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Nanomaterials for environmental and biomedical applications

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CURRICULUM VITAE

Dr. S. RAJA, B.E., M.Tech., PhD

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- **Listed in Top 2% World Scientists announced by Stanford University, United States, 2020 & 2021**

Armed with the best of both chemical engineering and biotechnology, **Dr S Raja**, a Senior Associate Professor in the Dept of Chemical Engineering, has a wide spectrum of knowledge through his academic pursuits. After graduating in B.E. Chemical Engineering from Annamalai University in 2000, he completed M.Tech. Biotechnology from Anna University, in 2003. Thereafter, Dr. Raja joined the Department of Biotechnology at SASTRA University, Tanjore for a period 3 years, teaching B.Tech and M.Tech students. His true calling in the research domain came up when he then joined as a Lecturer in MIT, MAHE where he was instrumental in setting up the Department of Biotechnology, right from its formative years. In 2013, MAHE conferred upon him the PhD degree for his work on extraction of biomolecules from waste waters using aqueous two phase systems. Fresh from the research mode, Dr. Raja continued his momentum by foraying into nanotechnology. He specializes in the green synthesis of nanoparticles and applying the same to a plethora of uses covering biomedical and environmental fields. Currently, his research team works on the development of nanocomposites for the removal of emerging pollutants from wastewater. His work was further bolstered with a VGST project (Government of Karnataka) that sanctioned him a sum of five lakh rupees. His research acumen and deep sense of commitment is the driving force behind his long list of peer-reviewed publications (cumulative impact factor > 200) in the topmost journals. A crowning glory to his dedication came in the form of an announcement that catapulted him among the world's top 2% emerging scientists. He is a reviewer for many

journals and has also reviewed 5 PhD theses. With an enviable h-index of 22, Dr Raja has a total of 70 SCI/scopus indexed publications and 1 book chapter to his credit, with many more in the pipeline. He is currently supervising 5 candidates towards their PhD. He is very active in driving student publications, which alone account for 40 % of his total publications, thereby enhancing the research profile of his students too. He is an active research collaborator across many countries and is ever open to discussions that can forge new dimensions in research across MAHE.

Teaching Experience:

Total 18+ yrs

- Currently serving as Associate Professor (Senior Scale) in Department of Chemical Engineering at MIT, Manipal from **14th Jan 2019 to till date**

Research Activities:

- **Ph.D-Biotechnology**
 - “Aqueous Two Phase Systems for the Recovery of Biomolecules from Tannery Wastewater” at MIT, Manipal University, Manipal.
 - **Guide: Dr.V.Ramachandra Murty**, Professor, Manipal University
- **M.Tech-Biotechnology**
 - Separation and purification of lipase enzyme from *Candida rugosa* using PEG/Phosphate salt aqueous two phase system (ATPS) at Anna university, CBT, Chennai
 - **Guide: Dr. Sanjoy Ghosh**, Assistant Prof, Anna University
- **B.E. Chemical Engineering**
 - A design project to maximize manufacture of methylamines

Research Guidance:

- **PhD: 6 (5 ongoing + 1 completed)**
- **M.Tech: 3 (completed)**
- **B.Tech: 4 (completed)**

Research Grants:

(1) **Funding Agency:** Vision Group of Science and Technology (VGST),

Government of Karnataka, India

- **Funding amount:** Rs. 5 Lakhs
- **Project Title:** Magnetic nanoadsorbents for the adsorptive removal of 2,4-dichlorophenoxyacetic acid (2,4-D) from aqueous solutions (under RGS/F Scheme)
- **Duration:** One year (2019 – 10)
- **Project Status:** Completed

(2) **Funding Agency:** Vision Group of Science and Technology (VGST),

Government of Karnataka, India

- **Funding amount:** Rs. 40, 000
- **Project Title:** Biohydrogen production from kitchen waste (Student project under TRIP scheme)
- **Duration:** Jan 2014 to April 2014
- **Project Status:** Completed

International Journal Publications:

(74)

