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Research Area

- Research interest is in finding out applications of nanomaterials in health and agriculture. A variety of metals-based nanoparticles are being explored for their antimicrobial activity which would be useful for achieving control of pathogens. Several biomolecules are being explored as molecular recognition elements which would aid in detection/isolation of bacteria from environmental samples. A platform technology based on use of molecular recognition elements - tagged magnetic nanoparticles for rapid antibiotic susceptibility testing is developed. An alternate 'one-step' method is also developed for isolation of bacterial genomic DNA and its utility in several downstream applications is being explored.
- Naturally occurring polymeric nanostructures are being explored for applications in nanobiotechnology
- As part of applications of nanotechnology in agriculture the potential of nanomaterials as micronutrient delivery systems for increasing micronutrient density in grain is being assessed.

Education & Scientific Career

- M.Sc. Microbiology (1991), University of Pune
- Ph.D. Microbiology (1997), University of Pune

Awards

- Senior Research Fellowship, Research Associateship, CSIR, New Delhi
- Teaching Research Associateship, Govt. of Maharashtra
- Fellowship under DST woman scientist scheme (not availed)

Publications

1. In vitro and in vivo studies of a novel bacterial cellulose-based acellular bilayer nanocomposite scaffold for the repair of osteochondral defects. Kumbhar JV, Jadhav SH, Bodas

DS, Barhanpurkar-Naik A, Wani MR, Paknikar KM, Rajwade JM. International Journal of Nanomedicine 2017, 12: 6437-6459.

2. Nanoscale silver depositions inhibit microbial colonization and improve biocompatibility of titanium abutments (2017). S Kheur, N Singh, D Bodas, JY Rauch, S Jambhekar, M Kheur, J Rajwade. Colloids and Surfaces B: Biointerfaces, 159: 151-158.

3. Lateral flow assay for rapid detection of white spot syndrome virus (WSSV) using a phage-displayed peptide as bio-recognition probe.

PK Kulabhusan, JM Rajwade, ASS Hameed, KM Paknikar.

Applied Microbiology and Biotechnology. DOI 10.1007/s00253-017-8232-6.

4. Zinc complexed chitosan/TPP nanoparticles: a promising micronutrient nanocarrier suited for foliar application P Deshpande, A Dapkekar, MD Oak, KM Paknikar, JM Rajwade Carbohydrate Polymers 2017, 165: 394-401

5. Field-Usable Lateral Flow Immunoassay for the Rapid Detection of White Spot Syndrome Virus (WSSV) PK Kulabhusan, JM Rajwade, V Sugumar, G Taju, AS Sahul Hameed, K Paknikar (2017)

PLoS ONE 12 (1), e0169012

6. Three-dimensional scaffold of gelatin-poly (methyl vinyl ether-alt-maleic anhydride) for regenerative medicine: Proliferation and differentiation of mesenchymal stem cells

H Chhabra, J Kumbhar, J Rajwade, S Jadhav, K Paknikar, S Jadhav, J Bellare (2016)

Journal of Bioactive and Compatible Polymers 31 (3), 273-290

7. Fruit peels support higher yield and superior quality bacterial cellulose production JV

Kumbhar, JM Rajwade, KM Paknikar (2015) Applied microbiology and biotechnology 99 (16),

6677-6691

8. Applications of bacterial cellulose and its composites in biomedicine

JM Rajwade, KM Paknikar, JV Kumbhar (2015) Applied microbiology and biotechnology 99 (6),

2491-2511

9. Choudhari M, Haghniaz R, Rajwade JM, Paknikar KM. Anti-cancer Activity of Indian Stingless Bee Propolis: An In Vitro Study, Evidence-Based Complementary and Alternative Medicine (2013) Article ID 928280, 10 pages.

10. Bhayani KR, Rajwade JM, Paknikar KM. Radio frequency induced hyperthermia mediated by dextran stabilizedLSMO nanoparticles: in vitro evaluation of heat shock protein response.

Nanotechnology (2013) 24: 015102-09.

11. Arora S, Rajwade JM, Paknikar KM. Nanotoxicology and in vitro studies: The need of the hour. Toxicology and Applied Pharmacology (2012) 258: 151-165

12. Jain J, Arora S, Rajwade JM, Omray P, Khandelwal S, Paknikar KM. Silver nanoparticles in therapeutics: development of an antimicrobial gel formulation for topical use. *Molecular Pharmaceutics* (2009) 6(5):1388-1401
13. Arora S, Jain J, Rajwade JM, Paknikar KM. Cellular responses induced by silver nanoparticles: In vitro studies. *Toxicology Letters* (2008) 179: 93-100
14. Arora S, Jain J, Rajwade JM, Paknikar KM. Interactions of silver nanoparticles with primary mouse fibroblasts and liver cells. *Toxicology and Applied Pharmacology* (2008) 236:310-318.
15. Kale SN, Rajgopal R, Arora S, Bhayani KR, Rajwade JM and Paknikar K M. Microwave response of La_{0.7}Sr_{0.3}MnO₃ nanoparticles for heating applications. *Journal of Biomedical Nanotechnology* (2007) 3:178-183.

Book chapter

Paknikar KM, Rajwade JM and Soni RN. (2013), Therapeutic applications of silver nanoparticles, In: R.S. Chaugule and S.C. Watawe (eds.), *Applications of Nanomaterials*, American Scientific Publishers, ISBN:1-58883-181-7, pp. 205-215

Patents

1. A method for the removal of chromium, selenium and tellurium from aqueous solutions using microorganisms. (Indian Patent No. 186512)
2. An integrated chemical and/or microbiological process to recover metals from cadmium-telluride photovoltaic modules. (Indian Patent No. 188285)
3. A non sludge-recycle mode facultative microbial process for reduction of hexavalent chromium bearing effluent into trivalent form and a device therefor. (No. 24/BOM/96)
4. Microbial detoxification of chromium(VI) contaminated solid wastes/residues. (No. 122/BOM/98)
5. A culture independent method of removal of plasmids from live and multiplying plasmid containing bacteria. (No. 1477/MUM/2007)
6. A process for producing chromium enriched yeast supplement. (No. 1409/MUM/2009)
7. A method and kit for rapid recovery, identification and antimicrobial susceptibility testing of microorganisms (No. 3229/MUM/2010)
8. A method for rapid isolation and purification of DNA. (No. 481/MUM/2013)