

Curriculum Vitae

RAJ MUKHOPADHYAY, PhD

Scientist, Division of Irrigation and Drainage, ICAR-Central Soil Salinity Research Institute, Karnal, India. E-mail (s): rajssaciari@gmail.com ; raj.mukhopadhyay@icar.gov.in

Area of Expertise: Clays and clay minerals; Nanotechnology; Material synthesis and characterization, Solid-liquid interface chemistry, Adsorption, Waste management; Biogeochemistry and remediation of contaminants/elements, Per- and polyfluoro alkyl substances (PFAS), Water treatment (Wastewater, drinking and irrigation water), salt-affected soils

Academic Qualification (Undergraduate Onwards)

Degree	Year	Subject	University/Institution
Ph.D.	February, 2018	Soil Science and Agricultural Chemistry	Indian Agricultural Research Institute, New Delhi, India
MS	July, 2014	Soil Science and Agricultural Chemistry	Banaras Hindu University, Varanasi, India
BS	June, 2012	Agriculture (Major: Soil Science)	Bidhan Chandra Krishi Viswavidyalaya, West Bengal, India

Professional Appointments

1. Scientist at Division of Irrigation and Drainage Engineering, ICAR-Central Soil salinity Research Institute, Karnal, India from October, 2017 to till date)
2. Scientist Trainee at ICAR-Indian Institute of Soil Science from November, 2017 to February, 2018.
3. Scientist Trainee at ICAR- National Academy of Agricultural Research Management, Hyderabad, India from July, 2017-October, 2017
4. PhD Student (Soil Science) at ICAR-Indian Agricultural Research Institute, India from August, 2014 to October, 2017.
5. Visiting Research Scholar at University of Alberta, Canada from May to July, 2016.
6. Junior Research Fellow (MS), Soil Science, Banaras Hindu University, India from August, 2012-July, 2014.

Research Interest

- Developing sustainable advanced material for environmental remediation and water treatment
 - ✓ Development of bioreactive organoclay minerals, engineered clay minerals, metal-organic frameworks (MOFs), new polymeric hybrids, multifunctional adsorbents for physicochemical water treatment applications.
 - ✓ Development of green nanoclay- based photocatalysts for the efficient degradation of forever chemicals

- ✓ Understanding contaminants interfacial reactions at liquid-solid interfaces at the molecular level in a natural and engineered system
- Removal, Fate, transport and bioavailability of Per- and Polyfluoroalkyl Substances (PFAS) in soil and water

Interested contaminants for study: Metal pollutants (arsenic, lead, chromium), Per- and polyfluoroalkyl Substances (PFAS) compounds, phosphate, and nitrate.

Professional Recognition/ Award/ Fellowship received by the applicant

S. No	Name of Award	Awarding Agency	Year
1.	Clay Minerals Group Bursary award to attend the 3 rd International Conferences on “Bio resources, Energy, Environment and Material Technology” from 12 th – 15 th June 2019 at Hong Kong Polytechnic University, Hong Kong	Clay Minerals Group of Mineralogical Society of Great Britain and Ireland, Middlesex TW1 3HQ, United Kingdom	2019
2.	IC-IMPACTS (the India-Canada Centre for Innovative Multidisciplinary Partnerships to Accelerate Community Transformation and Sustainability) Summer Institute Award on “Nanotechnologies for Safe & Sustainable Infrastructure, Integrated Water Management and Public Health”, University of Alberta, Edmonton, Canada	IC-IMPACTS, The University of British Columbia, Vancouver, Canada	2016
3.	Senior Research Fellowship (Indian Council of Agricultural Research)	Indian Council of Agricultural Research (ICAR), New Delhi, India	2015
4.	Merit Fellowship for perusing PhD studies	ICAR-Indian Agricultural Research Institute, New Delhi, India	2014
5.	Junior Research Fellowship for perusing Masters studies	Indian Council of Agricultural Research, New Delhi, India	2012

Google scholar citation: <https://scholar.google.co.in/citations?user=n-QNH8gAAAAJ&hl=en>

Research gate: <https://www.researchgate.net/profile/Raj-Mukhopadhyay>

Top peer-reviewed papers (List of papers published in Journals, in year wise descending order)

1. Nanthi Bolan, Binoy Sarkar, Meththika Vithanage, Gurwinder Singh, Daniel C. W. Tsang, **Raj Mukhopadhyay**, Kavitha Ramadass, Ajayan Vinu, Yuqing Sun, Sammani Ramanayaka, Son A. Huang, Yubo Yan, Yang Li, Jorg Rinklebe, Hui Li and M. B. Kirkham (2021). Distribution, behaviour, bioavailability and remediation of poly- and per-fluoroalkyl substances (PFAS) in solid biowastes and biowaste-treated soil. *Environment International*. 155, 106600. **IF: 9.621**

