

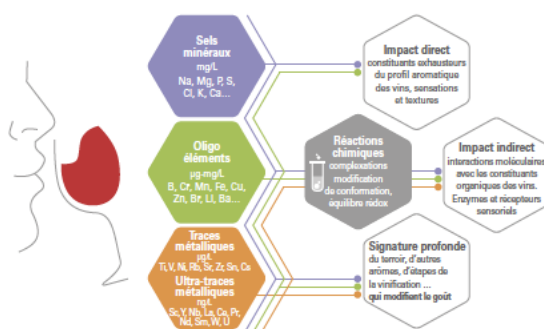
**« How are minerals and metals impacting Wine? »**  
**« Origines et interactions physico-chimiques des ions minéraux au sein des vins ? »**

Presence of metals in wine can have different sources both natural and anthropogenic (B. Thariba *et al.*, *Biol. Trace Elem. Res.*, **2011**). Contrary to organic molecules, mineral wine profile is a *fingerprint of the wine* that do not evolve but can have an impact on the organoleptic and nutritional points of view (M. Gajek *et al.*, *Molecules*, **2021**). This *fingerprint*, composed of more than 40 elements, can be used to follow the wine and to avoid counterfeiting as proposed by the start-up M&Wine, a spin-off of Institut des Sciences Analytiques (ISA – UMR 5280) and Institut Lumière Matière (ILM – UMR 5306) but also to try to improve the understanding of different processes that take place during winemaking. The alchemy of winemaking must now be based on advanced analysis of the constituents of the wine.

The PhD will focus on the determination of the Mineral Wine Profile (MWP) by ICP/MS on a large batch of wines issued from different regions and grape varieties in order to correlate the MWP with origins and quality. The taste of a wine is associated with a large number of organic molecules that are volatile and subject to evolution during the aging of the wine, notably due to oxidation catalyzed by metals or by precipitation that can be induced by these same metals or others. One of the objectives of the PhD will be to determine the influence of the Mineral Wine Profile on the nature and quantities of organic molecules responsible for the organoleptic profile of the wine. To do this, the PhD student chosen for the project will have access to the different characterization technics present in ISA and ILM including but not limited to ICP-MS, HPLC, NMR, IR, GC-MS... The research on physico-chemical and also bio-chemical interactions will focus on the two main categories' of elements in wine: Key Mineral (Na, Mg, Si, P, S, Cl, K, Ca) and Oligo-elements (B, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, I)

Also, the candidate will work in collaboration with an AI engineer to advance their research together on the MWP theme. In fact, knowledge in data analysis and statistical studies are recommended.

On this brand new project based on a paradigm change about the origins and roles of mineral in wines, the requirements for this PhD are of course motivation, curiosity, autonomy, but also basic knowledge of inorganic and organic and analytical chemistry.



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