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Preface

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Preface

Proceedings of the 6th Workshop on Biosensors and BioAnalytical μ -Techniques in Environmental and Clinical Analysis, October 8–12, 2004, ENEA, Rome, Italy.

This issue contains selected papers presented in Rome during ‘The 6th Workshop on Biosensors and BioAnalytical μ -Techniques for Environmental and Clinical Analysis’ held in the eternal city on 8–12 October 2004 and jointly organized by the Italian Agency for Energy, New Technologies and the Environment (ENEA) and the University of Rome ‘La Sapienza’ (UR).

Previous editions of the workshop were held in Paris (1994), Lund (1996), Las Vegas (1998), Menorca (1999) and Ithaca (2002). The 6th edition of the symposium has not only focused on bioanalytical methods for environmental monitoring as in the previous ones, but also on multidisciplinary tools allowing the solution of several analytical and bioanalytical problems in our *environment* intended in a broader sense. As a matter of fact the word *environment* has been recently acquiring a broader meaning because prevention, monitoring, and depuration are now focused not only on the chemical detection of air, water and soil pollutants but also on the health of the ecosystem, quality of life—including not only man but all living beings—clinical diagnostics and food safety, industrial activities and products, and effects of chemical, biological and physical agents. In this sense the need for controls of such a complex *environment* reflects the request for increased measurement ability, mainly in terms of number of analyses and costs, but also in terms of knowledge of the relationship between causes and effects.

Topics of the present edition have therefore been extended to μ -systems and nanotechnologies to take into account the scientific and technical developments occurring in the field of biosensors and their applications. Recently, multidisciplinary of chemistry, material sciences, biochemistry, molecular biology, physics, μ -electronic technologies, and engineering has created important new ideas in several research fields including biosensing, and remarkable results for improving quality of life on our planet can be expected. During the workshop, nucleotide, enzyme and receptor based biosensors, μ -arrays, silicon-based technologies, new materials and nanotechnologies, μ -fluidics and lab-on-a-chip have crossed several analytical problems and proper solutions for the environment, food and medicine.

The conference (www.biosensing.net/iaeac) brought together about 160 scientists worldwide (36 countries) with 116 presentations (46 oral + 70 poster presentations)

and it was a place of fruitful scientific exchange between senior experts (60) and young researchers (56). It began with an introduction by the President of our association (Prof. Dieter Klockow – Dortmund University), the head of the Chemistry Department of the University of Rome ‘La Sapienza’ (Prof. Luigi Campanella) and Prof. Marco Mascini (University of Florence).

Klockow presented the IAEAC profile as a non-profit international association, operating since 1977 and supporting a regular exchange of scientific information between experts in the fields of analytical chemistry, ecotoxicology, environmental chemistry, risk assessment and related areas. Mascini, the dean of biosensors in Italy for his pioneering work started at the beginning of the 1970s on electrochemical biosensors and for his international collaboration with several groups, noted the familiar character of the workshop that collects, with a biennial cadence, the old and the young researchers in the field of Biosensors and Bioanalytical Techniques, coming from several countries in the world. Campanella focused his attention on the bioethical problems which should be solved in some cases with biosensors. Then, eight invited lecturers introduced the seven scientific sessions:

- DNA-Chips
- μ -Systems and nanotechnologies
- Enzyme based biosensors
- Receptor based biosensors
- Environmental applications
- Food applications
- Biomedical applications

