Rakshak Kumar, PhD

PROFESSIONAL CAREER

Designation	Organization	Period		Nature of Work
		From	To	
Associate Professor	Tripura University (A Central University), Agartala - 799 022, Tripura	01-04-2024	Till date	Research, Teaching
Senior Scientist	CSIR-Institute of Himalayan Bioresource Technology (CSIR-IHBT), Palampur, HP	07-08-2020	28-03-2024	Research, Teaching
Scientist	CSIR-IHBT	07-08-2017	06-08-2020	Research, Teaching
DST INSPIRE Faculty	CSIR-IHBT	10-10-2014	07-08-2017	Research, Teaching

RESEARCH INTEREST

Our research focuses on uncovering the unique microbial communities thriving in the distinct environments of the Himalayan region, with a particular emphasis on the North East Himalayas. We are currently exploring the bioprospecting potential of psychrotrophic bacteria, aiming to harness their robust hydrolytic capabilities for efficient organic waste degradation in cold, hilly terrains. By leveraging the adaptive traits of psychrophilic and psychrotrophic bacteria native to the Himalayas, we aim to develop sustainable, eco-friendly solutions for waste management in these challenging environments.

Our expertise lies in microbial genomics and physiology, with a special focus on cold-adapted bacteria from high-altitude and extreme habitats. By integrating cutting-edge techniques in metagenomics, microbial community dynamics, and plant growth-promoting rhizobacteria (PGPR), we seek to drive sustainable agricultural practices, particularly in cold, arid, and saline soils. Our work has significantly advanced the bioprospecting of novel microbial strains, promoting nutrient recycling and bioinoculant development, while contributing to biotechnological innovations in biocontrol and stress alleviation.

Additionally, our lab is engaged in studying probiotics derived from traditional fermented foods and exploring mushrooms for their potential in enrichment and fortification, with a focus on enhancing economic value and supporting sustainable livelihoods in rural communities.

The core themes of our research can be summarized as follows:

- Investigating shifts in microbial community composition across various Himalayan glaciers to understand adaptive strategies and microbial responses to environmental change.
- Bioprospecting alpine bacterial strains from the Himalayas for organic waste management and industrial enzyme production.
- Exploring the potential of mushrooms for enrichment and value addition to boost rural economies.

ACADEMICS

2012 Ph.D Awarded on August 17th, 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 Domiasiatarea 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) (Biology, Physics, Chemistry), CBSE, DAV Public School, B S City,Jharkhand.

1997 AISSE (Class X), CBSE, 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
- **Junior Research Fellowship and Senior Research Fellowship** from Board of Nuclear Sciences (BRNS), Dept. of Atomic Energy, Govt. of India in April 2008
- **Second Rank** in BSc, Biotechnology (Hons.) Examination, 2002 of North-Eastern Hill University, Shillong, Meghalaya

PUBLICATIONS

- Peer Reviewed Research & review article: 72
- Book Chapters: 12
- Popular Article: 03
- Abstracts in conferences: 11

FULL LIST OF PUBLICATIONS (YEAR WISE)

