

Recovery of Bioproducts

Engineering Foundation Conference

Co-chairs

Charles L. Cooney, Massachusetts Institute of Technology, USA

Nils-Ingvar Olsson, Pharmacia Biotechnology AB, Sweden

Günter Schmidt-Kastner, Bayer AG, Germany

Honorary chair

Saburo Fukui, Kyoto University, Japan

Uppsala University Auditorium and Hotel Gillet, Uppsala, Sweden

11-16 May, 1986

Sunday, 11 May

Plenary Lecture

A General Review of Recovery of Bioproducts in China

Z. Xiong, Shanghai Institute of Pharmaceutical Research, China

Monday, 12 May

Membrane Technology

Session chairs

A. Michaels, Massachusetts Institute of Technology, USA

H. Stratman, Fraunhofer Institute, Germany

Membrane/Solute Interactions, and their Impact on UF/CFF Separations

A. Michaels, Massachusetts Institute of Technology, USA

Comparison of UF and Centrifugation

R. Datar, Alfa Laval AB, Sweden

Practical Aspects of Ultrafiltration Membrane Fouling

W. C. McGregor, Xoma Corp., USA

Protein Recovery via Precipitation and Membrane Separation

M. Hoare, University College London, UK

Continuous Removal of Bioreaction Products by Pervaporation

H. Strathman, Fraunhofer Institute, Germany

Extraction and Partitioning

Session chairs

M.-R. Kula, Gesellschaft für Biotechnologische Forschung, Germany

G. Johansson, University of Lund, Sweden

Enzyme Recovery by Continuous Crosscurrent Extraction

H. Hustedt, Gesellschaft für Biotechnologische Forschung, Germany

Liquid Extraction of Enzymes using Triazine Dye Affinity Ligands using Low-cost Aqueous Two-phase Systems

F. Tjerneld, University of Lund, Sweden

Enzyme Recovery by Liquid Extraction using Reversed Micelles

K. van't Riet, Agricultural University, The Netherlands

Preparative Countercurrent Chromatography

I.A. Sutherland, National Institute for Medical Research, UK

Tuesday, 13 May

Process Chromatography

Session chairs

M. Hearn, Monash University, Australia

J.-C. Janson, Pharmacia AB, Sweden

Criteria for Process Scale Optimization of Preparative Adsorption Chromatographic Systems

M. Hearn, Monash University, Australia

Scale-up of Gradient Elution Chromatogram

E.N. Lightfoot, University of Wisconsin, USA

Strategies for Optimization of Fixed-Bed Adsorption

H. Chase, University of Cambridge, UK

The Purification of Recombinant Gamma Interferon by Preparative FPLC

S. J. Brewer, Searle R & D, UK

Large Scale Purification of Recombinant Human Interferon by Combination of Immobilized Monoclonal Antibodies and Immobilized Metal Chelates

E. Hochuli, Hoffmann-La Roche Ltd, Switzerland

Process Chromatography of Small Molecules

M. R. Ladisch, Purdue University, USA

Lectures and Demonstration at Pharmacia AB Important Parameters when Scaling up Gel Filtration Separations

L. Hagel, Pharmacia AB, Biotechnology, Sweden

Kinetic Limitations in Ion-Exchange and Biospecific Affinity Chromatography

P. Hedman, Pharmacia AB, Biotechnology, Sweden

Practical Process Chromatography

D. Low, Pharmacia AB, Biotechnology, Sweden

Wednesday, 14 May

Downstream Processing Technologies in the Future

Session chairs

A. Atkinson, CAMR, UK

R. Hershberg, Genentech Inc., USA

Protein Refolding

P. Johnston, Genentech Inc., USA

Future Prospects in Downstream Processing

C. Lowe, University of Cambridge, UK

Recovery of Proteins from Dilute Solutions Using Reversed Micelles

T. A. Hatton, Massachusetts Institute of Technology, USA

Genetic Approaches to Down-Stream Processing-Secretion and Affinity Purification

M. Uhlén, Royal Technical University, Sweden

Principles of Optimized Industrial Mammalian Cell Culture for Producing Purified Proteins

S. Rose, Babagene, USA

Novel Continuous Sorption Processes for the Recovery of Bioproducts

J. P. Van der Wiel, Delft University of Technology, The Netherlands

Workshop Sessions

Cross-Flow Filtration vs. Centrifugation

Preservation of Biological Activity in DSP (including protein refolding)

Affinity and Immunoaffinity Chromatography

HPLC/FPLC and New Support Materials

Sensors for Monitoring and Automation in DSP Extraction and Concentration including Batch Adsorption