Pankaj Vadgama (Queen Mary Institute, London University) opened the scientific sessions with an invited lecture on polymeric membranes and interfacial phenomena, its ability in biological molecule stabilization and in the selective control of analyte flow over the sensor surface. A presentation by Niemeyer (Dortmund University) introduced new generation of DNA chips. Lo Gorton (Lund University) showed the results in the field of conducting polymers for molecular wiring of biomolecules or microorganisms, and Elena Dominguez (Alcala University) spoke about affinity sensors based on poly-electrolytes and their application to immunosensors and DNA chips. Thierry Livache (Commissariat à l’Energie Atomique, CEA, Grenoble), showed his biochips based on polypyrroles for detection of DNA fragments or oligosaccharides. Michael Wilson (Central Science Laboratory, Sand Hutton) explained his point of view about the strategy for developing new environmental biosensors and their requirements for realization of useful and effective biosensors in the near future. Berthold Hock (Technical University of Munich) showed an interesting use of genic expression patterns in analytical detection and Marco Mascini (University of Florence) showed interesting environmental applications of his electrochemical biosensors based on DNA fragments.

Young researchers have been encouraged to attend in order to contribute with their enthusiasm and new ideas to the biosensing field. For this purpose, travel grants were made available from sponsors. For this reason, the 6th edition has also been a workshop of young researchers with new ideas and cross-branch approaches. The last session of the workshop was dedicated to them and four poster awards were committed. The commission for poster evaluation was composed by Lo Gorton, Elena Dominguez, Berthold Hock and Pankaj Vadgama. The ‘Roland Frei Award’,

proclaimed from our association and committed by our President, went to the PhD student Claudio Guidotti (University of Florence) for the poster entitled *Characterization of Tethered Bilayers On Gold Electrodes as Models of Biomimetic Membranes* (μ -systems and Nanotechnology Session). The Metrohm-Ecochemie Award went to Caroline Michel (BRGM, Orleans) for the poster entitled *Amperometric Enzyme-Based Sensor for Chromate Bioavailability Determination* (Environmental Applications Session). The Palmsens Award went to the PhD student Sara Morandi (Florence University) for the poster entitled *Study of Langmuir Monolayers and Lb Film Containing Drug Molecules for Biosensor Applications* (μ -systems and Nanotechnology Session). The last award, sponsored from the ENEA target project on Biosensors and Bioelectronic (COSMIC: Coupling Smart Molecules into Chips), went to Dr Andri Papadoupoulos (EC-JRC, Ispra, Italy), with the poster entitled *Evaluation of Antibody Immobilization Strategies for Piezoelectric Immunosensor Development* (Environmental Applications Session).

At the end, the IAEAC President, Dieter Klockow, expressed good wishes to the local organizers for the high number of scientists and to the authors for the scientific content of their presentations. Similar enthusiastic comments were expressed from participants before leaving the Research Center of ENEA.

The selection of papers presented in this issue of the *Journal of Environmental and Analytical Chemistry* is certainly far from complete. It may however still give a good overview of the topics that were presented and discussed at this conference. As a whole, the papers give an excellent picture of the status of research and applications in Biosensors and Bioanalytical Techniques at the beginning of 21st century. This issue follows the order of sessions cited above.

I should like to give my thanks to all participants of the workshop who have contributed to making this event a highly successful one both from the scientific point of view and from that of human relations. I do hope that all the participants have returned from this conference rewarded by many new ideas and positive personal experiences.

This preface also offers me a good opportunity to thank all those individuals and institutions who have contributed to the organization of this event. It is a long list but far from complete. My particular thanks go to my friend Franco Mazzei (UR), Dr Carlo Cremisini (ENEA), the local team (Walter Vastarella, Maria Rita Montereali, Livia Della Seta, Katri Punakivi, Simona Montilla, Tiziana Farneti, Valeria De Benedictis, Vito, Natale, Paolo e Leonardo), D. Klockow and M. Frei whose enthusiasm and dedication have been essential for the success of this conference. J. Albaiges is also thanked for the enormous support in the preparation of this special issue.

Finally, I wish the next edition of the workshop, which will be held at Kuşadası in Turkey (<http://sci.ege.edu.tr/~biosensors2006>) and organized by EGE University at Izmir during October 2006, will once again represent a fertile meeting of scientists for generating new synergies, new frontiers and new fascinating questions and for stimulating doubts.

Roberto Pilloton
ENEA

The chairman of the workshop