PREPARING TO BOTTLE LOW-ALCOHOL WINE

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Vineyard and Winemaking

The aim of this document is not to help in advice on vineyard or winemaking treatment. Rather we aim to educate that if a wine is low-alcohol, then it needs to reach certain parameters to guarantee stability in the bottle.

WineWorks has been working with NZ WineGrowers to create a "guideline" for preparing lower alcohol wines for bottling in order to achieve guaranteed micro stability. We envisage a short document that can be utilized by participants in this growing sector of the industry. It is aimed to create a benchmark of good practice that is derived from independent, authentic and validated science, based on strong data for the good of the industry, in which all parties have had a say.

Low Alcohol Wines Defined: Quite simply wines can be defined as being "low alcohol" because their alcohol content is lower than the typical industry range of between 12% abv – 15%abv. Our Food Standards state these to be classified as wine the alcohol content must be 5% abv or higher, and so any wines with an alcohol content between 5% abv and 11% abv could be considered as "low alcohol".

Risks in Bottle: One of the biggest concerns is the increased risk of secondary fermentation or spoilage in-bottle, due to the lower alcohol levels. We need not be overly concerned about this as long as the winemaking protocols recognize the specific risk that low-alcohol wines can present.

Molecular SO2

The equipment and methods used to bottle wine around the world are very similar and rely on the use of sanitary, clean, sterilised equipment, and micro-filtration to a level of 0.45 micron. However this is not classified as Aseptic or Sterile filling, and the environments in which we bottle do not meet this standard either.

We rely on the inherent properties of the wine (low pH/high acidity, high alcohol, free SO_2 etc) to assist in the prevention of any chance for secondary spoilage. When the alcohol is lower, our reliance on molecular SO_2 in particular is critical. Therefore we need these wines presented ready for bottling with the ph and free SO_2 relationship correct to deliver a **molecular SO_2 level of 0.8ppm**. In the case of wines that are low alcohol and/or high sugar, then a molecular SO_2 of 1.2ppm is safer. This level has been widely researched and is accepted as being lethal to all micro-organisms (pathogens, bacteria, yeast and molds).

We know that many fermentative yeasts can operate in a "normal" wine environment, so when alcohol is lower this risk is greatly increased, and this is where the molecular SO_2 will "underwrite" the integrity and shelf-life of these wines.

Dissolved Oxygen effects

The current winery practices, and management of dissolved oxygen typically deliver levels of 0.4 - 0.5mg/L or less and there is no reason this should change for low alcohol wines. Refermentations however will happen faster in a higher-oxygen environment.

THE PLACE OF PRESERVATIVES

■ Velcorin

The NZ importer of Velcorin (DimethylDicarbonate) is Zymus, who states that it is only truly effective if added at the time of bottling and used in conjunction with other preservatives. WineWorks currently do not have the necessary dosing equipment and does not intend to, as the risks in keeping wine stability in the bottle can be managed with other more traditional methods. Contact Zymus here.

■ Potassium Sorbate

Potassium sorbate is a highly effective and cheap option, and needs to be present in wine at a level of 250ppm to guarantee effectiveness. At this level there can be a tangible sensory impact on the acidity. However, because it must be declared on the label, it is often not attractive to wine marketers. For supply, contact Clark Products

SUMMARY CHART

This chart is used to assist in assessing the competing levels of Dissolved Oxygen, pH, and etc etc to achieve the 'safe' levels of molecular sulphur in the low-alcohol wine to be bottled.

■ pH vs Molecular Sulphur

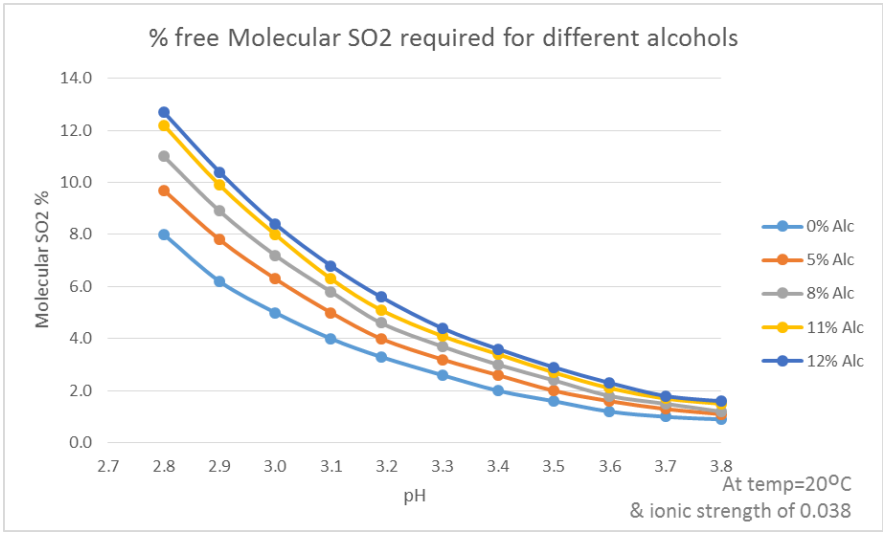
Distribution of Free SO_2 at Various pHs

pH	% SO_2 (m)	% HSO_3	% SO_3^{-2}	Free SO_2 to Obtain 0.8 ppm Molecular SO_2
2.9	7.5	92.5	.009	11 ppm
3.0	6.1	93.9	.012	13 ppm
3.1	4.9	95.1	.015	16 ppm
3.2	3.9	96.1	.019	21 ppm
3.3	3.1	96.8	.024	26 ppm
3.4	2.5	97.5	.030	32 ppm
3.5	2.0	98.0	.038	40 ppm
3.6	1.6	98.4	.048	50 ppm
3.7	1.3	98.7	.061	63 ppm
3.8	1.0	98.9	.077	79 ppm
3.9	0.8	99.1	.097	99 ppm
4.0	0.6	99.2	0.122	125 ppm

Alcohol also affects the level of mSO2 required for protection.
This relationship can be seen on the table and chart:

Source:
Wine Microbiology:
Science and Technology
By Claudio Delfini,

but needs adjusting for alcohol level:



RESPONSIBILITIES

The Bottler

The bottler's responsibilities when bottling normal wine are to provide a clean environment that a wine with normal levels of alcohol (over 12%) will remain microbially stable at. We know from experience that there are elevated levels of risk in bottling low-alcohol wines, that wine-bottling machinery and procedures cannot always prevent. This includes the bottles, caps, gases and environment, which are not (and can not be) sterile.

We will;

a) Deliver clean, sterilised wine contact surfaces in our plants.

b) Demonstrate the integrity of the 0.45 micron final filtration, where you have specified 'sterile' filtration.

c) Prove a) and b) by sample analysis through micro-plating.

d) Apply the hose-keeping and Dry Goods handling regimes to mitigate environmental spoilage risks.

The Winery and Winemaker

From you, our customer, we request;

a) The understanding that wine bottling is not an aseptic, sterile process.

b) The properties of the wine are a key part of the microbial "hurdles" in the bottling process.

c) Delivering low alcohol wines (<12% abv) for bottling that are inherently microbiologically stable, and have a **molecular SO_2 of between 0.8 and 1.2ppm**, or use sorbate or some other preservative of your choice.

WineWorks would like to acknowledge the assistance of Dr Simon Hooker of NZ Winegrowers in preparing this document to help increase the understanding of the industry.