).

Juban suggests that practices in the second category should be added to the Codex Œnologique. Practices in the third category are already in the international standards and hence should be adopted by the country that does not currently admit them, so as to avoid barriers to trade. Ideally, for practices in the last category, mutual consensus should lead to the adoption of a standard in the Codex Œnologique, but if this is not possible or in the meantime, a solution is to consider mutual recognition or acceptance of equivalence of the practice.

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<sup>2</sup><http://www.codexalimentarius.net>

<sup>3</sup><http://www.wto.org>



The issue of the differences between the EU and USA regulation has to some extent been addressed by an EU regulation. This is discussed further in Chapter 7, as is the general area of law and barriers to trade.

### 5.2.2 The AWRI comparison webpage

The Australian Wine Research Institute has a webpage titled *Permitted additives and processing aids for winemaking and wine importing countries*<sup>4</sup> (AWRI 2005) which provides a search facility. This search facility allows one to find out what additives are permitted in a specific jurisdiction, and in which jurisdictions a given additive is permitted. The countries covered are Argentina, Australia, Brazil, Canada, Chile, Japan, New Zealand, South Africa and the USA. It also covers the EU, the EU-Australia Trade agreement, the OIV, Codex Alimentarius, and the Mercosur countries: Argentina, Brazil, Paraguay and Uruguay<sup>5</sup>.

Unfortunately, due to the format of the presentation, it does not have space to give the conditions under which additives are allowed. For example, under EU regulations some additives can be applied to the must and some to the wine. This distinction is not made. A more serious concern, in my opinion, is that this can lead to incorrect information. For example, South Africa is listed as a country where sugar is permitted. However, under South African law, sugar can only be added to sparkling wines “for the initiation of the second alcoholic fermentation and to sweeten the final product” (Table 6, SA Regulations). In practice, these fine distinctions are of crucial importance.

## 5.3 Comparison of permitted additives and processes

As mentioned previously, the focus here is on still dry, off-dry and semi-sweet wines. Using South African wine law terminology, this covers wines with no more than 30g/l residual sugar. Since it is beyond the scope of this document to describe the differences in sweetness terminology in different countries, the term is used here loosely to describe still wines except those that have high levels of residual sugar or that are fortified. This simplifies the presentation because it is then possible to exclude legislation relating to these special types of wine. Additives used for wines such as sparkling wines and fortified wines will be mentioned if this is relevant for explaining differences in legislation, but otherwise will not be considered.

Table 5.1 gives an overview of additives and processes that may be used. Many of the items are phrased in terms of the reasons for adding a substance. The organ-

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<sup>4</sup>[http://www.awri.com.au/analytical\\_service/additives/](http://www.awri.com.au/analytical_service/additives/)

<sup>5</sup>Mercosur is a common market among Brazil, Argentina, Uruguay and Paraguay, established by the 1991 Treaty of Asunción.

Table 5.1: Categories used to organise Section 5.3

Yeasts, yeast nutrition and malolactic bacteria
Alcohol increase by addition of substances
Acidification
Deacidification
Water
Use and addition of gases
Enzymes
Anti-foaming agents
Clarification and stabilization (This classification is taken from Ribéreau-Gayon et al. (2000b, p. 272) with some omissions and additions)
Clarification: fining with gelatine, isinglass, casein, egg or blood albumin, siliceous earths, filtration, polyvinylpolypyrrolidone, plant proteins
Biological stabilisation: heating, sulphur dioxide, sorbic acid, dimethyl dicarbonate (Rankine 1998), lysozyme (Falchek 2004), fumaric acid (Boulton et al. 1996)
Prevention of oxidation: sulphur dioxide, ascorbic acid, blanketing with inert gas
Prevention of tartrate precipitation: cold stabilisation, electro dialysis, ion exchange, metatartaric acid, mannoproteins
Prevention of turbidity due to proteins in white wine: bentonite, kaolin, tannin, cold stabilisation
Prevention of turbidity due to colouring matter in red wines: cold stabilisation, fining, bentonite, gum arabic
Prevention of metallic hazes: citric acid, gum arabic, ascorbic acid, potassium ferrocyanide, phytates, bentonite, ferrous sulphate, heating
Improvement of colour, flavour and aroma: charcoal, casein and milk, fresh yeast lees, polyvinylpolypyrrolidone, caramel, copper sulphate, flavour extracted from grapes
Sweetening
Wood
Technological processes
Unusual additives

isation of the table follows to some extent the winemaking process. The comparison will be done following this table, except that processes for clarification and stabilisation will be discussed as technological processes. The bulk of this comparison is summarised in Tables 5.2 and 5.3.

### **5.3.1 Yeasts, yeast nutrition and malolactic bacteria**

Yeast, either that which is present in cellars and on grapes, or preparations of cultured yeasts which are added to must, are necessary for sugars to be turned into alcohol. All jurisdictions allow yeast to be added, as well as some yeast nutrients. South Africa explicitly allows yeast nutrients (with the rider that they are not foreign to wine or contribute to flavour) as well as explicitly permitting thiamin, diammonium phosphate, ammonia, ammonium bisulphite, ammonium phosphate and ammonium sulphite. The Australian regulations mention cultures of micro-organisms, as well as ammonium phosphate, thiamin chloride and thiamin hydrochloride. For the thiamin compounds there is a footnote that these can only be added for nutrient reasons. New Zealand allows ammonium phosphates and calcium phosphates as additives and thiamin as a processing aid. Addition of yeast is permitted because it is a food, and it is not clear where or how malolactic bacteria are permitted, but there is no reason to assume their addition is not permitted.

The USA legislation allows ammonium phosphates and thiamin hydrochloride as nutrients, as well as defatted soy flour and autolysed yeast. The EU regulations specify yeasts, diammonium phosphate, ammonium sulphate, ammonium sulphite, ammonium bisulphite, thiamin hydrochloride, preparations of the yeast cell wall, and fresh lees. All jurisdictions allow use of malolactic bacteria (in the EU legislation, these are called lactic bacteria).

Ribéreau-Gayon et al. (2000a) suggests other fermentation activators that can be prepared from various fungi. These would only appear to be legal in those jurisdictions that allow yeast nutrients. This could then apply only to South Africa out of the jurisdictions considered here.

In summary, all countries permit the addition of yeast, some type of yeast nutrient and malolactic bacteria.

### **5.3.2 Alcohol increase by addition of substances**

Increasing the potential alcohol by adding substances is called enrichment in the EU legislation and chaptalisation in the USA legislation. In all jurisdictions it can be achieved by addition of some form of concentrated grape must. This is a relatively recent change in the South African regulations, and does not apply to special late harvest wines, wines made from naturally dried grapes or noble late harvest wines.

The addition of sugar is more regulated – in Europe it can only be done by dry sugaring<sup>6</sup> and “only in the wine-growing zones where it is traditionally or exceptionally practised under the legislation in force at 8 May 1970” (Annex V(D), EC Reg No 1493/1999) which are listed in Regulation No 1622/2000 as Zone A, B and parts of Zone C (Article 22, EC Reg No 1622/2000).

Sugar is allowed by the Federal Regulations in the USA, but explicitly barred in California (§17010, California Administrative Code) where only pure condensed grape must is allowed in general, and sugar use is only allowed in some specific wine styles, such as secondary fermentation in sparkling wines. It is allowed in New Zealand since any food is a generally permitted processing aid. Because sugar is consumed during the alcoholic fermentation, it does not play a technical role in the final product and hence can be classified as a processing aid.

In both South Africa and Australia, sugar is not permitted in general. An exception in both South Africa and Australia is in the production of sparkling wine.

Hence, the use of concentrated must is permitted in all countries, although the use of sugar is not.

### 5.3.3 Acidification

There are differences in the types of acids that are allowed for acidification. No jurisdictions of the five investigated allow hydrochloric, phosphoric or sulphuric acid. New Zealand and the USA allow citric, fumaric<sup>7</sup>, lactic, malic and tartaric, Australia citric, lactic, malic and tartaric, South Africa citric, malic and tartaric, and Europe only tartaric acid. Additionally, in the EU, acidification is only allowed in Zones C II and C III in normal weather conditions and in these zones and in Zones C I in exceptional years. In 2003, it was permitted by derogation (which is exemption from a regulation) in Zones A and B (EC Reg No 1687/2003) and it was permitted by the national authorities everywhere in France (Decanter 2003) and Germany (Schmidt 2004).

The EU list of permitted additives includes citric acid but it can only be used for stabilisation and not for acidification.

Acidification is permitted in all jurisdictions, but in the EU it is limited by location and climatic conditions.

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<sup>6</sup>The addition of refined white sugar directly to must during the first third of fermentation (Ribéreau-Gayon et al. 2000a).

<sup>7</sup>Note that fumaric acid is not typically used for acidification but rather to prevent malolactic fermentation. However, the USA legislation specifically permits the use of fumaric acid for acidification (see Table D.2) and the New Zealand legislation permits it as an additive without further specification.

#### 5.3.4 Deacidification

The EU permits deacidification with potassium tartrate, potassium bicarbonate, calcium carbonate and calcium tartrate, in all zones except Zone C III (b). Tartaric acid is permitted for deacidification only in parts of Zone A and only for two grape varieties.

In the USA, amelioration (the addition of water and/or sugar) can be performed to adjust the acidity level, and additionally calcium carbonate, potassium carbonate and potassium bicarbonate can be used.

In South Africa, calcium carbonate, calcium hydroxide, and sodium hydroxide are permitted for removing organic acids. Sodium carbonate is also listed in permitted additives.

Calcium carbonates, potassium carbonates, potassium sodium tartrate, potassium tartrate and sodium carbonates can be added in New Zealand, and calcium carbonate, potassium carbonate and potassium hydrogen carbonate (potassium bicarbonate) are permitted in Australia.

All five jurisdictions permit the use of malolactic bacteria, hence they all permit the biological deacidification of wine (Jackson 1994).

In summary, except in the EU where there are geographic constraints, deacidification is permitted by addition of substances. The process of using ion exchange resins will be discussed in Section 5.3.12.

#### 5.3.5 Water

The USA is the only jurisdiction to permit addition of water to change the character of the wine – it can be added with or without sugar to reduce acidity. This is known as amelioration. Water is also allowed to flush equipment and facilitate fermentations, and to add materials within specified limits. Note however, this does not apply to California where “no water in excess of the minimum amount necessary to facilitate normal fermentation” is allowed (§17010(a), California Administrative Code). However, as discussed in Section 2.2.1 this was interpreted more broadly in 2002, and water is allowed to be added to prevent stuck fermentations which is more likely to happen when grapes are very ripe.

In the EU, “[a]uthorised oenological practices and processes shall exclude the addition of water, except where required by specific technical necessity” (Article 42(3), EC Reg No 1493/1999). South Africa states that allowed substances can be “added to a liquor product in accordance with generally accepted cellar or manufacturing practices” (Section 30, SA Act), and this would appear to permit the addition of water for the purposes of adding allowed substances. In New Zealand, water is a permitted processing aid, but as with any processing aid must be added at the lowest level to achieve the purpose required. Standard 4.5.1 for Australian wine

states wine “may contain water in proportion not exceeding 30 mL/L where the water is necessary for the incorporation” of any permitted additive or processing aid (Clause 5(7), FSANZ Standard 4.5.1).

To conclude, except in the USA (excluding California) where water can be used to modify the characteristics of the wine, water is only allowed as a processing aid.

### **5.3.6 Use and addition of gases**

The EU permits aeration with oxygen, argon or nitrogen; the addition of oxygen and carbon dioxide; and the use of carbon dioxide, argon or nitrogen to prevent oxidation. The USA permits carbon dioxide to “stabilize and preserve”; nitrogen to prevent oxidation and preserve pressure in bottling and filtering; and the use of oxygen and compressed air.

South Africa permits addition of carbon dioxide, nitrogen and oxygen with no qualification on reason for use. Australia allows carbon dioxide as additive and processing aid, and argon, nitrogen and oxygen as processing aids. New Zealand permits carbon dioxide as an additive and nitrogen, argon and oxygen as a processing aid.

In addition to providing protection from oxidation, inert gases such as carbon dioxide or nitrogen can be used to clarify wine by flotation, where bubbles bring suspended particles to the top where they can be removed (Ribéreau-Gayon et al. 2000a; Bird 2000). This is permitted in all jurisdictions, except the USA which has specific conditions on the use of nitrogen.

All jurisdictions permit the use of oxygen, so micro-oxygenation and hyperoxidation are permitted. Micro-oxygenation is the controlled addition of oxygen to must or wine at various stages, but particularly after fermentation to simulate the effects of maturation in barrel (Robinson 1999, p. 449). Hyperoxidation (also called hyperoxygenation) involves exposing must to pure oxygen with the goal of oxidising the components of the must that are most susceptible to oxidation, and then removing them from the wine, resulting in a wine that is more stable with respect to oxygen (Ribéreau-Gayon et al. 2000a; Bird 2000).

### **5.3.7 Enzymes**

Enzymes can be used for must clarification (pectinases and glucanases), colour extraction and stabilisation (pectinases), aroma release (glycosides) (Ribéreau-Gayon et al. 2000a) and to prevent malolactic fermentation (lysozyme) (Falchek 2004). The differences in the way enzymes are specified reflect the different approaches to legislation. South Africa just specifies enzymes, and Australia lists enzymes under processing aids (although redundantly also includes lysozyme which

is an enzyme).

For New Zealand, lysozyme appears in the list of additives in Schedule 2 – these are the additives which are allowed to be used as processing aids. Other enzymes appear in the tables listing enzymes that can be used as processing aids.

In contrast, both the EU and USA legislation list specific enzymes and how they can be used. The EU lists lysozyme (without a specific use), urease to reduce urea, and “pectinolytic enzymes” and “an enzymatic preparation of betaglucanase” for clarification. Reduction of urea prevents the formation of ethyl carbamate which is thought to have carcinogenic properties (Ribéreau-Gayon et al. 2000b). The USA legislation lists seventeen enzymes (some distinguished by source) including betaglucanase, pectinase, lysozyme and urease with specific reasons for usage.

### 5.3.8 Antifoaming agents

New Zealand permits both polyoxyethylene (40) monostearate and sorbitan monostearate as additives, and other antifoam agents as processing aids. In the USA legislation, these two antifoam agents are permitted during fermentation as are silicon dioxide, dimethylpoly-siloxane, glyceryl mono-oleate and glyceryl dioleate. Antifoaming agents such as these are not permitted in Australia, South Africa or the EU.

### 5.3.9 Clarification and stabilisation

This section focusses on the additives in Table 5.1. Processes will be considered in Section 5.3.12

#### Clarification

Fining with gelatine, isinglass, casein, egg albumin or siliceous earths (silicon dioxide, silica gel, silicasol) is permitted in all five jurisdictions. Neither Australia nor New Zealand list casein or potassium caseinate explicitly, but both permit the use of milk and milk products. Blood albumin is not allowed in any of the five. Polyvinylpyrrolidone (PVPP) is allowed in all five jurisdictions.

Australian regulations allow the use of collagen, and New Zealand allows fish collagen, including isinglass. Australia and New Zealand also allow plant proteins, for example proteins extracted from wheat, rice, peas, lupins and maize (FSANZ 2004a). This is to allow the use of vegan proteins for fining (FSANZ 2004a). Agar-agar or agar (which is extracted from seaweed) is permitted in Australia and South Africa.

In conclusion, a wide range of substances are permitted in the five jurisdictions, but only Australia, New Zealand and South Africa allow proteins derived from

plants, with South Africa restricted to agar.

### **Biological stabilisation**

Sulphur dioxide (SO<sub>2</sub>) and sorbic acid are allowed in all five jurisdictions. Regulations may mention different sources of these products. For example, in the South African regulations, sulphur dioxide gas is mentioned, as well as potassium metabisulphite and sodium metabisulphite. For sorbic acid, New Zealand, for example, includes sorbic acid as well as sodium, potassium and calcium sorbates.

Dimethyl dicarbonate (DMDC) which kills micro-organisms is allowed in South Africa, Australia, New Zealand and the USA.

Both lysozyme and fumaric acid can be used to stop malolactic fermentation by destroying the malolactic bacteria (Falchek 2004; Boulton et al. 1996). Lysozyme is permitted in all jurisdictions, and fumaric acid is permitted in the USA for “wine stabilisation” and in New Zealand.

