



CV Dr. Tarun Kumar Naiya

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5. Institution : Indian Institute of Technology (Indian School of Mines) Dhanbad
6. Date of Birth : 27/11/1974
7. Gender (M/F/T) : M
8. Category Gen/SC/ST/OBC : SC
9. Whether differently abled (Yes/No) : No
10. Specialization : Petroleum Production Engineering, Enhanced Oil Recovery, Flow Assurance problems like Oilfield Scale, Wax deposition, corrosion, Water Pollution, Adsorption etc.
11. Academic Qualification (Undergraduate Onwards)

Sl. No.	Degree	Year	Subject	University/Institution	% of marks
1	B. Sc.	1997	Chemistry HONS	University of Calcutta	56
2	B. Tech.	2000	Chemical Engg.	University of Calcutta	69.23
3	M. Tech.	2003	Chemical Engg.	University of Calcutta	69.33
4.	Ph. D.	2010	Chemical Engg.	University of Calcutta	Awarded

12. Ph. D thesis title, Guide's Name, Institute/Organization/University, Year of Award.

Ph.D thesis title	Guide's Name	Institute/Organization/University	Year of Award
Studies on the Removal of Heavy Metals Using Natural and Chemical Adsorbents.	Prof. S. K. Das	University of Calcutta	2010

13. Work experience:

S.No.	Designation	Name of the Institute/Organization	From Month-year	To Month-year	No. of year of Experience	Responsibility
1.	Lecturer	Durgapur Institute of Advanced Technology and Management, Rjabandh, Durgapur	01.07.2008	06.04.2010	2 years	Teaching
2.	Guest Lecturer	University of Calcutta	January, 2009	April, 2010	1.5 year	Teaching
3.	Assistant Professor	Indian Institute of Technology (Indian School of Mines), Dhanbad	07.04.2010	05.06.2019	9.2 years	Teaching and research
4.	Associate Professor	Indian Institute of Technology (Indian School of Mines), Dhanbad	05.06.2019	23.02.2025	5 years 8 months	Teaching and research
5.	Professor	Indian Institute of Technology (Indian School of Mines), Dhanbad	24.02.2025	Till date	1 Year	Teaching and research

14. Professional Recognition/ Award/ Prize/ Certificate, Fellowship received by the applicant.

S.No	Name of Award	Awarding Agency	Year
1	2025 Regional Technical Award-Production and Operations for South Asia & the Pacific Region	SPE	2025
2	Distinguish Achievement Award for Petroleum Engineering Faculty for South Asia & the Pacific Region	SPE	2021
3	ONGC Award for Excellent in Design and Development of Oil/Gas Related Process Plant and/or Chemical for the year 2020	Indian Institute of Chemical Engineers (IChE)	2020
4	CSIR Fellowship	CSIR – India	April, 2006 – June, 2008
5	Best Paper Presentation award	GMSARN International Conference, China	2008
6	Vical Award – 1 st Prize	SCHEMCON 2006	2006

15. Publications (*List of papers published in SCI Journals, in year wise descending order*).

1. Bhattacharya, A. K., T. K. Naiya, S. N. Mandal and S. K. Das, Adsorption, Kinetics and Equilibrium studies on removal of Cr(VI) from aqueous solutions using different low-cost adsorbents, Chemical Engineering Journal, 137(3) (2008) 529-541, IF : 13.273. Q1
2. Naiya, T. K., A. K. Bhattacharya and S. K. Das, Adsorption of Pb (II) by saw dust and neem bark from aqueous solutions, Environmental Progress, 27 (2008) 313-328, IF : 2.80. Q2
3. Naiya, T. K., A. K. Bhattacharya and S. K. Das, Removal of Cd(II) from aqueous solutions using clarified sludge, Journal of Colloid and Interface Science, 325 (2008) 48-56, IF : 8.128, Q3
4. Naiya, T. K., A. K. Bhattacharya, S. N. Mandal and S. K. Das The sorption of Lead(II) ions on rice husk ash, Journal of Hazardous Material 163 (2009) 1254-1264, IF : 14.224, Q1
5. Naiya, T. K., P. Chowdhury, A. K. Bhattacharya and S. K. Das, Saw dust and neem bark as low cost natural biosorbent for adsorptive removal of Zn(II) and Cd(II) ions from aqueous solutions, Chemical Engineering Journal, 148 (2009) 68-79., I.F. : 13.273, Q1
6. Naiya, T. K., A. K. Bhattacharya and S. K. Das, Adsorption of Cd(II) and Pb(II) from aqueous solutions on activated alumina, Journal of Colloid and Interface Science, 333 (2009) 14-26, IF : 8.128. Q1
7. Naiya, T. K., A. K. Bhattacharya and S. K. Das, Adsorptive removal of Cd(II) ions from aqueous solutions by rice husk ash, Environmental Progress and Sustainable Energy 28 (2009) 535-546
IF : 2.80, Q2
8. Naiya, T. K., A. K. Bhattacharya and S. K. Das, Clarified Sludge (basic oxygen furnace sludge) – An adsorbent for removal of Pb(II) from aqueous solutions – kinetics, thermodynamics and desorption studies, Journal of Hazardous Material 170 (2009) 252-262, IF : 14.224. Q1

