

## **TROUBLESHOOTING GUIDE – HPLC**

Before starting any troubleshooting, whether it is related to instruments or columns, it is essential that safe laboratory practices be observed. The chemical and physical properties of any solvents used should be known and the material safety data sheet (MSDS) for these solvents should be readily available.

All electrically powered instruments should be powered down and unplugged from the main supply before the removal of their covers, etc...

Wear eye protection when troubleshooting the detector (with the cover removed) as ultraviolet light is emitted during UV and fluorescence detector operation and this will damage the eye's cornea irreversibly.

There are many areas in a HPLC instrument that give rise to system and chromatographic problems. This guide will deal with each one in the following sections:

- visual inspection
- pressure
- baseline irregularities
- changes in chromatography
- qualitative results
- quantitative results

### **I- Visual inspection**

When a problem occurs, it is advisable to perform a quick visual check of the instrument and column. This will pick up leaks, loose or disconnected tubing, changes in instrument settings, etc...

### **II- Pressure**

System pressure is affected by a number of variables including the viscosity of the solvent used, column variables, flow rate and temperature. It is important to have a reference point when high or low pressures to the norm. This reference point should be the pressure generated in the system when everything is functioning correctly.

Pressure problems fall into one of three categories: high, low or fluctuating pressure. They can occur suddenly or be a gradual process. Sudden pressure rises tend to be due to particles from the sample, blocked or damaged tubing or column packed bed collapse. Gradual pressure rises can also be due to particles in the sample, but they can also arise from particles generated in the instrument, for example, debris from vial septa or degrading seals.

Before releasing any high pressure build-up in a system, be aware that the solvent may form an aerosol or spray when loosening connections. Eye protection should be worn and ideally the connection to be positioned above and adsorbent material to soak up all released solvents.

# Hplc Guide Armelle Vallat

**Henri Colin**



## **Hplc Guide Armelle Vallat:**

High-Temperature Liquid Chromatography Thorsten Teutenberg, 2010-06-03 High temperature liquid chromatography has attracted much interest in recent years but has not yet recognized its full potential in the chromatographic community. There is a widespread reluctance in industry to use temperature to speed up the separation process, influence the selectivity of a separation or implement novel detection techniques. However, the technology has now matured and could revolutionize chromatography as we see it today. Better equipment such as heating systems able to generate faster heating rates is becoming more readily available. Also, columns based on silica gel which can withstand higher temperatures for an extended period are now being introduced. Nevertheless, further technological and methodical efforts are needed to establish the method in a regulated environment like the pharmaceutical industry. This is the only text to cover all the practical aspects as well as the underlying theoretical principles of setting up an HPLC system for high temperature operation. It is not intended solely for academics but will also benefit the researcher interested in more practical considerations. The author is a recognized expert and has conducted several studies with partners from industry to validate the method. Many real examples from these studies have been included in the book. The aim is to support practitioners in the creation of their own protocols without the need to rely solely on trial and error. The book starts with a brief definition of high temperature liquid chromatography before going on to cover system set up, the heating system, mobile phase considerations, suitable stationary phases, method development using temperature programming, analyte stability and special hyphenation techniques using superheated water as a mobile phase. In each chapter, experimental data is used to illustrate the main statements and the advantages over conventional HPLC are evaluated. The book concludes with a critical outlook on further developments and applications, underlining the necessary advances needed to make high temperature HPLC more robust. **The HPLC**

**Solvent Guide** Paul C. Sadek, 1996-09-06 An indispensable working resource for anyone who performs liquid chromatography. The HPLC Solvent Guide provides an opportunity for analytical chemists to expand their experimental toolkits. It features extensive and detailed coverage of HPLC solvents currently used in most laboratory settings. Over the course of seven chapters, each one focusing on a specific solvent class, the author provides all the practical information needed to develop separations using these solvent classes. A valuable working reference for experimentalists in a broad array of industrial and research fields. The HPLC Solvent Guide divides solvents according to chemical class, then arranges the methods by field of application and finally by groups of analytes. Provides complete descriptions of separations including sample matrices, lists of analytes separated and quantified, chromatographic parameters and results. Features tables listing individual solvents and their physical, chemical and chromatographic properties, safety and health parameters and availability, both in terms of supplier and performance specifications. Includes figures that show the chemical structure of each solvent discussed. Solvent selection is perhaps the most commonly overlooked of experimental parameters in high performance liquid