In summary, sulphur dioxide and sorbic acid are allowed in all five jurisdictions, but other substances used to destroy micro-organisms have more limited applicability.

### **Prevention of oxidation**

Ascorbic acid and related compounds are allowed in all five jurisdictions. The use of inert gases has been described above in Section 5.3.6, and the use of sulphur dioxide in the previous section.

### **Prevention of tartrate precipitation**

Metatartaric acid is a relatively short-term solution for preventing crystallisation, and is prepared by heating tartaric acid (Ribéreau-Gayon et al. 2000b). It is allowed in Australia, New Zealand and the EU, but not South Africa or the USA.

Mannoproteins, which are obtained from yeast cell walls, also reduce tartrate crystallisation (Ribéreau-Gayon et al. 2000b). They are permitted in the EU which allows for preparations of yeast cell walls. The USA regulations allow for yeast cell walls to be used but only as yeast nutrients, not for stabilisation. Neither South Africa or Australia permit them, and the situation in New Zealand is unclear.

Additives are used during cold stabilisation; typically potassium bitartrate (potassium hydrogen tartrate) and calcium tartrate are used to remove tartrates from wine. Both are permitted in the EU and Australia, whereas only potassium bitartrate is allowed in the USA and South Africa. Tartaric acid is explicitly permitted in South Africa for removal of tartrates. The situation in New Zealand is unclear.



The EU permits the removal of calcium with “DL tartaric acid or . . . its neutral salt of potassium”.

Hence, all countries allow additives that can be used during cold stabilisation to induce precipitation, but only Australia, New Zealand and the EU permit substances that prevent precipitation of tartrates by preventing crystallisation.

### **Prevention of turbidity due to proteins in white wine**

Various hydrated aluminum silicates consisting of montmorillonites, often called bentonites, are used in winemaking. They can be calcium-based or sodium-based (Wyoming clay) (Ribéreau-Gayon et al. 2000b). All five jurisdictions allow bentonite, and some allow other clays, for example, kaolin is allowed in the EU, New Zealand and the USA. Australia and New Zealand also allow cupric citrate on a bentonite base. The copper citrate is used to remove hydrogen sulphide (FSANZ 2004a).

Tannin addition is permitted in all five jurisdictions. Australia allows tannin as an additive, and New Zealand allows both tannin and grape skin extract. The EU allows tannin for clarification of must and as an addition to wine. The USA allows tannin addition both for clarification and the adjustment of tannin content, with the restriction that it must not add colour.

In South Africa, the legislation for tannin addition requires that it not be “foreign to wine”. Since commercial tannins for winemaking can be prepared from grapes (procyanidin-based) or oak wood, chestnut wood or gall nuts (gallotannin-based) (Ribéreau-Gayon et al. 2000b), this could mean that only grape tannins are acceptable. South African legislation permits wood without indicating type, hence it could mean that gallotannins are allowed, and the prohibition is against other tannins that are not used in winemaking. It is not clear what is permitted.

In summary, all jurisdictions permit the use of some form of bentonite and tannin for protein stability in white wine.

### **Prevention of turbidity due to colouring matter in red wine**

One additive for preventing cloudiness due to colouring matter, namely bentonite, has been discussed in the previous section and is permitted in all jurisdictions. Fining has been discussed in Section 5.3.9.

Gum arabic is obtained from certain acacia trees, and is a protective colloid, hence it prevents the precipitation of material in wine (Ribéreau-Gayon et al. 2000b). It is permitted in all five regulatory jurisdictions.

### **Prevention of metal hazes**

To prevent hazes, one can use citric acid which reacts with iron to form soluble iron citrate, ascorbic acid to prevent oxidation of iron, and potassium ferrocyanide or phytates to precipitate metals that can then be removed (Ribéreau-Gayon et al. 2000b). In all five jurisdictions, citric acid, ascorbic acid and potassium ferrocyanide (described as “ferrocyanide compounds (sequestered complexes)” in the USA regulations) are permitted for the purpose of preventing metal hazes. Ferrous sulphate is permitted in the USA. Phytate use is permitted in Australia, New Zealand and the EU, but in the EU only calcium phytate is permitted, and only for red wine. Since both potassium ferrocyanide and phytates are hazardous to human health, they can only be used as a processing aid, after which there must be no traces left in the treated wine. Hence, all jurisdictions have strict regulations about the usage of these substances.

### **Improvement of colour, flavour and aroma**

Copper sulphate to improve aroma is permitted in all five. Both Australia and New Zealand permit cupric citrate on a bentonite base. The copper citrate is used to remove hydrogen sulphide and is superior to copper sulphate for this task (FSANZ 2004a). Ferrous sulphate is permitted in the USA.

Charcoal (also called activated carbon) is allowed for improving colour and aroma in all five jurisdictions. It is limited to white must and wine within the EU.

Milk and milk products (as opposed to casein or potassium caseinate) are only explicitly permitted in the USA (to remove off-flavours) and Australia. In New Zealand they are allowed as processing aids because they are foods. Fresh yeast lees are explicitly permitted within the EU, and may possibly be permitted elsewhere, but not directly. Polyvinylpolypyrrolidone (PVPP) is allowed in South Africa to remove undesirable flavours, and in the USA to remove colour from red wine or must. It is permitted in the other three jurisdictions.

Caramel is allowed for liqueur wines in the EU, fortified wines in Australia, for all wine in New Zealand, and for all wine except special late harvest and noble late harvest in South Africa. In South Africa, the caramel used must not be manufactured by the ammonia process. Grape skin extract which can add colour is permitted in New Zealand.

Only the USA explicitly permits the addition of volatile fruit-flavour concentrate from grapes, within certain limits. Since the definition of wine in Australia and New Zealand refers explicitly to products derived solely from grapes, addition of flavour concentrate extracted from grapes is permitted. Neither South Africa nor Europe permit this addition.

All jurisdictions permit the use of materials to remove unwanted colour, flavour and aroma. Fewer jurisdictions permit the addition of colour (by caramel) or aroma and flavour (by flavour extracted from grapes).

### **5.3.10 Sweetening**

In South Africa, sweetening<sup>8</sup> can be done by the addition of concentrated must, must or by sweet reserve (for definition, see Appendix A). In the EU, it can be done by adding must, concentrated must or rectified concentrated must, but not sugar. In the USA, sweetening can be done by adding juice, concentrated juice or sugar (but sugar is not allowed in California). In Australia, mistelle (see definition in Appendix B), must or concentrated must can be used. In New Zealand, various forms of must can be used.

### **5.3.11 Wood**

In South Africa, wood (with no further qualification) is permitted. In Australia and New Zealand, oak is permitted as a processing aid. The USA regulations refer to “oak chips or particles, uncharred and untreated” for smoothing wine.

The EU legislation does not mention wood or oak at all, but since it does not regulate container type, it would appear that barrels are acceptable, although oak chips would not be. Experimentation with oak chips is taking place in France (Styles 2005b) and Italy (Commission Decision of 6 November 2003, document number C(2003)4099). See Section 8.2.1 for French proposals to deal with their wine crisis by allowing the use of oak chips in certain Vin de Pays wine.

### **5.3.12 Technological processes**

The most distinctive aspect of the Australian and New Zealand law is that there is no description of allowed processes, only of processing aids and additives, therefore it appears that any processes are acceptable. Hence this section will focus mainly on the differences between South Africa, the USA and the EU.

The EU legislation is quite detailed in the processes it allows: heat treatment, centrifuging, filtration, removal of sulphur dioxide, and electro dialysis. But it does not describe everything – not included are racking, cold stabilisation or the use of barrels, for example. The USA legislation lists some of the more novel treatments only, and omits more traditional processes such as racking.

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<sup>8</sup>Sweetening is not allowed for special late harvest or noble late harvest wines.

**Alcohol increase by removal of substances**

The final alcohol level in wine can be increased by processes applied directly to the must prior to fermentation which reduce the amount of water in the must. This technique is called must concentration. Must concentration is permitted in the EU, and it can be done by reverse osmosis. Other techniques used in the EU for must concentration are vacuum extraction and cryoextraction (European Commission 2004). In the EU, for lower quality wine, alcohol increase is permitted by partial concentration by cooling of wine itself.

In contrast, in both the USA and South Africa, concentrated must can be added (within limits) to must, but direct concentration of the must is not obviously permitted.

**Alcohol decrease by removal of substances**

This is not permitted in the EU or South Africa. However, in the USA reverse osmosis can be used to remove alcohol, as can the osmotic transport process and the spinning cone column process. In South Africa, reverse osmosis to remove alcohol is apparently currently permitted on an experimental basis.

**Filtration**

The South African legislation mentions the use of filtering aids of inert material that leave no undesired residue in the product, as well as agar-agar. The Australian legislation mentions as processing aids: agar, cellulose, diatomaceous earth and perlite, whereas the New Zealand legislation only mentions the last two. In the USA, inert filtering aids are permitted and agar-agar, carrageenan, cellulose and diatomaceous earth are given as examples. The EU regulations mention only inert filtering agents that must not leave an undesired residue. The USA legislation explicitly refers to nanofiltration and ultrafiltration as acceptable.

**Technology to remove off flavours**

This is permitted in the USA by reverse osmosis and spinning cone column, with nanofiltration (in combination with ion exchange resins) permitted for removing volatile acidity. In South Africa, reverse osmosis is only explicitly permitted for the removal of volatile acidity.

**Removal of sulphur dioxide by physical processes**

This is permitted in both the EU and the USA, but not South Africa.

**Heat treatment**

This is permitted without limit in the EU. Pasteurisation is permitted in South Africa for tartrate, colour and protein stability. Thermal gradient processing to separate wine into fractions with different alcohol levels, and to separate juice into fractions with different sugar concentrations, is permitted in the USA.

**Cold stabilisation**

This is explicitly permitted for tartrate, colour and protein stability in South Africa. In the USA legislation, it is mentioned in connection with the use of calcium carbonate.

**Ion exchange**

In the USA, ion exchange resins are approved for various applications provided they do not change fruit character or colour of the wine (§24.248, USA CFR Title 27). In the EU, ion exchange resins can be used on grape must that is used for rectified concentrated grape must. South Africa does not allow ion exchange resins for wine. Both Australia and New Zealand permit ion exchange resins as processing aids.

**Electrodialysis**

Electrodialysis, a process using an electrical current to move ions through membranes depending on their charge (Ribéreau-Gayon et al. 2000b), is permitted in both the EU and the USA to remove tartrates.

**Others**

The USA also permits the use of metal reducing matrix sheets, sulphide reducing matrix sheets and thin-film evaporation under reduced pressure. See Appendix D for more details.

**5.3.13 Unusual additives**

These have been singled out as unusual because one country allows their usage.

**South Africa**

South Africa permits sodium and calcium hydroxide for deacidification but no other jurisdiction considered here does. Additionally, pimarizin (also called natamycin or pimaricin), an anti-bacterial and anti-fungal agent is permitted. Its use as an

additive is being investigated for the Australian and New Zealand food standards as an alternative to sorbates and sulphites in food production, but it is not being considered for use in wine (FSANZ 2004c).

### **Australia**

Hydrogen peroxide is approved as a processing aid for Australia. It appears that it can be used to reduce sulphur dioxide content by converting it to sulphate.

### **USA**

The USA legislation permits the use of granular cork to smooth wine, as well as acetaldehyde to stabilise the colour in must before concentration.

### **EU**

The two unusual practices in the EU legislation relate to traditional practices and have limited applicability. Pine resin is allowed to make retsina wines in Greece, and paraffin discs containing allyl isothiocyanate which are used to create a sterile atmosphere are listed, but can only be used in the areas where this is traditional.

## **5.4 Assessment of the comparison**

A summary of the comparison is given in Tables 5.2 and 5.3. The column on the left gives the reason for the additive or the actual additive, and the remaining three columns give more details of what is permitted, as well as indicating whether this is permitted in all five jurisdictions, in three or four (some) or in one or two (few). The relevant countries are also indicated.

The summary that appears in these tables does not contain all details presented in the previous section, but is fairly comprehensive. It concentrates on still dry, off-dry and semi-sweet wines, and hence does not include additives that may be allowed for other types of wines. The table also does not capture the additional geographical constraints within the EU for some additives and processes. Australia and New Zealand are not included in the processes listed, unless there is specific comment in their legislation, specifically filtration materials and ion exchange resins.

For most functions of additives, each jurisdiction permits some substance to achieve that function, however there may be variations in what is allowed. Notable exceptions are use of wood or oak, and addition of colour or flavour extracted from grapes. Considering processes, there is much less commonality than for additives.

Table 5.2: Summary of permitted additives and processes

Reason/ additive	Jurisdictions		
	All	Some (3 or 4)	Few (1 or 2)
Fermentation	yeast, nutrients, malolactic bacteria		
Alcohol increase by addition	concentrated must	ENU: sugar	
Acidification	tartaric	ANSU: malic, citric ANU: lactic	NU: fumaric
Deacidification	calcium carbonate	various potassium-based substances	S: calcium and sodium hydroxide U: sugar and/or water
Water	processing aid		U: deacidification
Gases	oxygen, carbon dioxide, nitrogen	AEN: argon	
Enzymes	lysozyme, urease, pectinase, betaglucanase		AS: enzymes (without further specification)
Prevention of oxidation	sulphur dioxide, ascorbic acid, carbon dioxide, nitrogen	AEN: argon	
Fining	gelatine, egg albumin, casein, siliceous earths, isinglass, PVPP		AN: plant proteins AS: agar A: collagen N: fish collagen
Biological stability	sulphur dioxide, sorbic acid, lysozyme	ANSU: DMDC	NU: fumaric acid
Tartrate stability		AESU: potassium bitartrate AENU: metatartaric acid ANS: tartaric acid	AE: calcium tartrate E: mannoproteins
Protein and colour stability	bentonite, tannin, gum arabic	ENU: kaolin	AN: cupric citrate on a bentonite base

A: Australia, E: European Union, N: New Zealand, S: South Africa, U: USA

Table 5.3: Summary of permitted additives and processes (continued)

Reason/ additive	Jurisdictions		
	All	Some (3 or 4)	Few (1 or 2)
Antifoaming			NU: named agents
Prevention of metal hazes	citric acid, gum arabic, ascorbic acid, bentonite, potassium ferrocyanide	AEN: phytates	U: ferrous sulphate
Removal of off-odours, flavours or colour	copper sulphate, charcoal/activated carbon, PVPP, casein	ANU: milk products	AN: cupric citrate on a bentonite base E: fresh yeast lees
Addition of colour or flavour		ANU: flavour extract from grapes	NS: caramel N: grape skin extract
Sweetening	concentrated must, must		S: sweet reserve A: mistelle U: sugar
Wooding		ANU: oak	S: wood
Filtration	various aids		
Ion exchange resins		ANU: various uses	
Alcohol increase by removal			E: concentration
Alcohol decrease by removal			U: various processes
SO <sub>2</sub> removal by physical processes			EU: various processes
Electrodialysis			EU: removal of tartrates
Removal of volatile acidity			SU: reverse osmosis U: nanofiltration
Removal of off-flavours			U: various processes

A: Australia, E: European Union, N: New Zealand, S: South Africa, U: USA



Attempting to classify jurisdictions in terms of how liberal their wine laws are, New Zealand appears the most liberal (although this is not obvious from the table, since they have been excluded in places as it has not been possible to identify whether an additive is permitted or not), followed by Australia, South Africa, and then the EU and the USA. This classification is partly constructed from what is allowed, but also how the use of additives and processes is specified. Since the USA regulations specify the specific use of each substance and process, it is classified as the least liberal. However, even within this attempt at classification, there are inconsistencies. New Zealand and the USA are at opposite ends of the scale, but they are the only two jurisdictions that permit fumaric acid, and two of the three that permit addition of sugar.

The major differences between the jurisdictions are whether (and when) sugar is permitted, the range of acids permitted, water use, antifoaming agents, addition of colouring or (grape-extracted) flavouring, use of wood, ion exchange resins and other technological processes.

## 5.5 Implications for the South African wine industry

Comparing the South African regulations with those of other countries can be done in a number of ways. The comparison could be done:

- with other warmer climate countries (Australia, New Zealand and the USA),
- with our major competitors (Australia and New Zealand),
- with our major export destinations (Europe and the USA), or
- in terms of additives that are accepted by some jurisdictions, but not by few jurisdictions (as defined in Tables 5.2 and 5.3).

