

# Rakshak Kumar, PhD

Scientist & Asst. Professor (AcSIR)  
Department of Biotechnology,  
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## **PROFESSIONAL CAREER**

2017 to date: Scientist, High Altitude Microbiology Lab, CSIR-IHBT, Palampur

2014 to 2017: DST INSPIRE Faculty, Department of Biotechnology, CSIR-IHBT, Palampur

2013 to 2014: DS Kothari Postdoctoral Fellow, Sikkim University, Gangtok

2012 to 2013: DBT Research Associate, Institute of Microbial Technology, Chandigarh

## **ACADEMICS**

2012 Ph.D Awarded on August 17<sup>th</sup>, 2012, under the supervision of Dr. SR Joshi, Associate Professor, Microbiology Laboratory, Department of Biotechnology and Bioinformatics, North Eastern Hill University, Shillong, Meghalaya.

Title of Thesis: **Characterization of metal tolerant bacteria from soils of Domiasiat area of Meghalaya**

2005 Master of Science (Biotechnology), University of Madras, Chennai, Tamil Nadu.

2002 Bachelor of Science [Biotechnology (Hons.), Botany and Chemistry], North Eastern Hill University, St. Anthony's College, Shillong, Meghalaya.

1999 AISSCE (Class XII), CBSE Board, DAV Public School, B S City, Jharkhand.

1997 AISSE (Class X), CBSE Board, DAV Public School, B S City, Jharkhand.

## **AWARDS AND HONOURS**

- **Start-up Research Grant** awarded by Science and Engineering Research Board (SERB) Department of Science and Technology, Government of India in November 2019
- **INSPIRE Faculty Award** from Department of Science & Technology, Government of India in July 2014
- **Dr. D S Kothari Postdoctoral Fellowship Award** from University Grants Commission, Government of India in August 2013
- **DBT-Research Associateship in Biotechnology & Life Sciences** from Department of Biotechnology, Ministry of Science and Technology, Government of India in May 2012
- **JRF** and **SRF** from BRNS, DAE
- **Second Rank** in BSc, Biotechnology (Hons.) Examination, 2002 of North-Eastern Hill University, Shillong, Meghalaya

## **RESEARCH AREAS OF INTEREST**

Our research aims at exploring the microbial community from high altitude extreme environments from both eastern and western Himalaya. At present, we are unraveling the potential of psychotropic bacteria for bioprospection. We have started by sequencing genomes to identify bioprospection potential and adaptational strategies. With the efficient

hydrolytic psychrotrophic/psychrophilic bacterial community of Himalaya, we have targeted organic waste degradation in cold-hilly regions. Another potential enzyme being explored in our lab is lipase/phospholipase for oil degumming. Our lab is also exploring other important aspects of Himalaya that includes probiotics from traditional fermented foods and enrichment of Vitamin D in *Shiitake* mushroom. The main focus of our lab can be summarized in the following broad themes:

- Study changes in community composition in different Himalayan glacier to understand its adaptational strategies and to reveal the response of microorganisms to environmental change.
- Exploration of bacteria from alpine regions of Himalaya for bioprospection-organic waste management & industrial enzymes
- Exploration of mushrooms and its enrichment/ fortification for value addition

### **PHD STUDENT SUPERVISING:**

Five PhD Students registered under Academy of Scientific and Innovative Research (AcSIR), New Delhi:

- i) Miss. Shruti Sinai Borker (UGC-JRF);
- ii) Mr. Anil Kumar (DBT-JRF);
- iii) Miss. Neha Baliyan (INSPIRE Fellow);
- iv) Miss. Kiran Dhindhoria (CSIR-JRF)
- v) Mr. Aman Thakur (Project Fellow L-II);

One student registered under Guru Nanak Dev University, Amritsar:

- i) Miss Srijana Mukhiya (INSPIRE project JRF)

### **POSTDOCTORAL FELLOWS: Nil**

### **PROJECTS**

#### **Undergoing Projects (Eight)**

- 1. Development of remunerative organic waste management systems for colder regions of India with the intervention of psychrophilic aerobic and anaerobic microbial consortia** sanctioned by DST-Waste management technology programme Govt. of India under Technology development and Transfer programme. April 2020-March 2023. Total project cost: Rs. 1,17,67,463/-
- 2. Improvement of Biomethanation in Anaerobic Digesters in Cold Regions with Interventions of Anaerobic Psychrotrophic Bacteria** sanctioned by SERB, DST, Govt. of India under Start-up research grant. Nov 2019 to Oct 2021. Total project cost: Rs Rs.29,66,434/-
- 3. Improvisation of the traditional practices of night soil composting using microbiological intervention for sustaining agro-ecosystems in the Lahaul valley of Northwestern Himalaya.** Sanctioned by "National Mission On Himalayan

- Studies" implemented by the Ministry of Environment, Forest & Climate Change (MoEF&CC), Govt. of India. June 2018-June 2021. Total project cost: Rs 47,040,00/-
4. **Sumbuk Shiitake mushroom and other food processing cluster** sanctioned by Ministry of MSME, Govt. of India under SFURTI, programme. April 2020-March 2023. Total project cost: Rs 2,44,90000/-
  5. **Norbo Choeling Shiitake mushroom and other food processing cluster**, sanctioned by Ministry of MSME, Govt. of India under SFURTI, programme. April 2020-March 2023. Total project cost: Rs 2,44,90000/-
  6. **West Sikkim Shiitake mushroom and other food processing cluster**, sanctioned by Ministry of MSME, Govt. of India under SFURTI, programme. April 2020-March 2023. Total project cost: Rs 2,44,90000
  7. **Triloki Enriched Composting/ Vermicomposting Cluster**, sanctioned by Ministry of MSME, Govt. of India under SFURTI, programme. April 2020-March 2023. Total project cost: Rs 2,05,08000/-
  8. **Moonew Tareybhair Enriched Composting/ Vermicomposting Cluster**, sanctioned by Ministry of MSME, Govt. of India under SFURTI, programme. April 2020-March 2023. Total project cost: Rs 2,05,08000/-

