

# POTASSIUM POLYASPARTATE (KPA)

ENSURING TARTRATE STABILITY IN  
SOUTH AFRICAN SAUVIGNON BLANC... SINCE 2019!

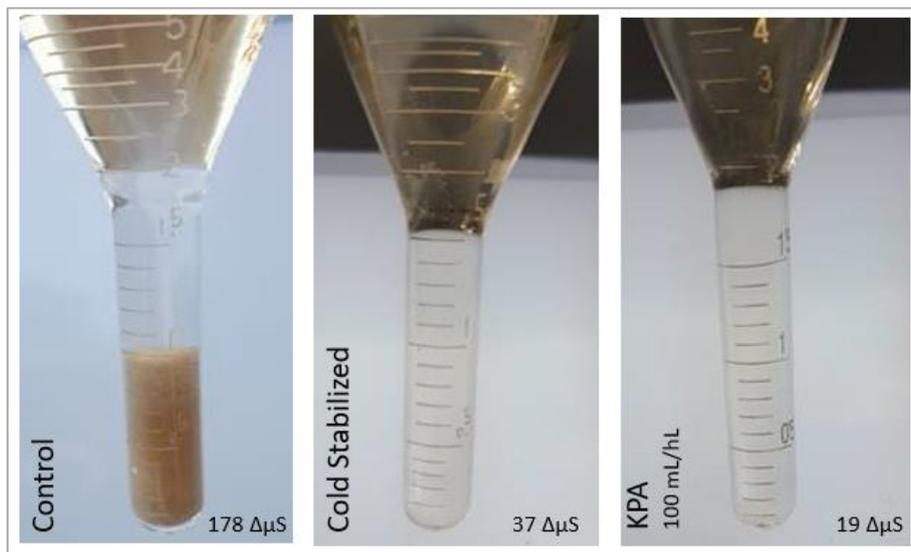


Figure 1. Cold stabilization vs KPA. Source: Adjusted from Van Zyl, A. Cold Stab is Over. The practice of Zenith. Enartis Stabilization School 2018

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[Basic Wine](#)

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Until now, various additives, such as metatartaric acid, carboxymethylcellulose (CMC), mannoproteins and Gum Arabic showed some limitation to guarantee total **tartrate and colour stability** in young wine. However, there is a **new kid on the block** making headway in wine stabilization:

**Potassium polyaspartate (KPA)**  
a newly approved wine additive that can be effectively used  
as a crystallization inhibitor

During the Enartis stabilization school, held in July and August this year, Enartis representative, **Antoinette van Zyl**, presented fascinating results showing the newest information available on the use of KPA in wine. These results were based on the use of Enartis' KPA-containing product range called Zenith™, that specifically facilitates tartaric stability while maintaining colour stability. The following is a summary of Van Zyl's presentation.

## WHAT IS KPA AND HOW DOES IT WORK?

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KPA is a potassium salt of a polyamino acid produced from L-aspartic acid, a natural amino acid present in grapes. This polymer has a medium molecular mass of around 5 kDa and has a negative charge at wine pH. This negative charge allows the molecule to bind potassium ions in the wine, thereby inhibiting the growth of potassium bitartrate crystals ensuring tartrate stability.

## NO MORE RED TAPE

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The OIV authorized the use of KPA in 2016 ([OIV Resolution 543/2016](#)) followed by the EU in 2017. Since then, the number of wineries using Zenith™ increased significantly, with a 25 % growth observed in the last year for Spain, Portugal and Italy combined.

The use of KPA for the stabilization of wine has also been approved in other countries including Argentina, Australia and New Zealand. KPA is not yet permitted as an additive in wines produced in the USA, however, wine containing KPA may be imported into the country. **The use of KPA in the South African wine industry was finally approved in May 2019** and the [Liquor Products Act 60](#) was amended to include KPA as a legal wine additive at a maximum dosage of 10 g/hL.

## HOW DOES KPA STABILIZATION COMPARE TO OTHER PRODUCTS?

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The Enartis laboratory in South Africa **tested the stability of several South African white and rosé wines** using both CMC and Zenith™ products (freeze test done immediately after addition). **Results from 2019 showed that, on average, KPA (Zenith Uno™) delivered improved stability (20 – 25 % lower ΔμS) compared to CMC for 88 and 80% of the white and rosé samples respectively.** Other studies also reported improved efficiency of KPA compared to CMC and mannoproteins while stability was comparable to that of metatartaric acid over the short term.

