

Name: Vinay Singh

Objective: IITKGP-University of Manchester, PhD

Interested Research Area: Microbial Bioremediation

Statement of purpose

Researchers are like artists; they nurture their curiosity and express unlimited imagination in their work. Scientists, through their ideas, bring, innovate and develop technology for the betterment of the world. Being a well-educated researcher, I began another round of soul searching and figuring out my goal of life after graduating with an excellent performance from the Indian Institute of Technology (IIT), Indore. I believe IIT Kharagpur and the University of Manchester is a leading institute in academia and abundant in creative energy, will be my best next step to pursue my ideal.

I was always motivated to work in the field of environmental pollution management and to study the impact of toxic chemicals and their bioremediation. The diversity and the behavior of the target bacteria are influenced by the degradation of contaminants during bioremediation. Since many bacteria cannot be cultivated by conventional laboratory techniques. With the use of molecular microbiological techniques, we are expected to detect and enumerate the target bacteria directly related to the degradation of contaminants. It will provide new insights into bioremediation in terms of process optimization, validation, and the study of the impact on the ecosystem. For example, During bioremediation of toxic chemicals, to study how the target microbial communities are changing during the process of remediation like types of other microbes growing and how is it influencing the growth and efficiency of remediation of the target bacteria with the help of molecular techniques like Fluorescent in situ hybridization, in situ PCR and fingerprinting 16s ribosomal DNA.

Myself coming from a farming background, I am always concerned about the pollution caused due to stubble burning. Farmers do not go for the conventional technique of converting crop waste into fertilizers as it is very tedious, time-consuming, and costs too much compared to farmers' income. Therefore they prefer an easy way of burning it.

If in situ conversion of waste to fertilizers can be assisted with harmless microbes that feed on plant residue and fastens the conversion of waste to fertilizers. Won't it be great! I know there are microbes used for this purpose, but their application is limited due to their restricted growth due to unfavorable conditions and economics.

These plant residues can also be used for bio-sourced chemicals and materials with the help of microbiological techniques of gene editing and cloning.

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My enthusiasm for molecular biology and bioremediation supported the pursuit of my MSc project in Molecular Immunology and Biosensing Lab under the guidance of Dr. Prashant Kodgire and Dr. Abhijeet Joshi. I worked on the project titled "**Recombinant expression and development of enzyme-based biosensors for the detection of pesticides.**" We did cloning, expression, and purification of Organophosphate degrading enzymes tagged with fluorescent markers to detect organophosphate pesticides. Even in the recent challenging covid-19 spread, I joined the lab and have full practical experiences in recombinant DNA technology, protein expression, purification, enzyme kinetics, biosensing of pesticides.

Besides my passion for molecular biology and microbial remediation. Having learned inline skating, I found out my most unique assets distinguishing me from others might be my creative mind. This precious gift provided me with unlimited inspiration in my work and life. I have a full list of practical experiences, enthusiasm for advanced knowledge in molecular biology, and most importantly, a perspective vision to embrace the future technology. Having the motivation and ability to thrive in IIT Kharagpur and the University of Manchester, I am well prepared to study at your esteemed institute. I believe I will be your best choice.