2025

1. Baliyan N, Goel A, Kumar S S, Gupta M, Padwad Y, **Kumar R*** .2025. Integration of conjugated linoleic acid-producing probiotic strains having anti-adipogenic properties with Honey and Oyster mushrooms for the formulation of non-dairy probiotic beverage. **Probiotics and Antimicrobial Proteins.** Accepted**.** DOI: 10.1007/s12602-025-10525-2**.** *Corresponding author)
2. Thakur A, Borker SS, **Kumar R***. 2025. Effects of high vitamin D_2 enriched shiitake mushroom soup on raising the serum 25-hydroxyvitamin D levels in vitamin D-deficient healthy adults: a clinical study. **International Journal of Food Science & Technology**. Accepted. DOI: 10.1093/ijfood/vvaf073.
3. Sambiani K, Lare Y, Narra S, Zanguina A, **Kumar R**. 2025. Modeling and Simulation of Syngas Potential From Supercritical Water Gasification of Combustible Municipal Solid Waste Materials. **International Journal of Energy Research**. (1):6039763. DOI: 10.1155/er/6039763.
4. Raj Y, Dindhoria K, Kumar P, Pati AM, Kumar R, **Kumar R***. 2025. Sculpturing *Hypericum perforatum* L.-rhizosphere with plant-specific and un-specific beneficial rhizobacteria distinctively tailors rhizosphere bacterial community structure to accumulate differential amounts of specialized metabolites. **Industrial Crops and Products**. 1;226:120670. DOI: 10.1016/j.indcrop.2025.120670
5. Lepcha A, Kumar R, Dindhoria K, Bhargava B, Pati AM, **Kumar R***. 2025. Metagenomic insights into the functional potential of non-sanitary landfill microbiomes in the Indian Himalayan region, highlighting key plastic degrading genes. **Journal of Hazardous Materials**. 484:136642. DOI: 10.1016/j.jhazmat.2024.136642. (*Corresponding Author)
6. Giri L, Hussain M, Angmo JC, Mustafa G, Singh B, Bahukhnadi A, Pradhan R, **Kumar R**, Mukherjee S, Bhatt ID, Nautiyal S. 2024. Enhancing tomato (Solanum lycopersicum) yield and nutrition quality through hydroponic cultivation with treated wastewater. **Food Chemistry**. 3:141079. DOI: 10.1016/j.foodchem.2024.141079
7. Sharma SK, **Kumar R**, Yadav SK, Saneja A. Development of a multifunctional and sustainable pterostilbene nanoemulsion incorporated chitosan-alginate food packaging film for shiitake mushroom preservation. **International Journal of Biological Macromolecules**. 2025 Mar 1;293:139241. DOI: 10.1016/j.ijbiomac.2024.139241
8. Kumar A, Sharma S, Dindhoria K, Thakur A, **Kumar R***. 2025. Insight into physico-chemical properties and microbial community structure of biogas slurry from household biogas plants of sub-Himalaya for its implications in improved biogas production. **International Microbiology**. **28**, 187–200. DOI: 10.1007/s10123-024-00530-w

2024

9. Sharma P, Kaushal G, Borker SS, Lepcha A, Kumar A, **Kumar R***. 2024. Physiological and Genomic Elucidation of Cold-Resilient Rhizobacteria Reveals Plant Growth Promotion by Siderophore Optimization and Enhanced Biocontrol Potential Against Fungal Pathogens. **Journal of Plant Growth Regulation**. Jul 24:1-4. DOI: 10.1007/s00344-024-

11430-8. (*Corresponding Author)

