

MERLIN K. L. BICKING. Ph. D.

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EDUCATION:

Bachelor of Science - Chemistry
University of Wisconsin - River Falls, WI

Doctor of Philosophy - Organic-Analytical Chemistry
Iowa State University - Ames, IA

TECHNICAL INTERESTS AND EXPERIENCE:

Expert-Level Technical Training in Analytical Chemistry
Analytical Separations/Chromatography
Experimental Design/Method Development
Technical Problem-Solving

QUALIFICATION SUMMARY:

General Experience

- More than 40 years post-graduate experience in academia, contract research, contract laboratory, and independent consulting.
- A problem-solving, organic-analytical chemist.
- Currently an independent consultant for numerous industries that have analytical chemistry issues.
- Extensive technical writing experience in preparation and review of technical summaries, literature reviews, risk assessment summaries, project reports, manufacturing procedures, and SOPs.
- Excellent teaching and technical training skills.

Specific Analytical Chemistry Experience

- Knowledgeable in all aspects of analytical separations, method development, and problem-solving, using techniques such as chemical derivatization, HPLC, GC, GC/MS, SFE, SFC, FTIR, NMR, and absorbance spectrophotometry.
- The application of experimental design strategies for chemical problem-solving and data analysis.
- Application experience includes environmental analysis, chemical characterization, additive analysis, product reformulation, stability testing, and product characterization.
- Developed the *Practichem*[™] Series of Training Seminars, which provides practical technical training for laboratory staff.
- Author of two U.S. EPA analytical methods.
- Short course instructor at Eastern Analytical Symposium (EAS) for the last 20+ years.

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Other Experience

- Knowledge of Design Control, GMP, and CE Mark issues for implantable devices.
- Preparation and review of regulatory documents (IDE, Risk Assessment, FMECA, Technical Dossiers).
- Manufacturing process troubleshooting and optimization.
- Medical device testing.
- Design, manufacture, and testing of implantable medical devices.
- Certified instructor for Agilent Technologies hardware and software.

PROFESSIONAL EXPERIENCE:

ChromAfrica LLC, Nairobi, Kenya

2009 to Present. Co-Founder and DIRECTOR, US OPERATIONS.

Organizes and presents technical training events for African scientists. Identifies suitable instructors, assists with marketing, planning, and coordination of training events and scientific exhibitions.

Analytical Chemistry Consulting and Training Associates, Inc. (ACCTA, Inc.), Woodbury, MN

1993 to Present. SENIOR ANALYTICAL SCIENTIST and PRESIDENT

Provides independent contractor services in laboratory problem-solving, in-laboratory services, document preparation, and new technology evaluations for the biomedical device, pharmaceutical, food, scientific instrument, manufacturing, environmental, and water purification device industries. Develops and presents laboratory staff training courses on a wide variety of chemistry-related topics. (Additional details at www.accta.com.)

Uroplasty, Inc., Minneapolis, MN

1997 to 2001. TECHNICAL DIRECTOR

Provided technical support to all aspects of design, testing, and manufacturing of implantable medical devices. Reviewed and/or prepared technical summaries, test plans and reports, regulatory submissions, and manufacturing procedures. Evaluated new technologies for manufacturing improvements and product testing. Coordinated clinical complaints.

TCT (Twin City Testing) Corporation, St. Paul, MN

1992 to 1993. TECHNICAL DIRECTOR, Chemistry Departments

Provided technical oversight for non-routine chemistry groups involved with routine environmental analysis, high resolution mass spectrometry, industrial chemistry, and GLP programs. Provided internal consulting and problem-solving expertise, new technology evaluation, staff training, and specialty method development.

1990 to 1992. MANAGER, Organic Analytical Chemistry

Responsibilities included management of a group of 15 professional and technical staff members in the following non-routine technical areas: dioxin programs,

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technology development (FTIR), product chemistry, agrichemical programs, and method development.

1988 to 1990. SUPERVISOR, Method Development Section

Responsibilities included management of a group of professional staff devoted to developing new methodologies or improving existing procedures. These duties included technical management of staff, project management, evaluation and incorporation of new technologies, and technical marketing.

