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Book review

Practical HPLC Method Development, second edition, by L.R. Snyder, J.J. Kirkland and J.L. Glajch, John Wiley and Sons, Chichester, U.K., 1997, xxviii+765 pp., price £70.00; US$93.50; ISBN 0-471-00703

The first edition of this work, written by foremost experts in the field, was very well accepted and there are all reasons to believe that the new edition will at least be equally successful. The work was thoroughly revised and greatly expanded to include new advances. All steps in the development of an HPLC separation method are discussed in detail, with particular stress on practical problems and methods for their solution.

The book is divided into 15 chapters. After an initial presentation of general strategy of method development, fundamentals of HPLC separations are surveyed, with special attention to the effects of the experimental separation conditions on the resolution of the components in sample mixtures. The following chapters discuss general separation aspects, including the detection techniques, properties, characterisation and specification of chromatographic columns and sample preparation and pretreatment. Various problems likely to occur during the column use are considered and remedies are suggested to prolong the column life. The sample isolation, preseparation and enrichment techniques discussed include liquid-liquid-, solid-phase –, supercritical fluid –, microwave-assisted – and accelerated solvent extraction, membrane separations, derivatization and column switching for the sample cleanup.

The largest part of the book is focused on the essential steps in adjusting adequate separation conditions for samples containing low-molecular ionic and non-ionic compounds, biopolymers and optical isomers. Possibilities offered by the reversed-phase, normal-phase, ion-pair, ion-exchange, hydrophobic interaction and size-exclusion chromatographic modes for the separation are discussed. Most of the space is devoted to the practically far most important reversed-phase chromatographic methods. Special attention is paid to rational systematic approach to selecting conditions for successful separations using isocratic and gradient elution. Further, computer-assisted method development approaches using commercially available software are surveyed and compared.

Practical aspects of normal-phase chromatography method development are also discussed in detail, while the principles of ion-exchange and size-exclusion chromatography are only briefly surveyed in connection with the separation of biopolymers, as it was not the objective of the book to cover separation of inorganic ions and of synthetic polymers. The part dealing with ion-exchange chromatography is possibly too short with respect to the other parts and some important factors controlling the separation are not mentioned: (1) the ion-exchange capacity of the column packing material which controls adequate buffer concentration for appropriate retention of sample compounds and (2) the temperature – the efficiency and the speed of many ion-exchange separations can be significantly improved at a higher temperature.

Great attention is focused on the chromatography of optical isomers. Chiral separations are generally more difficult and less well established than non-chiral separations, but are becoming very important because of increasing requirements on the optical purity of the pharmaceutical products. Developments

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of the separation methods using protein-derived, polysaccharide, cavity-type and Pirkle-type stationary phases are discussed in detail.

HPLC preparative separations are also addressed and various aspects of quantitation, including trace analysis, are surveyed. Very important is the final chapter on method validation and transfer of developed separation methods between different laboratories.

The discussion in the individual chapters is illustrated by many instructive examples of HPLC separations. In each chapter, valuable practical hints are given, which are rarely found in other monographs on HPLC. The book contains a glossary of terms, an index and six appendices with tabular data which are very useful for practical method development.

The text is well written and presented in a clear and comprehensible way, so that it can address readers with various levels of experience in HPLC. The discussion is concentrated on the most important practical aspects and the treatment of the theory is limited to the minimum necessary for understanding the underlying principles of separation, however, without compromising the scientific accuracy of the text. The book is very well produced and contains a minimum of misprints and errors. Worth mentioning is only the error in equation 5.2 for the pressure drop in packed columns.

I believe that this book is one of the best treatments on HPLC available. It can be extremely useful not only for all practising chromatographers involved in HPLC method development, but also for the newcomers to the field, for students and for all readers interested in modern instrumental analytical techniques, as it offers an excellent and very instructive survey of contemporary HPLC techniques.

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