

XV Reunión Científica de la SECyTA y VII Reunión Nacional de la SEEM

Ambient Ionization with Plasmas and Charged Droplets.

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The ambient ionization is a form of ionization that is performed at atmospheric pressure with no or minimal effort for sample preparation that allows a direct analysis. Desorption electrospray ionization (DESI) and direct analysis in real time (DART) are different examples of ambient ionization techniques.

Three different studies were performed. The first one is the fast detection of fake drugs. A clear example is what happened in Angola on July 2012, where 33,2 millions of unit for the antimalarial treatment were fake. They had similar color but different components. For the antimalarial treatment, the tablets should contain artemether and lumefantrine in the correct proportions. So, in this study, were analyzed different drugs. Large amount of these drugs were substandard using an incorrect proportion. In the same drugs, only few were falsified with less than 8 %. The second study is about the multimodal mass spectrometry imaging in ovarian cancer metabolomics. It is an important field because the ovarian cancer is the fifth cause of cancer in women. Using a targeted method, there are 15 metabolites (majority lipids) that were detected using mass spectrometry imaging. The last study is about three dimensional surface sampling in origins of life research. The sampling scanning was performed with a 3D camera that contains: IR projector, IR sensor and RGB camera.

New Analytical Strategies for Sorption-Based Methods

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The sorption is a physical and/or a chemical process in which the molecules of one substance becomes attached to another. There are different types of sorption such as absorption and adsorption. Furthermore, there are two types of sampling techniques, the static and the dynamic. Focusing on the static sampling techniques, there are the solid-phase micro extraction (SPME) and the stir bar sorptive extraction (SBSE) which have a lot of advantages such as low sample volume, reutilization, operation under immersion or head-space modes and can operate overnight that allows automation. However, the SPME and SBSE have disadvantages too. For the SPME, the disadvantages are the limited amount of sorbent (low capacity), the fibers are expensive and it is more indicated for GC analysis. Whereas, for the SBSE, the disadvantages are a thermal desorption system is compulsory for TD, limited for polar compound and the coating phase deteriorates during agitation. One of the adsorptive micro extraction technique with bar-shaped geometry is the bar adsorptive micro extraction (BA μ E) with potential applications in the environment, pharmaceutical, forensic and food fields. The BA μ E is a polypropylene tube that is coating with different types of phases such as activated carbon and polymeric. In these case the mode that is used is the floating mode. The new improvements of this technique are downsizing the analytical device without losing extraction capacity and decreasing the desorption solvent volume (up to 100 μ L) without losing back-extraction efficiency.

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