chromatography When performing separations even the most experienced analytical chemist tends to select one of three solvents acetonitrile methanol or water overlooking the fact that many different classes of solvent can be used very effectively in HPLC By providing extensive detailed coverage of HPLC solvents currently used in a wide range of separations The HPLC Solvent Guide offers chemists an opportunity to expand their experimental repertoires The author begins with an in depth review of the role of solvents in HPLC This is followed by a series of chapters devoted to the different classes of solvent To facilitate easy reference chapters are first grouped by solvent classes including alcohols alkanes ethers ketones and nitriles They are then further divided by field of application e g environmental pharmaceutical and by specific analyte class e g priority pollutants anticancer drugs Throughout each separation is described as fully as possible listing the sample matrix analytes separated and quantified chromatographic parameters used and abbreviated results As a consequence even novice chromatographers have sufficient information to begin to develop a separation on the basis of a citation alone

Appealing to anyone doing HPLC are the four tables appearing in each of the seven chapters dealing with individual solvent classes These tables list physical chemical and chromatographic properties safety and health parameters and availability both in terms of supplier and performance specifications A separate table provides the chemical structures of the solvents presented in each chapter In writing this book the author has drawn heavily from contemporary references in which the chromatograms for described separations were included thus providing readers with clear reference points from which to conduct a more extensive historical literature review if needed Providing the most detailed treatment of HPLC solvents to date The HPLC Solvent Guide is a valuable working resource for anyone who performs liquid chromatography **HPLC** Marvin C. McMaster, 2007-01-29 This Second Edition of the classic handbook details how to set up an HPLC system that capitalizes on the latest innovations It covers new techniques in high temperature micro flow and ultra fast chromatography the linking of an HPLC to a mass spectrometer and more Complete with a CD ROM and appendices this guide has everything chromatographers need to know to confidently separate identify purify and quantify compounds Note CD ROM DVD and other supplementary materials are not included as part of eBook file **HPLC** Toshihiko Hanai, 1999 How can these compounds be separated Why was that method used These are the two basic questions often asked by students of chromatography HPLC A Practical Guide provides the answers enabling the reader to grasp the concepts of the technique using simple representative chromatograms Divided into six chapters this practical guide covers basic concepts of HPLC instrumentation stationary phase materials eluents column efficiency and the influence of physical chemistry on separations Focusing on the basic considerations such as selection of stationary phase and eluent rather than specific applications sections on troubleshooting are also included Uniquely the descriptions of chromatographic separations are based on solubility using molecular properties and solubility parameters are used to analyse the selections of chromatographic mode and column Presenting the chemistry of liquid chromatography for undergraduate students this valuable practical guide will

also be useful for laboratory staff in industry and academia

*The HPLC Solvent Guide* Paul Charles Sadek, 1996 Solvent selection is perhaps the most commonly overlooked of experimental parameters in high performance liquid chromatography. When performing separations even the most experienced analytical chemist tends to select one of three solvents: acetonitrile, methanol, or water, overlooking the fact that many different classes of solvent can be used very effectively in HPLC. By providing extensive, detailed coverage of HPLC solvents currently used in a wide range of separations, *The HPLC Solvent Guide* offers chemists an opportunity to expand their experimental repertoires. The author begins with an in-depth review of the role of solvents in HPLC. This is followed by a series of chapters devoted to the different classes of solvent. To facilitate easy reference, chapters are first grouped by solvent classes including alcohols, alkanes, ethers, ketones, and nitriles. They are then further divided by field of application, e.g., environmental, pharmaceutical, and by specific analyte class, e.g., priority pollutants, anti-cancer drugs. Throughout each separation is described as fully as possible, listing the sample matrix, analytes separated, and quantified chromatographic parameters used, and abbreviated results. As a consequence, even novice chromatographers have sufficient information to begin to develop a separation on the basis of a citation alone.

**HPLC Columns** Uwe D. Neue, 1997-07-28 An in-depth guide to HPLC column technology. High performance liquid chromatography and its derivative techniques have become the dominant analytical separation tools in the pharmaceutical, chemical, and food industries, environmental laboratories, and therapeutic drug monitoring. Although the column is the heart of the HPLC instrument and essential to its success, until now no book has focused on the theory and practice of column technology. *HPLC Columns* provides thorough state-of-the-art coverage of HPLC column technology for the practicing technician and academician alike. Along with a comprehensive discussion of the chemical and physical processes of the HPLC column, it includes fundamental principles, separation mechanisms, and available technologies, column selection criteria, and special techniques. Special features include: Comprehensive overview of state-of-the-art HPLC column technology; Explanation of the underlying principles of HPLC columns; Methods for selecting columns; Practical advice on using and applying columns, including examples; Section by M. Zoubair El Fallah on methods development; Special techniques including preparative chromatography, continuous chromatography, and the simulated moving bed; Troubleshooting section. *HPLC Columns* helps laboratory practitioners make better choices in column selection, methods development, and troubleshooting; it is also an excellent textbook for graduate level courses and HPLC short courses.

