

In Vino Veritas

Special Issue: The Cork Problem

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Resolved: The Mystery of the Cork Taste

It has been found that in more than 95% of the cases, cork taste is not due to the cork but to contamination of the wine by insecticide residues that have been used in the treatment of wood used for construction. How many times have we heard the phrase “Waiter, this wine is corked!” and thrown it out without really knowing who to blame? It is shameful today that the percentage of “corked wine” is growing and becoming unacceptable—a total of 2 to 5%.

An organoleptic defect, cork taste irreparably damages wine from the simplest to the grandest and most well reputed labels. It has haunted winemakers ever since we can remember. No one can pinpoint its origins and everyone blames someone else.

For decades, researchers from many disciplines have tried to capture this elusive phantom in order to resolve the mystery of this bad taste in wine—all for naught until one day...

In our issue of In Vino Veritas, N° 14, April 1994, we published a feature on Pascal Chatonnet, who had teamed up with Ms. Dominique Labadie. Before we reveal the secrets of their discovery, let us present a profile of these two savants of modern enology.

Dominique Labadie, a much decorated and lauded enologist and analyst at the Laboratory of the Study of Aromas at the Institute of Enology at Bordeaux, specializes in studying corks and her expertise has put her in charge of quality control at the Excell Laboratory since Sept. 1, 1992.

Pascal Chatonnet, also a much lauded enologist, created the Excell Laboratory in July 1992, all while preparing his doctoral thesis, maintaining his duties as an expert with the Ministry of Research and Space, and acting as the technical consultant for France and abroad with the Tonnelerie Seguin-Moreau.

The Excell Laboratory works on two levels. The primary thrust of their work concerns that of packaging and regrouping all the analyses and expert evaluations involved with litigations. A second part of their work concerns of all their studies and technical advice put at the disposition of wine producers, growers, merchants, wine-related industries, and especially cork producers.

Corky molds

Sensory analysis gurus have known for a long time that the idea of a cork taste is actually a catch-all phrase for several types of bad flavors. The real cork flavor, that which we can

call “stinking”, is really quite rare and is recognizable by the descriptions of “old barrels”, “moldy wood”, and “dusty cork.” Faced with an inability to furnish plausible explanations for the exact causes of these flavors, artistic terms rather than scientific ones have always been more or less used to mask some of the ignorance surrounding this mystery.

The central idea of the team Chatonnet’s and Labadie’s work was to think that rather than the cork taste coming from the corks themselves, perhaps the problem could come from some contamination in the wine before it was bottled, such as the contamination of the air in the wine’s environment. All that needed to be done was to establish a method whereby the contaminating substances could be caught and detected. Their discovery was monumental: In 95% of the wines tested with the cork flavor defect, it was found that the contamination did not come from the cork. The wine was contaminated from contact with tainted air while it was still stored or ageing in tanks or barrels, before it was bottled. The unpleasant musty and moldy flavors that resulted were attributed to the presence of chloroanisoles, from 2,4,6-trichloroanisole (TCA), 2,3,4,6-tetrachloroanisole (TeCA) and pentachloroanisole (PCA).

TCA was found to have developed microbiologically in cork bark during manufacturing or storage. The other components, (TeCA and PCA) came from the decomposition of corresponding chlorophenols by diverse microorganisms and most notably mold. The chlorophenols were largely used for insecticide treatment for many types of wood materials that were used in the construction and insulation of buildings built for storing bottles. All these chemical elements are found concentrated in relatively important amounts in cellars’ atmospheres and they easily dissolve into the wines either from the wood barrels, while the wine is stored in tanks, or as it is being pumped, thus having contaminated the dry materials utilized in the production of wine (bentonite, diatom, glue...) or for their packaging (corks).

What is the solution?

Therefore it’s the development of mold that occurs in humid environments that transforms these odorless preliminary elements into very smelly moldy flavors. After this discovery, a frenzy followed to rid the wine of these molds—disinfecting cellars and sterilizing corks. These procedures proved to be too utopist and unrealistic. Whoever has seen a cellar up close knows that cork contamination can happen at any moment: such as on the tree itself or during the washing of some equipment with chlorine based products, which will introduce the chemical precursor to TCA—trichlorophenol. In a humid environment, mold will develop and form TCA—a frequent occurrence with cork manufacturers and in storage warehouses.

In fact, contrary to what many may think, the presence of mold in a cellar environment does not automatically imply that the wine risks systematically being contaminated with mold. To understand this, one need only visit the vast majority of natural stone cellars and older production and ageing wine cellars where, today, the existence of large

colonies of microscopic mushrooms and mold do not impede the production of great quality wines.

All cellars contain more or less large amounts of mold, most of which are capable of transforming chlorophenols into chloroanisoles. Therefore, it is easier to avoid having the presence of chlorophenols than to try and eliminate mold from cellars—cellars need to maintain high levels of humidity, which naturally foster the development of mold.

For bottled wines stored in wood, and therefore in direct contact with chlorophenol-treated wood, cork contamination is almost inevitable. However, one shouldn't panic. Only the upper 2/3 portion of the cork can be contaminated. If the bottle is well sealed and the quality of the cork is sound, only the cork will be "corked." Only by drinking the whole bottle will the wine avoid becoming "corked", since the cork—which now has been popped and thus sustains a hole from the corkscrew—will indeed "cork" the remaining wine if it is put back in the bottle.

So what about those corks that have been stored in cellar environments containing chloroanisoles that have consequently tainted the wine? Indeed they are guilty, but not responsible.

Since 1991, chlorophenols have been prohibited as insecticide use for wood, but there are still quite a few in stock to be liquidated. Furthermore, all the wood cases for storage are treated. What can be done? Burn everything? No—we must simply be careful not to create a situation where storage locations for wine and materials co-exist.

Minimum range of cork flavors

The head of the list of bad cork tastes is one caused by polysulphur components—very smelly but fortunately rare. It comes from the cork tree itself, having grown in humid undergrowth. The actual taste of the cork may also be present, but it isn't necessarily unpleasant. Nevertheless, it should be indistinguishable from the wine because the role of a cork is to be odorless. Other rare cork tastes, which have chemical origins, are barely recognizable such as those echoing resin, wood, or dust.

Today's, laboratory research centers around cork problems in general, and in particular dealing with the elimination of cork influences that are caused by trichloroanisol due to tainted stocks of corks. It's somewhat a question of deodorizing, but that's top secret.

Etienne Collin, Enologist