9. Naiya, T. K., A. K. Bhattacharya, D. Sarkar and S. K. Das, Applicability of shrinking core model on the adsorption of heavy metals by clarified sludge from aqueous solution, *Adsorption* 15 (2009) 354-364, IF : 2.318. Q2
10. S Banerjee, R Kumar, A Mandal, TK Naiya Use of a novel natural surfactant for improving flowability of Indian heavy crude oil, *Petroleum Science and Technology* 33 (7) (2015) 819-826, IF : 1.268. Q2
11. Kumar, R., Banerjee, S., Kumar, N., Mandal, A., T. K. Naiya, Comparative Studies on Synthetic and Naturally Extracted Surfactant for Improving Rheology of Heavy Crude Oil, *Petroleum Science and Technology* 33 (Issue 10) (2015) 1101-1109, IF : 1.268. Q2
12. Banerjee, S., Kumar, R., Mandal, A. and Naiya, T.K., 2015. Effect of natural and synthetic surfactant on the rheology of light crude oil. *Petroleum Science and Technology*, 33(15-16), pp.1516-1525, IF : 1.268. Q2
13. R Kumar, S Banerjee, A Mandal, TK Naiya, Improvement in transportability of Indian heavy crude oil using novel surfactant, *Indian Journal of Chemical Technology* 23 (4) (2016) 262-270, IF : 0.76. Q4
14. TK Naiya, SK Das, Removal of Cr (VI) from aqueous solution using fly ash of different sources, *Desalination and Water Treatment*, 57 (13) (2016) 5800-5809, IF : 1.234. Q4
15. Banerjee, S., Kumar, R., Ansari, I., Mandal, A. and Naiya, T.K., 2016. Effect of extracted natural surfactant on flow behaviour of heavy crude oil. *International Journal of Oil, Gas and Coal Technology*, 13(3), pp.260-276. IF : 0.723 Q4
16. R Kumar, S Banerjee, A Mandal, TK Naiya, Flow improvement of heavy crude oil through pipelines using surfactant extracted from soapnuts, *Journal of Petroleum Science and Engineering*, 152 (2017) 353-360, IF : 5.168. Q1
17. M Gudala, S Banerjee, A Kumar, RM Rao T, A Mandal, TK Naiya, Rheological modeling and drag reduction studies of Indian heavy crude oil in presence of novel surfactant, *Petroleum Science and Technology* 35 (24) (2017) 2287-2295, IF : 1.268. Q2
18. S Banerjee, R Kumar, A Akhtar, R Bairagi, A Mandal, TK Naiya, Effect of pour point depressant on wax deposition and drag reduction in horizontal pipelines, *Petroleum Science and Technology*, 35 (6) (2017) 561- 569, IF : 1.268. Q2
19. Banerjee, S., Kumar, S., Mandal, A. and Naiya, T.K., 2017. Design of novel chemical solvent for treatment of waxy crude. *International Journal of Oil, Gas and Coal Technology*, 15(4), pp.363-379. IF : 0.723 Q4
20. Kumar, R., Banerjee, S., Mandal, A. and Naiya, T.K., 2017. Investigation of novel extracted surfactant on rheological properties of heavy crude oil. *International Journal of Oil, Gas and Coal Technology*, 14(4), pp.354-368. IF : 0.723 Q4
21. R Kumar, S Banerjee, A Banik, TK Bandyopadhyay, TK Naiya, Simulation of single phase non-Newtonian flow characteristics of heavy crude oil through horizontal pipelines, *Petroleum Science and Technology* 35 (6) (2017) 615-624, IF : 1.268. Q2
22. M Gudala, S Banerjee, RM Rao T, T K Naiya, A Mandal, The effect of bio additive on the viscosity and energy requirement for heavy crude oil flow, *Petroleum Science and Technology*, 36 (2018) 99-107, IF : 1.268. Q2
23. R Kumar, S Banerjee, A Mandal, TK Naiya, Flow improvement of heavy crude oil through pipelines using surfactant extracted from soapnuts, *Journal of Petroleum Science and Engineering*, 152 (2017) 353-360, IF : 5.168. Q1
24. R Kumar, GS Bora, S Banerjee, A Mandal, T K Naiya, Application of naturally extracted surfactant from *Madhuca longifolia* to improve the flow properties of heavy crude oil through horizontal pipeline, *Journal of Petroleum Science and Engineering* 168 (2018) 178 – 189, IF : 5.168. Q1
25. Raipuria, V., Rani, N., Sharma, V.P. and Naiya, T.K., 2018. Use of nanoparticle derived from natural source and its application in drilling fluid. *International Journal of Oil, Gas and Coal Technology*, 19(3), pp.283-295. IF : 0.723 Q4

