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# MICROFLUIDIC DEVICES: ELECTROMEMBRANE EXTRACTION OR LIQUID PHASE MICROEXTRACTION

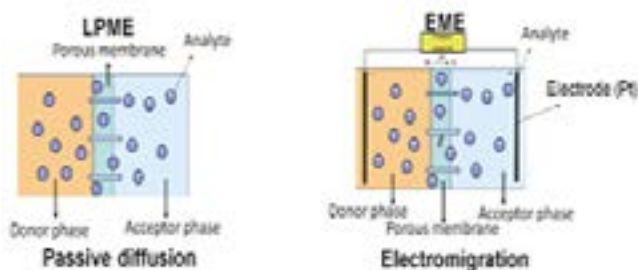
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Sample treatment is the most important step previous real sample analysis. This procedure has been developed in order to improve the existing methodologies and offer new advantages. A step forward in this topic has been achieved with the miniaturized LE as Liquid phase microextraction (LPME), where the extraction of the analytes is controlled by passive diffusion and as Electromembrane Extraction (EME) where the extraction procedure is controlled by an electrical field force. Both techniques have been optimized in microfluidic systems, however, compared to traditional LPME and EME, there are other parameters to take into account when miniaturized systems are used. Based on the literature, traditional EME seemed to offer higher extractions efficiencies than traditional LPME when both were carried out using the same set-up. When LPME and EME are miniaturized into microfluidic systems, the geometry and the depth of the channels are critical for the performance. Since any of those techniques use agitation during extraction, the depth of the channel must be carefully optimized in order to get better extraction efficiencies. EME procedures require the use of a platinum electrode in each channel so, consequently, the depth of the channel must be a bit deeper than the i.d of the electrode. However, LPME channels can be much less deeper since it works under passive diffusion and the distance between the analyte of interest and the SLM decrease. For this reason, in miniaturized systems, an exhaustive study of the channel size must be carried out since the extraction efficiencies are not always higher using EME than LPME, although the first one use an electrical field to accelerate the electromigration.

## Recent Publications

1. María Ramos Payan, Santiago Maspoch and Andreu Llobera. An effective microfluidic based liquid-phase microextraction device ( $\mu$ LPME) for extraction of non-steroidal anti-inflammatory drugs from biological and environmental samples. *Talanta* 165, 496 - 501.
2. María Ramos Payan, Santiago Maspoch and Andreu Llobera. A simple and fast Double-Flow microfluidic device based liquid-phase microextraction (DF- $\mu$ LPME) for the determination of parabens in water samples. *Talanta* 165, 496-501.
3. María Ramos Payán, Henrik Jensen, Nicolaj Petersen, Steen Honorée and Sig Pedersen Bjeergard. Liquid-phase Microextraction in a microfluidic-chip – high enrichment and sample clean-up from small volumes of biological fluids. *Analytica Chimica Acta* 735, 46
4. Bin Li, Nicolaj Petersen, María Ramos Payán, Steen Honorée and Stig Pedersen Bjerggaard. Automated on-line clean-up and enrichment of opium alkaloids using a liquid-phase microextraction-chip directly coupled to high-performance liquid chromatography. *Talanta* 120, 224 - 229.
5. María Ramos Payán, Bin Li, Henrik Jensen, Nicolaj Petersen, Steen Honorée and Stig Pedersen Bjerggaard. Nano-Electromembrane Extraction. *Analytica Chimica Acta* 785, 60 - 66.



## Biography

María Ramos Payán has completed her PhD at University of Seville, Spain and Postdoctoral studies at University of Copenhagen, Denmark; University of North Carolina, USA and; Microelectronic National Center of Barcelona, Spain. She is the leader of the microfluidic research line. She has published more than 30 papers in reputed journals and has been serving as an Editorial Board Member of reputed journals. Her research interests include analytical chemistry, chromatography, high-performance liquid chromatography, sample preparation, analytical chemistry instrumentation, extraction and spectrometry.

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