

CQC Internal Report

Sulfide Analysis of Screw Cap Wines

2/26/07

At our last CQC meeting we discussed the skepticism exhibited by many members of the wine community towards the notion that screw-cap closures may contribute to sulfide problems. In many cases, reports of sulfide problems in screw-cap wines have been dismissed as propaganda from the natural cork industry.

To run a quick look for corroboration we agreed to send a small sample of screw-cap wines through a sulfide panel at ETS Laboratories. The selection was based on New Zealand or Australian Sauvignon Blancs from the '05 or '04 vintages. A total of eleven wines were purchased from a local retailer. The sample included every wine within the criteria (except for the one costing over \$20).

Notably, all tested wines had high levels of dimethylsulfide (DMS) – at levels well over the sensory threshold of 25ppb. The lowest level of DMS observed was 61ppb. Average for the group was 208ppb. There appears to be some correlation between vintage and DMS - as the average from the '04 was 249ppb. The '05 vintage averaged 184ppb.

Most literature concerning sulfide aromas in screw-cap closures simply describe the sensory detection of sulfur-like odors (SLO's). Where literature mentions specific sulfide compounds, the usual focus is on the redox reaction between disulfides and mercaptans. I found only one article that dealt with DMS and closure performance. The study reported the observation that DMS in sparkling wines was elevated in bottles finished with low permeability closures.

“During aging on the lees, dimethylsulfide accumulates more rapidly when low oxygen permeability bottle caps are used. Dimethylsulfide formation is also influenced by bottle capacity, and it could result from an increase in the reduction of wine dimethyl sulfoxide.” Y. VASSEROT,* C. JACOPIN, and P. JEANDET “Effect of Bottle Capacity and Bottle-cap Permeability to Oxygen on Dimethylsulfide Formation in Champagne Wines during Aging on the Lees” *AJEV* 52:1 (2001)

To see if these elevated levels of DMS were merely characteristic of the wine type, we elected to test some cork finished wines from similar vintages and origins. Going back to the same retailer we purchased every bottle of cork-finished Sauvignon Blanc available from New Zealand and Australia.

The cork-finished wines also had elevated DMS levels, but at an average of 76ppb, the concentration was roughly one third of that found in wines finished with screw-caps.

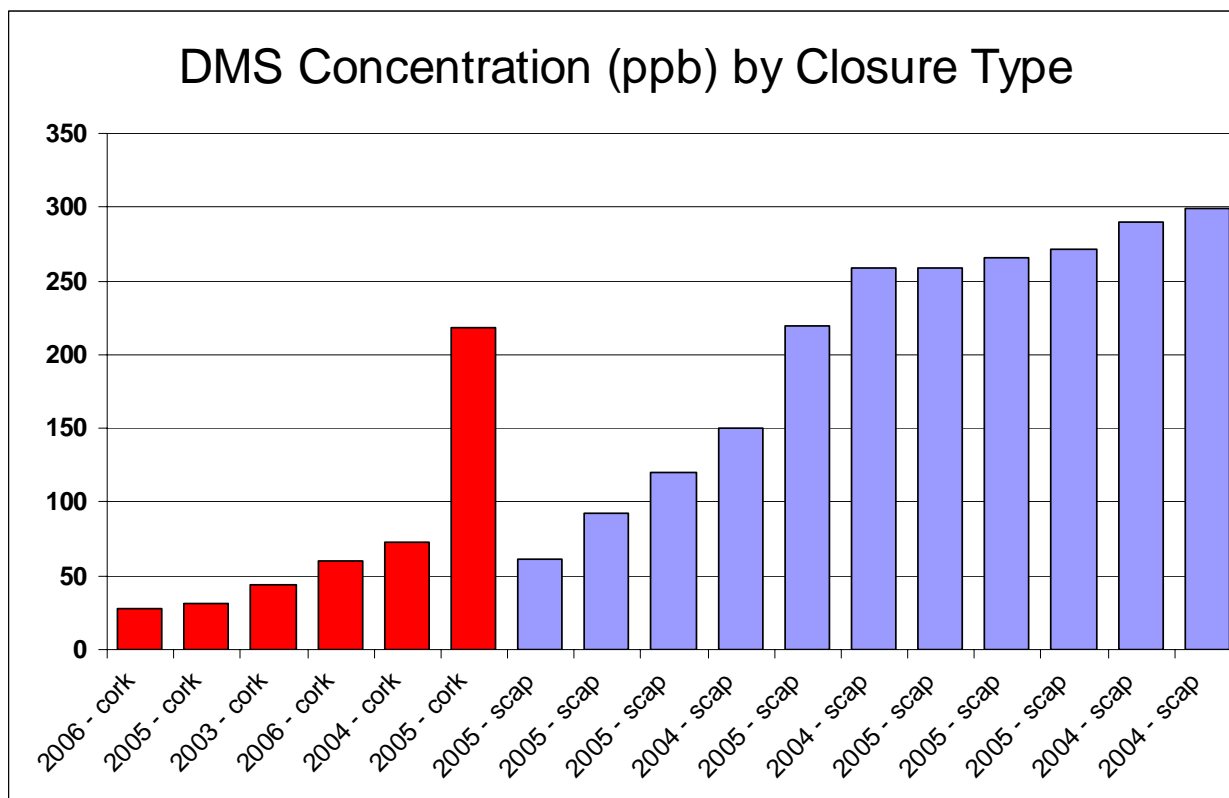
This small project suggests that DMS concentrations might be higher in screw-cap wines than in those finished with natural cork. Any follow-up should include a controlled environment, with identical base wines and bottling practices.