1. Bhole, R., Gonsalves, D., Murugesan, G., Narasimhan, M.K., Srinivasan, N.R., Dave, N., Varadavenkatesan, T., Vinayagam, R., Govarthanan, M. and Selvaraj, R., 2022. Superparamagnetic spherical magnetite nanoparticles: synthesis, characterization and catalytic potential. *Applied Nanoscience*, pp.1-12. <https://doi.org/10.1007/s13204-022-02532-4>
2. Selvaraj, R., Murugesan, G., Rangasamy, G., Bhole, R., Dave, N., Pai, S., Balakrishna, K., Vinayagam, R. and Varadavenkatesan, T., 2022. As (III) removal using superparamagnetic magnetite nanoparticles synthesized using *Ulva prolifera*— optimization, isotherm, kinetic and equilibrium studies. *Chemosphere*, 308, p.136271. <https://doi.org/10.1016/j.chemosphere.2022.136271>
3. Goveas, L. C., Selvaraj, R., & Sajankila, S. P. (2022). Characterization of biosurfactant produced in response to petroleum crude oil stress by *Bacillus* sp. WD22 in marine environment. *Brazilian Journal of Microbiology*, 1-11. <https://doi.org/10.1007/s42770-022-00811-4>
4. Selvaraj, R., Pai, S., Vinayagam, R., Varadavenkatesan, T., Kumar, P. S., Duc, P. A., & Rangasamy, G. (2022). A recent update on green synthesized iron and iron

- oxide nanoparticles for environmental applications. *Chemosphere*, 136331. <https://doi.org/10.1016/j.chemosphere.2022.136331>
5. Nayak, S., Goveas, L. C., Selvaraj, R., Vinayagam, R., & Manickam, S. (2022). Advances in the Utilisation of Carbon-Neutral Technologies for a Sustainable Tomorrow: A Critical Review and the Path Forward. *Bioresource Technology*, 128073. <https://doi.org/10.1016/j.biortech.2022.128073>
 6. Goveas, L. C., Selvaraj, R., Kumar, P. S., Vinayagam, R., & Sajankila, S. P. (2022). Biodegradation kinetics and metabolism of Benzo (a) fluorene by *Pseudomonas* strains isolated from refinery effluent. *Chemosphere*, 307, 136041 <https://doi.org/10.1016/j.chemosphere.2022.136041>
 7. Prabhu, P., Rao, M., Murugesan, G., Narasimhan, M.K., Varadavenkatesan, T., Vinayagam, R., Chi, N.T.L., Pugazhendhi, A. and Selvaraj, R., 2022. Synthesis, characterization and anticancer activity of the green-synthesized hematite nanoparticles. *Environmental Research*, p.113864 <https://doi.org/10.1016/j.envres.2022.113864>
 8. Ghate, P., Prabhu, D., Murugesan, G., Goveas, L.C., Varadavenkatesan, T., Vinayagam, R., Chi, N.T.L., Pugazhendhi, A. and Selvaraj, R., 2022. Synthesis of hydroxyapatite nanoparticles using *Acacia falcata* leaf extract and study of their anti-cancerous activity against cancerous mammalian cell lines. *Environmental Research*, p.113917 <https://doi.org/10.1016/j.envres.2022.113917>
 9. Somayaji, A., Dhanjal, C.R., Lingamsetty, R., Vinayagam, R., Selvaraj, R., Varadavenkatesan, T. and Govarthanan, M., 2022. An Insight into the Mechanisms of Homeostasis in Extremophiles. *Microbiological Research*, p.127115 <https://doi.org/10.1016/j.micres.2022.127115>
 10. Vinayagam, R., Singhanian, B., Murugesan, G., Kumar, P.S., Bhole, R., Narasimhan, M.K., Varadavenkatesan, T. and Selvaraj, R., 2022. Photocatalytic degradation of methylene blue dye using newly synthesized zirconia nanoparticles. *Environmental Research*, 214, p.113785. <https://doi.org/10.1016/j.envres.2022.113785>
 11. Goveas, L.C., Selvaraj, R., Vinayagam, R., Alsaiari, A.A., Alharthi, N.S. and Sajankila, S.P., 2022. Nitrogen dependence of rhamnolipid mediated degradation of petroleum crude oil by indigenous *Pseudomonas* sp. WD23 in seawater. *Chemosphere*, p.135235. <https://doi.org/10.1016/j.chemosphere.2022.135235>
 12. Nayak, S., Goveas, L.C., Kumar, P.S., Selvaraj, R. and Vinayagam, R., 2022. Plant-mediated gold and silver nanoparticles as detectors of heavy metal contamination. *Food and Chemical Toxicology*, p.113271. <https://doi.org/10.1016/j.fct.2022.113271>
 13. Goveas, L.C., Nayak, S. and Selvaraj, R., 2022. Concise review on bacterial degradation of petroleum hydrocarbons: Emphasis on indian marine environment. *Bioresource Technology Reports*, p.101136. <https://doi.org/10.1016/j.biteb.2022.101136>
 14. Vinayagam, R., Sharma, G., Murugesan, G., Pai, S., Gupta, D., Narasimhan, M.K., Kaviyarasu, K., Varadavenkatesan, T. and Selvaraj, R., 2022. Rapid Photocatalytic degradation of 2, 4-dichlorophenoxy acetic acid by ZnO nanoparticles synthesized using the leaf extract of *Muntingia calabura*. *Journal of Molecular Structure*, p.133127. <https://doi.org/10.1016/j.molstruc.2022.133127>
 15. Sodhani, H., Hedao, S., Murugesan, G., Pai, S., Vinayagam, R., Varadavenkatesan, T., Bharath, G., Haija, M.A., Nadda, A.K., Govarthanan, M.