2. **Raj Mukhopadhyay**, Binoy Sarkar, Eakalak Khan, Daniel S. Alessi, Jayanta Kumar Biswas, K. M. Manjaiah, Miharu Eguchi, Kevin C. W. Wu, Yusuke Yamauchi and Yong Sik Ok (2021). Nanomaterials for sustainable remediation of chemical contaminants from water and soil. *Critical Reviews in Environmental Science and Technology*. <https://doi.org/10.1080/10643389.2021.1886891> **IF: 12.561**
3. Binoy Sarkar, **Raj Mukhopadhyay**, Sammani Ramanayaka, Nanthi S. Bolan and Yong Sik Ok (2021). The role of soils in the disposition, sequestration and decontamination of environmental contaminants. *Philosophical Transactions of the Royal Society B: Biological Sciences* (In Press). [10.1098/rstb.2020.0177](https://doi.org/10.1098/rstb.2020.0177) **IF: 6.237**
4. Kumuduni Niroshika Palansooriya, Sok Kim, Avanthi Deshani Igalavithana, Yohey Hashimoto, Yoon-E. Choi, **Raj Mukhopadhyay**, Binoy Sarkar and Yong Sik Ok (2021). Fe(III) loaded chitosan-biochar composite fibers for the removal of phosphate from water. *Journal of Hazardous Materials*. 415, 125464. **IF: 10.58**
5. Po-Hsiang Chang, Pan Liu, Binoy Sarkar, **Raj Mukhopadhyay**, Qing-Yuan Yang, Yu-Min Tzou, Bo Zhong, Xuxiang Li and Gary Owens (2021). Unravelling the mechanism of amitriptyline removal from water by natural montmorillonite through batch adsorption, molecular simulation and adsorbent characterization studies. *Journal of Colloid and Interface Science*. 598, 379-387. <https://doi.org/10.1016/j.jcis.2021.04.033> **IF: 8.128**
6. **Raj Mukhopadhyay**, Binoy Sarkar, Arijit Barman, Samar Chandra Datta and Kanchikeri Math Manjaiah (2021). Arsenic Adsorption on Modified Clay Minerals in Contaminated Soil and Water: Impact of pH and Competitive Anions. *CLEAN-Soil, Air, Water*. [DOI: 10.1002/clen.202000259](https://doi.org/10.1002/clen.202000259). **IF: 1.603**
7. **Raj Mukhopadhyay**, Binoy Sarkar, Hanuman Sahay Jat, P. C. Sharma, and Nanthi Bolan (2020). Soil salinity under climate change: Challenges for sustainable agriculture and food security. *Journal of Environmental Management*. 280, 111736. **IF: 6.789**
8. **Raj Mukhopadhyay**, K.M. Manjaiah, S.C. Datta and Binoy Sarkar (2019). Comparison of properties and aquatic arsenic removal potentials of organically modified smectite adsorbents. *Journal of Hazardous Materials*. 377, 124-131. <https://doi.org/10.1016/j.jhazmat.2019.05.053>. **IF: 10.58**
9. **Raj Mukhopadhyay**, Tapan Adhikari, Binoy Sarkar, Arijit Barman, Ranjan Paul, Ashok K Patra, Parbodh C Sharma and Parveen Kumar (2019). Fe-exchanged nano-bentonite outperforms Fe₃O₄ nanoparticles in removing nitrate and bicarbonate from wastewater. *Journal of Hazardous Materials*. 376, 141-152. <https://doi.org/10.1016/j.jhazmat.2019.05.025>. **IF: 10.58**
10. **Raj Mukhopadhyay**, Debarati Bhaduri, Binoy Sarkar, Ruhaida Rusmin, Deyi Hou, Rubina Khanam, Subhas Sarkar, Jayanata Kumar Biswas, Meththika Vithanage, Amit Bhatnagar and Yong Sik Ok (2019). Clay-polymer nanocomposites: Progress and challenges for use in sustainable water treatment. *Journal of Hazardous Materials*. 383, 121125. <https://doi.org/10.1016/j.jhazmat.2019.121125>. **IF: 10.58**
11. **Raj Mukhopadhyay**, K.M. Manjaiah, S.C. Datta, R. K. Yadav and Binoy Sarkar (2017). Inorganically modified clay minerals: Preparation, characterization and arsenic adsorption in contaminated soil and water. *Applied Clay Science*. 147, 1-10. <http://dx.doi.org/10.1016/j.clay.2017.07.017> **IF: 5.467**

