



Biswajit Sarkar

Associate Professor

Ph.D., (Chem. Engg.), Indian Institute of Technology, Kharagpur, 2009

M.Tech. (Chem. Engg.), Calcutta University, 1998

B.Tech. (Chem. Engg.), Calcutta University, 1996

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Teaching Experience

- University School of Chemical Technology, G.G.S. Indraprastha University, Delhi
Associate Professor: July 2013 onwards
Assistant Professor: January 2006 - July 2013
Lecturer: July 1999 – December 2005
- Lecturer, Institute of Technology and Management, Gwalior: September 1998 –June 1999

Courses Taught

Fluid Mechanics; Transport Phenomena; Unit Operation-II; Mass Transfer; Computational Methods in Chemical Engineering; Membrane Science and Technology; Advanced Separation Engineering.

Research Overview

Our research focuses on the application of membrane in food, bioprocessing, and wastewater treatment. This entails carrying out experiments in the laboratory, understanding of underlying membrane fouling phenomena and modeling of flux decline behavior. Our study also involves in the optimization of process parameters, understanding of kinetics and mechanism during extraction of bioactive compounds from plant materials. Our recent study demonstrated that the aqueous extracts of jamun seeds and leaves were rich in polyphenol with antioxidant activities and the integrated membrane processes could be a potential tool for concentrating both the extracts with enhanced process throughput, product purity and storage stability. The flux decline behaviour during ultra- and nanofiltration was successfully explained by combined sequential model. Currently we are working on the application of biosurfactant for simultaneous removal of heavy metal ions and organic compounds from wastewater, with the aim of identification of membrane fouling mechanism, adsorption kinetics, adsorption isotherm, prediction of process throughput and process intensification.

Patent

A method of separation of pectin during membrane clarification of fruit juice for productivity improvement, **B. Sarkar**, P. Rai, S. De, S. DasGupta, 697/KOL/2007, **Granted Patent No. 274256, Dated: 25.07.2016.**

Sponsored Projects

1. Project Title: Enhancement in productivity of apple juice using ultrafiltration
Principal Investigator: **Dr. Biswajit Sarkar**
Co-Principal-Investigators: Dr. U.K. Mandal
Sponsor: **CSIR**
Duration: 2 years (2011 to 2013)
2. Project Title: Integrated membrane process for production of concentrated *Syzygium cumini* (L.) juice and better recovery of antioxidant compounds from extract of *Syzygium cumini* (L.) leaves and seeds
Principal Investigator: **Dr. Biswajit Sarkar**
Sponsor: **CSIR**
Duration: 3 years (2015 to 2018)

University Sponsored Projects

1. Project Title: Biosurfactant enhanced ultrafiltration for the separation of heavy metal ions and organic pollutants from wastewater.
Principal Investigator: **Dr. Biswajit Sarkar**
Sponsor: **FRGS**
Duration: 1 years (2016 to 2017)
2. Project Title: Simultaneous removal of heavy metal ions and organic dyes from wastewater using biosurfactant enhanced ultrafiltration
Principal Investigator: **Dr. Biswajit Sarkar**
Sponsor: **FRGS**
Duration: 1 years (2017 to 2018)
3. Project Title: Simultaneous removal of dye and heavy metal ions from water in multicomponent system using micellar enhanced ultrafiltration with biosurfactant.
Principal Investigator: **Dr. Biswajit Sarkar**

Sponsor: **FRGS**
Duration: 1 years (2018 to 2019)

Book/Book Chapter

1. Electric field enhanced membrane separation system: principles and typical applications, **BISWAJIT SARKAR**, SISSHENDU DE, SUNANDO DAS GUPTA, **Nova Science Publishers**, Inc. New York, 2009, ISBN: 978-1-60741-592-3.9
2. Advances in fruit processing technologies; series: contemporary food engineering, chapter 4: membrane applications in fruit processing technologies, S. DasGupta and **B. Sarkar**, Editor(s): Sueli Rodrigues; Fabiano Andre Narciso Fernandes, **CRC Press**, 2012