Battelle Columbus Division, Columbus, OH.

1985 to 1988. PRINCIPAL RESEARCH SCIENTIST and GROUP LEADER

Duties included management of nine professional and technical staff as well as operation of HPLC laboratory. Other activities included project management, preparation of proposals and reports, and review of proposals and reports prepared by group staff members.

State University of New York-Buffalo, Buffalo, NY.

1982 to 1985. ASSISTANT PROFESSOR OF CHEMISTRY

Duties included preparing grant proposals, directing graduate and undergraduate research, teaching graduate and undergraduate courses and various committee assignments. A research program in analytical separations was developed.

PUBLICATIONS:

Bicking, M.K., and Kniseley, R.N., "Size Exclusion Chromatographic Analysis of Refuse-Derived Fuel for Mycotoxins." Anal. Chem. 1980, **52**, 2164.

Bicking, M.K.L., Kniseley, R.N., and Svec, H.J., "Determination of Aflatoxins in Air Samples of Refuse-Derived Fuel by Thin Layer Chromatography with Laser Fluorescence Spectrometric Detection." Anal. Chem. 1983, **55**, 200.

Bicking, M.K.L., Kniseley, R.N., and Svec, H.J., "Coupled-Column System for Quantitating Low Levels of Aflatoxins." J. Assoc. Off. Anal. Chem. 1983, **66**, 905.

Bicking, M.K.L., "Thermodynamics of Retention for Small Molecules in the Polystyrene/Chloroform System." Anal. Chem. 1984, **56**, 2671.

"Lasers and Thin Layer Chromatography: Present and Future" in *Techniques and Applications of Thin-Layer Chromatography*, J. Touchstone (Ed.), Wiley, New York, 1985, Chapter 1.

Book Review: "Steric Exclusion Liquid Chromatography of Polymers." J. Am. Chem. Soc. 1985, **107**, 1091.

Book Review: "Modern Liquid Chromatography of Macromolecules." J. Am. Chem. Soc. 1985, **107**, 3001.

Book Review: "A Guide to the HPLC Literature. Vol. 1." J. Am. Chem. Soc. 1985, **107**, 4808.

Bicking, M.K.L., and Adinolfi, N.A., "Simplex Optimization of Extractive Alkylation Procedures for Organic Acids in Aqueous Samples." J. Chromatogr. Sci. 1985, **23**, 348.

Adinolfi, N.A., and Bicking, M.K.L., "Direct Determination of Adipic Acid in Urine by Extractive Alkylation." J. Chromatogr. Sci. 1985, **23**, 407.

Adams, J.R., and Bicking, M.K.L., "Thermodynamics of Retention for Small Molecules in the Polystyrene/Toluene and Polystyrene/THF Systems." Anal. Chem. 1985, **57**, 2844.

Bicking, M.K.L., Bicking, M.L., and Longman, W.E., "Direct Fluorination of Silica for Use in Liquid Chromatography." Anal. Chem. 1986, **58**, 499.

Skow, C.A.R., and Bicking, M.K.L., "Direct Alkylation of Carboxylic Acids in Aqueous Samples." Chromatographia 1986, **21**, 157.

Bicking, M.K.L., and Serwon, S.J., "Molecular Interactions on Polystyrene Stationary Phases." J. Liq. Chromatogr. 1987, **10**, 1369.

Bicking, M.K.L., Cooke, W.M., Kawahara, F.K., and Longbottom, J.E., "Method Development for the Determination of Formaldehyde in Samples of Environmental Origin." Am. Soc. Testing Mat., Special Technical Publication 976, 1988, pg 159.

Bicking, M.K.L., Cooke, W.M., Kawahara, F.K., and Longbottom, J.E., "The Effect of pH on the Reaction of 2,4-Dinitrophenylhydrazine with Formaldehyde and Acetaldehyde." J. Chromatogr. 1988, **455**, 310.

