CONTENTS

Preface xi
Contributors xiii

SECTION 1 FUNDAMENTALS AND METHOD DEVELOPMENT 1

1 Improvement in Pretreatment and Analysis with Spectrometric Methods: A Typical Application to Routine Analysis 3
K. Boutakhrit, F. Bolle, J. M. Degroodt, and L. Goeyens

2 Solubilization: Trends of Development in Analytical Atomic Spectrometry for Elemental Food Analysis 19
Henryk Matusiewicz

3 Chemical Elements in Food and the Role of Atomic and Mass Spectrometry. Advantages and Drawbacks of the Determination of Selected Trace Elements in Foodstuffs by Atomic Absorption Spectrometry 51
Lars Jorhem and Joakim Engman

4 High-Resolution Continuum Source AAS and its Application to Food Analysis 81
Bernhard Welz, Daniel L. G. Borges, and Uwe Heitmann
5 Determining the Geographical Origin of Foods: Considerations when Designing Experimental Protocols and Choosing Analytical Approaches 115

John Lewis and Simon Hird

6 Method Validation for Food Analysis: Concepts and Use of Statistical Techniques 135

Joris Van Loco

7 Demonstration of Measurement Capabilities by Means of Interlaboratory Comparison Schemes for Trace Element Analysis in Food 167

Yetunde Aregbe, Piotr Robouch, and Thomas Prohaska

SECTION 2 SELECTED APPLICATIONS 223

8 Applications of Inductively Coupled Plasma Mass Spectrometry to Trace Element Research and Control 225

Francesco Cubadda

9 Danish Monitoring System for Foods 1998–2003. Content of As, Cd, Hg, Ni, Pb, and Se and Dietary Intake by Children and Adults 297

Erik H. Larsen, Inge Rokkjær, and Tue Christensen

10 Trace Elements in the Total Diet Typical of Northern Italy 333

M. Bettinelli, S. Spezia, A. Gatti, A. Ronchi, C. Minoia, C. Roggi, and G. Turconi

11 Car Catalytic Converters and the Contamination of Food by Platinum-Group Elements 353

Chiara Frazzoli, Roberta Cammarone, and Sergio Caroli

12 Arsenic and Other Potentially Toxic Trace Elements in Rice 383

Chiara Frazzoli, Marilena D’Amato, Sergio Caroli, and Gyula Záravy

13 Total Analysis and Distribution of Trace Elements in Human, Cow, and Formula Milk 401

Rafael R. de la Flor St. Rèmy, María Luisa Fernández Sánchez, and Alfredo Sanz-Medel

14 Use of Spectrochemical Methods for the Determination of Metals in Fish and other Seafood in Louisiana 437

Joseph Sneddon

15 Essential and Potentially Toxic Chemical Elements in Beverages 455

Patricia Smichowski and Daniel A. Batistoni
CONTENTS

SECTION 3 SPECIATION ANALYSIS 503

16 Species-Specific Determination of Metal(loid)-Containing Food Additives and Contaminants by Chromatography with ICP-MS Detection 505
A. Polatajko, B. Bouyssiere, and J. Szpunar

17 Elemental Speciation in Human Milk and Substitute Food for Newborns 535
Bernhard Michalke, María Luisa Fernández Sánchez, and Alfredo Sanz-Medel

18 Measurement of Total Arsenic and Arsenic Species in Seafood By Q ICP-MS 567
William A. Maher, Jason Kirby, and Frank Krikowa

19 Sample Preparation Prior to As- and Se-Speciation 597
Mihály Dernovics and Péter Fodor

20 Measurement of Total Se and Se Species in Seafood by Quadrupole Inductively Coupled Plasma Mass Spectrometry, Electrothermal Atomization Atomic Absorption Spectrometry, and High-Performance Liquid Chromatography Inductively Coupled Plasma Mass Spectrometry 643
William A. Maher and Frank Krikowa

21 Application of ICP-MS for the Evaluation of Se Species in Food Related Products and in Dietary Supplements 671
Katarzyna Wrobel, Kazimierz Wrobel, and Joseph A. Caruso

22 Determination of Hg Species in Seafood 707
Petra Krystek and Rob Ritsema

Author Index 727

Subject Index 729