26. M Gudala, S Banerjee, R Kumar, T R M Rao, A Mandal, T K Naiya, Experimental Investigation on Hydrodynamics of Two-Phase Crude Oil Flow in Horizontal Pipe With Novel Surfactant, *Journal of Fluids Engineering* 140 (6) (2018) 061302, IF : 2.056. Q3
27. Sanjiv Kumar, Tarun Kumar Naiya, Tarkeshwar Kumar, Developments in oilfield scale handling towards green technology-A review, *Journal of Petroleum Science and Engineering* 169 (2018) 428-444, IF : 5.168, Q1
28. Manojkumar Gudala, Shirsendu Banerjee, Tarun Kumar Naiya, Ajay Mandal , Subbaiah T. C., Rama Mohan Rao T., Hydrodynamics and energy analysis of heavy crude oil transportation through horizontal pipelines using novel surfactant, *Journal of Petroleum Science and Engineering* 178 (2019) 140-151
IF : 5.168. Q1
29. M Gudala, S Banerjee, TK Naiya, GS Kumar, Experimental and Correlation Development of Heavy oil viscosity using bio-additives, *Energy & Fuels* 33 (2019) 6313-6326, IF : 3.421. Q1
30. A Azeem, R Kumar, B Pal, TK Naiya, Use of novel pour point depressant synthesized from vegetable oil for waxy crude oil, *Petroleum Science and Technology* 38 (2020) 185-193, IF : 1.268. Q2
31. S Quereshi, KK Pant, S Dutta, TK Naiya, Unfolding the role of molybdenum disulfide as a catalyst to produce platform chemicals from biorenewable resources, *Biomass Conversion and Biorefinery*, <https://doi.org/10.1007/s13399-020-00888-7> 1-14 (2020), IF : 2.602. Q2
32. S Quereshi, TK Naiya, A Mandal, S Dutta, Residual sugarcane bagasse conversion in India: current status, technologies, and policies, *Biomass Conversion and Biorefinery*, <https://doi.org/10.1007/s13399-020-00871-2> 1-23 (2020), IF : 2.602. Q2
33. Gudala, Manojkumar; Naiya, Tarun Kumar, Govindarajan, Suresh Kumar, "Remediation of Heavy oil Transportation Problems via Pipelines using Biodegradable Additives: An Experimental and Artificial Intelligence Approach, *SPE Journal*, SPE-203824-PA 2020, IF : 3.095. Q1
34. Pal, Biswadeep, and Tarun Kumar Naiya. "Application of Synthesized Novel Biodegradable Pour-Point Depressant from Natural Source on Flow Assurance of Indian Waxy Crude Oil and Comparative Studies with Commercial Pour-Point Depressant." *SPE J.* (2021;), 27 (01): 864–876, IF : 3.095. Q1
35. Pal, B., Kumar, R. and Naiya, T.K., 2021. Demulsification of crude oil-water emulsion using naturally formulated demulsifier. *Petroleum Science and Technology*, 39(21-22), pp.1027-1042, IF : 1.268. Q2
36. Yogesh Dhandhi, Ronak Kumar Chaudhari & Tarun Kumar Naiya (2021) Development in separation of oilfield emulsion toward green technology – A comprehensive review, *Separation Science and Technology*, IF : 2.475 Q3
37. Gudala, M., Naiya, T.K. and Govindarajan, S.K., 2022. Heavy oil-water dispersed flows in horizontal pipelines using bio-additives with energy analysis: Experimental and numerical investigations. *Journal of Petroleum Science and Engineering*, p.110142 (1-17), IF : 5.168. Q1
38. Yogesh Dhandhi, Om Prakash, Tarun Kumar Naiya, Chandan Guria, Statistical design and process optimization for using chemical demulsifiers for the dehydration of the crude oil *Journal of Petroleum Science and Engineering* 217 (2022) 110876. IF : 5.168. Q1
39. Pal, B. and Naiya, T., 2022. Application of novel fruit extract for flow assurance of Indian field waxy crude oil. *SPE Journal*, 27(05), pp.3178-3195. IF : 3.095. Q1
40. Pal, B., Naiya, T.K. and Sarkhel, G., 2023. Effect of Amla Fruit (*Phyllanthus emblica*) Extract in Flow Assurance of Indian Waxy Crude Oil. *SPE Journal*, 28(02), pp.628-642. IF : 3.095. Q1

