

## ANURAG SINGH RATHORE

Department of Chemical Engineering  
Indian Institute of Technology Delhi  
Hauz Khas, New Delhi, 110016, India

Phone: 9650770650  
E-mail: [asrathore@biotechcmz.com](mailto:asrathore@biotechcmz.com)  
Website: [www.biotechCMZ.com](http://www.biotechCMZ.com)

### EDUCATION

Ph.D. in Chemical Engineering, Yale University, New Haven, CT November, 1998  
Thesis title: “*Studies on separation of peptides and proteins by capillary electrophoresis and liquid chromatography*”  
Thesis advisor: Prof. Csaba Horvath, Yale University, New Haven, CT  
M.S. in Chemical Engineering, Yale University, New Haven, CT May, 1995  
B.Tech. in Chemical Engineering, IIT-Delhi, New Delhi, India June, 1994

### EXPERIENCE

**Professor, Department of Chemical Engineering, IIT Delhi, New Delhi, India (December 2012 to present). Associate Professor (June 2009 to December 2012).**

**Created a group focused on Bioprocessing and Bioseparations.** Group consists of 15 post-doctoral fellows, 30 PhD, 4 M Tech and 10 B. Tech. students. The group has approximately 5 million US\$ in research funding. Key ongoing projects include:

- Continuous processing for production of biotherapeutics
- Development and characterization of biosimilars
- Implementation of Quality by Design in biotechnology
- Process analytical technology (PAT)
- Multivariate data analysis (MVDA)
- Computational fluid dynamics (CFD)
- Modeling of biotech unit operations
- Scientific and regulatory issues around approval of biosimilars

### **Director, Process Development, Amgen Inc. (March 2003 to May 2009)**

- **Led** a group of 30 scientists and engineers that work in the different project teams for a late stage project. Key activities for the group include:
  - Creation of commercial process and analytical technology
  - Process scale-up from pilot scale to clinical scale and from clinical to commercial scale
  - Technology support for Phase III campaign
  - Identification of a Third Party Manufacturer (TPM) for commercial manufacturing if required
  - Technology transfer to the TPM or other Amgen manufacturing sites
  - Process characterization
  - Process validation
  - Regulatory filings: IND, Briefing Document, BLA, etc.
  - Other activities leading to product launch including Pre-Approval Inspections
  - Process Analytical Technology (PAT)
  - Quality by Design (QbD)
- **Led** a team that developed Amgen’s approach towards Process Characterization, Validation, In-Process Controls and Monitoring (CVIM) followed by implementation across Amgen’s manufacturing network for products under commercialization and legacy products
- **Participated** in creation of the Amgen Commercialization Process, including Commercial Process Development, Technology Transfer, and Process Comparability
- Provide **technical leadership and mentorship** within the Process Development group by:
  - Actively **presenting and publishing** in external conferences and journals
  - **Organizing** sessions at major meetings
  - **Creating** professional development opportunities for peers and junior staff

### **Senior Process Engineer, Bioprocess Sciences, Pfizer Corporation (January 1999 to March 2003)**

- **Led Somavert Process Team** to approval of the product from the EMEA (Nov 02) and FDA (Mar 03). Key activities included:
  - Identification and validation of post-Phase III changes in the purification process
  - Technology transfer from one Third Party Manufacturing (TPM) site to another
  - Technology support for manufacturing of launch supplies
  - Responses to queries from regulatory agencies
  - Technology support for site inspection by EMEA and FDA
  - Process validation and support of other critical activities leading to product launch

- **Performed** evaluation of different TPMs as possible manufacturing sites and **performed process modeling** for estimation of the COGS for use in site-selection
- **Evaluated novel technologies**, such as expanded bed adsorption (EBA) and osmotic shock
- **Participated** in due diligence of potential projects for in-licensing
- **Supervised/ mentored** staff

#### Research Assistant, Yale University (August 1994 to January 1999)

- **Conceived** of novel applications utilizing **cyclodextrins as selectivity enhancers** in electrophoretic separation of proteins and peptides
- **Established** LC and CE methods for **separating cis-trans isomers** of peptidyl-proline containing peptides like Angiotensin I at temperatures of upto -20 °C and measuring kinetic parameters

#### HONORS & AWARDS

- 2023 Appointed member of CII National Forum on Industry-Academia Partnership for R&D and Innovation
- 2023 Awarded Tata Transformation Prize 2023
- 2023 Appointed Editor-in-Chief, The AAPS Journal, a Springer Journal
- 2023 CII National Committee on Biotechnology 2023 -24
- 2023 Advisory Board of the Mumbai Biocluster Foundation
- 2023 DBT Sectoral Expert Committee on Biomanufacturing of Precision Biotherapeutics-Monoclonal Antibodies
- 2023 FITT Industry Partnerships Award 2023
- 2023 Appointed, Expert Working Group-Biologicals and rDNA Derived Therapeutic Products, Indian Pharmacopoeia Commission
- 2023 Aegis Graham Bell Award for Innovation in Manufacturing
- 2022 UGC Committee for Fast Track Promotions
- 2022 Research and Innovation Council, JSS University, Mysore
- 2021 Appointed Member, Working Group to Review Current Biosimilar Guidelines, Department of Biotechnology, Ministry of Science and Technology, Government of India.
- 2021 Advisory Editorial Board, *Journal of Chromatography Open*, Elsevier
- 2020 Editorial Advisory Board, *Journal of Chromatography B*, Elsevier
- 2020 Agilent Thought Leader, Agilent Technologies, USA
- 2020 CII National Committee on Biotechnology 2020 -21
- 2020 Joined Editorial Board, *Electrophoresis*, Wiley
- 2019 Institute Chair, IIT Delhi
- 2019 Dean, Corporate Relations, IIT Delhi
- 2017 Appointed Member, NITI Aayog Committee for Evaluation of NIPERs
- 2016 Appointed Associate Dean, Corporate Relations, IIT Delhi
- 2015 Awarded the Center of Excellence for Biopharmaceutical Technology by DBT, India
- 2015 Selection Committee, IIT Patna
- 2015 Appointed Member, Scientific Expert Committee, National Institute of Biologicals, Government of India
- 2015 Appointed Member, Management Advisory Committee for BIRAC Bio-Incubator at NCR Biotech Science Cluster Faridabad, BIRAC, Department of Biotechnology
- 2015 Appointed Member, IP & Technology Management Advisory Committee, BIRAC, Department of Biotechnology
- 2013 Started the Bioprocessing India Conference Series
- 2013 Appointed Chairman, Committee for Advising the DCGI on Regulation of Biotech Products (r-DNA product), Ministry of Health and Family Welfare, Government of India.
- 2013 Appointed Member, Scientific Advisory Committee, Bio Processing Unit, Department of Biotechnology
- 2012 Appointed Expert Member, Biotechnology Ignition Grant (BIG) from Department of Biotechnology, IIT Delhi
- 2012 Appointed Member, Scientific Advisory Board, Pall Life Sciences, USA
- 2012 Appointed Associate Editor, *Journal of Chemical Technology and Biotechnology*
- 2012 Joined BIRAC Technical Expert Committee for Translational Facilities, Biotechnology Industry Research Assistance Council, Department of Biotechnology.
- 2011 Joined Task Force to Frame Guidelines for Submission of Dossiers or Proposals for Regulation of Biotech Products (r-DNA product), Ministry of Health and Family Welfare, Government of India.
- 2011 Joined Scientific Body, Indian Pharmacopoeia Commission, Ministry of Health and Family Welfare, Government of India.
- 2011 Advisory Board, *Dr. Reddy's Laboratory*
- 2010 Evaluation Committee, *Dutch Technology Foundation STW*, The Netherlands
- 2010 Selection Committee, Fulbright-Nehru Postdoctoral Fellowships, *United States-India Educational*

- Foundation*, New Delhi
- 2010 Scientific Committee, *Fondazione Cariplo*, Italy
- 2010 Appointed Editor-in-Chief, *Preparative Biochemistry and Biotechnology*, a Taylor and Francis Journal
- 2009 Appointed Associate Editor, *PDA Journal of Pharmaceutical Science and Technology*
- 2009 Joined Advisory Board, *GE Healthcare (Bioprocessing Division)*
- 2009 Joined Technical Advisory Board, *Intas Biopharmaceuticals Limited*
- 2009 Joined Scientific and Education Advisory Council of the *National Institute for Pharmaceutical Technology and Education (NIPTE)*
- 2008 Appointed member of Editorial Advisory Board, *Biotechnology Progress*
- 2008 Appointed Series Editor, *Biotechnology and Bioprocessing Series, Wiley Interscience*
- 2007 Joined Editorial Advisory Board for *Pharmaceutical Technology Europe*
- 2007 Guest Editor for special issue of *Biotechnology Progress* for ACS meeting
- 2006 Appointed on Biotechnology Advisory Board for *Parenteral Drug Association (PDA)*
- 2005 Appointed Adjunct Faculty, Department of Chemical Engineering, *University of California at Los Angeles (UCLA)*
- 2005 Joined Editorial Advisory Board for *BioPharm International*
- 2004 Joined Editorial Board for *Journal of Biochemical and Biophysical Methods*
- 2004 Joined Editorial Board for *Separation and Purification Reviews*
- 2004 Joined Program Planning Committee for *2005 PDA Annual Meeting*
- 2002 Appointed Series Editor, *Biotechnology and Bioprocessing Series, Taylor & Francis*
- 2002 Appointed Series Editor, *Elements of Biopharmaceutical Production, Biopharm International*
- 2002-03 Appointed Adjunct Faculty, Department of Chemical Engineering, *University of Washington at St. Louis*
- 1996-98 Elected Member, *Assembly of Graduate Students, Yale University*
- 1994-98 *Yale University* Fellowship and Research Assistantship

## AFFILIATIONS

- American Chemical Society (ACS)
- Parenteral Drug Association (PDA)
- Indian Institute of Chemical Engineers (IChE)

## BOOKS

1. Process Validation in Manufacturing of Biopharmaceuticals, Edition 3, Ed. By A. S. Rathore, H. Baseman and S. Rudge, Taylor and Francis, 2023.
2. Preparative Chromatography for Separation of Proteins and Peptides, Ed. By A. Staby, A. S. Rathore, and S. Ahuja, Wiley Interscience, 2017.
3. Process Validation in Manufacturing of Biopharmaceuticals, Edition 2, Ed. By A. S. Rathore and G. Sofer, Taylor and Francis, 2012.
4. Quality by Design for Biopharmaceuticals: Perspectives and Case Studies, Ed. by A. S. Rathore and R. Mhatre, Wiley Interscience, 2009, New Jersey.
5. Elements of Biopharmaceutical Production Series, Ed. By A. S. Rathore, Advanstar Communications, New York, 2007.
6. Process Validation in Manufacturing of Biopharmaceuticals, Ed. By A. S. Rathore and G. Sofer, CRC Press, 2005.
7. Electrokinetic phenomena: Principles and Applications in Analytical Chemistry and Microchip Technology, Ed. by A. S. Rathore and A. Guttman, Marcel Dekker, 2003.
8. Scale-up and Optimization in Preparative Chromatography, Ed. by A. S. Rathore and A. Velayudhan, Marcel Dekker, 2002.

## TECHNOLOGIES DEVELOPED

1. An innovative coiled flow inverted reactor for continuous refolding of denatured recombinant proteins (patent application filed for US and for India)
2. Creation of a novel aqueous two-phase extraction process for purification of biotech therapeutics (patent application filed for US and for India)
3. Creation of a novel single step process for purification of biotech therapeutics (patent application filed for US and for India)
4. CFD modeling of a helical coil heat exchanger to aid in scaleup from lab to manufacturing scale for Ranbaxy Laboratories
5. Creation of a high throughput process development (HTPD) protocol for development of biotech processes for GE Healthcare

6. Proposed a novel approach for using multivariate data analysis (MVDA) for evaluating comparability of biotech processes and products for Dr Reddy Laboratories
7. Developed a process analytical technology (PAT) based control scheme for a process chromatography column for Biocon Ltd.
8. Creation of manufacturing process for Granulocyte Colony Stimulating Factor (GCSF), a biotech therapeutic - in negotiation with Indian biotech companies for licensing.

## FILED PATENT DISCLOSURES

1. Anurag S. Rathore, Garima Thakur, Nikita Saxena, "System and method to control a continuous biopharmaceutical manufacturing", application 202121004083 filed on 29th January 2021 at the Indian Patent Office.
2. Anurag S. Rathore, Garima Thakur, Nikita Saxena, "Surge tank based system for automated operation and control of continuous biopharmaceutical manufacturing", application 202011034558 filed on 11th August 2020 at the Indian Patent Office. Published, Application awaiting examination in India
3. Anurag S. Rathore, Garima Thakur, Vishwanath Hebhi, Tushar Savane, "A system for real time monitoring of protein and excipients", application 202011007820 filed on 24th February 2020 at the Indian Patent Office. PCT/IN2021/050176 filed on 24 February 2021. Published. Application awaiting examination in India / Published Internationally
4. Anurag S. Rathore, Purva Bhojane, Md. Areeb Afzal, "Fingerprinting Biotherapeutics with FTIR Spectroscopy", Indian Patent Application 201911032987 filed on 30th August 2019 at the Indian Patent Office. Published / Under Examination / Intl REQUEST FOR EXAMINATION filed on 17.08.2020
5. Anurag S. Rathore, Ashish Chauhan, S. Kathiresan, "Bioprocess Performance Enhancing Strains Of Escherichia Coli", Indian Patent Application No. 201911033511 dated August 20, 2019 Published. Application awaiting examination in India
6. Anurag S. Rathore, Nikhil Kateja, Nitika Singh "A process for preparation of pegylated therapeutic proteins", Indian Patent Application 201911049731 filed at the Indian Patent Office. PCT/IN2020/050999 filed December 3, 2020. Published / Application awaiting examination in India / Published Internationally
7. Anurag S. Rathore, Garima Thakur, Vishwanath Hebhi, "An NIR based Real -time control of loading in protein A chromatography", Application IN100482 filed on 28th March 2019 at the Indian Patent Office, PCT/IN2020/050264 filed on March 20, 2020, Publication number WO 2020/053875 on March 19, 2020.
8. Anurag S. Rathore, Claire Komives, Vishwanath Hebhi, S. Kathiresan, "Process for producing recombinant peptides", application PD028671IN filed on 14th September 2018 at the Indian Patent Office. PD028671PCT filed on 24th June 2019. Appl.No PCT/IN2019/050471 & WO 2020053875 Published Internationally
9. Gaurav Goel, Anurag S. Rathore, Avinash Mishra, Rohit Bansal, "Polypeptide sequence and composition thereof", Disclosure 201711030494 filed on 28 September 2017 the Indian Patent Office. Reply Filed. Application in amended examination.
10. Anurag S. Rathore, V. Haridas, R. Bansal, Soumili Chattopadhyay, Sameer Dhawan, "A formulation for stabilizing biotherapeutics", PD022345IN filed on 9th December 2016, PD022345PCT filed on 8th June 2017.
11. Anurag S. Rathore, Mili Pathak, Viki Chopda, "Method for monitoring of foulants present on chromatographic resins using fluorescence probe", Patent Application No. 201611015421, filed June 7, 2016 at the Indian Patent Office, Date of Grant: 23 January 2020, Patent number: 330088. PCT/IN2017/050035 filed 12th July 2018. US Patent App. 16/069,745.
12. Anurag S. Rathore, Claire Komives, "Scaleable, low cost method of making snake antivenom peptide(s) and uses thereof", application 778/DEL/2015, filed 20th March 2015 at the Indian Patent Office. Indian patent 341561 granted on 14th July 2020.
13. Anurag S. Rathore, K. D. P. Nigam, Mili Pathak, Harshit Agarwal, Abhishek Kumar Sharma, Nikhil Kateja, Vishwanath Hebhi, "An innovative coiled flow inverted reactor for continuous refolding of denatured recombinant proteins", application 185/DEL/2015 filed 21st January 2015 at the Indian Patent Office, PCT/IN2016/000022 filed 20th January 2016. Published Internationally
14. Darpan Gupta, Rahul Bhambure, Rohit Sharma, Anurag S. Rathore "A process for purification of recombinant granulocyte colony stimulating factor", Application 1880/DEL/2012, filed 19th June 2012 at the Indian Patent Office. PCT application 13/921891 filed 19th June 2013 at US Patent Office.
15. Anurag S. Rathore, Stephen B. Lyle, David E. Steinmeyer, Scott I. Allen, John Meyer, Denis M. Boyle, John J. Buckley, Gary V. Johnson, "Method for the preparation of growth hormone and antagonist thereof having lower levels of isoform impurities thereof", application # 20040048315, filed 26th August 2003, granted 3rd April 2012, US patent number 8148331.
16. Denis M. Boyle, John J. Buckley, Gary V. Johnson, David E. Steinmeyer, Michele Toal, Serdar Aykent, Anurag S. Rathore, "Methods for decreasing aggregate levels of pegylated growth hormone antagonists", filed Sep 22nd 2003, granted 30 December 2008, US patent number US7470779B2 International Application No. PCT/US2003/026498, Publication Number- WO2004031213.

## SCIENTIFIC LEADERSHIP

- **Major Editorial Responsibilities**
  - *Editor-in-Chief* of *Preparative Biochemistry and Biotechnology* (a Taylor and Francis journal, 2010-present)
  - *Associate Editor* for *Journal of Chemical Technology and Biotechnology* (2012-present) and *PDA Journal of Pharmaceutical Science and Technology* (2009-2015)
  - *Editorial Board Member* of *Biotechnology Journal* (2020-present), *Separation and Purification Reviews* (2004-present), *Biotechnology Progress* (2008-present), *Electrophoresis* (2020-present), *Journal of Chromatography B* (2020-present), and *Journal of Chromatography O* (2021-present).
- **External Committees**
  - Working Group to Review Current Biosimilar Guidelines, Department of Biotechnology, Ministry of Science and Technology, Government of India
  - BIRAC Technical Expert Committee for Translational Facilities, Biotechnology Industry Research Assistance Council, Department of Biotechnology
  - NITI Aayog Committee for Evaluation of NIPERs
  - CII National Committee for Biotechnology
  - UGC Committee for Fast Track Promotions
  - Selection Committee – IIT Patna, Shiv Nadar University, IIT BHU, NIPER Ahmedabad, and others
- **Conference Organization**
  - Initiated the *Bioprocessing India* conference series in 2013. Seven international conferences have been organized under this series thus far at IIT Delhi, IIT Chennai, IIT Mumbai, CIAB Mohali, IIT Guwahati, and NCL Pune.
  - Have been a co-organizer for numerous events for *American Chemical Society*
- **Technology Licensing**
  - *More than 30 projects* have been taken from industry for technology development and the resulting technologies successfully transferred to the sponsor.
  - These project, with net value more than **20 Crores**, have been successfully completed with industry partners, thereby highlighting our ability towards technology development
- **Start-ups**
  - *Clensta International*: a biotechnology start-up to improve the National Hygiene condition whilst addressing the aspect of water conservation. Clensta works to create innovative healthcare solutions to make hygiene accessible for anyone, anytime, and anywhere. With annual revenue exceeding 15 Crores INR, Clensta is on the way to be the next unicorn.
  - *Edna Biotech*: Launched in IIT Delhi in 2020, Edna BioLabs produces specialty enzymes for the Indian and global market. Our initial product offering includes enzymes in the molecular biology and mass spectrometry segments, as well as derivative products including kits and reagent mixes. With more than 30 products selling on the market already, Edna aspires to be a future deep-tech biotech unicorn.
  - *Growdea Technologies* is an in-silico life science company focusing on application of AI/machine learning & high-end computational techniques to address current problems in biology, incorporated in 2018. They also design applications to automate computational biology process and minimize human intervention.
- **Public Outreach Activities**
  - Initiated *Bioprocessing Society India* in 2021 to facilitate exchange of ideas and information amongst students, academia and scientists in government organizations and industry in bioprocessing, to foster professional programs such as scientific conferences and scientific publications to offer an avenue for sharing scientific developments in this field, and to promote education in bioprocessing.
  - Have been organizing the *COE for Biopharmaceutical Technology (CBT) Training Event* since 2017. More than 1000 participants from industry and academia have been trained thus far.
  - *Research and Innovation Council, JSS University*, Mysore, involves mentoring JSS towards achieving academic and research excellence.
- **Institutional Administrative Responsibilities**
  - *Dean, Corporate Relations, IIT Delhi (2016-2022)*: Established this new function at IIT Delhi. Today IIT Delhi boasts of one of the most successful with respect to academia-industry collaborations.
  - *Coordinator, COE for Biopharmaceutical Technology (CBT), IIT Delhi*: Was awarded CBT in 2015 by DBT. Today CBT offers infrastructure and the facilities to perform end-to-end processing, cloning, shake flask process development, bioreactor process development, protein purification, protein formulation, and analytical and functional characterization.

