



J O U R N A L O F

# AOAC

I N T E R N A T I O N A L

An International  
Journal of  
Analytical Science



The Scientific  
Association Dedicated  
to Analytical  
Excellence®



# JOURNAL OF AOAC INTERNATIONAL

A Peer-Reviewed Journal Publishing Basic and Applied Research in the Analytical Sciences Related to Foods, Drugs, Agriculture, and the Environment

## EDITORIAL BOARD

Steven Dentali, *Chair*  
Joseph M. Betz  
Gabriel Giancaspro  
Sarwar Gilani  
Thomas Hammack  
James Harnly  
Milan Ihnat  
Bert Popping  
Jeanne I. Rader  
David L. Soderberg  
Edward Waysek  
Luann Wetzler  
Robert E. Rathbone, *Staff Liaison*

## JOURNAL EDITORS

**Agricultural Materials**  
W. Emmett Braselton, Nancy Thieux  
**Dietary Supplements**  
Albert E. Pohland  
**Drug Formulations and Clinical Methods**  
Samir Wahab  
**Food Biological Contaminants**  
Anthony D. Hitchins  
**Food Chemical Contaminants**  
Albert E. Pohland  
**Food Composition and Additives**  
Sarwar Gilani  
**Microbiological Methods**  
Anthony Hitchins  
**Residues and Trace Elements**  
Alexander J. Kryniatsky  
**Statistical Analysis**  
George W. Latimer, Jr  
**Veterinary Drug Residues**  
Joe Boison  
**Acquisitions Editor**  
Joseph Sherma

## JOURNAL STAFF

**Publisher:** E. James Bradford  
**Sr Director, Publications:** Robert E. Rathbone  
**Production Manager:** Catherine Wattenberg  
**Production Editors:** Jennifer J. Diaz  
Tien L. Milor  
Chris Bradley  
**Subscriptions:** Chris Bradley

## Advertising Sales:

AOAC INTERNATIONAL  
481 N. Frederick Ave, Suite 500  
Gaithersburg, MD 20877, USA  
Tel: +1-301-924-7077 • Fax: +1-301-924-7089  
E-mail: cbradley@aoac.org

## AOAC BOARD OF DIRECTORS

**President:** Russell S. Flowers  
**President-Elect:** Stan W. Bacler  
**Treasurer:** Jonathan W. DeVries  
**Secretary:** Darryl M. Sullivan  
**Immediate Past President:** Gayle A. Lancette  
**Directors:** Mark R. Coleman  
Douglas A. Hite  
Xiumei Liu  
Ronald L. Johnson  
Hilde Skaar Norli  
**Directors-at-Large:** David Acheson  
Clay Detlefsen  
James M. Harnly

# Table of Contents

July/August 2011 VOL. 94, No. 4

JAINEE 94(4) 1005–1382 (2011)

- 39A** *Cumulative Author Index*  
**44A** *Instructions to Authors*  
**45A** *Letter from the Editor*  
**46A** *Journal Information*

## SPECIAL GUEST EDITOR SECTION

- 1005 Allergen Detection by Mass Spectrometry—The New Way Forward  
*Bert Popping and Samuel Benrejeb Godefroy*
- 1006 Analytical Methods for Detection of Gluten in Food—Method Developments in Support of Food Labeling Legislation  
*Reka Haraszi, Hubert Chassaingne, Alain Maquet, and Franz Ulberth*
- 1026 Current Perspectives and Recommendations for the Development of Mass Spectrometry Methods for the Determination of Allergens in Foods  
*Phil E. Johnson, Sabine Baumgartner, Thomas Aldick, Conrad Bessant, Valeria Giosafatto, Julia Heick, Gianfranco Mamone, Gavin O'Connor, Roland Poms, Bert Popping, Andreas Reuter, Franz Ulberth, Andrew Watson, Linda Monaci, and E.N. Clare Mills*
- 1034 Reliable Detection of Milk Allergens in Food Using a High-Resolution, Stand-Alone Mass Spectrometer  
*Linda Monaci, Ilario Losito, Francesco Palmisano, and Angelo Visconti*
- 1043 Development and Validation of a Method for the Quantification of Milk Proteins in Food Products Based on Liquid Chromatography with Mass Spectrometric Detection  
*Petra Lutter, Véronique Parisod, and Hans Weymuth*
- 1060 Application of a Liquid Chromatography Tandem Mass Spectrometry Method for the Simultaneous Detection of Seven Allergenic Foods in Flour and Bread and Comparison of the Method with Commercially Available ELISA Test Kits  
*Julia Heick, Markus Fischer, Sandra Kerbach, Ulrike Tamm, and Bert Popping*

## DIETARY SUPPLEMENTS

- 1069 Development of Extraction Methods for Speciation Analysis of Selenium in Aqueous Extracts of Medicinal Plants  
*Nida F. Kolachi, Tasneem G. Kazi, Hassan I. Afridi, Sumaira Khan, Jameel A. Baig, Sham K. Wadhwa, Abdul Q. Shah, and Faheem Shah*

