

Geosmin...soiling my wine



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10 November 2017

“Damp soil”, “earthy”, “musty”, “muddy”, “beets” and even “rotton”...Often confused for TCA, **geosmin** is the culprit responsible these types of characters in wine. When comparing TCA and geosmin, it is evident that geosmin has a distinct “**earthy**” or “**wet soil**” character to it, and also contributes a “vegetal” edge.

- Grapes infected with *Botrytis cinerea* together with *Penicillium expansum* show elevated concentrations of geosmin due to the complementary action between the two moulds. Thus, **grey rot on grapes** often deliver geosmin especially when wet conditions during ripening and harvest were prevalent.
- Geosmin and 2-methylisoborneol are primary metabolites of soil bacteria and algae and are responsible for the off-flavours in town **water** supplies/storage (and freshwater fish). **Water contamination** is probably the “easiest” explanation for geosmin presence in wine, especially if the wine did not show geosmin characters during the vinification process. Cleaning tanks and cellar equipment with dirty water can lead to geosmin increases. Pushing contaminated water through pipes can also cause significant increases of geosmin in wine.
- Several moulds isolated from corks are capable of the biosynthesis of geosmin
- Dirty barrels or corks can also be a source of geosmin

Geosmin is relatively **stable during fermentation** and **unstable in an acidic medium**. Therefore, the concentration right after fermentation might be higher compared to the concentration after an aging period. Long-term barrel aging might reduce concentrations significantly, however there are no guarantees and the exact amount of time needed varies from one wine to the next. The **temperature** during this aging period also plays a vital role with higher temperatures accelerating the breakdown. Thermal treatments at 70°C for 24 hours in closed bottles could potentially lead to 80% degradation.



Preventative treatments include harvesting healthy grapes or doing cluster sorting before crushing. Avoiding contaminated water (or just knowing if your water is contaminated!) could prevent the wine becoming tainted and save you the effort and money needed for the removal thereof. **Remedial** treatments are not ideal, but might be necessary even when great attention is paid during ripening and winemaking. Unfortunately, treatments that showed an efficacy in decreasing geosmin concentration **also decreased desirable aroma** compounds. Other than that, the reduction of other aroma compounds might lift the masking effect on geosmin and worsen the aroma intensity thereof. The most efficient fining agents includes

- Potassium caseinate
- Activated carbon
- Grape seed oil (very effective, however, as of today, they are not allowed in oenology)

Samples are seldomly brought in to Vinlab for geosmin analysis, however, a few samples with very high concentrations has come through these doors (perception threshold 25 ng/L), often with the producer not knowing the source of the problem and subsequently not knowing what tests to request. By producing this article, we hope to broaden the understanding of this wine taint, its prevention and treatment.



References

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