## RESEARCH GRANTS (As PI)

1. Quality by Design (QbD) based process development for biosimilar products, GE Healthcare, Sweden, 28 Lakhs, March 2013 (3 years)
2. Fundamental Studies and Industrial Applications in Membrane Adsorbers, Sartorius Stedim, Germany, 37 Lakhs, July 2013 (3 years)
3. Use of Bio-Separation Technologies in PAT and QbD based Process, Pall Life Sciences, 8 Lakhs, September 2013 (3 years)
4. Platform Development for Design, Characterization and Implementation of PAT Based Process Control Schemes for Downstream Biotech Processes, DBT, 72 Lakhs, September 2013 (3 years)
5. Creation of a Decoupled Input-Output Linearizing Controller for Bioprocess Applications, DST, 33 Lakhs, December 2012 (2 years)
6. Process Development and Optimization Studies for Therapeutic Biotech Products, Dr. Reddy Laboratories, 28 Lakhs, September 2012 (1 year)
7. Evaluation of CEX and HIC Process Steps for Purification of Monoclonal Antibody Based Therapeutics, Dr. Reddy Laboratories, 55 Lakhs, February 2015 (2 years)
8. Aggregation of Monoclonal Antibody Based Therapeutics – Effect of Processing and Storage, Dr. Reddy Laboratories, 40 Lakhs, February 2014, 2 years
9. Imaging Technologies to Understand Bioseparations, UGC-UKIERI, 25 Lakhs, March 2014, 2 years
10. Use of Membrane Chromatography for Purification of Monoclonal Antibody Therapeutics, Pall Life Sciences, France, 45 Lakhs, February 2015, 1 year
11. Understanding the role of raw material attributes in influencing the critical quality attributes of a pharmaceutical product, DSM Sinochem, 37 Lakhs, September 2015, 1 year
12. Creation of a Process Understanding of Chromatographic Performance Loss during Biotherapeutic Manufacture DST EPSRC, 4 Crores, October 2014, 3 years
13. Stability and processing of high concentration monoclonal antibody products, Biocon Corporation, 85 Lakhs, January 2016, 2 years
14. Use of Surface Plasmon Resonance for Characterization of Biosimilars, GE Healthcare, 35 Lakhs, January 2016, 2 years
15. Continuous Processing for Production of Biotech Therapeutics, DST, Biocon, Pall Life Sciences, 15 Crores, September 2016, 3 years
16. Development of a Low-Cost Therapy for Biological Toxins for Rural India, DBT, 71 Lakhs, May 2017, 2 years
17. CFD Applications in Bioprocessing, Ansys Corporation, 20 Lakhs, January 2016, 5 years
18. Applied of ALD Coating of APIs in the Pharmaceutical Industry, Applied Materials, USA, 65 Lakhs, August 2017, 1 year
19. ALD Coating for Enhancing Stability of Biopharmaceutical Products, Applied Materials, USA, 65 Lakhs, October 2017, 1 year
20. Modeling based Control of Continuous Manufacturing of Biopharmaceutical Products, Tata Consulting Services, 77 Lakhs, October 2017, 3 years
21. Correlating impact of media components on CQA of recombinant mAbs, Agilent Technologies, 20 Lakhs, September 2018, 2 years
22. Fail Safe Option for Continuous Processing, Pall Life Sciences, 45 lakhs, April 2018, 2 years
23. Surge Tank Management for Continuous Processing, Pall Life Sciences, 83 Lakhs, September 2019, 2 years
24. Center of Excellence of Biopharmaceutical Technology, DBT, 10 Crores, December 2015, 10 years
25. Process Automation and Continuous Process Monitoring Analysis, Tata Consulting Services, 3.0 Crores, September 2018, 5 years
26. Managing Charge Variant Profile in Continuous Processing, Pall Life Sciences, 59 Lakhs, September 2019, 3 years
27. Translational Research Consortium for Establishing Platform Technologies to Support Prophylactic and Therapeutic Strategies for Dengue ? Discovery to Proof-of-Concept, BIRAC, 82 Lakhs, September 2019, 5 years
28. Platform for production of affordable biopharmaceuticals: Ranibizumab as a case study, BIRAC, 2 Crores, September 2019, 4 years
29. Development of an economical production process for rHu biosimilar insulin, BIRAC, 94 Lakhs, September 2019, 4 years
30. Acute decompensated heart failure prediction using Machine Learning algorithm, DBT, 50 Lakhs, March 2020, 3 years
31. Agilent Thought Leader Award, Agilent Technologies, USA, 3 Crores, August 2021, 3 years
32. Incubator for Bioanalytical Characterization Agilent Technologies, 1.5 Crores, Jan 2021, 3 years
33. Platform for reliable characterization and evaluation of comparability of biosimilar drug products in lyophilized and liquid formulations, US FDA, 6.6 Crores, Sep 2022, 3 years
34. Creating as Continuous Process Platform for Production of Biotherapeutic Products, Pall Life Science, 1.8 Crores, Sep 2022, 3 years
35. Downstream development for production of Tacrolimus, Raspa Biologics, 1.1 Crores, Dec 2022, 3 years

## RESEARCH GRANTS (As Co-PI)

1. Designer dendrimers as thermal stability amplifiers for IgG1 monoclonal antibody biotherapeutics, DST, 41 Lakhs, Dec 2018, 3 years
2. Metabolic Regime Control for Production of Biotherapeutics, DST, 46 Lakhs, Sep 2018, 3 years
3. Multiscale modeling for quantitative prediction of protein aggregation kinetics, DST, 38 Lakhs, Jun 2018, 3 years

## PUBLICATIONS

1. A.S. Rathore, A. Anupa, K.N. Mihooliya, N. Nitika, Instrument platforms for large-scale ion-exchange separations of biomolecules, Book Chapter In: Ion-Exchange Chromatography and Related Techniques, (2024), pp 243-262
2. P. Nain, A. Rathore, J. Gomes, A. Kunjapur, Exploring the Frontiers of Biotherapeutic Production: Harnessing the Power of Host Diversity, Coculture for Advancing Live Biotherapeutic Development, and Biocatalysis, 2023 AIChE Annual Meeting.
3. A.S. Rathore, A. Guttman, A. Shrivastava, S. Joshi, Recent progress in high-throughput and automated characterization of N-glycans in monoclonal antibodies, Trends in Analytical Chemistry, (2023) 117397. Impact Factor: 13.1
4. E. Shukla, L. Choudhury, S. Rastogi, A. Chawla, S. Bhattacharya, U. Kaushik, M. Mittal, A.S. Rathore, G. Pandey, Improved Stability and Manufacturability of Nucleocapsid Antigens for SARS-CoV2 Diagnostics through Protein Engineering, Biomolecules, 13 (2023) 1524. Impact Factor: 5.5
5. Anupa, V. Bansode, N. Kateja, A.S. Rathore, A novel method for continuous chromatographic separation of monoclonal antibody charge variants by combining displacement mode chromatography and step elution, Biotechnology Progress, (2023) e3395. Impact Factor: 2.9
6. A.S. Rathore, S. Sreenivasan, Utilizing Image Analysis Algorithm for Therapeutic mAb Aggregate Analysis, BP Elements 2 (2023).
7. A.S. Rathore, D. Sarin, What should next-generation analytical platforms for biopharmaceutical production look like? Trends in Biotechnology, (2023)
8. S. Sreenivasan, S.S. Patil, A.S. Rathore, Does Aggregation of Therapeutic IgGs in PBS Offer a True Picture of What Happens in Models Derived from Human Body Fluids? Journal of Pharmaceutical Sciences, (2023)
9. A.S. Rathore, S. Sreenivasan, Image Analysis Algorithm for Therapeutic mAb Aggregate Analysis, Biopharm International, 36 (2023) 12-21.
10. S. Bhattacharya, A.S. Rathore, Assessment of structural and functional similarity of biosimilar products: Bevacizumab as a case study, Journal of Chromatography B, 1229 (2023) 123896.
11. M. Garg, A.S. Rathore, Application of PAT in pharmaceutical manufacturing: model-based control of particle size distribution in anti-solvent aided crystallization, Journal of Chemical Technology & Biotechnology, (2023).
12. A.K. Rani, W.H. Khan, M. Banerjee, A.S. Rathore, Recent Advancements and Challenges in Recombinant Expression for Commercial Production of Virus-Like Particles (VLPs), Book Chapter In: Bioprocess and Analytics Development for Virus-based Advanced Therapeutics and Medicinal Products (ATMPs), Springer International Publishing (2023) 407-428.
13. J. Auclair, A. Rathore, S. Bhattacharya, The Role of Ion Pairing Agents in Liquid Chromatography (LC) Separations, LCGC North America, 41 (2023) 268–273.
14. Banerjee, S. Mahajan, A. Rathore, S. Shiture, M. Rajput, Digi-Farming Assistant for Soil Quality Analysis, International Conference on Applied Intelligence and Sustainable Computing (ICAISC) (2023) 1-4.
15. D. Sarin, S. Kumar, A.S. Rathore, Monitoring oxidation in recombinant monoclonal antibodies at subunit level through two-dimensional liquid chromatography coupled with mass spectrometry, Journal of Chromatography Open, 3 (2023) 100086.
16. S.S. Patil, M. Ramteke, M. Verma, S. Seth, R. Bhargava, S. Mittal, A.S. Rathore, A Domain-Shift Invariant CNN Framework for Cardiac MRI Segmentation Across Unseen Domains, Journal of Digital Imaging, (2023) 1-16.
17. S. Kumar, T.S. Savane, A.S. Rathore, Multiattribute Monitoring of Aggregates and Charge Variants of Monoclonal Antibody through Native 2D-SEC-MS-WCX-MS, Journal of the American Society for Mass Spectrometry, 34 (2023) 1263–1271.
18. S. Bhattacharya, A.S. Rathore, A novel filter-assisted protein precipitation (FAPP) based sample pre-treatment method for LC-MS peptide mapping for biosimilar characterization, Journal of Pharmaceutical and Biomedical Analysis, 234 (2023) 115527.
19. H. Chhabra, N.G. Jesubalan, A.S. Rathore, Soft sensor based rapid detection of trace chlorine dioxide (ClO<sub>2</sub>) concentration in water, Water Research, 242 (2023) 120231.
20. A. Chenna, W.H. Khan, R. Dash, S. Saraswat, A. Chugh, A.S. Rathore, G. Goel, An efficient computational protocol for template-based design of peptides that inhibit interactions involving SARS-CoV-2 proteins, Proteins: Structure, Function, and Bioinformatics, <https://doi.org/10.1002/prot.26511>.
21. R.S. Patil, N. Upadhyay, A.S. Rathore, Optimization of Process Parameters for Enhanced Production of Ranibizumab in Escherichia coli, Biotechnology and Bioprocess Engineering, 28 (2023) 386-397.
22. J. Auclair, A. Rathore, Analysis of Lipid Nanoparticles, LCGC North America, 41 (2023) 216-219.
23. A. Shrivastava, S. Mandal, S.K. Pattanayek, A.S. Rathore, Rapid Estimation of Size-Based Heterogeneity in Monoclonal Antibodies by Machine Learning-Enhanced Dynamic Light Scattering, Analytical Chemistry, 95 (2023) 8299–8309.
24. S. Sreenivasan, A.S. Rathore, Combined Presence of Ferrous Ions and Hydrogen Peroxide in Normal Saline and In Vitro Models Induces Enhanced Aggregation of Therapeutic IgG due to Hydroxyl Radicals, Molecular Pharmaceutics, 20 (2023) 3033–3048.
25. S. Bhattacharya, S. Joshi, A.S. Rathore, A native multi-dimensional monitoring workflow for at-line characterization of mAb titer, size, charge, and glycoform heterogeneities in cell culture supernatant, Journal of Chromatography A, 1696 (2023) 463983.
26. R. Nag, S. Joshi, A.S. Rathore, S. Majumder, Profiling Enzyme Activity of L-Asparaginase II by NMR-Based Methyl Fingerprinting at Natural Abundance, Journal of the American Chemical Society, 145 (2023) 10826–10838.
27. R. Kumar, D. Sarin, A.S. Rathore, High-throughput capillary electrophoresis analysis of biopharmaceuticals utilizing sequential injections, Electrophoresis, 44 (2023) 767-774.
28. D. Sarin, S. Joshi, A.S. Rathore, Hydrophobic interaction chromatography, Book Chapter In: Liquid Chromatography, Fundamentals and Instrumentation, Elsevier (2023) pp 441-464.
29. A.S. Rathore, R. Kumar, O.S. Tiwari, Recent advancements in snake antivenom production, International Journal of Biological Macromolecules, 240 (2023) 124478.
30. T.S. Savane, S. Kumar, A.S. Rathore, Rapid analysis of titer, aggregate and intact mass of antibody therapeutics using automated multi-dimensional liquid chromatography coupled with native mass spectroscopy, Journal of Separation Science, (2023) 2201050.
31. P. Saroha, A.S. Rathore, Production of bioactive recombinant monoclonal antibody fragment in periplasm of Escherichia coli

- expression system, *Preparative Biochemistry & Biotechnology*, DOI: 10.1080/10826068.2023.2195482.
32. A.S. Rathore, J Auclair, S Kumar, Intact mass analysis–based multi-attribute methods (iMAMs) for characterization of biopharmaceuticals, *LCGC North America*, 41 (2023) 138-142.
  33. S. Bhattacharya, S. Joshi, A.S. Rathore, A native multi-dimensional monitoring workflow for at-line characterization of mAb titer, size, charge, and glycoform heterogeneities in cell culture supernatant, *Journal of Chromatography A*, 1696 (2023) 463983.
  34. G.B. Hubli, S. Banerjee, A.S. Rathore, Near-infrared spectroscopy based monitoring of all 20 amino acids in mammalian cell culture broth, *Talanta*, 254 (2023) 124187.
  35. R. Raman, V. Ramamohan, A. Rathore, D. Jain, A. Mohan, V. Vashistha, Prevalence of highly actionable mutations among Indian patients with advanced non-small cell lung cancer: A systematic review and meta-analysis, *Asia-Pacific Journal of Clinical Oncology*, 19 (2023) 158-171.
  36. S. Nikita, S. Mishra, K. Gupta, V. Runkana, J. Gomes, A.S. Rathore, Advances in bioreactor control for production of biotherapeutic products, *Biotechnology and Bioengineering*, 120 (2023) 1189-1214.
  37. R. Kaur, R. Jain, N. Budholiya, A.S. Rathore, Long term culturing of CHO cells: phenotypic drift and quality attributes of the expressed monoclonal antibody, *Biotechnology Letters*, 45 (2023) 357-370.
  38. R. Sharma, A. Anupa, A.S. Rathore, Refolding of proteins expressed as inclusion bodies in *E. coli*, Book Chapter In: *Inclusion Bodies: Methods and Protocols*, (2023) 201-208.
  39. A.K. Rani, V.R. Naira, A.S. Rathore, Method for inclusion bodies production via *E. coli* host system: rGCSF as model biotherapeutic protein, Book Chapter In *Inclusion Bodies: Methods and Protocols*, (2023) 249-256.
  40. J. Auclair, A. Rathore, Analytical methods to determine the stability of biopharmaceutical products, *LCGC North America*, 41 (2023) 23-27.
  41. S. Mishra, V. Kumar, J. Sarkar, A.S. Rathore, Mixing and mass transfer in production scale mammalian cell culture reactor using coupled CFD-species transport-PBM validation, *Chemical Engineering Science*, 267 (2023) 118323.
  42. N. Nitika, G. Thakur, A.S. Rathore, Continuous manufacturing of monoclonal antibodies: dynamic control of multiple integrated polishing chromatography steps using BioSMB, *Journal of Chromatography A*, 1690 (2023) 463784.
  43. S. Sheth, L. Vashishta, R. Goyal, A. Rathore, N. Chirmule, On the manufacturers of biosimilars in Asia, *Clinical Pharmacology & Therapeutics*, 113 (2023) 23-26.
  44. A.S. Rathore, S. Joshi, N. Nupur, S. Nikita, S. Bhattacharya, S. Roy, Taking the individual bias out of examining comparability of biosimilars: A case study on monoclonal antibody therapeutics, *International Journal of Biological Macromolecules*, 227 (2023) 124-133.
  45. G.B. Hubli, S. Banerjee, A.S. Rathore, Near-infrared spectroscopy based monitoring of all 20 amino acids in mammalian cell culture broth, *Talanta*, 254 (2023) 124187.
  46. R. Kaur, A.S. Rathore, Role of oxidative stress in modulating CHO cell culture performance: Impact on titer and quality attributes of a monoclonal antibody therapeutic, *Journal of Chemical Technology and Biotechnology*, 98 (2022) 651-660.
  47. R. Dash, S. Mandal, A.S. Rathore, Mathematical modeling of cell-based potency data for mAb biotherapeutics, *BioPharm International*, (2022).
  48. S. Joshi, K. Upadhyay, A.S. Rathore, Ion exchange chromatography hyphenated with fluorescence detector as a sensitive alternative to UV detector: Applications in biopharmaceutical analysis, *Journal of Chromatography B*, 1212 (2022) 123511.
  49. A.S. Rathore, S. Nikita, N.G. Jesubalan, Digitization in bioprocessing: The role of soft sensors in monitoring and control of downstream processing for production of biotherapeutic products, *Biosensors and Bioelectronics: X*, 12 (2022) 100263.
  50. A.S. Rathore, F. Shereef, Innovating manufacturing technology in emerging economies, *Nature Biotechnology*, 40 (2022) 1714-1716.
  51. A.S. Rathore, C.M. Smales, A. Guttman, Characterization of biotherapeutic products, Book Chapter In *Frontiers in Bioengineering and Biotechnology and Frontiers in Chemistry* (2022).
  52. A.S. Rathore, S. Joshi, A. Ahluwalia, J. Auclair, On replication in biopharmaceutical analysis, *LCGC North America*, 40 (2022) 536-542.
  53. G. Thakur, V. Bansode, A.S. Rathore, Continuous manufacturing of monoclonal antibodies: Automated downstream control strategy for dynamic handling of titer variations, *Journal of Chromatography A*, 1682 (2022) 463496.
  54. A. Tiwari, V. Bansode, A.S. Rathore, Application of advanced machine learning algorithms for anomaly detection and quantitative prediction in protein A chromatography, *Journal of Chromatography A*, 1682 (2022) 463486.
  55. D. Sarin, S. Kumar, A.S. Rathore, Multiattribute monitoring of charge-based heterogeneity of recombinant monoclonal antibodies using 2D HIC-WCX-MS, *Analytical Chemistry*, 94 (2022) 15018-15026.
  56. J. Auclair, A. Rathore, Analytical characterization of host cell proteins (HCPs), *LCGC North America*, 40 (2022) 493-495.
  57. D. Kumar, N. Gangwar, A.S. Rathore, M. Ramteke, Multi-objective optimization of monoclonal antibody production in bioreactor, *Chemical Engineering and Processing-Process Intensification*, 180 (2022) 108720.
  58. R.P. Mishra, S. Gupta, A.S. Rathore, G. Goel, Multi-level high-throughput screening for discovery of ligands that inhibit insulin aggregation, *Molecular Pharmaceutics*, 19 (2022) 3770-3783.
  59. A.S. Rathore, G. Thakur, N. Kateja, Continuous integrated manufacturing for biopharmaceuticals: A new paradigm or an empty promise?, *Biotechnology and Bioengineering*, 120 (2022) 333-351.
  60. A.S. Rathore, S. Nikita, G. Thakur, S. Mishra, Artificial intelligence and machine learning applications in biopharmaceutical manufacturing, *Trends in Biotechnology*, (2022). doi.org/10.1016/j.tibtech.2022.08.007.
  61. M. Mittal, M. Banerjee, L.H.L. Lua, A.S. Rathore, Current status and future challenges in transitioning to continuous bioprocessing of virus-like particles, *Journal of Chemical Technology & Biotechnology*, 97 (2022) 2376-2385.
  62. A.S. Rathore, M. Fernandez-Lahore, In focus: Continuous processing, *Journal of Chemical Technology and Biotechnology*, 97 (2022) 2287-2289.
  63. V. Bansode, P. Gupta, N. Kateja, A.S. Rathore, Contribution of protein A step towards cost of goods for continuous production of monoclonal antibody therapeutics, *Journal of Chemical Technology and Biotechnology*, 97 (2022) 2420-2433.
  64. R. Sharma, A. Anupa, N. Kateja, A.S. Rathore, Optimization of the in-vitro refolding of biotherapeutic Fab Ranibizumab, *Biochemical Engineering Journal*, 187 (2022) 108601.



