

An investigation into the practical aspects of the quantitative analysis of solid-liquid systems using low-field NMR

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Low Field Nuclear Magnetic Resonance (LF-NMR) has established itself in many food applications as a technique that combines providing a wealth of information with speed of analysis and minimal perturbation to the sample.

This poster focuses on practical aspects that can have a significant impact in quantitative analysis of solid-liquid systems using LF-NMR. The aspects investigated in this study were:

Instrument characteristics:

- Magnetic field homogeneity (and sampling space with maximal homogeneity)
- Coil length

Practice aspects:

- Sample volume and tube filling height
- Signal-to-noise ratio (S/N)

Of particular interest in this study were:

- The lack of portability of protocols across equipments (due to the reasons above). This is a major limitation facing the implementation of analytical methods. The fact that the results vary according to the spectrometer in which the experiments are performed is mainly due to the magnet characteristics. This poster presents the influence of different magnets on NMR measurements.
- The influence of Signal-to-noise ratio (S/N) was studied by applying Partial Least Squares Regression (PLSR) to NMR data of samples with different liquid/solid ratios. The improvement of S/N by increasing the number of scans (NS) and the receiver gain (RG) on the performance of the quantitative analysis was characterised.

Most of the content of the poster is "common sense" for any NMR specialist but often not to many NMR users who are the intended audience of this poster.