DeRoos, F.L and Bicking, M. K. L., "Supercritical Fluid Extraction for the Determination of PCDDs and PCDFs in Soil", Chemosphere 1990, **20**, 1355.

Bicking, M.K.L. and Wilson, R.L., "High Performance Size Exclusion Chromatography in Environmental Method Development. 1. The Effect of Mobile Phase and Temperature on the Retention of Dioxins, Furans, and Polychlorinated Biphenyls." Chemosphere 1991, **22**, 421.

Bicking, M.K.L., and Wilson, R.L., "High Performance Size Exclusion Chromatography in Environmental Method Development. 2. An Automated Procedure for Determination of Dioxins and Furans." Chemosphere 1991, **22**, 437.

Bicking, M.K.L., "A Simplified Experimental Design Approach to Optimization of SFE Conditions for Extraction of an Amine Hydrochloride." J. Chromatogr. Sci. 1992, **30**, 358.

Bicking, M.K.L., Hayes, T. L., Kiley, J., and Deming, S. N., "An Experimental Design Approach to the Optimization of Supercritical Fluid Extraction for the Determination of Oil and Grease in Soil." J. Chromatogr. Sci. 1993, **31**, 170.

Bicking, M.K.L., "Analytical Extractions of Organic Compounds." *Encyclopedia of Separation Science*, I. Wilson (Ed.), Academic Press, London, 2000.

Bicking, M., "On Second Thought." (A Parent Questions the Conventional Wisdom About Competitive Soccer.) *Soccer for Parents*, Scholastic Inc., September, 2000, pg. 14.

Bicking, M.K.L., "Integration Errors in Chromatographic Analysis. Part 1 - Peaks of Approximately Equal Size", LCGC Magazine, 2006, **24**, 402 - 414.

Bicking, M.K.L., "Integration Errors in Chromatographic Analysis. Part 2 - Large Peak Size Ratios", LCGC Magazine, 2006, **24**, 604 - 616.

Bicking, M.K.L., Henry, R. A., "A Global Approach to HPLC Column Selection using RP and HILIC Modes...What To Try When C18 Doesn't Work", LCGC Magazine, 2010, **28** (3), 234-244.

Farrell, F.M., Fitch, T.M., Bicking, M.K.L., "Analysis of Chemical and Physical Effects of Ultraviolet Bulbs on Cooking Emissions", Journal of the Air & Waste Management Association, 2011, **61** (10), 1005 - 1014.

Bicking, M.K.L., "Investing to Save - A simple tool for calculating ROI can determine which investments are best for your lab", Lab Manager, 2012, **7** (11), 18-21.

Bicking, M.K.L., "An Efficient Procedure for Determining Simple Sugars in Fruit Juices", LCGC International, 2024, **1** (3), 28-34.
<https://doi.org/10.56530/lcgc.int.kp358111>

INVITED LECTURES:

"Laser Fluorescence Determination of Aflatoxins on TLC Plates.", Bicking, M., Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy (Pittcon), Abstract No. 657, Advances in Thin Layer Chromatography Symposium, March 7-12, 1983.

"Coupled-Column System for Quantitating Low Levels of Aflatoxins.", Bicking, M., Eastern Analytical Symposium, November 16-18, 1983.

"Lasers and Thin Layer Chromatography - Present and Future.", Bicking, M., Eastern Analytical Symposium, November 16-18, 1983.

"Molecular Interactions on Polystyrene Stationary Phases.", Bicking, M., Department of Chemistry, Miami University, September 1986.

"Development and Evaluation of Methodology to Determine Formaldehyde in Samples of Environmental Origin.", Bicking, M., 40th ACS Southeast Regional Meeting, Abstract No. 198, November 9-11, 1988.

"Novel Analyte Enrichment Procedures for the Determination of PCDFs and PCDDs.", Bicking, M. Electric Power Research Institute (EPRI) PCDF/PCDD Workshop, Palo Alto, CA, June, 1990.