65. L.K. Shekhawat, A. Tiwari, S. Yamamoto, A.S. Rathore, An accelerated approach for mechanistic model based prediction of linear gradient elution ion-exchange chromatography of proteins, *Journal of Chromatography A*, 1680 (2022) 463423.
66. A.S. Rathore, Y. Li, H. Chhabra, A. Lohiya, FDA warning letters: A retrospective analysis of letters issued to pharmaceutical companies from 2010–2020, *Journal of Pharmaceutical Innovation*, (2022). <https://doi.org/10.1007/s12247-022-09678-2>.
67. S. Gupta, K. Upadhyay, C. Schöneich, A.S. Rathore, Impact of various factors on the kinetics of non-enzymatic fragmentation of a monoclonal antibody, *European Journal of Pharmaceutics and Biopharmaceutics*, 178 (2022) 131-139.
68. S. Nikita, G. Thakur, N.G. Jesubalan, A. Kulkarni, V.B. Yezhuvath, A.S. Rathore, AI-ML applications in bioprocessing: ML as an enabler of real time quality prediction in continuous manufacturing of mAbs, *Computers & Chemical Engineering*, 164 (2022) 107896.
69. N. Nupur, A.S. Rathore, Elucidating chemical and disulfide heterogeneities in rituximab using reduced and non-reduced peptide mapping, *Journal of Separation Science*, 15 (2022) 2887-2900.
70. A. Mishra, A.S. Rathore, RNA dependent RNA polymerase (RdRp) as a drug target for SARS-CoV2, *Journal of Biomolecular Structure and Dynamics*, 40 (2022) 6039-6051.
71. G. Thakur, V. Masampally, A. Kulkarni, A.S. Rathore, Process Analytical Technology (PAT) implementation for membrane operations in continuous manufacturing of mAbs: Model-based control of single-pass tangential flow ultrafiltration, *The AAPS Journal*, 24 (2022) 1-10.
72. G. Wang, X. Wu, Y. Yin, S. Shi, Z. Wang, L. Shen, H. Xiao, A.S. Rathore, A.L. Zydney, A. Anupa, S. Nikita, N. Gangwar, Z. Yan, et al., 773 Engineering synthetic auxotrophs for growth-coupled directed protein evolution, *Biotechnology*, 40 (2022).
73. A. Ramakrishna, V. Maranholkar, S. Hadpe, J. Iyer, A. Rathore, Optimization of multi flow rate loading strategy for process intensification of Protein A chromatography, *Journal of Chromatography Open*, 2 (2022) 100049.
74. S. Gupta, M. Mittal, A.S. Rathore, Atomic layer deposition coating on the surface of active pharmaceutical ingredients to reduce surface charge build-up, *ACS Applied Materials & Interfaces*, 14 (2022) 27195-27202.
75. H. Chhabra, M.C. Mouslim, S. Kashiramka, A.S. Rathore, Dynamics of biosimilar uptake in emerging markets, *Expert Opinion on Biological Therapy*, (2022). 679-688.
76. A.S. Rathore, S. Joshi, Establishing analytical and functional comparability for biosimilars, *LCGC North America*, 40 (2022) 258-261.
77. S. Joshi, L.R. Khatri, A. Kumar, A.S. Rathore, NMR based quality evaluation of mAb therapeutics: A proof of concept higher order structure biosimilarity assessment of trastuzumab biosimilars, *Journal of Pharmaceutical and Biomedical Analysis*, 214 (2022) 114710.
78. A.S. Rathore, N. Jesubalan, G. Thakur, Perspectives on process analytical technology, *BioPharm International*, 35 (2022) 31-35.
79. N. Gangwar, P. Priyanka, A.S. Rathore, Achieving charge variant profile of innovator molecule during development of monoclonal antibody based biosimilars—Use of media components, *Biochemical Engineering Journal*, 182 (2022) 108438.
80. S.K. Singh, D. Kumar, S. Nagpal, S.K. Dubey, A.S. Rathore, A charge variant of bevacizumab offers enhanced fcγn-dependent pharmacokinetic half life and efficacy, *Pharmaceutical Research*, 39 (2022) 851-865.
81. M. Mittal, S. Gupta, A.S. Rathore, Raman spectroscopy as process analytical technology tool for monitoring atomic layer deposition (ALD) of drug particles, *Materials Chemistry and Physics*, 282 (2022) 125976.
82. A. Shrivastava, S. Joshi, A. Guttman, A.S. Rathore, N-Glycosylation of monoclonal antibody therapeutics: A comprehensive review on significance and characterization, *Analytica Chimica Acta*, 1209 (2022) 339828.
83. R.S. Patil, A. Anupa, J.A. Gupta, A.S. Rathore, Challenges in expression and purification of functional Fab fragments in *E. coli*: Current strategies and perspectives, *Fermentation*, 8 (2022) 175.
84. A.S. Rathore, G. Thakur, S. Nikita, S. Banerjee, Control of continuous manufacturing processes for production of monoclonal antibodies, Book Chapter in *Process Control, Intensification, and Digitalisation in Continuous Biomanufacturing*, (2022) 39-74.
85. A.S. Rathore, R. Dash, Late-stage failures of monoclonal antibodies, *Biopharm International*, 35 (2022) 14-16.
86. J.R. Auclair, A. Rathore, Charge detection mass spectrometry: what's the “big” deal?, *LC GC North America*, 40 (2022) 125-127.
87. N. Swaminathan, P. Priyanka, A.S. Rathore, S. Sivaprakasam, S. Subbiah, Cole-Cole modeling of real-time capacitance data for estimation of cell physiological properties in recombinant *Escherichia coli* cultivation, *Biotechnology and Bioengineering*, 119 (2022) 922-935.
88. A.S. Rathore, A. Singh, Biomass to fuels and chemicals: A review of enabling processes and technologies, *Journal of Chemical Technology & Biotechnology*, 97 (2022) 597-607.
89. N. Nupur, S. Joshi, D. GUILLARME, A.S. Rathore, Analytical similarity assessment of biosimilars: Global regulatory landscape, recent studies and major advancements in orthogonal platforms, *Frontiers in Bioengineering and Biotechnology*, 10 (2022) 1-23.
90. R. Dash, S.K. Singh, N. Chirmule, A.S. Rathore, Assessment of functional characterization and comparability of biotherapeutics: a review, *The AAPS Journal*, 24 (2022) 1-11.
91. A.S. Rathore, H. Malani, Need for a risk-based control strategy for managing glycosylation profile for biosimilar products, *Expert Opinion on Biological Therapy*, 22 (2022) 123-131.
92. A.S. Rathore, J.G. Stevenson, H. Chhabra, C. Maharana, The global landscape on interchangeability of biosimilars, *Expert Opinion on Biological Therapy*, 22 (2022) 133-148.
93. W.H. Khan, N. Khan, A. Mishra, S. Gupta, V. Bansode, D. Mehta, R. Bhambure, A.S. Rathore, Dimerization of SARS-CoV-2 nucleocapsid protein affects sensitivity of ELISA based diagnostics of COVID-19, *International Journal of Biological Macromolecules*, 200 (2022) 428-437.
94. A.S. Rathore, A.L. Zydney, A. Anupa, S. Nikita, N. Gangwar, Enablers of continuous processing of biotherapeutic products, *Trends in Biotechnology*, 40 (2022) 804-815.
95. J. Kumar, S.U. Bhat, A.S. Rathore, Slow post-induction specific growth rate enhances recombinant protein expression in *Escherichia coli*: Pramlintide multimer and ranibizumab production as case studies, *Process Biochemistry*, 114 (2022) 21-27.
96. A. Mishra, A.S. Rathore, Pharmacophore screening to identify natural origin compounds to target RNA-dependent RNA

- polymerase (RdRp) of SARS-CoV2, *Molecular Diversity*, (2022) 1-17.
97. A. Ramakrishna, V. Prathap, V. Maranholkar, A.S. Rathore, Multi-wavelength UV-based PAT tool for measuring protein concentration, *Journal of Pharmaceutical and Biomedical Analysis*, 207 (2022) 114394.
  98. Chenna, W.H. Khan, R. Dash, A.S. Rathore, G. Goel, Template-based design of peptides to inhibit SARS-CoV-2 RNA-dependent RNA polymerase complexation, *BioRxiv*, (2022).
  99. Rathore, J. Auclair, S. Bhattacharya, D. Sarin, Two-dimensional liquid chromatography (2d-lc): analysis of size-based heterogeneities in monoclonal antibody-based biotherapeutic products, *LCGC North America*, 40 (2022) 27-31.
  100. P.P. Bhojane, S. Joshi, S.J. Sahoo, A.S. Rathore, Unexplored excipients in biotherapeutic formulations: natural osmolytes as potential stabilizers against thermally induced aggregation of IgG1 biotherapeutics, *AAPS PharmSciTech*, 23 (2022) 1-12.
  101. P. Priyanka, R.S. Patil, P. Meshram, J.A. Gupta, M. Banerjee, A.S. Rathore, Ethanol as additive enhances expression of Ranibizumab in *Escherichia coli*: Impact on cellular physiology and transcriptome, *Process Biochemistry*, 112 (2022) 167-176.
  102. R. Kumar, A. Guttman, A.S. Rathore, Applications of capillary electrophoresis for biopharmaceutical product characterization, *Electrophoresis*, 43 (2022) 143-166.
  103. A.S. Rathore, S. Narnaware, Purification of therapeutic antibodies by protein affinity chromatography, *Therapeutic Antibodies*, (2022) 169-177.
  104. A.S. Rathore, V. Hebhi, Ion exchange chromatographic methods for purification of therapeutic antibodies, *Therapeutic Antibodies*, (2022) 179-186.
  105. P. Priyanka, A.S. Rathore, A novel strategy for efficient expression of an antibody fragment in *Escherichia coli*: ranibizumab as a case study, *Journal of Chemical Technology & Biotechnology*, 97 (2022) 42-54.
  106. S. Banerjee, M.A. Afzal, P. Chokshi, A.S. Rathore, Mechanistic modelling of Chinese hamster ovary cell clarification using acoustic wave separator, *Chemical Engineering Science*, 246 (2021) 116894.
  107. S. Gupta, W. Jiskoot, C. Schöneich, A.S. Rathore, Oxidation and deamidation of monoclonal antibody products: potential impact on stability, biological activity, and efficacy, *Journal of Pharmaceutical Sciences*, (2021).
  108. G. Vishwakarma, N. Nupur, A.S. Rathore, Assessing the structural and functional similarity of insulin glargine biosimilars, *Journal of diabetes science and technology*, (2021).
  109. R. Bansal, S.K. Pattanayek, R. Bansal, A.S. Rathore, A correlation of thermodynamic parameters with size of copper-chelated albumin aggregates, *Colloid and Polymer Science*, 299 (2021) 1945-1953.
  110. G. Thakur, A. S. Rathore, Modelling and optimization of single-pass tangential flow ultrafiltration for continuous manufacturing of monoclonal antibodies, *Separation and Purification Technology*, 276 (2021) 119341.
  111. A. Uppal, R. Chakrabarti, N. Chirmule, A. Rathore, F. Atouf, Biopharmaceutical industry capability building in India: Report from a Symposium, *Journal of Pharmaceutical Innovation*, (2021) 1-8.
  112. G. Thakur, P. Ghumade, A.S. Rathore, Process analytical technology in continuous processing: Model-based real time control of pH between capture chromatography and viral inactivation for monoclonal antibody production, *Journal of Chromatography A*, 1658 (2021) 462614.
  113. D. Kumar, N. Gangwar, A.S. Rathore, M. Ramteke, Multi-objective optimization of monoclonal antibody production in bioreactor, *Chemical Engineering and Processing-Process Intensification*, (2021) 108720.
  114. A.S. Rathore, S. Joshi, R. Dash, N. Nupur, S. Sreenivasan, Emergence of India as a global manufacturing hub for biosimilars, *Biopharm International*, 34 (2021) 42-45.
  115. J.R. Auclair, A.S. Rathore, Intact mass analysis of biopharmaceuticals as its own unique application, *LC-GC North America*, 39 (2021) 548-552.
  116. R. Kumar, G. Vishwakarma, A.S. Rathore, Cyclodextrins as modulators for separation of charged variants of mAbs by capillary zone electrophoresis, *Journal of Chromatography Open*, 1 (2021) 100011.
  117. S. Sreenivasan, W. Jiskoot, A.S. Rathore, Rapid aggregation of therapeutic monoclonal antibodies by bubbling induced air/liquid interfacial and agitation stress at different conditions, *European Journal of Pharmaceutics and Biopharmaceutics*, 168 (2021) 97-109.
  118. A. Mishra, W.H. Khan, A.S. Rathore, Synergistic effects of natural compounds toward inhibition of sars-cov-2 3cl protease, *Journal of chemical information and modeling*, 61 (2021) 5708-5718.
  119. S. Sreenivasan, D. Sonawat, A.S. Rathore, Image analysis algorithm-based platform for determining micron and higher aggregate size distribution of therapeutic IgG using brightfield and fluorescence microscope images, *Pharmaceutical Research*, 38 (2021) 1747-1763.
  120. M. Garg, A. S. Rathore, Process development in the QbD paradigm: Implementing design of experiments (DoE) in anti-solvent crystallization for production of pharmaceuticals, *Journal of Crystal Growth*, 571 (2021) 126263.
  121. A.S. Rathore, A. Bhargava, Regulatory considerations in biosimilars: Middle East and Africa regions, *Preparative Biochemistry & Biotechnology*, 51 (2021) 731-737.
  122. S. Nikita, R. Raman, A. S. Rathore, A chemical engineer's take of COVID-19 epidemiology, *AIChE Journal*, 67 (2021) e17359.
  123. R. Dash, A. S. Rathore, Freeze thaw and lyophilization induced alteration in mAb therapeutics: Trastuzumab as a case study, *Journal of Pharmaceutical and Biomedical Analysis*, 201 (2021) 114122.
  124. M. Mittal, Kritika Sharma, A. S. Rathore, Checking counterfeiting of pharmaceutical products by attenuated total reflection mid-infrared spectroscopy, *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 255 (2021) 119710.
  125. S. Kiruthika, R. Bhat, R. Dash, A. S. Rathore, P. Vivekanandan, B. Jayaram, A novel piperazine derivative that targets hepatitis B surface antigen effectively inhibits tenofovir resistant hepatitis B virus, *Scientific Reports*, 11 (2021) 1-13.
  126. A.S. Rathore, R. Dash, R. Jain, J. Auclair, Tools for functional assessment of biotherapeutics, *LC-GC North America*, 39 (2021) 272-277.
  127. A.S. Rathore, S. Mishra, S. Nikita, P. Priyanka, Bioprocess control: current progress and future perspectives, *Life*, 11 (2021) 557.
  128. S. Sreenivasan, D. Sonawat, S. Mandal, K. Khare, A.S Rathore, Novel semi-automated fluorescence microscope imaging algorithm for monitoring IgG aggregates in serum, *Scientific Reports*, 11 (2021) 1-18.
  129. J. Kumar, A.S Chauhan, J. Gupta, A.S. Rathore, Supplementation of critical amino acids improves glycerol and lactose uptake

- and enhances recombinant protein production in *Escherichia coli*, *Biotechnology Journal*, 16 (2021) 2100143.
130. N. Gangwar, R. Mishra, N. Budholiya, A.S. Rathore, Effect of vitamins and metal ions on productivity and charge heterogeneity of IgG1 expressed in CHO cells, *Biotechnology Journal*, 16 (2021) 2000464.
  131. M. A. Afzal, P. P. Bhojane, A.S. Rathore, A Simple, Rapid and Robust “on-the-go” Identity Testing of Biotherapeutics Using FTIR Spectroscopy, *Electrophoresis*, 42 (2021) 1655-1664.
  132. N. Nitika, H. Chhabra, A.S. Rathore, Raman spectroscopy for in situ, real time monitoring of protein aggregation in lyophilized biotherapeutic products, *International Journal of Biological Macromolecules*, 179 (2021) 309-313.
  133. S. Mishra, V. Kumar, J. Sarkar, A.S. Rathore, CFD based mass transfer modeling of a single use bioreactor for production of monoclonal antibody biotherapeutics, *Chemical Engineering Journal*, 412 (2021) 128592.
  134. A.S. Rathore, J.G. Stevenson, H. Chhabra, C. Maharana, The global landscape on interchangeability of biosimilars, *Expert Opinion on Biological Therapy*, 6 (2021) 1-16.
  135. G. Thakur, V. Hebhi, A.S. Rathore, Near Infrared Spectroscopy as a PAT tool for monitoring and control of protein and excipient concentration in ultrafiltration of highly concentrated antibody formulations, *International Journal of Pharmaceutics*, 600 (2021) 120456.
  136. G. Thakur, N. Saxena, A. Tiwari, A.S Rathore, Control of surge tanks for continuous manufacturing of monoclonal antibodies, *Biotechnology Bioengineering*, 118 (2021) 1913-1931.
  137. N. Kateja, A. Tiwari, G. Thakur, A.S Rathore, Complete or periodic continuity in continuous manufacturing platforms for production of monoclonal antibodies, *Biotechnology Journal*, 16 (2021) 2000524.
  138. A.S. Rathore, J.G Stevenson, H. Chhabra, Considerations related to comparative clinical studies for biosimilars, *Expert Opinion on Drug Safety*, 20 (2021), 265-274.
  139. G. Thakur, A.S. Rathore, Near Infrared Spectroscopy as a Versatile PAT tool for Continuous Downstream Processing, *Pharmaceutical Technology*, 45 (2021) 32-40.
  140. A.S. Rathore, N. Saxena, G. Thakur, N. Deore, Challenges in process control for continuous processing for production of monoclonal antibody products, *Current Opinion in Chemical Engineering*, 31 (2021), 100671.
  141. N. Kateja, N. Nitika, R.S Fadnis, A.S Rathore, A novel reactor configuration for continuous virus inactivation, *Biochemical Engineering Journal*, 167 (2021) 107885.
  142. P. Gupta, N. Kateja, S. Mishra, H. Kaur, A.S. Rathore, Economic assessment of continuous processing for manufacturing of biotherapeutics, *Biotechnology Progress*, 37 (2021) e3108.
  143. S. Joshi, L.R. Khatri, A. Kumar, A.S. Rathore, Monitoring size and oligomeric-state distribution of therapeutic mAbs by NMR and DLS: Trastuzumab as a case study, *Journal of Pharmaceutical and Biomedical Analysis*, 195 (2021) 113841.
  144. N. Saxena, A. Tiwari, D. Sonawat, H. Kodamana, A.S. Rathore, Reinforcement learning based optimization of process chromatography for continuous processing of biopharmaceuticals, *Chemical Engineering Science*, 230 (2021) 116171.
  145. R. Jindani, S. Sheth, S. Paul, A.S. Rathore, N. Chirmule, Platform specific risk assessment of SARS-COV-2 vaccines using FMEA, *BioPharm International*, 34 (2021) 15-20.
  146. A.S. Rathore, A. Bhargava, Regulatory considerations in biosimilars: Latin America region, *Preparative Biochemistry & Biotechnology*, 51 (2021) 201-206.
  147. S. Joshi, S. Kumari, A.S. Rathore, Identification and characterization of carbonylation sites in trastuzumab biosimilars, *International Journal of Biological Macromolecules*, 169 (2021) 95-102.
  148. V. Kumar, K.U. Doshi, W.H. Khan, A.S. Rathore, COVID-19 pandemic: mechanism, diagnosis, and treatment, *Journal of Chemical Technology & Biotechnology*, 96 (2021) 299-308.
  149. S.K. Singh, D. Kumar, H. Malani, A.S. Rathore, LC–MS based case-by-case analysis of the impact of acidic and basic charge variants of bevacizumab on stability and biological activity, *Scientific Reports*, 11 (2021) 1-15.
  150. V. Hebhi, G. Thakur, A.S Rathore, Process analytical technology application for protein PEGylation using near infrared spectroscopy: G-CSF as a case study, *Journal of Biotechnology*, 325 (2021) 303-311.
  151. A.S. Rathore, A. Bhargava, Regulatory considerations in biosimilars: Asia pacific regions, *Preparative Biochemistry & Biotechnology*, 51 (2021) 1-8.
  152. A.S. Rathore, H. Chhabra, A. Bhargava, Approval of biosimilars: a review of unsuccessful regulatory filings, *Expert Opinion on Biological Therapy*, 21 (2021) 19-28.
  153. A.S. Rathore, S. Muthukumar, High-Throughput Process Development: II—Membrane Chromatography, *Protein Downstream Processing*, 2178 (2021), 21-26.
  154. A.S. Rathore, R. Bhambure, High-Throughput Process Development: I—Process Chromatography, *Protein Downstream Processing*, 2178 (2021), 11-20.
  155. A.S. Rathore, R. Bhambure, Aqueous Two-Phase-Assisted Precipitation of Proteins: A Platform for Isolation of Process-Related Impurities from Therapeutic Proteins, *Protein Downstream Processing*, 2178 (2021) 81-91.
  156. J.R. Auclair, A.S. Rathore, The Multi-Attribute Method (MAM) for the Characterization of Biopharmaceuticals, *LC-GC North America*, 39 (2021) 28-33.
  157. W.H. Khan, N. Khan, A. Mishra, S. Gupta, V. Bansode, D. Mehta, R. Bhambure, A.S. Rathore, Dimerization of SARS-CoV-2 nucleocapsid protein affects sensitivity of ELISA based diagnostics of COVID-19, *bioRxiv*, (2021).
  158. G. Thakur, S. Thori, A.S Rathore, Implementing PAT for single-pass tangential flow ultrafiltration for continuous manufacturing of monoclonal antibodies, *Journal of Membrane Science*, 613 (2021) 118711.
  159. S.K. Singh, A. Mishra, G. Goel, N. Chirmule, A.S Rathore, Modulation of granulocyte colony stimulating factor conformation and receptor binding by methionine oxidation, *Proteins: Structure, Function, and Bioinformatics*, 89 (2021) 68-80.
  160. N. Swaminathan, P. Dalal, A.S. Rathore, S. Sivaprakasam, S. Subbiah, Multiobjective optimization for enhanced production of therapeutic proteins in *Escherichia coli*: Application of real-time dielectric spectroscopy, *Industrial & Engineering Chemistry Research*, 59 (2020) 21841-21853.
  161. R. Kumar, M. Banerjee, A.S Rathore, Virus-like Particles as Therapeutic Moieties of the Future, *BioPharm International*, (2020).
  162. S Krull, J. Auclair, A.S. Rathore, Ion Mobility Spectrometry (IMS): How It Works and Its Use in Biotechnology, *LC GC North America*, 38 (2020) 619-625.