- and Selvaraj, R., 2022. Adsorptive removal of Acid Blue 113 using hydroxyapatite nanoadsorbents synthesized using *Peltophorum pterocarpum* pod extract. *Chemosphere*, p.134752. <https://doi.org/10.1016/j.chemosphere.2022.134752>
16. Vinayagam, R., Pai, S., Murugesan, G., Varadavenkatesan, T., Kaviyarasu, K. and Selvaraj, R., 2022. Green synthesized hydroxyapatite nanoadsorbent for the adsorptive removal of AB113 dye for environmental applications. *Environmental Research*, 212, p.113274. <https://doi.org/10.1016/j.envres.2022.113274>
 17. Shraddha Pai, M. Srinivas Kini, Raja Mythili, Raja Selvaraj, "Adsorptive removal of AB113 dye using green synthesized hydroxyapatite/magnetite nanocomposite", *Environmental Research* (2022): 112951. <https://doi.org/10.1016/j.envres.2022.112951> (**Impact factor: 6.49**)
 18. Vinayagam, Ramesh, Niyam Dave, Thivaharan Varadavenkatesan, Natarajan Rajamohan, Mika Sillanpää, Ashok Kumar Nadda, Muthusamy Govarthan, and Raja Selvaraj. "Artificial neural network and statistical modelling of biosorptive removal of hexavalent chromium using macroalgal spent biomass." *Chemosphere* (2022): 133965. <https://doi.org/10.1016/j.chemosphere.2022.133965> (**Impact factor: 7.09**)
 19. Vinayagam, Ramesh, Yash Patnaik, P. Brijesh, Deepa Prabhu, Melisha Quadras, Shraddha Pai, Manoj Kumar Narasimhan, K. Kaviyarasu, Thivaharan Varadavenkatesan, and **Raja Selvaraj**. "Superparamagnetic hematite spheroids synthesis, characterization, and catalytic activity." *Chemosphere* (2022): 133730. <https://doi.org/10.1016/j.chemosphere.2022.133730> (**Impact factor: 7.09**)
 20. Vinayagam, Ramesh, Shraddha Pai, Gokulakrishnan Murugesan, Thivaharan Varadavenkatesan, Selvaraju Narayanasamy, and Raja Selvaraj. "Magnetic activated charcoal/Fe₂O₃ nanocomposite for the adsorptive removal of 2, 4-Dichlorophenoxyacetic acid (2, 4-D) from aqueous solutions: Synthesis, characterization, optimization, kinetic and isotherm studies." *Chemosphere* (2022): 131938. <https://doi.org/10.1016/j.chemosphere.2021.131938> (**Impact factor: 7.09**)
 21. Shet, Vinayaka B., Ramesh S. Bhat, Raja Selvaraj, Guru Prasad, Amogh Kodgi, Anurag Damodaran, and Akshara Savithri. "Development and optimization of Zn–Ni–TiO₂ composite coating, assessment of its corrosion resistance and antimicrobial activity." *Applied Nanoscience* (2021): 1-9. <https://doi.org/10.1007/s13204-021-02029-6> (**Impact factor: 2.88**)
 22. Shetty, Anala Vinay Kumar, Niyam Dave, Gokulakrishnan Murugesan, Shraddha Pai, Arivalagan Pugazhendhi, Thivaharan Varadavenkatesan, Ramesh Vinayagam, and Raja Selvaraj. "Production and extraction of red pigment by solid-state fermentation of broken rice using *Monascus sanguineus* NFCCI 2453." *Biocatalysis and Agricultural Biotechnology* 33 (2021): 101964. <https://doi.org/10.1016/j.bcab.2021.101964>
 23. Selvaraj, Raja, Shraddha Pai, Gokulakrishnan Murugesan, Sadanand Pandey, Ruchi Bhole, Delicia Gonsalves, Thivaharan Varadavenkatesan, and Ramesh Vinayagam. "Green synthesis of magnetic α -Fe₂O₃ nanospheres using *Bridelia retusa* leaf extract for Fenton-like degradation of crystal violet dye." *Applied Nanoscience* (2021): 1-8 <https://doi.org/10.1007/s13204-021-01952-y> (**Impact factor: 2.88**)
 24. Varadavenkatesan, T., Pai, S., Vinayagam, R. and Selvaraj, R., 2021.

