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Research Area

- Investigating the microbial diversity associated with extreme, pristine and other habitats for taxonomic novelty and industrial applications (especially Bioenergy, Petroleum Biotechnology and Bioremediation).
 - Group is involved in collecting samples from a variety of extreme and pristine habitats including (but not limited to) volcanic mud, deep subsurface high temperature oil reservoirs, submarine methane hydrate sediments, high altitude lake sediments, etc.
 - Documentation of the bacterial and archaeal diversity associated with such environments using molecular tools such as PCR-DGGE-Sequencing of house-keeping genes (e.g. SSU rRNA, mcrA, dsr, rpoB, etc.) or metagenome sequencing using NGS platform.
 - Microbial cultures, in isolation or as consortium, are used to develop technologies in the field of bioenergy, petroleum biotechnology, bioremediation or production of valuable enzymes/ biomolecules. Microbial metabolism underlying such industrial application is investigated using whole genome, transcriptome and proteome analysis
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Profile

Education & Scientific Career

- M.Sc. (Microbiology)-1988
 - Ph.D. (Microbiology) 1993
 - Microbiologist in Global Environmental Engineering Ltd., Pune (1993-1995)
 - Research Associate at University of Virginia, Charlottesville, USA (1998-2000)
 - Scientist in Microbiology Department
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Technologies developed through industrial collaborations

- Microbial Enhanced Oil Recovery
- Bioremediation of petroleum hydrocarbons contaminated produced waters

- Biomethanation of agricultural residues
- Production of optically pure unnatural amino acids
- Microbial control of foul odor and pathogens associated with human excreta
- Conversion of residual oil to methane for energy recovery from spent oil reservoirs (proof of concept)

Publications

- VS Honkalas, AP Dabir, P Arora, DR Ranade, PK Dhakephalkar (2015) Draft genome sequence of *Clostridium celerecrescens* 152B isolated from sub-seafloor methane hydrate deposits. *Marine Genomics*. doi:10.1016/j.margen.2015.01.008
- P Singh, N Kapse, P Arora, SM Singh, PK Dhakephalkar (2015) Draft genome of *Cryobacterium* sp. MLB-32, an obligate psychrophile from glacier cryoconite holes of high Arctic. *Marine Genomics*. doi:10.1016/j.margen.2015.01.006
- Arora, P., Ranade, D. R., & Dhakephalkar, P. K. (2014). Development of a microbial process for the recovery of petroleum oil from depleted reservoirs at 91–96° C. *Bioresource technology*, 165: 274-278.
- Pore, S. D., Arora, P., & Dhakephalkar, P. K. (2014). Draft genome sequence of *Geobacillus* sp. strain FW23, isolated from a formation water sample. *Genome announcements*, 2: e00352-14.
- Singh, P., Singh, S. M., & Dhakephalkar, P. (2014). Diversity, cold active enzymes and adaptation strategies of bacteria inhabiting glacier cryoconite holes of High Arctic. *Extremophiles*, 18: 229-242.
- Engineer, A. S., Dhakephalkar, A. P., Gaikawai, R. P., & Dhakephalkar, P. K. (2013). Process parameter optimization for hydantoinase-mediated synthesis of optically pure carbamoyl amino acids of industrial value using *Pseudomonas aeruginosa* resting cells. *Journal of industrial microbiology & biotechnology*, 40:1367-1372.
- Antony, R., Krishnan, K. P., Laluraj, C. M., Thamban, M., Dhakephalkar, P. K., Engineer, A. S., & Shivaji, S. (2012). Diversity and physiology of culturable bacteria associated with a coastal Antarctic ice core. *Microbiological research*, 167: 372-380.
- Kamalaskar, L. B., Dhakephalkar, P. K., Meher, K. K., & Ranade, D. R. (2010). High biohydrogen yielding *Clostridium* sp. DMHC-10 isolated from sludge of distillery waste treatment plant. *International Journal of Hydrogen Energy*, 35: 10639-10644.
- Sachdev, D., Nema, P., Dhakephalkar, P., Zinjarde, S., & Chopade, B. (2010). Assessment of 16S rRNA gene-based phylogenetic diversity and promising plant growth-promoting traits of *Acinetobacter* community from the rhizosphere of wheat. *Microbiological research*, 165: 627-638.
- Satpute, S. K., Banat, I. M., Dhakephalkar, P. K., Banpurkar, A. G., & Chopade, B. A. (2010). Biosurfactants, bioemulsifiers and xopolysaccharides from marine microorganisms. *Biotechnology advances*, 28: 436-450.

