Subhankar Basu

Research interest:

Membrane development and its applications in water & wastewater treatment and gas separations.

Education:

PhD in Biochemical Enginerring from Katholieke Universiteit Leuven (KU L), Belgium
M.Tech in Environmental Engineering from Indian Institute of Technology (IIT) Kanpur

Work experience:

National Institute of Advanced Manufacturing Technology (NIAMT), Ranchi (15-11-2016), Department of Environmental Engineering.
The Energy and Resources Institute (TERI), New Delhi (20-06-2005 to 01-11-2016)
Research Scientist, Energy and Environment Technology Development Division
Ballarpur Industries Limited (BILT), Gurgaon, Haryana (20-06-2004 to 10-06-2005)
Research Engineer, Industrial Research and Development Centre, Patiala, BILT.

PUBLICATIONS

International/National

1. R. Kumari, A. Kumar, T. K. Ghosh, S. Basu*, Facile synthesis of Aluminium fumarate metal-organic framework and hydroxyapatite composite with improved adsorption characteristics for efficient fluoride removal from water, Chemical Engineering Science 283 (2024) 119440, IF 4.7, https://doi.org/10.1016/j.ces.2023.119440

2. U. Sharma, P. Mukherjee, S. Basu, P. Saravanan, Facile synthesis of ZIF-8 modified PES beads with improved sorption characteristics for elimination of Congo red from aquatic stream, Reactive and Functional Polymers 193 (2023) 105765, IF:5.1,10.1016/j.reactfunctpolym.2023.105765

3. R. Lakra, M. R. Bilad, M. Balakrishnan, S. Basu*, Development of high-performance CuBTC MOF based forward osmosis (FO)membranes and their cleaning strategies, Chemical Engineering Research and Design 190 (2023) 566-579, IF: 3.9,10.1016/j.cherd.2023.01.005

4. R. Kumari, A. Kumar, S. Sarkar, T. K. Ghosh, S. Basu*, Zirconium fumarate metal-organic framework: a selective adsorbent for fluoride from industrial wastewater, Water Practice & Technology 18 (2023) No 5, 1074, IF:1.6, 10.2166/wpt.2023.066

5. U. Sharma, R. Pandey, S. Basu*, P. Saravanan. ZIF-67 blended PVDF membrane for improved Congo Red removal and antifouling properties: A correlation establishment between morphological features and ultra-filtration parameters. Chemosphere320 (2023) 138075, IF: 8.943, 10.1016/j.chemosphere.2023

6. U. Sharma, R. Pandey, S. Basu, P. Saravanan, Facile monomer interlayered MOF based thin film nanocomposite for efficient arsenic separation, Chemosphere 309 (2022) 136634, IF 8.943, 10.1016/j.chemosphere.2022.136634.

7. R. Kumari, A. Kumar, S. Basu*, Aluminium Fumarate-based polymer matrix composite for selective removal of fluoride from ground water, Environmental Nanotechnology, Monitoring & Management 17 (2022) 100642, IF 0.86, 10.1016/j.enmm.2022.100642.

8. R. Lakra, M. Balakrishnan, S. Basu*, Activated Carbon Incorporation on Forward Osmosis Membrane Surface for Enhanced Performance, Water Science and Technology-Water Supply 22 (2022) 409, IF 1.7, 10.2166/ws.2021.260.

9. R. Lakra, M. Balakrishnan, S. Basu*, Development of cellulose acetate-chitosan-metal organic framework forward osmosis membrane for recovery of water and nutrients from wastewater, Journal of Environmental Chemical Engineering 9 (2021)105882, IF 7.968, 10.1016/j.jece.2021.105882.

10. U. Sharma, S. Shalini, S. Basu, P. Saravanan, M. Jang, Active layer modification of commercial Nanofiltration membrane using CuBTC/PVA matrix for improved surface and separation characteristics, J Applied Polymer Science, 138 (21) (2021) 1-12, IF3.125, 10.1002/app.50508

11. N. Singh, S. Basu*, M. Balakrishnan Comprehensive treatment scheme for distillery wastewater targeting recovery of water, antioxidant compounds and biogas, J Water Process Engineering, 38 (2020), 101663, IF 7.34, 10. 1016/j.jwpe.2020.101663