"Systematic Study of Extraction Conditions for SFE", M. Bicking, F. DeRoos, T. Hayes, 105 AOAC Annual International Meeting, Phoenix, AZ, August, 1991.

"Introduction to Environmental Analysis", F. DeRoos, M. Bicking, Minnesota Chromatography Forum Short-Course, Bloomington, MN, May, 1990.

"Traditional Sample Preparation - Old But Not Dead!", M. Bicking, Ohio Valley Chromatography Symposium, Hueston Woods State Park, OH, June, 1997.

"Outcome-Based Study Design", M. Bicking, Biomedical Focus, Minneapolis, MN, July, 1998.

"ChromAfrica: Bringing Scientific and Technical Resources to the African continent", M. Bicking, SciX 2013: Symposium on Analytical Chemists Easing World Poverty, Milwaukee, WI, October, 2013.

"ChromAfrica: Updates on Bringing Scientific and Technical Resources to the East African Continent", M. Bicking, Minnesota Chromatography Forum, Quarterly Meeting, April, 2014.

"Economic Development from the Analytical Scientist Up – East Africa Perspectives", M. Bicking, SciX 2014: Symposium on Analytical Chemists Easing World Poverty, Reno, NV, October, 2014.

"Merging Business, Science, and Culture in East Africa", M. Bicking, SciX 2016, Minneapolis, MN, October, 2016.

"Merging Business, Chromatography, and Culture in East Africa", Chicago Chromatography Discussion Group, Chicago, IL, May, 2019.

"Fast Screening of Oligo- and Poly-saccharides in Beer", in Symposium: Analytical Chemistry of Beer and Brewing (S23-05), Pittcon, March 9, 2021.

"Listen to Your LC Instrument – It Is Trying to Tell You Something", ChromTalks 2023: Troubleshooting Chromatography Workflows. On-line Symposium. May, 2023.

PRESENTATIONS:

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"Solvent-Related Non-Exclusion Effects on Poly(styrene) Gels.", Bicking, M., Northeast Regional Chromatography Discussion Group (NERCDG), September 1983.

"A Multi-Derivative Method for the Determination of Organic Acids in Urine.", Adinolfe, N., and Bicking, M., Pittcon Abstract No. 027, March 5-9, 1984.

"A Multi-Derivative Method for Analysis of Trace Organics.", Bicking, M., and Adinolfe, N., NERCDG, May 1984.

"Solvent Effects on the Exclusion Chromatographic Analysis of Small Molecules Using Poly(styrene) Gels.", Bicking, M., and Kubis, A., Pittcon, Abstract No. 551, March 5-9, 1984.

"Preconcentration and Analysis of Quaternary Ammonium Compounds by Ion Pairing Chromatography.", Bicking, M., and Rowehl, C. Pittcon, Abstract No. 073, March 5-9, 1984.

Gel Permeation Chromatography Discussion Section (Presider), NERCDG, September 1984.

"Development of a Gel Permeation Chromatography Clean-up Procedure for Priority Pollutant Analysis by Capillary Gas Chromatography.", Adams, J., and Bicking, M., Pittcon, Abstract No. 243, February 25-28, 1985.

"Solvent Effects on the Exclusion Chromatographic Separations of Small Molecules in Several Solvent Systems.", Bicking, M., and Adams, J. Pittcon, Abstract No. 310, February 25-28, 1985.

"Determination of Formaldehyde and Other Carbonyl Compounds in Liquid and Solid Environmental Matrices.", Bicking, M., Cooke, W., Kawahara, F., and Longbottom, J. Chemical and Biological Characterization of Municipal Sludges, Sediments, Dredge Spoils and Drilling Muds Symposium, Cincinnati, Ohio, May 20-13, 1986.

"Fractionation of Complex Environmental Samples Using Mobile Phase Effects in Size Exclusion Chromatography.", Bicking, M., Pittcon, Abstract No. 1152, March 9-13, 1987.

"Preparation and Characterization of a Chloroalkane Stationary Phase.", Bicking, M., Pittcon, Abstract No. 582, March 9-13, 1987.

