Tartrate stabilisation of Rosé wine using ion exchange resins

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Introduction and Aims

Tartaric stabilisation is essential to satisfy the quality criteria of wines. To prevent wine tartaric precipitates, potassium hydrogen tartrate (KHT) and calcium tartrate (CaT), several techniques can be used. The addition of oenological products, such as metatartaric acid and carboxymetilcelulose (CMC) as well as the use of ion exchange resins are acceptable techniques for tartaric stabilization by the OIV (OIV, 2016). The aim of this study was to evaluate the ion exchange resins effect on wine tartaric stabilisation efficiency and wine quality, compared to the effect of the addition of different oenological additives

Material and Methods

Parameters analyzed	Method
Conventional oenological parameter	FTIR Baccus
Conductivity	Mini contact test
Metallic composition	Atomic absorption spectroscopy
Color intensity	OIV (2015)
Total phenols, flavonoids and non-flavonoids	Kramling and Singleton (1969)
Anthocyanins profile by HPLC	Guise et al. (2014)
Sensory analysis	ISO 13299:2016

Wine conventional oenological parameters	Rose wine (Douro 2015)
Alcohol content (% v/v)	11.13
Specific gravity (g/cm^3)	0.9897
Titratable acidity (g/L tartaric acid)	6.6
pH	3.22
Volatile acidity (g/L de acetic acid)	0.18

CMC structural characteristics. Adapted from Guise et al. (2014)

CMC	Viscosity (mPas^{-1}) Solution 0.1%	Degree of substitution (DS)	Degree of polymerization kDa	Potassium g/100g	Sodium g/100g	Calcium g/100g	Magnesium g/100g
CMC1 5 %	1.21±0.02^{a}	0,96±0.03^{b}	441±5^{a}	6.72±0.03^{b}	4.59±0.01^{b}	0.15±0.01^{b}	0.035±0.008^{b}
CMC2 20%	1.15±0.04^{a}	1.12±0.05^{c}	441±7^{a,b}	0.044±0,001^{a}	7,68±0,02^{a}	0,055±0,002^{a}	0,008±0,001^{a}
CMC3 solid	1.35±0.02^{b}	0.63±0.04^{a}	512±27^{b}	0.010±0.001^{a}	7.68±0.02^{a}	0.012±0.004^{c}	0.001±0.000^{a}