When doing a comparison with export destinations and competitor countries, it is more important to consider import legislation and this is discussed in Chapter 7. The comparison given next will concentrate on additives accepted by three or more jurisdictions, and this will in many cases intersect with countries with warmer climates.

The major differences are addition of sugar for enrichment; argon; the use of plant proteins, metatartaric acid, kaolin and phytates; and various technological processes. There are certainly arguments against the use of sugar (see Chapter 3), and it could be argued that if enrichment is to be done it should be done with a grape product. The other additives could be investigated to see whether there is a need. The use of plant proteins would allow the easier production of vegan and vegetarian wines which could provide a point of differentiation.

South Africa limits use of various processes including ion exchange resins, some concentration processes and reverse osmosis (except for removal of volatile acidity), and this could be a possible area for change. In our climate, wines often have high alcohol, and the ability to reduce it could be useful, as there appears to be at present an increasing consumer backlash against high alcohol wine. Whether it would affect the quality of our wines is a question that needs to be considered.

In contrast, there are two aspects of the South African laws which are more liberal than most of the other jurisdictions. First, there is no restriction on type of enzyme so the industry can quickly move to using new enzyme products as they become available, and second, there is no restriction on the type of wood that can be used, permitting South African winemakers to experiment.

## **5.6 Conclusion**

In the end, the debate comes down to opinions about how the industry should be regulated, and opinions about how wine should be made. This chapter has compared these beliefs as they have been embodied in the legislation of the jurisdictions considered. At an abstract level, when considering additives and their functions, every jurisdiction permits some substances that fulfil those functions, and many additives are accepted in all five jurisdictions. Exceptions relate to wood and oak, addition of colour, and addition of flavour extracted from grapes. When considering processes and their functions, there is less commonality. It appears additives may be seen as more acceptable currently than processes. Looking at what is allowed in detail, there are large differences both in terms of additives and processes.

The next chapter considers the link between quality and usage of additives and processes, and whether this link is reflected in legislation.

## 6. Quality and cost

### 6.1 Introduction

Chapter 3 considered what wine is in relation to what substances are added or processes used during the production process. Some commentators have made an association between quality and low levels of additive and process use. This current chapter considers whether this is reflected in the legislation, namely whether legislation that covers quality restricts oenological practice. This is most relevant in the EU and South Africa since they both have regulations regarding different quality levels of wine. In South Africa, this is the Wine of Origin Scheme, and in the EU it is the legislation around quality wine psr (produced in a specific region) which covers Appellation d'Origine Contrôlée (AOC) wines in France, DOC and DOCG wines in Italy, QbA and QmP wines in Germany and DO and DOCa wine in Spain, to mention a few.

The second section of this chapter considers how cost may influence the practices that are permitted, and gives an example to show that winemaking costs (excluding the use of oak) are a relatively small component of the cost of making wine, regardless of the quality of the wine.

The remaining sections consider regimes that specifically restrict what can be used in winemaking. They are organic production, which aims to increase the naturalness of the product by reducing the non-natural substances used both in growing grapes and producing wine, and environmentally-friendly winemaking, in this case the South African Integrated Production of Wine Scheme, which aims to reduce the impact of the growing and production phases on the environment.

### 6.2 Wine quality

An interesting aspect of the comparison of additives is that little distinction is made by quality level within the legislation. For example, caramel is allowed in South African and New Zealand dry wines, regardless of their quality. Reverse osmosis in the EU for enrichment and in the USA for removal of alcohol is unlimited – the technique can be used on any type of wine. Producers making high quality wines are likely to eschew additives or techniques that are not consistent with quality wines, but they do not have to.

In South Africa, the Wine of Origin Scheme is a quality-based scheme based

on area of origin, grape variety and vintage. Section 17 of the scheme states that the provisions of the Act regarding addition and removal apply to wines made under the Wine of Origin Scheme – these would be the regulations in terms of Section 27 of the Liquor Products Act – except where otherwise provided for in the Wine of Origin Scheme regulations (Section 17(1)(a), SA WOS). There are more specific rules given about yeast addition in the Scheme than in the Regulations, for example that it should not alter the distinctive character of the wine. Any concentrated must that is added, either for sweetening or before or during fermentation is deemed to be of the same origin, variety and/or vintage as the wine it is added to (Sections 8(2), 9(2), 10(2) and 11(2), SA WOS). In contrast, sweet reserve which can only be added for sweetening, must have the same origin, and in the case of variety or vintage certified wine, must be the same variety or vintage, or must not alter the distinctive character of the wine (Section 20, SA WOS). Specific permission is required from the Wine and Spirit Board to add concentrated must or sweet reserve (Section 20, SA WOS).

Because the Australian and New Zealand laws are based on health and safety, these laws cannot make quality distinctions. Concerns about quality or at least perceptions of quality have influenced the legislation. A reason given for the fact that Australia has a different standard for wine to New Zealand is partly to do with a recognition that “maintenance of wine quality is paramount to export success” (Gregan and Battaglione 2002, p. 506) and there was concern that changing the regulations could lead to a perception of a drop in quality (Gregan and Battaglione 2002).

In the USA, California has passed state laws that forbid sugar usage (except in specific types of wine such as sparkling) and limit water usage (compared to the USA federal legislation), possibly in part to distinguish itself from other states and to uphold wine making quality.

The EU has additional rules for quality wines psr (produced in specific regions); specifically partial concentration through cooling of wine cannot be used to increase alcohol, and the must and concentrated must used for sweetening should come from the same specified region. Also, in the EU, individual states are permitted to impose stricter laws for quality wines psr and table wines with geographical indications. An example of this is the fact that wines classified Qualitätswein mit Prädikat (QmP) in Germany are not allowed to use enrichment – such a wine “must be fermented as it was harvested” (Diel and Payne 1999, p. 13), and when sweetening using *süßreserve* (sterilised grape juice with a few degrees of alcohol), the *süßreserve* must be of the same level of ripeness as the wine to which it is added (Stevenson 2001, p. 264). Until 2002, must concentration was not permitted in Germany at all (Schmidt 2004), but is now permitted for wines at lower quality levels than QmP (European Commission 2004).

In Spain, the wine type indicates how long it has been matured. For red wines, Crianza wines require six months in oak with a total of two years' maturation before sale, although some regions such as Rioja require 12 months in oak (Radford 1998); Reserva wines have three years' total maturation before sale with at least one year in oak, and the rest in bottle; and Gran Reserva wines must have at least five years' maturation, 18 months of that in cask (Radford 2004).

Due to the lack of availability of laws in English, it is difficult to find further European examples. However, the impression given by magazine articles is that there are few major differences, and that the issues of the day are more to do with how reverse osmosis can be used, and the use of oak chips, rather than a focus on the specific additives. A recent European Commission report on the European common market in wine (European Commission 2004) considered a number of aspects, including the effect of the regulations. Responses from experts in each country showed that the general opinion was that the regulatory framework in the EU did not prevent the production of good wines (European Commission 2004).

### 6.3 Cost

There is an obvious relationship between cost and quality – wines that are cheap are perceived as lower quality than more expensive wines, and in general this relationship holds. In contrast, there can be an inverse relationship between cost, and level of additive or process use. An obvious exception is the use of wood. Generally, wines that are submitted to more processes and use more additives are those that are made in bulk and that cost less, whereas those wines that are closer to handmade are likely to have fewer additives and undergo fewer processes (although it seems that an increasing number of high quality wines are undergoing processes such as reverse osmosis to concentrate flavours and reduce alcohol).

The costs of wine production have been estimated for cheap and expensive wines based on a supermarket chenin blanc and an oak-aged cabernet sauvignon (Motteux 2005). A wine that will cost the consumer R24 will have production costs of R8 of which R3 is packaging, R2 is wine making, R0.20 is oak staves and R2.80 is grapes. Hence, of the R5 for production excluding packaging, additives and processes will cost 40%, and wooding 4%. On the other hand, a wine that costs R120 (5 times more expensive) will have production costs of R42, R15 for packaging, R3 winemaking, R16 for oak and R8 for the grapes. So of the R27 for production without packaging (more than 3 times more expensive), additives and processes will cost 11% and wooding 59%. Although the winemaking may cost more for higher-end wines (presumably because of using better additives rather than more), proportionally, it is substantially less. However, the major difference in production

costs occur because of the differences in the cost of wooding the wine (80 times more expensive), and to some extent the cost of the grapes (almost 3 times more expensive). To summarise, for cheap wine, additives make up 40% of production costs versus 11% for expensive wine, however the actual cost per bottle of additives are R2 for cheap wine and R3 for expensive wine, so there is not much difference per bottle.

In the European Commission report on the wine market mentioned above, none of the country responses indicated that the regulations restricted the production of good wines, but some indicated that restrictions on the usage of cheaper methods prevented the EU from being competitive in terms of price (European Commission 2004, Section 7.5.1).

When considering additives and techniques that are permitted by regulations, there may be a choice of which to use or whether to use it, and cost and effect on quality may determine which is chosen. An example of this is choosing between tartaric acid and synthetic tartaric acid which is cheaper but may not be as effective or usable (Lloyd 2004b). Enrichment techniques may also have different outcomes. Sucrose and rectified concentrated must do give small differences in the organoleptic properties of wines (Dehoogh et al. 1991, as cited by European Commission (2004), Section 7.2). Direct must concentration methods such as vacuum evaporation, cryoextraction and reverse osmosis can lead to better wines than the use of sucrose if the must is of high quality; however these concentration techniques if applied to musts from unripe grapes can lead to an intensification of the unripe character (Amann 2001; Diel 1996; Krebs 2000; Dehoogh et al. 1991, as cited in European Commission (2004), Section 7.2). Reverse osmosis to remove volatile acidity can leave a wine bitter and tannic (Motteux 2002). Different types of organic acids have different prices: tartaric acid is twice the price of malic and four times the price of citric (Motteux 2005). There is currently debate about whether the use of staves together with micro-oxygenation gives wines that are equivalent to those that are barrel-matured (Nel 2001).

The two previous sections have considered quality, both its relation to regulations and to cost. The next section considers two different regimes that further limit the types of additives that can be used, beyond national regulations.

## **6.4 Organic and environmentally-friendly wine**

One area in which there are specific differences in what additives can be used is that of organic winemaking and also the South African Integrated Production of Wine (IPW) Scheme which is aimed at more environmentally-friendly wine production. Organic wine production typically imposes further limits (over national or

regional winemaking legislation) on what additives can be used. The IPW Scheme on the other hand tries to encourage more ecologically-aware practices.

### 6.4.1 Organic wines

The production of wine from organic grapes may or may not result in a suitably organic product – it depends on the winemaking techniques used. A naive approach is to say nothing can be added during winemaking, but making good wine without sulphur dioxide is difficult. Next, some of the rules for organic production are considered in the five jurisdictions, and since it is beyond the scope of this document to consider these rules in detail, the focus will be on the use of sulphur dioxide and related compounds.

In the EU, there is no legislation regarding organic winemaking, hence this process is certified by a recognised body, such as the Soil Association or Ecocert, and the requirements may vary from body to body. As a result of this lack of legislation, wines produced from organic grapes in the EU can only be labelled as “wine made from organically grown grapes” and not as “organic wine” (The Soil Association 2004). In general, sulphur dioxide levels permitted by the various certification bodies are about a quarter of the level allowed for wine complying with EU regulations (The Soil Association 2004). Other additives permitted may vary, for example the Soil Association permits egg white and isinglass (The Soil Association 2004).

In contrast to this, USA legislation covers production as well as agriculture. Their National Organic Program<sup>1</sup> which falls under the USA Department of Agriculture defines two categories that are applicable to wine that is produced from organic grapes: wine made without sulphites can be labelled “organic wine” whereas wine made with sulphites can only be labelled “made with organic grapes”, but only if the sulphite concentration is less than 100ppm. Any other additive or processing aid must meet the requirements of the law (Part 205 *National Organic Program*, Title 7 *Agriculture of the Code of Federal Regulations*).

In Australia, the National Standard for Organic and Biodynamic Produce 2002 (Third Edition) published by the Australian Quarantine and Inspection Service (AQIS 2004) sets the minimum standards for organic food. It specifically permits sulphur dioxide and potassium metabisulphite for wine (and only wine – no other organic products) and oak chips from untreated sources also only for wine. The organic standards published by Biological Farmers of Australia<sup>2</sup> suggest a limit of 125ppm for sulphur dioxide, and permit sulphur dioxide, potassium metabisulphite, citric acid, tartaric acid, ammonium phosphate, ammonium sulphate, tannin, tannic acid, potassium carbonate, tartaric acid and salts, silicon dioxide, bentonite, casein, egg-

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<sup>1</sup><http://www.ams.usda.gov/nop/>

<sup>2</sup><http://www.bfa.com.au>

white albumin and isinglass for wine production; as well as calcium carbonate, carbon dioxide, agar, carrageenan, argon, nitrogen, oxygen and micro-organisms (if not genetically modified) as generally accepted in food production (BFA 2003). There are some substances that are permitted in winemaking in Australia that are permitted for some organic products, but not wine; examples are gum arabic and lactic acid (BFA 2003). Other products such as polyvinylpyrrolidone and potassium ferrocyanide are not permitted for any organic products (BFA 2003).

In New Zealand, the New Zealand Food Standards authority authorises third-party agencies to monitor compliance with organic criteria. As an example of this, one of the agencies Bio-Gro<sup>3</sup> lists the acceptable reasons for using additives or processing aids in organic winemaking in Module 4.11 *Viticulture and Winemaking Standard* (Bio-Gro 2004):

- to maintain nutritional value,
- for a stable product,
- for an acceptable composition, consistency or appearance with no aim of deception,
- if there is no way to make the product without the substance,
- if it is not used only for efficiency or to rectify losses of flavour, colouring or nutrition during processing,
- if the minimum amount necessary is used, and
- if the substance contains no unpermitted substances.

The standard further defines good winemaking practices (Bio-Gro 2004):

**Permitted processes:** centrifugation, natural or cultured yeasts (no genetically modified yeasts), natural ageing.

**Permitted processes and additives:** clarification with fresh egg whites, pure casein, food quality natural gelatine, kaolin and calcium carbonate; chaptalisation with pure sugar certified by Bio-Gen, certified grape juice, oak infusion systems, use of yeast hulls, addition of tartaric or malic acid.

**Restricted processes and additives:** ascorbic acid, sulphur dioxide over certain limits, copper sulphate, diammonium phosphate for winemaking only.

**Sparging/flushing methods** inert gases such as carbon dioxide, nitrogen and argon.

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<sup>3</sup><http://www.bio-gro.co.nz>



In South Africa, there is as yet no government regulation of organic produce although draft regulations in terms of the Agricultural Product Standards Act (Act No 119 of 1990) were published in 2001. According to Neil Erasmus of the South African National Department of Agriculture as quoted by Duminy (2004), wine may be excluded from these regulations, and regulations for organic wine would be promulgated in terms of the Liquor Products Act. Currently, various local and international bodies certify South African wine as organic and there are variations in their standards (Duminy 2004). These wines are currently sold as “organic wine”. The draft regulations for general organic production in South Africa (a version of these regulations can be found on the AFRISCO website<sup>4</sup>) do not discuss sulphur dioxide and it appears that if they were to be applied to wine, only wines made without sulphur dioxide could be described as organic.

#### 6.4.2 Integrated Production of Wine

The Integrated Production of Wine (IPW) Scheme<sup>5</sup> is promulgated in terms of Section 14 of the Liquor Products Act and it is aimed at producing grapes and wine in a manner that reduces the impact of this production on the environment and reduces human intervention in the process as well (IPW 2004c). It involves a voluntary points-based system with random auditing to assess whether the production processes of a given wine cellar meet the aims of the scheme, and allow wine from that cellar to be described as an IPW wine. It considers both vineyard and cellar practices. The categories that deal with additives are as follows (IPW 2004b):

- Sulphur dioxide – this is categorised into three levels depending on concentration: good, average and poor.
- Precipitants and fining agents – these are classified as good (egg albumen, gelatine, isinglass, pectolytic enzymes, calcium bentonite, silicasol), average (agar-agar, activated animal/plant charcoal, polyvinylpolypyrrolidone, tannin) and poor (sodium bentonite).
- Filter materials – only good filter materials are classified (cellulose, diatomaceous earth, perlite).
- Other – these are also classified into good (for example, concentrated must, lysozyme, lactic and tartaric acid, wood), average (for example, ascorbic acid, citric acid, diammonium phosphate, potassium carbonate) and poor (copper sulphate, dimethyl dicarbonate, pimarizin).