**Copyright**, 2011 by AOAC INTERNATIONAL, Inc. All rights reserved. The *Journal of AOAC INTERNATIONAL* [ISSN 1060–3271 (print), ISSN 1944–7922 (digital)] is published bimonthly by AOAC INTERNATIONAL, 481 N. Frederick Ave, Suite 500, Gaithersburg, MD 20877, USA. **Subscriptions** for Vol. 94 (2011) are: Members, \$400.00 in North America, \$490.00 outside North America; Nonmembers, \$560.00 in North America, \$650.00 outside North America. Periodicals postage paid at Gaithersburg, Maryland, USA, and additional mailing offices. Abstracted or indexed in AGRICOLA, Analytical Abstracts, Biological Abstracts, Cambridge Scientific Abstracts, Chemical Abstracts, Current Advances in Ecological Sciences, Current Contents, and others. Printed in USA.

**POSTMASTER:** Send address changes to *Journal of AOAC INTERNATIONAL*, 481 N. Frederick Ave, Suite 500, Gaithersburg, MD 20877, USA.

- 1076 Development and Validation of a Column High-Performance Liquid Chromatography Method for Quantification of Ganaphaliin A and B in Inflorescences of *Gnaphalium liebmannii* Sch. Bp ex Klatt  
*Fernando Rodríguez-Ramos, Víctor H. Sánchez-Estrada, Alejandro Alfaro-Romero, Gabriela Rubí Tapia-Álvarez, and Andrés Navarrete*

#### **DRUG FORMULATIONS AND CLINICAL METHODS**

---

- 1082 Determination of Disulfiram by Micellar Liquid Chromatography in Illicit Preparations  
*Sandeep-Kumar Mourya, Swati Dubey, Abhilasha Durgabanshi, Sudheer Kumar Shukla, Josep Esteve-Romero, and Devasish Bose*
- 1089 Development and Validation of an HPLC Method for Mefloquine Hydrochloride Determination in Tablet Dosage Form  
*Fernando Henrique Andrade Nogueira, Leticia de Paula Lana Goulart, Isabela da Costa César, Lígia Maria Moreira de Campos, and Gérson Antônio Pianetti*
- 1094 An Efficient and Simultaneous Analysis of Caffeine and Paracetamol in Pharmaceutical Formulations Using TLC with a Fluorescence Plate Reader  
*Hossein Tavallali, S. Faraneh Zareiyani J., and Maryam Naghian*
- 1100 High-Performance Liquid Chromatography/Tandem Mass Spectrometry Method for the Determination of Arbidol in Human Plasma  
*Xin Xiong and Suodi Zhai*

#### **FOOD BIOLOGICAL CONTAMINANTS**

---

- 1106 Evaluation of Applied Biosystems *MicroSEQ*<sup>®</sup> Real-Time PCR System for Detection of *Salmonella* spp. in Food  
*Priya Balachandran, Yanxiang Cao, Lily Wong, Manohar R. Furtado, Olga V. Petrauskene, and Robert S. Tebbs*
- 1117 DuPont Qualicon BAX<sup>®</sup> System Real-Time PCR Assay for *Escherichia coli* O157:H7  
*Frank Burns, Lois Fleck, Bridget Andaloro, Eugene Davis, Jeff Rohrbeck, George Tice, and Morgan Wallace*
- 1125 Reveal<sup>®</sup> *Salmonella* Enteritidis Test for Detection of *Salmonella* Enteritidis in Shell Eggs and Environmental Samples  
*Balamurugan Jagadeesan, Stephanie Curry, Debra Foti, Lauren Peterson, Rebecca Wilson, and Mark Mozola*
- 1138 RapidChek SELECT<sup>™</sup> *Salmonella* Enteritidis Test System for the Detection of *Salmonella* Enteritidis in Poultry House Drag Swabs, Shell Egg Pools, and Chicken Carcass Rinsates  
*Mark T. Muldoon, Verapaz Gonzalez, Meredith I. Sutzko, Ann-Christine Olsson Allen, Samantha Creamer, Dale V. Onisk, and Klaus Lindpaintner*
- 1154 Liquid Chromatography Post-Column Oxidation (PCOX) Method for the Determination of Paralytic Shellfish Toxins in Mussels, Clams, Oysters, and Scallops: Collaborative Study  
*Jeffrey van de Riet, Ryan S. Gibbs, Patricia M. Muggah, Wade A. Rourke, James D. MacNeil, and Michael A. Quilliam*

#### **FOOD CHEMICAL CONTAMINANTS**

---

- 1177 Impact of Quality Parameters on the Recovery of Putrescine and Cadaverine in Fish Using Methanol-Hydrochloric Acid Solvent Extraction  
*Nicole L. Richard, Lori F. Pivarnik, P. Christopher Ellis, and Chong M. Lee*

#### **FOOD COMPOSITION AND ADDITIVES**

---

- 1189 A Solid-Phase Microextraction GC/MS/MS Method for Rapid Quantitative Analysis of Food and Beverages for the Presence of Legally Restricted Biologically Active Flavorings  
*Katerina Bousova, Klaus Mittendorf, and Hamide Senyuva*