10. Thakur A, Pandey KK, Kharka K, Borker SS, Kumar B, Bhatt A, **Kumar R***. 2024. Comparative analysis of substrate components, nutritive value, ergosterol distribution, and vitamin D_2 enrichment in shiitake mushrooms cultivated on wood substrates. **Journal of Food Composition and Analysis**. 11:106508. DOI: 10.1016/j.jfca.2024.106508
11. Baliyan N, Kumar A, Sharma R, Mukhia S, Sharma SK, Agnihotri VK, **Kumar R***. 2024. Unveiling the microbiome and metabolites of traditional dairy and alcoholic products from North-western Himalayan region. **Journal of Food Composition and Analysis**. 1;136:106833. DOI: 10.1016/j.jfca.2024.106833.
12. Borker SS, Sharma P, Thakur A, Kumar A, Kumar A, **Kumar R***. 2024. Physiological and genomic insights into a psychrotrophic drought-tolerant bacterial consortium for crop improvement in cold, semiarid regions. **Microbiological Research**. 26:127818. DOI: 10.1016/j.micres.2024.127818.
13. Kumari S, Kumar A, Lepcha A, **Kumar R***. 2024. Cold-adapted *Exiguobacterium sibiricum* K1 as a potential bioinoculant in cold regions: Physiological and genomic elucidation of biocontrol and plant growth promotion. **Gene**, 916, p.148439. DOI: 10.1016/j.gene.2024.148439
14. Chauhan R, Vishvamitera S, Dhiman D, Sharma SK, **Kumar R**, Kumar D, Singh S. 2024. Growth, essential oil yield and biological activities of Curcuma caesia in response to sowing time and planting geometry in the non-traditional area of western Himalayas. **Scientia Horticulturae**. 1;338:113740. DOI: 10.1016/j.scienta.2024.113740
15. Borker SS, Thakur A, Pandey KK, Sharma P, Manyapu V, Khatri A, **Kumar R.*** 2024. Nutrient recycling of source-separated human faeces using biochar immobilized indigenous psychrotrophic bacteria for sustaining the agroecosystems of north-western Himalaya. **Applied Biological Chemistry.** 67(1), 37. DOI: 10.1186/s13765-024-00887-6
16. Mukhia S, Kumar A, **Kumar R***. 2024. Bacterial community distribution and functional potentials provide key insights into their role in the ecosystem functioning of a retreating Eastern Himalayan glacier. **FEMS Microbiology Ecology**, 100(3), p.fiae012. DOI: 10.1093/femsec/fiae012
17. Dindhoria K, Kumar R, Bhargava B, **Kumar R***. 2024. Metagenomic assembled genomes indicated the potential application of hypersaline microbiome for plant growth promotion and stress alleviation in salinized soils. **Msystems.** e01050-23 **[IF:6.4].** DOI: 10.1128/msystems.01050-23
18. Mukhia S, Kumar A. **Kumar R***. 2024. Red bioactive pigment from Himalayan *Janthinobacterium* sp. ERMR3:09: optimization, characterization, and potential applications. **Archives of Microbiology**. 206, 44. DOI:10.1007/s00203-023-03779-3[IF: 2.8]

2023

19. Ali, A., Dindhoria, K, **Kumar R***. 2023**.** *Acinetobacter oleivorans* IRS14 alleviates cold stress in wheat by regulating physiological and biochemical factors. **Journal of Applied Microbiology**. 134(8), p.lxad176. DOI:10.1093/jambio/lxad176
20. Kumari S., Kumar A., Manyapu V, Lepcha A, **Kumar R***. 2023**.** Unravelling the importance of cold-adapted bacterial formulations in microbial community dynamics during in situ lemongrass residue valorization under cold conditions. **Biomass Conversion**

and Biorefinery . DOI:10.1007/s13399-023-05085-w (*Corresponding Author)