"Determination of Formaldehyde in Liquid and Solid Environmental Matrices.", Bicking, M., Cooke, W., Kawahara, F., and Longbottom, J., Pittcon, Abstract No. 1150, March 9-13, 1987.

"Determination of Formaldehyde in Samples of Environmental Origin.", Bicking, M., Cooke, W., Kawahara, F., and Longbottom, J., Solid Waste Testing and Quality Assurance, US EPA Symposium, Washington, D.C., July 13-17, 1987.

"A Coupled-Column System for Cleanup of Environmental Extracts - Determination of PCBs, Dioxins and Furans.", Bicking, M., and Wilson, R.L. Pittcon, Abstract No. 1005, February 22-26, 1988.

"Evaluation of Supercritical Fluid Extraction for Determination of PCDD's and PCDF's in Selected Matrices.", Bicking, M., and DeRoos, F. 12th Annual EPA Conference on Analysis of Pollutants in the Environment, Norfolk, VA, May 1989.

"Novel Analyte Enrichment Method for the Determination of PCDD's and PCDF's in Complex Matrices.", Bicking, M., and DeRoos, F. 12th Annual EPA Conference on Analysis of Pollutants in the Environment, Norfolk, VA, May 1989.

"Evaluation of Supercritical Fluid Extraction for Determination of PCDDs and PCDFs in Selected Matrices.", Bicking, M., Hayes, T., and DeRoos, F. Minnesota Chromatography Forum (MCF), Bloomington, MN, May 1990.

"Stabilization of Photoconductivity Detector Response for the Determination of Selected Analytes in Soil and Water.", Bicking, M., and Fisher, H. MCF, Bloomington, MN, May 1990.

"Optimization of Supercritical Fluid Extraction for the Determination of PCBs, PCDDs, and PCDFs in Soil.", Bicking, M. The International Conference on Organohalogen Compounds (Dioxin '90), Bayreuth, FRG, September 1990.

"Experimental Design Approach to Optimization of SFE Conditions", M. Bicking, T. Hayes, F. DeRoos, 3rd International Symposium on Supercritical Fluid Chromatography and Extraction, Park City, UT, January, 1991.

"Experimental Design Approach to Optimization of SFE Conditions", M. Bicking, T. Hayes, F. DeRoos, 12th Annual Environmental Laboratory Technology conference, St. Paul, MN, February, 1991.

"Experimental Design Approach to Optimization of SFE Conditions", M. Bicking, T. Hayes, F. DeRoos, Pittcon, Abstract No. 929, Chicago, IL, March, 1991.

"Evaluation of SFE for Extraction of Environmental Contaminants", M. Bicking, F. DeRoos, T. Hayes, 14th Annual EPA Conferences on Analysis of Pollutants in the Environment, Norfolk, VA, May, 1991.

"Optimization of Supercritical Fluid Extraction Conditions for Polychlorinated Compounds in Environmental Samples", M. Bicking, F. DeRoos, 11th International Symposium on Chlorinated dioxins and Related Compounds (Dioxin '91), Research Triangle Park, NC, September, 1991.

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"Determination of Organochlorine Pesticides in Wastewater using Empore Disks and Supercritical Fluid Extraction", M. Bicking, F. DeRoos, J. Osterheim, E. Dooley, ACS National Meeting, San Francisco, CA, April, 1992.

"Evaluation of a Modification to EPA Method 608 Using Solid-Phase Extraction Disks", 15th Annual EPA Conference on Analysis of Pollutants in the Environment, Norfolk, VA, May, 1992.

"A Simplified Experimental Design Strategy for Optimizing SFE Conditions", M. Bicking, 4th International Symposium on Supercritical Fluid Chromatography and Extraction, Cincinnati, OH, May, 1992.

"Optimized Determination of Plasticizers in PVC Samples by SFE", M. Bicking, J. Levy, 5th International Symposium on Supercritical Fluid Chromatography and Extraction, Baltimore, MD, January, 1994.