Electrokinetic Separations

Controlling Monitoring and Computers in Downstream Processing

Session chairs

D. Wang, Massachusetts Institute of Technology, USA

A. Holmberg, Rintekno Oy, Finland

Computer Based Management and Documentation of Pharmaceutical Processes

A. Holmberg, Rintekno Oy, Finland

Automated Production Scale Affinity Chromatography

A. C. Kenney, Celltech Ltd, UK

Online Measurement of Enzymes for Process Control Purposes

K.H. Kroner, Gesellschaft für Biotechnologische Forschung, Germany

Use of ASPEN for Modelling Downstream Processes

L. Evans, Massachusetts Institute of Technology, USA

Thursday, May 15

Recovery of Products from Mammalian Cell Culture

Session chair

A. van Wezel, Rijksinstituut voor Volksgezondheid, The Netherlands, J. Birch, Celltech, UK

Downstream Processing of Biologicals Produced by Animal Celltechnology

A. van Wezel, Rijksinstituut voor Volksgezondheid, The Netherlands

Production of Human Interferon Beta with Microcarrier Culture Systems

M. Iizuka, Toray Industries Inc., Japan

The Use of Immobilized Monoclonal Antibodies for Industrial Scale Production

A. C. Kenney, Celltech, UK

Large Scale Recovery of Surface Antigen from Genetically Engineered Mammalian Cells by Immunoaffinity Chromatography and Classical Chromatography Methods

R. Hershberg, Genentech Inc., USA

Large Scale Purification of Bioactive Proteins from Mammalian Tissues

J. Shiloach, National Institutes of Health, Bethesda, USA

Removal of Growth Inhibitory Products from Cell Culture Bioreactor

W.-S. Hu, University of Minnesota, USA.

Poster Sessions

Recovery of Biochemical Components from Fish Waste by Crossflow Filtration

Karl A. Almås and Asbjörn Gilberg, Institute of Fishery Technology Research and Olav Thorstad, Norsk Hydro A/S, Norway

Novel DNA Enzymes: A New Class of Site-Specific Endonucleases Isolated from Yeasts

T. Ando, T. Shibata, H. Watabe, T. Iino and T. Kaneko, RIKEN Institute, Japan

Separation of Proteins: Scaling up with Trisacryl® LS

E. Boschetti and P. Girot, IBF-Biotechnics, France, J. Saint-Blanchard C.T.S.A. Jean Juillard, France

Bacteriophage-Induced Lysis Improves the Yield of Enzymes from Escherichia coli

Anthony S. Breeze, Heriot-Watt University, UK

Centrifugal Product Recovery and Influence of Fermentation

K.-H. Brunner, Westfalia Separator AG, Germany

Fractionation of Steam-Exploded Wood

Henry R. Bungay, Maria Garcia-Caro, Leonore S. Clesceri and Brian E. Foody, Rensselaer Polytechnic Institute, USA and Iotech Corporation, Ltd., Canada

Use of Magnetically Stabilized Fluidized Beds for Continuous Bioseparations

Mark A. Burns and David J Graves, University of Pennsylvania, USA

Alkaline Protease Recovery by Membrane Filtration

J. M. S. Cabral, C. L. Cooney and E. Robinson, Massachusetts Institute of Technology, USA

Affinity Separations Using Foam Fractionation

Ruben G. Carbonell, North Carolina State University, USA

Removal of Cell and Cell Debris by Electrostatic Adsorption

Chan Wha Kim, Sung-Koo Kim and Cho Kyun Rha, Massachusetts Institute of Technology and Elizabeth Robinson, Genzyme Corporation, USA

Desorption Recovery of an Electrostatically Absorbed Protein (Beta-Galactosidase), using Polyethylene Glycol/Potassium Phosphate Aqueous Two-Phase Systems

Chan Wha Kim, Sung-Koo Kim and ChoKyun Rha, Massachusetts Institute of Technology, USA

Modified Membranes for the Recovery of Bioproducts

H. Chmiel and F.J. Germer, Fraunhofer-Institut für Grenzflächen und Bioverfahrenstechnik, Germany

The Pleiade Plate and Frame System for the Cross Flow Membrane Filtration in Bioindustry

G.Cueille, Rhône-Poulenc Recherches, France

Ion Exchange Chromatography for Protein Production at a Large Industrial Scale: The Spherosil Process

G. Cueille, Rhône-Poulenc Recherches, France

Gels and Size Selective Extraction Solvents

E.L. Cussler, University of Minnesota, USA

Separation of Bioactive Lipid Components from Fish Oil by Supercritical Fluid Extraction