163. K. Pandi, A.S. Chauhan, W.H. Khan, A.S. Rathore, Phosphate starvation controls lactose metabolism to produce recombinant protein in *Escherichia coli*, *Applied Microbiology and Biotechnology*, 104 (2020), 9707-9718.
164. G. Thakur, S. Thori, A.S. Rathore, Implementing PAT for single-pass tangential flow ultrafiltration for continuous manufacturing of monoclonal antibodies, *Journal of Membrane Science*, 613 (2020) 118492.
165. A. Mishra, R.S. Patil, S. Singh, A.S. Rathore, Mechanistic explanation of structural and functional changes induced by methionine mutation in G-CSF protein, *Current Research in Biotechnology*, 2 (2020) 37-44.
166. N. Kateja, S. Dureja, A.S. Rathore, Development of an integrated continuous PEGylation and purification Process for granulocyte colony stimulating factor, *Journal of Biotechnology*, 322 (2020) 79-89.
167. N. Saxena, P. Gupta, R. Raman, A.S. Rathore, Role of data science in managing COVID-19 pandemic, *Indian Chemical Engineer*, 62 (2020) 385-395.
168. S.K. Singh, D. Kumar, A.S. Rathore, Understanding Oxidation Propensity in GCSF and Assessment of its Safety and Efficacy, *Pharmaceutical Research*, 37 (2020) 207.
169. V. Amritkar, S. Adat, V. Tejwani, A.S. Rathore, R. Bhambure, Engineering Staphylococcal Protein A for high-throughput affinity purification of monoclonal antibodies, *Biotechnology Advances*, 40 (2020) 107632.
170. R. Bansal, R. Dash, A.S. Rathore, Impact of mAb aggregation on its biological activity: rituximab as a case study, *Journal of Pharmaceutical Sciences*, 109 (2020) 2684-2698.
171. S.R. Hadpe, V. Mohite, S. Alva, A.S. Rathore, Pretreatments for enhancing clarification efficiency of depth filtration during production of monoclonal antibody therapeutics, *Biotechnology Progress*, 36 (2020) e2996.
172. J. Kumar, A.S. Chauhan, R.L. Shah, J.A. Gupta, A.S. Rathore, Amino acid supplementation for enhancing recombinant protein production in *E. coli*, *Biotechnology and Bioengineering*, 117 (2020) 2420-2433.
173. S. Joshi, C. Maharana, A.S. Rathore, An application of Nano Differential Scanning Fluorimetry for Higher Order Structure assessment between mAb originator and biosimilars: Trastuzumab and Rituximab as case studies, *Journal of Pharmaceutical and Biomedical Analysis*, 186 (2020) 113270.
174. G.Thakur, V. Hebbs, S. Parida, A.S. Rathore, Automation of dead-end filtration: An Enabler for Continuous Processing of Biotherapeutics, *Frontiers in Bioengineering and Biotechnology*, 8 (2020) 758.
175. A.S. Rathore, Covid 19–pandemic in India, *Journal of Chemical Technology and Biotechnology*, 95 (2020) 1841.
176. K. Pandi, A.S. Chauhan, J.A. Gupta, A.S. Rathore, Microaerobic fermentation alters lactose metabolism in *Escherichia coli*, *Applied Microbiology and Biotechnology*, 104 (2020) 1-13.
177. R. Kumar, R.L. Shah, A.S. Rathore, Harnessing the power of electrophoresis and chromatography: Offline coupling of reverse phase liquid chromatography-capillary zone electrophoresis-tandem mass spectrometry for peptide mapping for monoclonal antibodies, *Journal of Chromatography A*, 1620 (2020) 460954.
178. A.S Rathore, R. Kumar, I. Krull, Multidimensional Separation Techniques for Characterization of Biotherapeutics, *LC GC North America*, 38 (2020) 338-345.
179. T. Bhardwaj, P. Dalal, A.S. Rathore, S. K. Jha, An aptamer based microfluidic chip for impedimetric detection of Ranibizumab in a bioreactor, *Sensors and Actuators B: Chemical*, 312 (2020) 127941.
180. H. Malani, D. Kumar, A.S. Rathore, Effect of chemically defined growth medium components on characteristics of bacterial inclusion bodies, *Journal of Chemical Technology & Biotechnology*, 95 (2020) 1640-1648.
181. V. Hebbs, S. Roy, A.S. Rathore, A. Shukla, Modeling and prediction of excipient and pH drifts during ultrafiltration/diafiltration of monoclonal antibody biotherapeutic for high concentration formulations, *Separation and Purification Technology*, 238 (2020) 116392.
182. R. Bansal, P. Srivastava, A.S. Rathore, P. Chokshi, Population balance modelling of aggregation of monoclonal antibody based therapeutic proteins, *Chemical Engineering Science*, 216 (2020) 115479.
183. A. Mishra, R. Bansal, S. Sreenivasan, R. Dash, S. Joshi, R. Singh, A.S. Rathore, G. Goel, Structure-Based Design of Small Peptide Ligands to Inhibit Early-Stage Protein Aggregation Nucleation, *Journal of Chemical Information and Modelling*, 60 (2020) 3304-3314.
184. N. Budholiya, S. Roy, A.S. Rathore, Neural network–based fingerprinting of monoclonal antibody aggregation using biolayer interferometry, *Analytical and Bioanalytical Chemistry*, 412 (2020) 2177-2186.
185. A.M. Nair, A. Dhawangale, S. Chandra, L.K. Shekhawat, A.S. Rathore, S. Mukherji, Polymer-Coated Fiber Optic Sensor as a Process Analytical Tool for Biopharmaceutical Impurity Detection, *IEEE Transactions on Instrumentation and Measurement*, 69 (2020) 7666-7674.
186. V. Hebbs, D. Kumar, A.S. Rathore, Process Analytical Technology Implementation for Peptide Manufacturing: Cleavage Reaction of Recombinant Lethal Toxin Neutralizing Factor Concatemer as a Case Study, *Analytical Chemistry*, 92, (2020) 5676-5681.
187. V. Hebbs, D. Kumar, A.S. Rathore, Process intensification in peptide manufacturing: Recombinant lethal toxin neutralizing factor (rLTNF) as a case study, *Process Biochemistry*, 90 (2020) 193-203.
188. S.K. Singh, A. Mishra, D. Yadav, N. Budholiya, A.S. Rathore, Understanding the mechanism of copurification of “difficult to remove” host cell proteins in rituximab biosimilar products, *Biotechnology Progress*, 36 (2020) e2936.
189. G. Thakur, V. Hebbs, and A.S. Rathore, An NIR-based PAT approach for real-time control of loading in Protein A chromatography in continuous manufacturing of monoclonal antibodies, *Biotechnology Bioengineering*, 117 (2020) 673–686. Selected as *Biotechnology and Bioengineering Editor’s Choice*.
190. S. Sreenivasan, D. Kumar, H. Malani, A.S. Rathore, Does interaction of monoclonal antibody charge variants with VEGF-A and ELISA reagents affect its quantification? *Analytical Biochemistry*, 590 (2020) 113513.
191. S.K. Singh, A. Mishra, G. Goel, N. Chirmule, A.S. Rathore, Modulation of granulocyte colony stimulating factor conformation and receptor binding by methionine oxidation, *Proteins: Structure, Function, and Bioinformatics*, 89, (2020) 68-80.
192. M. Kumar, A. Pant, R. Bansal, A. Pandey, J. Gomes, K. Khare, A.S. Rathore, M. Banerjee, Electron Microscopy-based semi-automated characterization of aggregation in monoclonal antibody products, *Computational and Structural Biotechnology Journal*, 18 (2020) 1458-1465.
193. A.S. Rathore, and A. Bhargava, Biosimilars in Developed Economies: Overview, Status, and Regulatory Considerations,

- Regulatory Toxicology and Pharmacology, 110 (2020) 104525.
194. S. Joshi and A. S. Rathore, Assessment of Structural and Functional Comparability of Biosimilar Products: Trastuzumab as a Case Study, *Biodrugs*, 34 (2020) 209-223.
  195. T. Bhardwaj, A.S. Rathore, S.K. Jha, The selection of highly specific and selective aptamers using modified SELEX and their use in process analytical techniques for Lucentis bioproduction, *RSC Advances*, 10 (2020) 28906-28917.
  196. A.M. Nair, A. Dhawangale, S. Chandra, L.K. Shekhawat, A.S. Rathore, S. Mukherji, Polymer coated Fibre Optic Sensor as a Process Analytical Tool for Biopharmaceutical Impurity Detection, *IEEE Transactions on Instrumentation and Measurement*, 69 (2020) 7666-7674.
  197. A.S Rathore, I. Krull, N. Budholiya, A Review of Recent Developments in Analytical Characterization of Glycosylation in Therapeutic Proteins, *LC GC North America*, (2020).
  198. V. Kumar, K.U. Doshi, W.H. Khan, A.S. Rathore, COVID-19 Pandemic: Mechanism, Diagnosis and Treatment, *Journal of Chemical Technology & Biotechnology*, 96 (2020) 299-308.
  199. S.K. Singh, G. Goel, A.S. Rathore, A novel approach for protein identification from complex cell proteome using modified peptide mass fingerprinting algorithm, *Electrophoresis*, 40 (2019) 3062-3073.
  200. M. Pathak, K. Lintern, T.F. Johnson, A.M. Nair, S. Mukherji, D.G. Bracewell, A.S. Rathore, Analytical tools for monitoring changes in physical and chemical properties of chromatography resin upon reuse, *Electrophoresis*, 40 (2019) 3074-3083.
  201. R. Bansal, S. Gupta, A.S. Rathore, Analytical platform for monitoring aggregation of monoclonal antibody therapeutics, *Pharmaceutical Research*, 36 (2019) 152.
  202. V. Halan, S. Maity, R. Bhambure, A.S. Rathore, Multimodal chromatography for purification of biotherapeutics—a review, *Current Protein and Peptide Science*, 20 (2019) 4-13.
  203. S. Madan, C. Nehate, T.K. Barman, A.S. Rathore, V. Koul, Design, preparation, and evaluation of liposomal gel formulations for treatment of acne: in vitro and in vivo studies, *Drug development and industrial pharmacy*, 45, (2019) 395-404.
  204. A.S. Rathore, R. Kumar, I.S. Krull, Practical Considerations of Capillary Electrophoresis Mass Spectrometry for Analysis of Biotherapeutics, *LC GC North America*, 37 (2019) 386-391.
  205. A.S. Rathore, F. Shereef, Shadow pricing and the art of profiteering from outdated therapies, *Nature Biotechnology*, 37 (2019) 1521-1521.
  206. A.S. Rathore, R. Kumar, I.S. Krull, Practical Considerations of Capillary Electrophoresis Mass Spectrophotometry for Analysis of Biotherapeutics, *LC GC North America*, 37 (2019), 386-391.
  207. S. Ghosh, S. Alam, A.S. Rathore, S.K. Khare, Stability of Therapeutic Enzymes: Challenges and Recent Advances, in *Therapeutic Enzymes: Function and Clinical Implications*, Ed. N. Labrou, Springer, Singapore, (2019) 131-150.
  208. V. Hebhi, S. Chattopadhyay, A.S. Rathore, High performance liquid chromatography (HPLC) based direct and simultaneous estimation of excipients in biopharmaceutical products, *Journal of Chromatography B*, 1117 (2019) 118-126.
  209. D. Kumar, J. Batra, C. Komives, A.S. Rathore, QbD Based Media Development for the Production of Fab Fragments in *E. coli*, *Bioengineering*, 6 (2019) 29.
  210. V. Halan, S. Maity, R. Bhambure, A.S. Rathore, Multimodal Chromatography for Purification of Therapeutics- A Review, *Current Peptide and Protein Science*, 20 (2019) 4-13.
  211. L.K. Shekhawat, A.S. Rathore, An overview of mechanistic modeling of liquid chromatography, *Preparative Biochemistry and Biotechnology*, 49 (2019) 623-638.
  212. A.S. Rathore, A.G. Vulto, J.G. Stevenson, V.P. Shah, Challenges with Successful Commercialization of Biosimilars, *BioPharm International*, 32 (2019), 22-31.
  213. V. Hebhi, G. Thakur, A.S. Rathore, Process analytical technology implementation for protein refolding: GCSF as a case study, *Biotechnology Bioengineering*, 116 (2019) 1039-1052.
  214. Priyanka, J. Kumar, J. Gomes, A.S. Rathore, Implementing process analytical technology for the production of recombinant proteins in *Escherichia coli* using an advanced controller scheme, *Biotechnology Journal*, 14 (2019) 1800556.
  215. N. Nupur, N. Chhabra, R. Dash, A.S. Rathore, Usability of NISTmAb reference material for biosimilar analytical development, *Analytical and Bioanalytical Chemistry*, 411 (2019) 2867–2883.
  216. A.S. Rathore, R. Dash, Real-Time Characterization of Biotherapeutics and Comparability of Biosimilars, *BioPharm International*, 32 (2019), 34-49.
  217. L.K. Shekhawat, A.S. Rathore, Mechanistic modeling based process analytical technology implementation for pooling in hydrophobic interaction chromatography, *Biotechnology Progress*, 35 (2019) e2758.
  218. A.S. Rathore, F. Shereef, The influence of domestic manufacturing capabilities on biologic pricing in emerging economies, *Nature Biotechnology*, 37(2019), 498-501.
  219. Priyanka, S. Roy, V.R. Chopda, J. Gomes, A.S. Rathore, Comparison and implementation of different control strategies for improving production of rHSA using *Pichia pastoris*, *Journal of Biotechnology*, 290 (2019) 33-43.
  220. A.S. Rathore, R. Bansal, Modeling the Degradation of mAb Therapeutics, *BioPharm International*, 32 (2019), 41-45.
  221. J. Auclair, A.S. Rathore, I.S. Krull, Methods and Purposes for Determining Higher Order Structures of Biopharmaceuticals, *LC GC North America*, 37 (2019), 34-43.
  222. L.K. Shekhawat, A. Godara, V. Kumar, A.S. Rathore, Design of experiments applications in bioprocessing: Chromatography process development using split design of experiments, *Biotechnology Progress*, 35 (2019) e2730.
  223. A.S. Rathore, R. Dash, Real-Time Characterization of Biotherapeutics and Comparability of Biosimilars, *BioPharm International* 32, (2019) 34-39.
  224. J. Gomes, V. Chopda, A.S. Rathore, Monitoring and control of bioreactor: basic concepts and recent advances, in *Bioprocessing Technology for Production of Biopharmaceuticals and Bioproducts*, John Wiley & Sons, Inc., 2018, 201-237.
  225. A.S. Rathore, N. Kateja, D. Kumar, Process integration and control in continuous bioprocessing, *Current Opinion in Chemical Engineering*, 22 (2018) 18-25.
  226. A.S. Rathore, I.S. Krull, S. Joshi, Analytical Characterization of Biotherapeutic Products Part II: The Analytical Toolbox, *LC GC North America*, 36 (2018), 814.
  227. L.K. Shekhawat, M. Pathak, J. Sarkar, A.S. Rathore, Process development in the Quality by Design paradigm: Modeling of

- Protein A chromatography resin fouling, *J. Chromatogr. A*, 1570 (2018) 56-66.
228. S. Madan, C. Nehate, T.K. Burman, A.S. Rathore, V. Koul, Design, Preparation and Evaluation of Liposomal Gel Formulations for Treatment of Acne: In vitro and In vivo Studies, *Drug Development and Industrial Pharmacy*, 45 (2019) 395-404.
  229. N. Kateja, D. Kumar, S. Sethi, and A.S. Rathore, Non-protein A purification platform for continuous processing of monoclonal antibody therapeutics, *Journal of Chromatography A* 1579 (2018) 60–72.
  230. A. Tiwari, N. Kateja, S. Chanana, A.S. Rathore, Use of HPLC as an enabler of process analytical technology in process chromatography, *Analytical Chemistry*, 90 (2018) 7824-7829.
  231. M. Garg, M. Roy, P. Chokshi, A.S. Rathore, Process development in the QbD paradigm: mechanistic modeling of antisolvent crystallization for production of pharmaceuticals, *Crystal Growth & Design*, 18 (2018), 3352-3359.
  232. A.S. Rathore, A. Chauhan, Transcriptomics and the Production of Recombinant Therapeutics, *BioPharm International*, 31 (2018), 22-28.
  233. S. Ravuluri, R. Bansal, N. Chhabra, A.S. Rathore, Kinetics and Characterization of Non-enzymatic Fragmentation of Monoclonal Antibody, *Pharmaceutical Research*, 35 (2018), 142.
  234. A.S. Rathore, D. Kumar, N. Kateja, Recent developments in chromatographic purification of biopharmaceuticals, *Biotechnology Letters*, 40, 2018, 895-905.
  235. M.C. Nweke, A.S. Rathore, D.G. Bracewell, Lifetime and Aging of Chromatography Resins during Biopharmaceutical Manufacture, *Trends in Biotechnology*, 36 (2018), 992-995.
  236. V.S. Joshi, V. Kumar, A.S. Rathore, Enhanced product understanding in the QbD paradigm: linkage between charge heterogeneity and stability of monoclonal antibody therapeutic products, *Journal of Chemical Technology & Biotechnology*, 8 (2018), 2102-2110.
  237. A.S. Rathore, D.K. Yadav, S.S. Pandey, S.K. Singh, D. Kumar, Preclinical Evaluation of Product Related Impurities and Variants, *BioPharm International*, 31 (2018), 26-32.
  238. A.S. Rathore, D. Kumar, N. Kateja, Role of raw materials in biopharmaceutical manufacturing: risk analysis and fingerprinting, *Current Opinion in Biotechnology*, 53 (2018) 99-105.
  239. J.R. Auclair, A.S. Rathore, I. Krull, Charge-Variant Profiling of Biopharmaceuticals, *LC GC North America*, 36 (2018), 26-36.
  240. J. Gomes, J. Batra, V.R. Chopda, P. Kathiresan, A.S. Rathore, Monitoring and Control of Bioethanol Production from Lignocellulosic Biomass, in *Waste Biorefinery: Potential and Perspectives*, Eds. T Bhaskar, A Pandey, S. V. Mohan, D-J Lee, S K Khanal, Elsevier, Amsterdam, The Netherlands, 2018, 727-749.
  241. L.K. Shekhawat, J. Sarkar, R. Gupta, S. Hadpe, A.S. Rathore, Application of CFD in Bioprocessing: Separation of mammalian cells using disc stack centrifuge during production of biotherapeutics, *Journal of Biotechnology*, 267 (2018) 1-11.
  242. A.S. Rathore, Approval of Ogivri, *PDA Journal of Pharmaceutical Science and Technology*, 72 (2018) 1-1.
  243. M. Pathak, K. Lintern, D.G. Bracewell, and A.S. Rathore, Protein A Chromatography Resin Lifetime - Impact of Feed Composition, *Biotechnology Progress*, 34 (2018) 412-419.
  244. A.S. Rathore, D. Kumar, J. Batra, I. Krull, Biolayer Interferometry as an Alternative to HPLC for Measuring Product Concentration in Fermentation Broth, *LC GC North America*, 35 (2017), 870-877.
  245. V. Hebhi, P. Kathiresan, D. Kumar, C. Komives, and A.S. Rathore, Process for production and purification of Lethal Toxin Neutralizing Factor (LTNF) from *E. coli* and its economic analysis, *Journal of Chemical Technology and Biotechnology*, 93 (2018) 959-967.
  246. N. Nupur, N. Chhabra, R. Dash, and A.S. Rathore, Assessment of Structural and Functional Similarity of Biosimilar Products: Rituximab as a case study, *mAbs*, 10 (2018) 143-158.
  247. R. Bansal, S. Dhawan, S. Chatterjee, G. Maurya, V. Haridas, A.S. Rathore, Peptide dendrons as thermal stability amplifiers for IgG1 monoclonal antibody biotherapeutics, *Bioconjugate Chemistry* (2017)
  248. Sumit K. Singh, D. Kumar, and A.S. Rathore, Determination of Critical Quality Attributes for a Biotherapeutic in the QbD Paradigm: GCSF as a Case Study, *The AAPS Journal*, 19 (2017) 1826-1841.
  249. N. Kateja, D. Kumar, A. Godara, V. Kumar, and A.S. Rathore, Integrated Chromatographic Platform for Simultaneous Separation of Charge Variants and Aggregates from Monoclonal Antibody Therapeutic Products, *Biotechnology Journal* (2017).
  250. A.S. Rathore, N. Kateja, H. Agarwal, Continuous Downstream Processing for Production of Biotech Therapeutics, in *Continuous Downstream Processing*, Taylor and Francis, 2017, 261-287.
  251. P. Misra, A. Sinha, F.Q. Mir, A.S. Rathore, and A. Shukla, A three plus three parameters mechanistic model for viral filtration, *Biotechnology Progress*, (2017)
  252. M. Pathak and A.S. Rathore, Implementation of a Fluorescence Based Process Analytical Technology Control of Fouling of Protein A Chromatography Resin, *Journal of Chemical Technology and Biotechnology*, 92 (2017) 2799–2807.
  253. V. Kumar and A.S. Rathore, Mechanistic Modeling of Ion-Exchange Process Chromatography of Charge Variants of Monoclonal Antibody Products: Application for PAT Implementation, *Biotechnology Journal* (2017).
  254. V.S. Joshi, V. Kumar and A.S. Rathore, Optimization of ion exchange sigmoidal gradients using hybrid models: Implementation of quality by design in analytical method development, *Journal of Chromatography A*, 1491 (2017) 145-152.
  255. L.K. Shekhawat, M. Chandak and A.S. Rathore, Mechanistic modeling of hydrophobic interaction chromatography for purification of monoclonal antibody therapeutics: Process optimization in the quality by design paradigm, *Journal of Chemical Technology and Biotechnology*. 92 (2017) 2527–2537.
  256. N. Kateja, H. Agarwal, V. Hebhi, and A.S. Rathore, Integrated continuous processing of proteins expressed as inclusion bodies: GCSF as a case study, *Biotechnology Progress* 33 (2017) 998-1009.
  257. S.R. Hadpe, A.K. Sharma, V.V. Mohite and A.S. Rathore, ATF for cell culture harvest clarification: Mechanistic modelling and comparison with TFF, *Journal of Chemical Technology and Biotechnology*, 92 (2017) 732-740.
  258. Komives, E. Sanchez, A.S. Rathore, B. White, M. Suntravat, M. Balderrama, A. Cifelli, V. Joshi, Opossum peptide that can neutralize rattlesnake venom is expressed in *Escherichia coli*, *Biotechnology Progress*, 33 (2017) 81-86.
  259. R. Singh, R. Jindal, A.S. Rathore, and G. Goel, Equilibrium Ensembles for Insulin Folding from Bias-Exchange Metadynamics, *Biophysical Journal*, 112 (2017) 1571-1585.
  260. M. Pathak, K. Lintern, V. Hopda, D.G. Bracewell, and A.S. Rathore, Fluorescence based real time monitoring of fouling in