- Characterization of silver nano-spheres synthesized using the extract of *Arachis hypogaea* nuts and their catalytic potential to degrade dyes. *Materials Chemistry and Physics*, 272, p.125017. <https://doi.org/10.1016/j.matchemphys.2021.125017> **(Impact Factor: 4.094)**
25. Dave, Niyam, Thivaharan Varadavenkatesan, Raja Selvaraj, and Ramesh Vinayagam. "Modelling of fermentative bioethanol production from indigenous *Ulva prolifera* biomass by *Saccharomyces cerevisiae* NFCCI1248 using an integrated ANN-GA approach." *Science of The Total Environment* (2021): 148429. <https://doi.org/10.1016/j.scitotenv.2021.148429> **(Impact factor: 7.963)**
 26. Varadavenkatesan, Thivaharan, Shraddha Pai, Ramesh Vinayagam, Arivalagan Pugazhendhi, and Raja Selvaraj. "Recovery of value-added products from wastewater using Aqueous Two-Phase Systems–A review." *Science of The Total Environment* (2021): 146293. <https://doi.org/10.1016/j.scitotenv.2021.146293> **(Impact factor: 7.963)**
 27. Vinayagam, R., Pai, S., Murugesan, G. et al. Synthesis of photocatalytic zinc oxide nanoflowers using *Peltophorum pterocarpum* pod extract and their characterization. *Appl Nanosci* (2021). <https://doi.org/10.1007/s13204-021-01919-z> **(Impact factor: 2.88)**
 28. Vinayagam, Ramesh, Shraddha Pai, Thivaharan Varadavenkatesan, Arivalagan Pugazhendhi, and **Raja Selvaraj**. "Characterization and photocatalytic activity of ZnO nanoflowers synthesized using *Bridelia retusa* leaf extract." *Applied Nanoscience* (2021): 1-10. <https://doi.org/10.1007/s13204-021-01816-5> **(Impact factor: 2.88)**
 29. Dave, N., Varadavenkatesan, T., Singh, R.S., Giri, B.S., Selvaraj, R. and Vinayagam, R., 2021. Evaluation of seasonal variation and the optimization of reducing sugar extraction from *Ulva prolifera* biomass using thermochemical method. *Environmental Science and Pollution Research*, pp.1-15. **(Impact factor: 3.056)** <https://doi.org/10.1007/s11356-021-12609-2>
 30. Vinayagam, R., Zhou, C., Pai, S., Varadavenkatesan, T., Narasimhan, M.K., Narayanasamy, S. and Selvaraj, R., 2021. Structural characterization of green synthesized magnetic mesoporous Fe₃O₄NPs@ME. *Materials Chemistry and Physics*, p.124323. **(Impact Factor: 4.094)** <https://doi.org/10.1016/j.matchemphys.2021.124323>
 31. Pai, S., Kini, S.M., Narasimhan, M.K., Pugazhendhi, A. and Selvaraj, R., 2021. Structural characterization and adsorptive ability of green synthesized Fe₃O₄ nanoparticles to remove Acid blue 113 dye. *Surfaces and Interfaces*, p.100947. **(Impact Factor: 4.837)** <https://doi.org/10.1016/j.surfin.2021.100947>
 32. Varadavenkatesan, Thivaharan, Ramesh Vinayagam, Shraddha Pai, Brindhadevi Kathirvel, Arivalagan Pugazhendhi, and **Raja Selvaraj**. "Synthesis, biological and environmental applications of hydroxyapatite and its composites with organic and inorganic coatings." *Progress in Organic Coatings* 151: 106056. <https://doi.org/10.1016/j.porgcoat.2020.106056> **(Impact Factor: 5.161)**
 33. Das, Deblina, Ramananda Bhat, and **Raja Selvaraj***. "Optimization of inulinase production by a newly isolated *Penicillium amphiloparia* strain using solid-state fermentation of hardy sugarcane stems." *Biocatalysis and Agricultural Biotechnology* (2020): 101875. <https://doi.org/10.1016/j.bcab.2020.101875>
 34. Pai, Shraddha, Srinivas M. Kini, **Raja Selvaraj***, and Arivalagan Pugazhendhi. "A review on the synthesis of hydroxyapatite, its composites and adsorptive removal of