21. Khatri A, Thakur A, Lepcha A, Acharya V, **Kumar R***. 2023. IHM-DB: a curated collection of metagenomics data from the Indian Himalayan Region, and automated pipeline for 16S rRNA amplicon-based analysis (AutoQii2). **Database**, p.baad039. DOI: 10.1093/database/baad039. (*****Corresponding Author) [
22. Raj Y, Kumar A, Kumari S, **Kumar R***, Kumar R. 2023. Comparative Genomics and Physiological Investigations Supported Multifaceted Plant Growth-Promoting Activities in Two Hypericum perforatum L.-Associated Plant Growth-Promoting Rhizobacteria for Microbe-Assisted Cultivation. **Microbiology Spectrum**. DOI: 10.1128/spectrum.00607-23. (*****Corresponding Author)
23. Dindhoria K, Jain R, Kumar R, Bhargava B, **Kumar R***, Sanjay Kumar. 2023. Microbial community structure analysis of hypersaline niches and elucidation of their role in the biogeochemical cycling of nitrogen, sulphur, and methane. **Ecological Informatics,** 102023. DOI: 10.1016/j.ecoinf.2023.102023 (*****Corresponding Author)
24. Baliyan N, Maurya AK, Kumar A, Agnihotri VK, **Kumar R***. 2023. Probiotics from the bovine raw milk of Lahaul valley showed cis-9, trans-11 conjugated linoleic acid isomer and antioxidant activity with food formulation ability. **LWT-Food Science and Technology**, 176:114553. DOI:10.1016/j.lwt.2023.114553. (*****CorrespondingAuthor)
25. Mukhia S, Kumar A, **Kumar R***. 2023. Antioxidant prodigiosin-producin cold- adapted *Janthinobacterium* sp. ERMR3: 09 from a glacier moraine: Genomic elucidation of cold adaptation and pigment biosynthesis. **Gene**, 857:147178. DOI:10.1016/j.gene.2023.147178. (*****Corresponding Author)
26. Dindhoria K, Manyapu V, Ali A, **Kumar R***. 2023. Unveiling the role of emerging metagenomics for the examination of hypersaline environments. **Biotechnology and Genetic Engineering Reviews**. 6:1-39. DOI:10.1080/02648725.2023.2197717. (*****Corresponding Author)
27. Rathore S, Mukhia S, **Kumar R**, Kumar R. 2023. Essential oil composition and antimicrobial potential of aromatic plants grown in the mid-hill conditions of the Western Himalayas**. Scientific Reports**. 25;13(1):4878. DOI: 10.1038/s41598-023-31875-3
28. Thakur M, Verma V, Chandel A, Kumar R, Sharma T, Kumar A, Bhardwaj S, **Kumar R**, Bhargava B. 2023. Lemon grass essential oil improves *Gladiolus grandiflorus* postharvest life by modulating water relations, microbial growth, biochemical activity, and gene expression. **Scientific Reports**. 14;13(1):2630. DOI:10.1038/s41598-023-28829-0.

2022

29. Kumar A, Flèche-Matéos L, **Kumar R***. Lomprez F, Fichenick F, Singh D, Grimont PA, Kumar S. 2022. *Rahnella sikkimica* sp. nov., a novel cold-tolerant bacterium isolated from the glacier of Sikkim Himalaya with plant growth-promoting properties. **Extremophiles**, 26.3:35. DOI:10.1007/s00792-022-01283-y (*****Corresponding Author)
30. KumarA, Mukhia S. **Kumar R***. 2022. Microbial community dynamics from a fast-receding glacier of Western Himalayas highlight the importance of microbes in primary succession, nutrient recycling, and xenobiotics degradation. **Ecological Indicators**, 144:109565. DOI:10.1016/j.ecolind.2022.109565 .(*****CorrespondingAuthor)
31. Dindhoria K, Kumar S, Baliyan N, Raphel S, Halami PM, **Kumar R***. 2022. Bacillus licheniformis MCC 2514 genome sequencing and functional annotation for providing

genetic evidence for probitic gut adhesion properties and its applicability as a bio-preservative agent. **Gene** 840:146744. DOI:10.1016/j.gene.2022.146744. (*Corresponding Author)

