

From grapevine to the glass: a metabolomics tale

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“The whole universe is in a glass of wine” [1]. This universe is the result of different biochemical processes that involve several players: the carefully selected grape varieties, the bacteria and yeasts present during fermentation, and the effects of terroir and geographical origin. The characterization of the chemical fingerprint of wine remains one of the greatest challenges of analytical chemistry, defying all conventional approaches. Offering the highest resolution and mass accuracy possible and allowing the detection and identification of thousands of compounds in a single analysis, Fourier transform ion cyclotron resonance mass spectrometry (FT-ICR-MS) is ideal for metabolomics studies of complex samples such as wine.

We have been using FT-ICR-MS to unfold the metabolomics wine tale, from the metabolic composition of grapevines [2,3], to the metabolic contribution from yeasts (both conventional and non-conventional), that goes beyond the fermentation process itself, and finally to the unique chemical signature of wine. This whole set of small molecules that contribute to the wine's physical, aromatic and organoleptic properties, as a signature of its origin and authenticity, can be unraveled by FT-ICR-MS, thus telling the wine tale, from the grapevine to the glass.

References

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