

---

## RECENT DEVELOPMENTS FOR IN VIVO SPME

Heather L. Lord, Shine Zhang, Simon N. Zhou, Dajana Vuckovic, Ehsanul Hoque, Erasmus Cudjoe and Janusz Pawliszyn

University of Waterloo, Department of Chemistry, 200 University Ave. West., Waterloo, ON, N2L 3G1, Canada, hlord@uwaterloo.ca

In vivo SPME provides an interesting new complement to the range of technologies currently being employed for in vivo analysis of living systems. Microdialysis has long provided optimal selectivity while biosensors have had the advantage in fast response time. SPME can match the selectivity and sensitivity of microdialysis analysis with the potential for improved time resolution of sampling.

To date in vivo SPME has been applied for intravenous analysis of drugs for pharmacokinetic studies, as well as direct sampling of drugs and neurotransmitters from brain, aquatic pollutants from fish muscle in living fish, contaminants in food products, and a variety of metabolites for metabolomic studies. The need for better temporal and spatial resolution and extraction efficiencies have spurred research in kinetic calibration strategies, as well as the development of smaller devices, segmented sorbent strategies and improved sorbents for biological sample analysis.

Three important kinetic calibration strategies have recently been developed to allow shorter extraction times and improved temporal resolution. We have compared the precision, accuracy, and ease of experimental of these in relation to equilibrium-based calibration in a model system for intravenous drug analysis experiments. Optimized sorbent strategies employing biocompatible C18 and mixed mode sorbents have been developed for biological sample analysis, and more polar analytes. Miniaturized and segmented sorbent devices are under development for improving spatial resolution. Finally, data from in vivo SPME sampling have been shown to compare favourably with sampling by microdialysis.