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## **RESEARCH EXPERIENCE**

Since December 2014 - working as a **researcher** in King Abdullah Institute for Nanotechnology, King Saud University, Kingdom of Saudi Arabia.

December 2009 to March 2014 - worked as **Project Associate** in a project entitled “Ultrafiltration Membrane for Arsenic, Chromium and Nitrate Rejection and Remediation of Arsenic using Sulphate Reducing Bacteria (SRB) Consortia” Sponsored by Ministry of Drinking Water & Sanitation (MDWS), Government of India, under the guidance of Prof. Gopal P. Agarwal, Downstream Processing Lab, Department of Biochemical Engineering and Biotechnology, Indian Institute of Technology Delhi, New Delhi. India.

## **RESPONSIBILITIES & DUTIES**

### **Membrane Separation Process**

- ✚ Preparation of nanocomposite flat-sheet and hollow fibers membrane for RO, NF, UF, FO and VMD application.
- ✚ Improving the membrane surface properties using different technique.
- ✚ Membrane characterization in the terms of thermal and mechanical stability, morphology (SEM & AFM), spectroscopic analysis, contact angle, water content, porosity, zeta potential, MWCO, surface free energy and water permeability.
- ✚ The standard elements performance test are used to determine the solute rejection and the permeate flow rate of different membranes.
- ✚ Separation and determines of ions presence in water and wastewater.
- ✚ The effect of physical & engineering parameters (like cross flow velocity, fouling, concentration polarization, pressure and temperature) as well as chemical parameters (pH and ionic strength).
- ✚ Separation of inhibitors such as acetic acid, ferulic acid, lignin and concentration of enzymes and monosaccharide's from pre-treated rice straw by using ultrafiltration and nanofiltration membranes.

## Environmental Biotechnology

- ✚ Bioremediation of Arsenic by using Sulphate Reducing Bacteria and Optimization of various parameters such as pH, Temperature and Sulphate consumption rate (COD/Sulphate ratio).

## EDUCATION BACKGROUND

### ❖ Post-Graduation (2007-2009)

Master of Technology in Biotechnology (Bioprocess Technology)

Sam Higginbottom Institute of Agriculture, Technology & Sciences, Uttar Pradesh, India.

### ❖ Undergraduate (2001-2005)

Bachelor of Technology in Biotechnology (Industrial Microbiology)

Allahabad Agricultural Institute (Deemed University), Uttar Pradesh, India.

## AREA OF INTEREST

- Membrane Separation Technology
- Nanomaterial application
- Membrane Bio-reactor for waste water treatment
- Biological Wastewater Treatment

## PATENT

- 1) Gopal P. Agarwal, Muthumareeswaran M.R, **Arun Kumar Shukla**, Y.Luka Thuyavan, Ulhas Kharul, Harshada Lohokare, “Polyacrylonitrile based ultrafiltration membrane for facilitating removal of arsenic and chromium ions from water, has module for facilitating rejection of metals at specific concentration, where membrane produces high rejection percentage”, *IN201502470-II (17 Feb 2017)*.

## PUBLICATIONS

- 1) Javed Alam, Mansour Alhoshan , **Arun Kumar Shukla**, Ali Aldalbahi , Fekri Abdulraqeb Ahmed Ali ,Lawrence Arockiasamy Dass , M.R. Muthumareeswaran “K-Carrageenan as a promising pore-former for the preparation of a highly porous polyphenylsulfone membrane” *Materials Letters (2017) 204: 108–111*.
- 2) **Arun Kumar Shukla**, Javed Alam, Mansour Alhoshan, Lawrence Arockiasamy Dass & M. R. Muthumareeswaran “Development of a nanocomposite ultrafiltration membrane based on polyphenylsulfone blended with graphene oxide” *Scientific Reports (2017) 7: 41976*