- process chromatography, *Scientific Reports*, 7 (2017).
261. N. Kateja, H. Agarwal, V. Hebhi, and A.S. Rathore, A coiled flow inversion reactor enables continuous processing, *BioPharm International* (2016).
  262. J. Batra and A.S. Rathore, Glycosylation of Monoclonal Antibody Products: Current Status and Future Prospects, *Biotechnology Progress*, 32 (2016) 1091-1102.
  263. H. Agarwal, S.R. Hadpe, S.J. Alva and A.S. Rathore, Artificial neural network (ANN) based prediction of depth filter loading capacity for filter sizing, *Biotechnology Progress*, 32 (2016) 1436-1443.
  264. K. Lintern, M. Pathak, C.M. Smales, K. Howland, A.S. Rathore, and D.G. Bracewell, Residual on column host cell protein analysis during lifetime studies of protein A chromatography, *J. Chromatography A*, 1461 (2016) 70-77.
  265. N. Kateja, H. Agarwal, A. Saraswat, M. Bhat, and A.S. Rathore, Continuous precipitation of process related impurities from clarified cell culture supernatant using a novel coiled flow inversion reactor (CFIR), *Biotechnology Journal*, 11 (2016) 1320-1331.
  266. Sumit K. Singh, V. Hebhi, A.S. Rathore, and I.S. Krull, Practical Considerations of Capillary Electrophoresis-Mass Spectrophotometry for Analysis of Biotherapeutics, *LC GC North America*, September, 2016.
  267. S.K. Singh, G. Narula, and A.S. Rathore, Should charge variants of monoclonal antibody therapeutics be considered critical quality attributes, *Electrophoresis*, 37 (2016) 2338-2346.
  268. M. Pathak and A.S. Rathore, Mechanistic understanding of fouling of Protein A chromatography resin, *Journal of Chromatography A*, 1459 (2016) 78-88.
  269. A.S. Rathore, N. Kateja, H. Agarwal, A.K. Sharma, Continuous Processing for Production of Biopharmaceuticals, *BioPharm International*, 29 (2016) 14-19.
  270. A.S. Rathore and G. Kapoor, Implementation of Quality by Design for Processing of Food Products and Biotherapeutics, *Food and Bioproducts Processing*, 99 (2016) 231-243.
  271. V.R. Chopda, M. Pathak, J. Batra, J. Gomes, and A.S. Rathore, Enabler for Process Analytical Technology Implementation in *Pichia pastoris* Fermentation: Fluorescence Based Soft Sensors for Rapid Quantitation of Product Titer, *Engineering in Life Sciences*, 17 (2016), 448-457.
  272. J. Batra and A.S. Rathore, Antibody Production in Microbial Hosts, *BioPharm International*, 2 (2016) 18-23.
  273. P. Kathiresan, J. Kumar, V. Chopda, S. Jain, M. Banerjee, A.S. Rathore, J. Gomes, An Input-Output Linearizing Controller for Producing Angiogenin from *E. coli*, in *Microbes in the Spotlight: Recent Progress in the Understanding of Beneficial and Harmful Microorganisms*, BrownWalker Press, 2016, 379-384.
  274. A.S. Rathore, V.R. Chopda, J. Gomes, Knowledge Management in a Waste based Biorefinery in the QbD Paradigm, *Bioresource Technology*, 215 (2016) 63-75.
  275. A.S. Rathore, S.K. Singh, Production of Protein Therapeutics in the Quality by Design (QbD) Paradigm, in *Protein Therapeutics, Topics in Medicinal Chemistry*, Eds. Prof. Zuben Sauna and Prof. Chava Kimchi-Sarfaty, Springer, 2016, 1-27.
  276. A.S. Rathore, M. Pathak, and A. Godara, Process Development in the QbD Paradigm: Role of Process Integration in Process Optimization for Production of Biotherapeutics, *Biotechnology Progress*, 32 (2016) 355-362.
  277. V.R. Chopda, J. Gomes, and A.S. Rathore, Bridging the gap between PAT concepts and implementation: An integrated software platform for fermentation, *Biotechnology Journal*, 11 (2016) 164-171.
  278. N. Nupur, S.K. Singh, G. Narula, and A.S. Rathore, Assessing analytical comparability of biosimilars: GCSF as a case study, *J. Chromatography B*, 1032 (2016) 165-171.
  279. M. Pathak, S. Dixit, S. Muthukumar, and A.S. Rathore, In-vitro refolding of recombinant human granulocyte colony stimulating factor: Mechanistic understanding and its application towards process design, *Journal of Pharmaceutical and Biomedical Analysis*, 126 (2016) 124-131.
  280. V. Kumar, S. Leweke, E. von Lieres, and A.S. Rathore, Mechanistic Modeling of Ion-Exchange Process Chromatography of Charge Variants of Monoclonal Antibody Products, *J. Chromatography A* 1426 (2015) 140-153.
  281. A.S. Rathore, M. Pathak, R. Jain, and G.P.S. Jadaun, Monitoring Quality of Biotherapeutic Products Using Multivariate Data Analysis, *AAPS Journal*, 18 (2016) 793-800.
  282. A. Singla, R. Bansal, V. Joshi, and A.S. Rathore, Aggregation Kinetics for IgG1 Based Monoclonal Antibody Therapeutics, *AAPS Journal*, 18 (2016) 689-702.
  283. A.S. Rathore, Quality by Design (QbD) based Process Development for Purification of a Biotherapeutic, *Trends in Biotechnology*, 34 (2016) 358-370.
  284. S. Muthukumar, T. Muralikrishnan, R. Mendhe, and A.S. Rathore, Economic benefits of membrane chromatography versus packed bed column purification of therapeutic proteins expressed in microbial and mammalian hosts, *Journal of Chemical Technology and Biotechnology*, 92 (2017) 59-68.
  285. J. Sarkar, L.K. Shekhawat, V. Loomba, and A.S. Rathore, CFD of Mixing of Multiphase Flow in a Bioreactor using Population Balance Model, *Biotechnology Progress*, 32 (2016) 613-628.
  286. O.F. Garcia-Aponte, A. Golabgir, B.M. Valejo-Diaz, A.S. Rathore, C. Herwig, Clarifying the Role of Knowledge Management in QbD: A Review, *Pharmaceutical Research*, (2016) 1-14.
  287. A.K. Sharma, H. Agarwal, M. Pathak, K.D.P. Nigam, and A.S. Rathore, Continuous Refolding of a Biotech Therapeutic in a Novel Coiled Flow Inverter Reactor, *Chemical Engineering Science*, 140 (2016) 153-160.
  288. G. Narula, V. Hebhi, S.K. Singh, A.S. Rathore, and I.S. Krull, Glycosylation in mAb Therapeutic Products: Analytical Characterization and Impact of Process, *LC GC North America*, January, 2016.
  289. A.S. Rathore, S.K. Singh, N. Nupur, G. Narula, Role of Proteomics in Characterization of Biological Products, in *Biomarker Discovery in the Developing World: Dissecting the Pipeline for Meeting the Challenges*, *Advances in Experimental Medicine and Biology Series*, Ed. S. Srivastava, Springer India, 2016, 83-97.
  290. A.S. Rathore, L. Kanwar, V. Loomba, Computational Fluid Dynamics for Bioreactor Design, in *Bioreactors: Design, Operation and Novel Applications*, Ed. C.-F. Mandenius, Wiley VCH, Weinheim, Germany, 2016, pages 295-322.
  291. L.K. Shekhawat, A.P. Manvar, and A.S. Rathore, Enablers for QbD Implementation: Mechanistic modeling for ion-exchange membrane chromatography, *J. Mem. Sci.* 500 (2016) 86-98.

292. V.R. Chopda, J. Gomes, and A.S. Rathore, Maximizing biomass concentration in baker's yeast process by using a decoupled geometric controller for substrate and dissolved oxygen, *Bioresource Technology* 196 (2015) 160-168.
293. I.S. Krull and A.S. Rathore, Challenges in the Determination of Protein Aggregates, *LC GC North America*, Part 1: January, 2015, Part 2: July, 2015.
294. A.S. Rathore, M. Pathak, G. Ma, and D. G. Bracewell, Reuse of Protein A Resin: Fouling and Economics, *BioPharm International* (2015) March.
295. S. Muthukumar and A.S. Rathore, Use of Polymeric Membranes for Purification of an E. coli Expressed Biotherapeutic Protein, *Preparative Biochemistry and Biotechnology*, 46 (2016) 183-191.
296. A.S. Rathore, H. Agarwal, A.K. Sharma, M. Pathak, and S. Muthukumar, Continuous Processing for Production of Biopharmaceuticals, *Preparative Biochemistry and Biotechnology*, 45 (2015) 836-849.
297. A.S. Rathore, M. Pathak, S.K. Singh, E.K. Read, and K. Brorson, Fermentanomics: Relating Quality Attributes of a Monoclonal Antibody to Cell Culture Process Variables and Raw Materials using Multivariate Data Analysis, *Biotechnology Progress*, 31 (2015) 1586-1599.
298. V. Joshi, V. Kumar, and A.S. Rathore, Role of Organic Modifier and Gradient Shape in RP-HPLC Separation: Analysis of GCSF Variants, *J. Chromatography Sci.* 53 (2015) 417-423.
299. V. Joshi, V. Kumar, and A.S. Rathore, Rapid analysis of charge variants of monoclonal antibodies using non-linear salt gradient in cation-exchange high performance liquid chromatography, *Journal of Chromatography A*, 1406 (2015) 175-185.
300. Herwig, O.F. Garcia-Aponte, A. Golabgir, and A.S. Rathore, Knowledge Management in the QbD Paradigm: Manufacturing of Biotech Therapeutics, *Trends in Biotechnology*, 33 (2015) 381-387.
301. A.S. Rathore, S.K. Singh, Use of Multivariate Data Analysis in Bioprocessing, *BioPharm International* 28 (2015) 26-31.
302. A.S. Rathore, Biosimilars in India. *Journal of Proteomics* 127 (2015) 71-72.
303. R. Seth, P. Singh, K. Puri, A. Arora, and A.S. Rathore, Morbidity profile and outcome of hyperleukocytosis in childhood acute leukemia: experience from a tertiary center, *Int. J. Hematology Research* 2 (2015) 90-94.
304. J. Gomes, V.R. Chopda, and A.S. Rathore, Integrating Systems Analysis and Control for Implementing Process Analytical Technology in Bioprocess Development, *J Chem Technol Biotechnol* 90 (2015) 583-589.
305. V. Joshi, A. S. Rathore, and I. Krull, Sigmoidal Gradients in the HPLC-Based Analysis of Biotherapeutic Products, *LC GC North America*, August, 2015.
306. R. Mendhe, T. Muralikrishnan, N. Patil, and A.S. Rathore, Comparison of PAT based Approaches for Making Real-time Pooling Decisions for Process Chromatography- Use of Feed Forward Control, *J Chem Technol Biotechnol* 90 (2015) 341-348.
307. A.S. Rathore and G. Kapoor, Application of Process Analytical Technology for Downstream Purification of Biotherapeutics, *J Chem Technol Biotechnol* 90 (2015) 228-236.
308. S. Muthukumar, A. Shukla, and A.S. Rathore, Modeling of Filtration Processes- Microfiltration and Depth Filtration for Harvest of a Therapeutic Protein Expressed in *Pichia pastoris* at Constant Pressure, *Bioengineering*, 1 (2014) 260-277.
309. A.S. Rathore, R. Jain, M. Kalaivani, G. Narula and G.N. Singh, Setting Standards for Biotech Therapeutics in India, *BioPharm International*, October, 2014, 2-7.
310. A.S. Rathore, V. Joshi, V. Kumar and I. Krull, Role of elution gradient shape in separation of protein therapeutics, *LC GC North America*, September, 2014.
311. V. Joshi, T. Shivach, N. Yadav, and A.S. Rathore, Circular Dichroism Spectroscopy as a Tool for Measurement and Assessment of Aggregation in Monoclonal Antibody Therapeutics, *Anal. Chem.* 86 (2014) 11606-11613.
312. V. Kumar and A.S. Rathore, Two-Stage Chromatographic Separation of Aggregates for Monoclonal Antibody Therapeutics, *J. Chromatogr. A* 1368 (2014) 155-162.
313. A.S. Rathore, Quality by Design for Manufacturing of Biotech Therapeutics, *Pharma Times*, 46 (2014) 57-59.
314. A. Heckendorf, M. Gilar, I.S. Krull, and A.S. Rathore, HILIC and Its Applications for Biotechnology, *LC GC North America*, Part 1: December 2013, Part 2: January, 2014.
315. A.S. Rathore, QbD/ PAT for Bioprocessing: Moving from Theory to Implementation, *Current Opinion in Chemical Engineering*, 6 (2014) 1-8.
316. A.S. Rathore, S. Mittal, M. Pathak and V. Mahalingam, Chemometrics Application in Biotech Processes: Assessing Comparability across Processes and Scales, *J Chem Technol Biotechnol* 89 (2014) 1311-1316.
317. A.S. Rathore, A. Weiskopf and A.J. Reason, Defining Critical Quality Attributes for Monoclonal Antibody Therapeutic Products, *BioPharm International*, July, 2014, 34-43.
318. V. Joshi, T. Shivach, V. Kumar, N. Yadav, and A.S. Rathore, Avoiding Antibody Aggregation During Processing: Establishing Hold Times, *Biotechnol. J.* 9 (2014) 1195-1205.
319. M. Pathak, D. Dutta and A.S. Rathore, Analytical QbD: Development of a native gel electrophoresis method for measurement of monoclonal antibody aggregates, *Electrophoresis*, 35 (2014) 2163-2171.
320. M.A. Shaik, A. Dhakre, N. Patil and A.S. Rathore, Capacity Optimization and Scheduling of a Multiproduct Manufacturing Facility for Biotech Therapeutic Products, *Biotechnology Progress*, 30 (2014) 1221-1230.
321. A.S. Rathore, S. Mittal, M. Pathak and A. Arora, Guidance for Performing Multivariate Data Analysis of Bioprocessing Data: Pitfalls and Recommendations, *Biotechnology Progress*, 30 (2014) 967-973.
322. A.S. Rathore and R. Bhambure, Chemometrics application in bioavailability for "Biosimilars": Filgrastim as a Case Study, *Analytical and Bioanalytical Chemistry*, 406 (2014) 6569-6576.
323. A.H. Mollah, H.S. Baseman, M. Long, and A.S. Rathore, A Practical Discussion of Risk Management for Manufacturing of Pharmaceutical Products, *PDA J Sci Tech*, 68 (2014) 271-280.
324. A.S. Rathore and R. Bhambure, High Throughput Process Development: I. Process Chromatography, *Methods in Molecular Biology*, 1129 (2014) 29-37.
325. A.S. Rathore and R. Bhambure, Aqueous Two Phase Assisted Precipitation of Proteins: A Platform for Isolation of Process Related Impurities from Therapeutic Proteins, *Methods in Molecular Biology*, 1129 (2014) 101-110.
326. A.S. Rathore and S. Muthukumar, High Throughput Process Development: II. Membrane Chromatography, *Methods in Molecular Biology*, 1129 (2014) 39-44.



327. A.S. Rathore, V. Kumar, A. Arora, S. Lute, K. Brorson, and A. Shukla, Mechanistic modeling of viral filtration, *Journal of Membrane Science*, 458 (2014) 96-103.
328. M. Pathak, N. Chaudhary and A.S. Rathore, Development of a low-cost, high-throughput native polyacrylamide gel electrophoresis (N-PAGE) protocol for lipoprotein sub-fractionation using Quality by Design approach, *Journal of Pharmaceutical and Biomedical Analysis*, 92 (2014) 119-126.
329. V. Halan, S. Maity, A.S. Rathore and I.S. Krull, Fluorescence-Detection Size- Exclusion Chromatography —An Analytical Technique with Multiple Applications, *LC GC North America*, December 2014.
330. R. Bhambure, I. Sharma, S.K. Pattanayek and A.S. Rathore, Qualitative and Quantitative Examination of Non-Specific Protein Adsorption on Filter Membrane Disks of a Commercially available High Throughput Chromatography Device, *Journal of Membrane Science*, 451 (2014) 312-318.
331. V. Kumar, A. Bhalla, and A.S. Rathore, Design of Experiments Application in Bioprocessing: Concepts and Approach, *Biotechnology Progress*, 30 (2014) 86-99.
332. A.S. Rathore, P. Bade, V. Joshi, M. Pathak, S.K. Pattanayek, Refolding of Biotech Therapeutic Proteins Expressed in Bacteria: Review, *J Chem Technol Biotechnol*, 88 (2013) 1794-1806.
333. A.S. Rathore, V. Kumar, N. Tugcu and R. Godavarti, Evolution of the Monoclonal Antibody Platform, *BioPharm International*, 2013, November.
334. V. Joshi, V. Kumar, A.S. Rathore, and I.S. Krull, A Rapid HPLC Method for Enabling PAT Application for Processing of GCSF, *LC GC North America*, September, 2013.
335. R. Bhambure, D. Gupta and A.S. Rathore, A Novel Multimodal Chromatography based Single Step Purification Process for Efficient Manufacturing of an E. coli based Biotherapeutic Protein Product, *Journal of Chromatography A*, 1314 (2013) 188-198.
336. S. Kabra, M.A. Shaik, and A.S. Rathore, Multi-period scheduling of a multi-stage multi-product bio-pharmaceutical process, *Computers and Chemical Engineering*, 57 (2013) 95-103.
337. A.H. Mollah, S. Bozzone, and A.S. Rathore, Process Lifecycle Validation: Applying Risk Management, *BioPharm International*, 2013, August.
338. Vashishta, M. Garg, R. Chaudhary, H. Sahni, R. Khanna, and A.S. Rathore, Use of Computational Fluid Dynamics for Development and Scale-up of a Helical Coil Heat Exchanger for Dissolution of a Thermally Labile API, *Organic Process and Product Development*, 17 (2013) 1311-1319.
339. R. Bhambure, R. Sharma, D. Gupta and A.S. Rathore, A Novel Aqueous Two Phase Assisted Platform for Efficient Removal of Process Related Impurities Associated with E. coli based Biotherapeutic Protein Products, *Journal of Chromatography A*, 1307 (2013) 49-57.
340. A.S. Rathore, V. Joshi and N. Yadav, Aggregation of Monoclonal Antibody Products: Formation and Removal, *BioPharm International*, 2013, March.
341. S. Muthukumar and A.S. Rathore, High Throughput Process Development (HTPD) Platform for Membrane Chromatography, *Journal of Membrane Science*, 442 (2013) 245-253.
342. R. Bhambure and A.S. Rathore, Chromatography Process Development in the QbD Paradigm I. Establishing a High Throughput Process Development (HTPD) Platform as a Tool for Establishing “Characterization Space” for an Ion Exchange Chromatography Step, *Biotechnology Progress*, 29 (2013) 403-414.
343. A. Persad, V. Chopda, A.S. Rathore, J. Gomes. Comparative Performance of Decoupled Input-Output Linearizing Controller and Linear Interpolation PID Controller: Enhancing Biomass and Ethanol Production by *Saccharomyces cerevisiae*, *Applied Biochemistry and Biotechnology*, 169 (2013) 1219-1240.
344. A.S. Rathore, S. Mittal, S. Lute, K. Brorson, Chemometrics Applications in Biotech Processes: Predicting Column Integrity and Impurity Clearance during Reuse of Chromatography Resin, *Biotechnology Progress*, 28 (2013) 1308-1314.
345. A.S. Rathore and V. Joshi, Scale-down of Biopharmaceutical Purification Operations, *Encyclopedia of Industrial Biotechnology: Bioprocess, Bioseparation, and Cell Technology*, (2013).
346. A.S. Rathore and G. Kapoor, Process Analytical Technology: Strategies for Biopharmaceuticals, *Encyclopedia of Industrial Biotechnology: Bioprocess, Bioseparation, and Cell Technology*, (2013).
347. P. Bade, S. P. Kotu, A.S. Rathore, Optimization of the Refolding Process for a Therapeutic Fusion Protein in a Quality by Design (QbD) Paradigm, *Journal of Separation Science*, 35 (2012) 3160-3169.
348. A. Guttman, A.S. Rathore, and I.S. Krull, Bioanalytical Tools for the Characterization of Biologics and Biosimilars, *LC GC North America*, May, 2012.
349. A.S. Rathore, C. Sharma and A. Persad, Computational Fluid Dynamics (CFD) as a Tool for establishing Design Space for Mixing in a Bioreactor, *Biotechnology Progress*, 28 (2012) 382-391.
350. A.S. Rathore, S. Jadhav, M. Bhalghat, S. Kandawalla, S. Ray, A.K. Patra, Key Considerations for Development and Production of Vaccine Products, *BioPharm International*, March, 2012.
351. N. Bhushan, S. Hadpe and A.S. Rathore, Chemometrics Applications in Biotech Processes: Assessing Process Comparability, *Biotechnology Progress*, 28 (2012) 121-128.
352. A.S. Rathore, A. Bansal and J. Hans, Knowledge Management and Process Monitoring of Biopharmaceutical Processes in the Quality by Design Paradigm, in *Measurement, Monitoring, Modelling and Control*, Ed. C.-F. Mandenius and N. T. Hooker, Springer Verlag, 2013 (132) 217-247.
353. R. Mendhe, I.S. Krull, and A.S. Rathore, Analytical Tools for Enabling Process Analytical Technology Applications in Biotechnology, *LC GC North America*, January, 2011. *Pharm. Tech.*, November, 2012.
354. V. Joshi, V. Kumar, A.S. Rathore, and I.S. Krull, A Rapid HPLC Method for Enabling PAT Application for Processing of GCSF, *LC GC North America*, September, 2013.
355. S. Kreimer, J. Champagne, A.S. Rathore, and I.S. Krull, The Use of Light-Scattering Detection with SEC and HPLC for Protein and Antibody Studies, Part II: Examples and Comparison to Mass Spectrometry, *LC GC North America*, December, 2012.
356. S. Kreimer, A.S. Rathore, and I.S. Krull, The Use of Light-Scattering Detection with SEC and HPLC for Protein and Antibody Studies, Part I: Background, Theory, and Potential Uses, *LC GC North America*, September, 2012.