41. Dhandhi, Y., V Bhardwaj, Naiya, T. K., 2023. Application of Novel Biodegradable Demulsifier Synthesized from *Helianthus annuus* in Field Crude Oil Demulsification_ Experimental and Modeling Approach through RSM, *Industrial & Engineering Chemistry Research* 62 (44), 18621-18636, IF : 4.2, Q2
42. Dhandhi, Y., Kumar Saw, R., Singh, R. and Naiya, T.K., 2023. Application of a novel surface-active green demulsifier for demulsification of field crude oil emulsion. *Separation Science and Technology*, 58(9), pp.1654-1678. IF : : 2.475. Q3
43. Dhandhi, Y., and Naiya, T.K., 2023 Synthesis of Green Polyethylene Glycol-Lauric Acid Demulsifier from a Natural Source and Its Application in Demulsification of Field Emulsion: Experimental and Modeling Approach, *SPE Prod & Oper*, SPE-215841-PA 1–15. IF : 1.4. Q3
44. Dhandhi, Y., Naiya, T.K. and Guria, C., 2024. Development of high-performance biodegradable and non-toxic demulsifier for dehydration of field crude oil emulsion: Statistical design and process optimization. *Geoenergy Science and Engineering*, 234, p.212677 (1-15). IF : 5.168. Q1
45. Dhandhi, Yogesh, Bhardwaj, Vaibhav, Saw, Rohit Kumar, and Tarun Kumar Naiya. "Demulsification of Water-in-Crude Oil Field Emulsion Using Green Demulsifier Based on *Sesamum indicum*: Synthesis, Characterization, Performance, and Mechanism." *SPE J.* (2024;): doi: <https://doi.org/10.2118/221457-PA>, IF : 3.095. Q1
46. Guin, Sampa, and Tarun Kumar Naiya. "Improvement of Flow Properties of Waxy Crude Oil through Pipeline Using Biodegradable Pour-Point Depressants Synthesized from Plant-Based Fatty Acid: Modeling and Application Studies." *SPE J.* (2025;): doi: <https://doi.org/10.2118/225437-PA>, IF : 3.095. Q1
47. S. Guin, T.K. Naiya, Enhancement of cold flowability of waxy crude oil using ecofriendly PPDs synthesized from stearic acid and lauric acid – Experimental, modelling, and mechanistic approach, *Journal of Molecular Liquids* (2025), doi: <https://doi.org/10.1016/j.molliq.2025.127363>, IF : 5.2, Q1
48. Guin, S. and Naiya, T.K., 2026. Cold flow behavior improvement of waxy crude oil using eco-friendly esterified cellulose nanocrystals synthesized from agricultural waste: Experimental studies, rheological modeling, and Mechanistic aspects. *Fuel*, 406, p.137143. doi : <https://doi.org/10.1016/j.fuel.2025.137143>, IF 7.5, Q1
49. Rebari, Chirag, and Tarun Kumar Naiya. "Application of Biodegradable Mustard Waste Extract as Corrosion Inhibitor for Oil Pipeline." Paper presented at the SPE Annual Technical Conference and Exhibition, Houston, Texas, USA, October 2025. doi: <https://doi.org/10.2118/228832-STU>
50. Guin, Sampa, and Tarun Kumar Naiya. "Performance Evaluation of Eco-Friendly PPDs Synthesized from Natural Sources for Enhancing the Cold Flow Behavior of Waxy Crude Oil." Paper presented at the SPE Annual Technical Conference and Exhibition, Houston, Texas, USA, October 2025. doi: <https://doi.org/10.2118/228843-STU>