*HPLC* Joel K. Swadesh, 2000-12-21 Product specifications, regulatory constraints, and tight production schedules impose considerable pressures on separation scientists in industry. The first edition of *HPLC: Practical and Industrial Applications* helped eliminate the need for extensive library or laboratory research when confronting a problem, an unfamiliar technique, or work in a new area.

*An Introduction to HPLC for Pharmaceutical Analysis* Oona McPolin, 2009-03-01 If you are new to HPLC, this book provides an invaluable guide to how HPLC is actually used when analysing pharmaceuticals. It is full of practical advice on the operation of HPLC systems.

combined with the necessary theoretical knowledge to ensure understanding of the technique Key features include A thorough discussion of the stationary phase enabling the reader to make sense of the many parameters used to describe a HPLC column Practical advice and helpful hints for the preparation and use of mobile phase A complete overview of each of the different components which together make up a HPLC system A description of the contents of a typical HPLC analytical method and how to interpret these A step by step guide on how to follow a method and set up a HPLC analysis A discussion of system suitability criteria and how to interpret the values obtained during an analysis Explanation of the common methods of calibration and quantification used for pharmaceutical analysis

*HPLC Analysis of Biological Compounds* William S. Hancock, James T. Sparrow, 1984

High Performance Liquid Chromatography Win Fung Ho, Brian Stuart, Elizabeth R. Prichard, 2003 This book covers the basic practical aspects of high performance liquid chromatography HPLC and is aimed at the inexperienced analyst who may have no or very little knowledge of this technique It includes basic tips identifies key skills arouses awareness and gives guidance on good practice of the basic aspects of HPLC page 1

Modern HPLC for Practicing Scientists Michael W. Dong, 2006-05-19 A comprehensive yet concise guide to Modern HPLC Written for practitioners by a practitioner Modern HPLC for Practicing Scientists is a concise text which presents the most important High Performance Liquid Chromatography HPLC fundamentals applications and developments It describes basic theory and terminology for the novice and reviews relevant concepts best practices and modern trends for the experienced practitioner Moreover the book serves well as an updated reference guide for busy laboratory analysts and researchers Topics covered include HPLC operation Method development Maintenance and troubleshooting Modern trends in HPLC such as quick turnaround and greener methods Regulatory aspects While broad in scope this book focuses particularly on reversed phase HPLC the most common separation mode and on applications for the pharmaceutical industry the largest user segment Accessible to both novice and intermediate HPLC users information is delivered in a straightforward manner illustrated with an abundance of diagrams chromatograms tables and case studies and supported with selected key references and Web resources With intuitive explanations and clear figures Modern HPLC for Practicing Scientists is an essential resource for practitioners of all levels who need to understand and utilize this versatile analytical technology

A Practical Guide to HPLC Detection Donald Parriott, 1993

**Handbook of Pharmaceutical Analysis by HPLC** Satinder Ahuja, Michael Dong, 2005-02-09 High pressure liquid chromatography frequently called high performance liquid chromatography HPLC or LC is the premier analytical technique in pharmaceutical analysis and is predominantly used in the pharmaceutical industry Written by selected experts in their respective fields the Handbook of Pharmaceutical Analysis by HPLC Volume 6 provides a complete yet concise reference guide for utilizing the versatility of HPLC in drug development and quality control Highlighting novel approaches in HPLC and the latest developments in hyphenated techniques the book captures the essence of major pharmaceutical applications assays stability testing impurity testing dissolution testing cleaning validation high

