DR. MANDIRA KOCHAR

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Broad area of research interest

Dr Mandira Kochar received her PhD Degree in Genetics (Microbial Genetics) from Delhi University in 2007. She has extensive research experience over the past 10 years focused on Molecular Microbiology, Microbial Physiology and Genomics to support thematic areas of Agriculture and Environment Sustainability as well as Multidrug Resistance in bacteria. Work in her research group has concentrated on molecular and functional analysis of plant growth regulators [Nitric oxide (NO) and indole acetic acid (IAA)] crosstalk in the plant-associated bacterium, *Azospirillum brasilense* and has extended understanding of the role of these molecules in plant-microbe interactions. They have shown for the first time that NO metabolism in bacteria has effect on IAA biosynthesis, indicating a crosstalk of 2 important bacterial signaling molecules. Currently her group is studying novel, small regulatory molecules from *Azospirillum* that may play a specific role in bacterial stress response or be implicated in plant-microbe interactions using genomics, transcriptomics and functional assays. They are actively looking at novel strains capable of forming biofilms in nature to develop sustainable agriculture solutions. Her group has used electron/atomic force microscopy, bioinformatics tools and biochemical techniques to conclude that type IV pili produced by cyanobacteria are electrically conductive in nature (nanowires) and also recently identified a new type of conductive pili in *Nostoc*. Possible functions of nanowires in *Synechocystis*, cell-arsenic (As) interactions highlights that As can modulate number of pili and bind/immobilize As. Mandira has been involved in the TERI Deakin program since 2011 and her current research interests lie in studying naturally formed microbial biofilms, regulation of plant-microbe interactions, microbial genomics and nanotechnology based interventions for sustainable agriculture.

Current research involvements

1. Understanding Arbuscular Mycorrhizal Fungi-Bacteria interactions in Endophytic Colonization of Plants
2. Small regulatory molecules produced by plant-associated bacteria in abiotic stress
3. Life Cycle assessment of Agriculturally relevant nanomaterials