

Crystal stabilisation

Recommendations
for practical use



innovativ



ERBSLÖH
Der Getränke-Experte

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The precipitation of tartaric acid salts (potassium hydrogen tartrate and calcium tartrate) is a natural process in the course of winemaking. Tartar crystals can also occur in the bottle during storage and maturing of the wines. Despite thorough and comprehensive information consumers reject tartar crystals. Therefore lacking crystal stability in wine and sparkling wine is a frequent reason for complaints. With the application of a suitable, professional process safe crystal stability is obtained. To be taken into account must be the costs, the operational prerequisites, such as production equipment and facilities, and the requirements crystal

stability of a wine must fulfill. In table 1 current stabilisation methods and their advantages and disadvantages are compared. Hereby the long-term effect and the impact on filtration capacity are of particular interest.

NEW Currently approved in the EU: VinoStab® carboxymethylcellulose (CMC)

Since August 1st 2009 carboxymethylcellulose, CMC in short, can be used as a further method of crystal stabilisation.

Crystal stabilisation method	Low process costs	Reduced staff expenses	Environmentally friendly	Easy application	Effect against Ca-crystals	Long-term effect	Impact on filtration	Foreign matter with wine	Preservation of acidity/ extract
Contact process with Kali-Contact	-	-	-	-	+/-	+	-	-	-
Metavin® Opti	+	+	+	+	+/-	-	+/-	-	+
VinoStab® (CMC) liquid	+	+	+	+	+/-	+	+	+	+
Mannoproteins	-	-	+	-	?	?	+	-	+
MetaGum®	+	+	+	+	+/-	+	+/-		+

Tab. 1: Comparison of crystal stabilisation methods



What is carboxymethylcellulose?

Carboxymethylcellulose (synonym: cellulose gum) is a polysaccharide, obtained as modified cellulose from plant fibres. Already for many years, CMC is used in the food sector as thickening agent (E466) in the production of ready-made sauces and soups, yoghurt, etc. The polymers consisting of anhydroglucose units are of different solubility dependent on the degree of polymerisation and substitution and form more or less viscous solutions. Solubility in water is rather poor and in ethanol CMC is insoluble.

Why is VinoStab® applied in wine?

Due to its molecular structure CMC acts, similar to metatartaric acid, as protective colloid, which attaches to the surface of dissolved potassium hydrogen tartrate and thus prevents crystal growth. The great advantage of carboxymethylcellulose as against metatartaric acid is its temperature insensitivity. While metatartaric acid decomposes under warm storage conditions or with frequent temperature variations and loses its efficiency, this is not the case with CMC. This means with CMC lasting crystal stability is obtained. Natural acidity and potassium are preserved, analogical to the application of metatartaric acid, which is, besides the low-cost process, an advantage of CMC vis-à-vis the energy-consuming minicontact process.

With strongly oversaturated wines (ST 1 > 18 °C) the effect of CMC is limited and also with an increased addition full stability cannot always be guaranteed. Pretests and parallel measurements with the mini-contact process are a reliable means of assessment in this case. The effect of carboxymethylcellulose against calcium tartrate is limited.

Carboxymethylcellulose in powder form is poorly soluble which makes the preparation of the solutions during running operation in the production plant difficult. In the frame of the OIV recommendation the possibility of industrially manufactured liquid products was taken into account. These have a lot of benefits for the user.

Dosage graduation

Saturation temperature (T _{sat} in °C)	Minicontact process (Δ μS)	Recommended dosage VinoStab® (mL/100 L)	Remarks
< 18	< 100	75	
18–20	100–150	100	
> 20	150–200	130	Stability control after VinoStab® application with the minicontact process (target value: Δ μS < 20)

Tab. 2: Dosage graduation dependent on stability conditions

After evaluation of the wines to treat by means of the stability ranges indicated in table 2 (saturation temperature or minicontact process), the VinoStab® dosages can be adjusted accordingly.

To minimize a possible impact on filtration by the application of CMC, the optimal VinoStab® dosage must be determined in advance. The maximum dosage should only be added when crystal instability is high. As to the stability assessment of red wines, the minicontact process should always also be applied

together with the measurement of the saturation temperature.

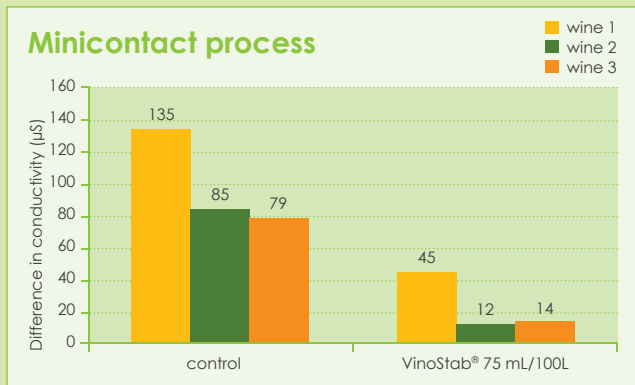
Due to the individual colloid portion of the red wines, it may be possible that, despite high saturation temperatures, crystal stability is already good, yet is not sufficiently detected by the sole measurement of the saturation temperature. For improved filtration capacity, add VinoStab® at least 3–4 days before bottling. Prior to the application of VinoStab® full protein stability must be assured.

