ETS LABORATORIES

FAQs

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ETS Haloanisoles Analysis

1. **What are the differences between TCA, TeCA, PCA and TBA?**

   They are all chemically related haloanisole compounds that differ in their number of halogen atoms. Each compound has a similar odor but possesses different sensory thresholds.

2. **What are the origins of TCA, TeCA, PCA and TBA?**

   The origin of haloanisoles is often attributed to the biodegradation of halophenols by molds. Trichlorophenol (TCP), tetrachlorophenol (TeCP), pentachlorophenol (PCP) and tribromophenol (TBP) are converted to TCA, TeCA, PCA and TBA respectively. TCP in wineries is often traced to the former use of bleach as a sanitizer. TeCP, PCP and TBP are wood preservatives. Each of these compounds, or combinations of them , can be found in winery wood materials. TBP, also used in flame retardants, can be present in plastics and other polymers. It might also result from the use of bromine as a sanitizer. The origin of TCA in natural corks is still debated.

3. **How can wine get contaminated in a cellar?**

   Haloanisoles are not naturally occurring wine constituents. Wine contamination requires contact or storage with contaminated material. Once haloanisoles are present in a winery environment, plenty of opportunity exists for them to reach wine.

   Direct airborne transfer of haloanisoles can contaminate cellared wine. Various materials, including tank coatings, hoses, oak products (wood tanks, barrels, chips, staves), bungs, bentonite, filtration media, and closures, may also pick-up airborne haloanisoles. Once contaminated, these materials may, in turn, release haloanisoles into wine.

4. **What is “Cork Taint”?**

   Strictly speaking, "cork taint" results from the migration of TCA from cork in bottled wine, giving off-odors described as "musty", "wet cardboard” or "moldy". Other haloanisoles however, can have a similar effect on wine.

5. **If our cellar were contaminated with haloanisoles, wouldn’t we smell it before wines become tainted?**

   Not necessarily. The human nose dramatically looses sensitivity with progressive or constant exposure to haloanisoles. Wine contamination often occurs before a problem is suspected in a cellar.

6. **How can haloanisoles analysis in wine point to a source of contamination?**

   For both bulk and bottled wine, the relative concentrations of TCA, TeCA, PCA and TBA often suggest a possible contamination source. For example, the presence of pentachlorophenol-treated wood in the cellar would be suspected when TeCA and PCA are the predominant haloanisoles.

   With bottled wines, bottle-to-bottle variability provides additional information. Significant bottle variability and the predominance of TCA suggest that the corks may be the contamination source.

   Analyzing wine at bottling is highly recommended. It is the only way to confirm if contamination occurred before or after bottling. If a sample taken at bottling is positive, causes of contamination in the cellar can be investigated.

   ETS Laboratories assists in conducting specific studies upon request.

7. **Can haloanisoles be detected in a winery before they can be found in wine?**

   Fortunately, yes. Airborne haloanisoles can be detected before they represent a serious threat to wine: ETS offers "atmosphere traps" designed to detect and monitor them. ETS also designs sampling plans for long-term risk assessments. These plans typically include the determination of haloanisoles and their precursors in wooden materials and winery structures. They have already been implemented by most major wineries in California.

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ETS Haloanisole Analysis

8. At what levels do haloanisoles have a sensory impact?

The sensory impact of aroma compounds is commonly described in relation to sensory thresholds. With TCA, reported thresholds in wine are typically in the range of 2 ng/L (difference) to 6 ng/L (recognition). TBA is virtually as powerful, while TeCA appears approximately three times less potent. PCA, reportedly 1,000 times less potent than TCA, is unlikely to reach its odor threshold in wine.

Sensory thresholds are average numbers, however. Some individuals can be especially sensitive, while others are practically unable to experience any wine taint. An individual's sensitivity can also vary from day to day.

Background aromas and sensory fatigue may also impair the sensory perception of haloanisoles, especially when large numbers of samples are screened. This is particularly true with cork soaks.

9. What is the difference between ng/L and ppt?

These two units are used synonymously. However, ppt (part per trillion) may mean ng/L (concentration in liquids) or ng/kg (concentration in solids). To avoid confusion, ETS uses ng/L for all wines and cork soaks.

10. Our winery has a cork QC program based on sensory evaluation. Will the Haloanisoles Analysis enhance our sensory program?

Analytical determination of haloanisoles in cork soaks complements sensory QC programs and is now widely used for cork evaluation programs.

Periodic analytical evaluation of cork sensory soaks can enhance a monitoring program by checking the performance of the entire QC program. TCA analysis can also augment a sensory program by providing quantitative data, and can be used to confirm sensory decisions and to validate purchasing decisions.

11. How does ETS test corks for haloanisoles?

ETS tests corks after soaking them in a neutral white wine. Haloanisole levels in the soak solution are determined using GC/MS analysis.

12. What is "Releasable TCA"?

In 1998, ETS discovered that corks soaked in wine release TCA until an apparent equilibrium is reached (within 24h with uncoated corks, 48h with coated corks). We called the concentration of TCA reached in the soaked wine "Releasable TCA" (RTCA). The determination of RTCA is now used in large scale screening programs for corks and has gained international acceptance.

13. Do corks need to be tested individually for Releasable TCA?

For screening purposes group soaks of 50 corks are widely used. Group soaks allow more corks to be sampled and dramatically reduce the total number of analyses required. Research conducted by ETS on behalf of the Cork Quality Council showed that the RTCA score of group cork soaks corresponded to the mathematical average of the individual corks. The only drawback is the imprecision caused by the sample sizes of 50 corks. Fortunately, most of the imprecision is caused by tests giving abnormally high scores ("high outliers"), possibly causing rejection of "good" cork bales, while the opposite ("low outliers") leading to acceptance of "bad" bales seldom happens.

14. How does Releasable TCA relate to TCA in a bottled wine?

ETS has conducted several studies demonstrating that Releasable TCA is a good predictor of TCA transferred in bottled wine. In the most recent, funded by the American Vineyard Foundation, cork bales with low RTCA scores (group soak tests close to, or below 1 ng/L) were found to have virtually no TCA-affected bottles.

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