throughput screening A complete reference guide to HPLC Describes best practices in HPLC and offers tricks of the trade in HPLC operation and method development Reviews key HPLC pharmaceutical applications and highlights current trends in HPLC ancillary techniques sample preparations and data handling      **A Guide to the HPLC Literature: 1980-1981** Henri Colin, 1984 HPLC has largely contributed to the development of pharmacology biology food research and the biomedical sciences as demonstrated by the growing number of meetings dedicated to this topic and by the proliferation of companies offering equipment products or services for HPLC users It is becoming highly difficult to follow the current literature particularly in the area of applications      **A Guide to the HPLC Literature** Henri Colin, 1984 HPLC has largely contributed to the development of pharmacology biology food research and the biomedical sciences as demonstrated by the growing number of meetings dedicated to this topic and by the proliferation of companies offering equipment products or services for HPLC users It is becoming highly difficult to follow the current literature particularly in the area of applications      *Reversed Phase HPLC* ,      [Beginners Guide to Liquid Chromatography](#) Waters Corporation, 2014-04-21 The Beginners Guide to Liquid Chromatography a 56 page paperback book is a useful tool for those learning about the technology of liquid chromatography LC with a focus on high performance liquid chromatography HPLC The Beginners Guide offers an uncomplicated look at LC HPLC and includes clear and colorful diagrams to acquaint the reader with basic concepts and terminology No previous scientific training is required to obtain a better working knowledge of this powerful technology Looking for something else Learn a new technique or technology with the Waters Primers Series view other titles available here <http://www.wiley.com/go/waters>      **Selection of the HPLC Method in Chemical Analysis** Serban C. Moldoveanu, Victor David, 2016-11-01 Selection of the HPLC Method in Chemical Analysis serves as a practical guide to users of high performance liquid chromatography and provides criteria for method selection development and validation High performance liquid chromatography HPLC is the most common analytical technique currently practiced in chemistry However the process of finding the appropriate information for a particular analytical project requires significant effort and pre-existent knowledge in the field Further sorting through the wealth of published data and literature takes both time and effort away from the critical aspects of HPLC method selection For the first time a systematic approach for sorting through the available information and reviewing critically the up to date progress in HPLC for selecting a specific analysis is available in a single book Selection of the HPLC Method in Chemical Analysis is an inclusive go to reference for HPLC method selection development and validation Addresses the various aspects of practice and instrumentation needed to obtain reliable HPLC analysis results Leads researchers to the best choice of an HPLC method from the overabundance of information existent in the field Provides criteria for HPLC method selection development and validation Authored by world renowned HPLC experts who have more than 60 years of combined experience in the field      **Optimization in HPLC** Stavros Kromidas, 2021-11-08 Learn to maximize the performance of your HPLC or UHPLC system with this resource from leading experts in the field

Optimization in HPLC Concepts and Strategies delivers tried and tested strategies for optimizing the performance of HPLC and UHPLC systems for a wide variety of analytical tasks. The book explains how to optimize the different HPLC operation modes for a range of analyses including small molecules, chiral substances and biomolecules. It also shows readers when and how computational tools may be used to optimize performance. The practice oriented text describes common challenges faced by users and developers of HPLC and UHPLC systems as well as how those challenges can be overcome. Written for first time and experienced users of HPLC technology and keeping pace with recent developments in HPLC instrumentation and operation modes, this comprehensive guide leaves few questions unanswered. Readers will also benefit from the inclusion of a thorough introduction to optimization strategies for different modes and uses of HPLC including working under regulatory constraints. An exploration of computer aided HPLC optimization including ChromSwordAuto and Fusion QbD. A treatment of current challenges for HPLC users in industry as well as large and small analytical service providers. Discussions of current challenges for HPLC equipment suppliers. Tailor made for analytical chemists, chromatographers, pharmacologists, toxicologists and lab technicians. Optimization in HPLC Concepts and Strategies will also earn a place on the shelves of analytical laboratories in academia and industry who seek a one stop reference for optimizing the performance of HPLC systems.

*Practical High-Performance Liquid Chromatography* Veronika R. Meyer, 2013-03-25. Jump into the HPLC adventure. Three decades on from publication of the 1st German edition of Veronika Meyer's book on HPLC, this classic text remains one of the few titles available on general HPLC aimed at practitioners. New sections on the following topics have been included in this fifth edition: Comparison of HPLC with capillary electrophoresis; How to obtain peak capacity; van Deemter curves and other coherences; Hydrophilic interaction chromatography; Method transfer; Comprehensive two dimensional HPLC; Fast separations at 1000 bar; HPLC with superheated water. In addition, two chapters on the instrument test and troubleshooting in the appendix have been updated and expanded by Bruno E. Lendi, and many details have been improved and numerous references added. A completely new chapter is presented on quality assurance covering: Is it worth the effort? Verification with a second method; Method validation; Standard operating procedures; Measurement uncertainty; Qualifications instrument test and system suitability test. The quest for quality. Reviews of earlier editions. That this text is written by an expert in both the practice and teaching of HPLC is evident from the first paragraph: not only an enjoyable, fascinating and easy read, but a truly excellent text that has and will serve many teachers, students and practitioners very well. The Analyst provides essential information on HPLC for LC practitioners in academia, industry, government and research laboratories: a valuable introduction. *American Journal of Therapeutics*.



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