Table 1. Effectivity of different colloids. Source: Van Zyl, A. Zenith in Action. Enartis Stabilization School 2019

	Metatartaric Acid	CMC	<b>NEW</b> KPA
Stabilisation Efficiency	++++	+++	++++
Effect over Time	+	+++	+++
Filterability	+++	++	+++
Effect on Colour	0	-	0

## LONG TERM STABILITY - HOW DOES KPA STABILIZATION COMPARE TO OTHER PRODUCTS?

Wine containing KPA, CMC, mannoproteins and metatartaric acid were subjected to thermal treatment (40°C for 14 days). Results showed that the effectivity of **KPA, CMC and mannoproteins were similar during the long term, however, wines containing metatartaric acid developed instabilities** and would thus not be a suitable option for wines intended for ageing.

## SUITABILITY OF KPA FOR SAUVIGNON BLANC WINE

KPA adds to the “toolkit” available to winemakers for **stabilizing young wines**. This is especially good news for producers of Sauvignon blanc, a variety that is often bottled while the wine is still young. Sauvignon blanc is generally perfectly suitable for treatment with KPA, however, as with all the varieties, **prior laboratory trials** need to be done to ensure the product’s effectivity (especially for high acid wines).

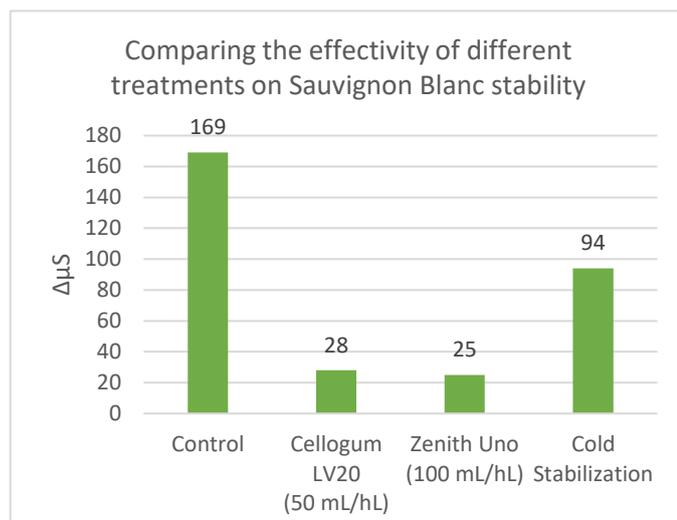


Figure 2. Comparison of different stabilization treatments on a Sauvignon Blanc wine. Source: Adjusted from Van Zyl, A. Cold Stab is Over. The practice of Zenith. Enartis Stabilization School 2018.

One of the great perks of using KPA for the stabilization of Sauvignon Blanc wines is that it **eliminates the oxygen dissolution that often occurs during cold stabilization**. Aroma compounds such as the volatile thiols and various esters are important aromatic contributors to Sauvignon blanc, and the preservation thereof is critical. By sidestepping cold stabilization, the risk of oxidation is minimized, and the aroma profile preserved.

## CAN I USE KPA ON WHITE AND RED WINES?

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**Great news, KPA can be used on red wines too!**

The effectivity of the product on red wine is quite astounding. A number of images (post freeze test) were shown during Van Zyl's presentation. These images depicted control samples in comparison to samples treated with Zenith Color™, which is a combination of KPA and Gum Arabic



Figure 3. Paarl Carignan 2018 – Analysed 2019. Source: Van Zyl, A. Zenith in Action. Enartis Stabilization School 2019

(*Acacia vereck*). Colour and tartrate instabilities were evident in the control samples while Zenith Color™ treated wines showed complete **stability at various dosages**. According to Van Zyl, these images are not selective, and the laboratory personnel see similar significant results on a daily basis.

CMC (on its own) is not recommended for the use in red wines as it can lead to colour instabilities of previously colour stable red wines. In this case, the combination of CMC together with Gum Arabic (*Acacia vereck*) is advised to ensure that colour instabilities do not develop. **This is where KPA has the upper hand: it does not have the colour unstabilizing effect.** KPA can be applied to red wines to stabilize the tartrates, provided that the colour of the wine is stable prior to addition.

## WHAT IS THE EFFECT OF KPA ON THE FILTERABILITY OF MY WINE?

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Testing the filterability of a range of South African white wine samples showed that KPA mostly delivered **improved filterability compared to CMC** (Cellogum LV 20™). In seven out of eight cases,

KPA gave lower filterability index values (greater filterability) compared to CMC on both one, and three days after treatment.