- pollutants from wastewater." *Journal of Water Process Engineering* 38 (2020): 101574. <https://doi.org/10.1016/j.jwpe.2020.101574> (**Impact Factor: 3.465**)
35. Sathiyavimal, Selvam, Seerangaraj Vasantharaj, Felix LewisOscar, **Raja Selvaraj**, Kathirvel Brindhadevi, and Arivalagan Pugazhendhi. "Natural organic and inorganic-hydroxyapatite biopolymer composite for biomedical applications." *Progress in Organic Coatings* 147 (2020): 105858. <https://doi.org/10.1016/j.porgcoat.2020.105858> (**Impact Factor: 4.469**)
36. Vinayagam, Ramesh, Shraddha Pai, Thivaharan Varadavenkatesan, Manoj Kumar Narasimhan, Selvaraju Narayanasamy, and **Raja Selvaraj***. "Structural characterization of green synthesized α -Fe₂O₃ nanoparticles using the leaf extract of *Spondias dulcis*." *Surfaces and Interfaces* 20 (2020): 100618. <https://doi.org/10.1016/j.surfin.2020.100618> (**Impact Factor: 3.724**)
37. Saranya, N., E. Suganya, Selvaraju Narayanasamy, Senthilkumar Sivaprakasam, V. Sivasubramanian, Sivakumar Pandian, and **Raja Selvaraj**. "3-level Box- Behnkenoptimization of hexavalent chromium reduction by chromate resistant *Trichoderma asperellum* cells from simulated and industrial effluent." *Environmental Technology & Innovation* 19 (2020): 101024. <https://doi.org/10.1016/j.eti.2020.101024> (**Impact Factor: 3.356**)
38. Varadavenkatesan T, Vinayagam R, **Selvaraj R***. Green synthesis and structural characterization of silver nanoparticles synthesized using the pod extract of *Clitoria ternatea* and its application towards dye degradation. *Mater Today Proc.* 2020;23:27-29. <https://doi.org/10.1016/j.matpr.2019.04.216>
39. Varadavenkatesan T, **Selvaraj R**, Vinayagam R. Green synthesis of silver nanoparticles using *Thunbergia grandiflora* flower extract and its catalytic action in reduction of Congo red dye. *Mater Today Proc.* 2020;23:39-42. <https://doi.org/10.1016/j.matpr.2019.05.441>
40. Philip, N.V., Koteswara, A., Kiran, G.A., **Raja, S.**, Subrahmanyam, V.M. and Chandrashekar, H.R., 2020. Statistical Optimization for Coproduction of Chitinase and Beta 1, 4-Endoglucanase by Chitinolytic *Paenibacillus elgii* PB1 Having Antifungal Activity. *Applied Biochemistry and Biotechnology*, pp.1-16. <https://doi.org/10.1007/s12010-020-03235-8> (**Impact factor: 2.14**)
41. Pai, S., Kini, M.S. and **Selvaraj, R.**, 2020. A review on adsorptive removal of dyes from wastewater by hydroxyapatite nanocomposites. *Environmental Science and Pollution Research*, pp.1-15. <https://doi.org/10.1007/s11356-019-07319-9> (**Impact factor: 3.056**)

