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Academic Qualifications

Ph.D	Microbiology	M. S. University of Baroda, Baroda
M.Sc.	Botany	Lucknow University, Lucknow
B.Sc.	Botany, Zoology, Chemistry	Kumaun University, Nainital

Research Appointments

Director	2010 – till date	CSIR-NBRI, Lucknow
Chief Scientist & Coordinator, Plant Microbial Interactions	2009–2010	CSIR-NBRI, Lucknow
Senior Principal Scientist, Head, Division of Plant-Microbial Interactions	2004–2009	CSIR-NBRI, Lucknow
Principal Scientist & Group Leader, Laboratory of Microbiology	1999–2004	CSIR-NBRI, Lucknow
Senior Scientist, Laboratory of Microbiology	1994–2009	CSIR-NBRI, Lucknow
Production Manager	1991–1993	American Biotech. Inc., Boston, USA
Research Associate	1988–1991	Novartis Biotech Corporation, North Carolina, USA Laval University, Quebec, Canada North Carolina State University, NC, USA
Post Doctoral Fellowship	1985–1988	Indo-US Science & Technology Initiative, US Department of Agriculture, Maryland, USA

Honors and Awards

Fellow of The National Academy of Sciences
Fellow of National Academy of Agricultural Sciences

2011- **Vigyan Gaurav Samman**, Council of Science & Technology, UP, Department of Science and Technology, Government of Uttar Pradesh.

2009-**TATA Innovation Fellow**, Department of Biotechnology, Government of India

2007- **Industrial Medal Award**

2004- **Biotech Product and Process Development and Commercialization Award**

2001- **Vigyan Bharati Rashtriya Puraskar**

2001- **All India Biotech Association (AIBA) Award**

Research Interest and Area of R&D Activities

The complexity of interaction between microbes and plants is one of the most complex scientific challenges. Our group is interested in understanding the importance of root zone, the hidden one half of plant below ground, for plant productivity and stress tolerance. Research is focused at enhancing our knowledge of the ecological and genetic interactions between plants, their root pathogens and beneficial microbes in the rhizosphere.

Understanding the population genetics and functional dynamics of soil-borne bacteria have been exploited to improve the sustainability of plant production systems. Using Eco-genomics approaches for enhanced crop yield and crop protection, plant associated bacteria have been commercial exploited for products and technology development. Current R&D activities of the Plant-Microbial Interactions laboratory include:

- Development of efficient assays to evaluate the root colonization capability of the native microbial population in host plant rhizosphere.
- Exploration, exploitation and characterization of native stress-tolerant plant growth promoting microbes for plant improvement.
- Elucidate the role of introduced beneficial microbe on plant productivity, microbial community structure alterations and improvement of soil fertility.
- Metagenomics of soil from different agro- climatic regions.
- Development of stress-tolerant transgenic microbes and plants, to enhance plant growth in degraded ecosystems.
- Identification of root-specific traits for root development, architecture, sensing of edaphic stress, and root-to-shoot communication, to enhance plant growth under low nutrient and water stress-limited conditions.