- Satpute, S. K., Banpurkar, A. G., Dhakephalkar, P. K., Banat, I. M., & Chopade, B. A. (2010). Methods for investigating biosurfactants and bioemulsifiers: a review. *Critical reviews in biotechnology*, 30: 127-144.

Patents

- Shete, S.D., Dhakephalkar, P. K., Kanekar, P.P., Ranade, D.R. & Rao, J.U. Production of cerium sulfide pigment by a novel microbiological process using recombinant strain of E. coli. Indian Patent Number(s): 512/MUM/2013.
- Ranade, D.R., Kamalaskar, L., Lapsiya, K., Kshirsagar, P.R. & Dhakephalkar, P.K. A method for continuous generation of hydrogen by biodegradation of organic matter using *Clostridium biohydrogenum* MCM B-509 sp nov. Indian Patent Number(s): 412/MUM/2014.
- Engineer, A.S., Dhakephalkar, P.K. & Gaikawai, R.P. Microbial Process for the production of optically pure unnatural carbamoyl amino acids. Indian Patent Number(s): 1384/MUM/2013.
- Dhakephalkar, P.K., Ranade, D.R., Bateja, S., Biswas, S.K., Kukreti, V. & Rana, D.P. Process for Enhanced Recovery of Crude Oil from Oil-Wells at 91°C or Higher Temperatures Using Hyperthermophilic Indigenous or Injected Microorganisms / Consortia. Indian Patent Number(s): 751/MUM/2014.
- Ranade, D. R., Dhakephalkar, P. K., Deshpande, M. G., Lanjekar, V. B., Padmanabhan, G., & Dnyansagar, R. V. Development of a bioprocess to reduce pathogenic load and malodor of human night soil. Indian Patent Number(s): 2072/MUM/2012.
- Dhakephalkar, P.K., Deshpande, M.G. & Wagh, S.A. Composition of novel microbial consortium to improve poultry health, in terms of increased feed conversion ratio and weight gain. Indian Patent Number(s): 1366/MUM/2011.
- Deshmukh, N. S., Dhakephalkar, P. K., Kalluri, K. M., Lapsiya, K. L., Ranade, D. R., Savant, D. V. & Yadav, Y.T. Microbial process for removal of adsorbable organic halides from industrial wastewater using an anaerobic filter. Indian Patent Number(s): IN200701687-I3.
- Nilegaonkar, S. S., Zambare, V. P., Kanekar, P. P., Dhakephalkar, P. K., Sarnaik, S. S., Chandrababu, N. K., Ramanaiah, B., Rajaram, R., Ramasamy, T., Krishnaiah, Y., Kumari, S. & Balaram, P. Eine neue Protease für industrielle Anwendungen. German Patent Number(s): 102007013950
- Nilegaonkar, S. S., Zambare, V. P., Kanekar, P. P., Dhakephalkar, P. K., Sarnaik, S. S., Rajaram, R., Chandrababu, N. K., Ramanaiah, B., Balram, P. Y., Kumari, S & Ramasamy, T. A novel protease for industrial application. US Patent No. : US 2008/0220499 A1
- Latha, C., Shriram, V.D., Rojatkar, S.R., Jahagirdar, S.S. & Dhakephalkar, P.K. Composition and a method of curing antibiotic resistance plasmids. PCT No. WO/2007/088408.
- Deshmukh N. S., Dhakephalkar, P. K., Kalluri, K. M., Lapsiya, K. L., Ranade, D R., Savant, D. V. & Yadav, Y. T. (2010) Microbial process for removal of adsorbable organic halides from industrial wastewater using anaerobic filter. Indian Patent Number(s): IN200701687-I3