42. Vinayagam, R., **Selvaraj, R.**, Pugazhendhi, A. and Varadavenkatesan, T., 2020. Synthesis, characterization and photocatalytic dye degradation capability of Calliandra haematocephala-mediated zinc oxide nanoflowers. *Journal of Photochemistry and Photobiology B: Biology*, p.111760 <https://doi.org/10.1016/j.jphotobiol.2019.111760> (**Impact factor: 4.383**)
43. Das, D., **Selvaraj, R.** and Bhat, M.R., 2019. Optimization of inulinase production by a newly isolated strain *Aspergillus flavus* var. *flavus* by solid state fermentation of *Saccharum arundinaceum*. *Biocatalysis and Agricultural Biotechnology*, 22, p.101363. <https://doi.org/10.1016/j.bcab.2019.101363>
44. Varadavenkatesan, T., Lyubchik, E., Pai, S., Pugazhendhi, A., Vinayagam, R. and **Selvaraj, R***, 2019. Photocatalytic degradation of Rhodamine B by zinc oxide nanoparticles synthesized using the leaf extract of *Cyanometra ramiflora*. *Journal of Photochemistry and Photobiology B: Biology*, 199, p.111621. <https://doi.org/10.1016/j.jphotobiol.2019.111621> (**Impact factor: 4.067**)
45. S. Anchan, S. Pai, H. Sridevi, T. Varadavenkatesan, R. Vinayagam, and **Raja. Selvaraj***, “Biogenic synthesis of ferric oxide nanoparticles using the leaf extract of *Peltophorum pterocarpum* and their catalytic dye degradation potential,” *Biocatal. Agric. Biotechnol.*, vol. 20, p. 101251, 2019. <https://doi.org/10.1016/j.bcab.2019.101251>
46. N. Dave, **Raja Selvaraj**, T. Varadavenkatesan, and R. Vinayagam, “A critical review on production of bioethanol from macroalgal biomass,” *Algal Res.*, vol. 42, p. 101606, 2019. (**Impact factor: 3.723**) <https://doi.org/10.1016/j.s.2019.101606>

47. T. Varadavenkatesan, **Raja Selvaraj**, and R. Vinayagam, "Dye degradation and antibacterial activity of green synthesized silver nanoparticles using *Ipomoea digitata* Linn. flower extract," *Int. J. Environ. Sci. Technol.*, vol. 16, no. 5, pp. 2395–2404, 2019. (**Impact factor: 2.037**) <https://doi.org/10.1007/s13762-018-1850-4>
48. V. M. Ghate, A. K. Kodoth, **S. Raja**, B. Vishalakshi, and S. A. Lewis, "Development of MART for the Rapid Production of Nanostructured Lipid Carriers Loaded with All-Trans Retinoic Acid for Dermal Delivery," *AAPS PharmSciTech*, vol. 20, no. 4, p. 162, Apr. 2019. (**Impact factor: 2.608**) <https://doi.org/10.1208/s12249-019-1307-1>
49. S. Pai, S. H. T. Varadavenkatesan, R. Vinayagam, and **R. Selvaraj***, "Photocatalytic zinc oxide nanoparticles synthesis using *Peltophorum pterocarpum* leaf extract and their characterization," *Optik (Stuttg.)*, vol. 185, pp. 248–255, 2019. (**Impact factor: 2.187**) <https://doi.org/10.1016/j.jileo.2019.03.101>
50. M. Geethu, R. Vrundha, **S. Raja**, H. Raghu Chandrashekar, and M. S. Divyashree, "Improvement of the Production and Characterisation of Polyhydroxyalkanoate by *Bacillus endophyticus* Using Inexpensive Carbon Feedstock," *J. Polym. Environ.*, vol. 27, no. 5, pp. 917–928, May 2019. (**Impact factor: 2.765**) <https://doi.org/10.1007/s10924-019-01397-z>
51. Das, Deblina, Ramananda Bhat, and **Raja Selvaraj**, "Review of inulinase production using solid-state fermentation." *Annals of Microbiology* 69 (2019) 201-209. (**Impact factor: 1.407**) <https://doi.org/10.1007/s13213-019-1436-5>