- 1200 Specific PCR Detection of Tiger, Leopard, and Lion Ingredients from Test Samples  
*Jijuan Cao, Junyi Xu, Ran Liu, Ke Yu, and Changwen Wang*
- 1206 Comparison of Two Methods for Determination of Tomato Paste Solids: Vacuum Oven versus Microwave Oven  
*Sahar Jazaeri, Yukio Kakuda, Stephen Gismondi, and Doug G. Wigle*
- 1210 Simultaneous Spectrophotometric Kinetic Determination of Four Flavor Enhancers in Foods with the Aid of Chemometrics  
*Yongnian Ni, Jinfeng Chen, and Serge Kokot*
- 1217 Determination of Vitamin B<sub>12</sub> in Fortified Bovine Milk-Based Infant Formula Powder, Fortified Soya-Based Infant Formula Powder, Vitamin Premix, and Dietary Supplements by Surface Plasmon Resonance: Collaborative Study  
*Pathik Vyas and Anthony A. O'Kane*
- 1227 Validation of a Carnation-Specific Gene, *ANS*, Used as an Endogenous Reference Gene in Qualitative and Real-Time Quantitative PCR for Carnations  
*Hong Zhu, Lingxi Jiang, Shiru Tao, Heyan Lin, Jinbin Wang, Furong Tan, Kai Zhao, Xiao Wu, Peng Li, Aihu Pan, Junwei Jia, and Xueming Tang*

#### **RESIDUES AND TRACE ELEMENTS**

---

- 1233 Development and Validation of an HPLC Stability-Indicating Method for Identification and Assay of Elemental Iron(II) in Pharmaceutical Drug Products Using Reversed-Phase HPLC  
*Neil C. Dias and Abu M. Rustum*
- 1240 Simultaneous Determination of Chromium, Selenium, and Molybdenum in Nutritional Products by Inductively Coupled Plasma/Mass Spectrometry: Single-Laboratory Validation  
*Lawrence H. Pacquette, Andre Szabo, and Joseph J. Thompson*
- 1253 High-Throughput GC/MS and HPLC/MS/MS Techniques for the Multiclass, Multiresidue Determination of 653 Pesticides and Chemical Pollutants in Tea  
*Guo-Fang Pang, Chun-Lin Fan, Feng Zhang, Yan Li, Qiao-Ying Chang, Yan-Zhong Cao, Yong-Ming Liu, Zeng-Yin Li, Qun-Jie Wang, Xue-Yan Hu, and Ping Liang*
- 1297 Use of Multiwalled Carbon Nanotube Disks for the SPE of Some Heavy Metals as 8-Hydroxyquinoline Complexes  
*Mustafa Soylak and Yunus Emre Unsal*
- 1304 Synthesis and Application of a New Thiazolylazo Reagent for Cloud Point Extraction and Determination of Cobalt in Pharmaceutical Preparations  
*Regina Terumi Yamaki, Luana Sena Nunes, Hygor Rodrigues de Oliveira, André S. Araújo, Marcos Almeida Bezerra, and Valfredo Azevedo Lemos*

#### **STATISTICAL ANALYSIS**

---

- 1310 Uncertainty Component Evaluation in Conventional Microbiological Qualitative Measurements  
*Charlotte Chan Tak Ka*

#### **VETERINARY DRUG RESIDUES**

---

- 1319 Determination of Residual Fluoroquinolones in Honey by Liquid Chromatography Using Metal Chelate Affinity Chromatography  
*Yoh-ichi Yatsukawa, Hironobu Ito, Takahiro Matsuda, Munetomo Nakamura, Masatoshi Watai, and Kazuhiro Fujita*

## STANDARD METHOD PERFORMANCE REQUIREMENTS

- 1328 Development of Standard Method Performance Requirements for Biological Threat Agent Detection Methods  
*Scott G. Coates, Sharon L. Brunelle, and Matthew G. Davenport*
- 1338 AOAC SMPR 2010.001: Standard Method Performance Requirements for Polymerase Chain Reaction (PCR) Methods for Detection of *Francisella tularensis* in Aerosol Collection Filters and/or Liquids
- 1342 AOAC SMPR 2010.002: Standard Method Performance Requirements for Polymerase Chain Reaction (PCR) Methods for Detection of *Yersinia pestis* in Aerosol Collection Filters and/or Liquids
- 1347 AOAC SMPR 2010.003: Standard Method Performance Requirements for Polymerase Chain Reaction (PCR) Methods for Detection of *Bacillus anthracis* in Aerosol Collection Filters and/or Liquids
- 1352 AOAC SMPR 2010.004: Standard Method Performance Requirements for Immunological-Based Handheld Assays (HHAs) for Detection of *Bacillus anthracis* Spores in Visible Powders
- 1356 AOAC SMPR 2010.005: Standard Method Performance Requirements for Immunological-Based Handheld Assays (HHAs) for Detection of Ricin in Visible Powders
- 1359 AOAC INTERNATIONAL Methods Committee Guidelines for Validation of Biological Threat Agent Methods and/or Procedures