

ask the

AWRI

Wine taints from oak

The AWRI helpdesk has conducted numerous investigations over the past 40 years of taints in wines caused by the use of tainted additives and processing aids. A previous 'Ask the AWRI' column answered some general taint-related questions and outlined a sensory screening method for assessing additives and processing aids for the presence of taints (Holdstock 2017). In this column, AWRI Senior Oenologist, Adrian Coulter, responds to questions about taints originating from oak barrels and other oak products.



What sort of taints can come from oak?

The majority of taints from oak barrels or other oak products are described as either 'plastic-like/antiseptic' or 'musty', 'mouldy' or 'dank'. 'Plastic-like' taints are typically due to one or more chlorophenol compounds, while 'musty' taints are typically due to chloro- and/or bromoanisoles (e.g. TCA, 'cork taint').

When was it found that TCA could taint oak barrels as well as cork?

AWRI researchers published a report during the late 1980s in which the source of TCA in a tainted wine was attributed to the new oak barrel in which the wine had been placed (Amon *et al.* 1987). A winemaker contacted the helpdesk regarding a wine that had developed a musty, mouldy off-flavour during wood maturation. The authors of the report identified 2,4,6-trichloroanisole (TCA), geosmin and 2-methylisoborneol (2MIB) as the major contributors to the taint; however, 2,3,4,6-tetrachloroanisole (TeCA), pentachloroanisole (PCA) and 2,4,6-trichlorophenol (TCP) were also identified. The identity of these compounds was known from related studies of cork taint, which had been conducted at the AWRI since the early 1980s. The authors concluded that the presence of PCA and TeCA at a concentration similar to that of TCA in the tainted wine was consistent with a pathway for the formation of TCA involving microbial methylation and dechlorination of PCP and TeCP. It was suspected that the barrel or the oak wood before barrel manufacture might have been treated with a chlorophenolic wood preservative.

Tainted oak can taint wine, but how does oak become tainted in the first place?

The AWRI's knowledge on chloroanisole and chlorophenol taints in oak barrels stems from both investigations conducted by the helpdesk and AWRI research on cork taint. While the compounds responsible for the taints were identified, often it was only possible to speculate on the source and/or mechanism of formation of the tainting compounds in oak. However, this work highlighted the risk from chlorophenol-containing wood

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preservatives, chemical spillage during transport, aerial contamination from unclean cargo holds and containers, the use of hypochlorite and microbial growth in wood.

What are the best practices to avoid taints when taking receipt of a new inventory of barrels?

If possible, it is advisable for winemakers to be present when shipping containers holding new barrels are first opened, as a musty or plastic-like aroma might be observed if the barrels are tainted. Otherwise, the barrels should be inspected by sniffing the bung hole for the presence of any off-odours. The human nose is an excellent detector of taints and can sometimes be more sensitive than analytical instruments. If taint aromas are detected, then samples of oak shavings should be taken for sensory assessment and/or chemical analysis to confirm and determine the extent of any taint. The oak shavings can be tested using a method similar to that used for testing batches of corks. Samples of oak shavings can be placed in a glass jar which is then filled with a neutral white wine and covered with aluminium foil before securing the lid. The oak shavings are left to soak in the wine for 24 hours, after which time the samples are decanted into clean tasting glasses and assessed by a panel of tasters for the presence of any taint. A 'control' jar containing wine but no shavings should also be prepared for comparison. Note that such testing can be included in a winery's regular quality control regime, such that new consignments of oak are routinely tested for the presence of any taint, whether there is any suspicion of taint or not.

What is the problem with using hypochlorite in the cellar?

Chlorophenol taints have often been traced back to the use of sanitisers containing chlorine in wineries and the contact of those sanitisers with phenol. There can be many sources of phenol in a winery, including some two-part epoxy paints, resinous linings, gaskets, rubber or plastic hoses, plastic fittings and importantly, oak barrels. When sanitisers containing chlorine come in contact with phenol, a reaction between chlorine and phenol can yield monochlorophenols, dichlorophenols and trichlorophenol. Subsequent microbial methylation of the chlorophenols, as might occur if there was mould growth on a hypochlorite-treated barrel, can then generate the corresponding chloroanisole compounds. Winemakers should therefore avoid the use of hypochlorite solutions and should be cautious when using strongly chlorinated water.

For further information on taints in oak, or any other technical winemaking or viticulture question, contact the AWRI helpdesk on helpdesk@awri.com.au or 08 8313 6600.

References

Amon, J.M. Simpson, R.F. Vandepier, J.M. 1987. A taint in wood-matured wine attributable to microbiological contamination of the oak barrel. *Aust. N.Z. Wine Ind. J.* 2(2): 35–37. 