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# *Food Analysis Laboratory Manual*

*Third Edition*

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edited by

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# Preface and Acknowledgments

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This laboratory manual was written to accompany the textbook, *Food Analysis*, fifth edition. The laboratory exercises are tied closely to the text and cover 21 of the 35 chapters in the textbook. Compared to the second edition of this laboratory manual, this third edition contains four introductory chapters with basic information that compliments both the textbook chapters and the laboratory exercises (as described below). Three of the introductory chapters include example problems and their solutions, plus additional practice problems at the end of the chapter (with answers at the end of the laboratory manual). This third edition also contains three new laboratory exercises, and previous experiments have been updated and corrected as appropriate. Most of the laboratory exercises include the following: background, reading assignment, objective, principle of method, chemicals (with CAS number and hazards), reagents, precautions and waste disposal, supplies, equipment, procedure, data and calculations, questions, and resource materials.

Instructors using these laboratory exercises should note the following:

1. Use of Introductory Chapters:
  - Chap. 1, "Laboratory Standard Operating Procedures" – recommended for students prior to starting any food analysis laboratory exercises
  - Chap. 2, "Preparation of Reagents and Buffers" – includes definition of units of concentrations, to assist in making chemical solutions
  - Chap. 3, "Dilution and Concentration Calculations" – relevant for calculations in many laboratory exercises
  - Chap. 4, "Use of Statistics in Food Analysis" – relevant to data analysis
2. Order of Laboratory Exercises: The order of laboratory exercises has been changed to be fairly consistent with the reordering of chapters in the textbook, *Food Analysis*, fifth edition (i.e., chromatography and spectroscopy near the front of the book). However, each laboratory exercise stands alone, so they can be covered in any order.
3. Customizing Laboratory Procedures: It is recognized that the time and equipment avail-

able for teaching food analysis laboratory sessions vary considerably between schools, as do student numbers and their level in school. Therefore, instructors may need to modify the laboratory procedures (e.g., number of samples analyzed, replicates) to fit their needs and situation. Some experiments include numerous parts/methods, and it is not assumed that an instructor uses all parts of the experiment as written. It may be logical to have students work in pairs to make things go faster. Also, it may be logical to have some students do one part of the experiment/one type of sample and other students to another part of the experiment/type of sample.

4. Use of Chemicals: The information on hazards and precautions in the use of the chemicals for each experiment is not comprehensive but should make students and a laboratory assistant aware of major concerns in handling and disposing of the chemicals.
5. Reagent Preparation: It is recommended in the text of the experiments that a laboratory assistant prepare many of the reagents, because of the time limitations for students in a laboratory session. The lists of supplies and equipment for experiments do not necessarily include those needed by the laboratory assistant in preparing reagents for the laboratory session.
6. Data and Calculations: The laboratory exercises provide details on recording data and doing calculations. In requesting laboratory reports from students, instructors will need to specify if they require just sample calculations or all calculations.

Even though this is the third edition of this laboratory manual, there are sure to be inadvertent omissions and mistakes. I will very much appreciate receiving suggestions for revisions from instructors, including input from lab assistants and students.

I maintain a website with additional teaching materials related to both the *Food Analysis* textbook and laboratory manual. Instructors are welcome to contact me for access to this website. To compliment the laboratory manual, the website contains more detailed versions of select introductory chapters and Excel sheets related to numerous laboratory exercises.

I am grateful to the food analysis instructors identified in the text who provided complete laboratory experiments or the materials to develop the experiments. For this edition, I especially want to thank the authors of the new introductory chapters who used their experience from teaching food analysis to develop what I hope will be very valuable chapters for students and instructors alike. The input I received from other food analysis instructors, their students, and mine who reviewed these new introductory chapters was extremely valuable and very

much appreciated. Special thanks go to Baraem (Pam) Ismail and Andrew Neilson for their input and major contributions toward this edition of the laboratory manual. My last acknowledgment goes to my former graduate students, with thanks for their help in working out and testing all experimental procedures written for the initial edition of the laboratory manual.

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The original version of this book was revised.

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- Correction to: Food Analysis Laboratory Manual C1

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