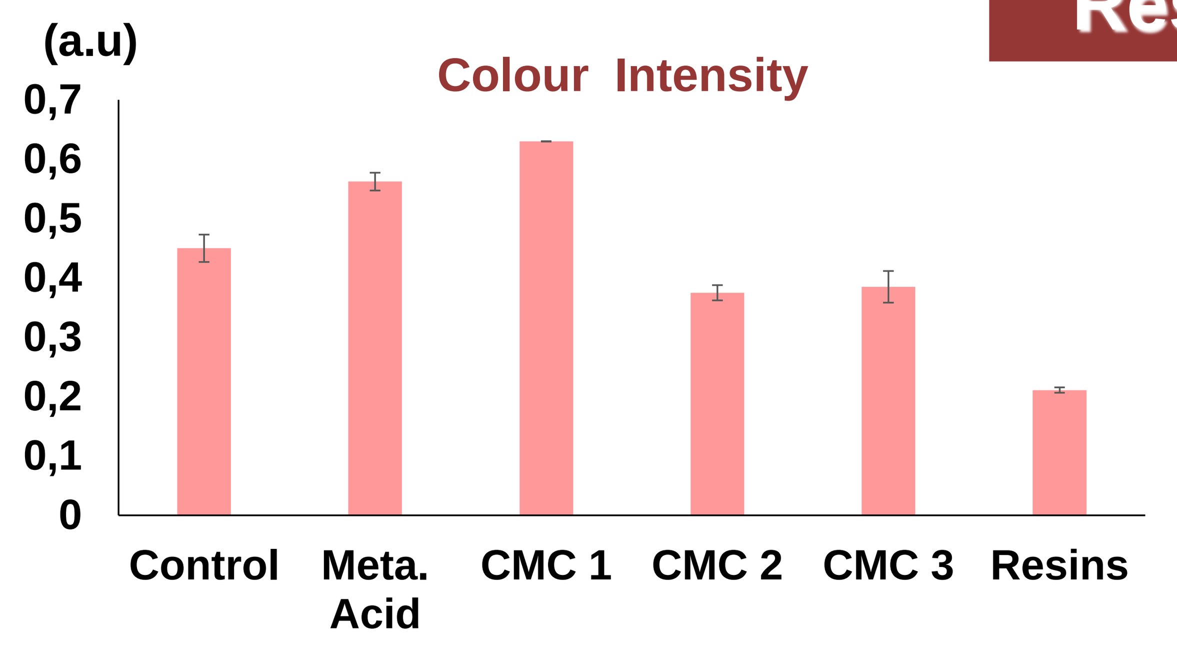
Oenological additives

- CMC1- 5% solution
- CMC2- 20% solution
- CMC3- solid
- Metatartaric acid

Ion exchange resins: pH-Stab/AEB laboratory

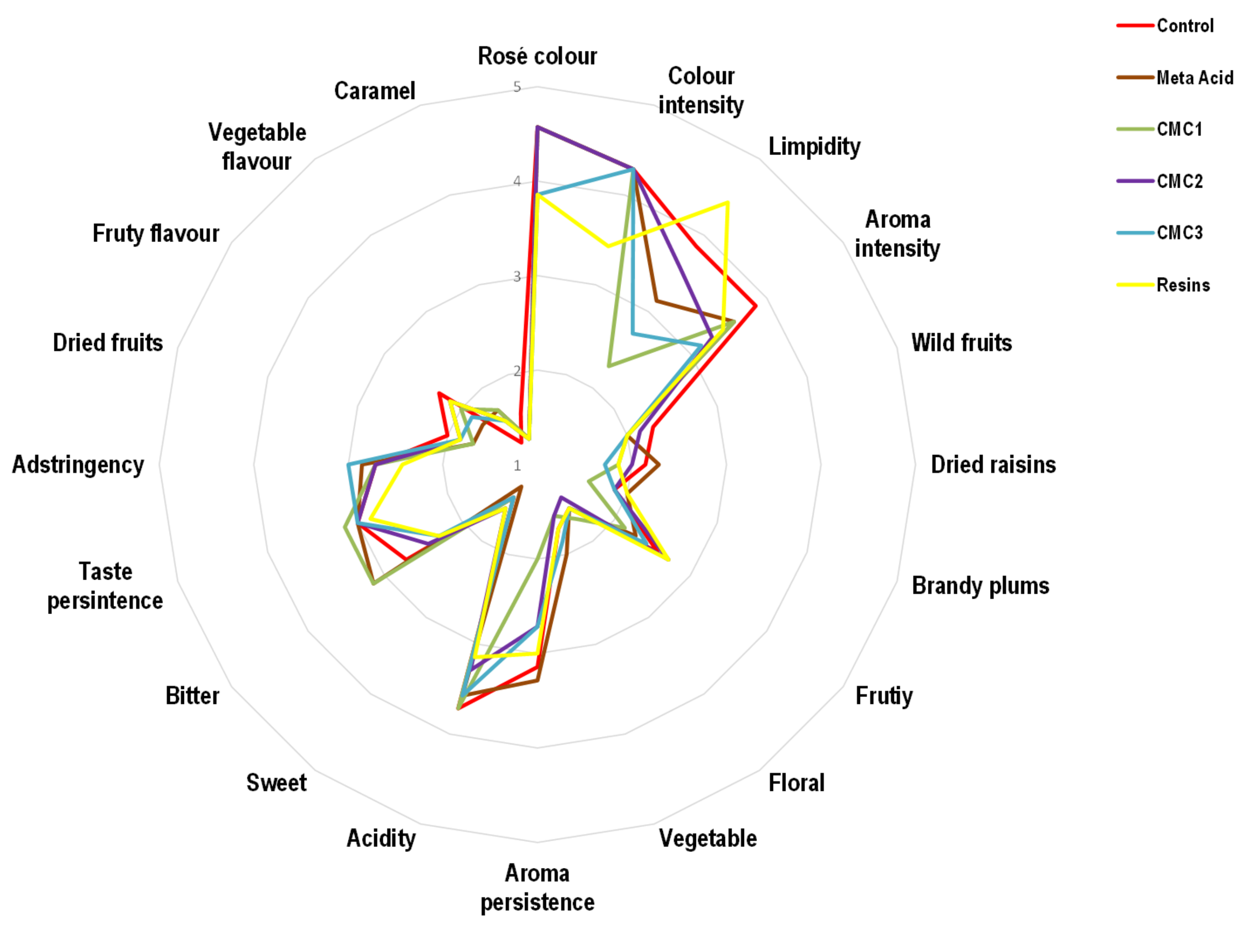
Experiments were carried out at Gran Cruz winery. Treated wine was 30%.

Results



Treated Rose wines pH, total acidity and mineral composition

	pH	Total Acidity (g/L tartaric acid)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)
Control	3.10 ± 0.01^{a}	5.85 ± 0.00^{a}	19.10 ± 0.85^{a}	59.95 ± 0.83^{a}	436.69 ± 41.13^{a}
Meta. Acid	3.10± 0.00^{a}	5.81 ± 0.05^{a}	20.00 ± 0.42^{a}	63.57 ± 2.38^{a}	465.80 ± 11.23^{a}
CMC 1	3.15± 0.02^{b}	7.24 ± 1.96^{b}	19.10 ± 0.00^{a}	49.19 ± 0.36^{b}	468.58 ± 45.01^{a}
CMC 2	3.16 ± 0.00^{b}	5.78 ± 0.00^{a}	19.70 ± 0.00^{a}	65.33 ± 0.59^{a}	511.16 ± 21.84^{b}
CMC 3	3.17 ± 0.01^{b}	5.85 ± 0.11^{a}	19.10 ± 0.85^{a}	63.90 ± 0.71^{a}	548.20 ± 35.66^{b}
Resins	2.93 ± 0.00^{c}	6.58 ± 0.08^{b}	13.40 ± 0.42^{b}	38.76 ± 4.40^{c}	334.54 ± 23.78^{c}



Final remarks

- ✓All treatments studied stabilized the Rose wine, regarding tartaric instability
- ✓Wine treated with resins showed lower pH and higher acidity comparing to other treatments
- ✓Lower calcium , magnesium and potassium content was observed after wine treatment with resins
- ✓In wines treated with ion exchange resins there is a decrease in polymeric pigments
- ✓A decrease in colour intensity was also observed mostly after treatment with resins
- ✓Sensory analysis revealed that wine treatment with resin was more scored for fruity aroma and limpidity attributes and lesser scored for astringency and colour attributes

References

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