

Summary Analysis of taint-related compounds in wine pairs from the 2002 Sonoma County Harvest Fair – Rejected + Accepted

CQC Analysis of Cork Related Taints in Sonoma County Harvest Fair Samples

This project compared cork related taint compounds in wines rejected for sensory defects at the 2002 Sonoma County Harvest Fair Wine Competition. Forty wines were selected for study. Each wine was represented by a sample rejected by judges for general quality reasons assumed to be related to bottle variation. A sample of an “accepted” bottle of each wine was used as control.

Samples were collected at the end of the day. Wines were stored with their original cork (based on the best efforts of competition workers). Approximately 200mL was poured off for delivery to an independent laboratory for subsequent chemical analysis by GCMS methods.

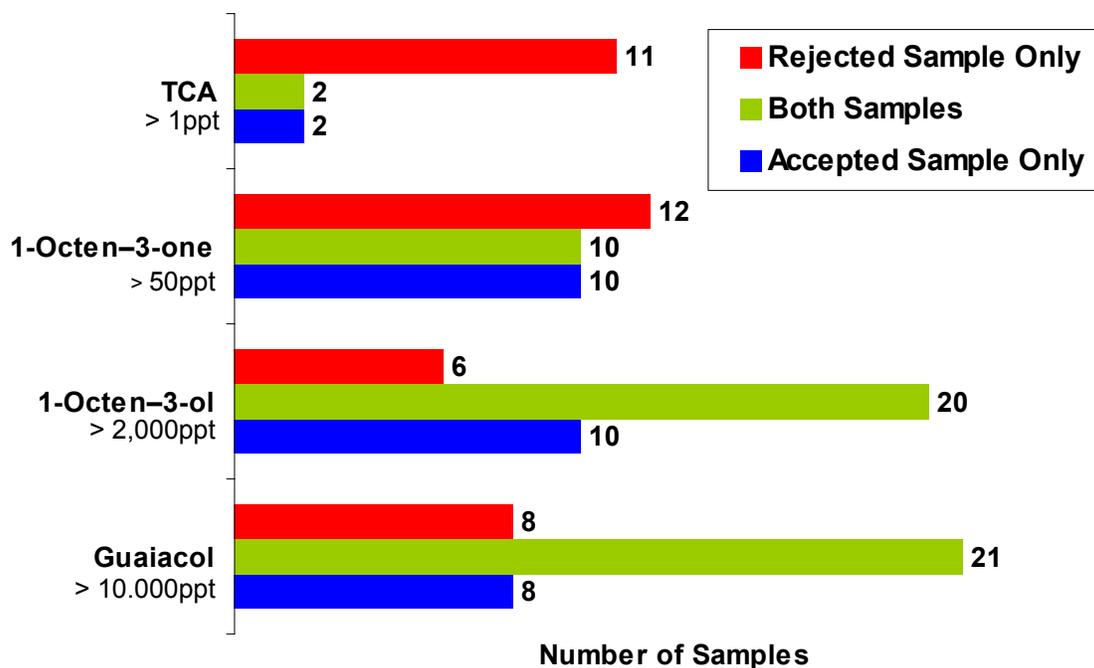
Samples were analyzed for the following compounds:

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| TCA TeCA PCA geosmin | MIB guaiacol 1–octen–3–one 1–octen–3–ol |
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I. Characteristics of Rejected Bottles

Results from this group show that several of the compounds did not appear at significant levels in any of the wine samples. Only TCA appeared to be more prominent in the rejected wine samples.

Occurance of Taint Compounds in 40 Wine Pairs



II. Summary by Compound

TCA–trichloroanisole (musty)

TCA was measured to within 1ppt (part per trillion). This is well below published sensory thresholds. TCA has a strong musty, wet cardboard aroma that is the traditionally associated with cork taint.