357. A.S. Rathore, Development and Commercialization of Biosimilars in India, BioPharm International, November, 2011.
358. A.S. Rathore, N. Bhushan and S. Hadpe, Use of Multivariate Data Analysis (MVDA) for Generating Process Understanding from Manufacturing Data of Biotech Processes, Proceedings of the Indian National Science Academy, 77 (2011) 133-142.
359. Sharma, D. Malhotra and A.S. Rathore, Computational Fluid Dynamics (CFD) Applications in Biotechnology Processes - Review, Biotechnology Progress, 2011, 27 (6) 1497-1510.
360. A.S. Rathore and A. Shirke, Recent Developments in Membrane-Based Separations in Biotechnology Processes – Review, Preparative Biochemistry and Biotechnology, 41 (2011) 307-315. <https://doi.org/10.1080/10826068.2011.613976>
361. A.S. Rathore, R. Bhambure, V. Ghare, Process Analytical Technology (PAT) for Bioseparation Unit Operations, in Process Analytical Technology Applied in Biopharmaceutical Process Development and Manufacturing, Ed. C. Undey, D. Low and J. M. C. de Menezes, Taylor and Francis, Boca Raton, pp 179-200, 2011.
362. I.S. Krull, A.S. Rathore, and Thomas E. Wheat, Current Applications of UHPLC in Biotechnology, Part I: Peptide Mapping and Amino Acid Analysis, LC GC North America, Part 1: September and Part 2: December, 2011.
363. A. Bansal, J. Hans and A.S. Rathore, Operation Excellence: More Data or Smarter Approach, BioPharm International, 2011, June.
364. A.S. Rathore, S. Hadpe and N. Bhushan, Chemometrics Applications in Biotech Processes: Review, Biotechnology Progress, 27 (2011) 307-315.
365. A. Shrivastava, S. Sakthivel, B. Pitchumani and A.S. Rathore, Estimation of Significant Variables in Wet Attrition Milling – a Statistical Approach, Powder Technology, 211 (2011) 46-53.
366. I.S. Krull, A.S. Rathore, and S. Kreimer, SteveBiotechnology Highlights from IsrAnalytica 2011, LC GC North America, June, 2011.
367. T. Sengar and A.S. Rathore, Achieving Process Intensification by Scheduling and Debottlenecking Biotech Processes, BioPharm International, 2011, February.
368. A.S. Rathore, R. Bhambure and I. S. Krull, High Throughput Tools and Approaches for Development of Process Chromatography Steps, LC GC North America, March, 2011.
369. A.S. Rathore and D.A. LeBlanc, PDA's New Technical Report for Biotech Cleaning Validation, BioPharm International, March, 2011.
370. A.S. Rathore, Quality by Design for Follow-on Biologics, Pharmaceutical Technology, February, 2011.
371. R. Bhambure, K. Kumar and A.S. Rathore, High Throughput Process Development for Biopharmaceutical Products: Review, Trends in Biotechnology, 29 (2010) 127-135.
372. I.S. Krull and A.S. Rathore, Popular Cell Expression Systems in the Biotechnology Industry, LC GC North America, 28 (2010) 800-809.
373. A.S. Rathore and I.S. Krull, Biosimilars: Introduction, Concerns and Opportunities, LC GC North America, 28 (2010) 598-600.
374. A.S. Rathore and D. Low, Implementation of QbD for Biotech Products: Managing Raw Materials, BioPharm International, 2010, part 1 – October and part 2 - November.
375. I.S. Krull and A.S. Rathore, Analytical Tools for Characterization of Biotechnology Products and Processes, LC GC North America, 29 (2010) 454.
376. A.S. Rathore, R. Bhambure and V. Ghare, Process Analytical Technology (PAT) for Biopharmaceutical Products, Anal. Bioanal. Chem., 398 (2010) 137-154.
377. A.S. Rathore, Quality by Design for manufacturing of biopharmaceuticals, BioSpectrum, 2010, April.
378. A.O. Kirdar, G. Chen and A.S. Rathore, Combining Near-Infrared (NIR) Spectroscopy and Multivariate Data Analysis (MVDA) for Screening of Raw Materials Used in the Cell Culture Medium for the Production of a Recombinant Therapeutic Protein, Biotechnol. Prog., 26 (2010) 527-531.
379. A.S. Rathore, L. Parr, S. Dermawan, K. Lawson and Y. Lu, Large Scale Demonstration of Process Analytical Technology (PAT) in Bioprocessing: Use of High Performance Liquid Chromatography (HPLC) for Making Real Time Pooling Decisions for Process Chromatography, Biotechnol. Prog., 26 (2010) 448-457.
380. A.S. Rathore, Quality by Design for Biotechnology Products: Challenges and Solutions, Pharmaceutical Technology Europe, 2010, February, 4.
381. A.S. Rathore, Setting Specifications for a Biotech Therapeutic Product in the Quality by Design Paradigm, BioPharm International, January, 2010, 46-53.
382. E.K. Read, J. T. Park, R.B. Shah, B.S. Riley, K.A. Brorson, and A.S. Rathore, Process Analytical Technology (PAT) for Biopharmaceutical Products: Concepts and Applications – Part I, Biotechnology Bioengineering, 105, 2010, 276-284.
383. E.K. Read, J.T. Park, R.B. Shah, B.S. Riley, K.A. Brorson, and A.S. Rathore, Process Analytical Technology (PAT) for Biopharmaceutical Products: Concepts and Applications – Part II, Biotechnology Bioengineering, 105, 2010, 285-295.
384. T. Arora et al, Quality by Design for Biotechnology Products, BioPharm Intl., Part 1: November, 2009, 26-36; Part 2: December, 2009, 42-58; Part 3: January, 2010, 36-45.
385. A.S. Rathore, Follow-on Protein Products: Scientific Issues, Developments and Challenges, Trends in Biotechnology, 27, 2009, 698-705.
386. B.S. Kendrick, G. Chrimes, S.L. Cockrill, J.P. Gabrielson, K.K. Arthur, B.D. Prater, Q. Qin, B. Zhang and A.S. Rathore, Analytical Tools for Product and Process Characterization, BioPharm Intl., August, 2009, 32-44.
387. A.S. Rathore, X. Li, W. Bartkowski, A. Sharma, and Y. Lu, Case Study and Application of Process Analytical Technology (PAT) towards Bioprocessing: III. Use of Tryptophan Fluorescence as At-line Tool for Making Pooling Decisions for Process Chromatography, Biotech. Prog., 25, 2009, 1433-1439.
388. A.S. Rathore, A Roadmap for Implementation of Quality by Design (QbD) for Biotechnology Products, Trends in Biotechnology, 27, 2009, 546-553.
389. S.K. Singh, N. Rathore, A. McAuley and A.S. Rathore, Formulation and Manufacturing of Biotech Drug Products: Issues and Best Practices, BioPharm Intl., June (2009) 32-49.
390. P. Konold, R. Woolfenden II, Cenk Undey and A.S. Rathore, Monitoring of Biopharmaceutical Processes: Present and Future Approaches, BioPharm Intl., May (2009) 26-39.

391. D.M. Boyle, J.J. Buckley, G.V. Johnson, A.S. Rathore, and M. G. Gustafson., Use of Design of Experiments (DOE) for Development of Refold Technology for Progenipointin-1, A Recombinant Human Cytokine Fusion Protein from E. Coli Inclusion Bodies, *Biotechnol. Appl. Biochem.*, 54 (2009) 85-92.
392. X. Liu, M. Collins, N. Fraud, J. Campbell, I. Lowenstein, K. M. Lacki and A.S. Rathore, Upcoming Technologies to Facilitate More Efficient Manufacturing of Biologics, *BioPharm Intl.*, February, 2009, 38-51.
393. A.S. Rathore, Application of Process Analytical Technology (PAT) towards Bioprocessing, *American Pharmaceutical Review*, March/April (2009) 60-62.
394. R. Mhatre and A.S. Rathore, Quality by Design (QbD) – an overview of the basic concepts, in *Quality by Design for Biopharmaceuticals: Perspectives and Case Studies*, Ed. A. S. Rathore and R. Mhatre, Wiley Interscience, New Jersey, 2009, 1-8.
395. P. van Hoek, J. Harms, X. Wang, and A.S. Rathore, Case Study on Definition of Design Space for a Microbial Fermentation Step, in *Quality by Design for Biopharmaceuticals: Perspectives and Case Studies*, Ed. by A. S. Rathore and R. Mhatre, Wiley Interscience, New Jersey, 2009, 85-109.
396. A.S. Rathore, Process Analytical Technology (PAT): Application in Manufacturing of Biologics, *Quality for Biologics*, BioPharm Knowledge Publishing, (2009) 39-53.
397. A.S. Rathore and H. Winkle, Quality by Design for Biopharmaceuticals: Regulatory Perspective and Approach, *Nature Biotechnology*, 27 (2009) 26-34.
398. A.S. Rathore, A. Saleki-Gerhardt, S.H. Montgomery, and S.M. Tyler, Quality by Design for Pharmaceuticals: Industrial Case Studies on Defining and Implementing Design Space for the Process, *BioPharm Intl.*, Part 1: December (2008) and Part 2: January (2009).
399. A.S. Rathore and R. Devine, Quality by Design for Pharmaceuticals: Concepts and Implementation, *PDA Journal of Science and Technology*, 62 (2008) 380-390.
400. O. Kaltenbrunner, J. McCue, J.M. Mollerup and A.S. Rathore, Modeling of Biopharmaceutical Processes: II. Process Chromatography Unit Operation, *BioPharm*, 21(2008) 28-42.
401. A.S. Rathore, R. Wood, A. Sharma, and S. Dermawan Case Study and Application of Process Analytical Technology (PAT) towards Bioprocessing: II. Use of Ultra Performance Liquid Chromatography (UPLC) for Making Real Time Pooling Decisions for Process Chromatography, *Biotech. Bioengg.*, 101 (2008) 1366-1374.
402. A.O. Kirdar, K. D. Green and A.S. Rathore, Application of Multivariate Analysis for Identification and Resolution of a Root Cause for a Bioprocessing Application, *Biotech. Prog.*, 24 (2008) 720-726.
403. J. Harms, X. Wang, T. Kim, J. Yang, and A.S. Rathore, Defining Design Space for Biotech Products: Case Study of *Pichia pastoris* Fermentation, *Biotech. Prog.*, 24 (2008) 655-662.
404. A.S. Rathore, M. Yu, S. Yeboah, and A. Sharma, Case Study and Application of Process Analytical Technology (PAT) towards Bioprocessing: Use of On-Line High Performance Liquid Chromatography (HPLC) for Making Real Time Pooling Decisions for Process Chromatography, *Biotech. Bioengg.*, 100 (2008) 306-316.
405. G. Nyberg, K. Green, Y. Hashimura and A.S. Rathore, Modeling of Biopharmaceutical Processes: I. Microbial and Mammalian Unit Operations, *BioPharm*, June, 2008, 56-65.
406. A. Sharma, S. Anderson and A.S. Rathore, Filter Clogging Issues in Sterile Filtration, *BioPharm*, April, 2008, 53-57.
407. R. Johnson, O. Yu, A. Kirdar, A. Annamalai, S. Ahuja, K. Ram and A.S. Rathore, Applications of Multivariate Data Analysis (MVDA) for Biotech Processing, *BioPharm*, 20 (2007) 130-144.
408. R. Samavedam, R. Morrison, T. Kichefski, S. Cote and A.S. Rathore, Lifetime Studies for Membrane Reuse: Principles and Case Study, *BioPharm*, September, 2007.
409. Y. Xiao, A.S. Rathore, J. P. O'Donnell, E. J. Fernandez, Generalizing a Two Conformation Model for Describing Salt and Temperature Effects on Protein Retention and Stability in Hydrophobic Interaction Chromatography, *J. Chromatogr. A*, 1157 (2007) 197-206.
410. A.S. Rathore, R. Branning and D. Cecchini, Design Space for Biotech Products, *BioPharm*, April, 2007, 36-40.
411. X. Wang, A. Germansderfer, J. Harms and A.S. Rathore, Using Statistical Analysis for Setting Process Validation Acceptance Criteria for Biotech Products, *Biotech. Prog.*, 23 (2007) 55-60.
412. A. O. Kirdar, J. S. Conner, J. Baclaski, and A.S. Rathore, Application of Multivariate Analysis towards Biotech Processes: Case Study of a Cell-Culture Unit Operation, *Biotech. Prog.*, 23 (2007) 61-67.
413. A.S. Rathore and M. Karpen, Economic Analysis as a Tool for Process Development: Harvest of a High Cell Density Fermentation, *BioPharm*, November, 2006.
414. A.S. Rathore, A. Sharma and D. Chillin, Applying Process Analytical Technology to Biotech Unit Operations, *BioPharm*, August, 2006, 48-57.
415. Russell, A. Wang, and A.S. Rathore, Harvest of a Therapeutic Protein Product from High Cell Density Fermentation Broths: Principles and Case Study, in *Process Scale Bioseparations for the Biopharmaceutical Industry*, Ed. by A. A. Shukla, M. Etzel, and S. Gadam, CRC Press, 2006, 1-58.
416. B. Channer, G.G. Skellern, M.R. Euerby, A.P. McKeown, and A.S. Rathore, Retention Behavior of Charged Analytes in Voltage Assisted Micro-HPLC, *J. Chromatogr.*, 1095 (2005) 172-179.
417. J. Moscariello, E. Lightfoot, and A.S. Rathore, Efficiency Measurements for Chromatography Columns, *BioPharm*, August, 2005.
418. A. Wang, R. Lewus, and A.S. Rathore, Comparison of Different Options for Harvest of a Therapeutic Protein Product for High Cell Density Fermentation Broth, *Biotech. Bioengg.*, 94 (2005) 91-104.
419. A.S. Rathore, R. Krishnan, S. Tozer, S. Rausch and J. Seely, Optimization, Guidelines and Examples for Scale-down of Biopharmaceutical Unit Operations, – Part I, *BioPharm*, March, 2005; Part II, *BioPharm*, April, 2005. Part 1, *Pharmaceutical Technology Europe*, April (2006) 51-57. Part 2, *Pharmaceutical Technology Europe*, July (2006) 28-32.
420. A.S. Rathore, Y. Li and J. Wilkins, Use of Electrokinetic Measurements for Characterization of Monolithic Columns uses in Capillary Electrochromatography, *J. Chromatogr. A*, 1079 (2005) 299-306.
421. A.S. Rathore and G. Sofer, Lifespan studies for Chromatography and Filtration Media, in *Process Validation*, Ed. by A. S.

- Rathore and G. Sofer, Marcel Dekker, 2005, 169-203.
422. A.S. Rathore, Process Optimization and Characterization Studies for Purification of an E. Coli Expressed Protein Product, in Process Validation, Ed. by A. S. Rathore and G. Sofer, Marcel Dekker, 2005, 451-468.
  423. A.S. Rathore, A. Wang, M. Menon, F. Riske, J. Campbell, E. Goodrich, and J. Martin, Optimization, Scale-up and Validation Issues in Filtration of Biopharmaceuticals – Part I, BioPharm, August, 2004; Part II, BioPharm, September (2004) 42-50.
  424. A.S. Rathore, H. Levine, P. Latham, J. Curling, and O. Kaltenbrunner, Costing Issues in Production of Biopharmaceuticals, BioPharm, February, 2004.
  425. A.S. Rathore, Joule Heating and Determination of Temperature in Capillary Electrophoresis and Capillary Electrochromatography Columns: Review, J. Chromatogr., 1037 (2004) 431-443.
  426. A.S. Rathore, Migration of Sample Components in Capillary Analytical Techniques: Chromatography, Electrophoresis, and Electrochromatography, in Electrokinetic Phenomena, Ed. by A. S. Rathore and A. Guttman, Marcel Dekker, 2003, 1-14.
  427. Wen, A.S. Rathore, and Cs. Horváth, Electroosmotic Mobility and Conductivity in Microchannels, in Electrokinetic Phenomena, Ed. by A. S. Rathore and A. Guttman, Marcel Dekker, 2003, 141-166.
  428. A.S. Rathore, R.E. Bilbrey, and D.E. Steinmeyer, Optimization of an Osmotic Shock Procedure for Isolation of a Protein Product Expressed in E. coli, Biotech. Prog., 19 (2003) 1541-1546.
  429. A.S. Rathore, A.P. McKeown, and M.R. Euerby, Interplay of Chromatographic and Electrophoretic Processes in Capillary Electrochromatography, J. Chromatogr., 1010 (2003) 105-111.
  430. A.S. Rathore, S.E. Sobacke, T.J. Kocot, D.R. Morgan, R.L. Dufield, and N.M. Mozier, Analysis for Residual Host Cell Proteins and DNA in Process Streams of a Recombinant Protein Product Expressed in E. coli Cells, J. Pharm. Biomed. Anal., 32 (2003) 1199-1211.
  431. A.S. Rathore, Qualification of a Chromatographic Column: Why and How to Do it, Biopharm, March (2003) 30-40; Pharmaceutical Technology Europe, March (2003) 45-56.
  432. A.S. Rathore and A. Velayudhan, Scale-up Guidelines for Preparative Chromatography, BioPharm, January (2003) 34-42.
  433. G.V. Annathur, J.L. Pierce, R.G. Combs, A.S. Rathore, and D. E. Steinmeyer, Improvements in Spinner Flask Designs for Insect Cell Suspension Culture, Biotechnol. Appl. Biochem., 38 (2003) 15-18.
  434. A.S. Rathore, G.V. Johnson, J.J. Buckley, D.M. Boyle, and M.E. Gustafson, Process Characterization of the Chromatographic Steps in the Purification Process of a Recombinant E. coli Expressed Protein, Biotechnol. Appl. Biochem., 37 (2002) 51-61.
  435. A.S. Rathore, Theory of Electroosmotic Flow, Retention and Separation Efficiency in Capillary Electrochromatography: Review, Electrophoresis, 23 (2002) 3827-3846.
  436. A.S. Rathore, J. F. Noferi, E. R. Arling, G. Sofer, P. Watler, and R. O'Leary, Process Validation: How Much and When, BioPharm, October, 2002, 18-+.
  437. A.S. Rathore, K. Reynolds, and L. A. Colon, Effects of joule heating on conductivity in capillary electrophoresis and electrochromatography, Electrophoresis, 23 (2002) 2918-2928.
  438. A.S. Rathore, R. R. Kurumbail, and A. V. Lasdun, Requirements for validating a capillary isoelectric focusing method for impurity quantitation, LC-GC, November, 2002, 1042-+.
  439. A.S. Rathore, Chromatography process development for purification of a recombinant E. coli expressed protein, in Scale-up and Optimization in Preparative Chromatography, Ed. by A. S. Rathore and A. Velayudhan, Marcel Dekker, 2002, 317-338.
  440. A.S. Rathore and A. Velayudhan, An Overview of Scale-Up in Preparative Chromatography”, in Scale-up and Optimization in Preparative Chromatography, Ed. by A. S. Rathore and A. Velayudhan, Marcel Dekker, 2002, 1-32.
  441. A.S. Rathore and Cs. Horváth, Chromatographic and electrophoretic migration parameters in capillary electrochromatography, Electrophoresis, 23 (2002) 1211-1216.
  442. Wen, A.S. Rathore, and Cs. Horváth, Enhancement of electroosmotic flow in capillary electrochromatography, Electrophoresis, 22 (2001) 3720-3727.
  443. A.S. Rathore and Cs. Horváth, Migration of charged sample components and electroosmotic flow in packed capillary columns, in Capillary Electrochromatography, Ed. by Z. Deyl and F. Svec, Elsevier, 1-38, 2001.
  444. A.V. Lasdun, R.R. Kurumbail, and A.S. Rathore, Validability of an capillary isoelectric focusing method for impurity quantitation, J. Chromatogr., 917 (2001) 147-158.
  445. A.S. Rathore, Resin screening for optimization of chromatographic separations, LC GC, 19 (2001) 616-622.
  446. A.S. Rathore, E. Wen, and Cs. Horváth, Electroosmotic mobility and conductivity in columns for capillary electrochromatography, Anal. Chem., 71 (1999) 2633-2641.
  447. A.S. Rathore and Cs. Horváth, Cyclodextrins as selectivity enhancers in capillary zone electrophoresis of proteins, Electrophoresis, 19 (1998) 2285-2289.
  448. A.S. Rathore and Cs. Horváth, Axial nonuniformities and flow in columns for capillary electrochromatography, Anal. Chem., 70 (1998) 3069-3077.
  449. A.S. Rathore and Cs. Horváth, “Effect of a pre-detection open segment in the column on the speed and selectivity in capillary electrochromatography,” Anal. Chem., 70 (1998) 3271-3274.
  450. A.S. Rathore and Cs. Horváth, Cyclodextrin aided separation of peptides and proteins by capillary zone electrophoresis, J. Chromatogr. A, 796 (1998) 367-373.
  451. A.S. Rathore and Cs. Horváth, CZE of interconverting cis-trans conformers of peptidyl proline dipeptides: estimation of the kinetic parameters, Electrophoresis, 18 (1997) 2935-2943.
  452. A.S. Rathore and Cs. Horváth, Capillary electrochromatography - theories of electroosmotic flow in porous media, J. Chromatogr. A, 781 (1997) 185-195.
  453. A.S. Rathore and Cs. Horváth, Displacement chromatography with on-column isomerization, J. Chromatogr. A, 787 (1997) 1-12.
  454. Thuncke, A. Kalman, F. Kalman, S. Ma, A.S. Rathore and Cs. Horváth, Kinetic study on cis-trans isomerization of peptidyl proline peptides, J. Chromatogr. A, 744 (1996) 2259-2272.
  455. A.S. Rathore and Cs. Horváth, Separation parameters via virtual migration distances in HPLC and CZE and electrokinetic chromatography, J. Chromatogr. A, 743 (1996) 231-246.