32. Kumari S, Kumar A, **Kumar R*.** 2022. A cold active cellulase isolated from *Exiguobacterium sibiricum* K1 for the valorization of agro-residual resources. **Biomass Conversion and Biorefinery**. 2022, 1-11. DOI:10.1007/s13399-022-03031-w (*****Corresponding Author)
33. Borker SS, Thakur A, Khatri A, **Kumar R*.** 2022. Quality assessment, safety evaluation, and microbiome analysis of night-soil compost from Lahaul valley of northwestern Himalaya. **Waste Management**,149:42-52. DOI:10.1016/j.wasman.2022.06.003. (*****Corresponding Author)
34. Mukhia S, Kumar A, Kumari P , **Kumar R*.** 2022. Psychrotrophic plant beneficial bacteria from the glacial ecosystem of Sikkim Himalaya: Genomic evidence for the cold adaptation and plant growth promotion. **Microbiological Research** *260*:127049. DOI:10.1016/j.micres.2022.127049. (*****Corresponding Author)
35. Kumar A, Mukhia S, **Kumar R*.** 2022. Production, characterisation, and application of exopolysaccharide extracted from a glacier bacterium *Mucilaginibacter* sp. ERMR7: 07. **Process Biochemistry** 113:27–36. DOI:10.1016/j.procbio.2021.12.018. (*****Corresponding Author)
36. Mukhia S, Kumar A, Kumari P, **Kumar R*.** Kumar S. 2022. Multilocus sequence based systematics of *Pseudomonas* sp. from supraglacial site of Sikkim Himalaya and their adaptational strategies. **Plos One**. 17(1): e0261178. DOI:10.1371/journal.pone.0261178. (*****Corresponding Author)
37. Rathore S, Mukhia S, Kapoor S, Bhatt V, **Kumar R**, Kumar R. 2022. Seasonal variability in essential oil composition and biological activity of *Rosmarinus officinalis* L. accessions in the western Himalaya. **Scientific Reports**, 12.1: 3305.DOI:10.1038/s41598-022-07298.
38. Lalthafamkimi, L, Bhau, B S, Kumar, S, Mukhia S, **Kumar R**., Banik D. Bhattacharyya P, 2022. Indirect organogenesis-mediated high frequency conversion of non-embryonic synthetic seeds, essential oil profiling and antibacterial activity in genetically stable plants of Patchouli. **3Biotech,** 12.12: 349 (2022).DOI:10.1007/s13205-022-03302-3
39. Chander R, Maurya AK, Kumar K, Kumari S, **Kumar R**, Agnihotri VK. 2022. In vitro antidiabetic and antimicrobial activity of *Dracocephalum heterophyllum* Benth. essential oil from different sites of North-western Himalayas India. **Natural Product Research.** 2022, 1-4 DOI: 10.1080/14786419.2022.2096603
40. Maurya AK, Baliyan N, **Kumar R**, Agnihotri VK, 2022. Synthesis of Sulfur Containing Analogues of Hedychenone, a Labdane Diterpenoid from Hedychium spicatum. **Journal of Natural Products**.85.7:1691-1696. DOI:10.1021/acs.jnatprod.2c00112
41. Maurya AK, Sharma A, Mukhia S, Rani D, Kumar A, Kumar D, **Kumar R**, Padwad, YS and Agnihotri VK. 2022. Essential Oil Composition, In Vitro Biological Activities and Safety Evaluation of Cultivated *Hedychium spicatum* Seeds. **Indian Journal of Pharmaceutical Sciences**. 84.3:783-790 DOI:10.36468/pharmaceutical-sciences.973.

2021

42. Manyapu V, Kumar A, **Kumar R*.** 2021. Psychrophilic biomethanation for enhanced

bioenergy production in cold regions. **Clean Technologies and Environmental Policy** 20:1-6.1. DOI:10.1007/s10098-021-02223-8. (*****Corresponding Author)