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<sup>4</sup>[http://www.afrisco.net/Html/Product\\_Stardards.htm](http://www.afrisco.net/Html/Product_Stardards.htm)

<sup>5</sup><http://www.ipw.co.za>

- Fermentation – use of selected dry yeasts or natural yeasts that do not require additional energy or sulphur dioxide usage gain more points than inoculating must from other fermentations in the cellar. (IPW 2004a).
- Disposal of solid waste such as filtering materials, bentonite, and synthetic tartaric acid – points are awarded for good management as well as recovery of alcohol and tartaric acid (IPW 2004b).

For a cellar that produces and bottles wine, there are 150 points available of which 77 must be obtained for wines made in that cellar to be described as IPW wines (IPW 2004a). For each category, 5 points are awarded for a good score, 2 or 3 points for average (although a number of categories only allow a good or poor score), and 0 points for poor (IPW 2004a). This means that a cellar that is mostly average with some poor practices will not meet the required number of points.

## 6.5 Conclusion

The major difference between the organic wine rules and those for IPW are that organic rules make strong distinctions about what is permitted, whereas the IPW rules allow some poor practices but too many will prevent self-certification. Neither of these approaches are focussed on quality of wine specifically, but they are more about the quality of the process in making the wine. There may be practices that could be viewed as more environmentally friendly in terms of production but that are more likely to be used in bulk wine production than small-scale production.

This chapter has considered the link between legislation regarding quality and that regarding oenological practices. In the main, there is little restriction of what practices can be used for higher quality wines. The EU and South Africa have some restrictions, and New Zealand, Australia and the USA do not obviously have any, apart from California restricting some practices that are permitted at federal level. Cost also determines the additives and processes used, although apart from how oak is used, it does not appear to be a major component of the cost of winemaking.

Two approaches to winemaking that limit the additives used are organic wine-making and environmentally-friendly winemaking (represented here by the IPW scheme in South Africa). Since the aims of these schemes are not directed towards making high quality wine specifically, it is not surprising that this goal is not used as a limiter on the additives and processes used. Both approaches essentially limit the more noxious of the additives involved which is good from the point of view of wine being a healthy product, and not just a safe one.

The next chapter considers international trade in wine, and how different countries regulate the import of wine. It concludes with a consideration of labelling of additives in the five jurisdictions.

# 7. International trade and labelling of additives

## 7.1 Introduction

The export of wine is of major importance to many of the countries considered here, particularly South Africa, Australia, and many of the EU member countries. Since countries and regions set their own standards for how wine should be made, it is not surprising that they also apply standards to the wine being imported, and these often specify the additives used and processes applied to wine. Hence, oenological practice regulation affects trade. The World Trade Organisation (WTO) has two agreements that impact wine trade with respect to the practices used to make wine (Gregan and Battaglione 2002). They are

- the Agreement on the Application of Sanitary and Phytosanitary Measures<sup>1</sup>, and
- the Agreement on Technical Barriers to Trade<sup>2</sup>.

These both revolve around achieving food safety and consumer protection without the regulations becoming a hindrance to trade between countries. This is achieved in two ways, one by international standards, and two by ensuring that regulations are set at the minimum to achieve these standards. Gregan and Battaglione (2002) explain how the Australian and New Zealand wine regulations were influenced in part by a desire to meet these agreements. The food standards for Australia and New Zealand are based on international standards, specifically the Codex Alimentarius.

The rest of this chapter considers the actual trade regulations, the EU's approach of bilateral agreements with individual countries, a new multilateral agreement, and then finally how the five jurisdictions regulate the labelling of additives on wine containers.

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<sup>1</sup>[http://www.wto.org/english/tratop\\_e/sps\\_e/sps\\_e.htm](http://www.wto.org/english/tratop_e/sps_e/sps_e.htm)

<sup>2</sup>[http://www.wto.org/english/tratop\\_e/tbt\\_e/tbt\\_e.htm](http://www.wto.org/english/tratop_e/tbt_e/tbt_e.htm)

## **7.2 Trade regulations**

### **7.2.1 South Africa**

Any wine imported into South Africa must have an import certificate which must “be accompanied by documentary proof, issued by a competent authority in the country of origin” that the product meets any “particular production, composition or maturation requirements” given in terms of the regulations for liquor products (Section 43(2)(g), SA Regulations).

### **7.2.2 Australia and New Zealand**

Any wine imported into Australia or New Zealand has to meet Standard 2.7.1, the same standard that New Zealand wines must meet.

### **7.2.3 USA**

It appears that until recently, the most important aspect of importing wines into the USA was payment of appropriate taxes as well as approval of labels. In November 2004, an amendment was made to Internal Revenue Code to describe “proper cellar treatment of natural wines” and to introduce certification of this treatment for imported wines produced from the start of 2005 onwards. The Alcohol and Tobacco Tax and Trade Bureau (TTB) is responsible for implementing this law and is in the process of formulating regulations (Alcohol and Tobacco Tax and Trade Bureau 2004). Concerns have been raised that the suggested implementation is counter to the Mutual Acceptance Agreement on Oenological Practices (see Section 7.3) to which the USA is a signatory<sup>3</sup>.

### **7.2.4 European Union**

The situation in the EU is complex. Regulation 1493/1999 only allows wine to be sold for human consumption if it has undergone oenological practices that are permitted in the EU (Article 45, EC Reg No 1493/1999). Regulation 883/2001 indicates that the practices that are permitted for an imported wine are those that are permitted for the EU zones that have the same climatic conditions as the source of that wine (Article 31, EC Reg No 883/2001). This specifically applies to enrichment, acidification and deacidification which varies among zones. The VI1 form which is required for importation explicitly asks for certification that the product has not undergone oenological practices which are not permitted if the product is to be sold for direct human consumption (Annex VII, EC Reg No 883/2001).

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<sup>3</sup>See [http://www.ttb.gov/foia/nprm\\_comments/ttbnotice26\\_comments.htm](http://www.ttb.gov/foia/nprm_comments/ttbnotice26_comments.htm) for comments on the proposed regulations.

Many countries have specific treaties with the EU about wine trade and so the situation is somewhat different when considered on a country to country basis. It appears that the EU sees the way forward in dealing with potential technical barriers to trade as having an individual wine trade agreement with each country that exports significant amounts of wine to the EU. These treaties describe which oenological practices are acceptable for wines to be sold in the countries of the EU, and what practices are acceptable for wine of the EU to be sold to the country signing the treaty.

Countries who have bilateral agreements on wine trade with the EU are Australia, Canada, Chile and South Africa, as well as Switzerland, Bulgaria, Romania, Croatia, Slovenia, the former Yugoslav Republic of Macedonia, Tunisia and Algeria (European Commission 2004, Annex 9.4.3, pp. 415-416). The USA does not have a wine trade agreement but there is an EC Council Regulation that deals with differences in practices (EC Reg No 1037/2001). New Zealand does not appear to have a treaty. Argentina has a derogation to permit the use of malic acid in its wines until its trade agreement is finalised (EC Reg No 527/2003).

The oenological practices permitted for South African, Australian and USA wines sold in the EU are listed in Appendix F.

A major difference between the treaty with South Africa and that with Australia is the permission for usage of wood shavings for South African wines with no similar clause for Australian wine. This has been a sticking point in the finalisation of the Australian-EU treaty (Osborne 2003) although it does not appear to be an issue in other treaties. For example, the use of "oak chips and sawdust, uncharred and not treated" is permitted for wines from the USA (EC Reg No 1037/2001), and is classified as a process with is comparable to one permitted in the EU. Considering EU treaties with jurisdictions that are not covered by this document, the EU-Chile treaty permits the "use of wood, solely in the form of staves, pieces and chips in the fermentation and ageing of the wine" (Appendix V, EU-Chile Agreement), and the EU-Canada treaty permits "oak pieces, chips or particles as processing aids which are filtered out of the wine before bottling" (Annex I, EU-Canada Agreement).

The treaty with South Africa was signed after the implementation of EC Regulation 1493/1999, and the permitted practices for EU wines are very similar to those in that regulation. The Australian treaty was signed in 1994, and hence the practices for European wines are slightly different to Regulation 1493/1999. For example, partial concentration by reverse osmosis to increase alcoholic strength is permitted for EU wines in the treaty with South Africa but not in the treaty with Australia.

Both Australia and South Africa have modified their wine laws that relate to additives since the signing of the treaties. The fact that Australia has a separate wine standard from New Zealand is in part due to the desire not to affect this treaty

(FSANZ 2002). It is not clear whether the treaties have been updated in light of these modifications, although they both describe procedures for the acceptance of new practices. There is no obvious documentation of changes to the treaties on the EUR-Lex website<sup>4</sup>, the website of European legislation where the original treaties can be found.

### 7.3 A different approach

The World Wine Trade Group<sup>5</sup> (WWTG, originally called the New World Wine Producers) consists of the national representatives of the wine industries of a number of countries who focus on access to international markets for sale of their wine based on free movement of goods, and removal of barriers to trade. Participating countries are Argentina, Australia, Canada, Chile, Mexico, New Zealand, South Africa and the USA.

To date, the major achievement of this group is the Mutual Acceptance Agreement on Oenological Practices. This agreement embodies the statement made at the October 1999 meeting in Chile of the WWTG:

“The Parties to this Statement shall accept for import, wine that has been produced in accordance with the Oenological Practices of a producing Party. Each Party agrees that Oenological Practices are the subject of domestic laws and regulations in the jurisdiction where the Wine is produced; that each Party has established acceptable mechanisms for regulating the health and human safety factors associated with such Oenological Practices; and that such regulations and standards are acceptable to the country of importation, as equivalent to its Oenological Practice standards and regulations. The Parties agree that they will not impose restrictions on imported wine inconsistent with this statement.” (WWTG 1999)

Article 5 of the MAA can be found in Appendix F – this expresses the core of the agreement. To date, the MAA has been ratified by Argentina, Australia, Canada, Chile, New Zealand and the USA (WWTG 2005). South Africa has neither signed nor ratified the MAA, and the statement of the WWTG from the March 2005 meeting in New Zealand states that they “would like to pursue the re-engagement of South Africa with the World Wine Trade Group, as one of its founding members, at both Government and Industry level” (WWTG 2005).

The other issue being considered by the WWTG is labelling with the goal being a uniform labelling policy that allows one label for many markets and hence to re-

<sup>4</sup><http://europa.eu.int/eur-lex/>

<sup>5</sup><http://www.wwtg-gmcv.org>

duce the cost and complexities in labelling, as well as providing suitable information for consumers, producers and regulatory bodies. This relates to oenological practices since there has been a move to list possible allergens on labels, particularly sulphur dioxide. The next section considers labelling of additives.

## 7.4 Labelling of additives

Currently, the legislation of all five jurisdictions considered here concentrate on labelling of allergens, as opposed to ingredients. Australia used to label wine with preservatives and anti-oxidants but that has been phased out (AWBC 2004). The rules for the five regions are given below. It appears that these laws also apply to wines imported into the jurisdictions.

### 7.4.1 South Africa

All wine sold after 30 June 2004 must have “bevat sulfiete” or “contains sulfites” on the label whenever “sulphur dioxide occurs in that wine in a concentration of more than 10 milligram per litre, measured as total sulphur dioxide” (Section 33(2)(d), SA Regulations). It appears that “contains sulphites” will also be allowed (James 2004a). Subsequently, the date was postponed to 25 November 2005 (Matthee 2005).

### 7.4.2 Australia and New Zealand

Certain allergenic substances must be declared on the label of foods if they are an ingredient, additive or processing aid or a component of one of these in terms of Standard 1.2.3 *Mandatory warning and advisory statements and declarations* (Clause 4, FSANZ Standard 1.2.3). The substances are cereals containing gluten, crustacea, egg, fish, milk, peanuts, soybeans, tree nuts and sesame seeds, and any products made from these foods. Additionally, added sulphites in concentrations of 10 mg/kg or more must be declared.

There has been some debate in the Australian wine industry as to exactly what wording is allowed (Drinkwater 2004; Omond 2003), but the final decision is that solely using the phrasing “may contain” is not acceptable. However, in some cases, especially with processing aids such as fining products, it may not be possible to measure whether there is any residue, hence it should be stated that the substance has been used in the production and that there may still be traces in the final product (AWBC 2004). Examples of acceptable phrasings are (AWBC 2004, p. 7):

- “Produced with isinglass (fish product).”

- “Contains/produced with fish product.”
- “Produced with isinglass (fish product). Traces may remain.”
- “Produced with fish products. Traces may remain.”

Since tannins in Australia may be derived from chestnuts, if this type of tannin was used then this also would need to be declared (AWBC 2004). Other examples are caramel produced from wheat which may contain gluten, and technical corks made with casein-based glues (AWBC 2004). Plant proteins derived from wheat that are used for fining could also contain gluten. The presence of added sulphur dioxide above the limit can be indicated by referring to “preservative (220)” or sulphites (AWBC 2004) or presumably simply sulphur dioxide.

An interesting aspect of this regulation is the fact that only added sulphites have to be declared. Between 12 and 64 mg/litre of sulphur dioxide can be generated by yeast metabolism during fermentation, although levels above 30mg/litre are usually due to additions (Larue et al. 1985, as cited in Jackson (1994)). This means that some legally labelled Australian and New Zealand wines may have sulphur dioxide levels higher than 10mg/litre without it being labelled, but these wines would fall foul of the European, USA and South African requirements. Note that Australian law does not allow these wines to be called “preservative free” since this can only be used if there is less than 10mg/litre of total sulphur dioxide in the wine (AWBC 2004).

### **7.4.3 USA**

The USA regulations require that somewhere on the label appears “the statement ‘Contains sulfites’ or ‘Contains (a) sulfiting agent(s)’ or a statement identifying the specific sulfiting agent where sulfur dioxide or a sulfiting agent is detected at a level of 10 or more parts per million, measured as total sulfur dioxide” (S4.32(d), USA CFR Title 27). This requirement has been in force since 1987. Currently, the Alcohol and Tobacco Tax and Trade Bureau has called for comments on new labelling laws which could include ingredient and more comprehensive allergen labelling (Alcohol and Tobacco Tax and Trade Bureau 2005).

### **7.4.4 EU**

The relevant EU legislation concentrates on allergens. From 25 November 2004, wine labels can, and from 25 November 2005, wine labels must give information about the following ingredients and products made from these ingredients: cereals containing gluten, crustaceans, eggs, fish, peanuts, soybeans, milk, nuts (almond,



hazelnut, walnut, pecan nut, Brazil nut, pistachio nut, macademia nut), celery, mustard and sesame seeds. Additionally, information must be given if the wine contains “Sulphur dioxide and sulphites at concentrations of more than 10 mg/kg or 10 mg/litre expressed as SO<sub>2</sub>” (Annex IIIa, Directive 2000/13/EC). Since chestnuts are not included in the list of nuts, chestnut-derived tannins are not an issue (AWBC 2005). These regulations apply to other foodstuffs, but unlike other foodstuffs, wine labels are not required to list all ingredients. Additionally, Member States are required to ensure that this label information is provided in a language that consumers will understand (Article 16, Directive 2000/13/EC).

Directive 2005/26/EC further amends Directive 2000/13/EC and excludes until 25 November 2007 the following from the list of products that need to be listed.

- Lysozyme (produced from egg) used in wine.
- Albumin (produced from egg) used as a fining agent in wine.
- Fish gelatine or isinglass used as a fining agent in wine.
- Milk (casein) products used as fining agents in wines.

Hence the mandatory requirement from 25 November 2005 will be “Contains sulphites” or “Contains sulphur dioxide” in one or more appropriate languages (AWBC 2005).

## 7.5 Conclusion

As can be seen in this chapter, the baseline that most countries require for imported wine is that the wine meets the requirements applied to their own wine, although the USA is still finalising their legislation regarding the cellar practices that are permissible for imported wines. There are two major divergences from this. In Australia, imported wines need only meet Standard 2.7.4 and not the Australia only standard, Standard 4.5.1. The second divergence is the EU, where individual trade agreements are made with individual countries that accept many of the oenological practices of those countries. It appears that this leads to some inconsistencies, and this may act as a barrier to trade as these differences cannot be justified on health or environmental grounds.