IF : Impact Factor

Total Number of Citations : 3930

Please refer the link for Google scholar citation details: <https://scholar.google.com/citations?user=a1GtRhAAAAAJ>

16. Detail of patents :

A. Granted

S.No.	Patent Title	Name of Applicant(s)	Patent No.	Award Date	Agency/ Country	Status
1	Process of preparation of fuel additives and commodity chemicals	Kamal K Pant, Shireen Quereshi, Ejaz Ahmad, Suman Dutta, Tarun Kumar Naiya	413014	15/11/2019	India	Granted
2	A Green Demulsifier for Application in the Petroleum Industry and a Process for the Preperation Thereof	Yogesh Dhandhi, Tarun Kumar Naiya	562144	07/03/2025	India	Granted
3	A pour point deppressant and a process for the preparation thereof	Sampa Guin, Tarun Kumar Naiya	567422	13/06/2025	India	Granted
4	A pour point depressant for flow assurance of Indian waxy crude oil, a process for the preparation thereof and the use thereof	Sampa Guin, Tarun Kumar Naiya	582684	09.03.2026	India	Granted

B. Published

S.No.	Patent Title	Name of Applicant (s)	Patent No.	Published date	Agency/ Country	Status
1	Modified cellulose nanocrystals synthesized utilizing agricultural waste as effective PPD for waxy crude oil	Sampa Guin, Tarun Kumar Naiya	202531021015	08.01.2025	India	Published

17. Books/Reports/Chapters/General articles etc.

<i>S.No.</i>	<i>Title</i>	<i>Author's Name</i>	<i>Publisher</i>	<i>Year of Publication</i>
1	Catalytic Conversion of Lignocellulosic Biomass into Fuel and Value-added Chemicals	Shireen Quereshi , Suman Dutta, T.K. Naiya , Suman Dutta	PROCESSING AND ENERGY UTILIZATION Edited by Sonil Nanda, Prakash Kumar Sarangi and Dai-Viet N., ISBN 9781138593206 - CAT# K387044 CRC Press	2019
2	Application of Epoxidized Vegetable Oil for Improving Rheological Properties of Crude Oil	Pal, Biswadeep, Guin, Sampa, Naiya, Tarun Kumar	Sustainable Chemical, Mineral and Material Processing, Springer Nature Singapore (2023) <i>Springer Nature Singapore (2023)</i> 10.1007/978-981-19-7264-5_8	2023
3	Challenges During Production, Storage, and Transportation of Waxy and Heavy Crude Oils Due to Organic Deposition	Pal, B. and Naiya, T.K.,	Environmental Friendly Green Technologies for Improvement of Heavy Crude Oil Flow Assurance. Environmental Science and Engineering. Springer, Cham. https://doi.org/10.1007/978-3-031-86701-9_2	2025
4	The Chemistry of Wax Formation, Agglomeration, and Deposition in Crude.	Pal, B., Guin, S. and Naiya, T.K.,	Environmental Friendly Green Technologies for Improvement of Heavy Crude Oil Flow Assurance. Environmental Science and Engineering. Springer, Cham. https://doi.org/10.1007/978-3-031-86701-9_1	2025

18. List of Currently Operated Sponsored Projects as PI and Co-PI (Last 10):

As PI					
Sl.No.	Title	Cost in Lakhs	Duration	Role as PI/Co-PI	Agency
1.	Synthesis of Bio-Based Zwitterionic surfactant for use in Enhanced Oil recovery (EOR) at High Reservoir Temperature Conditions	32.56	2024-2027	PI	DST (SERB) India
As Co-PI					
2.	Developing portable potentiometric biosensors for in-situ detection of trace metal pollutants (Cd, Pb, Hg and Cu)	41.926	2024-2027	Co-PI	DBT, India

