Progress on environmental analysis and bioanalysis in Spain

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Analytical and bioanalytical chemistry is a robust and growing field of research in Spain. Diverse reasons contribute to this success, but if we had to highlight one of them, the strength of the academic discipline of analytical chemistry within Spanish universities would be the primary and fundamental reason for the large and competitive generation of excellent scientists devoted to chemical and biochemical metrology. This community is organized around several scientific societies: the Spanish Society for Analytical Chemistry (SEQA; <http://www.seqa.es>) the Spanish Society of Chromatography and Related Techniques (SECyTA; <http://www.secyta.org>), the Spanish Society of Mass Spectrometry (SEEM; <http://www.e-seem.org>), and the Society of Applied Spectroscopy (SEA; <http://www.s-ea.es>).

All these societies cooperate in the organization of a triennial conference (*Jornadas de Análisis Instrumental*, JAI) at Expoquimia, an international chemical exhibition in Spain. This creates a rather unique scenario for this conference, and it is recognized nationally as the merging point for analytical chemists from academia and research organizations with the industrial sector exhibiting at the largest chemistry trade fair in

the south of Europe. The last JAI conference, the 13th Conference on Instrumental Analysis, was held on November 14–16, 2011, on the premises of FIRA-Gran Via in Barcelona. The conference was held in collaboration with the Division of Analytical Chemistry of the European Association for Chemical and Molecular Sciences and was attended by 500 participants, who enjoyed a scientific program including five sessions that covered recent progress and fundamental aspects of instrumental analysis.

In the conference's opening session, R. Graham Cooks (Purdue University) presented a detailed overview of the state of the art of miniature mass spectrometers and ambient ionization. Luis M. Liz-Marzán (University of Vigo) discussed ultrasensitive analysis using metal nanoparticles. Electrochemistry was covered by Richard M. Crooks (The University of Texas at Austin), who focused on bipolar electrodes for chemical sensing and concentration enrichment. From the Technical University of Denmark, Jenny Emnéus described lab-on-a-chip tools for real-time monitoring of cellular dynamics. The closing lecture was given by Pier Giorgio Righetti (Politecnico di Milano), who shared his proteotyping technology via combinatorial peptide ligands with an audience eager to learn about proteome analysis of daily drinks.

In addition to these plenary lectures, five key lectures highlighted specific applications of instrumental analysis related to food, the environment, imaging, antidoping, and biomarkers and drug discovery. The program was completed with 54 short presentations, four sessions devoted to the discussion of posters, and three roundtables focusing on young scientists, technology transfer, and academic aspects of analytical chemistry. Complete information on the conference and abstracts can be found at <http://www.jornadasanalisis.com/eng/index.html>.

This issue includes seven original articles and a technical note presented during the conference and focusing on

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environmental applications and bioanalysis in the broadest sense. They are a good snapshot of the variety of approaches, techniques, and methods that the Spanish analytical chemistry community uses in these areas.

The first three articles focus on environmental analysis. Tena et al. used a microtip for the production of high-power focused ultrasonic waves that resulted in an efficient solid–liquid extraction method. Focused ultrasound solid–liquid extraction and gas chromatography (GC)–mass spectrometry (MS) were used for the analysis of brominated flame retardants in indoor dust. The group of García-Campaña describes the analysis of nitroimidazole residues in surface waters using off-line and online methods for preconcentration. Micellar electrokinetic chromatography with UV detection is proposed for the detection of nine 5-nitroimidazoles and their metabolites. The analytical challenge of C_{60} fullerene derivatives is approached by the group of Galceran in the next article. This work describes a nonaqueous capillary electrophoretic separation for the analysis of C_{60} and C_{70} fullerenes; its reliability is demonstrated by the analysis of a commercial cosmetic cream and comparison of the results with those obtained by liquid chromatography (LC)–MS.

The following four articles cover very different perspectives of bioanalysis. First, a quantitative proteomic approach is described by Luque-García et al., who analyzed protein expression of hepatic cells upon exposure to MeHg. The use of stable isotopic labeling by amino acids in cell culture (SILAC) in combination with sodium dodecyl sulfate polyacrylamide gel electrophoresis and nanoflow LC–electrospray ionization–linear ion trap results in new insights into the molecular mechanism of toxicity. Ventura et al. applied LC-MS/MS and GC-MS for the study of budesonide and its metabolites. They detected 16 metabolites, ten of them being reported for the first time. Escarpa et al. used natural polyphenols of different food samples for the formation of gold nanoparticles, and suggest this approach as a new marker for the assessment of antioxidant capacity. An autoindicating optical sensor based on the intrinsic molecular absorption and fluorescence of laccase is described by Marcos et al. A technical note on the analysis of pulses by means of pressurized liquid extraction and LC with diode-array detection by Delgado-Zamarreño et al. closes this collection of articles. We hope you enjoy all of them.

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has been Professor of Analytical Chemistry in the Department of Analytical Chemistry at the University of Alcalá in Alcalá de Henares (Spain) since 2002. Her professional activity has been conducted at the Chemical Center at Lund University (Sweden), in the European Commission (Directorate-General for Research and Innovation, Brussels, Belgium), and mainly at the University of Alcalá. There, she leads a group specializing in bioelectrochemistry for the

production of (bio)sensing systems for diagnostics, food control, and environmental monitoring. Her other research interests include data mining for sample identification and, more recently, biomimetic nanoparticles. Presently, she is President of the Spanish Society for Analytical Chemistry (SEQA).

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has been Professor in the Department of Physical and Analytical Chemistry at Oviedo University (Spain) since 1982. His current research interests include new atomic detectors and ion sources for ultratrace analysis using plasmas, new molecular optical sensors, particularly those based on the use of quantum dots, and hybrid techniques, for ultratrace and trace metal speciation to solve biological and environmental problems and speciation for proteomics. This is

aimed at by integrating molecular (matrix-assisted laser desorption/ionization and electrospray mass spectrometry) and atomic (inductively coupled plasma mass spectrometry) mass spectrometry techniques, and the extensive use of inductively coupled plasma mass spectrometry techniques to perform heteroatom-tagged proteomics, both for qualitative and for quantitative purposes. He has been an editor of *Analytical and Bioanalytical Chemistry* since 2002. At Euroanalysis 2007, in Antwerp, he received the Robert Kellner Award. In 2011, he received the European Award for Plasma Spectrochemistry.