In terms of labelling of additives, currently all countries focus on allergens. South Africa, the USA and the EU require labelling indicating sulphur dioxide levels over a given maximum. In contrast, New Zealand and Australia require labelling of additional allergens (that have been exempted from labelling in the EU), as well as added sulphur dioxide levels over a given maximum.

## **8. Conclusion**

### **8.1 Introduction**

To this point, this document has concentrated on the current state of affairs, covering a general classification of additives, what wine is defined to be philosophically, and then studying in detail the legislation of the five chosen jurisdictions. After the detailed comparison, other aspects have been considered: the association between permitted oenological practices and legislation relating to quality, approaches that limit additives, import legislation and finally labelling of additives.

The next section considers the future, and possible ways forward. It will cover a number of aspects, including new additives and processes, international trade and new requirements for traceability of products.

The final section of the document sums up what has been presented here.

### **8.2 Future trends**

Over the next decade, there will be advances in science and technology that will lead to the development of new ways to produce wine, and countries will need to decide whether these fit with their definitions of what wine is. Additionally, there is likely to be an increased push for removal of barriers to trade, and this will affect wine production, especially with a likely increase of wine production from countries without a strong tradition of winemaking. What follows is a brief overview of some of the possible future trends.

#### **8.2.1 Adoption of existing additives and processes**

As is clear from the legislation presented in this document, there are variations in what is accepted for winemaking in different countries. Some of these differences have been ameliorated by the multilateral treaty that covers acceptance of oenological practices (MAA) but this does not necessarily lead to adoption within one country of practices accepted by another country. Pressure from producers who feel they will be more able to compete if they are allowed to use the same practices as other countries, may lead to changes in national legislation.

An interesting case in point are the proposals in France to permit producers in Bordeaux and Burgundy to declassify their wines to Vin de Pays, and for these

declassified wines, to permit blending across varietal and vintage and to allow the use of oak chips. This change would require France to obtain permission from the EU for the blending practices and the oak chip usage (Williams 2004).

### 8.2.2 Trade agreements and treaties

There are two aspects here: the MAA agreement, and the bilateral treaties between the EU and other countries.

In terms of the MAA agreement, South Africa may become a signatory and other countries may join the WWTG and sign the MAA. To date, signatories have a winemaking culture and tradition which informs their legislation. It will be interesting to see the robustness of this agreement if countries with very liberal winemaking legislation join. However, the fact that in the Codex Alimentarius, wine made from grapes has now been separated from other types of wines, may lead to a generally accepted standard for additives.

There is no indication that the EU is moving away from their policy of individual bilateral trade agreements on wine. Negotiations with Argentina are ongoing (Preface(2), EC Reg No 2067/2004), as well as with the USA (Preface(2), EC Reg No 2324/2003). The EU-Australia trade agreement still has some unfinalised items (although it was originally signed in 1994) and there is a clash over the use of oak chips (Osborne 2003). AREV, the Assembly of Wine Producing European Regions has raised objections to agreements with other countries that “sacrifice European stances on oenological practices” (AREV 2003, Section 5). Both of these indicate that the way ahead for future agreements may not be smooth.

### 8.2.3 New additives and processes

One obvious new direction is the use of additives created by genetically modified organisms (GMOs) as well as the direct use of genetically modified organisms themselves including yeasts and bacteria. Currently, there is both consumer and producer resistance to the use of GMOs and there is unlikely to be change soon.

There are other less controversial advances. Examples are the use of proteolytic enzymes and heat to obtain protein stability leading to reduced bentonite requirements (Pocock et al. 2003), fermentation activators obtained from fungi (Ribéreau-Gayon et al. 2000a), the use of copolymers to remove TCA (Styles 2005a) during production, and the use of bacteriocins such as nisin produced by malolactic bacteria to control bacterial activity and reduce sulphur dioxide use (Nel et al. 2002). One motivation for identifying new substances is to reduce the need for additives about which there is concern, either in terms of health or the environment.

### 8.2.4 Traceability

Both the European Union and the USA have introduced laws that deal with traceability. Although this is placed under future trends, it should be noted that both of these laws are already in force.

EC Regulation No 178/2002 requires that from 1 January 2005 appropriate traceability systems are in place for all food imported into the EU, including wine. Producers are required to record from whom they have obtained grapes and any product used in winemaking, as well as to record to whom they supply products (Matthee 2004). The Wine of Origin Scheme recordkeeping requirements goes some way towards this (Matthee 2004), but additional information relating to additives is required, including details of supplier, date received, product details and batch numbers (GS1 2005). A manual for the wine industry is available<sup>1</sup>.

The USA has established the Security and Bioterrorism Preparedness and Response Act of 2002 (Bioterrorism Act) which covers food production (and this includes wine). Under the Act, recordkeeping is required that allows the identification of the source of each product used in the production of a specific wine batch, and additionally, importers need to give advance notice of the arrival of imported wines at ports (Coggan 2004).

### 8.2.5 Changes in legislation

This document highlighted the fact that there is a limited link between quality and authorisation to use additives and processes. There is no indication that this is likely to change in the future in any of the five jurisdictions considered here.

However, there may be more changes in labelling of additives and ingredients in the USA. The USA TTB is currently requesting comments on labelling regulations, and asking specifically about whether mandatory nutrition and ingredient listing is desirable, and what information would be useful to consumers (Alcohol and Tobacco Tax and Trade Bureau 2005).

### 8.2.6 Future trends in South Africa

Articles have appeared in *Wineland* recently about practices which are not currently approved, for example, direct must concentration by reverse osmosis where the author concludes with a recommendation that the process be legalised (Marais 2003). There also appears to be demand for legalisation of reverse osmosis to remove alcohol, as there is the start of a backlash against high alcohol wines, which South Africa is prone to because of its warm climate. This problem could possibly

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<sup>1</sup> *Wine Supply Chain Traceability Guideline* available from [http://www.ean-int.org/docs/GS1\\_0003.pdf](http://www.ean-int.org/docs/GS1_0003.pdf)

be addressed by identifying yeasts that are less efficient. There is no indication of major changes in the South African legislation, apart from the possibility of modifying the Wine of Origin Scheme to encompass the EU traceability requirements (Matthee 2004).

### 8.3 Conclusion

This document had the aim of investigating legislation about additives and practices used in winemaking, in other words, oenological practices. To limit the scope of the document, three major choices were made. First, a decision was taken only to focus on practices during winemaking, and hence to exclude legislation about geographical indications or labelling rules. Second, the decision was made to concentrate on still dry, off-dry and semi-sweet wines to ensure that the document concentrated on the most common type of winemaking and was not distracted by regulations for other types of winemaking. The third decision was to focus on a small set of jurisdictions. Five were chosen: South Africa, Australia, New Zealand, the United States of America and the European Union. The choice was determined by their importance in the global wine market, and to some extent by the availability of their legislation in English.

Additives have been used in winemaking since before Roman times, to preserve and improve wine. From the nineteenth century onwards, increased understanding of winemaking led to a definition of wine, and from this, laws about winemaking. These laws have often been broken, with greed (wanting to make more profit) probably the most common motivator.

By considering what can be added to wine, it is possible to develop a classification of additives and processes, first by considering what is safe for human consumption and second, considering how wine is defined, and classifying additives into those that are accepted in winemaking and those that are not. A third level of classification can be added for accepted substances based on what their function is in the winemaking process. Either they are additives and play a role in the finished product, or they are processing aids and only play a role during production.

How wine is defined is a sizable topic. Of the five jurisdictions considered here, there are differences in their basic definitions of wine. These basic definitions are not useful in considering oenological practices. Alternatively, more philosophical criteria can be used to decide whether a particular substance or process is acceptable in winemaking. Criteria that have been used include traditional considerations, the desire to make the best product possible, marketing claims relating to oenological practices that may give an advantage, cosmetic improvements versus good

winemaking, the avoidance of deception, the level of additive usage, and a desire to ensure that wine remains more than an industrial product. Consumers also influence what is produced, and more information is required about what they know about winemaking, whether they understand the reality of commercial winemaking and how they make their purchasing choices.

The legislation chosen was first considered at an abstract level in terms of what other products were covered and how specific it was. The legislation of Australia and New Zealand are based on food safety standards, that of South Africa and the USA on the regulation of alcoholic products in general, and the EU legislation is specific to wine. The legislation of Australia and New Zealand divides substances into processing aids and additives, and does not consider processes. South Africa's legislation considers addition and removal of substances, with little specification of the reasons for additions. The USA legislation specifies conditions of use for all additives and processes, whereas the EU legislation specifies conditions for some.

The approach taken to considering the legislation in detail was a close reading followed by a categorisation of additives, partly by their function in the winemaking process and a comparison on that basis. This is summarised in Tables 5.2 and 5.3 (pages 46 and 47). These tables show that for most functions, some additive or process is permitted to achieve that function in each jurisdiction. In all five jurisdictions, the following are permitted: addition of concentrated grape must before fermentation (which results in potential alcohol increase), acidification, deacidification and sweetening of wine with concentrated must or must. The EU restricts the use of acidification and deacidification by climatic region. Functions on which jurisdictions differ include the use and type of wood, as well as addition of flavour extracted from grapes.

Major differences in additives and processes between jurisdictions include the use of sugar, the types of acid allowed, use of water, antifoaming agents, addition of colouring and flavour extracted from grapes, oak chips, ion exchange resins, direct must concentration, use of reverse osmosis and removal of substances including alcohol by various processes. The South African legislation differs from other jurisdictions in not permitting sugar to increase alcohol, not permitting plant proteins, and not permitting the use of metatartaric acid, kaolin or phytates. Additionally, the South African legislation limits which of the newer technological processes can be used, only permitting reverse osmosis for removal of volatile acidity. The South African legislation is liberal with respect to wood and enzymes since it does not further specify them.

Since there is often a link made between quality and lower use of additives and processes, the legislation was investigated to see if it imposed additional requirements in terms of oenological practices for higher quality wine. This is not the case for Australia, New Zealand or the USA (although California does have more restric-

tive laws in terms of water and sugar usage). In South Africa and the EU, there are some limited restrictions for wine made under the Wine of Origin Scheme, and quality wine psr (produced in specific regions) respectively, but they focus mainly on the origin of the must or concentrated must used in the wine. Hence, it appears that the legislation in the five jurisdictions does not impose more stringent restrictions on oenological practices for higher quality still dry, off-dry and semi-sweet wines.

Organic wine production and environmentally-friendly wine production limit the amount and type of additives used. Jurisdictions vary in terms of whether they have an overarching legislation. South Africa does not currently have legislation that covers organic wine production, although it is currently being developed. In contrast, South Africa has strongly developed environmentally-friendly wine production legislation, the Integrated Production of Wine Scheme. This scheme encourages the usage of additives that are less harmful to the environment.

The international wine trade is important for all jurisdictions considered in this document. South Africa, New Zealand and the EU (in general) require imported wine to match the standard required for their own wines. The USA is introducing legislation requiring imported wines to be certified in terms of the practices they have undergone. Australia requires that imported wines match the standard that New Zealand wines must match. The EU also has individual wine trade agreements with a number of countries that accept most practices of those countries, although there are some exceptions. A new approach is that of the World Wine Trade Group with their multilateral Mutual Acceptance Agreement on Oenological Practices where the aim is to prevent differences in oenological practices from being a barrier to trade.

All jurisdictions require the labelling of sulphites in wine. However, the Australian and New Zealand legislation appears to refer to added sulphites in contrast to other jurisdictions that refer to total sulphites. The Australian and New Zealand legislation also requires labelling of other allergens, including gluten, fish, egg, milk and nuts.

In conclusion, wine is mostly a natural product. Its production can range from handcrafted to essentially industrial, depending on the additives and processes that are used to make it. It is important that the balance does not shift too far in favour of industrial bulk production, because then we will lose something of infinite diversity and cultural importance. Because of the essentially national nature of legislation, it is unlikely that legislation can have a major effect on global trends in winemaking. It also seems unlikely that legislation will be introduced in any jurisdiction to further restrict the practices permitted for high quality wine. Other solutions need to be found.

## Legislative references

This part of the document lists the legislation that is cited in the text, and indicates how it is cited.

### South Africa

- The *Liquor Products Act*, No 60 of 1989, as amended by the *Wine and Spirit Control Act*, No 47 of 1970 and the *Liquor Products Amendment Act*, No 11 of 1993 (SA Act).
- The *Regulations* promulgated under Section 27 of the Liquor Products Act, No 60 of 1989 published by Government Notice No R1433 of 29 June 1990, as amended by Government Notices Nos R838 of 19 April 1991, R2841 of 29 November 1991, R2079 of 24 July 1992, R2593 of 11 September 1992, R2791 of 2 October 1992, R3152 of 20 November 1992, R1376 of 30 July 1993, R2350 of 10 December 1993, R356 of 25 February 1994, R636 of 8 April 1994, R1022 of 27 May 1994, R2242 of 23 December 1994, R394 of 17 March 1995, R1695 of 3 November 1995, R1876 of 8 December 1995, R501 of 29 March 1996, R1038 of 8 August 1997, R1141 of 29 August 1997, R833 of 26 June 1998, R1078 of 28 August 1998, R24 of 8 January 1999, R70 of 22 January 1999, R672 of 28 May 1999, R951 of 6 August 1999, R21 of 12 January 2001, R349 of 20 April 2001, R678 of 27 July 2001, R343 of 7 March 2003, (SA Regulations).
- The *Wine of Origin Scheme* established under Section 14 of the Liquor Products Act, No 60 of 1989 published by Government Notice No R1434 of 29 June 1990, as amended by Government Notices Nos R837 of 19 April 1991, R2482 of 29 November 1991, R1054 of 10 April 1992, R2594 of 11 September 1992, R3231 of 27 November 1992, R546 of 2 April 1993, R1375 of 30 July 1993, R1021 of 27 May 1994, R2067 of 2 December 1994, R814 of 9 June 1995, R1875 of 8 December 1995, R1039 of 8 August 1997, R834 of 26 June 1998, R324 of 19 March 1999, R19 of 12 January 2001, R829 of 21 June 2002 and R1306 of 25 October 2002, R1503 of 6 December 2002 and R1819 of 19 December 2003 (SA WOS).
- The *Scheme for the Integrated Production of Wine*, established under Section 14 of the Liquor Products Act, No 60 of 1989 published by Government Notice



R1434 of 29 June 1990 (SA IPW).

### Australia

- Standard 4.5.1 *Wine Production Requirements (Australia only)* of the Australia New Zealand Food Standards Code as amended, which was first published as Standard 4.1.1 *Wine Production Requirements (Australia only)* in Amendment No 63<sup>2</sup> to the Food Standards Gazette, No FSC 5, 24 October 2002 (FSANZ Standard 4.5.1).
- Standard 1.3.4 *Identity and Purity* of the Australia New Zealand Food Standards Code as amended (FSANZ Standard 1.3.4).

These standards are available in an unofficial consolidated version at the Food Standards Australia New Zealand website<sup>3</sup>.

### New Zealand

- Standard 2.7.4 *Wine and Wine Product* of the Australia New Zealand Food Standards Code as amended (FSANZ Standard 2.7.4).
- Standard 1.3.1 *Food Additives* of the Australia New Zealand Food Standards Code as amended (FSANZ Standard 1.3.1).
- Standard 1.3.3 *Processing Aids* of the Australia New Zealand Food Standards Code as amended (FSANZ Standard 1.3.3).
- Standard 1.3.4 *Identity and Purity* of the Australia New Zealand Food Standards Code as amended (FSANZ Standard 1.3.4).

These standards are available in an unofficial consolidated version at the Food Standards Australia New Zealand website<sup>4</sup>.

### United States of America

- Part 24 *Wine* of Title 27 *Alcohol, Tobacco and Firearms* of the Code of Federal Regulations (USA CFR Title 27).
- Part 205 *National Organic Program* of Title 27 *Agriculture* of the Code of Federal Regulations (USA CFR Title 7).

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<sup>2</sup><http://www.foodstandards.gov.au/standardsdevelopment/gazettenotices/amendment6324october1758.cfm>

<sup>3</sup><http://www.foodstandards.gov.au/foodstandardscode/>

<sup>4</sup><http://www.foodstandards.gov.au/foodstandardscode/>

The Code of Federal Regulations is available currently via the US Government Printing Office website<sup>5</sup>.