456. K.B. Ramachandran, A.S. Rathore and S.K. Gupta, Modeling the effects of electrostatic interaction with reaction-generated pH change on the kinetics of immobilized enzymes, *Chem. Eng. Journal*, 57 (1995) B15-B21.

## LECTURES

---

1. A. S. Rathore, "Implementation of PAT in Continuous Platforms", Bioprocess International US West, San Diego, US, February, 2023
2. A. S. Rathore, "Model-Based Control of Continuous Processes", Biosimilar Workshop 2023, Goa, February, 2023
3. A. S. Rathore, "Next Generation Manufacturing", Global Pharma, Healthcare & Technology Expo & Summit, New Delhi, February, 2023
4. A. S. Rathore, "India as Global Biomanufacturing Destination-Challenges and Solutions", National Summit on Quality of Biologicals, New Delhi, January, 2023
5. A. S. Rathore, "Role of Spectroscopy for Real Time Monitoring and Control of Continuous Bioprocesses", Bioprocessing India 2022, Pune, India, December, 2022.
6. A. S. Rathore, "Implementation of PAT in Continuous Process Platforms", NIPTE 2022 Annual Research Conference, November, 2022
7. A. S. Rathore, "Multi-attribute monitoring (MAM) of CQAs for recombinant mAbs", Invited Lecture, Separation Science: State of the Art in Biopharmaceutical Analysis", LC GC, November, 2022
8. A. S. Rathore, "Model-Based Control of Continuous Processes", Lecture, Integrated Continuous Biomanufacturing V, Sitges, Spain, October, 2022.
9. A. S. Rathore, "Challenges with Development of Biotech Therapeutics", Virtual Invited Lecture, GIET University, Delhi, India, September, 2022.
10. A. S. Rathore, "Big Data Analytics for Control of Continuous Processes", Lecture, Recovery of Biological Products XIX, Rome, Italy, July, 2022.
11. A. S. Rathore, "Challenges in Analytical Characterization of Biosimilars", Virtual Lecture, 6th Annual USPs Workshop on Biologics and Peptides, June, 2022.
12. A. S. Rathore, "Continuous Processing of Biotech Therapeutics – Enabling Case Studies", Invited Virtual Lecture, Great Indian Biologics Festival, May, 2022.
13. A. S. Rathore, "Process Control of Continuous Bioprocesses", Invited Virtual Lecture, BioHabana 2022, April, 2022.
14. A. S. Rathore, "Model based Control of Continuous Bioprocesses", Invited Lecture, SCEJ 87th Annual Meeting/ICHES 2022, March, 2022.
15. A. S. Rathore, "Model based control of continuous processes for production of biotherapeutic products", Invited Lecture, ACS National Meeting 2022, March, 2022.
16. A. S. Rathore, "Membrane applications in integrated continuous bioprocessing", Invited Lecture, ACS National Meeting 2022, March, 2022.
17. A. S. Rathore, "Role of spectroscopy for real time monitoring and control of continuous bioprocesses", Invited Lecture, ACS National Meeting 2022, March, 2022.
18. A. S. Rathore, "Modeling and Control of a Process Cation Exchange Chromatography Step", Virtual Lecture, Bioprocessing India Mini-Symposium Series 2022, February, 2022.
19. A. S. Rathore, "Role of Chemical Engineers in Affordability and Accessibility of Healthcare", Virtual Invited Lecture, Fugacity 2022, IIT Bombay, Mumbai, India, February, 2022.
20. A. S. Rathore, "Process Control of Continuous Processing", NIPTE 2021 Annual Research Conference, December, 2021
21. A. S. Rathore, "Managing product quality attributes of biosimilars", AFOB Virtual Conference, November, 2021
22. A. S. Rathore, "Role of Spectroscopy for Monitoring and Control of Bioprocesses", Invited Lecture, Spectroscopy SAS-Spectroscopy-BioPharm Virtual Symposium on Spectroscopy in Biopharma, BioPharm International, Spectroscopy, and the Society for Applied Spectroscopy, October, 2021
23. A. S. Rathore, "Global Acceptance of Biosimilars - Science, Regulations and Pharmacoeconomics", CPhI P-MEC India 2021 Virtual Conference, October, 2021
24. A. S. Rathore, "Manufacturing practices and challenges for biosimilars", CPhI P-MEC India 2021 Virtual Conference, October, 2021
25. A. S. Rathore, "Implementation of QbD and PAT in Bioprocessing", SCEJ-AFOB-ESBES Virtual DSP Session, September, 2021
26. A. S. Rathore, "Identification of CQAs for biotherapeutic products", Invited Lecture, ACS National Meeting 20211-Virtual, September, 2021.
27. A. S. Rathore, "Role of mechanistic modeling in bioprocess control", Invited Lecture, ACS National Meeting 20211-Virtual, September, 2021.
28. A. S. Rathore, "Implementation of PAT in continuous process platforms", Invited Lecture, ACS National Meeting 20211-Virtual, September, 2021.
29. A. S. Rathore, "Best Practices in Scale Up and Manufacturing", Invited Lecture, Biologics and Biosimilars: Upstream and Downstream Technologies, Federation of Asian Biotech Associations (FABA), July, 2021
30. A. S. Rathore, "Challenges in Analytical Characterization of Biosimilars", Invited Lecture, InfinityLab\_LC\_Conference, June, 2021
31. A. S. Rathore, "Model Based Control of Process Chromatography", Invited Lecture, The Society for BioChromatography and Nanoseparations, Bordeaux, France, May, 2021
32. A. S. Rathore, "Membrane applications in integrated continuous bioprocessing", Invited Lecture, NAMS 2021 North American Membrane Society Annual Meeting, Colorado, USA, May, 2021

33. A. S. Rathore, "Best Practices in Scale Up and Manufacturing", Invited Lecture, Course on Biologics, IIT Bombay, April, 2021
34. A. S. Rathore, "Modulation of charge variant profile in mammalian cell culture", Invited Lecture, The Animal Cell Technology Industrial Platform (ACTIP), April, 2021
35. A. S. Rathore, "Challenges and Opportunities in Development of Biosimilar Products", Inaugural Lecture, Opportunities and Challenges for Employment and Entrepreneurship in Chemical and Bio-Process Industries (OCEE-2021), Allahabad, India, March 2021.
36. A. S. Rathore, "Regulation and Policies for Global Convergence", Invited Lecture, Global BIO India 2021, New Delhi, India, March 2021.
37. A. S. Rathore, "Process Control of Continuous Processing", Invited Lecture, Bioprocessing Summit Europe, March 2021.
38. A. S. Rathore, "Challenges in Analytical Characterization of Biosimilars", Invited Lecture, SelectScience Virtual Analytical Summit, February 2021.
39. A. S. Rathore, "Global Acceptance of Biosimilars - Science, Regulations and Pharmacoeconomics", IFPAC Annual Meeting 2021, Baltimore, MD, February, 2021
40. A. S. Rathore, "Implementation of PAT in Continuous Process Platforms", IFPAC Annual Meeting 2021, Baltimore, MD, February, 2021
41. A. S. Rathore, "Analytical Characterization of Biotherapeutic Products", Inaugural Lecture, National Chemical Laboratory, Pune, India, November, 2020
42. A. S. Rathore, "Analytical characterization of biotherapeutic products", 12th Annual Meeting of Proteomics Society, India, November, 2020.
43. A. S. Rathore, "Analytical characterization of biotherapeutic products", 7th Annual BioProNET Science Symposium, University of Manchester, UK, November, 2020.
44. A. S. Rathore, "Challenges with Development of Biotech Therapeutics", Invited talk, Punjab University, India, September, 2020.
45. A. S. Rathore, "Deploying modeling & simulation for reducing cost and time-to-market", ETHealthWorld, New Delhi, India, September, 2020.
46. A. S. Rathore, "Adaptation of Analytical Tools for PAT Implementation", Webinar for Agilent Technologies, July, 2020.
47. A. S. Rathore, "Advances in bio manufacturing for affordable antibody production", 2nd Leadership Conclave, Institute of Chemical Technology, Mumbai, India, February, 2020.
48. A. S. Rathore, "Challenges with Development of Biotech Therapeutics", Yellapragada SubbaRow Memorial Lecture, IP University, New Delhi, India, January, 2020.
49. A. S. Rathore, "Challenges with Development of Biotech Therapeutics", Invited talk, ETH Zurich, Zurich, Switzerland, June, 2019.
50. A. S. Rathore, "Continuous platforms for intensification of biotech processes", CHEMCON 2019, New Delhi, India, December, 2019.
51. A. S. Rathore, "Continuous processing of biotech therapeutics- Enabling case studies", Bioprocessing India 2019, Mysore, India, December, 2019.
52. A. S. Rathore, "Indian Scenario: Current Status and Gap Analysis", Global BIO India, New Delhi, India, November, 2019.
53. A. S. Rathore, "Affordability of Biosimilars", WHO's 2019 World Conference on Access to Medical Products Achieving the SDGs 2030, New Delhi, India, November, 2019.
54. A. S. Rathore, "Characterization of Biosimilars: Challenges and Opportunities", Webinar for International Pharmaceutical Federation, September, 2019.
55. A. S. Rathore, "Challenges in Development and Characterization of Biosimilars", CPhI's Biopharma Conclave, Mumbai, India, September, 2019.
56. A. S. Rathore, "QbD based Production of Pharmaceuticals", Workshop with Centrient Pharmaceuticals, Seoul, South Korea, August 2019.
57. A. S. Rathore, "Challenges with Development of Biotech Therapeutics", Invited talk, ETH Zurich, Zurich, Switzerland, June, 2019.
58. A. S. Rathore, "Non-protein A purification platform for continuous processing of monoclonal antibody therapeutics", 255th ACS National Meeting, Orlando, USA, April, 2019.
59. A. S. Rathore, "Continuous processing of biotech therapeutics - enabling case studies", Keynote Lecture, 255th ACS National Meeting, Orlando, USA, April, 2019.
60. A. S. Rathore, "Role of mechanistic modeling in optimization and control of bioseparation processes", 255th ACS National Meeting, Orlando, USA, April, 2019.
61. A. S. Rathore, "Kinetics and characterization of non-enzymatic fragmentation of monoclonal antibody therapeutics", 255th ACS National Meeting, Orlando, USA, April, 2019.
62. A. S. Rathore, "Multivariate data analysis for biotech processes: Industrial case studies", 255th ACS National Meeting, Orlando, USA, April, 2019.
63. A. S. Rathore, "Healthcare initiatives at IIT Delhi", Invited talk, University of Queensland, Brisbane, Australia, March, 2019.
64. A. S. Rathore, "Model Based Control of Biotechnology Processes", Biotherapeutics and Vaccines Development, Gordon Research Conference, Houston, USA, January, 2019.
65. A. S. Rathore, "Development of continuous processes for manufacturing of biotherapeutic products", Invited talk, Biocon Limited, Bangalore, India, January, 2019.
66. A. S. Rathore, "Model Based Process Control for Production of Biopharmaceuticals", Keynote talk, Bioprocessing India 2018, New Delhi, India, December 2018.
67. A. S. Rathore, "Implementation of QbD for Biopharmaceuticals: Tools and Case Studies", Keynote talk, Bioprocessing Asia 2018, Langkawi, Malaysia, November 2018.
68. A. S. Rathore, "Challenges in Development and Commercialization of Biotech Therapeutics", Invited talk, Jamia Millia

- Islamia, New Delhi, October 2018.
69. A. S. Rathore, "Role of Modeling in Optimization and Control of Bioseparation Processes", Keynote Lecture, European Society of Biochemical Engineering Sciences (ESBES) 2018, Lisbon, Portugal, September, 2018.
  70. A. S. Rathore, "Quality by Design for Production of Biopharmaceuticals", Workshop at the University of Massachusetts Lowell, Lowell, USA, August 2018.
  71. A. S. Rathore, "QbD, PAT, QRM for Production of Pharmaceuticals", Workshop with DSM Sinochem, Kuala Lumpur, Malaysia, June 2018.
  72. A. S. Rathore, "Role of Mechanistic Modeling in Process Control and Implementation of Quality by Design for Production of Biopharmaceuticals", Invited talk, Austrian Center for Biotechnology, Vienna, Austria, June, 2018.
  73. A. S. Rathore, "QbD, PAT, QRM for Production of Pharmaceuticals", Workshop with DSM Sinochem, Bangkok, Thailand, May 2018.
  74. A. S. Rathore, "Challenges with Development of Biosimilars", Invited talk, Indian Institute of Technology Mumbai, Mumbai, April 2018.
  75. A. S. Rathore, "Development and Commercialization of Biosimilar Products: Challenges and Opportunities", Invited talk, BioEpoch-2018, New Delhi, India, April 2018.
  76. A. S. Rathore, "QbD, PAT, QRM for Production of Pharmaceuticals", Workshop with DSM Sinochem, Manila, Philippines, April 2018.
  77. A. S. Rathore, "Role of Mechanistic Modeling in Optimization and Control of Bioseparation Processes", Bioprocessing India 2017, Guwahati, India, December, 2017.
  78. A. S. Rathore, "Role of Mechanistic Modeling in Process Control and Implementation of Quality by Design for Production of Biopharmaceuticals", Invited talk, Biocon Ltd, December, 2017
  79. A. S. Rathore, "Challenges with Development of Biotech Therapeutics", Invited talk, Institute of Microbial Technology, Mohali, November 2017
  80. A. S. Rathore, "QbD, PAT, QRM for Production of Pharmaceuticals", Workshop with DSM Sinochem, Jakarta, Indonesia, October 2017.
  81. A. S. Rathore, "Implementation of QbD and PAT in Biopharmaceutical Processes", Invited talk, Hanyang University, Seoul, South Korea, September, 2017.
  82. A. S. Rathore, "Process Validation, Risk Management and Process Characterization", Workshop with Kbio, Seoul, South Korea, September, 2017.
  83. A. S. Rathore, "Pharmacoeconomic Impact of Biosimilars", Invited Lecture, FIP World Congress of Pharmacy & Pharmaceutical Sciences, Seoul, South Korea, September, 2017.
  84. A. S. Rathore, "QbD, PAT, QRM for Production of Pharmaceuticals", Workshop with DSM Sinochem, Dubai, UAE, July 2017.
  85. A. S. Rathore, "Quality by Design and Process Analytical Technology", Workshop with Kbio, Seoul, South Korea, June, 2017.
  86. A. S. Rathore, "Scientific and Regulatory Challenges in Development and Commercialization of Biosimilars", Invited Lecture, Global BioConference (GBC), Seoul, South Korea, June, 2017.
  87. A. S. Rathore, "Challenges with Development of Biotech Therapeutics", Invited talk, Banaras Hindu University, Varanasi, June 2017
  88. A. S. Rathore, "Application of Process Analytical Technology and Advanced Controls for Manufacturing", Johnson and Johnson, Pomezia, Italy, May, 2017.
  89. A. S. Rathore, "QbD, PAT, QRM for Production of Pharmaceuticals", Workshop with DSM Sinochem, Ho Chi Minh City, Vietnam, May 2017.
  90. A. S. Rathore, "Implementation of Quality by Design for Processing of Food Products and Biotherapeutics", Invited Lecture, Food and Biosystems Engineering (FABE), Rhodes, Greece, May, 2017.
  91. A. S. Rathore, "Integrated Continuous Processing of Proteins Expressed as Inclusion Bodies", Keynote Lecture, 253rd ACS National Meeting, San Francisco, USA, April, 2017.
  92. A. S. Rathore, "Multivariate Data Analysis for Biotech Processes: Industrial Case Studies", Keynote Lecture, 253rd ACS National Meeting, San Francisco, USA, April, 2017.
  93. A. S. Rathore, "Continuous Processing of Biotech Therapeutics – Enabling Case Studies", Invited talk, 3rd Annual Biologics Manufacturing India 2017, Pune, India, February 2017.
  94. A. S. Rathore, "Continuous processing in biopharma manufacturing", Bioprocessing India 2016, Mohali, India, December, 2016.
  95. A. S. Rathore, "Workshop on Methods for Accelerating Scalable Bioprocess Development", Workshop co-organized with Prof. Christoph Herwig, Technical University of Vienna, Vienna, Austria, November, 2016.
  96. A. S. Rathore, "A Masterclass in QbD, QRM and PAT for Bioprocessing Applications", with Pall Life Sciences, Boston, USA, October, 2016.
  97. A. S. Rathore, "Industry Implementation of Continuous Manufacturing for Biotherapeutics: Passing Trend or Fundamental Shift?", Invited talk, University College London, UK, September, 2016.
  98. A. S. Rathore, "Technology Drivers for Implementation of QbD and PAT in Biopharmaceutical Processes", Invited talk, Newcastle University, UK, September, 2016.
  99. A. S. Rathore, "Recent Trends in the Biopharmaceutical Industry", Invited talk, BioPharma Solutions Workshop, Bangalore, India, August 2016.
  100. A. S. Rathore, "QbD, PAT, QRM for Production of Pharmaceuticals", Workshop with DSM Sinochem, Cairo, Egypt, July 2016
  101. A. S. Rathore, "QbD, PAT, QRM for Production of Pharmaceuticals", Workshop with DSM Sinochem, Alexandria, Egypt, July 2016
  102. A. S. Rathore, "Quality by Design for Manufacturing of Biopharmaceuticals", with Pall Life Sciences, Boston, USA, May,

- 2016.
103. A. S. Rathore, "Discussing the application of PAT at the development level for robust processes and consistent quality", Invited talk, CPhI's Process Analytical Technology Workshop, Hyderabad, India, April 2016.
  104. A. S. Rathore, "Development and Commercialization of Biosimilar Products in India: Industrial Challenges and Opportunities", Invited talk, BiTERM 2016, New Delhi, India, April 2016.
  105. A. S. Rathore, "Aseptic Processing for Production of Pharmaceuticals: QbD, PAT, QRM and Validation", Workshop with DSM Sinochem, Bangkok, Thailand, March 2016.
  106. A. S. Rathore, "Development and Commercialization of Biosimilar Products: Challenges and Opportunities", Invited talk, BioEpoch-2016, New Delhi, India, March 2016.
  107. A. S. Rathore, "Enabling Continuous Processing for Production of Biotech Therapeutics", Bioprocessing India 2015, Chennai, India, December, 2015.
  108. A. S. Rathore, "Challenges with Development of Biotech Therapeutics", Plenary Lecture, Targeted Proteomics Workshop and International Symposium, Mumbai, India, December, 2015
  109. A. S. Rathore, "Enabling continuous processing of biotech therapeutics: Case Studies", Invited talk, BioPharma India Convention 2015, November, 2015
  110. A. S. Rathore, "Current and Emerging trends in the Biopharmaceutical Industry", Invited talk, Biocon Limited, October, 2015
  111. A. S. Rathore, "Quality by Design for Production of Biopharmaceuticals", Short Course, Boston, October, 2015.
  112. A. S. Rathore, "Aseptic Processing for Production of Pharmaceuticals: QbD, PAT, QRM and Validation", CEP Workshop with DSM Sinochem, IIT Delhi, New Delhi, October 2015.
  113. A. S. Rathore, "Challenges in Development and Commercialization of Biotech Therapeutics", Invited talk, 1st Refresher Course in Course in Life Science & Biotechnology, UGC-Human Resource Development Centre, Jawaharlal Nehru University, New Delhi, August 2015.
  114. A. S. Rathore, QbD, PAT, Downstream Processing, in Advanced Methods in Bioprocess Development, Workshop co-organized with Prof. Christoph Herwig, Technical University of Vienna, Vienna, Austria, June, 2015.
  115. A. S. Rathore, "Continuous Processing of Biotech Therapeutics – Enabling Case Studies", Invited Lecture, Biopartitioning and Purification Conference 2015, Vienna, Austria, June, 2015.
  116. A. S. Rathore, "Regulatory Issues related to Approval of Biotech Therapeutics", Invited talk, Tools and techniques in Biotechnology, BIRAC 1st BIG Conclave, New Delhi, May, 2015.
  117. A. S. Rathore, "Implementation of QbD for Production of Biotech Therapeutics", Invited talk, Tools and techniques in Biotechnology, Short Term Training Programme organized by MDU Rohtak, Rohtak, May, 2015.
  118. A. S. Rathore, "Development and Commercialization of Biosimilar Products: Challenges and Opportunities", Keynote Lecture, QbD in Pharma Development World Congress 2015, Chandigarh, India, April, 2015.
  119. A. S. Rathore, "Development and Commercialization of Biosimilar Products: Challenges and Opportunities", Keynote Lecture, 249th ACS National Meeting, Denver Colorado, March, 2015.
  120. A. S. Rathore, "Implementation of QbD for Development of a Downstream Process for a Therapeutic Biosimilar", Invited talk, 249th ACS National Meeting, Denver Colorado, March, 2015.
  121. A. S. Rathore, "Comparison of PAT based Approaches for making Real-Time Pooling Decisions for Process Chromatography – use of Feed Forward Control", Invited talk, 249th ACS National Meeting, Denver Colorado, March, 2015.
  122. A. S. Rathore, "Development of PAT based monitoring & control platform for fermentation", Invited talk, Challenges with Scale-up, cGMP Production and Data Processing Solutions from Applikon Biotechnology, Workshop from Applikon and Spinco, New Delhi, March, 2015.
  123. A. S. Rathore, "Implementation of QbD and PAT for Production of Biotech Therapeutics", Invited talk, Technical University of Vienna, Austria, December 2014.
  124. A. S. Rathore, "Implementation of QbD for Biopharmaceuticals: Tools and Case Studies", Bioprocessing India 2014, Mumbai, India, December 2014.
  125. A. S. Rathore, "QbD based Process Development for Production of Biotech Therapeutics", Invited talk, Denmark Technical University, Denmark, June 2014.
  126. A. S. Rathore, "Implementation of QbD and PAT in Biopharmaceutical Processing", Workshop, Pall Corporation, Portsmouth, UK, June 2014.
  127. A. S. Rathore, "Creation of a Process Understanding of Chromatographic Performance Loss during Biotherapeutic Manufacture: A UK-India Partnership", Invited talk, University College London, London, UK, June 2014.
  128. A. S. Rathore, "Strategies for Accelerating Discovery to Early Stage Development", Invited Talk, BIRAC 2nd Foundation Day, New Delhi, March, 2014.
  129. A. S. Rathore, "Implementation of QbD for Biopharmaceuticals: Tools and Case Studies", Keynote Speaker, PAT & QbD Forum, Goettingen, Germany, February, 2014.
  130. A. S. Rathore, "Effective scale up, regulatory and standards implementation", Invited talk, FITT Workshop on Strategizing IP Management & Biotech Commercialization, IIT Delhi, New Delhi, January, 2014.
  131. A. S. Rathore, "Challenges in and Solutions for Purification of Biotech Therapeutics", Asian Congress on Biotechnology 2013, New Delhi, India, December 2013
  132. A. S. Rathore, "India Perspective: Recent Trends in the Regulation of Biopharmaceuticals", Invited talk, CMC Forum Asia 2013, Tokyo, Japan, December, 2013.
  133. A. S. Rathore, "QbD based Process Development for Production of Biotech Therapeutics", Bioprocessing India 2013, New Delhi, India, December, 2013.
  134. A. S. Rathore, "Process Validation for Biopharmaceutical Products", Invited talk, QbD Workshop by GE Healthcare, Tokyo, Japan, October, 2013.
  135. A. S. Rathore, "Quality by Design: Risk Management and Assessment", Invited talk, QbD Workshop by GE Healthcare,