"SFE Optimization Strategies", M. Bicking and J. Levy, HPLC'94, Minneapolis, MN, May, 1994.

"Optimized Determination of a Sulfonated Dye by Reverse Phase Ion Pairing Liquid Chromatography", M. Bicking, MCF, Minneapolis, MN, May, 2002.

"Lessons Learned in Chromatographic Peak Integration", M. Bicking, MCF, Minneapolis, MN, May, 2005.

"Relative Peak Size, Integration, and the Resolution Equation", M. Bicking, 29th International Symposium on Capillary Chromatography, Riva del Garda, Italy, May, 2006.

"Retention Effects for Cationic Analytes on PFP Stationary Phases in Very Dilute Acid Mobile Phases", M. Bicking, R. Henry, MCF, Minneapolis, MN, May 2007.

"Comparison of HILIC and Reversed Phase Ultra-Fast LC Particles for Separating Very Polar Compounds," M. Bicking, R. Henry, Pittcon, Chicago, IL, March 2009.

"Tuning Selectivity to Improve Separations on PFPP Stationary Phases," M. Bicking, Pittcon, Chicago, IL, March 2009.

"Lessons Learned in the Validation of USP <467> - Residual Solvents in Pharmaceuticals," M. Wangsness, M. Bicking, MCF, Minneapolis, MN, May 2009.

"Comparison of HILIC and Reversed Phase Ultra-Fast LC Particles for Separating Very Polar Compounds," M. Bicking, R. Henry, MCF, Minneapolis, MN, May 2009.

"Tuning Selectivity to Improve Separations on PFPP Stationary Phases," M. Bicking, MCF, Minneapolis, MN, May 2009.

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“Development of a Normal Phase HPLC Method for the Separation of Creatinine and Purine Metabolites”, M. Bicking, B. Evans, Eastern Analytical Symposium, Somerset, NJ, November 2009.

“Preferred Columns and Conditions for Achieving Quantitative HPLC Performance in the HILIC Separation Mode” M. Bicking, B. Evans, Pittcon, Orlando, FL, March, 2010, Abstract No. 2330-2.

“Is a Second Retention Mechanisms in LC a Curse or Cure?”, M. Bicking, R. A. Henry, MCF, Minneapolis, MN, May 2014.

“Application of Zirconia Phases for Structurally Similar Compounds and other Difficult HPLC Separations”, K. Johnson, M. Bicking, R. Henry, Pittcon, New Orleans, LA, March, 2015.

“A Faster and More Efficient Method for Sugars”, M. Bicking, EAS, Princeton, NJ, November, 2019.

“Your LC Autosampler Can Make Mixtures or Calibration Standards”, M. Bicking, EAS, Princeton, NJ, November, 2019.

“Improved Options for Sugar Analysis by HPLC” , M. Bicking, Pittcon, Chicago, IL, March, 2020.

“Use Your Autosampler to Make Calibration Standards”, M. Bicking, Pittcon, Chicago, IL, March, 2020.

“Use Your Autosampler to Make Calibration Standards”, Chicago Chromatography Discussion Group (CCDG), April 22, 2021.

“A Simple Method for Predicting HPLC Selectivity in Ternary Reversed-Phase Solvent Systems”, MCF, Minneapolis, MN, May 5, 2022.

“A Simple Method for Predicting HPLC Selectivity in Ternary Reversed-Phase Solvent Systems (P-M-110)”, HPLC 2022, San Diego, CA, June 20, 2022.

“Optimizing Older UHPLC Systems for Use with New, Smaller ID Columns (P-T-719)”, HPLC 2022, San Diego, CA, June 21. 2022.

PROFESSIONAL MEMBERSHIPS:

American Chemical Society
Minnesota Chromatography Forum (MCF)
Chicago Chromatography Discussion Group (CCDG)
Member of the Gerson Lehrman Group (GLG) Council

PERSONAL:

In addition to a rather fanatical love for marching bands, I am also interested in performing trumpet music of the baroque era, particularly with organ accompaniment. I am also active in science education, coaching youth soccer, and writing about youth sports.