#### **Completed Projects (Four)**

1. **Study of bacteria from the ice core of East Rathong glacier of Sikkim with reference to climate change**, sanctioned by DST, Govt. of India under INSPIRE Faculty programme. Oct 2014 to Oct 2019. Rs 35,00000/-
2. **Development of selenium and vitamin D2 enriched formulation from Lentinula edodes (Shiitake)**. CSIR Mission Project. August 2018-March 2020. Rs 90,00,000/-
3. **Development of bacterial formulations and organic dustbin for organic waste degradation in cold hilly regions**. CSIR FTT Project. August 2018-March 2020. Rs 75,00,000/-
4. **Bioprospection of microbiome from himalayan niches**. CSIR-NCP Project. August 2018-March 2020. Rs 75,00,000/-

#### **LIST OF PUBLICATIONS IN LAST 5 YEARS**

1. Walia S, Mukhia S, Bhatt V, Kumar R, Kumar R. 2020. Variability in chemical composition and antimicrobial activity of *Tagetes minuta* L. essential oil collected from different locations of Himalaya. **Industrial Crops and Products**. 1;150:112449 [IF: 4.419].
2. Kumari M, Kumar R, Singh D, Bhatt S, Gupta M. 2020. Physiological and genomic characterization of an exopolysaccharide-producing *Weissella cibaria* CH2 from cheese of the western Himalayas. **Food Bioscience**. 21:100570 [IF: 3.220]
3. Khare D, Kumar R, Acharya C. 2020. Genomic and functional insights into the adaptation and survival of *Chryseobacterium* sp. strain PMSZPI in uranium enriched environment. **Ecotoxicology and Environmental Safety**. 15;191:110217 [IF: 4.527]
4. Kumar V, Thakur V, Kumar V, Kumar R, Singh D. 2020. Genomic insights revealed physiological diversity and industrial potential for *Glaciimonas* sp. PCH181 isolated

from Satrundi glacier in Pangi-Chamba Himalaya. *Genomics*, 112(1), 637-646 [IF: 3.16]

5. **Kumar R\***, Acharya V, Mukhia S, Singh D, Kumar S. 2019. Complete genome sequence of *Pseudomonas frederiksbergensis* ERDD5: 01 revealed genetic bases for survivability at high altitude ecosystem and bioprospection potential. *Genomics*, 111(3), 492-499 (\*Corresponding Author) [IF: 3.16]
6. **Kumar R\***, Acharya V, Singh D, Kumar S. 2018. Strategies for high-altitude adaptation revealed from high quality draft genome of non-violacein producing *Janthinobacterium lividum* ERGS5:01. **Standards in Genomic Sciences**. 13(1), 1. (\*Corresponding Author) [IF: 1.458]
7. Maurya AK, Devi R, Kumar A, Koundal R, Thakur S, Sharma A, Kumar D, **Kumar R**, Padwad YS, Chand G and Singh B. 2018. Chemical Composition, Cytotoxic and Antibacterial Activities of Essential Oils of Cultivated Clones of *Juniperus communis* and Wild *Juniperus* Species. **Chemistry & Biodiversity**. [IF: 1.449]
8. Himanshu, Swarnkar MK, Singh D, **Kumar R\***. 2016. First complete genome sequence of a species in the genus *Microterricola*, an extremophilic cold active enzyme producing bacterial strain ERGS5:02 isolated from Sikkim Himalaya. **Journal of Biotechnology**. 222, 17-18. (\*Corresponding Author) [IF: 3.163]
9. **Kumar R\***, Singh D, Swarnkar MK, Singh AK, Kumar S. 2016. Complete genome sequence of *Arthrobacter alpinus* ERGS4:06, a yellow pigmented bacterium tolerant to cold and radiations isolated from Sikkim Himalaya. **Journal of Biotechnology**. 220, 86-87. (\*Corresponding Author) [IF: 3.163]
10. **Kumar R\***, Singh D, Swarnkar MK, Singh AK, Kumar S. 2015. Genome assembly of *Chryseobacterium polytrichastri* ERM1:04, a psychrotolerant bacterium with cold active proteases, isolated from East Rathong Glacier in India. **Genome Announcement**. 3(6):e01305-15. (\*Corresponding Author)
11. **Kumar R\***, Singh D, Swarnkar MK, Singh AK, Kumar S. 2015. Complete genome sequence of *Arthrobacter* sp. ERGS1: 01, a putative novel bacterium with prospective cold active industrial enzymes, isolated from East Rathong glacier in India. **Journal of Biotechnology**. 214, 139–140. (\*Corresponding Author) [IF: 3.163]
12. Rai AK, **Kumar R**. 2015. Potential of microbial bio-resources of Sikkim Himalayan region. *ENVIS Bulletin on Himalayan Ecology*, 23, 99-105. [ISSN: 0971-7447]

## **PERSONAL DETAILS**

Father's name : Madhur Kumar Chhetri  
Born : August 10, 1982-Shillong, Meghalaya  
Marital status : Single  
Permanent Address : Flat No. 4(B), Fourth Floor, Anusuya Ananda Apartment,  
Bagharbori, Satgaon, Six Mile, Guwahati-781022