List of Publications

Journal

1. Satya Pal Verma, **Biswajit Sarkar**, Simultaneous removal of Cd (II) and p-cresol from wastewater by micellar-enhanced ultrafiltration using rhamnolipid: Flux decline, adsorption kinetics and isotherm studies, **Journal of Environmental Management**, 213 (2018) 217-235 **Elsevier (I.F: 4.449)**
2. Upasna Balyan, **Biswajit Sarkar**, Analysis of flux decline using sequential fouling mechanisms during concentration of *Syzygium cumini* (L.) leaf extract, **Chemical Engineering Research and Design**, 130 (2018) 167–183 **Elsevier (I.F: 3.080)**
3. Satya Pal Verma, **Biswajit Sarkar**, Rhamnolipid based micellar-enhanced ultrafiltration for simultaneous removal of Cd(II) and phenolic compound from wastewater, **Chemical Engineering Journal**, 319 (2017)131-142 **Elsevier (I.F: 6.735)**
4. Upasna Balyan, **Biswajit Sarkar**, Aqueous extraction kinetics of phenolic compounds from *Syzygium cumini* (L.) seeds, **International Journal of Food Properties**. 20 (2) (2017), 372–389. **Taylor & Francis (I.F: 1.845)**
5. Upasna Balyan, **Biswajit Sarkar**, Ultrafiltration of *Syzygium cumini* (L.) seeds extract: Analysis of flux decline and extract stability, **Asia-Pacific Journal of Chemical Engineering**, DOI: 10.1002/apj.2166 **Wiley (I.F: 1.238)**
6. Upasna Balyan, **Biswajit Sarkar**, Integrated membrane process for purification and concentration of aqueous *Syzygium cumini* (L.) seed extract, **Food and Bioprocess Technology**, 9 (2016) 29–43. **Elsevier (I.F: 3.547)**
7. Upasna Balyan, **Biswajit Sarkar**, Enhanced separation of polyethylene glycol from bovine serum albumin using electro-ultrafiltration, **Separation Science and Technology**, 50 (2015) 1846–1859. **Taylor & Francis (I.F: 1.302)**

8. Satya Pal Verma, **Biswajit Sarkar**, Analysis of flux decline during ultrafiltration of apple juice in a batch cell, **Food and Bioproducts Processing**, 94 (2015) 147-157
Elsevier (I.F: 3.547)
9. **Biswajit Sarkar**, Enhanced cross-flow ultrafiltration of apple juice using electric field, **Journal of Food Processing and Preservation**, doi:10.1111/jfpp.12356, 1-13, 2014.
Wiley (I.F: 1.51)
10. Pranshu Sharma, **Biswajit Sarkar**, Prediction of permeate flux during ultrafiltration of polysaccharide in a stirred batch cell, **Food and Bioprocess Technology**, 6(2013) 3634–3643
Springer (IF: 2.998)
11. **Biswajit Sarkar**, A combined complete pore blocking and cake filtration model during ultrafiltration of polysaccharide in a batch cell, **Journal of Food Engineering**, 116 (2013) 333-343
Elsevier (I.F: 3.851)
12. Upasna Balyan, **Biswajit Sarkar**, Modelling of permeate flux decline during, ultrafiltration of polyvinyl alcohol in a batch cell, **Desalination and Water Treatment**, 2013, 1-12.
Taylor & Francis (I.F: 1.631)
13. **Biswajit Sarkar**, Sirshendu De, A combined complete pore blocking and cake filtration model for steady state electric field assisted cross flow ultrafiltration, **AIChE**, 58(5) 2012, 1435-1436.
Wiley (I.F: 2.892)
14. **Biswajit Sarkar**, Sirshendu De, Prediction of permeate flux for turbulent flow in cross flow electric field assisted ultrafiltration, **Journal of Membrane Science**, 369 (2011) 77-87.
Elsevier (I.F: 6.656)
15. **Biswajit Sarkar**, Sirshendu De, Electric field enhanced gel controlled cross-flow ultrafiltration under turbulent conditions, **Separation and Purification Technology**, 74 (2010) 73–82.
Elsevier (I.F: 4.202)
16. **Biswajit Sarkar**, Aritra Sengupta, Sirshendu De, Sunando DasGupta, Prediction of permeate flux during electric field enhanced cross-flow ultrafiltration - A neural network approach, **Separation and Purification Technology**, 65 (3) (2009) 260-268.
Elsevier (I.F: 4.202)
17. **Biswajit Sarkar**, Sunando DasGupta, Sirshendu De, Flux decline during electric field assisted cross flow ultrafiltration of mosambi (Citrus sinensis (L.) Osbeck) juice, **Journal of Membrane Science**, 331 (1-2) (2009) 75-83.
Elsevier (I.F: 6.656)
18. **Biswajit Sarkar**, Sunando DasGupta, Sirshendu De, Application of electric field to enhance permeate flux during micellar enhanced ultrafiltration, **Separation and Purification Technology**, 66(2) (2009) 263-272.
Elsevier (I.F: 4.202)
19. **Biswajit Sarkar**, Sunando DasGupta, Sirshendu De, Electric field enhanced fractionation of protein mixture using ultrafiltration, **Journal of Membrane Science**, 341(2009) 11-20.