#### NOTES:

- The filterability index of the wine needs to **meet specific standards set in-house** (not higher than 30 units) before the addition of KPA (and colloids in general), as blockages can occur if the initial filterability index is too high.

When measuring the filterability of your wine over time it is important to analyse the control sample (no additions) together with the treated sample as the measurement could show an increased filterability index in both treatments. This is an indication of an inherent factor (and not the added colloids) causing the decreased filterability.

## KPA AND PROTEINS

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Often, heat test results (at 80°C) indicate unstable results *after* a CMC addition compared to the test done prior to the addition of CMC. The interaction between the added colloids and proteins, seen in these examples, can also occur due to the addition of KPA (which is also a negatively charged colloid).

**It is important to ensure that the wine is protein stable prior to the addition of KPA**, however, for peace of mind, there is a **method to test the risk of colloidal instability** of a treated sample.

The test involves heating the treated wine to 40°C for three days and then testing the turbidity of the sample. For a treated wine to be considered as colloidally stable, the NTU needs to be below 1.5 after heating. In this way, an accurate prediction of haze formation resulting from interactions between added colloids (CMC/KPA), and wine colloids, can be determined. In some instances, KPA delivers lower NTU values compared to CMC, however, each wine needs to be treated as a unique sample with specific colloidal properties.

## HOW WILL KPA AFFECT THE TASTE OF MY WINES?

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According to the [Stabiwine Research Project](#) (investigating the use of biopolymers for sustainable stabilization of quality wines), the addition of KPA, at the recommended dosages, **does not alter the sensory composition of wine**.

## IS KPA SUSTAINABLE?

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Due to the simple and rapid application, the use of **KPA for wine stability is much more cost-effective and sustainable than alternative options**. The application does not involve chilling, racking, water usage or tank sanitizing.

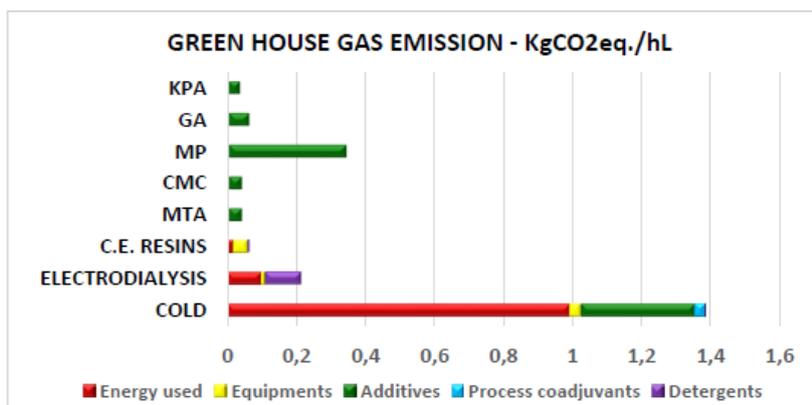


Figure 4. Comparison of various stabilization treatments on the greenhouse gas emission. Source: Stabiwine Research Project

## THE DO'S AND DON'TS OF COLLOIDS

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- Do laboratory trials before addition to determine the suitability of the wine for the treatment
- Add the product to the final blend
- Test the wine's protein stability before addition
- Filter the wine before addition so that the NTU <1
  
- Don't add tartaric acid too close to addition
- Don't add acids after laboratory trials
- Don't add acids after addition of KPA
- Don't fine wines post-treatment
- Don't crossflow filter a colloid-treated wine
- Don't treat an unfilterable wine
- Don't treat wines containing residual lysozyme

## CONCLUSIONS

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KPA has a high stabilising capacity, with a long-lasting effect that has a negligible impact on the wine filterability, no negative interaction with stable wine colour and does not alter the sensory properties of the wine. In comparison to CMC, (other than the red wine colour benefit) it is generally more filterable and has increased effectivity. Sounds almost too good to be true, right? Believe it. It looks

like this product is ready to take the South African wine industry by storm, revolutionizing the way we stabilize, especially Sauvignon Blanc, wine!

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## ABBREVIATIONS

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Potassium polyaspartate (KPA)

Carboxymethylcellulose (CMC)

## REFERENCES

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- Van Zyl, A. Zenith in Action. Enartis Stabilization School 2019
- Van Zyl, A. Cold Stab is Over. The practice of Zenith. Enartis Stabilization School 2018
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