VinoStab® Advantages of the application of VinoStab® as liquid product

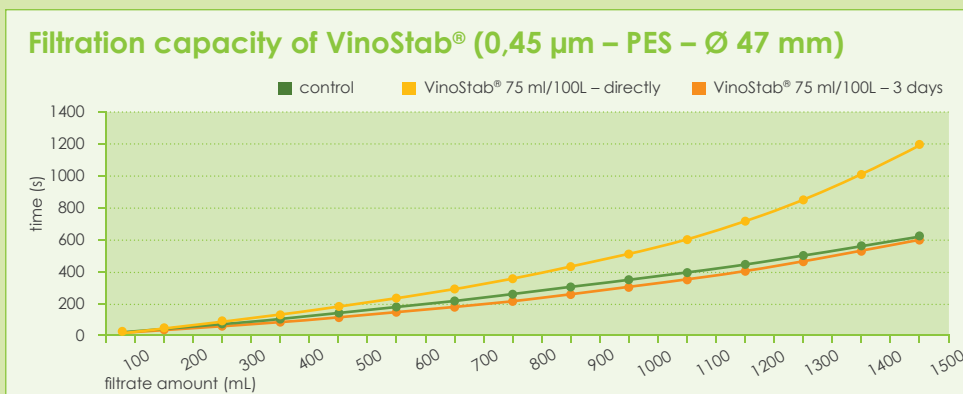
- Easy application and homogeneous distribution in wine
- Direct addition possible
- Higher CMC concentration at product addition, realised by industrial manufacture (minimised water input)
- Positive impact on wine filterability
- Less personnel needed since no labour-intensive cleaning of mixing containers

CMC Legally approved basic conditions for CMC application in wine

- Maximum dosage: 10 g/100 L sodium carboxymethylcellulose
- Legally admitted for the treatment of white, rosé and red wine as well as sparkling wine in all wine-growing regions (EU-wine regulation)
- Chemical characteristics according to the OIV purity directives
- Application as powder product, as granulate, or as viscous liquid

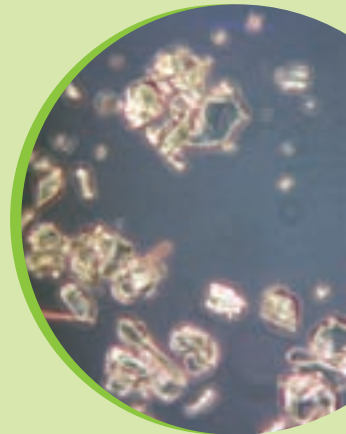


Stabilising effect of VinoStab®



Filtration capacity of VinoStab® in dependence on contact time until filtration

Due to the chemical structure of CMC, an addition of such a polymer to the wine indeed has an impact on filtration characteristics. Specialised selection of the carboxymethylcellulose can optimise filtration properties along with maximum stabilising effect.



Metavin® Opti

**Metavin® Opti –
the classic in crystal stabilisation**

The extremely highly esterified metatartaric acid Metavin® Opti is still successfully applied. Metavin® Opti has the best stabilising effect, since the esterification degree of this product responsible for this, is fully optimised in technical respect.

Metavin® Opti is very well suited for wines consumed within one year but can equally be used for wines stored for longer periods of time, wines which however, do not undergo significant temperature fluctuations.

MetaGum®

**MetaGum®:
effective combination of metatartaric
acid and gum arabic**

The efficiency of different high-molecular substances which prevent crystal precipitations is optimally combined in this product.

The combined basic products of MetaGum®, a highly and stable-esterified metatartaric acid and a clearly soluble gum arabic, assure long-term crystal stability in an effective and safe way. Treated wines are crystal-stable in respect of tartar (potassium hydrogen tartrate) precipitations and calcium tartrate precipitations which occur very frequently. The decomposition of metatartaric acid is significantly delayed by the gum arabic compound in MetaGum® and thus the product is active for an up to 40 % prolonged time period.

EasyKristaTest

**Erbslöh EasyKristaTest
for the evaluation of crystal stability**

The easiest method to control crystal stability is to determine the saturation temperature. It indicates the quantity of crystals dissolved in the wine. A low concentration means the wine is stable and further determinations are unnecessary. An increased saturation temperature lets expect crystal precipitations. Yet not every wine necessarily shows crystal precipitations when the saturation temperature is increased.

Furthermore the tendency of a wine to crystallize can be determined by means of the minicontact process. To the cooled wine inoculation crystals are added in

form of finely ground tartar, subsequently it is determined whether the amount of tartar dissolved in the wine actually leads to crystallisation or whether other wine components prevent this crystallisation.

By a combination of the two methods the crystal stability of a wine can be evaluated relatively reliably also at increased saturation temperature.



Metatartaric acid

Long-term effect of metatartaric acid