- 3) Lawrence Arockiasamy Dass, Mansour Alhoshan, Javed Alam, Muthumareeswaran MR, Alberto Figoli , **Arun Kumar Shukla** “Separation of proteins and antifouling properties of polyphenylsulfone based mixed matrix hollow fiber membranes”, *Separation and Purification Technology* (2017) 174: 529–543.
- 4) Jothi Ramalingam Rajabathar , **Arun K. Shukla**, Aldalbahi Ali ,Hamad A. Al-Lohedan, “Silver nanoparticle/r-graphene oxide deposited mesoporous-manganese oxide nanocomposite for pollutant removal and supercapacitor applications” *International Journal of Hydrogen Energy* (2017) 42 : 15679 -15688
- 5) Varish Ahmad, Qazi Mohammad Sajid Jamal, **Arun K. Shukla**, Javed Alam, Ahamad Imran,Usama Mohamed Abaza, “Bacilli as Biological Nano-factories Intended for Synthesis of Silver Nanoparticles and Its Application in Human Welfare” *J Clust Sci.* (2017) 28:1775–1802,
- 6) Varish Ahmad, Qazi Mohammad Sajid Jamal, Mughees Uddin Siddiqui, **Arun K. Shukla**, Mohammad A. Alzohairy, Mohammad A. Al Karaawi, Mohammad Amjad Kamal, “Methods of Screening-Purification and Antimicrobial Potentialities of Bacteriocin in Health Care” *Current Drug Metabolism*, (2017) Volume 18, 12 Issues,
- 7) Javed Alam & Mansour Alhoshan & Lawrence Arockiasamy Dass & **Arun Kumar Shukla** & M. R. Muthumareeswaran & Mukhtar Hussain & Abdullah S. Aldwayyan, “Atomic layer deposition of TiO<sub>2</sub> film on a polyethersulfone membrane: separation applications” *J Polym Res* (2016) 23:183
- 8) Mohammad Jalal, Mohammad Azam Ansari, **Arun Kumar Shukla**, Syed G. Ali,Haris M. Khan, Ruchita Pal, Javed Alam and Swaranjit Singh Cameotra, “Green synthesis and antifungal activity of Al<sub>2</sub>O<sub>3</sub> NPs against fluconazole-resistant *Candida* spp isolated from a tertiary care hospital” *RSC Adv.*, (2016) 6: 107577.
- 9) G. Raja, S. Gopinath, R. Azhagu Raj, **Arun K. Shukla**, Mansour S. Alhoshan, K. Sivakumar “Comparative investigation of CuFe<sub>2</sub>O<sub>4</sub> nano and microstructures for structural, morphological, optical and magnetic properties” *Physica E* 83 (2016) 69 – 73.
- 10) Mohammad Azam Ansari, **Arun Kumar Shukla**, Mohammad Oves, Haris M Khan “Electron microscopic ultrastructural study on the toxicological effects of AgNPs on the liver, kidney and spleen tissues of albino mice” *Environmental Toxicology and Pharmacology* (2016) 44: 30–43.
- 11) Mansour Alhoshan, Javed Alam, Aslam Khan, Fahad Surur Al Shabouna, Senthivel Sasivarnam, Lawrence Arockiasamy and **Arun Kumar Shukla**, “Polysulfone – poly (Orthotoluidine) nanocomposite membrane with an improved separation performance” *Polymer Composites*, (2016)
- 12) O.P.Verma, **Arun Kumar Shukla**, Kamin Alexander, Onkar Chaudhary and Abha Singh “Extraction of organic compound from different medicinal plant “*International Journal of Plant Science*, 5(1):74-75, 2010.

- 13) O.P.Verma, **A.K.Shukla**, Abha Singh and S.K.Verma “Standarization of growth regulator for rapid shoot proliferation in chrysanthemum morifolium”Asian Journal of Bio Science, 4(2):337-339, 2010.
- 14) Ankit Kumar, Om Prakash Verma, **Arun Kumar Shukla**, Abha Singh and Poonam Singh“Comparative Study of Alkaloid Extraction from different parts of Rauvolfia Vomitoria”Bionano Frontier, 2(1): 129 -131, January-June 2009 – A Biannual Journal of Science and Technology.
- 15) Om prakash Verma, **Arun Kumar Shukla**, Ankit Kumar, Abha Singh, Poonam Singh and Akhilesh Bind “Partial Purification and characterization of Glukoamylase using Aspergillus Oryzae Ncim 616 from different substrates” Bionano Frontier,05-08,Feb.2009 Journal of Science and Technlogy.
- 16) O.P.Verma, A.Singh,**A.K.Shukla**, P.Singh,P.Kumar and B.K.Singh “Study of spoilage causing and pathogenic microorganisms in Indian cheese (Paneer) sold in Allahabad city” Journal of current science, 12(2):643-648,2008.

## CONFERENCES AND SEMINARS

- Attended 2<sup>nd</sup> Saudi International Biotechnology Conference February 2016 in Riyadh, Saudi Arabia.
- Attended International Remote Sensing Conference January 2016 in Riyadh, Saudi Arabia.
- **A. Shukla**, G.P. Agarwal and U. Kharul (2013).Chromium ion rejection via modified polyacrylonitrile ultrafiltration membrane. The International Seminar on Advances in Membrane Processes & Materials (AMPM-13), April 6, Vadodara, Gujarat, India.
- **Arun K. Shukla** (2013) Study on the removal of toxic ions using polyacrylonitrile (PAN) based modified Ultrafiltration Membrane. Open House 2013, Indian Institute of Technology Delhi, New Delhi, India.

## PROFESSIONAL EXPERIENCE

- Chemoenzymatic synthesis of medicinal compound (Anti-malarial Drug) under the supervision of Dr.S. Chattopadhyay at Bio-Organic Division, Bhabha Atomic Research Centre (BARC), Mumbai, India (March – August 2009).
- Biotransformation: Potential application of fungus *Rhizopus arrhizus* in the preparation of chiral carbinols” under the supervision of Dr.S. Chattopadhyay at Bio-Organic Division, Bhabha Atomic Research Centre (BARC), Mumbai, India (January – June 2005).

## TECHNICAL SKILLS

- ✓ Optimization of filtration process in various Ultrafiltration, Nanofiltration, Forward Osmosis, Vacuum Membrane Distillation and Reverse Osmosis Modules (Cross Flow, Dead End and Pilot Plant scale).
- ✓ Hand on experience working with Ceramic, Hollow fibre, Tubular and Spiral wound membrane modules.
- ✓ Characterization of polymeric membranes surface using Fourier transform infrared spectroscopy (FTIR), Scanning Electron Microscope (SEM), Transmission Electron Microscopy (TEM), Zeta potentiometer and porosity meter instruments.
- ✓ Hands on experience in analytical instrument such as Atomic Absorption Spectroscopy(AAS), Spectrophotometer, Gas Chromatography (GC), Ion Chromatography (IC), High-performance liquid chromatography (HPLC), pH and conductivity meter
- ✓ Hands on experience for the measurement of Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD) in water and waste water using new techniques.



*Arun Kumar Shukla*