



Thesis title: The Evolution of Wine after Packaging with an Emphasis on the Level of Oxygen Exposure

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Abstract (max 300 words)

Throughout aging, the level of oxygen (O₂) exposure is a critical factor for wine evolution, particularly in terms of its influence on color and aroma. This review will examine oxidative processes in wine, as well as the factors affecting wine oxidation and its importance for sensory properties. Additionally, there will be a focus on the role of packaging for determining the intensity of wine oxidation. The bottle closures of natural corks, technical corks, synthetic corks, and screw caps allow varying levels of O₂ ingress and are thereby associated with different effects on wine evolution. Research evaluating the barrier properties of these closures, as well as studies comparing their O₂ permeabilities and impact on wine oxidation, will be examined by this review. General trends observed for these closures include: low O₂ permeabilities for screw caps and technical corks, high O₂ permeabilities for synthetic corks, and intermediate O₂ permeabilities for natural corks compared to these closures. The possible reasons for the permeability characteristics of the closures will be discussed in detail. A growing area of interest in the wine industry is the

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development of alternative packages and closures, which also influence the oxidative evolution of wine. For certain packages, such as bag-in-box (BIB) containers, tetra brick cartons, and polyethylene terephthalate (PET) bottles, there is a considerable amount of scientific literature available, which will be examined in this review. Less research has been conducted for glass stoppers and Zork bottle closures, along with aluminum cans and stainless steel kegs, but available information regarding these package alternatives will also be discussed. In the field of wine packaging, there are on-going advancements related to both well-established bottle closures and alternative packages, making it important to understand the effects of a specific closure or package type on wine evolution.

Keywords (5): wine, packaging, oxygen, corks, screw caps