
NMR metabolomics at the service of wine authenticity and quality

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Résumé

qNMR metabolomics has proven to be a powerful tool for discriminating wines according to environmental factors such as provenance, grape variety and vintage (Gougeon *et al.*, 2019a). NMR allows the study of several chemical families from a small volume of wine in a single analysis. The spectra obtained by NMR can be considered as identity cards for wines since the metabolome is directly impacted by many factors.

On this observation, two applications have been developed. The first concerns the use of NMR metabolomics for the authenticity of wines with the creation of a database. The second consists in studying the impact of viticultural or oenological processes on the wine metabolome to better understand the interactions between oenological processes and wine quality.

To do this, non-targeted and targeted approaches with the identification of about fifty molecules were carried out on wine samples. NMR analysis results were statistically processed through principal component analysis (PCA), partial least squares discriminant analysis (PLS-DA) and s-scores (Gougeon *et al.*, 2019b).

The results obtained prove that NMR analyses combined with chemometrics show the significant impact of the terroir and winemaking practices on the wine metabolome. Moreover, the targeted approach allows highlighting the impacted metabolites. ¹H NMR metabolomics is a rapid technique that guarantees the authenticity of wines and could also be used as a decision support tool for professionals in the choice of technical itineraries.

Gougeon, L., da Costa, G., Richard, T., & Guyon, F. (2019a). Wine authenticity by quantitative ¹H NMR versus multitechnique analysis: a case study. *Food Analytical Methods*, 12 (4), 956–965.

Gougeon, L., da Costa, G., Guyon, F., & Richard, T. (2019b). ¹H NMR metabolomics applied to Bordeaux red wines. *Food Chemistry*, 301.

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