Short Communication Journal of Clinical & Experimental Pharmacology 2020
Vol.10 No.8

The determination of metoclopramide and ondansetron in urine samples by Using Electro membrane extraction combined with capillary electrophoresis - Ehsan Sadeghi- Shahid Beheshti University

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Electro membrane extraction (EME) was inspired by solid phase microextraction and developed from hollow fiber liquid phase microextraction in 2006 by applying an electrical field over the supported liquid membrane (SLM). EME provides rapid extraction, efficient sample clean-up and selectivity supported the character of the SLM and therefore the electrical field. EME has been applied for the separation of ionizable compounds from complex samples, and EME is currently considered as a lively research topic within the area of sample preparation and analytical chemistry. We expect that EME will play important roles in future analytical laboratories. This review summarizes and highlights the advancements in EME from 2006 to 2016 with focuses on 1) fundamental aspects, 2) device and operation modes, 3) performance, and 4) hyphenation to other analytical sample preparation techniques. Meanwhile, this review indicates that the most objectives for future EME are to determine EME as tool for routine applications, and to stimulate for further research on sophisticated systems based on the EME principle. The scientific interest for EME is said to many unique conceptual properties. First, extraction selectivity are often manipulated by the direction and magnitude of the electrical field . The direction of the electrical field is controlled by the external power supply, and is employed to tune the extraction system for either cationic or anionic analytes. The magnitude of the electrical field is additionally controlled by the external power supply, and research has demonstrated that extraction selectivity depends on the magnitude of the electrical field [10]. Second, extraction selectivity is controlled by the chemical composition of the SLM. The SLM are often tuned for non-polar analytes , polar analytes , or for highly selective extraction of certain analytes supported molecular recognition and complexation . Third, extraction selectivity is controlled by the pH conditions within the sample and acceptor solution. Additional advantages of EME include efficient sample cleanup, Due to the non-polar nature of the SLM, many matrix components present in aqueous samples such as biological fluids are unable to pass the SLM, and that they remain within the sample. In addition, anionic species will remain within the sample during extraction of cationic analytes, and the other way around, thanks to the direction of the electrical filed. Acceptor solutions in EME are (in most cases) aqueous; therefore, they can be injected directly into liquid chromatography (HPLC), liquid chromatography–mass spectrometry (LC–MS), and capillary electrophoresis (CE). Thus, there is no need for evaporation of extracts and reconstitution, as is often the case with traditional sample preparation methods. Normally, the volume of sample in EME exceeds the volume of acceptor solution; there fore analytes can be pre-concentrated during the process. In one example, EME from 3.5 mL samples and into 20 μL acceptor solution resulted in 74 times the target analyte pre-concentration. Finally, the volume of organic solvent used for the SLM is in the range of 3–15 μL, and this represents the total volume of organic solvent required per sample. Thus, EME represents a green chemistry approach to analytical sample preparation. Capillary electrophoresis (CE) may be a separation technique that separates molecules in an electrical field consistent with size and charge. CE is performed during a small glass tube called a capillary that's crammed with an electrolyte solution. Analytes are separated due to differences in electrophoretic mobility, which varies with charge, solvent viscosity, and size. Traditional electrophoresis in gels is restricted within the amount of voltage which will be applied because Joule heating effects will ruin the gel and therefore the separation.

This work is partly presented at 10th World Congress on Pharmacology scheduled during August 02-03, 2018 at Barcelona, Spain