

# TROUBLESHOOTING HPLC SYSTEMS



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# TROUBLESHOOTING HPLC SYSTEMS

A Bench Manual

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Paul C. Sadek, Ph.D.



A WILEY-INTERSCIENCE PUBLICATION

**JOHN WILEY & SONS, INC.**

New York / Chichester / Weinheim / Brisbane / Singapore / Toronto

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Published simultaneously in Canada.

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For ordering and customer service, call 1-800-CALL WILEY.

*Library of Congress Cataloging-in-Publication Data is available.*

Sadek, Paul C.

Troubleshooting HPLC Systems: A Bench Manual

ISBN: 0-471-17834-9

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

To the most important people in my life:  
Tammy, Geoffrey, Becky, Charles, and Joanne.



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# PREFACE

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This book is intended and written expressly for those analysts who are unfamiliar with or have had limited experience with high-performance liquid chromatography (HPLC): a lab companion if you will. It is a “what is?” and “how to” book. It is designed for use in the laboratory next to the instrument. The very presentation of the book, a spiral-bound format, allows the text to lie flat and facilitates use in the laboratory. The organization is straightforward and logical. The book follows the course of the solvent through each component of the system from reservoir to detector.

The book begins (Chapter 1) with a detailed overview of HPLC instrumentation and a wide range of ancillary components used in an HPLC system. The purpose of each component, its positioning within the system, and its functioning are described piece by piece. Chapter 2 presents in a very detailed way the common parameters used in defining the performance of an HPLC system. Chapter 2 also contains a series of précis on the different categories of HPLC separations (e.g., reversed phase, chiral, and size exclusion). These chapters are preparatory to Chapter 3.

Chapter 3 presents problems related to each component and the way in which they present themselves to the chromatographer (e.g., erratic flow rate or high backpressure); then it details the way to pinpoint the problem (i.e., troubleshoot) and describes the process of solving the problem. The final part of Chapter 3 deals with preventive maintenance scheduling. This is a key factor in avoiding problems. A preventive maintenance program should be implemented for every HPLC system.

This book does not contain detailed presentations on fundamentals of theory, extended discourses on applications, or full-blown discussions of method development and optimization. These topics are not associated with basic system troubleshooting.

My hope is that this book will save the analyst hours of work by helping to focus in on and rapidly solve problems that arise in the routine operation of the HPLC system.

PAUL C. SADEK



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