Book Chapters

1. Bolan, N., Hoang, S. A., Yan, Y., Ramanayaka, S., Koliyabandara, P., Chamanee, G., **Mukhopadhyay, R.**, Sarkar, B., Wijeskara, H., Vithanage, M. and Kirkham, M. B. (2021) Landfills as Sources of PFAS Contamination of Soil and Groundwater. In: Kempisty, D. M. and Racz, L. (Eds), *Forever Chemicals: Environmental, Economic, and Social Equity Concerns with PFAS in the Environment*. CRC Press. (In Press)
2. Manjaiah, K. M., **Mukhopadhyay, R.**, Paul, R., Datta, S.C., Kumararaja, P. and Sarkar, B. (2019) Clay minerals and zeolites for environmentally sustainable agriculture. In: Mercurio, M., Sarkar, B., Langella, A. (Eds.), *Modified Clay and Zeolite Nanocomposite Materials: Environmental and Pharmaceutical Applications*. Elsevier. Pp. 309-329. <https://doi.org/10.1016/B978-0-12-814617-0.00008-6>
3. Sarkar, B., Rusmin, R., Ugochukwu, U.C., **Mukhopadhyay, R.** and Manjaiah, K. M. (2019) Modified clay minerals for environmental applications. In: Mercurio, M., Sarkar, B., Langella, A. (Eds.), *Modified Clay and Zeolite Nanocomposite Materials: Environmental and Pharmaceutical Applications*. Elsevier. Pp. 113-127. <https://doi.org/10.1016/B978-0-12-814617-0.00003-7>
4. Mandal, S., Sarkar, B., **Mukhopadhyay, R.**, Biswas, J. K. and Manjaiah, K. M. (2019) Microparticle-Supported nanocomposites for safe environmental applications. In: Rai, M. and Biswas, J. K. (Eds.), *Nanomaterials: Ecotoxicity, Safety, and Public Perception*. Springer. Pp. 305-317. https://doi.org/10.1007/978-3-030-05144-0_15
5. Manjaiah, K. M., **Mukhopadhyay, R.**, Narayanan, N., Sarkar, B. and Datta, S.C. (2018) Clay Amendments for Environmental Clean-Up. In: Rakshit, A., Sarkar, B. and Abhilash, P. (Eds.), *Soil Amendments for Sustainability: Challenges and Perspectives*. CRC Press, Taylor and Francis. Pp. 19-29. DOI: [10.1201/9781351027021-2](https://doi.org/10.1201/9781351027021-2)

Selected Conference/ Seminar and Presentation

1. **Mukhopadhyay, R.**, Sarkar, B., Manjaiah, K. M. and Datta, S. C. 2019. Arsenic adsorption onto modified clays in contaminated soils and water: Impact of pH and competitive anions. 3rd International conference on Bioresources, Energy, Environment, and Materials Technology (Hong Kong) from 12-15th June, 2019. (Oral presentation)
2. **Mukhopadhyay, R.**, Manjaiah, K. M., and Datta, S. C. 2018. Modified clays: A potential immobilizing agent of arsenic in soil and water. National conference on Advances in Clay Science towards Agriculture, Environment and Industry (ICAR-NBSS&LUP, Kolkata, India) from 14-15th September, 2018. (Oral presentation)
3. **Mukhopadhyay, R.** and Adhikari, T. 2019. Nano Iron Oxide: A Potential Adsorbent for Remediation of Bicarbonate in Aqueous System. Golden Jubilee International Salinity Conference on "Resilient Agriculture in Saline Environments under Changing Climate: Challenges & Opportunities" at ICAR-Central Soil salinity Research Institute, Karnal, India during 7-9 February, 2019 (Poster presentation).

Teaching Experiences

Teaching Soil Science to the PhD students of ICAR-CSSRI & CCSHAU (ICAR-Central Soil Salinity Research Institute & Chaudhary Charan Singh Haryana Agricultural University, Hisar, India) since 2018

Courses (Lectures+Practicals)

SOILS-509: Soil Water and Air Pollution (2+1)

SOILS-603: Physical Chemistry of Soils (2+0)

SOILS-601: Advances in Soil Physics (3+0)

Student Supervision as co-advisor

Supervised **one** Master student of Fisheries Sciences of ICAR-Central Institute of Fisheries Education (CIFE), Mumbai, India.

Project title- *“Mineral-biochar composite for carbon sequestration in Inland Saline Shrimp Farming System”*

Supervised **one** PhD student of Fisheries Extension of ICAR-CIFE, Mumbai

Project title: *“Inland Shrimp Aquaculture: Ecological Externalities and Trade-off with Agriculture in Haryana and Punjab”*

Professional Trainings

1. 106th Foundation Course for Agricultural Research Service (ARS) at ICAR-National Academy of Agricultural Research Management, Hyderabad, India. Duration: 5th July to 4th October, 2017.
2. Agricultural research service professional attachment training on ‘Nanotechnological interventions for decontamination of wastewater’ at ICAR-Indian Institute of Soil Science, Bhopal, India. Duration: 3 months (November 2017 to February, 2018)

Workshops

1. International workshop on HYDRUS 1, 2 and 3D software at Indian institute of Technology-Mandi, India. Duration: 9-11 September, 2019.
2. National workshop on Inland Saline Aquaculture: Environmental Challenges and Eco-friendly Technologies/Practices at ICAR-Central Institute of Fisheries Education, Rohtak, India. Duration: 5-6 October, 2019.

Journal Editorship

Guest editor of Special Issue on “Designing Minerals for Remediation of Environmental Contaminants” in Minerals. Publisher: MDPI

https://www.mdpi.com/journal/minerals/special_issues/DMREC

Journal Reviewer

Associated as reviewer for evaluating manuscripts submitted in Critical Reviews in ES&T, Journal of Hazardous Materials, Journal of Molecular Liquids, Journal of Environmental Management, Soil Use and Management, and European Journal of Soil Science