NMR IN WINE ANALYSIS: PAST, PRESENT AND FUTURE

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Wine falsification has a time span as long, as probably the history of winemaking itself. However, the laws controlling wine quality, safety and especially genuineness are recently new in historical perspective, appearing only in the Industrial age.[1] With the development of analytical instrumentation such as chromatography and mass spectrometry (MS), later isotope ratio mass spectrometry (IRMS) in the second half the 20th and 21st centuries those began to be used [2]. Nuclear magnetic resonance (NMR), however, seemed to lag behind, mostly because of its lower sensitivity compared to MS, approximately 10 orders of magnitude. NMR's advent in wine analysis started in the late 1970 s first with ethanol measurement and later site-specific natural isotopic fractionation (SNIF) for geographical determination. In this century, with significant progress in computation power, metabolomics came to stage, both targeted and untargeted. [3].
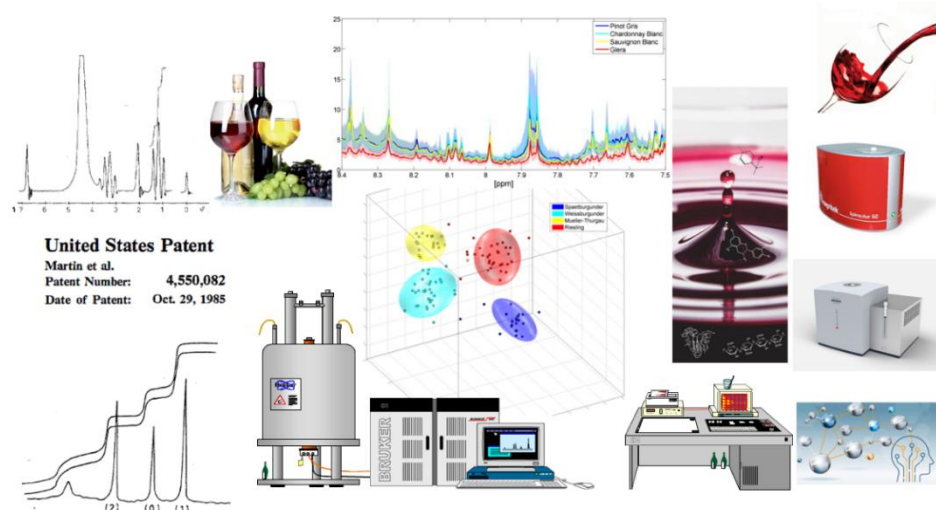

Figure 1. A collage depicting NMR use for wine analysis in the past present and possible future.

The latest steps in evolution of this method for wine analysis show a comeback of low-field or so-called benchtop NMR devices. In the future, artificial intelligence (AI) models will most probably enter the stage of this technology (see Figure 1). This lecture will cover all this in detail.

REFERENCES

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