- Article 14 *Wine Standards and Prohibited Practices* of Group 2 *Definitions and Standards* of Subchapter 2 *Food and Drugs* of Chapter 5 *Sanitation (Environmental)* of Division 1 *State Department of Health Services* of Title 17 *Public Health of the California Administrative Code*, specifically §17001, 17005, 17010, 17015, 17075 (California Administrative Code).

These extracts from the California Administrative Code are available at the Wine Institute website<sup>6</sup>.

### European Union

- Council Regulation (EC) No 1493/1999 of 17 May 1999 on the common organisation of the market in wine, as amended by Commission Regulation (EC) No 1622/2000 of 24 July 2000, Commission Regulation (EC) No 885/2001 of 24 April 2001, Commission Regulation (EC) No 1410/2003 of 7 August 2003, Council Regulation (EC) No 2826/2000 of 19 December 2000, Council Regulation (EC) No 2585/2001 of 19 December 2001, Council Regulation (EC) No 806/2003 of 14 April 2003, Commission Regulation (EC) No 1795/2003 of 13 October 2003, Act concerning the conditions of accession of the Czech Republic, the Republic of Estonia, the Republic of Cyprus, the Republic of Latvia, the Republic of Lithuania, the Republic of Hungary, the Republic of Malta, the Republic of Poland, the Republic of Slovenia and the Slovak Republic and the adjustments to the Treaties on which the European Union is founded (EC Reg No 1493/1999).
- Commission Regulation (EC) No 1622/2000 of 24 July 2000 laying down certain detailed rules for implementing Regulation (EC) No 1493/1999 on the common organisation of the market in wine and establishing a Community code of oenological practices and processes, as amended by Commission Regulation (EC) No 2451/2000 of 7 November 2000, Commission Regulation (EC) No 885/2001 of 24 April 2001, Commission Regulation (EC) No 1609/2001 of 6 August 2001, Commission Regulation (EC) No 1655/2001 of 14 August 2001, Commission Regulation (EC) No 2066/2001 of 22 October 2001, Commission Regulation (EC) No 2244/2002 of 16 December 2002, Commission Regulation (EC) No 1410/2003 of 7 August 2003, Commission Regulation (EC) No 1427/2004 of 9 August 2004, Commission Regulation

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<sup>5</sup><http://www.gpoaccess.gov/ecfr/index.html>

<sup>6</sup>[http://www.wineinstitute.org/reflib/pub/california/regs\\_cal/regs\\_dhs.htm](http://www.wineinstitute.org/reflib/pub/california/regs_cal/regs_dhs.htm)

(EC) No 1428/2004 of 9 August 2004, Act concerning the conditions of accession of the Czech Republic, the Republic of Estonia, the Republic of Cyprus, the Republic of Latvia, the Republic of Lithuania, the Republic of Hungary, the Republic of Malta, the Republic of Poland, the Republic of Slovenia and the Slovak Republic and the adjustments to the Treaties on which the European Union is founded (EC Reg No 1622/2000).

- Commission Regulation (EC) No 883/2001 of 24 April 2001 laying down detailed rules for implementing Council Regulation (EC) No 1493/1999 as regards trade with third countries in products in the wine sector, as amended by Commission Regulation (EC) No 885/2001 of 24 April 2001, Commission Regulation (EC) No 812/2002 of 16 May 2002, Commission Regulation (EC) No 1574/2002 of 2 September 2002, Commission Regulation (EC) No 2380/2002 of 30 December 2002, Commission Regulation (EC) No 715/2003 of 24 April 2003, Commission Regulation (EC) No 1175/2003 of 1 July 2003, Commission Regulation (EC) No 1220/2003 of 7 July 2003, Commission Regulation (EC) No 2338/2003 of 30 December 2003, Commission Regulation (EC) No 908/2004 of 29 April 2004 (EC Reg No 883/2001).
- Council Regulation (EC) No 1037/2001 of 22 May 2001 authorising the offer and delivery for direct human consumption of certain imported wines which may have undergone oenological processes not provided for in Regulation (EC) No 1493/1999, as amended by Council Regulation (EC) No 2324/2003 of 17 December 2003 (EC Reg No 1037/2001).
- Council Regulation (EC) No 527/2003 of 17 March 2003 authorising the offer and delivery for direct human consumption of certain wines imported from Argentina which may have undergone oenological processes not provided for in Regulation (EC) No 1493/1999, as amended by Council Regulation (EC) No 1776/2003 of 29 September 2003, Council Regulation (EC) No 2067/2004 of 22 November 2004 (EC Reg No 527/2003).
- Commission Regulation (EC) No 1687/2003 of 25 September 2003 authorising the acidification of grape must and wine produced in wine-growing zones A and B for the 2003/04 wine year (EC Reg No 1687/2003).
- Directive 2000/13/EC of the European Parliament and of the Council of 20 March 2000 on the approximation of the laws of the Member States relating to the labelling, presentation and advertising of foodstuffs, as amended by Commission Directive 2001/101/EC of 26 November 2001, Directive 2003/89/EC of the European Parliament and of the Council of 10 November 2003, Commission Directive 2005/26/EC of 21 March 2005, Act concerning the condi-

tions of accession of the Czech Republic, the Republic of Estonia, the Republic of Cyprus, the Republic of Latvia, the Republic of Lithuania, the Republic of Hungary, the Republic of Malta, the Republic of Poland, the Republic of Slovenia and the Slovak Republic and the adjustments to the Treaties on which the European Union is founded (Directive 2000/13/EC).

- Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety, as amended by Regulation (EC) No 1642/2003 of the European Parliament and of the Council of 22 July 2003 (EC Reg No 178/2002).

Original versions as well as non-official consolidated versions of this legislation can be found at the EUR-Lex website<sup>7</sup>.

### Agreements

- Agreement between the European Community and the Republic of South Africa on trade in wine 2002, available at the EUR-Lex website<sup>8</sup> (EU-SA Trade Agreement).
- Agreement between the European Community and Australia on trade in wine 1994, available at the EUR-Lex website<sup>9</sup> (EU-Australia Trade Agreement).
- Agreement between the European Community and Chile on trade in wine 2002, available at the EUR-Lex website<sup>10</sup> (EU-Chile Trade Agreement).
- Agreement between the European Community and Canada on trade in wines and spirit drinks 2004, available at the EUR-Lex website<sup>11</sup> (EU-Canada Trade Agreement).
- Mutual Acceptance Agreement on Oenological Practices, available at the USA International Trade Administration website<sup>12</sup> (MAA).

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<sup>7</sup><http://europa.eu.int/eur-lex/lex>

<sup>8</sup>[http://europa.eu.int/eur-lex/pri/en/oj/dat/2002/l\\_028/l\\_02820020130en00040105.pdf](http://europa.eu.int/eur-lex/pri/en/oj/dat/2002/l_028/l_02820020130en00040105.pdf)

<sup>9</sup>[http://europa.eu.int/comm/agriculture/markets/wine/third/austr\\_en.pdf](http://europa.eu.int/comm/agriculture/markets/wine/third/austr_en.pdf)

<sup>10</sup>[http://europa.eu.int/comm/agriculture/markets/wine/third/chile\\_en.pdf](http://europa.eu.int/comm/agriculture/markets/wine/third/chile_en.pdf)

<sup>11</sup>[http://europa.eu.int/eur-lex/lex/LexUriServ/LexUriServ.do?uri=CELEX:22004A0206\(02\):EN:HTML](http://europa.eu.int/eur-lex/lex/LexUriServ/LexUriServ.do?uri=CELEX:22004A0206(02):EN:HTML)

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## A. South African legislation

This appendix describes the relevant parts of South African legislation as it pertains to additives to wine. The tables in this appendix present extracts from the legislation relating to wine.

- Tables A.1 to A.4 contain the details of additives permitted in wine production (Table 6, SA Regulations).

The first column lists the substance, the second column the products to which it applies. If the substance can be added to any liquor product (including wine), the phrase “All types and classes” appears. If in the original legislation, an additive is only permitted in certain liquor products, then an additive is only included in the tables if it is permitted in some form of wine, and these types of wine are described in column two. The third column describes the conditions under which it can be added – again only the information that applies to wine is listed in these tables.

A number of changes, mostly additions, were made to these tables in a regulation published on 7 March 2003 (Government Notice No R343). These additions are indicated in the table by [. . .]. Comments on changes are given in brackets. The only deletions were calcium bentonite and sodium bentonite; these two entries were replaced with a single entry for bentonite.

- Table A.5 presents the substances that can be removed from wine, and the manner in which this can be done, which in most cases involves adding substances that appear in Tables A.1 to A.4 (Table 7, SA Regulations). The regulation permitting the removal of volatile acid was published on 20 April 2001 (Government Notice No R349), and that permitting the removal of organic acids on 7 March 2003 (Government Notice No R343).

Section 30(2)(a) of the Regulations permit additions to must as well as wine, as long as these do not conflict with the manner and conditions specified in Table 6. Likewise Section 31(2)(a) permits removal from must as long as this does not conflict with Table 7.

Table A.1: Substances that can be legally added to wine in South Africa (Table 6, SA Regulations)

Name of substance	Liquor products to which substance may be added	Manner and conditions of additions
Acacia/Arabic gum	Wine	This product may only be added after completion or termination of alcoholic fermentation
Activated animal or vegetable charcoal	Wine (excluding SLH and NLH wine)	
Agar-agar	Wine	
[Ammonia]	[Wine]	
[Ammonium bisulphide]	[Wine]	
Ammonium phosphate	Wine	
[Ammonium sulphide]	[Wine]	
L-ascorbic acid	Wine	The final product shall not contain more 150 mg/l of this substance
[Bentonite]	[All types and classes]	
[Calcium alginate]	[Bottle-fermented sparkling wines]	
Calcium carbonate	Wine	
Calcium hydroxide	Wine	
Caramel	Wine (excluding SLH and NLH wine)	This substance may be added only if it has not been manufactured by the ammonia process and it does not contain more than 200mg/kg of 4-methyl imidazole
Carbon dioxide	Wine (excluding NLH wine)	

SLH: special late harvest, NLH: noble late harvest

[...]: Added on 27 March 2003 (Government Notice No R343)

Table A.2: Substances that can be legally added to wine in South Africa (Table 6, SA Regulations) (continued)

Name of substance	Liquor products to which substance may be added	Manner and conditions of additions
Casein	Wine	
Citric acid	Wine	
Concentrated must	Wine (excluding SLH, [wine from NDG] and NLH wine)	This substance may [be added before or during alcoholic fermentation on condition that it may not be diluted before addition; the volume of the must to which it is added may not increase by more than 5 per cent as a result of the addition; and the total (actual plus potential) alcohol content of the final product may not increase by more than 2 per cent as a result of this addition; otherwise, only] be added after completion or termination of alcoholic fermentation
Copper sulphate	Wine	
Di-ammonium-phosphate	Wine	
Dimethyl-dicarbonat	Wine	
Egg albumen	Wine	
Enzymes	Wine	
Filtering aids [of inert material]	All types and classes	[No undesired residue shall be left behind in the treated product]
Gelatine	All types and classes	
Isinglass	Wine	
[Iso-ascorbic acid]	[Wine]	[The final product shall not contain more 150 mg/l of this substance]

SLH: special late harvest, NLH: noble late harvest, NDG: naturally dried grapes

[...]: Added on 27 March 2003 (Government Notice No R343)



Table A.3: Substances that can be legally added to wine in South Africa (Table 6, SA Regulations) (continued)

Name of substance	Liquor products to which substance may be added	Manner and conditions of additions
Malic acid	Wine	
Malolactic fermentation bacteria	Wine	
Must	Wine (excluding SLH and NLH wine)	
Nitrogen gas	Wine	
[Oxygen]	[Wine]	
Pimarizin	Wine	
Polyvinyl pyrrolidone	Wine (excluding SLH and NLH wine)	
Potassium bitartrate	Wine	
Potassium carbonate	Wine	
Potassium ferro cyanide	Wine	In accordance with the provisions of regulation 31(4)
Potassium meta bisulphide	Wine	
Potassium sorbate	Wine	The final product shall not contain more 200 mg/l, calculated as sorbic acid, of this substance
Silicasol	All types and classes	
[Sodium alginate]	[Bottle-fermented sparkling wines]	
Sodium carbonate	Wine	
Sodium hydroxide	Wine	

SLH: special late harvest, NLH: noble late harvest

[...]: Added on 27 March 2003 (Government Notice No R343)

Table A.4: Substances that can be legally added to wine in South Africa (Table 6, SA Regulations) (continued)

Name of substance	Liquor products to which substance may be added	Manner and conditions of additions
Sodium meta bisulphide	Wine	
[Sorbic acid]	[Wine]	[The final product shall not contain more 200 mg/l of this substance]
Spirit derived from grapes	Wine (excluding LH, SLH, NLH and SN wine)	
Sugar [of vegetable origin] (before 27 March 2003: derived from cane or grain)	Sparkling wines	The substance shall in the case of sparkling wines, only be added for the initiation of the second alcoholic fermentation and to sweeten the final product
Sulphur dioxide gas	Wine	
Sweet reserve (must which has undergone partial fermentation and of which the residual sugar content is at least 130g/l)	Wine (excluding SLH and NLH wine)	This substance shall, in the case of wines other than sparkling wines, only be added after the completion or termination of alcoholic fermentation
Tannin [if it is not foreign to wine]	All types and classes	
Tartaric acid	Wine	
[Thiamine]	[Wine]	
Wood	Wine	(before 27 March 2003: wood originating from casks in which the liquor product concerned is matured)
Yeasts and yeast nutrients [if it is not foreign to wine or primarily flavour contributive]	Wine	

LH: late harvest, SLH: special late harvest, NLH: noble late harvest, SN: sweet natural

[...]: Added on 27 March 2003 (Government Notice No R343)

Table A.5: Substances that can be legally removed from wine in South Africa (Table 7, SA Regulations)

Name of substance	Liquor products from which substance may be removed	Manner and conditions of removal
Undesirable flavours	Wine	By means of treatment with activated animal or vegetable charcoal, copper sulphate or polyvinyl polypyrrolidone
Heavy metals	Wine	By means of treatment with potassium ferro cyanide in accordance with the provisions of regulation 31(4)
Tartrates and other substances which could affect the stability of a liquor product	Wine	By means of pasteurisation or cold stabilisation or treatment with potassium bitartrate or tartaric acid
Cloudiness, colouring agents and proteins	Wine	By means of pasteurisation or cold stabilisation or treatment with agar-agar, [bentonite], egg albumen, filtering aids, activated animal or vegetable charcoal, gelatine, casein, polyvinyl polypyrrolidone, silicasol, tannin or isinglass
{ Volatile acidity }	{ Wine }	{ By means of reverse osmosis }
[ Organic acids ]	[ Wine ]	[ By means of calcium carbonate, calcium hydroxide, cold stabilisation or sodium hydroxide ]

{...}: Added on 20 April 2001 (Government Notice No R349)

[...]: Added on 27 March 2003 (Government Notice No R343)

## B. Australian legislation

This appendix describes the Australian law with respect to products that can be added to wine, and the processing aids that are allowed. Clause 3 *Substances used in productions* contains the following:

“(1) Subject to any limits imposed by clause 5 of this Standard, any of the substances specified in the Table to this clause may be used in the production of wine, sparkling wine or fortified wine.

(2) In this clause -

**mistelle** means grape must or grape juice prepared from fresh grapes to which grape spirit has been added to arrest fermentation and which has an ethanol content between 120 mL/L and 150 mL/L at 20°C.

**prepared cultures** means cultures of micro-organisms such as yeasts or bacteria permitted for food use (including yeast ghosts) used in wine manufacture with or without the addition of any one or more of thiamin hydrochloride, niacin, pyridoxine, pantothenic acid, biotin and inositol.”

(Clause 3, FSANZ Standard 4.5.1)

The table referred to in (1) is reproduced as Table B.1. Note that although prepared cultures are defined in (2), they do not appear in the table (although they did in earlier versions of the standard). At the time that they were dropped from this table, the item “cultures of micro-organisms” was added to the table to Clause 4 (FSANZ 2003).