43. Dindhoria K, Kumar S, **Kumar R***. 2021. Taxonomic and functional analysis of proglacial water bodies of Triloknath glacier ecosystem from North-WesternHimalayas. **Ecological Informatics**, 64:101365. DOI:10.1016/j.ecoinf.2021.101365. (*****Corresponding Author)
44. Kumar A, Mukhia S, **Kumar R***. 2021. Industrial applications of cold-adapted enzymes-challenges, innovations and future perspective. **3 Biotech** 11:426. DOI:10.1007/s13205-021-02929-y. (*****Corresponding Author)
45. Baliyan N, Dindhoria K, Kumar A, Thakur A, **Kumar R***. 2021. Comprehensive substrate-based exploration of probiotics from undistilled traditional fermented alcoholic beverage 'Lugri'. **Frontiers in Microbiology**. 12:626964. DOI:10.3389/fmicb.2021.626964. (*****Corresponding Author)
46. Thakur A, Kumari S, Borker SS, Prashant SP, **Kumar R*.** 2021. Solid waste management in Indian Himalayan Region: Current scenario, resource recovery, and way forward for sustainable development". **Frontiers in Energy Research**. 9:609229. DOI:/10.3389/fenrg.2021.609229. (*****Corresponding Author)
47. Mukhia S, Kumar A, **Kumar R***. 2021.Generation of antioxidant peptides from soy protein isolate through psychrotrophic *Chryseobacterium* sp. derived alkaline broad temperature active protease. **LWT-Food Science and Technology**. 143:111152 / DOI:10.1016/j.lwt.2021.111152. (*****Corresponding Author)
48. Mukhia S, Khatri A, AcharyaV, **Kumar R***. 2021. Comparative genomics and molecular adaptational analysis of *Arthrobacter* from Sikkim Himalaya provided insights into its survivability under multiple high-altitude stress. **Genomics**. 113.1: 151-158**.** DOI:10.1016/j.ygeno.2020.12.001. (*****Corresponding Author)
49. Kumar A, Mukhia S, Kumar N, Acharya V, Kumar S, **Kumar R***. 2020. A broad temperature active lipase purified from a psychrotrophic bacterium of Sikkim Himalaya with potential application in detergent formulation. **Frontiers in Bioengineering and Biotechnology**. 8:642. DOI:10.3389/fbioe.2020.00642.(*****Corresponding Author)
50. Borker S S, Thakur A, Kumar S, Kumari S, **Kumar R***, Kumar S. 2021. Comparative genomics and physiological investigation supported safety, cold adaptation, efficient hydrolytic and plant growth-promoting potential of psychrotrophic Glutamicibacterarilaitensis LJH19, isolated from night-soil compost. **BMC Genomics**, 22.1:307.DOI:10.1186/s12864-021-07632-z. (*****Corresponding Author)
51. **Kumar R***, Borker SS, Thakur A, Thapa P, Kumar S, Mukhia S, Kumari A, Bhattacharya A, Kumar S. 2021. Physiological and genomic evidence supports the role of *Serratia quinivorans* PKL:12 as a potential biopriming agent for the biohardening of micropropagated *Picrorhiza kurroa* plantlets in cold regions. **Genomics**. 113.3:1448-1457. DOI: 10.1016/j.ygeno.2021.03.019. (*****Corresponding Author)
52. Suyal DC, Joshi D, Kumar S, Bhatt P, Narayan A, Giri K, Singh M, Soni R, **Kumar R**, Yadav A. 2021. Himalayan Microbiomes for Agro-environmental Sustainability: Current Perspectives and Future Challenges. **Microbial Ecology**, 84:643–675. DOI:10.1007/s00248-021-01849-x.

2020

53. Singh J, Prashant S P, Kumari S, Borker S S, **Kumar R***. 2020. Conservation of the night

soil composting and the importance of organic farming in high altitude regions:A review. **Bharatiya Vaigyanik Eevam Audyogik Anusandhan Patrika** (BVAAP). 28.2: 132-139. [CSIR Journal]

54. Walia S, Mukhia S, Bhatt V, **Kumar R**, Kumar R. 2020. Variability in chemical composition and antimicrobial activity of *Tagetesminuta* L. essential oil collected from different locations of Himalaya. **Industrial Crops and Products.** 1; 150:112449. DOI:10.1016/j.indcrop.2020.112449.
55. 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 Himalaya **Food Bioscience**. 21:100570. DOI:10.1016/j.fbio.2020.100570.
56. 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**.191:110217. DOI:10.1016/j.ecoenv.2020.110217.
57. 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 DOI:10.1016/j.ygeno.2019.04.016. [IF: 4.4]

