

Alcohol Reduction in the wine industry - using Spinning Cone Column Technology

Author – Tim Birks, Flavourtech Pty Ltd

Market Trends

Lower alcohol wines and non alcoholic wine products have become increasingly popular in recent times and it appears that they are here to stay. Demand for these products seems mainly driven by consumer's search for a healthier lifestyle. However, in recent years, governments have made use of incentives (most commonly tax related) and deterrents (such as tougher drink driving laws) in an effort to reduce alcohol consumption.

As higher quality non-alcohol wine products become more readily available, new markets for these products are emerging. Religious groups and pregnant women are now able to enjoy a wine derived beverage in the form of a non-alcoholic wine product that can either be less than 0.1%v/v or less than 0.5%v/v alcohol.

In Asia, this market is also steadily growing with demand from China accelerating over the last two years. Low and zero alcohol products are being requested from many wine producers due to the intolerance of Chinese for alcohol from a health or allergy perspective.



Alcohol Reduction in the Wine Making Process

To satisfy these market trends, alcohol reduction is fast becoming an essential part of the wine making process. It is being used in two main areas:

- As a winemaking tool, whereby a wine's alcohol level is reduced by a small increment to achieve an optimal balance in the final product. This allows the production of wines with alcohol levels in the range of 9-13%v/v alcohol, instead of the sometimes overpowering 14-16%v/v range.
- For the production of low alcohol 'wine products' where the final alcohol levels are less than the minimum level required for wine. This includes products in the <0.1%v/v, <0.5%v/v and <5.5%v/v alcohol range.

There are a number of techniques available for removing alcohol in wine. These techniques include membrane techniques, partial vacuum evaporation, and (vacuum steam) distillation with the latter being widely considered the gentler and more efficient process, especially when the production of lower alcohol 'wine products' is the objective. The Flavourtech Spinning Cone Column (SCC),

discussed herein, uses vacuum steam distillation at low temperatures and short residence times thus avoiding thermal degradation of the wine's flavour and colour.

Legislation

Current regulations in Europe allow the SCC to be used as part of the 'distillation' technology category and follow regulations set by the International Organisation of Vine and Wine (OIV).

For the final product to be marketed as a wine the OIV stipulates that:

- Alcohol in a wine may be reduced by up to 20% of the total alcohol content, without reducing the final alcohol concentration below the minimum required for the product to qualify as a wineⁱ.

For Example:

- A 15%abv wine can be reduced by a maximum of 3%abv to 12%abv
- A 10%abv wine can be reduced by a maximum of 2%abv to 8%abv¹
- A 9% wine can be reduced by a maximum of 1%abv to 8%abv¹

Where the final product will have an alcohol level below the minimum alcohol concentration for the product to be considered a wine, there are currently two categories:

- *"Beverage obtained by partial dealcoholisation of wine" for products with an ABV content comprised between the required minimum for wines and 0.5%ⁱⁱ, and*
- *"Beverage obtained by dealcoholisation of wine" for products with an ABV content below 0.5%ⁱⁱⁱ.*

The Spinning Cone Column

The SCC was developed and commercialised in the 1980's by the Australian company Flavourtech. With its unique ability to gently and efficiently recover volatile components from all kinds of slurries, purees, and clear liquids, it was soon identified as an ideal method for reducing alcohol in wine.

The key attribute of the SCC is its ability to maintain the wine's quality, and with operating temperatures of between 25-40°C, residence times of less than 30seconds, and the ability to preserve a wine's delicate aromas, the SCC is considered the best in class.



¹ Assuming that the legal minimum alcohol concentration for the product to be considered a 'Wine' is 8%abv.

Alcohol reduction with SCC is typically broken down into the following steps:

Step 1: Based on the target alcohol level required in the finished product, the winemaker determines the volume of full strength wine to be processed.

Step 2: The wine aroma (approximately 1% of the initial wine volume) is stripped from the wine at around 25-30° C (in only 30seconds), condensed as a clear liquid, and stored for re-addition at a later stage.

Step 3: The aroma-stripped wine is then re-processed at around 35-40°C (again in less than 30 seconds) to remove the bulk of the alcohol. Alcohol levels in the wine exiting the SCC will typically be between 0.05 and 2% v/v and can be adjusted depending on requirements. Additionally, the alcohol removed is in the form of a high quality, high strength spirit that can be sold or used in other applications.

Step 4: The stripped wine and the aroma are combined and blended back with the remainder of the bulk wine to achieve a wine of the required alcohol content.

If the requirement is for a low alcohol 'wine product' in the range of 0.05-0.5%v/v then the entire volume of wine will need to be processed through the SCC.

Industry References

Many products in this category are now manufactured using the SCC and are experiencing critic's acclaim and increased market share. One example is Miguel Torres 'Natureo' at 0.5%v/v alcohol. Natureo is available in a white muscat, rose, and red. Other producers of note include Gruppo Matarromera in Spain and Vinselekt Michlovsky who is paving the way for high quality low alcohol wine products in Eastern Europe.

Toll Processors in Australia and the US have also established successful businesses through the implementation of the SCC for the dealcoholisation of wine for smaller growers and wineries.



For more information on the SCC and other wine applications, such as grape juice desulphiting, aroma management and grape juice concentration, please visit www.flavourtech.com.

ⁱ International Code of Oenological Practices: 3.5.13. CORRECTION OF THE ALCOHOL CONTENT IN WINES (OIV-OENO 394B-2012)

ⁱⁱ International Code of Oenological Practices: 6.10 BEVERAGE OBTAINED BY PARTIAL DEALCOHOLISATION OF WINE (OIV- OENO 433-2012)

ⁱⁱⁱ International Code of Oenological Practices: 6.9 BEVERAGE OBTAINED BY DEALCOHOLISATION OF WINE (OIV-OENO 432-2012)