Clause 4 *Processing aids* describes the processing aids that can be used in wine production and contains the following:

“Subject to any limits imposed by clause 5 of this Standard, any of the substances specified in the Table to this clause may be used in the production of wine, sparkling wine or fortified wine.” (Clause 4, FSANZ Standard 4.5.1)

The table referred to in the above is reproduced as Table B.2. The standard also contains an editorial note with the following content:

“Clause 3(a) to Standard 1.3.3 permits the use of foods, including water as processing aids. Therefore, plant proteins that are foods are

Table B.1: Additives permitted for Australian wine (Table to clause 3, FSANZ Standard 4.5.1)

<b>Additive</b>
Ascorbic acid
Calcium carbonate
Carbon dioxide
Citric acid
Dimethyl dicarbonate
Erythorbic acid
Grape juice containing concentrated grape juice
Gum arabic
Lactic acid
Malic acid
Metatartaric acid
Mistelle
Potassium carbonate
Potassium hydrogen carbonate
Potassium sorbate
Potassium sulphites
Sorbic acid
Sulphur dioxide
Tannins
Tartaric acid

permitted under that Standard, and would also be permitted under this Standard.” (Clause 3(a), FSANZ Standard 4.5.1)

This modification was added to allow the use of clarifying agents made from plant protein as a processing agent. Part of the motivation for this is to move away from non-vegetarian protein-based processing aids, because of consumer preferences and also because of concerns about diseases such as BSE (FSANZ 2004b).

Sugar is permitted for the production of sparkling wine (Clause 6(1)(c), FSANZ Standard 4.5.1) and caramel in the production of fortified wine (Clause 7(1), FSANZ Standard 4.5.1).

Table B.2: Processing aids permitted for Australian wine (Table to clause 4, FSANZ Standard 4.5.1)

<b>Processing aid</b>
Activated carbon
Agar
Alginates, calcium and potassium salts
Ammonium phosphates
Argon
Bentonite
Calcium tartrate
Carbon dioxide
Cellulose
Collagen
Copper sulphate
Cultures of micro-organisms
Cupric citrate on a bentonite base
Diatomaceous earth
Egg white
Enzymes
Gelatine
Hydrogen peroxide
Ion exchange resins
Isinglass
Lysozyme
Milk and milk products
Nitrogen
Oak
Oxygen
Perlite
Phytates
Plant proteins permitted as processing aids under clause 3(a) of Standard 1.3.3
Polyvinyl polypyrrolidone
Potassium ferrocyanide
Potassium hydrogen tartrate
Silicon dioxide
Thiamin chloride*
Thiamin hydrochloride*

\* Thiamin chloride and thiamin hydrochloride may only be added to wine, sparkling wine and fortified wine to facilitate the growth of micro-organisms

## C. New Zealand legislation

The additives allowed in New Zealand wine production are listed in Section 14.2.2 *Wine, sparkling wine and fortified wine* in Schedule 1 of Standard 1.3.1 *Food Additives*. The list is given in Table C.1. Section 14.2.2 in Schedule 1 explicitly notes that only the additives listed can be used for wine, sparkling wine and fortified wine, and that the additives in Schedules 2, 3 and 4 must not be added unless they appear in the list.

In terms of processing aids, Standard 1.3.3 *Processing Aids* describes the processing aids that can be used. This standard defines generally permitted processing aids as foods, including water; food additives listed in Schedule 2 of Standard 1.3.1; and a processing aid specified in the table given. This referencing of other standards makes it difficult to identify permitted processing aids. Table C.2 contains some of those identified, but it is not complete. Items in this table can only be used to perform a specific technological function in the food, and must be used at the lowest level possible.

Table C.1: Additives for wines made from *Vitis vinifera* grapes in New Zealand (Section 14.2.2 of Schedule 1, FSANZ Standard 1.3.1)

<b>Additive</b>
Ammonium phosphates
Ascorbic acid
Calcium ascorbate
Calcium carbonates
Calcium phosphates
Caramel I – plain
Caramel II – caustic sulphite process
Caramel III – ammonia process
Caramel IV – ammonia sulphite process
Carbon dioxide
Citric acid
Dimethyl dicarbonate
Erythorbic acid
Fumaric acid
Grape skin extract
Gum arabic
Lactic acid
Malic acid
Metatartaric acid
Polyoxyethylene (40) monostearate
Potassium carbonates
Potassium sodium tartrate
Potassium tartrate
Sorbic acid and sodium, potassium and calcium sorbates
Sodium ascorbate
Sodium carbonates
Sodium erythorbate
Sorbitan monostearate
Sulphur dioxide and sodium and potassium sulphites
Tannins
Tartaric acid



Table C.2: A selection of permitted processing aids for wine in New Zealand (FSANZ Standard 1.3.3)

<b>Processing aid</b>
Foods, including water
Food additives from Schedule 2 of Standard 1.3.1
Lysozyme
Nitrogen
Silicon dioxide (amorphous)
Activated carbon
Argon
Diatomaceous earth
Kaolin
Oxygen
Perlite
Permitted antifoam agents
Fish collagen, including isinglass
Phytates
Polyvinyl polypyrrolidone
Potassium ferrocyanide
Acid clays of montmorillonite
Permitted ion exchange resins
Copper sulphate
Cupric citrate on a bentonite base
Oak
Permitted enzymes of plant origin
Permitted enzymes of microbial origin
Beta-glucanase
Pectin lyase
Pectinesterase
Urease
Thiamin

## D. United States of America legislation

The USA law is complex since it focusses on processes as well as additives. This appendix gives a summary, but does not include information about permitted limits of substances. In §24.10 *Meaning of terms* of Title 27 of the Federal Code of Regulations, the following important definitions are given:

“*Amelioration*. The addition to juice or natural wine before, during, or after fermentation, of either water or pure dry sugar, or a combination of water and sugar to adjust the acid level.” (§24.10, USA CFR Title 27)

“*Chaptalization (Brix adjustment)*. The addition of sugar or concentrated juice of the same kind of fruit to juice before or during fermentation to develop alcohol by fermentation.” (§24.10, USA CFR Title 27)

“*Sweetening*. The addition of juice, concentrated juice or sugar to wine after the completion of fermentation and before taxpayment.” (§24.10, USA CFR Title 27)

“*Sugar*. Pure dry sugar, liquid sugar, and invert sugar syrup.” (§24.10, USA CFR Title 27)

From these definitions as well as §24.176, 24.177, 24.178, 24.179, it can be concluded that addition of water, sugar and grape juice and concentrated grape juice is permitted during the process of winemaking.

§24.243 *Filtering aids* permits the use of inert filtering aids such as inert fibres, pulps and earths, and lists agar-agar, carrageenan, cellulose and diatomaceous earth as examples. §24.245 allows for the addition of carbon dioxide to still wines.

§24.184 permits the addition of volatile fruit-flavor concentrate to wine as long as it is derived from grapes and the amount added does not exceed the amount of concentrate in the must that the wine was produced from.

§24.246 *Materials authorized for the treatment of wine and juice* and §24.248 *Processes authorized for the treatment of wine, juice, and distilling material* permits material and processes as long as they do not change “the character of the wine to the extent inconsistent with good commercial practice” (§24.248, USA CFR Title 27). §24.246 permits “[m]aterials used in the process of filtering, clarifying, or purifying wine may remove cloudiness, precipitation, and undesirable odors and flavors” (§24.246, USA CFR Title 27).

Tables D.1 to D.5 present extracts from §24.246 and §24.248 that pertain to *Vitis vinifera* wine.

The legislation also requires recordkeeping for a number of activities and products including chaptalisation and amelioration (§24.304), sweetening (§24.305), materials received and used (§24.315), sugar (§24.317), acid (§24.318), carbon dioxide (§24.319), chemicals (§24.320) and decolourising material (§24.321).

Table D.1: Materials for the treatment of *Vitis vinifera* wine and must in the USA (§24.246, USA CFR Title 27)

<b>Material</b>	<b>Use</b>
Acacia (gum arabic)	To clarify and to stabilize wine
Acetaldehyde	For color stabilization of juice prior to concentration
Activated carbon	To assist precipitation during fermentation To clarify and to purify wine
Albumen (egg white)	To remove color in wine and/or juice from which the wine was produced Fining agent for wine (can be prepared in a light brine)
Alumino-silicates (hydrated) e.g. Bentonite (Wyoming clay) and Kaolin	To clarify and to stabilize wine or juice
Ammonium phosphate (mono- and dibasic)	Yeast nutrient in wine production and to start secondary fermentation in the production of sparkling wines
Ascorbic acid iso-ascorbic acid (erythorbic acid)	To prevent oxidation of color and flavor components of juice and wine
Calcium carbonate (with or without calcium salts of tartaric and malic acids)	To reduce the excess natural acids in high acid wine, and in juice prior to or during fermentation A fining agent for cold stabilization
Calcium sulfate (gypsum)	To lower pH in sherry wine
Carbon dioxide (including food grade dry ice)	To stabilize and to preserve wine
Casein, potassium salt of casein	To clarify wine
Citric acid	To correct natural acid deficiencies in wine To stabilize wine other than citrus wine

Table D.2: Materials for the treatment of *Vitis vinifera* wine and must in the USA (§24.246, USA CFR Title 27) (continued)

<b>Material</b>	<b>Use</b>
Copper sulfate	To remove hydrogen sulfide and/or mercaptans from wine
Defoaming agents (polyoxyethylene 40 monostearate, silicon dioxide, dimethylpoly-siloxane, sorbitan monostearate, glyceryl mono-oleate and glyceryl dioleate)	To control foaming, fermentation adjunct
Dimethyl dicarbonate	To sterilize and to stabilize wine, dealcoholized wine, and low alcohol wine
Ferrocyanide compounds (sequestered complexes)	To remove trace metal from wine and to remove objectionable levels of sulfide and mercaptans from wine
Ferrous sulfate	To clarify and to stabilize wine
Fumaric acid	To correct natural acid deficiencies in grape wine To stabilize wine
Gelatin (food grade)	To clarify juice or wine
Granular cork	To smooth wine
Isinglass	To clarify wine
Lactic acid	To correct natural acid deficiencies in grape wine
Malic acid	To correct natural acid deficiencies in juice or wine
Malo-lactic bacteria	To stabilize grape wine (only <i>Leuconostoc oenos</i> )
Milk products (pasteurized whole, skim, or half-and-half)	Fining agent for grape wine or sherry To remove off flavors in wine
Nitrogen gas	To maintain pressure during filtering and bottling or canning of wine and to prevent oxidation of wine

Table D.3: Materials for the treatment of *Vitis vinifera* wine and must in the USA (§24.246, USA CFR Title 27) (continued)

<b>Material</b>	<b>Use</b>
Oak chips or particles, uncharred and untreated	To smooth wine
Oxygen and compressed air	May be used in juice and wine
Polyvinyl-pyrrolidone (PVPP)	To clarify and to stabilize wines and to remove color from red or black wine or juice
Potassium bitartrate	To stabilize grape wine
Potassium carbonate and/or potassium bicarbonate	To reduce excess natural acidity in wine, and in juice prior to or during fermentation
Potassium meta-bisulfite	To sterilize and to preserve wine
Silica gel (colloidal silicon dioxide)	To clarify wine or juice
Sorbic acid and potassium salt of sorbic acid	To sterilize and to preserve wine; to inhibit mold growth and secondary fermentation
Soy flour (defatted)	Yeast nutrient to facilitate fermentation of wine
Sulfur dioxide	To sterilize and to preserve wine
Tannin	To clarify or to adjust tannin content of juice or wine (must not impart color)
Tartaric acid	To correct natural acid deficiencies in grape juice/wine and to reduce the pH of grape juice/wine where ameliorating material is used in the production of grape wine
Thiamine hydrochloride	Yeast nutrient to facilitate fermentation of wine
Yeast, autolyzed	Yeast nutrient to facilitate fermentation in the production of grape or fruit wine
Yeast, cell wall/membranes of autolyzed yeast	To facilitate fermentation of juice/wine

Table D.4: Materials for the treatment of *Vitis vinifera* wine and must in the USA (§24.246, USA CFR Title 27) (continued)

<b>Material</b>	<b>Use</b>
Enzymatic activity	Various uses as shown below
Carbohydrase (alpha-Amylase)	To convert starches to fermentable carbohydrates
Carbohydrase (beta-Amylase)	To convert starches to fermentable carbohydrates
Carbohydrase (Glucoamylase, Amylogluco-sidase)	To convert starches to fermentable carbohydrates
Carbohydrase (pectinase, cellulase, hemicellulase)	To facilitate separation of juice from the fruit
Catalase	To clarify and to stabilize wine
Cellulase	To clarify and to stabilize wine and to facilitate separation of the juice from the fruit
Cellulase (beta-glucanase)	To clarify and filter wine
Glucose oxidase	To clarify and to stabilize wine
Lysozyme	To stabilize wines from malolactic acid bacterial degradation
Pectinase	To clarify and to stabilize wine and to facilitate separation of juice from the fruit
Protease (general)	To reduce or to remove heat labile proteins
Protease (Bromelin)	To reduce or to remove heat labile proteins
Protease (Ficin)	To reduce or to remove heat labile proteins
Protease (Papain)	To reduce or to remove heat labile proteins
Protease (Pepsin)	To reduce or to remove heat labile proteins
Protease (Trypsin)	To reduce or to remove heat labile proteins
Urease	To reduce levels of naturally occurring urea in wine to help prevent the formation of ethyl carbamate

Table D.5: Processes for the treatment of *Vitis vinifera* wine and must in the USA (§24.248, USA CFR Title 27)

<b>Process</b>	<b>Use</b>
Electrodialysis	To aid in the removal of tartrates
Elimination of sulfur dioxide by physical process	To reduce the sulfur dioxide content of juice
Ion exchange	Various applications in the treatment of juice or wine
Metal reducing matrix sheet processing	To reduce the levels of metals such as copper and iron in wine
Nanofiltration	To reduce the level of volatile acidity in wine (used with ion exchange)
Osmotic transport	For alcohol reduction
Reverse osmosis	To reduce the ethyl alcohol content of wine and to remove off flavors in wine
Spinning cone column	To reduce the ethyl alcohol content of wine and to remove off flavors in wine
Sulfide reducing matrix sheet processing	To reduce the level of sulfides in wine
Thermal gradient processing	To separate wine into low alcohol and high alcohol wine fractions
Thin-film evaporation under reduced pressure	To separate juice into low Brix and high Brix juice fractions
Ultrafiltration	To separate wine into low alcohol wine fraction and into a higher alcohol distillate
	To remove proteinaceous material from wine; harsh tannic material from white wine produced from white skinned grapes; to remove pink color from blanc de noir wine; to separate red wine into low color and high color wine fractions for blending purposes



## E. European Union legislation

European Union law is detailed, complex and difficult to read. This is most likely a result of establishing a wine law that is broad enough to cover the laws of all member states, many of whom produce wine. The law was recently amended to cover the wine produced in the ten states that became members of the EU in 2004: Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia (EUROPA 2005). The other EU members are Belgium, Germany, France, Italy, Luxembourg, the Netherlands, Denmark, Ireland, the United Kingdom, Greece, Spain, Portugal, Austria, Finland and Sweden (EUROPA 2005). Because of the complexity, only an overview can be given here. Most of the legislation that covers additives can be found in Annexes IV and V of Council Regulation No 1493/1999, with more specific information given in Commission Regulation No 1622/2000.

The legislation divides the EU wine producing areas into seven zones: Zones A, B, C I a), C I b), C II, C III a) and C III b), where Zone A covers the coolest regions and Zone C III b) the warmest. These zones are used to determine which oenological practices apply. These practices are now described.

**Enrichment:** This term means the addition of material or use of processes to increase the alcoholic strength of a product. Enrichment may be achieved by adding sucrose, concentrated grape must or rectified concentrated grape must, by partial concentration of must including by reverse osmosis, and for table wine (but not quality wine psr), by partial concentration through cooling of the wine. Only one such process can be applied to a particular wine. The addition of sucrose may only be done by dry sugaring, and in Zone A, Zone B and some of Zone C (Annex V(D)(1-3), EC Reg No 1493/1999), (Article 22, EC Reg No 1622/2000).

**Deacidification:** This is permitted in Zones A, B, C I (a) and C I (b), C II and C III (a) (Annex V(E)(1), EC Reg No 1493/1999).

