

MEMBRANE AND MATERIALS RESEARCH LABORATORY

Faculty Details:



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About the Laboratory:

- ❖ Development of novel materials such as adsorbents, carbon materials (Activated Carbon, Carbon Nanoparticles - CNT, carbon dots, etc.) and photocatalyst from various precursors.
 - ❖ Utilization of the developed materials for energy and environmental applications.
 - ❖ Development of reactors for continuous studies in effluent treatment and their Modelling, Simulation and Optimization.
 - ❖ Water splitting for Hydrogen production – Solutions to energy and environmental related problems.
 - ❖ Design and development of a downstream technique for separation.
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Accomplishment:

Publication Details:

- Devi AS, **Helen Kalavathy M** and Miranda LR. Optimization of the Process Parameters for the Preparation of Activated Carbon from Low Cost *Phoenix Dactylifera* Using Response Surface Methodology. Austin Chem Eng. Vol. 2, No. 2, ISSN: 2381-8905, pp. 1021-1029, 2015.
- J.B. Mathangi, **M. Helen Kalavathy**, “Optimization of process parameters for the adsorption of nickel onto activated carbon using response surface methodology”, Desalination and Water Treatment, Vol. 115, pp. 115 – 125, May 2018.

- Mathangi J.B., Sadeesh Sharma M., Mercy Jacqueline B., **Helen Kalavathy M.**, “Development of carbon-based material from biomass for the removal of Ni²⁺ and CO₂ from fluid phase”, *Vacuum*, Vol. 158 pp. 236 – 248, December 2018.
- Gayathri Manju B., Mathangi J B., Raji P., **Helen Kalavathy M.** “Equilibrium and kinetic studies on methylene blue adsorption by simple polyol assisted wet hydroxyl route of NiFe₂O₄ nanoparticles”, *Journal of Environmental Health Science and Engineering*, 17, No. 2, pp. 539 - 547, April 2019.
- J.B. Mathangi, **M. Helen Kalavathy** “Study of mathematical models for the removal of Ni²⁺ from aqueous solutions using *Citrullus lanatus* rind, an agro-based waste, *Water and Environment Journal*, Vol. 33, No. 2, pp. 276 –291, May 2019.
- Manikandan Gomathy Nainar, Kalidass Jayaraman, Helen Kalavathy Meyyappan, and Lima Rose Miranda ‘Antifouling properties of poly (vinylidene fluoride) - incorporated cellulose acetate composite ultrafiltration membranes’, *Korean Journal of Chemical Engineering*, Vol. 37 No.12, pp. 2248-2261, August 2020.
- D Anubriya, JB Mathangi, **Helen Kalavathy M.**, "Performance of nanoporous carbon material derived from *Cocos nucifera*: An approach for the recovery of nickel using continuous operation", *Materials Letters*, Vol. 262, pp. 127101(1-4), March 2020.
- Mathangi J B, **Helen Kalavathy M.**, “A comparative study of carbon nanotube characteristics synthesized from various biomass precursors through hydrothermal techniques and their potential applications”, *Chemical Engineering Communications*, Vol. 29, No. 1, pp. 127 – 139, 2022.
- J. B. Mathangi, **M. Helen Kalavathy**, Lima Rose Miranda, “Pore Formation Mechanism and Sorption Studies Using Activated Carbon from *Gleditsia triacanthos*”, *Chemical Engineering & Technology*, Vol. 44, No. 5, pp. 892 - 900 May 2021.
- Manikandan G.N., **Helen Kalavathy M.** "Performance studies of GO/PF127 incorporated Polyetherimide Ultrafiltration membranes for the rejection of oil from oil wastewater", *Chemical Engineering Research and Design*, Vol. 168, pp. 214 –226, April 2021.
- L. Muthulakshmi. J B Mathangi, R P Suryasankar, V C Padmanaban, **M Helen Kalavathy**, M R Sanjay, Suchart Siengchin, “Extraction of polymeric bioflocculant from *Enterobacter* sp. and adsorptive kinetic studies on industrial dye removal applications”, *Journal of Polymers and the Environment*, Vol 29 No. 4, pp. 1040 - 1049, April 2021.

Awards received:

- **Best paper award - IInd prize** for the paper entitled “Utilization of solid waste for the removal of pollutants” presented in National Conference on “Emerging Trends in Chemical and Petrochemical Technology” organized by Department of Petrochemical Technology, Anna University, BIT, Tiruchirappalli, during 10th & 11th March, 2016. (Oral)
- **Best paper award** for the paper entitled “Study of mathematical models for the removal of heavy metals from waste water” presented in CHEMCON 2016, held at A.C.Tech, Anna University, Chennai, during 27th – 30th December, 2016. (Oral)
- **Best oral presentation** for the paper entitled “Development of Carbon based Material from Biomass for the removal of Pollutants from Fluid Phase” in the “National Conference on Energy Materials” (NCEM 2018), organized by the Department of Physics, Manonmaniam Sundaranar University, Tirunelveli, during 28th -29th June, 2018. (Oral)
- **Students' Innovation Award for the project entitled "Designing a Self - Heating Package for RTE Food and Assessing its Performance"**, (Students innovative project funded by CTDT, Anna University), Technology Exhibition 2020 cum Training Programme held at Anna University, Chennai during 27th - 29th February 2020.

Sponsored Projects:

- "Synthesis and Characterization of Ceramic Membranes for Environmental Applications", funded by CTDT, Anna University, Chennai (September-2015 - September-2016) (completed).
- “Development of Carbon Nanotubes from Biomass for the Recovery and Reuse of Heavy Metals”, funded by DST- Science and Engineering Research Board (SERB) under the scheme Early Career Research Award (March 2017 – March 2020). (completed).
- Students Innovative Project entitled "Designing a Self - Heating Package for RTE Food and Assessing its Performance", funded by CTDT, Anna University, Chennai (July 2019 - December 2019), (completed).

M.Tech Projects Guided: 19

List of Major Equipment:

S.No.	Name of the Equipment
1.	TOC Analyzer
2.	Contact Angle Measuring Device
3.	UV Spectrophotometer

List of Research Scholars:

S. No.	Name	Thesis Title	Year of passing/Status
1	Manikandan G N	Morphological and Performance Studies of Polymeric Membranes and its Application to Water Treatment	Thesis submitted
2	Mathangi J B	Adsorbent Preparation and Modelling of Adsorption Column for Continuous Operation	Thesis submitted
3	Monisha Mary M	Performance Evaluation of Hybrid Membranes for the Treatment of Waste Streams	Course Work