19. List of Completed Sponsored Projects as PI. (top 10):

Sl.No.	Title	Cost in Lakhs	Duration	Role as PI/Co-PI	Agency
External					
1	Extraction of Pour Point Depressants from Fruits and Its use for Crude Oil Transportation	33.39	2017 – 2020	PI	DST (SERB)
2	Development of Advanced Reservoir Engineering Laboratory	145	2013 – 2017	Co-PI	DST (FIST)
3	Experimental and Modelling of Flow of Paraffinic Crude Oil Through a Complex Flow Loop	13.78	2013-2016	PI	UGC
4.	Use of Natural Extracts as Pour Point Depressants for Flow Assurance of Waxy Crude	54	2020-2023	PI	OIDB (Oil Industry Development Board, India) with Institute of Oil and Gas Production Technology (IPEOT), Mumbai, ONGC as mentor
Internal					
4	Studies on Characteristics of Paraffinic Crude Oil Through a Complex Flow Loop	1.0	2011 – 2013	PI	UGC-ISM Project
5	Studies on Multiphase Flow of Oil, Water and Gas in Horizontal and Vertical Pipes	8.5	2013-2016	PI	IIT (ISM) – FRS

20. List of Consultancy Projects

S.N.	Project Title	Amount in Rs (Lakh)	Role (PI/C O- PI)	No. of CO- PIs	Funding Agency	Sanctioned Date	Status (Completed/Ongoing)
1	Analysis of diesel samples	0.69	PI	1	EMTA COAL LIMITED	07-12-2013	08-01-2014
2	Testing of cold rolling oil	0.92	PI	1	SAIL, RANCHI	29-06-2017	12-08-2017
3	Testing of ldo confirming to is 15770:2008 specification	3	PI	2	STEEL AUTHORITY OF INDIA LIMITED, IISCO STEEL PLANT, P.O. - BURNPUR	10-05-2013	06-04-2014
4	Technical evaluation of crude oil different field of jti	1.239	PI	1	JOSHI TECHNOLOGIES INTERNATIONAL, INC.- INDIA PROJECTS	22-11-2022	26-04-2023
5	Evaluation of dust- suppressant material indicon-6251” manufactured by ion exchange (india) limited, patancheru, telengana	1.298	CO-PI	1	ORGANO CATALYST PRIVATE LIMITED, AZAMGARGH	24-05-2023	09-01-2024
6	Technical evaluation of diesel samples of heavy duty machines used by devprabha construction pvt. Ltd.	11.8	PI	3	DEVPRABHA CONSTRUCTION PVT. LTD., DHANBAD	06-03-2024	Completed
7	Compatibility study of fresh water with formation rock and fluid for bhaskar field in gujarat	38.08	CO-PI	2	SUN PETROCHEMICALS PVT. LTD., MUMBAI	21-02-2024	Completed
8	Technical assesement of diesel samples of heavy duty machines used by devprabha construction pvt. Ltd.	118	PI	4	DEVPRABHA CONSTRUCTION PVT. LIMITED, DHANBAD	10-09-2024	Ongoing
9	Feasibility Assessment on suitability of Diesel samples for heavy machinery Operations	1.805	Co-PI	1	GTS COAL SALES, Dhanbad	09.06.2025	Ongoing
10	Quantitative Analysis and Assessment on suitability of Diesel used for heavy machinery Operations for GTS COAL SALES	54.162	PI	1	GTS COAL SALES, Dhanbad	24.07.2025	Ongoing

