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Solid phase analytical derivatization: An enabling technology for automation of Ultra-High Sensitivity HPLC and Mass Spectrometric methods

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Analytical derivatizations (AD) can substantially enhance sensitivity of analysis by as much as three orders of magnitude. As a functional group analysis, AD also enhances specificity of detection. Such increases in sensitivity and specificity can open up new directions in automated analysis by substantially reducing sample size possibly leading to point of care analysis. However, the extra steps required in AD can discourage developments using this approach. Simultaneous extraction and derivatization attainable through solid phase analytical derivatizations (SPAD) can overcome such complicating problems in sample preparations that involve derivatization. We investigated SPAD for the analysis of carboxylic acids, phenols and carbonyls for analysis by HPLC or GC with a variety of detectors including mass spectrometry. In our latest work, such extraction/derivatization of the organic acid fractions in water provided a one-pot sample preparation technique for isolation of acid, base and neutral fractions from aqueous samples to allow profiling of drugs, biotransformation products, or environmental contaminants products in a single run. By controlling reaction conditions, selective reaction inhibitors and/or selective reagents, SPAD exhibits interesting and useful selectivity of reaction that can enhance the specificity of analysis. The technique has a wide scope of application to numerous compounds and matrices.

Biography

Jack Rosenfeld is a Professor Emeritus from the Department of Pathology and Molecular Medicine at McMaster University. His work focuses on solid phase analytical derivatizations (SPAD) and he has published numerous articles on the topic. He was a guest editor for a special issue on Environmental Analysis in Journal of Chromatographic Science and is currently a guest editor for a special issue in Journal of Chromatography on Analytical Derivatizations. At present holds a grant from the Best-in-Science Program in the Ministry of the Environment of Ontario and applying SPAD to environmental analysis.