Edel Elvevoll and Karl A. Almås, Institute of Fishery Technology Research, Norway

A Ceramic Tube Bioreactor for the Recovery of Biosynthetic Precursor

Isao Endo, The Institute of Physical and Chemical Research, Japan

Role of Proteases in Down-Stream Processing of rDNA Products

Sven-Olof Enfors, Halldis Hellebust and Andres Veide, The Royal Institute of Technology, Sweden

An Integrated Bioreactor-Separator: In-Situ Recovery of Fermentation Products by a Novel Membrane-Based Engineering

G.T. Frank and K.K. Sirkar, Stevens Institute of Technology, New Jersey

Chemical and Physical Concepts of Isolation and Purification of Bioactive Materials from Fermentation Broths

Louis S. Fries and Laszlo R. Treiber, Merck Sharp and Dohme Research Laboratories, USA

Chromatographic Separation of Proteins by Gradient-Elution

Shintaro Furusaki and Etsuro Haruguchi, University of Tokyo, Japan

Separation and Fractionation of Proteins via Precipitation with Polyelectrolytes

Charles E. Glatz and Kathleen M. Clark, Iowa State University, USA

On-line Process Liquid Chromatography, A Useful Tool in Biotechnology Processes

J. C. Gressin, Rhône Poulenc Santé, France

Fractionation of Plasma Proteins by Chromatography

D. Hasko, M. Salamon and K. Bartha, National Institute of Haematology and Blood Transfusion, Hungary

Purification of Carcinoembryonic Antigen (CEA) Derived from the Culture of Human Stomach Cancer Cell

T. Hoshi, S. Harie, A. Isoai and K. Uchida, Asahi Glass Co. Ltd., Japan

Purification of Human Insulin

F.E. A. Van Houdenhoven, Diosynth, The Netherlands

The Automated Immunoaffinity Purification of Human Pituitary Follicle Stimulating Hormone

G.W. Jack, R. Blazek, K. James and J. Boyd, Centre for Applied Microbiological Research, UK

Protein Separation from Lab Size Column to Large Scale on Fractogel TSK Size Exclusion Media

W Johannssen, J. Seubert and P. Kirch, E. Merck, Germany

Laser Beams Extract Useful Substances from Microorganisms

A. Katayama, IHI, Japan

Effects of Coupling Methods and Concentrations of Ligands on Equilibrium Characteristics in Immuno-Affinity Chromatography

Shigeo Katoh, Kyoto University, Japan

Application of Membrane Separation in Isolation of Antibiotics

Kégl L., Sziva D. and Järai M. Chinoin, Pharmaceutical and Chemical Works, Hungary

Large Scale Purification of Proteinase K

P. Kirch, J. Seubert and J. R. Friedle, E. Merck, Germany

Applications of Supercritical Carbon Dioxide Extraction to Solvent Recovery from Antibiotics and Sterilization of Bioactive Products

Takeshi Kobayashi, Nagoya University, Japan

Recent Studies of Dynamic Filtration in Enzyme Recovery

K. H. Kroner, B. Riesmeier, and M.-R. Kula, Gesellschaft für Biotechnologische Forschung mbH., and V. Nissinen, Helsinki University of Technology, Finland

Flocculation as a Method for Improved Cell Debris Removal by Centrifugation

Björn Lindman, Alfa-Laval AB, Sweden

Flow Efficiency in Production Scale Chromatography Columns

A.F. Mann, Amicon, UK, and L. Charles, Amicon, Switzerland

Media Characteristics for Large Scale Operation

A. F. Mann, Amicon, UK, and L. Charles, Amicon, Switzerland

Modular Preparative Chromatograph

A. F. Mann, Amicon, UK

Evaluation of Ultrafiltration Membranes and Systems for Cross-Flow Filtration of Streptomyces Culture Broth

H.R. Marfurt and H. Pfenninger, Ciba-Geigy AG, Switzerland

Affinity Purification as an Initial Step when Isolating Enzymes from Cellhomogenates. Affinity Partition Using Biospecific Chromatographic Particles in Aqueous Two-Phase Systems

Bo Mattiasson, University of Lund, Sweden

Monoclonal Antibody Mediated Immunoaffinity Purification of IgM

G.Mitra, J. Berkner, E. Hall and J. Bloom, Cutter Biological, USA

Studies on Mechanic Decompression for Disrupting Micro-Organisms and Partition of E. coli Cell Homogenate Components in Aqueous Two-Phase Systems

V. J. Nissinen and P. Markkanen, Helsinki University of Technology, Finland

Engineering Analysis of Counteracting Chromatographic Electrophoresis

Bruce Locke, Ruben Carbonell and David Ollis, North Carolina State University, USA