21. List of Technology Developed/Demonstrated :

Sl. No.	Title	Year	Institution	Brief Detail	References
1.	Adsorption, Kinetics and Equilibrium studies on removal of Cr(VI) from aqueous solutions using different low-cost adsorbents	2008	University of Calcutta	Developed different biosorbents for treatment waste water containing Cr(VI) like tannery waste	Chemical Engineering Journal, 137(3) 529-541 (2008)
2.	Removal of Cd(II), Pb(II) from aqueous solutions using clarified sludge	2009	University of Calcutta	Use waste like clarified sludge, rice husk ash, fly ash for treatment of industrial effluent containing Cd(II) from electroplating unit located near Kolkata, Pb(II) containing effluents from a battery manufacturing unit at Shyamnagar, near Kolkata, India.	Journal of hazardous materials, 163 1254-1264 (2009), Journal of hazardous materials 170 252-262 (2009), Environmental Progress & Sustainable Energy 28 535-546 (2009).
3	Flow Improvement of heavy crude oil through pipelines using surfactant extracted from soapnut	2017	IIT (ISM) Dhanbad	Surfactant was extracted from soapnut and used for rheology improvement which ultimately may save huge amount of money by reducing pumping power requirement.	Journal of Petroleum Science and Engineering, 152 353-360 (2017)
4	Application of naturally extracted surfactant from <i>Madhuca longifolia</i> to improve the flow properties of heavy crude oil through horizontal pipeline	2018	IIT (ISM) Dhanbad	Mahua (<i>Madhuca longifolia</i>) was used for reducing pressure drop during the flow of Indian heavy crude oil through pipeline. Pressure drop was greatly reduced after addition of surfactants and may be used as low cost environment friendly bio surfactants.	Journal of Petroleum Science and Engineering, 168 178-189 (2018)
5	Effect of Amla Fruit (<i>Phyllanthus emblica</i>) Extract in Flow Assurance of Indian Waxy Crude Oil	2023	IIT (ISM) Dhanbad	Work focuses on the application of a natural extract from Amla fruit in flow assurance of Indian waxy crude oil. The derived PPD is much more effective compared with a commercial one, is more environmentally friendly, and no special attention is required for the pretreatment of PPD-treated crude oil, which ultimately will reduce the project cost.	<i>SPE Journal</i> , 28(02), pp.628-642 (2023)
6	Application of Synthesized DSFO as a biodegradable, nontoxic, economical demulsifier for Indian Field	2023	IIT (ISM) Dhanbad	Novel application of DSFO chemical as a abundantly available natural source based biodegradable and non-toxic demulsifier was designed for the demulsification of water-in-oil Indian field emulsion. In addition, the demulsification process was designed, modeled, and optimized using the	Patent No. : 202331039244

				Central Composite Design (CCD) based on Response Surface Methodology (RSM) for maximize the demulsification efficiency	
7	Development of high-performance biodegradable and non-toxic demulsifier for dehydration of field crude oil emulsion: Statistical design and process optimization.	2024	IIT (ISM) Dhanbad	A high-performance non-toxic, and biodegradable demulsifier was synthesized based on ester of oleic acid and polyethylene glycol to dehydrate crude oil emulsions. CCD based on RSM was employed to maximize the dehydration performances. It was found the demulsifier is biodegradable and non-toxic satisfying the environmental standard limits of percent biodegradability and lethal concentration (LC50).	Geoenergy Science and Engineering, 23 4, p.212677
8	Performance evaluation of bio based environment friendly PPD synthesized from stearic acid for flow assurance of Indian waxy crude oil	2024	IIT (ISM) Dhanbad	Development of bio based PPD utilizing very low cost natural fatty acid like stearic acid by following a single step esterification reaction which is biodegradable, nontoxic and have excellent performance as PPD than commercial PPD with a very small dosage 600.	Patent : 202431028934
9.	Application of novel biodegradable pour point depressant (PPD) synthesized from <i>Cocos nucifera</i> in flow assurance of Indian waxy crude oil	2024	IIT (ISM) Dhanbad	Synthesis of bio-degradable pour point depressant using easily available and low-price coconut oil via single-step esterification reaction. Synthesized PPD is biodegradable and non-toxic to the environment, proven by its biodegradability and toxicity tests. The effectiveness of synthesised PPD was compared with the commercial PPD used in the Indian field and it perform better to assure flow of waxy crude oil.	PSD/PAT/128 6

22. Brief note on intended technology development covering Area, Scope, Level of already achieved success, gap analysis, competence (of PI), facility available and expected outcome.

In our Laboratory we have developed different biosorbents from natural source (saw dust neem bark). From industrial waste (Clarified sludge, rice husk ash, fly ash) and was used to treat industrial waste containing Cr(VI), Cd(II), Pb(II) etc. Bench scale studies were performed and quality of treated water meet the tolerance limit of Sewage water. So, this low cost additives may be used in industries like chrome plating, battery industries, tannery which discharge substantial amount of this heavy metals in waste water.

We also developed surfactant from natural extract (soapnut and Mahua) to reduce viscosity and to improve rheology of heavy crude oil produced by different field of ONGC, OIL etc. In laboratory scale it gives excellent results. We are planning for prototype set up before it is to be applied in real field. In this respect we are talking with ONGC Ahmedabad asset for field application of the produced bio surfactant.

Our research group also produce pour point depressants (PPDs) for easy flow of waxy crude oil through pipeline.

Both cost effective biosurfactants and PPDs not only improve the flow behavior of crude oil but also reduce the pumping power requirement which is a substantial part of project.

23. Referees Name Designation Organization Email id Phone

Sl. No.	Name	Designation	Organization	Email id	Phone
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