- Elsevier (I.F: 6.656)**
20. **Biswajit Sarkar**, Srimanta Pal, Timir Baran Ghosh, Sirshendu De, Sunando DasGupta, A study of electric field enhanced ultrafiltration of synthetic fruit juice and optical quantification of gel deposition, **Journal of Membrane Science**, 311 (2008) 112-120.
Elsevier (I.F: 6.656)
 21. **Biswajit Sarkar**, Sunando DasGupta, Sirshendu De, Prediction of permeate flux during osmotic pressure controlled electric field enhanced cross flow ultrafiltration, **Journal of Colloid and Interface Science**, 319 (2008) 236-246. **Elsevier (I.F: 4.281)**
 22. **Biswajit Sarkar**, Sunando DasGupta, Sirshendu De, Cross-flow electro-ultrafiltration of mosambi (*Citrus sinensis (L.) Osbeck*) juice, **Journal of Food Engineering**, 89 (2008) 241-245. **Elsevier (I.F: 3.585)**
 23. **Biswajit Sarkar**, Sirshendu De Sunando DasGupta, Pulsed-electric field enhanced ultrafiltration of synthetic and fruit juice, **Separation and Purification Technology**, 63 (3) (2008) 582-591. **Elsevier (I.F: 4.202)**
 24. **Biswajit Sarkar**, Sunando DasGupta, Sirshendu De, Effect of Electric field during gel-layer controlled ultrafiltration of synthetic and fruit juice, **Journal of Membrane Science**, 307 (2008) 268-276. **Elsevier (I.F: 6.656)**
 25. **B. Sarkar**, S. Pal, U. Banerjee, S. De, S. DasGupta, Evaluation of Surface Charge by Electro kinetic Method of Ultrafiltration Membranes. **International Journal of Chemical Sciences**, 5 (2007) 1902-1912. **Trade Science (I.F: 1.6)**

Conference

1. Concentration of aqueous *S. cumini* (L.) leaves extract using nanofiltration: Effect of pre-treatment and analysis of flux decline, Upasna Balyan, **Biswajit Sarkar**, **Euro-membrane 2018, Valencia**, July 9-13, 2018
2. Kinetic study of polyphenols extraction from *Syzygium cumini*(L.) seeds Upasna Balyan, Anshul Dhaliwal, Saksham Grover, **Biswajit Sarkar**, **CHEMCON – 2017**, Dept. of Chemical Engineering, Haldia Institute of Technology, 27-30th December, 2018
3. Satya Pal Verma and **Biswajit Sarkar**, Simultaneous removal of cadmium ion and p-cresol from wastewater using MEUF with rhamnolipid biosurfactant, **The 13th International Conference on Membrane Science and Technology, Semarang, Indonesia**, 15th -16th November, 2017
4. Satya Pal Verma, Poonam Tiwari, Rahul Juneja, **Biswajit Sarkar**, Application of Biosurfactant for simultaneous removal of Phenol and Cu⁺² from waste water by Micellar Enhanced Ultrafiltration, **ACEE'16, NIT Jalandhar**

