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“Corked Wine”

In a 2005 study of 2800 bottles tasted at the Wine Spectator blind-tasting facilities in Napa, California, 7% of the bottles were found to be tainted.

A 'Corked' wine is a wine that has been bottled with a cork that is contaminated with TCA (2,4,6-Trichloroanisole). The production of TCA in cork or its transfer by other means into wine is complex, but most results when naturally-occurring airborne fungi are presented with chlorophenol compounds, which they then convert into chloroanisole. Chlorophenols taken up by cork trees are an industrial pollutant found in many pesticides and wood preservatives, which may mean that the incidence of cork taint has risen in modern times. Ironically, chlorophenols can also be a product of the chlorine bleaching process used to sterilize corks; this has led to the increasing adoption of methods such as peroxide bleaching.

TCA contamination usually comes from corks but can also come from barrels, other cooperage or even, apparently, from wood within the cellar including walls or beams. The term 'corked wine' is applied to all wines with TCA contamination because corks are the source of most of the problems. The wine industry estimates that as many as 3% to 7% of all wines have TCA contamination at levels that can be detected by consumers. Because most people are not trained to recognize the smell and taste of TCA, only a very small fraction of these bad bottles are ever returned to stores or sent back at a restaurant.

Even a very tiny amount of TCA in a wine can ruin it. Most people become aware of TCA in quantities as small as 5 parts per trillion and some individuals are even more sensitive. When TCA is present in quantities high enough to be evident to a person, it comes across as 'musty' aromas and flavors. Even when TCA is not evident in the smell or taste of a wine, very small quantities can subdue the aromas and flavors of fruit that the wine would ordinarily exhibit.

TCA does not pose a health risk (at least in the levels found in wines). It just imparts the aromas and flavors that are objectionable when found in sufficient quantity. Many wines have levels of TCA that are below the threshold of perception. Wine is not the only place you can find TCA. It is also found in some municipal water supplies as well as in some teas.

Cork taint is in fact a set of very undesirable aroma and flavour characters that are imparted to bottled wines following contact with their cork. Six chemical compounds have been found to contribute to cork taint. These are guaiacol, geosmin, 2-methylisoborneol (MIB), octen-3-ol and octen-3-one; and the most important of them all 2,4,6 trichloroanisole. TCA as it is affectionately known is a small and chemically simple molecule. With the exception of guaiacol, these compounds are sensorially very potent. TCA can be detected in dry white wine and sparkling wines at levels around two parts per trillion (0.000000000002 grams in a litre of wine), and in red and port wines at around five parts per trillion.

Such low concentrations are difficult to conceptualise but it is analogous to one teaspoon in a couple of thousand olympic sized swimming pools or one second in 32,000 years. A single gram of pure TCA could badly taint the entire volume of wine produced in Australia each vintage. The other less common contributors to cork taint are not much better having sensory thresholds of around 20 parts per trillion. So how can you tell if a wine is cork tainted?

For particularly badly tainted wines it is relatively easy if you know what to look for. TCA which is implicated in more than 80 per cent of cork tainted wines typically has a *musty, mouldy or wet hessian character*. MIB and geosmin have an *earthy/muddy aroma*, guaiacol is *smoky or medicinal*, and octen-3-ol and octen-3-one smell distinctly of *tinned mushrooms*.

Cork bleaching with hyperchlorite (less frequently used now, peroxide bleaching is now favoured), also provide a ready source of chlorophenols for use by these micro-organisms. TCA can also be formed in packing materials and wooden shipping container floors. It can then pass either through the air or by direct contact to previously unaffected corks. For similar reasons TCA is a major contaminant of many other foods and beverages.

Arguments by even experienced tasters often arise over whether a wine is corked. This is due to a number of reasons. The first is that people vary greatly in their sensitivity to aromas, taints included. A rule of thumb is that for a specific aroma compound, the most perceptive five per cent of the population are about 200 times more sensitive than the bottom five per cent. Therefore when at low levels, you can be sure that not everyone will perceive the taint. Secondly, cork taint manifests itself differently depending on its degree. At low levels, while not being noticed in its own right, the TCA suppresses the wine's aroma and flavour. Under these circumstances, comparison with other bottles is the only way in which the taint can be confidently verified.

The upshot of this is if you think a wine is corked on the first sniff, it probably is. Subsequent sniffing is far less reliable. The question of whether a wine is corked is also complicated by the fact that the same taints can arise not from the cork but from wine storage in TCA-affected oak barrels. Winemakers describe this as musty oak, and typically associate the fault with poorly maintained old oak. However even relatively new barrels can be affected by TCA.

The wine from a single badly contaminated barrel when blended with hundreds of others, will significantly affect the entire blend. Such is the potency of these compounds. So if you open a bottle of corked wine what can you do about it? In short, nothing. Under wine conditions TCA is a very stable compound. After it leaches into the wine shortly after bottling it will remain there outliving the wine itself. No amount of subsequent breathing will clean up the wine.

In practical terms, it is the biggest peril bottled wine buyers face. It strikes sporadically, randomly and often very ferociously. No wine, regardless of its pedigree or price, is immune. What is worse is that it forms in the wine after bottling, and cannot be detected until it is opened. It is the serial killer of wine.

Faced with the rising costs of corked wines more wineries and now more home winemakers are turning to synthetic closures.

Note: An amazing number of people believe that if they see bits of cork in their wine it is corked.