Ultrafiltration and Microfiltration in Recovery of Bioproducts

Ole Jantoft Olsen, DDS RO-Division, Denmark

FPLC as a Tool for Recovery Process Design in the Downstream Recovery of Proteins in Biotechnology

Kenneth Olson, Roger Pai and William Bennet, Genentech Inc., USA

Cell Ultrafiltration and recycling for High Productivity Acetone-Butanol Continuous Fermentations

P. Pierrot, M. Fick, J. M. Engasser, Institut National Polytechnique de Lorraine, France

Scaling Up in Normal and Reverse Phase Chromatography

P. Rahnand, Amicon, USA, and F. Mann, Amicon, UK

The Recovery of Monoclonal Antibodies by Membrane Separation

P. W. Runstadler, C. W. Bryant, Verax Corporation, USA

A New Affinity-Based Approach for the Large Scale Separation of Bioproducts

M. Schneider, C. Guillot, B. Lamy, Battelle Geneva Research Centres, Switzerland

Analytical Protein Separation: An Increase in Speed Through Automated Multicolumn FPLC

Horst Schütte, Werner Hummel and Maria-Regina Kula, Gesellschaft für Biotechnologische Forschung mbH, Germany

Isolation and Purification of Immunglobulin G: A Process Improvement State

Warren E. Schwartz, Fiona M. Clark and Ira B. Sabran, Whatman Inc, USA

The Purification of Fermentation Products by Preparative Reversed-Phase HPLC

R. Sitrin, P. DePhillips and J. Dingerdissen, Smith Kline and French Laboratories

Large Scale Isolation of Membrane Bound Enzymes (Chromatophores) from Rhodospirillum Rubrum

Anna-Lisa Smeds and Sven-Olof Enfors, The Royal Institute of Technology, Sweden

Pervaporation

Sodeck Gottfried, Vogelbusch Ges, m.b.H, Austria

Affinity Purification of Monoclonal Antibodies

Selby John Starkie, Boldrock Ltd, England

Filtration of Disrupted Yeast

Z. Su, H.H. Kleizen, J. Van Brakel, J.A. Wesselingh, Delft University of Technology, The Netherlands

An Electrostatic Scheme for the Partition of Proteins in Aqueous Two-Phase Systems

Sung-Koo Kim, Chan Wha Kim, and ChoKyun Rha, Massachusetts Institute of Technology, uSa

Separation of Aminoacids and Proteins by Electrodialytic Focusing

E. Strathmann, W. Gudernatsch, F.J. Gerner, Fraunhofer-Institut für Grenzflächen- und Bioverfahrenstechnik, Germany

Successive Purification of Several Enzymes Having Affinities for Phosphoric Groups of Substrates by Affinity Chromatography on P-Cellulose

Isamu Takagahara, Yasuo Suzuki, Tuyoshi Fujita, Juni-iti Yamauti, Katsumi Fujiz, Jinpei Yamashita and Takekazu Horio, Oriental Yeast Co., Ltd., Japan

Chromatographic Separation of Ergot Alkaloids. Scaling up from Laboratory Equipment to Fully Automatic Industrial HPLC

Turci G. Piero, Varesio Carlo and Murador Enzo, Farmitalia, Italy

Purification of r-DNA products with Free-Flow-Electrophoresis

Hans Paul Walliser, Ciba-Geigy Ltd, Switzerland

Chemically Induced Cell Permeabilization

Henry Y. Wang and David J. Hettwer, The University of Michigan, USA

Penetration of Protein into Porous Support

J. P. Van der Wiel, J. M. Schnell, J. Van Brakel, J. A. Wasselingh, Delft University of Technology, The Netherlands

Isolation of Polygalacturonase from A. Niger by Affinity Chromatography and Modification of the Adsorbents for Large Scale Operation

J. Visser, F.M Rombouts, G. Eggink and K. Vant Riet, Agricultural University, The Netherlands

A Simple Process for the Isolation of Gammaglobulin and Albumin from Human Plasma. The Process is an Expansion of the Heat Precipitation Method of W. Schneider et al.

Anders Winter and Ulla Moberg, LKB-Produkter AB, Sweden

Nuclease Treatments During Protein-Isolation to Remove Nucleic Acid Contaminants

D.Zabriskie and M. DiPaolo, Smith Kline and French Laboratories, USA

A Monoclonal Antibody Based Reagent for the Immunopurification of Recombinant Interleukin 2

P. Mattock, D. Brady and C.R. Hill, Celltech Limited, UK

