

FOURTH EDITION

# *F*OOD ANALYSIS

S. SUZANNE NIELSEN  
*Editor*



 Springer

# *Food Analysis*

*Fourth Edition*

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*Fourth Edition*

edited by

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# *Preface and Acknowledgments*

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The intent of this book is the same as that described in the Preface to the first three editions – a text primarily for undergraduate students majoring in food science, currently studying the analysis of foods. However, comments from users of the first three editions have convinced me that the book is also a valuable text for persons in the food industry who either do food analysis or interact with analysts.

The big focus of this edition was to do a general update, adding many new methods and topics and deleting outdated/unused methods. The following summarizes changes from the third edition: (1) general updates, including addition and deletion of methods, (2) combined two chapters to create one chapter focused on food contaminants, residues, and chemical constituents of concern, (3) some chapters rewritten by new authors (e.g., Immunoassays, Extraneous Matter Analysis, Color Analysis, Thermal Analysis), (4) reorganized some chapters (e.g., Atomic Absorption and Atomic Emission Spectroscopy; Basic Chromatography), (5) added chapter on nuclear magnetic resonance, (6) added calculations for all practice problems, and (7) added tables to some chapters to sum-

# *List of Abbrevia*

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AACC	American Association of Cereal Chemists
AAS	Atomic absorption spectroscopy
ADI	Acceptable daily intake
AE-HPLC	Anion exchange high performance liquid chromatography
AES	Atomic emission spectroscopy
AMS	Accelerator mass spectrometer
AMS	Agricultural Marketing Service
AOAC	Association of Official Analytical Chemists
AOCS	American Oil Chemists' Society
AOM	Active oxygen method
APCI	Atmospheric pressure chemical ionization
APE	Atmosphere-pressure ionization
APHA	American Public Health Association
APPI	Atmospheric pressure photo-ionization
ASE	Accelerated solvent extraction
ASTM	American Society for Testing Materials
ATCC	American Type Culture Collection

ATCC	American Type Culture Collection
ATF	Bureau of Alcohol, Tobacco, Firearm and Explosives
ATP	Adenosine-5'-triphosphate
ATR	Attenuated total reflectance
$a_w$	Water activity
$B_0$	External magnetic field
BAW	Base and acid washed
BCA	Bicinchoninic acid
BCR	Community Bureau of Reference
Bé	Baumé modulus
BHA	Butylated hydroxyanisole
BHT	Butylated hydroxytoluene
BOD	Biochemical oxygen demand
BPA	Bisphenol A
BSA	Bovine serum albumin
BSDA	<i>Bacillus stearothermophilis</i> disk assay
Bt	<i>Bacillus thuringiensis</i>
CAST	Calf antibiotic and sulfa test
CCD	Charge-coupled device
CDC	Centers for Disease Control
CFR	Code of Federal Regulations
CFSAN	Center for Food Safety and Applied Nutrition
cGMP	Current Good Manufacturing Practices