AEB New-cel
Carboxymethlycellulose (CMC)

***New-cel* Introduction**:

AEB New-cel is an organic carboxymethlycellulose (CMC) polymer soluble in water, used to achieve tartrate stability in wines without the necessity for traditional cold stabilization.

The stabilization of tartrate precipitations represents one of the most significant cost implications for any winery. Currently, the traditional method of cold stabilization of a wine involves refrigeration of the entire volume of wine to close to -4^{o}C for a period of at least 72hrs (or longer if -4^{o}C cannot be achieved) followed by filtration. This process is a significant contributor to a winery's carbon footprint and electricity budget and is a process compounded by the warm climate location and exposed nature of many of Australia's inland winemaking facilities.

To add to the significant costs involved, the non-specific nature of traditional cold stabilization may have unintended impacts on wine organoleptic characteristics, as it is possible that compounds which are affected by cold filtration can be removed by this process e.g. colour and mouthfeel components.

New-cel was developed by ***AEB Group*** based on in-house research in which we have gauged that the ideal formulation for the most effective wine stabilization occurs when the CMC polymer contains a ratio between the number of carboxylated groups and glucose units equal to 1. This allows the ultimate efficacy in forming a chemical barrier between the crystals of potassium bi-tartrate preventing their enlargement. In wines, tartaric acid and potassium normally forms crystal structures with 7 sides, these progressively enlarge starting from micro-formations, until they become visible as small "glass-like" deposits in the wine. The long polymeric chains of ***New-cel*** act as colloidal protectors and wrap the crystal structure with a protective film and deform them making their growth impossible.

***New-Cel* in Red Wines:**

New-cel will prevent tartrate deposits in red wine regardless of whether or not the colour components are cold stable, however, it will not normally prevent the cold instability cause by unstable colour present in red wine. Unstable wine colour can cause interference with the mode of action of CMC if the wine contains unstable colour prior to its addition and post-CMC-addition in both cases causing cloudiness and an increase in turbidity. It is important to stabilize the red wine colour to prevent clouding of the wine by cold unstable colour precipitation. Colour can be partially stabilized by micro-oxygenation over time, chilling the wine and filtration prior to CMC addition or the addition of gum Arabic (***Arabinol 30***) prior to the addition of ***New-cel***.

***New-cel* Composition:**

Carboxy-methyl-cellulose (E466) stabilized in sterile, deionized water.
Citric Acid (E330).
Potassium Bisulfite (E228) - 100 g/hL of New-cel bring about 2 mg/L of SO2.
Ascorbic acid (E300).

***New-cel* Utilization:**

- Wines must be protein stable and turbidity <1ntu.
- Directly dissolve the solution into the wine while pumping over.
- Recommended Rate: 100-150g/hL. It is important to bench trial the dosage rate and test the cold stability before adding ***New-cel*** in the cellar.

Discussion of AWRI CarboxyMethylCellulose Benchmarking Trial

Authors: Dr. Tina Tran, Mr. Neil Scrimgeour, Dr. Eric Wilkes, April 17, 2013

In 2012 AWRI Commercial Services CMC Benchmarking Trial was initiated involving a consortium of wineries and suppliers to determine the performance of commercially available CMCs on a variety of white wines. AWRI was engaged by ***AEB Group*** to participate in the trial and determine the performance of ***New-cel*** on various white wines. The following is a report for Stages 1 and 2 of the trial which involved screening of a wide range of wines followed by determination of performance of varying doses of CMCs in a variety of wines.

Concentration of CMC /L used in the trial

CMC	Unit	Low	Medium (recommended dose)	High
#2	mL	0.5	0.75	1
#3	mL	0.8	1.4	2
#4	g	0.05	0.075	0.1
#6	mL	0.75	1.025	1.3
#7	g	0.05	0.075	0.1
AEB New-cel (#5)	mL	0.5	1	1.5

Testing:

Prior to treatment, it was requested all wines submitted for the trial have a turbidity levels <2 NTU; be protein stable and not contain lysozyme enzymes which are known to interact with CMCs and be detrimental to performance.

Australian wines made from Chardonnay, Semillon, Riesling, Sauvignon Blanc, Colombard, Pinot Gris and Traminer were 0.45micron filter sterilized into clear glass bottles, treated with CMC and incubated for 48hrs at 17^{o}C followed by testing for cold stability; 72 hrs at -4^{o}C; after which the wine was then inspected for crystal deposits (Saturation Temperature test was also performed).

Results: Effect of CMC dose on cold stability and impact on physical attributes of wine

A subset of wines was treated with low, medium and high doses of CMC (refer to Table above). The cold stabilisation performance was rated via the Brine test and treated wines analysed for impact on colour, phenolics, turbidity and saturation temperature.

The wines treated with CMCs varied in variety, chemical profile as well as the cold instability level. No particular trends in performance could be associated with wine variety or level of instability. ***New-cel*** performed best in several wines made from Sauvignon Blanc, Colombard, Pinot Gris and Traminer, where even at half the recommended dose it was able to stabilize the wines.

It was also found that the addition of CMC does not significantly impact on colour, turbidity or phenolic profile when compared to the untreated wines. Interestingly, the saturation temperature indicates that the wines were all unstable, even though the -4^{o}C for 72hrs test results indicate the wine is stable. This may be explained by the fact that the principle behind saturation temperature relies on the change in conductivity; since the addition of CMC does not significantly influence conductivity there is no significant change in saturation temperature.

New-cel **dosage rquired to achieve cold stability by variety and relative ranking compared to other CMCs tested**.

Wine Variety	*New-cel* dosage to achieve stability and Relative Ranking (1st to 6th)
Pinot Gris	High - 2nd
Riesling	Medium - 2nd
Sauvignon Blanc	Low - 1st
Traminer (1)	High - 3rd
Colombard	Medium - 1st
Pinot Grigio	Medium - 1st
Semillon	High - 2nd
Traminer (2)	Low - 1st
Chardonnay	High - 2nd

All CMCs were able to cold stabilize the wines, however, the minimum dose required varied between CMCs and wine. Differences in performance are highly wine specific and may be attributed to the chemical make-up of the wine.

Summary:

This work clearly demonstrates that ***New-cel*** is able to cold stabilise a wide variety of white wines including Chardonnay, Semillon and Riesling, even successfully achieving cold stability at half the recommended dose and out-performing other CMCs in wines from Sauvignon Blanc, Colombard, Pinot Gris and Traminer.

There is little or no impact of CMC treatments on colour or turbidity.

The level of performance of the various CMCs, including ***New-cel***, is affected by dosage as well as the wine it is applied to; this cannot be attributed to any one particular factor, as it is likely to be dependent on the wine chemical make-up.