Preface

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Biographical notes: Rita R. Plá is the Head of the Nuclear Analytical Techniques Group of the Argentine Atomic Energy Commission. Since 1980 she has been working on research and application of neutron activation analysis to the characterisation of different matrices, especially environmental ones. She has been teaching nuclear analytical techniques since 1998, in post-graduate courses of the National Technological University and Cuyo National University. She has coordinated different Latin American research projects related to environmental pollution studies by biomonitoring and direct sampling methods and currently she is the leader on a regional project related to atmospheric pollution biomonitoring and health. Her research objectives involve projects in collaboration with other national and international institutes with emphasis on the application of nuclear analytical techniques in areas such as environmental pollution and geology.

María Luisa Pignata graduated in Biochemical Sciences and subsequently obtained a PhD in Chemical Sciences at the Universidad Nacional de Córdoba, Argentina. Since 1980 she has been working as a Professor of General Chemistry for Biological Sciences. She is the Head of the Contamination and Bioindicators Group of the Multi-disciplinary Institute of Vegetal Biology from 2000 to till date. Her research interests focus on biomonitoring the air pollution

and the effects of pollutants on plants. She is also serving as Environmental Chemistry Professor for the Environmental Engineering Masters at the Universidad Tecnológica Nacional, Argentina, since 1996. Her research goals emphasise multidisciplinary projects among biology, chemistry, geology and environmental engineering disciplines.

Raquel C. Jasan graduated in Chemistry in 1997 at the University del Salvador, Buenos Aires and as a Specialist in Radiochemistry, in 2001 at Universidad Tecnológica Nacional – Instituto de Estudios Nucleares (CNEA). Since 1998, she has been working at the Ezeiza Atomic Centre of the Argentine Atomic Energy Commission at the Nuclear Analytical Techniques Group, on the application of neutron activation analysis in air pollution studies by biomonitoring and direct sampling including evaluation and interpretation of the data. She has participated in different research projects on the application of nuclear analytical techniques in environmental pollution studies.

Biomonitoring, in a general sense, refers to the set of techniques used for environmental assessment based on the use of living organisms. Some organisms accumulate atmospheric pollutants over certain periods of time, thus allowing discrimination of atmospheric quality levels through reliable analytical measurements. To such effect, organisms have to be suitably chosen, thus providing information on the integrated exposure over an extended period of time. Instrumental monitoring cannot simulate either complex atmospheric interactions or interception showed by biota, requiring in addition expensive technical equipment. Therefore, biomonitoring can be an effective tool for pollution monitoring with aims such as pollutant mapping and trend monitoring by real-time and retrospective analysis.

In order to address different scientific problems related to biomonitoring, an International Workshop on Biomonitoring of Atmospheric Pollution, BioMAP, was held for the first time in Lisbon, Portugal, from 21 to 24 September 1997. The workshop was organised following an idea arose during an International Atomic Energy Agency Technical Co-operation Project on monitoring of trace element pollution. During this first meeting emphasis was put on biomonitoring of trace element air pollution. The following editions took place in the Azores Islands (Portugal), Slovenia and Crete. From 20 to 24 September 2009, BioMap was organised for the first time outside Europe. The meeting was held in Buenos Aires, Argentina, organised by the Argentine National Atomic Energy Commission (CNEA), together with the National University of Córdoba, with the financial help of CNEA, the National Institute of Tourist Promotion, the National Nuclear Regulatory Authority and different private sponsors: NuclearLab, AADEE, SOLYDES, CONUAR (Argentine Nuclear Fuels), FAE (Especial Alloys) and DIOXITEK.

The workshop was focused on qualitative and quantitative aspects of biomonitoring of deposition of atmospheric pollutants. Topics included issues relating air pollutants to exposure and human health, different aspects of atmospheric pollution biomonitoring and its use for emission source identification. Furthermore, attention was given to atmospheric and terrestrial correlated pollution, combination of source profiles and geographical information, advantages of nuclear and related analytical techniques and use of different biomonitors.

BioMap-5 gave an overview of current applications of biomonitoring techniques and most used materials were mosses, lichens and tree bark although studies involving vascular plants were also presented. There were also some studies using other biomaterials such as mother milk, scalp hair, human bone and exhaled breath condensate. The advantages of multi-elemental analysis using non-destructive techniques were addressed as well as the importance of biomonitoring atmospheric volatile organic compounds and natural and artificial radionuclides. Relationships of air pollutants with human health and exposure, especially respiratory diseases, were also addressed. Several studies dealt with biological, physical morphological and chemical aspects of biomonitoring of environmental pollution using lichens, mosses, bark tissue and superior plants.

The idea of this first volume, comprising only a part of the manuscripts presented at the workshop, arose after considering the importance of presenting the current state of biomonitoring applications and surveys in different countries. Many of the works included in this volume are related to biomonitoring of air pollution and its use to identify emission sources. These surveys used multi-element and natural, volatile organic compounds and artificial radionuclide determinations in mosses, lichens, trees and other plants in urban, industrial and rural areas for addressing problems such as emission sources identification, pollutant distribution patterns, atmospheric, terrestrial and water correlated pollution and bioaccumulation strategies. Also relationships among contamination levels in top soils, plants and surface water samples, related to plant species potentially fit for phytoextraction at polluted areas and sustainable sampling, have been considered. Indoor air monitoring and potential genotoxic effects of organic pollutants have been addressed in a survey conducted in schools, using a common indoor plant species. Effects of air pollutants are shown in two works related with biological, morphological and chemical aspects of biomonitoring using vascular plants. Finally, the use of different biomaterials is addressed in two papers: possibilities of human bone for environmental monitoring and exhaled breath condensate for evaluation of pollutant exposition.

It is hoped that the manuscripts presented in this publication will contribute to general knowledge and emphasising on the use of biomonitoring of environmental pollution.

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