

# Influence of pH value, phenolic profile and maceration time on the physical and chemical deterioration of tropical red wines

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**Abstract:** Wine deterioration may occur due to many factors, including grape quality in the harvest or techniques applied to vinification, such as grape pH value, related to color stability, and maceration length, responsible for phenolic compounds extraction to the wine. Varietals Petit Verdot, Merlot, Malbec, and Tempranillo tropical wines were elaborated with natural grape pH (without any interference) and short maceration time (96 hours), in order to explain how these factors may influence in the physical and chemical deterioration. Approaches such as classical physicochemical analyses, quantification of acetaldehyde, higher alcohols, individual phenolic compounds, and antioxidant activity were used to explain this influence. Color ( $L$ ,  $a^*$ , and  $b^*$ ), free  $SO_2$ , and acetaldehyde highlighted Tempranillo wine as the sample with the highest deterioration rate. This wine also had the lowest color intensity, monomeric anthocyanins, and (+)-catechin contents. Petit Verdot wine was the least deteriorated sample, also having the highest total phenolic compounds, color intensity, anthocyanins, (+)-catechin, and antioxidant activity. The pH wine value had a strong positive correlation with the percentage of polymerized anthocyanins and acetaldehyde content. The (+)-catechin, procyanidins, and monomeric anthocyanins were related to higher antioxidant activity and resistance to oxidation of the red wine. Grapes with major phenolic potential may produce wines more stable in regions of adverse conditions of temperature, independently of the maceration time applied during the winemaking.

**Keywords:** spoilage indicators, climate changes, anthocyanins, acetaldehyde, GC-BID

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