12. N. Singh, I. Petrini, C. Hélix-Nielsen, S. Basu*, M Balakrishnan, Influence of Forward Osmosis (FO) membrane properties on dewatering of molasses distillery wastewater, J Water Process Engineering, 32 (2019), 100921, IF 7.34, 10.1016/j.jwpe.2019.100921

13. N. Singh, S. Dhiman, S. Basu*, M. Balakrishnan, I. Petrinic, C. Helix-Nielsen, Dewatering of sewage for nutrients and water recovery by Forward Osmosis (FO) using divalent draw solution, J Water Process Engineering, 31 (2019), 100853, IF 7.34, 10.1016/j.jwpe.2019.100853

14. Kaushik, A.; Basu*, S.; Batra, V. S.; Balakrishnan, M. Fractionation of sugarcane molasses distillery wastewater and evaluation of antioxidant and antimicrobial characteristics, Ind Crops Prod. 118 (2018) 73-80, IF 6.449, 10. 1016/j.indcrop.2018.03.040

15. N. Singh, I. Petrinic, C. Hélix-Nielsen, S. Basu*, M. Balakrishnan, Concentrating molasses distillery wastewater using biomimetic forward osmosis (FO) membranes, Water Research, 130 (2018), 271-280, IF 13.4, 10.1016/j.watres.2017.12.006

16. Basu*, S.; Mukherjee, S.; Balakrishnan, M.; Deepthi, M.; Sailaja,V. R. R. N. Polysulfone/ nanocomposites mixed matrix ultrafiltration membrane for the recovery of Maillard reaction products. Membr. Water Treat., 9 (2) (2018), 105-113, IF 1.092,10.12989/mwt.2018.9.2.105

17. Kaushik A., Basu S.*, Raturi S., V.S. Batra, M. Balakrishnan, Recovery of antioxidants from sugarcane molasses distillery wastewater and its effect on biomethanation, J. Water Process Engg., 25 (2018), 205-221, IF 7.34, 10. 1016/j.jwpe.2018.08.003.

18. Kaushik, A.; Basu*, S., Singh, K.; Batra, V. S.; Balakrishnan, M. Activated carbon from sugarcane bagasse ash for melanoidins recovery. J. Environ. Manage, 200 (2017), 29, IF 8.91, 10.1016/j.jenvman.2017.05.060.

20. Basu*, S.; Balakrishnan, M. Polyamide thin film composite membranes containing ZIF-8 for the separation of pharmaceutical compounds from aqueous streams. Sep. Purif. Technol., 179 (2017), 118, IF 9.136, 1 0.1016/j.seppur.2017.01.061.

21. Korenak, J.; Basu, S.; Balakrishnan, M.; Hélix-Nielsen, C.; Petrinic, I. Forward osmosis in wastewater treatment processes. Acta Chim. Slov., 64 (2017), 83, IF 1.449, 10.17344/acsi.2016.2852.

22. Basu*, S.; Kaushik, A.; Saranya, P.; Batra,V. S.; Balakrishnan M., High strength distillery wastewater treatment by a PAC-MBR with low PAC dosage, Water Sci. Technol., 73 (2016), 1104, IF 2.43, 10.2166/wst.2015.585.

23. Mehta, N., Basu*, S., Kumar, A. Separation of zinc oxide nanoparticles in water stream by membrane filtration, J Water Reuse Desal, 06, 2016, 148, IF 0.686, 10.2166/wrd.2015.069

24. Singh, N.; Basu*, S.; Vankelecom, I.; Balakrishnan, M. Covalently immobilized laccase for decolourization of glucose-glycine Maillard products as colourant of distillery wastewater, App. Biochem. Biotechnol., 2015, 177, 76, IF 2.431, 10.1007/s12010-015-1729-5

25. Basu*, S.; Mukherjee, S; Kaushik, A; Batra,V. S.; Balakrishnan, M. Integrated treatment of molasses distillery wastewater using microfiltration (MF), J Environ. Manage., 2015,158, 55, IF 8.91, 10.1016/j.jenvman.2015.04.037

26. Basu*, S.; Singh, S. K; Tewari, P.K; Batra, V. S, Balakrishnan, M. Treatment of nitrate-rich water in a baffled membrane bioreactor (BMBR) employing waste derived materials, J Environ. Manage, 2014,146, 16, IF 8.91, 10.1016/j.jenvman.2014.07.022