Of the 40 pairs of wines isolated by the judges, 15 contained measurable TCA. In eleven pairs – TCA was present only in the “rejected” sample. Two pairs contained TCA only in the “accepted” sample. Two pairs contained TCA in both samples. Overall TCA levels in the “rejected” bottles were 65% higher than in the “accepted” samples.

These results indicate a positive correlation between TCA and sensory rejection of wine samples by the judges.

TCA was not the only source of defect, as roughly two thirds of the rejected samples did not contain any measurable TCA. This ratio is consistent with other studies of wines rejected by sensory analysis. Potential causes are oxidation, storage conditions, bottling conditions, and human subjectivity.

TeCA–tetrachloroanisole and PCA–pentachloroanisole (musty)

These barrel-related chloroanisoles were not found above minimum reporting levels in any samples.

1-octen-3-one (mushroom)

The minimum measurement for 1-octen-3-one was 50ppt. This is at the higher range of the published sensory threshold. 1-octen-3-one is used commercially as an artificial flavor ingredient for mushrooms.

Of the 40 pairs of wines, 32 contained measurable levels of 1-octen-3-one. The distribution was nearly evenly distributed between: (a) 12 instances only in the “rejected” sample, (b) 10 instances only in the “accepted” sample, (c) 10 instances in both pairs, and (d) 8 instances where no measurable levels were found in either sample.

These results show no correlation between 1-octen-3-one and sensory rejection of wine samples by the judges.

Previous research has shown that 1-octen-3-one was often found in wines rejected by sensory analysis. Current studies, such as this one, suggest that the compound is also likely to be present in wines not rejected. In our prep work we discovered that our control wine - a neutral, white, bag-in-the-box contained 1-octen-3-one at levels of 90ppt.

1-octen-3-ol – octenol (mushroom)

The minimum measurement for 1-octen-3-one was 100ppt. This is well below the published sensory threshold of 500ppt. Octenol is found in commercial applications as an ingredient in pesticides to attract certain species of mosquitoes and biting flies. Like 1-octen-3-one it has a strong “mushroom” aroma.

Each of the 40 wine pairs contained measurable levels of octenol. The graphic analysis measured levels at 2,000ppt. At that level, octenol appears to be randomly present in 36 wine pairs. The distribution was nearly evenly distributed between: (a) 6 instances only in the “rejected” sample, (b) 10 instances only in the “accepted” sample, and (c) 20 instances in both pairs.

These results show no correlation between 1-octen-3-ol and sensory rejection of samples by the judges.

The average octenol content of all “accepted” samples was 6,750ppt. “Rejected” samples averaged 6,763ppt. It appears that octenol was present at significant levels in most of the wines sampled. Possible causes include natural byproducts of the aging process.

Geosmin (earthy) and MIB (medicinal)

Minimum reporting levels for these compounds was 15ppt. This is well below published sensory thresholds. Neither compound was detected in any of the samples.

Guaiacol (smoke)

The minimum measurement for guaiacol was 500ppt. This is well below the published sensory threshold of 2,000ppt. Guaiacol, listed as a flaw in cork, is one of the important contributions of oak cooperage. It is often characterized as a “smoky” attribute.

Each of the 40 wine pairs contained measurable levels of guaiacol. The graphic analysis measured levels at 10,000ppt. At that level, guaiacol appears to be randomly present in 37 wine pairs. The distribution was nearly evenly distributed between: (a) 8 instances only in the “rejected” sample, (b) 8 instances only in the “accepted” sample, and (c) 21 instances in both pairs.

These results show no correlation between guaiacol and sensory rejection of samples by the judges.

The average guaiacol content of all “accepted” samples was 16,143ppt. “Rejected” samples averaged 16,265ppt.

III Conclusions

TCA was the only compound studied that had a clear relationship to the wine samples rejected by the judges due to “off-aromas”. TCA was not detected in the majority of samples studied, and it is presumed that other causes were responsible for the remaining sensory rejections.