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58. **Kumar R***, Acharya V, Mukhia S, Singh D, Kumar S. 2019. Complete genomesequence of *Pseudomonas frederiksbergensis* ERDD5: 01 revealed genetic bases forsurvivability at high altitude ecosystem and bioprospection potential. **Genomics**. 111.3:492-499.DOI:10.1016/j.ygeno.2018.03.008. (*Corresponding Author)

2018

59. **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. **Environmental Microbiome.** 13.1: 1-13. DOI: DOI:10.1186/s40793-018-0313-3. (*Corresponding Author)
60. Maurya AK, Devi R, Kumar A, Koundal R, Thakur S, Sharma A, Kumar D, **Kumar R**, Padwad YS, Chand G,Singh B. 2018. Chemical Composition, Cytotoxic and Antibacterial Activities of Essential Oils of Cultivated Clones of Juniperuscommunis and Wild Juniperus Species. **Chemistry & Biodiversity**. 15.9: e180018. DOI:10.1002/cbdv.201800183.

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61. **Kumar R***, Singh D, Swarnkar MK, Singh AK, Kumar S. 2016. Complete genome sequence of *Arthrobacter alpinus* ERGS4:06, a yellow pigmented bacteriumtolerant to cold and radiations isolated from Sikkim Himalaya. **Journal of Biotechnology**. 220: 86-87. DOI:10.1016/j.jbiotec.2016.01.016. (*CorrespondingAuthor)
62. Himanshu, Swarnkar M K,Singh D, **Kumar R***. 2016. First completegenome 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. DOI:10.1016/j.jbiotec.2016.02.011. (*Corresponding

Author)

2015

63. **Kumar R***, Singh D, Swarnkar MK, Singh AK, Kumar S. 2015. Genome assembly of *Chryseobacterium polytrichastri* ERMR1:04, a psychrotolerant bacterium with cold active proteases, isolated from East Rathong Glacier in India. **Genome Announcement**.3(6):e01305-15. DOI:10.1128/genomeA.01305-15. (*Corresponding Author)
64. **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. DOI:10.1016/j.jbiotec.2015.09.025. (*Corresponding Author)

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65. **Kumar R**, Kumar R, Nupur, Srinivas TNR, Kumar PA. 2013. *Caldimonasmeghalayensis* sp. nov., a novel thermophillic betaproteobacterium isolated froma hot spring of Meghalaya in northeast India**. Antonie van Leeuwenhoek**. 104: 1217- 1225. DOI:10.1007/s10482-013-0043-x.
66. **Kumar R**, Nongkhlaw M, Acharya C, Joshi SR. 2013. Soil bacterial metagenomic analysis from uranium ore deposit of Domiasiat in North-eastIndia. **Current Science**. 105.4.
67. **Kumar R**, Nongkhlaw M, Acharya C, Joshi SR. 2013. Growth media composition and heavy metal tolerance behaviour of bacteria characterized from the sub-surface soil of uranium rich ore bearing site of Domiasiat in Meghalaya. **Indian Journal of Biotechnology**.12:115-119**.**
68. **Kumar R**, Nongkhlaw M, Acharya C, Joshi SR. 2013. (U)-tolerant bacterial diversity from U ore deposits of Domiasiat in North-East India and their prospective utilisation in bioremediation. **Microbes and Environment**. 28.1: 33-41. DOI:10.1264/jsme2.ME12074.
69. **Kumar R**, Nongkhlaw M, Acharya C, Joshi SR. 2013. Bacterial community structure from the perspective of the uranium ore deposit of Domiasiat in India.**Proceedings of the National Academy of Sciences, India Section B: Biological Sciences.** 83: 485-497. DOI: 10.1007/s40011-013-0164-z

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70. Nongkhlaw M[#], **Kumar R**[#], Acharya C, Joshi SR. 2012. Occurrence of horizontal gene transfer of PIB-type ATPases among bacteria isolated fromuranium rich deposit of Domiasiat in North East India. **Plos One**. 72.5: 3111-3118. DOI: 10.1371/journal.pone.0048199. ([#]Equal Contribution)

2011

71. **Kumar R**, Acharya C, Joshi SR. 2011. Isolation and analyses of uranium tolerant *Serratia marcescens* strains and their utilization for aerobic uranium U(VI) bioadsorption. **The Journal of Microbiology**. 49:568-574. DOI:10.1007/s12275-011-0366-0.

