

Title:**Applications of Field Cycling Relaxometry to Food Characterization****Authors & affiliations:**

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The last decades have witnessed a growing interest in the search of new tools for food characterization. Any progress in analytical instrumentation is exploited to obtain more advanced description of foodstuff. Often the diffusion of a new methodology is hampered only by the complex sample preparation and the associated costs. Therefore methods that do not require any (or minimal) sample treatment are highly desired.

Along the years, High Resolution NMR spectroscopy has gained an important position among the spectroscopic methods for food characterization thanks to its unique ability to identify (and quantify) all the major low-medium molecular weight components by a single spectrum acquisition without the need for any separative procedure. Besides the High Resolution approach, NMR has provided important contributions to the field by the use of its Low Resolution (or Wide Line) version. Low resolution methods lack of the chemical shift information and the acquired ¹H signal consists of a single absorption containing the information arising from all protons present in the specimen. This approach has been shown to be particularly useful to assess the occurrence of different phases (solid/liquid, water/fat, etc.). However the relaxation characteristics of the single absorption bring about a number of information on the solute molecules that are highly relevant in the characterization of a given (liquid) specimen. Moreover the possibility of recording the proton relaxation rate over an extended range of magnetic fields further improves the potential of this approach as it allows identifying the occurrence of different contributions assignable to various components of the foodstuff.

The herein presented results aim at showing the potential of the Field Cycling Relaxation approach in the food analysis. In particular, the methodology has been applied to the characterization of vinegar and hazelnut specimens, but it can be early extended to a number of other foodstuff.