- Tokyo, Japan, October, 2013.
136. A. S. Rathore, "Technology Transfer for Biopharmaceutical Products", Invited talk, QbD Workshop by GE Healthcare, Tokyo, Japan, October, 2013.
  137. A. S. Rathore, "Challenges in and Solutions in Bioprocessing", Invited talk, Biodownstream Technology Course India, Vellore Institute of Technology, India, September, 2013.
  138. A. S. Rathore, "Challenges in and Solutions for Purification of Biotech Therapeutics", Invited talk, IChE (NRC) Lecture Series, New Delhi, India, September, 2013.
  139. A. S. Rathore, "Comparison with Global Biopharmaceuticals Standards", Invited talk, BIRAC-CDSA Regulatory Meet: Demystifying Indian Regulations for Product Approvals, New Delhi, India, July, 2013.
  140. A. S. Rathore, "Best Practices in Scale Up and Manufacturing", Invited talk, BIRAC-CDSA Regulatory Meet: Demystifying Indian Regulations for Product Approvals, New Delhi, India, July, 2013.
  141. A. S. Rathore, "Quality by Design for Biopharmaceuticals : An Update", Invited talk, Pall Corporation, Bangalore, India, July, 2013.
  142. A. S. Rathore, "Risk Management in Pharmaceutical Development", Invited talk, Ranbaxy Limited, India, June, 2013.
  143. A. S. Rathore, "Perspective on QbD based process development", Invited talk, QbD Workshop by GE Healthcare, Mumbai, India, May, 2013.
  144. A. S. Rathore, "Case Studies in QbD applications for downstream development", Invited talk, QbD Workshop by GE Healthcare, Mumbai, India, May, 2013.
  145. A. S. Rathore, "Comparability issues for biosimilars", Invited talk, QbD Workshop by GE Healthcare, Mumbai, India, May, 2013.
  146. A. S. Rathore et al, "Challenges in and Solutions for Purification of Biotech Therapeutics", 245th ACS National Meeting, New Orleans, LA, April, 2013.
  147. A. S. Rathore, "Comparability of Biosimilar Products - Perspectives from the Indian Pharmacopeia Commission", 2013 IPC-USP 12th Science & Standards Symposium, Delhi, India, April, 2013.
  148. A. S. Rathore, "Establishing Product Comparability", BIO-ABLE Biosimilars Regulatory Roundtable, New Delhi, March, 2013.
  149. A. S. Rathore, "Global technological advances for process development and analytics of biosimilars", 4th Annual Biosimilars India 2013, Mumbai, February, 2013.
  150. A. S. Rathore, "Real time Experience in Filing and Seeking Approvals for New Drug/ INDs", BIRAC - CDSA Regulatory Meet, New Delhi, February, 2013.
  151. A. S. Rathore, "Comparability of Biosimilars – A Global Perspective", Pharma-BioTECH World Conference 2013, Mumbai, January, 2013.
  152. A. S. Rathore, "Product Comparability for Biosimilars", Pharma-BioTECH World Conference 2013, Mumbai, January, 2013.
  153. A. S. Rathore, "Risk Management in Quality by Design", GE Healthcare Seminar, China, November, 2012.
  154. A. S. Rathore, "Technology Transfer of Biotech Processes", GE Healthcare Seminar, China, November, 2012.
  155. A. S. Rathore, "Case Study 1: Development of Design Space for Upstream & Downstream Process", GE Healthcare Seminar, China, November, 2012.
  156. A. S. Rathore, "Process Validation", Training of the SFDA, Government of China, Shanghai, China, July, 2012.
  157. A. S. Rathore, "Quality by Design: Risk Management and Assessment", Training of the SFDA, Government of China, Shanghai, China, July, 2012.
  158. A. S. Rathore, "Production of Biosimilars in India: Challenges and Solutions", Invited talk, Invictus Oncology, New Delhi, India, July, 2012.
  159. A. S. Rathore, "Process Analytical Technology Applications for Biopharmaceutical Products", Recovery of Biological Products XV, Stowe, USA, July, 2012.
  160. A. S. Rathore, "Process Validation for Biopharmaceuticals", Invited talk, QbD Workshop by GE Healthcare, Lonza, Visp, Switzerland, June, 2012.
  161. A. S. Rathore, "Quality by Design for Biopharmaceuticals: Challenges and Solutions", Invited talk, Lupin, Pune, India, March, 2012.
  162. A. S. Rathore, "Trends in Process and Cleaning Validation", Invited talk, QbD Workshop by GE Healthcare, Mumbai, India, February, 2012.
  163. A. S. Rathore, "Production of Biosimilars in India: Challenges and How IPC can Help", 2012 IPC-USP 11th Science & Standards Symposium, Mumbai, India, February, 2012.
  164. A. S. Rathore, "Trends in Process and Cleaning Validation", Invited talk, QbD Workshop by GE Healthcare, Mumbai, India, February, 2012.
  165. A. S. Rathore, "Role of Risk Assessment and Management in Implementation of Quality by Design (QbD) for Biopharmaceuticals", Invited talk, QbD Workshop by GE Healthcare, Mumbai, India, February, 2012.
  166. A. S. Rathore, "Technology Drivers for Implementation of Quality by Design for Biopharmaceuticals", Invited talk, QbD Workshop by GE Healthcare, Mumbai, India, February, 2012.
  167. A. S. Rathore, "Production of Biotech Products in India: Challenges and Solutions", Invited talk, JSS College of Pharmacy, Mysore, December, 2011.
  168. A. S. Rathore, "Production of Biotech Products in India: Challenges and Solutions", Invited talk, JSS College of Pharmacy, Ooty, December, 2011.
  169. A. S. Rathore, "Process Validation", Training of the CDSCO, Drug Controller General of India, Government of India, Delhi, India, December, 2011.
  170. A. S. Rathore, "Quality by Design: Risk Management and Assessment", Training of the CDSCO, Drug Controller General of India, Government of India, Delhi, India, December, 2011.
  171. A. S. Rathore, "Need for Cost and Time Efficient Commercialization of Biotech Therapeutics and Technology Drivers for Achieving It", Keynote Lecture, EPSRC Centre for Innovative Manufacturing in Emergent Macromolecular Therapies,

- University College of London, London, UK, November, December, 2011.
172. A. S. Rathore, "Quality by Design based Process Development and Validation", Invited talk, GE Healthcare China, Shanghai, China, October, 2011.
  173. A. S. Rathore and Patrick Swann "Quality by Design for Biopharmaceuticals: Concepts and Implementation", PDA Training and Research Institute Course Series, Washington DC, USA, September, 2011
  174. A. S. Rathore, "Quality by Design based Process Development", Invited talk, Sartorius Stedim, Goettingen, Germany, May, 2011.
  175. A. S. Rathore, "Challenges in and Solutions for Purification of Biotech Therapeutics", Keynote Speaker, European Downstream Technology Forum, Goettingen, Germany, May, 2011.
  176. A. S. Rathore, "Chromatographic Separations in Biotech Processes", 5th International Workshop on Chromatographic Separation, Mixing, Filtration and Drying, Mumbai, India, April, 2011.
  177. A. S. Rathore, "Challenges in Implementation of Quality by Design for Production of Biosimilars in India", 2011 IPC-USP 10th Science & Standards Symposium, Hyderabad, India, February, 2011.
  178. A. S. Rathore, "Challenges in Development and Commercialization of Biosimilars", Invited talk, Export Inspection Council (EIC) India, New Delhi, India, January, 2011.
  179. A. S. Rathore, "Challenges in Development and Commercialization of Biosimilars", IPC-WHO Collaborative Workshop on Challenges and Opportunities in Compliance of Current Standards Prescribed in IP 2010, New Delhi, India, December, 2010.
  180. A. S. Rathore, "High Throughput Downstream Technologies to Enable QbD Process Development", Biologic Manufacturing World India, Mumbai, India, December, 2010
  181. A. S. Rathore and Patrick Swann "Quality by Design for Biopharmaceuticals: Concepts and Implementation", PDA Training and Research Institute Course Series, Washington DC, USA, September, 2010
  182. A. S. Rathore, "Quality Risk Assessment and Management for Biotech Processes", Interest Group Session on Quality Risk Management, 2010 PDA/FDA Joint Regulatory Conference, Washington DC, USA, September, 2010.
  183. A. S. Rathore, "Scale-up, Technology Transfer and Process Validation of Biotech Processes in QbD Paradigm", Invited talk, United States Food and Drug Administration (FDA), Silver Springs, MD, USA, September, 2010.
  184. A. S. Rathore, "Quality by Design for Biopharmaceuticals", Invited talk, GE Healthcare Course, Mumbai, June, 2010.
  185. A. S. Rathore, "Role of Risk Assessment and Management in Implementation of Quality by Design", Invited talk, PAT and Quality by Design for Biopharmaceuticals, London, United Kingdom, May, 2010.
  186. A. S. Rathore, "Implementation of QbD for Biopharmaceuticals: Roadmap and Case Studies", Invited talk, 6th Annual BioProcess International European Conference and Exhibition, Vienna, Austria, May 2010.
  187. A. S. Rathore, "Implications of Quality by Design for a Biopharmaceutical Vendor", Invited talk, GE Healthcare, Uppsala, Sweden, December, 2009.
  188. A. S. Rathore, "Development and Commercialization of Biosimilar Products: Challenges and Opportunities", Biologic India, Mumbai, India, December, 2009
  189. A. S. Rathore, "Quality by Design for Biotechnology Products and Processes", Invited talk for Food and Drug Administration (FDA), NIH Headquarters, Bethesda, MD, September, 2009
  190. A. S. Rathore and Patrick Swann "Quality by Design for Biopharmaceuticals: Concepts and Implementation", PDA Training and Research Institute Course Series, Washington DC, September, 2009
  191. A. S. Rathore, "Technology Transfer of Pharmaceutical Processes: Issues and Solutions", 2009 PDA/FDA Joint Regulatory Conference, Washington DC, September, 2009
  192. A. S. Rathore, "Roadmap for Implementation of Quality by Design for Biopharmaceuticals", Invited talk, Intas Biopharmaceuticals Limited, Ahmedabad, July, 2009.
  193. A. S. Rathore, "Introduction to Quality by Design for Biotech Products", Invited talk, Vical Corporation, San Diego, June, 2009.
  194. A. S. Rathore and Gail Sofer "Process Validation for Biopharmaceuticals", PDA Training and Research Institute Course Series, San Diego, February, 2009
  195. A. S. Rathore, "Application of Process Analytical Technology (PAT) Towards Bioprocessing", IFPAC Annual Meeting, Baltimore, MD, January, 2009
  196. A. S. Rathore, "Implementation of QbD for Biopharmaceuticals: Approach and Case Studies", 2008 PDA/FDA Joint Regulatory Conference, Washington DC, September, 2008
  197. A. S. Rathore et al, "Implementation of QbD for Biopharmaceuticals: Approach, Case Studies and Integration with PAT", 236th ACS National Meeting, Philadelphia, PA, August, 2008
  198. A. S. Rathore and Gail Sofer "Process Validation for Biopharmaceuticals", PDA Training and Research Institute Course Series, San Francisco, March, 2008
  199. A. S. Rathore, "Quality by Design: Case Studies", 2007 PDA/FDA Joint Regulatory Conference, Washington DC, September, 2007
  200. A. S. Rathore et al, "Application of Multivariate Analysis towards Biotech Processes: Case Study of a Cell-Culture Unit Operation", 234th ACS National Meeting, Boston, MA, August, 2007
  201. A. S. Rathore, "QbD from Past to Present", PDA Workshop on QbD for Biopharmaceuticals, Bethesda, MD, May, 2007
  202. A. S. Rathore, "Biotech Processing: Challenges and Approach", Biotech Symposium, University of California at Los Angeles (UCLA), Los Angeles, CA, June, 2007
  203. A. S. Rathore, "PAT Application for Biotech Products: Use of Multivariate Analysis", PDA 2007 Annual Meeting, Las Vegas, NV, March, 2007
  204. A. S. Rathore and Gail Sofer "Process Validation for Biopharmaceuticals", PDA Training and Research Institute Course Series, Las Vegas, NV, March, 2007
  205. A. S. Rathore, "Linking Process Characterization to Process Validation", Invited Lecture, IBC's 11th International Conference on Process Validation, Carlsbad, CA, March, 2007

206. A. S. Rathore, "Scale-down Modeling and Determination of Media Lifetime", Invited Lecture, Course on Bioprocess Purification Process Development, ASME, Montreal, CA, October, 2006
207. A. S. Rathore et al, "Technology Transfer of Biotech Processes: Issues and Solutions", Lecture, 232nd ACS National Meeting, San Francisco, CA, September, 2006.
208. A. S. Rathore, "Interplay of Chromatographic and Electrophoretic Processes in CEC", Lecture, HPLC 2006, San Francisco, CA, June, 2006.
209. A. S. Rathore et al, "Challenges in Applying PAT towards Biotech Processing", Lecture, CaSSS' Application of Process Analytical Technology in the Biotechnology Industry, San Francisco, CA, June, 2006.
210. A. S. Rathore, "Process Characterization, Validation and Monitoring", Invited Lecture, 2006 PDA Workshop on Biotech Process Validation, Anaheim, CA, April, 2006.
211. A. S. Rathore et al, "Process Analytical Technology (PAT) Applications for Downstream Unit Operations", Invited Lecture, 2006 PDA Annual Meeting, Anaheim, CA, April, 2006.
212. A. S. Rathore, "Scale-down Modeling and Determination of Media Lifetime", Invited Lecture, Course on Bioprocess Purification Process Development, ASME, Seattle, WA, September, 2005.
213. A. S. Rathore et al, "Comparison of Different Harvest Approaches for Harvest of a Therapeutic Protein Product from High Cell Density Yeast Fermentation Broth", Invited Lecture, IBC's 2nd Annual BioProcess International Conference, Boston, MA, September, 2005.
214. A. S. Rathore et al, "Process Analytical Technology Applications with Biotechnology Unit Operations", Invited Lecture, IBC's Conference on Process Analytical Technology, Vienna, VA, June, 2005.
215. A. S. Rathore, "Validation of Chromatography and Membrane Media Lifetime", Invited Lecture, IBC's Conference on Process Validation, San Diego, CA, March, 2005.
216. A. S. Rathore et al, "Use of Immobilized Metal Affinity Chromatography as a Capture Mode for Purification of a Microbial Product", Invited Lecture, 229th ACS National Meeting, San Diego, CA, March, 2005.
217. A. S. Rathore et al, "Use of Electrokinetic Measurements for Characterization of Columns used in Capillary Electrochromatography", Invited Lecture, 229th ACS National Meeting, San Diego, CA, March, 2005.
218. A. S. Rathore et al, "Interplay of Chromatographic and Electrophoretic Processes in Capillary Electrochromatography", Invited Lecture, Pittcon 2005, Orlando, FL, February, 2005.
219. A. S. Rathore et al, "Case Study on Scale-up and Scale down in Biopharmaceutical Production", Invited Lecture, IBC/ Bioprocess International Conference, Boston, MA, October, 2004.
220. A. S. Rathore, "Production Scenario I: Scale-up of a Typical Recombinant Protein Process", Invited Lecture, Course on Bioprocess Purification Process Development, ASME, Atlanta, GA, October, 2004.
221. A. S. Rathore et al, "Scale-down Modeling and Characterization of a Protein Refolding Step", Lecture, 227th ACS National Meeting, Anaheim, March 28-April 1, 2004.
222. A. S. Rathore et al, "Use of Scale-down Models in Support of Process Validation", Invited Lecture, IBC's Conference on Process Validation, San Diego, CA, February, 2004.
223. A. S. Rathore, "Production Scenario II: Scale-up of a Typical Recombinant Protein Process", Invited Lecture, Course on Bioprocess Purification Process Development, ASME, New Orleans, LA, October, 2003.
224. A. S. Rathore, "Optimization of an Osmotic Shock Procedure for Isolation of a Protein Product Expressed in E. coli", Lecture, ACS 2003, New Orleans, LA, March, 2003.
225. A. S. Rathore, "Explore an Approach to Process Validation for an Acceptable Validation Package", Invited Lecture, Course on Process Validation, Barnett International, Philadelphia, PA, January 2003.
226. A. S. Rathore, "Joule Heating in Capillary Electrochromatography", Lecture, ACS 2002, Boston, MA, August 2002.
227. A. S. Rathore, "Enhancement of Electroosmotic Flow in Capillary Electrochromatography", Lecture, HPLC 2002, Montreal, Canada, June 2002.
228. A. S. Rathore, "Development and Large Scale Demonstration of Enhanced Purification Process for Pegvisomant/ Somavert<sup>TM</sup> Bulk Intermediate", Lecture, TECH 2002, St. Louis, MO, May, 2002.
229. A. S. Rathore, "Challenges in Purification of Biotechnology Products", Invited Lecture, Washington University at St. Louis, St. Louis, MO, October, 2001.
230. A. S. Rathore, "Process Characterization of Chromatography Steps", Lecture, TECH 2001, St. Louis, MO, May, 2001.
231. A. S. Rathore, "Introduction to Liquid Chromatography", Lecture, Pharmacia Pilot Plant, St. Louis, MO, October, 2000.
232. A. S. Rathore, "Resin screening for optimization of chromatographic separations", Lecture, TCM Tech 2000, May, 2000.
233. A. S. Rathore, "Resin screening for optimization of chromatographic separations", Lecture, 219th ACS National Meeting, San Francisco, CA, March, 2000.
234. A. S. Rathore et al, "Axial nonuniformities of electric field and electroosmotic flow in columns used in capillary electrochromatography", Lecture, 9th Frederick Conference on Capillary Electrophoresis, Frederick, MD, October, 1998.
235. A. S. Rathore et al, "Flow of ions and bulk fluid in CEC", Invited Lecture, Northeastern University, Boston, MA, October, 1998.
236. A. S. Rathore, "Distribution of electroosmotic flow in capillary electrochromatographic columns", Invited Lecture, Sandia National Laboratory, Livermore, CA, May, 1998.
237. A. S. Rathore et al, "Axial nonuniformities and flow in columns for capillary electrochromatography", Lecture, HPLC'98, St. Louis, MO, May, 1998.
238. A. S. Rathore, "Studies on separation of peptides and proteins by CE and LC", Invited Lecture, Indian Institute of Sciences (IISc), Bangalore, India, November, 1997.
239. A. S. Rathore et al, "Migration parameters in HPLC, CZE and CEC", Lecture, CEC Workshop, HPCE'97, Anaheim, CA, January, 1997.
240. A. S. Rathore et al, "Enhancement of electroosmotic flow at high electric field in CEC", Lecture, HPCE'97, Anaheim, CA, January, 1997.
241. A. S. Rathore et al, "Displacement chromatography with on-column isomerization of feed components", Lecture, ACS

Annual Spring Meeting, New Orleans, March, 1996.