5. Upasna Balyan, **Biswajit Sarkar**, Purification and concentration of aqueous Syzygium cumini (L.) seed extract using integrated membrane process, **EFFOST, 28-30 November, 2016, Vienna, Austria.**
6. Upasna Balyan, **Biswajit Sarkar**, Clarification of phenolic compounds from S. Cumini (L.) seed extract using ultrafiltration, **Third International Conference on Membranes**, August, 21-24, 2015, Kochi, India
7. Siddartha Sharma, **Biswajit Sarkar**, Removal of copper ion from aqueous solution using ultrafiltration with fruit waste, **CHEMCON-2015, Institute of Chemical Technology, Guwahati**, 27-30th December, 2015
8. Upasna Balyan, **Biswajit Sarkar**, Separation of polyethylene glycol from bovine serum albumin using electro ultrafiltration, (0072)(AST 129), **CHEMCON-2013, Institute of Chemical Technology, Mumbai**
9. **Biswajit Sarkar**, Electric field assisted cross flow ultrafiltration of apple juice, 8th International Membrane Science & Technology Conference **IMSTEC 2013** held at **University of Melbourne, Australia**, 25-29th November, 2013.
10. **Biswajit Sarkar**, Sunando DasGupta, Sirshendu De, Prediction of permeate flux during osmotic pressure-controlled electric field-enhanced cross-flow ultrafiltration, **EPS Global International Forum of Analytical Science, Bangkok, Thailand**, 17-18th January, 2012
11. Upasna Balyan, **Biswajit Sarkar**, Electric field enhanced separation of Bovine Serum Albumin from a mixture of PEG and Bovine serum albumin, Indian Chemical Engineering Congress (**CHEMCON-2012**), 27 – 30th December, 2012, Kolkata, India.
12. Ayushi Verma, U.K. Mandal, **Biswajit Sarkar**, Ultrafiltration of apple juice in a stirred batch cell, Indian Chemical Engineering Congress (**CHEMCON-2012**), 27–30th December, 2012, **Jalandhar**, India.
13. **B. Sarkar**, U.K. Mandal, Prediction of permeate flux for gel-layer controlled laminar cross flow ultrafiltration, International Conference on Recent Advances in Chemical Engineering and Technology (**RACET 2011**), **Cochin**, India, 10-12th March, 2011.
14. Sunil Kumar, **Biswajit Sarkar**, Subhojit Sarkar, Barun Kumar Thakur, Sirshendu De, Electric field assisted micellar enhanced ultrafiltration of naphthenic acid from water, (**CHEMCON-2010**) 27–29th December, 2010, **Chidambaram**, India.
15. **B. Sarkar**, S. Pal, S. De, S. DasGupta, Electric field enhanced cross flow ultrafiltration of pectin and sucrose, '**ISSCS 2007**' at Indian Statistical Institute, Kolkata. 15-16th November 2007.
16. S. Pal, **B. Sarkar**, S. K. Ghatak, S. De, S. DasGupta, Plasma Modification of Polymer Membrane Surface to Reduce Adsorption of Protein Macromolecules During Ultrafiltration, '**ISSCS 2007**' at Indian Statistical Institute, Kolkata. 15-16th November, 2007
17. S. Pal, **B. Sarkar**, S. K. Ghatak, S. De, S. DasGupta, Wavelet Analysis for Roughness Measurement of CO₂ Plasma Treated PES Membrane and Quantification of Fouling

Reduction of Plasma Treated Membranes, National Conference on Frontiers in Chemical engineering (2007) at Indian IIT, **Guwahati**, Dec. 2007.

18. A. Maiti, V. Aggarwal, J.K. Basu, **B. Sarkar**, S. DasGupta, S. De, Removal of arsenate from aqueous system by iron oxide impregnated activated carbon prepared from tamarind shell, Indian Chemical Engineering Congress (**CHEMCON-2007**), 27 – 30th December, 2007, Kolkata, India.
19. **B. Sarkar**, S. DasGupta, S. De, Cross flow electro-ultrafiltration of synthetic fruit juice, **CHEMCON 2006**, 27–30th December, 2006, Ankleshwar, India.

Thesis Supervision

Ph.D.

1. Phenolic Compounds from *Syzygium Cumini* L. (Jamun) Seeds and Leaves: Extraction and Integrated Membrane Process for Purification and Concentration, (**Upasna Balyan, 2018, Awarded**)
2. Biosurfactant based micellar-enhanced ultrafiltration for simultaneous removal of heavy metal ions and organic compounds from wastewater. (**Satya pal Verma, On going**)

M.Tech.

Completed: **08**

Professional Activities

1. Reviewer of
 - Journal of Membrane Science, Separation and Purification Technology, Industrial Crops and Products, Food Research International, Food Chemistry, Food and Bioprocess Technology, International Journal of Food Properties, Journal of Food Process Engineering, Journal of Food Processing and Preservation, Journal of Water Process Engineering.
 - Book proposal for CRC Press.
2. External Examiner for M.Tech. theses of I.I.T. Delhi, Practical viva-voce of Deenbandhu Chhotu Ram University of Science and Technology, Murthal.
3. AICTE Observer for GMAT, GPAT Examination.
4. Paper Setter of Panjab University.
5. Member of Expert Committee for AICTE Research Promotion Scheme.

Membership of professional bodies

Life Member, Indian Institute of Chemical Engineers, Kolkata

Awards, Honours and Recognitions

1. Calcutta University Scholarship: 1993-1996
2. Awarded as the best presentation in National Conference on Frontiers in Chemical engineering (**ISSCS 2007**) at Indian Institute of Technology, Guwahati, December, 2007.