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Editorial

Nuclear Magnetic Resonance (NMR) Spectroscopy and Magnetic Resonance Imaging (MRI) are techniques of increasing interest for researchers in different fields of biological sciences. Thus, also in the field of environmental sciences there is a wide potential for NMR applications. This special issue of Biodegradation is directed at presenting examples of applications of NMR to research in environmental sciences, illustrating miscellaneous possibilities as well as the main limitations of the technique. The various contributions were initially presented on the symposium 'NMR in Environmental Sciences', organised by the Wageningen NMR Centre and the Research School for Environmental Chemistry and Toxicology, held on October 24th 1997 in Ede, The Netherlands.

The issue starts with an introductionary paper about NMR and MRI in environmental science and engineering by Lens and Hemminga. With regard to NMR spectroscopy applied to transformations and biodegradation, Ratcliffe and Roscher present a review about the application of non-invasive NMR in xenobiotic research in plants and plant materials. Hopkins et al. illustrate the application of ^{13}C NMR in the characterisation of the pathways of carbon in wood-feeding organisms. The degradative pathways of morpholine, a waste product from the chemical industry, was examined by Combourieu et al. using ^{1}H NMR.

By using magnetic field gradients, ^{1}H NMR can provide images of the distribution of protons in an object. This provides also information about transport of materials through porous media. Chudek and Reeves have used this methodology to study the movement of oil in sediments.

For the study of metabolic processes, NMR turns out to be an important tool as well. Matheron et al. and Stams et al. employ ^{13}C NMR to unravel pathways and metabolite production. In relation to fluorine-containing xenobiotics, ^{19}F NMR is very useful as is demonstrated by Bondar et al. and Reinscheid et al. Finally two contributions are presented by Vašák and Lommen et al. about environmental effects of heavy metals and the use of NMR in analytical fingerprinting.

This special issue demonstrates the large range of applications of NMR and MRI in environmental research. We wish to thank the authors for contributing to this special issue, and hope its contents will inspire others, thereby stimulating new applications of NMR in the field of environmental sciences. Clearly, the non-invasive and highly selective character of the technique makes it an invaluable tool in studies of living systems and in biological applications. For the next years, we expect a continuous growth in environmental applications in which NMR techniques will play a significant and exciting role.

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