27. Basu, S.; Maes, M.; Cano-Odena, A.; Alaerts, L.; DeVos, D. E.; Vankelecom, I. Solvent resistant nanofiltration (SRNF)membranes based on metal-organic frameworks, J Membr. Sci., 2009, 344, 190, IF 10.53, 10.1016/j.memsci.2009.07.051

28. Basu, S.; Khan, A. L.; Cano-Odena, A.; Liu, C.; Vankelecom, I. Membrane-based technologies for biogas separations, Chem. Soc. Rev., 2010, 39, 750, IF 54.56, 10.1039/b817050a

29. Basu, S.; Cano-Odena, A.; Vankelecom, I. Asymmetric Matrimid®/[$Cu_3(BTC)_2$] mixed-matrix membranes for gas separations, J Membr. Sci., 2010, 362, 478, IF 10.53, 10.1016/j.memsci. 2010.07.005.

30. Basu, S.; Cano-Odena, A.; Vankelecom, I. Asymmetric membrane based on Matrimid® and polysulphone blends for enhanced permeance and stability in binary gas (CO_2/CH_4) mixture separations, Sep. Purif. Technol., 75, 2010, 15, IF 9.136,10.1016/j.seppur.2010.07.004

31. Basu, S.; Cano-Odena, A.; Vankelecom, I. MOF-containing mixed-matrix membranes for CO_2/CH_4 and CO_2/N_2 binary gas mixture separations, Sep. Purif. Technol., 81, 2011, 31, IF 9.136, 10.1016/j.seppur.2011.06.037

32. Khan, A.L.; Basu, S.; Cano-Odena, A.; Vankelecom, I. Novel high throughput equipment for membrane-based gas separations, J Membr. Sci., 354, 2010, 32, IF 10.53, 1 0.1016/j.memsci.2010.02.069

33. Pinelli, D.; Bacca, A.E. M.; Kaushik, A.; Basu, S.; Nocentini, M.; Bertin, L.; Frascari, D.; Batch and continuous flow adsorption of phenolic compounds from olive mill wastewater: A comparison between nonionic and ion exchange resins. Int. J Chem. Engg.,2016, 2016, Article ID 9349627, 1 (Scopus indexed), 10.1155/2016/934 9627.

34. Chowdhury, P.; Basu*, S.; Tewari, P. K.; Batra, V. S.; Balakrishnan, M. Formation and characterization of aerobic granules in a lab-scale activated sludge system treating sewage, Int. J Environ. Waste Manage., 2015,16(1), 38 (Scopus indexed),10.1504/IJEWM.2015.070478.

35. Basu*, S.; Verma, S.; Singh, R.K.; Batra, V.S; Balakrishnan, M. Biological nitrate removal using waste-derived extracts as sole carbon source. Int. J. Environ. Waste Manage., 2014, 14, 276 (Scopus indexed), 10.1504/IJEWM.2014.064585.

35. Tare, V.; Basu* S., Prolong restoration of the water quality of the river Ganga: Effect of heavy metals and radioactive elements, J Environ. Sci. Engg., 2014, 56 (2), 137 (Scopus indexed), PMID: 26563059.

36. Basu*, S.; Singh, R. K.; Rajeshwari, K. V.; Johri, R.; Ghosh A. M.; Environmental degradation and health impacts in E-waste recycling industrial area, Delhi, Journal of Ind. Ass. Environ. Manage., 2007, 6, 30 (Scopus indexed), op.nisc air.res.in/index/php/JIAEM/index.

Conference full papers:

1. R. Lakra, S. Basu, Incorporation of porous materials in forward osmosis membrane for increased water recovery from waste streams, Materials Today: Proceedings 90 (2023) 1-6, 10.1016/j.matpr.2023.02.340

2. R. Lakra, S. Choudhury, S. Basu, Recovery of protein and carbohydrate from dairy wastewater using ultrafiltration and forward osmosis processes, Materials Today: Proceedings 47 (2021)1400-1403, 10.1016/j.matpr.2021.02.702

3. N. Singh, Y. Gautam, M. Balakrishnan, S. Basu, Separation of lignin from pulp and paper mill wastewater using forward osmosis process, Materials Today: Proceedings 47 (2021)1423-1429, 10.1016/j.matpr.2021.03.215

4. R. Kumari, H. Ankit, S. Basu, Reclamation of water from dairy wastewater using membrane bioreactor (MBR)-Membrane filtration processes, Materials Today: Proceedings 47 (2021)1452-1456, 10.1016/j.matpr.2021.03.452.

