Cold stabilisation: past and present

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Use of cold stabilisation methods by Australian wineries in 2016


Fraction of wines explicitly cold stabilised in Australia in 2016


Cold stabilisation – an early use of refrigeration in wineries

Cold water can be used for many cooling applications in wineries (e.g. support of lower tank temperatures in fermentation and conditioning, and cold conditioning of wine in storage). However, in the 1950s, when the technology was first adopted, cold stabilisation was only possible with refrigeration. Therefore many early refrigeration installations were specifically associated with cold stabilisation of wines.

<table>
<thead>
<tr>
<th>Winery size</th>
<th>&lt; 50 t</th>
<th>50-1,000 t</th>
<th>1,000-10,000 t</th>
<th>≥ 10,000 t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia (weighted)</td>
<td>10%</td>
<td>40%</td>
<td>50%</td>
<td>10%</td>
</tr>
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</table>

Metatarsic acid

Developed in the 1950s, this was the first successful specific crystallisation inhibiting additive. It is manufactured by heating tartaric acid to high temperatures to produce a polysaccharide. It is a low-cost, effective method for cold stabilisation and is still used today.

Gum arabic

Gum arabic has long been used as a wine colloidal stabiliser. It is now used in many applications in winemaking, such as for clarification and stabilization.

Electrodialysis

Electrodialysis uses an electric field and ion-selective membranes to remove ions responsible for tartrate instability from wine. It is a relatively new technology, but has shown promise in improving wine quality.

Potassium polyaspartate

Potassium polyaspartate is a naturally-occurring amino acid that can be used as a crystallisation inhibitor. It has been used in winemaking to improve wine stability.

Carboxymethylcellulose (CMC)

CMC has been investigated as a tartrate inhibitor in wines. It is a polysaccharide that can be used to bind calcium ions and prevent precipitation.

Yeast mannoproteins

Wine aged on yeast lees has long been known to be more resistant to tartrate instabilities. Yeast mannoproteins are released during fermentation and can provide natural stability to wines.

Hexametaphosphate

Hexametaphosphate is a scale inhibitor that is used to prevent precipitation of calcium carbonate and other minerals. It is used in large quantities in many wineries.

Crystallisation inhibitors vs ion removal

With the release of new crystallisation inhibitors to the market in recent years (e.g., Gum arabic, Potassium polyaspartate), there have been some philosophical/marketing discussions about additive versus subtractive approaches to wine production – wine argue that inhibitors are more natural and cost-effective, while others argue that additives are needed because they are not originally from the vine.

Potassium polyaspartate

Potassium polyaspartate has been found to be effective as a tartrate inhibitor. It is a natural amino acid that can be used to suppress the formation of calcium tartrate.

Carboxymethylcellulose (CMC)

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