data is attached

1. Reported Sensory Thresholds for Sulfide Compounds in Wine

compound	structure	sensory description	range (ppb)
hydrogen sulfide	H ₂ S	rotten egg, sewage-like	0.9-1.5
ethyl mercaptan	CH ₃ CH ₂ SH	burnt match, sulfidy, earthy	1.1-1.8
methyl mercaptan	CH ₃ SH	rotten cabbage, burnt rubber	1.5
diethyl sulfide	CH ₃ CH ₂ SCH ₂ CH ₃	rubbery	0.9-1.3
dimethyl sulfide	CH ₃ SCH ₃	canned corn, cooked cabbage, asparagus	17-25
diethyl disulfide	CH ₃ CH ₂ SSCH ₂ CH ₃	garlic, burnt rubber	3.6-4.3
dimethyl disulfide	CH ₃ SSCH ₃	vegetal, cabbage, onion-like at high levels	9.8-10.2
carbon disulfide	CS ₂	sweet, ethereal, slightly green, sulfidy	5

2. Comparison of DMS Levels by Type



3. Detail Scores by Wine

Results of Sulfide Testing for Random Selection of Australian and New Zealand Sauvignon Blanc Wines

					diethyl disulfide	diethyl sulfide	dimethyl disulfide	dimethyl sulfide	ethyl mercaptan	hydrogen sulfide	methyl mercaptan	other sulfides
Code	No	Vint	Variety	Country								
Scap	201	'04	SB	AUS	0.5	0.5	0.5	150.0	0.5	0.5	0.5	0.5
Scap	202	'04	SB	NZ	0.5	0.5	0.5	258.2	0.5	0.5	0.5	0.5
Scap	203	'04	SB	NZ	0.5	0.5	1.4	289.7	0.5	0.5	0.5	0.5
Scap	204	'04	SB	NZ	0.5	0.5	2.0	299.7	0.5	0.5	0.5	0.5
Scap	205	'05	SB	AUS	0.5	0.5	1.6	61.0	0.5	0.5	0.5	0.5
Scap	206	'05	SB	NZ	0.5	0.5	1.4	92.1	0.5	0.5	0.5	0.5
Scap	207	'05	SB	SB	0.5	0.5	0.5	120.0	0.5	0.5	0.5	0.5
Scap	208	'05	SB	NZ	0.5	0.5	1.4	219.7	0.5	0.5	0.5	0.5
Scap	209	'05	SB	NZ	0.5	0.5	0.5	259.0	0.5	0.5	0.5	0.5
Scap	210	'05	SB	NZ	0.5	0.5	0.5	266.2	0.5	0.5	0.5	0.5
Scap	211	'05	SB	NZ	0.5	0.5	1.3	272.0	0.5	0.5	0.5	0.5
average					0.5	0.5	1.1	208	0.5	0.5	0.5	0.5

Cork Finish

cork	224	'03	SB	AUS	0.5	0.5	0.5	43.4	0.5	0.5	0.5	0.5
cork	225	'04	SB	AUS	0.5	0.5	1.4	72.4	0.5	0.5	0.5	0.5
cork	226	'05	SB	NZ	0.5	0.5	0.5	31.3	0.5	0.5	0.5	0.5
cork	227	'05	SB	NZ	0.5	0.5	0.5	218.8	0.5	0.5	0.5	0.5
cork	228	'06	SB	NZ	0.5	0.5	0.5	27.6	0.5	0.5	0.5	0.5
cork	229	'06	SB	NZ	0.5	0.5	0.5	60.4	0.5	0.5	0.5	0.5
average					0.5	0.5	0.7	76	0.5	0.5	0.5	0.5

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