5. E. Gidarakos; E. Dimitrakakis, S. Basu, K V Rajeshwari, R. Johri, E-Waste recycling environmental contamination: Mandoli, India, Waste & Res Manage. ICE Institute of Civil Engineers Proceedings 165, (2011) 45 (UGC approved).

6. N. Mehta, S. Basu, A. Kumar, Incorporating Benefits of Nanomaterials in Membrane Filtration Process for Producing Safe Drinking Water, Environmental Sustainability: Concepts, Principles, Evidence, and Innovations - ISBN: 978-93-83083-75-6.

7. R. Lakra and S. Basu, Recovery of protein and carbohydrate from whey water using integrated membrane processes, Krispon Advancing Science, 1 (2021), 7, 10.5281/zenodo.5586351

8. Lodh, W. A. Quraishi, S. Basu, Effect of Temperature Variation on Co-composting of Flower and Fruit Wastes Using Rice Husk as Bulking Agent Journal of Modern Chemistry & Chemical Technology, 13 (3), (2022) 10.37591/JoMCC

9. A. Kaushik, S. Basu*, R. K. Singh, V. S Batra, M. Balakrishnan, Phenol removal from water with modified carbons prepared from bagasse ash, e-Planet, 10, 2013, 1-6.

10. A. Dubey, S. Basu*, P. K Tewari, R. K Singh, V S Batra, M Balakrishnan, Sewage treatment in a bioreactor with indigenous membranes, e-Planet, 11 (1), 2013, 1-5.

11. A. Nambiar, K. Doriya, P. Choudhry, S.Basu*, P. K Tewari, R. K Singh, V. S Batra, M. Balakrishnan, Biological powdered activated carbon membrane bioreactor (BPAC-MBR) for treatment of industrial wastewater, e-planet, 11(2), 2013, 6-11.

Books/ Book chapters/ Monographs published.

1. H. Naveed, H. Shaheen, R. Kumari, R. Lakra, A. L. Khan, S. Basu, Sustainable Metal-Organic Framework Technologies for CO2 Capture, CRC Press, 2022 Chapter 5, 161-183

2. S. Basu, R. Lakra, R. Kumari, W. A. Shaikh, and S. Chakraborty, Separation of Congo Red Dye from Water Using AgNPs Based Hybrid UF Membrane, Advances in Chemical, Bio, and Environmental Engineering, Springer, 2022

3. R. Kumari, A. Kumar, S. Basu, MOF Encapsulated Beads for Fluoride Removal from Water, Advances in Chemical, Bio, and Environmental Engineering, Springer, 2022

4. S. Basu, E-waste: Implications, regulations, and management in India and current global best practices, TERI Press, New Delhi, 2008 Chapter 3, 45-68

5. R. Johri, S. Basu, Water audit and conservation, Handbook on energy audit and environmental management, TERI Press, New Delhi, 2006 Chapter 17 , 225-235

Conference/seminars/workshop: paper presented.

Characterization of solid biofuel generated from fruit wastes vis hydrothermal carbonization, Advancement and Innovation in Science and Engineering Fields (AISEF: SERIES-1), 12-13 June 2024, Central Research Facility, NIT Rourkela

Hydrothermal Carbonization of Fruit Waste for Hydrochar Production, National Conference on Advanced Materials and its Applications, 9-10th Feb 2024, NIAMT, Ranchi

Removal of particulate matter emitted from point-sources using waste foundry sand-based filters, International Conference on Translation Research: Metals & Materials (TRMM 2023) 19th- 21st November, 2023, NIAMT Ranchi, India.

High Performance MOF-based filters for fluoride removal from waste streams 3rd International conference on Innovative Research, Sciences, Technology, Agriculture, Environment, Business Management, Humanities (STAEBM-2023) NIT J&K and Krishi Sanskriti 13-14 May 2023

Metal organic framework (MOF)-MIL-96 filters with high performance for fluoride removal from wastewater, International workshop and conference on membrane assisted water purification processes (ICMW 2023) School of Energy Materials (SEM) Mahatma Gandhi University, Kottayam, Kerala, India

Incorporation of porous materials in forward osmosis membrane for increased water recovery from waste streams 2nd International conference on water technologies (ICWT-2022) WIC-R &E at IIT Bombay 1-2 Dec 2022

Effect of temperature variation in co-composting of flower and fruit wastes using rice husk as bulking agent. International conference in Engineering and Technology (ICIET 2022) JNTU Hyderabad 15-17 Sep 2022

