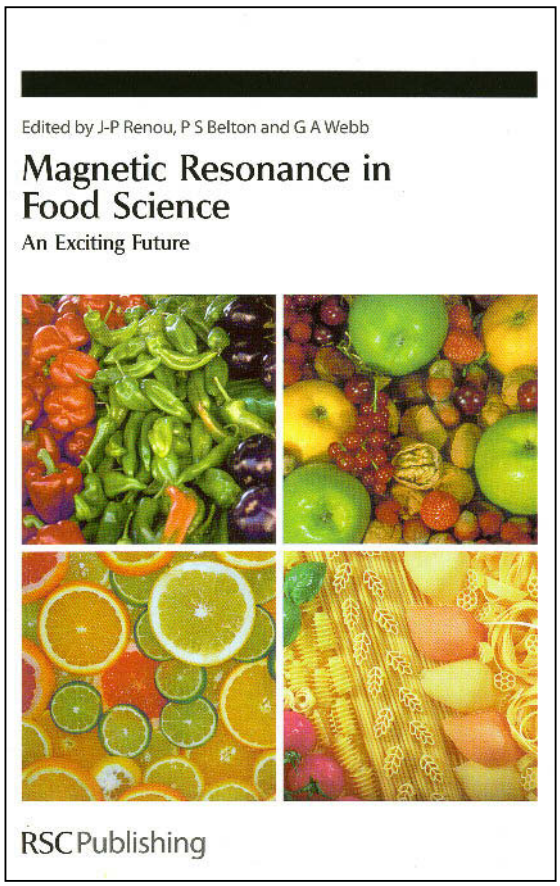
Magnetic Resonance in Food Science: An Exciting Future

Edited by J.-P. Renou, P.S. Belton, and G.A. Webb



"Magnetic Resonance in Food Science: An Exciting Future" is the collection of proceedings from the 10th International Conference on the Application of Magnetic Resonance in Food Science, organized by The Clermont-Ferrand-Theix Institute National de la Recherche Agronomique in France in September 2010. The book includes twenty three papers presenting the Nuclear Magnetic Resonance (NMR) as a powerful technique for the understanding of several different food systems: staring with the analysis of their components all the way to their structural determination.

NMR is a physical phenomenon where a specific nucleus placed under a magnetic field absorbs an electromagnetic radiation of precise frequency and emits the energy back at this exact and characteristic resonance frequency. NMR is a non invasive and non destructive technique, requires low quantities of material and is relatively fast in terms of sample preparation and acquisition time. It allows the chemist to determine the chemical structure of any chemical, and through some special experiments based on NMR other parameters like diffusion of molecules, dynamics of polymers and structural morphologies can also be determined.

The book includes a brief introduction to the basics of the NMR, and is divided in six chapters, which collect articles concerning data processing, new developments in food systems and in NMR, nutrition, metabolomics, and imaging. Special attention has been given to the analysis of food products (e.g. wine, cheese, grains, vegetables, fruits, oils, emulsions, and other food systems) and the identification of their composition, structural features, physical properties and qualities. Certain metabolic, degradation and radical formation processes are also presented in the book, showing that NMR makes the understanding of the chemical pathways and mechanisms involved during these reactions possible. Different experiments are shown, designed to determine and understand the role of food molecules – fats, amino acids, sugars, metabolites and other nutrients found in natural products –, as well as biopolymers, which all make the book a very helpful guide for researchers and students in the field of Food Science. From the nowadays already conventional liquid NMR, to two-dimensional analysis, relaxometry, double-quantum, electro spin resonance and imaging experiments, specific physical and chemical properties of any kind of food molecules can be studied.

Finally, this book is a perfect collection for the people who want to get a flavor of what NMR can do in Food Science. The articles are opening the door to exploration of the immense possibilities offered by the NMR not only to chemists and physicists, but also to life scientists, who might discover a valuable technique to be added to others, used more conventionally in their labs.

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Magnetic Resonance in Food Science:
An Exciting Future
Edited by J.-P. Renou, P.S. Belton, and G.A. Webb
RCS Publishing, Cambridge/UK (2011)
ISBN: 978-1-84973-233-8
125 Euro