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Macromolecular diversity of Italian red wines

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Proteins and polysaccharides play a key role in red wine quality. Proteins interact with tannins to form insoluble complexes; this is exploited in fining treatments to remove excessive tannins. Conversely to a common belief, several studies have shown that red wines contain significant amounts of soluble proteins [1, 2], but their role on wine quality is not clear. Polysaccharides can modulate astringency [3], but no specific data on Italian varieties are available.

The Diversity of Italian Wines (D-Wines) project aims to collect and analyze a large composition dataset of Italian wines, including data on their macromolecular composition, with the final aim to disclose its complex relationship with perceived astringency. The macromolecular fraction (proteins and polysaccharides) of 143 red wines from 11 varieties was measured [2, 4], and characterized by SDS-PAGE and HPLC. Tannin reactivity to a standard protein (BSA) was assessed by turbidimetry.

Results showed a great diversity: the protein content ranged between 0 and 150 mg/L, while the polysaccharides content ranged between 300 and 1000 mg/L. This latter correlated well with the turbidity formed upon BSA addition, confirming the role of these macromolecules in modulating astringency.

The information collected by the D-Wines consortium will help elucidating the mechanism at the basis of astringency of important varieties, thus providing valuable information to winemakers for the improvement of mouth-feel properties of red wines.

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