Recycling of Battery waste: Status in India and world International Conference on Reuse, Recycling, Upcycling, sustainable waste management and circular economy (ICRSC-2022) M G University Kottayam Kerala 9-11th Sep 2022

Application of Forward Osmosis membrane for the treatment of wastewater Second International Conference on Sustainable Technologies for Water Treatment and Desalination (STWTD-2022) Dept of Chemical Engg NIT Calicut 28-29 Jan 2022

Removal of Congo Red Dye for water using AgNPs containing hybrid UF membrane 2nd International conference on Chemical, Bio & Environmental Enginering (CHEMBIOEN 2021) Dept of Chemical Engg. NIT Jalandhar, Punjab 20-22 Aug 2021

International Conference on Advances in Sustainable Research for Energy and Environmental Management (ASREEM-2021) VNIT Surat 06-08- August 2021

Recovery of protein and carbohydrate from distiller wastewater using ultrafiltration and forward osmosis processes International Congress on Membranes and Membrane assisted processes (ICMMAP 2021) M G University Kottayam Kerala 12-14th Feb 2021

Recovery of Lignin from pulp and paper mill effluent by forward osmosis process 2nd International conference on future aspects of sustainable technologies (FAST 2.0) Dept. of Chemistry, CIT Kokrajhar 20-21 Oct 2020.

Separation of lignin from pulp and paper mill wastewater using forward osmosis process, International conference on sustainable technologies for water treatment and desalination Dept of Chemical Engg. NIT Calicut 18-19 December 2020.

Polymer Coated Ceramic Membranes for Sewage Treatment 6th Regional Membrane Technology Conference (6th IWA-RMTC) University of Baroda, Gujarat, 10-12 December 2018

Melanoidins up-concentration using biomimetic forward osmosis (FO) membrane International Conference on Water Resource Management CSIR-CGCRI, Kolkata 11-12 Jan 2018

Ceramic membrane filtration of sewage: resource recovery and reuse, National Conference On Environmental Issues, Challenges And Solutions (EICS-2016), February 23-24, 2017, NIFFT, Ranchi

Sewage up-concentration using biomimetic forward osmosis (FO) membrane, IV. Soós Ernő International Scientific Conference, Water and Wastewater Treatment in the Industry 2017, 19 Oct 2017, University of Pannonia, Hungry.

Concentrating melanoidins and cleaning of aquaporin hollow fiber forward osmosis membrane, International Congress on Membranes and membrane Processes (ICOM), July 29-August 4, 2017, San Fransisco, CA, USA.

Water recovery from sewage using forward osmosis process, National Conference on Biotechnology and Environment (NCOBE), April 10-11, 2017, Jamia Milia Islamia, New Delhi

Concentrating melanoidins and cleaning of aquaporin hollow fibre forward osmosis membrane, International Congress on Membrane and Membrane Processes (ICOM), July 29- August 4, 2017, San Francisco, USA.

Mixed matrix membrane for removal of pharmaceutical compounds International Conference on Innovations in Sustainable Water and Wastewater Treatment Systems (ISWATS) NEERI Nagpur, Ecosan services foundation, Eco-India, Swings, Saraswati, NaWaTech 21-23 April 2016

Characterization and modification of ceramic membranes made from sugarcane recycling material aiming for low-cost water treatment, Euromembrane conference, RWTH Aachen, Germany, 6-10 September 2015

Superparamagnetic biocatalytic membrane bioreactors for treatment of recalcitrant compounds, International Conference on Membrane Based Separations, MEMSEP 2015, M S University of Baroda, Vadodara, Gujarat, 21-23 March 2015

Lignin degradation with immobilized enzyme, International Congress Environmental Research, Bangalore, India Dec 26-28, 2014

Incorporating benefits of nanomaterials in membrane filtration process for producing safe drinking water, International Congress on "Agriculture, Food Engineering and Environmental Sciences- Sustainable Approaches" (AFESSA-2014), New Delhi, India, March 29-30, 2014

Sewage reclamation in an indigenous MBR, Recent advances in biodegradation of human wastes (SaniCon 2014) Tezpur, Assam, 16-17 Dec 2014

Treatment of distillery effluent in powdered activated carbon (PAC supplemented membrane bioreactor (MBR): Effect of PAC properties on system performance, Int. conf. Bio energy, Environment, Sustainable Technologies (ICBEST), Tamil Nadu, Jan 2013

Membrane Technology for Water and Wastewater Treatment: Opportunities and Challenges for Developing Countries, VI World Aqua Congress, New Delhi, Nov 2012

Wastewater treatment using separation media derived from industrial solid waste, 3rd GEM-IIT Research Seminar on Recent advances and innovations for sustainable water management, New Delhi, Dec 2012

Hybrid membranes for biogas separation, Int. Conf. Membranes: Environmental Biological Applications, M G University, Kottayam, Kerala, Dec 2011.

