

The effect of cork on the evolution of bottled wines



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▪ BACKGROUND:

Cork stoppers represent a traditional part of wine packaging, have positive ecological and sustainable features, and actively participate in the post-bottling evolution of wine.



High-level quality control in the cork manufacturing industry concerning oxygen permeability and the presence of "cork-taint" compounds, like 2,4,6-trichloroanisole (TCA).

HOWEVER

Some wine bottles still affected by premature and random oxidations or unexpected evolutions, in spite of using standard-quality cork stoppers.

Well-known role of cork stoppers in preserving the quality and shelf-life of sparkling wines both in terms of effervescence and aroma.

HOWEVER

Little investigation of the "aroma scalping effect" of different cork closures for sparkling wines during aging-in-bottle.

▪ PhD AIMS:

Investigate and identify the characteristics of cork that influence the evolution of bottled wines, both positively and negatively, and understand the underlying mechanisms.

RESEARCH TOPICS

EXPERIMENTAL APPROACH

a. Investigation of random wine oxidation phenomena

- Comparative assessment of sensory and analytical profiles of oxidized and non-oxidized wines by usual wine quality evaluation techniques and novel approaches;
- Physico-mechanical characterization and assessment of the oxygen transmission rate (OTR) of cork stoppers;
- Rheological characterization, evaluation of oxygen permeability properties and coating homogeneity of cork surface treatment products.

b. Investigation of TCA partitioning between cork and wine

- Comparison of different TCA extraction methods;
- Assessment of the kinetics of TCA release/absorption by cork and TCA migration within the cork matrix.

c. Investigation of the aroma scalping effect of cork in sparkling wines

- Comparison of different types of sparkling wine cork stoppers considering the analytical and sensory profile of both wine-like solution and real wine;
- Comparison of different types of binding agents and coating products in relation to their aroma scalping ability.

▪ EXPECTED ACTIVITIES:

Activity	Year Trimester	1				2				3			
		1	2	3	4	5	6	7	8	9	10	11	12
1. Training & Education													
2. Random Wine Oxidation *													
3. TCA Partitioning between Cork-Wine *													
4. Aroma Scalping in Sparkling Wines **													
5. Thesis and Paper Preparation													

* To be carried out both at UniUD laboratories and at Amorim Cork Italia
** To be carried out during the research period abroad

▪ EXPECTED OUTCOMES:



- Improved knowledge on the understanding of the interaction mechanisms between cork and wine, and on the identification of criticalities in the cork manufacturing industry that might affect cork quality and performance;
- Valuable results from both a scientific and a practical point of view to the cork industry practitioners as well as winemakers, to predict and prevent unfavorable wine evolutions;
- Potential basis for further research.

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