**Acidification:** This is permitted in Zones C II, C III (a) and C III (b), and it can be authorised by Member States in Zones C I (a) and C I (b) in exceptional climatic conditions, as it was in 2003 by the Institut National des Appellations d'Origine (INAO) for France (Decanter 2003) and by the national authorities in Germany (Schmidt 2004). Acidification was also permitted by derogation in Zones A and B in 2003 (EC Reg No 1687/2003).

**Combinations of the above processes** Acidification and deacidification of the same product is not allowed, and acidification and enrichment is only allowed by derogation on a case by case basis and must be recorded in Annex XV of Regulation No 1622/2000 (Annex V(E)(7), EC Reg No 1493/1999), (Article 27, EC Reg No 1622/2000). To date none have been recorded.

**Sweetening:** Sweetening can be done by grape must, concentrated grape must, or concentrated rectified grape must (Annex V(F)(1), EC Reg No 1493/1999), (Annex VI(F,G), EC Reg No 1493/1999).

Annex V of Regulation No 1493/1999 lists the approved oenological practices and processes and these are summarised in Tables E.1, E.2 and E.3 without full restriction and condition information. Practices are approved for musts and wine in fermentation (the **M** column), wine in fermentation and wine (the **W** column), and musts used for manufacture of rectified concentrated grape must (the **C** column).

Regulation No 1622/2000 gives more specific restrictions than Regulation No 1493/1999 but does not change the practices and processes allowed. Some of these details are given in the tables.

The EU has two major quality levels for wine: table wine and quality wine psr (produced in specified regions). Member States are allowed to set stricter requirements:

“Member States may, in respect of oenological practices and processes, impose stricter conditions to ensure the preservation of the essential characteristics of quality wines psr, table wines which are described by a geographical indication and are produced in their territory, sparkling wines and liqueur wines.” (Article 42(4), EC Reg No 1493/1999)

In the case of quality wine psr, Member States may specify vinification and manufacturing methods. Enrichment, acidification, deacidification and sweetening are permitted for quality wines psr in EC Regulation No 1493/1999 with some additional conditions, for example if grape must or concentrated grape must are used for sweetening, then they must originate in the same region, although this requirement does not apply to rectified concentrated grape must used for sweetening (Annex VI(F,G), EC Reg No 1493/1999).

Table E.1: Oenological practices and processes authorised in the EU (Annex IV, EC Reg No 1493/1999)

<b>M</b>	<b>W</b>	<b>C</b>	<b>Oenological practice/process</b>
✓			aeration or the addition of oxygen
✓			use of yeasts for wine production
✓			to encourage the growth of yeasts, addition of diammonium phosphate, ammonium sulphate, ammonium sulphite, ammonium bisulphite or thiamin hydrochloride
✓			use of Aleppo pine resin (Greece only (Article 9, EC Reg No 1622/2000))
✓	✓	✓	heat treatment
✓	✓	✓	centrifuging and filtration, with or without an inert filtering agent, without undesirable residue
✓	✓	✓	use of sulphur dioxide, potassium bisulphite or potassium metabisulphite
✓		✓	elimination of sulphur dioxide by physical processes
			clarification by means of one or more of the following substances for oenological use
✓	✓		edible gelatine, isinglass, casein and potassium caseinate, ovalbuminegg albumin and/or lactalbumin
✓	✓		bentonite, kaolin, silicon dioxide as a gel or colloidal solution, enzymatic preparation of betaglucanase
✓			tannin, pectinolytic enzymes
			use of one or more of the following substances for deacidification purposes
✓	✓		neutral potassium tartrate, potassium bicarbonate, calcium tartrate
✓	✓	✓	calcium carbonate, may contain small amounts of the double calcium salt of L(+) tartaric and L(-) malic acids
✓	✓		tartaric acid (only for Elbling and Riesling in parts of Zone A (Article 8, EC Reg No 1622/2000))
✓	✓		finely pulverised, homogeneous preparation of equal parts tartaric acid and calcium carbonate

**M:** permitted for must and wine in fermentation

**W:** permitted for wine and wine in fermentation

**C:** permitted for must for manufacture of rectified concentrated grape must

Table E.2: Oenological practices and processes authorised in the EU (Annex IV, EC Reg No 1493/1999) (continued)

<b>M</b>	<b>W</b>	<b>C</b>	<b>Oenological practice/process</b>
✓	✓		use of carbon dioxide, argon or nitrogen, to create an inert atmosphere and to shield from the air
✓	✓		treatment of white must and white wine with charcoal for oenological use
✓	✓		use of sorbic acid or potassium sorbate
✓	✓		use of preparations of yeast cell wall
✓	✓		use of polyvinylpyrrolidone
✓	✓		use of tartaric acid for acidification purposes
✓	✓		addition of lysozyme
✓	✓		use of lactic bacteria in a vinous suspension
	✓		use in dry wines of fresh lees
	✓		aeration or bubbling using argon or nitrogen
	✓		addition of carbon dioxide
	✓		addition of L-ascorbic acid
	✓		addition of citric acid for wine stabilisation purposes
	✓		addition of tannin
	✓		treatment with potassium ferrocyanide
	✓		treatment of red wine with calcium phytate
	✓		addition of metatartaric acid

**M:** permitted for must and wine in fermentation

**W:** permitted for wine and wine in fermentation

**C:** permitted for must for manufacture of rectified concentrated grape must

Table E.3: Oenological practices and processes authorised in the EU (Annex IV, EC Reg No 1493/1999) (continued)

<b>M</b>	<b>W</b>	<b>C</b>	<b>Oenological practice/process</b>
	√		use of acacia
	√		use of DL tartaric acid or of its neutral salt of potassium for precipitating excess calcium
	√		use of calcium and potassium alginates for the production of sparkling wines fermented in bottle
	√		use of yeasts for wine production, dry or in wine suspension, for the production of sparkling wine
	√		use of discs of pure paraffin impregnated with allyl isothiocyanate to create sterile atmosphere (solely where traditional)
	√		addition potassium bitartrate and calcium tartrate to assist the precipitation of tartarates, removal of
	√		use of copper sulphate to eliminate defects of taste or smell in the wine
	√		addition of caramel to reinforce the colour of liqueur wines
	√		addition of oxygen (solely with pure gaseous oxygen (Article 18, EC Reg No 1622/2000))
	√		electrodialysis treatment to ensure the tartaric stabilisation of the wine
	√		use of a urease to reduce the level of urea in the wine
		√	aeration
		√	treatment with charcoal for oenological use
		√	use of ion exchange resins

**M:** permitted for must and wine in fermentation

**W:** permitted for wine and wine in fermentation

**C:** permitted for must for manufacture of rectified concentrated grape must

## **F. Treaties relating to oenological practices**

Both Australia and South Africa have bilateral treaties with the European Union. Details of the accepted oenological practices for South African wines are given in Tables F.1 and F.2, and for Australian wines are given in Tables F.3 and F.4. For the accepted practices for European wines in each treaty, consult the treaties.

In contrast, for wines from the United States of America, the oenological practices are authorised in terms of an EU Council regulation, and are divided into practices that are permitted (some with time limits) given in Table F.5, those that are identical to European practices (see Table F.6) and those that are comparable (see Table F.5).

The World Wine Trade Group has established a multilateral treaty between Argentina, Australia, Canada, Chile, Mexico, New Zealand and the USA dealing with mutual acceptance of oenological practices. The most important article of this treaty appears in Table F.7.

Table F.1: Oenological practices and processes authorised for South African wines (where no prescription is given, under conditions laid down by South African law) (Annex I, EU-SA Trade Agreement)

<b>Oenological practice/process</b>
Aeration with argon, nitrogen or oxygen
Heat treatment
Use of fresh, sound and undiluted yeast from recently completed fermentation
Centrifuging and filtration with or without filtering agents on condition that no undesirable residue is left in the end product
Use of yeasts for wine production
Use of preparations of yeast cell walls
Use of lactic acid bacteria
Addition of polyvinylpolypyrrolidone
Addition of ammonium phosphate, di-ammonium phosphate, ammonium sulphate, ammonium sulphite, ammonium bisulphite, thiamin hydrochloride
Use of carbon dioxide, argon or nitrogen to create an inert atmosphere and to protect against oxidation
Addition of sulphur dioxide, potassium bisulphite, potassium meta-bisulphite, sodium meta-bisulphite
Addition of potassium sorbate and sorbic acid
Addition of ascorbic acid
Addition of tartaric acid, malic acid and citric acid for acidification purposes, provided that the initial acidity content is not raised by more than 4 grams per litre, expressed as tartaric acid
Addition of potassium tartrate and potassium-bitartrate
Addition of potassium carbonate, calcium carbonate, sodium carbonate, potassium bicarbonate

Table F.2: Oenological practices and processes authorised for South African wines (where no prescription is given, under conditions laid down by South African law) (Annex I, EU-SA Trade Agreement) (continued)

<b>Oenological practice/process</b>
Clarification by means of one or more of the following: edible gelatine, bentonite, isinglass, casein and potassium caseinate, egg albumin, milk albumin, kaolin, pectolytic enzymes, silicon dioxide, tannin, enzymatic preparation of beta-glucanase
Addition of tannin
Treatment with charcoal (activated carbon)
Use of wood shavings
Addition of potassium ferrocyanide provided that after the treatment the wine must be analysed and test free of any cyanides and cyanates
Addition of acacia or arabic gum only after completion of alcoholic fermentation
Addition of potassium, sodium and calcium alginate for bottle fermented sparkling wine
Addition of copper sulphate
Addition of caramel only for liqueur wine
Addition of wine or dried grape distillate or of neutral alcohol of vinous origin for the manufacture of liqueur wines
Addition of grape must or rectified concentrated grape must for the sweetening of wine
Addition of calcium hydroxide, sodium hydroxide
Addition of lysozyme
Electrodialysis to guarantee tartaric stabilisation of the wine
Use of urease to reduce the urea content in the wine



Table F.3: Oenological practices and processes authorised for Australian wines (Annex I, EU-Australia Trade Agreement)

<b>Oenological practice/process</b>
Aeration or bubbling using argon, nitrogen or oxygen
Heat treatment
Use in dry wines, and in quantities not exceeding 5%, of fresh lees which are sound and undiluted and contain yeasts resulting from the recent vinification of dry wine
Centrifuging and filtration, with or without an inert filtering agent, on condition that no undesirable residue is left in the products so treated
Use of yeasts for wine production
Use of preparations of yeast cell wall, up to a maximum of 40 grams per hectolitre
Use of lactic acid bacteria in a vinous suspension
Use of polyvinylpolypyrrolidone, provided that the wine so treated does not contain more than 100 mg/l polyvinylpolypyrrolidone
Addition, under conditions laid down in Australian rules, of one or more of the following substances to encourage the growth of yeasts: diammonium phosphate, ammonium sulphate, ammonium sulphite, ammonium bisulphite or thiamin hydrochloride
Use of carbon dioxide, argon or nitrogen, either alone or combined, solely in order to create an inert atmosphere and to handle the product shielded from the air
Addition of carbon dioxide, provided that the carbon dioxide content of wine so treated does not exceed 2 g/l
Use, under the conditions laid down in Community rules, of sulphur dioxide, potassium bisulphite or potassium metabisulphite, which may also be called potassium disulphite or potassium pyrosulphite
Addition of sorbic acid or potassium sorbate provided that the final sorbic acid content of the treated product on its release to the market for direct human consumption does not exceed 200 mg/l
Addition of up to 300 mg/l of L-ascorbic acid or erythorbic acid (iso-ascorbic acid)
Addition of citric acid for wine stabilization purposes, provided that the final content in the treated wine does not exceed 1 g/l

Table F.4: Oenological practices and processes authorised for Australian wines (Annex I, EU-Australia Trade Agreement) (continued)

<b>Oenological practice/process</b>
Use of tartaric acid, lactic acid or malic acid for acidification purposes, provided that the initial acidity content is not raised by more than 4.0 g/l expressed as tartaric acid
Addition of potassium bitartrate to assist the precipitation of tartar
Use for deacidification purposes of calcium carbonate
Clarification by means of one or more of the following substances for oenological use: edible gelatine, isinglass, casein and potassium caseinate, milk or evaporated milk, animal albumin, bentonite, silicon dioxide as a gel or colloidal solution, kaolin, tannin, pectolytic enzymes, enzymes approved for food usage
Addition of tannin
Treatment with charcoal for oenological use (activated carbon)
Treatment under conditions laid down in Australian rules: of white wines and rosé wines, with potassium ferrocyanide; of red wines, with potassium ferrocyanide or with calcium phytate; provided that the wine so treated contains residual iron
Addition of up to 100 mg/l of metatartaric acid
Use, for the manufacture of sparkling wine obtained by fermentation in bottle and with the lees separated by disgorging: of calcium alginate, potassium alginate
Use of copper sulphate to eliminate defects of taste or smell in the wine, up to a maximum of 1 gram per hectolitre, provided that the copper content of the wine so treated does not exceed 1 milligram per litre
Addition of caramel to reinforce the colour of liqueur wines
Addition of wine or dried grape distillate or of neutral alcohol of vinous origin for the manufacture of liqueur wines under conditions laid down in Australian rules
Addition, under conditions laid down in Australian rules, of grape must and concentrated grape must for sweetening of wine
Use of cation exchange resins for wine stabilization purposes, provided that the resins are sufficiently stable not to transfer substances to the wine in quantities which could endanger human health (until 31 December 1998 for the purposes of allowing further scientific evaluation)

Table F.5: Oenological processes authorised for wines from the USA (Annex, EC Reg No 1037/2001)

<b>Oenological processes permitted</b>
catalase derived from <i>Aspergillus niger</i> glucose oxydase derived from <i>Aspergillus niger</i> ferrous sulphate soya flour dimethylpolysiloxane (until 31 December 2005) polyoxyethylene-40-monostearate (until 31 December 2005) sorbitan monostearate (until 31 December 2005) fumaric acid (until 31 December 2005) ion-exchange resins, (until 31 December 2005) lactic acid (until 31 December 2005) malic acid (until 31 December 2005)
<b>Oenological processes that are comparable</b>
agar agar ammonium carbonate ammonium phosphate (monobasic) granular cork milk powder oak chips and sawdust, uncharred and not treated potassium carbonate carageenan cellulase derived from <i>Aspergillus niger</i> cellulose autolyzer yeast substances composed of potassium ferrocyanide and aqueous ferrous sulphate, possibly combined with copper sulphate and activated carbon

Table F.6: Oenological processes authorised for wines from the USA (Annex, EC Reg No 1037/2001) (continued)

<b>Oenological processes that are identical</b>
acacia (gum arabic)
activated carbon
animal albumen (including ovalbumin powder and ovalbumin solution)
ammonium phosphate (dibasic)
ascorbic acid
bentonite (Wyoming clay)
bentonite slurry
carbon dioxide
casein
citric acid
compressed air (aeration)
copper sulphate
diatomaceous earth
enzymes: pectolytic, derived from <i>Aspergillus niger</i>
edible gelatin
gelatin slurry
isinglass
nitrogen
potassium bitartrate
potassium caseinate
potassium disulphite
potassium sorbate
silica gel (colloidal silicon dioxide – 30 %)
sorbic acid
tannin
tartaric acid
calcium carbonate, possibly containing small quantities of double calcium salt of tartaric L (+) and malic L (–) acid
calcium sulphate, for the manufacture of liqueur wines
polyvinylpolypyrrolidone (PVPP)
oxygen

Table F.7: Article 5 *Mutual Acceptance of Oenological Practices* of the Agreement on Mutual Acceptance of Oenological Practices (MAA)

1. The Parties shall accept each other's laws, regulations and requirements relating to oenological practices and the mechanisms to regulate them.
2. The Parties shall permit the importation of wine produced in the territory of another Party in conformity with that other Party's laws, regulations and requirements relating to oenological practices and the mechanisms to regulate them.
3. Wine exported by a Party to another Party shall conform to the exporting Party's laws, regulations and requirements relating to oenological practices governing wine intended for the exporting Party's domestic consumption. The exporting Party, at its option, also may export to an importing Party wine produced in compliance with the importing party's laws, regulations and requirements relating to oenological practices governing wine intended for the importing Party's domestic consumption.
4. No Party shall require any other Party to apply for a derogation or other exemption or to provide routine certification with regard to any oenological practice except as a Party may require consistent with Article 3(2).
5. When a Party has reason to believe that any wine produced in, exported from or imported into its territory would compromise human health or safety, the Party shall notify all other Parties immediately via a mechanism to be determined by the Council.

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