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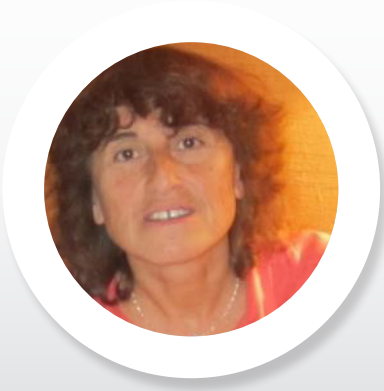
Rapid characterization of cocaine in illicit drug samples by 1D and 2D NMR spectroscopy



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The most commonly used techniques for the identification of forensic drug samples are HPLC and GC/MS because they can provide specific spectral data on individual compounds in a complex mixture without prior isolation. Recently, Diffusion Ordered SpectroscopY (DOSY) has been increasingly applied to the analysis of mixtures of small organic molecules. The usefulness of DOSY NMR has been demonstrated in the analysis of heroin in solution. In parallel, alternative NMR approaches suited for mixture analysis have been sought and developed. Among those, ^{1}H Maximum-Quantum NMR has provided the highest resolution, up to tens of molecules in favourable cases. We here report a simple and fast method to detect the presence of cocaine in illicit drug samples by nuclear magnetic resonance (NMR) spectroscopy. This is achieved by combining the commonly used 1D spectra and diffusion-ordered spectroscopy and introducing the 2D maximum-quantum NMR approach to forensic analysis. By relying on non-uniform sampling acceleration of 2D spectroscopy, the identification can be obtained in less than 3 min for 10 mg of product. Moreover, we will show that the intermolecular interactions of the sample constituents, while affecting the analysis result, do not interfere with the quality of the detection of the proposed protocol.

Biography

Mylène Campredon has completed her PhD in Chemistry from the University of Provence (1986), Marseille France. She has spent two years as a Post-doctoral Research Associate in Ottawa, Canada (1987-1988) working at the National Research Council. She is Professor in Chemistry at Aix-Marseille University and is actively involved in academic, departmental, university and research activities. She has published more than 35 papers in international journals and has been serving as a Referee Member for C. R. Chim., Dyes and Pigments, and Flavor and fragrance Journal. Her current research interest includes the development and application of novel methods in liquids NMR spectroscopy.

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