OMICS Group Conferences
Accelerating Scientific Discovery

International Expo and Conference on
Analytrix & HPLC

October 22-24, 2012 DoubleTree by Hilton Chicago-North Shore, USA

Experimental advances in comprehensive online multidimensional fast fourier transform separations applied to natural product analysis

Mark J.E. Trudgett
University of Western Sydney, Australia

The authors have previously described the theoretical basis of a new separations method that provided for the possibility of very high peak production chromatography in multidimensional systems whilst simultaneously affording comprehensive separations with greatly reduced analysis times. This method was called Comprehensive Multidimensional Fast Fourier Transform Separations (COMForTS). By applying time-dependent frequency-domain signals processing, the location of different analyte velocities is reported as a function of time, resulting in a comprehensive separation of all analyte signals providing only that no two analytes have the same retention time in all separation dimensions.

Significant advances have been made in COMForTS methodology that relax previously reported constraints and the method is now capable of producing very high peak capacities as well as extraordinarily high peak capacities per unit of analysis time. This paper presents an extended experimental proof of these concepts by utilizing a prototypical instrument consisting of an analytical HPLC column as the first dimension and an online open-tubular liquid capillary column as the second dimension for the analysis of brewed coffees with ultra-violet absorbance detection. Time dependent frequency spectra of separated analytes were calculated and the resulting separations compared to previously reported results produced by comprehensive offline (heart-cut) separations. The present results are discussed with respect to the theoretical basis and practicality of the COMForTS method in resolving wrap-around effects in multidimensional separations. Also discussed are the implications of these results for high-speed qualitative analysis and fingerprinting of complex samples of natural origin.

Biography

Mark Trudgett completed his M.Sc.(Hons) in 2005 at The University of Western Sydney, Australia. With extensive experience in consulting and pharmaceutical analytical chemistry and a master's degree in science management, he is currently a doctoral candidate at UWS under the supervision of Andrew Shalliker.

mark@trudgett.com