52. Asiman Dash, Mohammed Tameem Ahmed, **Raja Selvaraj***, "Mesoporous magnetite nanoparticles synthesis using the Peltophorum pterocarpum pod extract, their antibacterial efficacy against pathogens and ability to remove a pollutant dye", *Journal of Molecular Structure* 1178 (2019) 268-273. (**Impact factor: 2.011**) <https://doi.org/10.1016/j.molstruc.2018.10.042>
53. Priyanka Yadav, Harshita Manjunath. **Selvaraj, Raja***, "Antibacterial and dye degradation potential of zero-valent silver nanoparticles synthesized using the leaf extract of Spondias dulcis." *IET Nanobiotechnology* 13, (2019), 84 – 89 (**Impact factor: 2.059**) [10.1049/iet-nbt.2018.5058](https://doi.org/10.1049/iet-nbt.2018.5058)
54. Sirdeshpande, Karthikey Devadatta, Anushka Sridhar, Kedar Mohan Cholkar, and **Raja Selvaraj***. "Structural characterization of mesoporous magnetite nanoparticles synthesized using the leaf extract of Calliandra haematocephala and their photocatalytic degradation of malachite green dye." *Applied Nanoscience* 8 (4), (2018): 675 – 683. (**Impact factor: 2.951**) <https://doi.org/10.1007/s13204-018-0698-8>
55. Shet, Vinayaka B., Anusha M. Palan, Shama U. Rao, C. Varun, Uday Aishwarya, **Selvaraj Raja**, Louella Concepta Goveas, C. Vaman Rao, and P. Ujwal. "Comparison of response surface methodology and artificial neural network to enhance the release of reducing sugars from non-edible seed cake by autoclave assisted HCl hydrolysis." *3 Biotech* 8, no. 2 (2018): 127. **Impact factor: 1.497** <https://doi.org/10.1007/s13205-018-1163-9>
56. Bishnoi, Shahana, Aarti Kumar, and **Raja Selvaraj***. "Facile synthesis of magnetic iron oxide nanoparticles using inedible Cynometra ramiflora fruit extract waste and their photocatalytic degradation of methylene blue

- dye." **Materials Research Bulletin** 97 (2018): 121-127. **Impact factor: 2.873**
<https://doi.org/10.1016/j.materresbull.2017.08.040>
57. Vinayagam, Ramesh, Thivaharan Varadavenkatesan, and **Raja Selvaraj***. "Green synthesis, structural characterization, and catalytic activity of silver nanoparticles stabilized with *Bridelia retusa* leaf extract." **Green Processing and Synthesis** 7, no. 1 (2018): 30-37. **Impact factor: 1.672** <https://doi.org/10.1515/gps-2016-0236>
58. Varadavenkatesan, Thivaharan, Ramesh Vinayagam, and **Raja Selvaraj***. "Structural characterization of silver nanoparticles phyto-mediated by a plant waste, seed hull of *Vigna mungo* and their biological applications." **Journal of Molecular Structure** 1147 (2017): 629-635.
<https://doi.org/10.1016/j.molstruc.2017.07.002> **Impact factor: 2.011**
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1. V Thivaharan, V Ramesh, **S Raja (2018)** Green Synthesis of Silver Nanoparticles for Biomedical and Environmental Applications, In “**Green metal nanoparticles: Synthesis, Characterization and their applications**”. Nanoparticles naturally, John Wiley & Sons, ISBN: 978-1-119-41887-0 (**Chapter 12: Page 387 – 419**)

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- Machine learning
- Downstream Processing
- Environmental Biotechnology