Solvent resistant nanofiltration (SRNF) membranes based on metal-organic frameworks, Euromembrane Conference, Montpellier- France, 2009 (Best Oral Presentation Award).

Comparative study of asymmetric MOF based mixed-matrix membranes for gas separations, North American Membrane Society Conference, Washington D.C-USA, 2010

MOF-containing mixed-matrix membranes for CO_2/CH_4 and CO_2/N_2 binary gas mixture separations, Int.Congress Membranes Processes (ICOM), Amsterdam, The Netherlands,2011

Creation of optimum knowledge bank on E-Waste management in India, International Solid Waste Association Congress, Copenhagen, Denmark, 2006

Electronic waste in India with a special focus on recycling in Delhi Capital Region, Protection and restoration of the environment VIII, Crete, Greece, 2006

Invited Lectures

1. Keeping water quality of River Ganga: A myth or Scientific Evidence, ME College Tamil Nadu, Seminar, 22-01-2022

2. Resources Recovery from Distillery Industrial Waste, ATAL AICTE Faculty Development Programme on Waste Technology, C V Raman Global University Bhubaneswar, 23-12-2020

3. Nanomaterials for Environment Applications, Two-day Workshop on Recently Developed Materials (RDM-2018), B.A. College of Engg. Technol., Jamshedpur, 23-24th Feb 2018

4. Application of Membrane Technology in Water and Wastewater Treatment M.Tech invited CE classes Department of Civil Engineering IIT Delhi March 2015

5. Membrane Technology and its Applications for Wastewater Treatment TEQIP Summer Course on Water and Wastewater Treatment: Recent advances IIT Roorkee July 21 - 25, 2015

Sponsored Projects

S.No.	Sponsoring Agency	Title of Project	Sanctioned Amount (INR)	Period	Role	Status
1	Department of Science and Technology-SERB	Chitosan based thin active layer forward osmosis (FO)membrane for sewage up-concentration and resource recovery	2119176	36	PI	Completed
2	Department of Science and Technology-SERB	Solar Driven Community Potable Water Purification System	7209400	36	Co-PI	Completed
3	Department of Science and Technology	Biomimetic forward osmosis membranes for wastewater treatment	1211550	36	Co-PI	Completed
4	European Union and Department of Science and Technology	Enzyme supplemented membrane bioreactor (EnMBR) for degradation of recalcitrant compounds in industrial wastewater	2436000	24	Co-PI	Completed
5	Department of Biotechnology	Organics & color reduction of distillery wastewater in a biological powdered activated carbon membrane bioreactor (BPAC-MBR) using biomass ash filters	2294000	36	Co-PI	Completed
6	Ministry of Rural Development	Nitrate removal in membrane bioreactors using indigenous membranes	1573000	24	Co-PI	Completed
7	Department of Science and Technology	Development of indigenous membrane bioreactors (MBRs) using submerged fly ash membranes and its application for municipal wastewater treatment	3617048	36	Co-PI	Completed
8	European Union	Creation of optimum knowledge bank for efficient E-waste management	10663840	24	Co-PI	Completed
9	Department of Science and Technology-SERB	Polyamide thin film composite membranes containing MOFs for separation of pharmaceutical products from aqueous streams	1745000	36	PI	Completed
10	International Foundation for Science (IFS) Sweden	Surfactant removal potential of a filtration bioreactor equipped with a non-woven mesh as a filter material	480000	36	PI	Completed
11	The Patel College of Global Sustainability (PCGS), USA	Portable drinking water purification	422800	12	Co-PI	Completed

12	Veolia Water Technologies, UK	GSK Sonepat Industrial Wastewater Treatment Analysis	133747	12	PI	Completed
13	Sona Koya Steering SystemsLtd., Gurgaon	Water auditing in Sona Koya Steering Systems Ltd., Gurgaon	300000	12	PI	Completed