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72. Sohliya I, Joshi SR, Bhagobaty RK, **Kumar R**. 2009. Tungrymbai- A traditional fermented soybean food of the ethnic tribes of Meghalaya. **Indian Journal of Traditional Knowledge**. 8(4),559-561. http://nopr.niscpr.res.in/handle /123456789/6286

Book chapters in book published

1. **Kumar R,** Joshi SR. 2008. Microbial ecology of the soil: Studying the diversity of microorganisms in the most complex of environments- A review, pp 267-277. *In* P Parihar and L Parihar (eds.), **Advances in Applied Microbiology**, Agrobios. [ISBN number: 8177543563]
2. **Kumar R**, Joshi SR. 2009. Probiotics: Biotechnology in prolongation of life, pp 187-212. *In* C.S.K. Mishra and Pascale Champagne (eds.). **Biotechnology Applications**, I.K. International Pvt. Ltd., New Delhi. [ISBN number: 978-93-80026-29-9]
3. **Kumar R,** Joshi SR. 2009. Probiotics: Indigenous fermented foods as a source of potential medicinal microbes, pp 211-222. *In* D Marngar and S Jyrwa (eds). **Biodiversity–Herbal Medicine**. [ISBN number: 978-81-83701-54-9]
4. Joshi SR, Kalita D, **Kumar R**, Nongkhlaw M, Swer PB. 2014. Metal–Microbe Interaction and Bioremediation, pp 235-251. *In* D. K. Gupta and C. Walther (eds.). **Radionuclide Contamination and Remediation through Plants**. Springer International Publishing. [ISBN number: 978-3-319-07664-5]
5. Borker, S. S, Prashant, S. P, Kumari, A, Kumari, S, Devi, R, & **Kumar, R.** 2021. Metabolic Pathways in Biodegrading Psychrotrophic Bacteria Under Cold Environments, pp. 217-233. *In* Anita Pandey and Avinash Sharma (eds.). **Extreme Environments: Unique Ecosystems–Amazing Microbes.** CRC Press. [ISBN number: 9780367350161]
6. Baliyan, N, Kumari, M, Kumari, P, Dindhoria, K, Mukhia, S, Kumar, S, & **Kumar, R.** 2022. Probiotics in fermented products and supplements, pp. 73-107. *In* Amit Kumar Rai, Sudhir P. Singh, Carlos Ricardo Socco (eds.). **Current Developments in Biotechnology and Bioengineering**. Elsevier.
7. Kumari, S., Manyapu, V., & **Kumar, R.** 2022. Recent advances in composting and vermicomposting techniques in the cold region: resource recovery, challenges, and way forward, pp. 131-154. *In* Chaudhary Hussain and Subrata Hait (eds.). **Advanced Organic Waste Management.** Elsevier.
8. Kumar, A., Kumari, S., Dindhoria, K., Manyapu, V., & **Kumar, R.** 2021. Efficient

Utilization and Bioprocessing of Agro-Industrial Waste, (pp. 1-37). In Eric Lichtfouse, Shivendu Ranjan Nandita Dasgupta (eds.). **Sustainable Agriculture Reviews 56.** Springer, Cham.x

9. Manyapu, V., Lepcha, A., Sharma, S. K., & **Kumar R**. (2022). Role of psychrotrophic bacteria and cold-active enzymes in composting methods adopted in cold regions. **Advances in Applied Microbiology**, 121, 1-26.

10. Kumar, A., Mukhia, S., Kumar, A., Dindhoria, K., Baliyan, N., & **Kumar R***. (2023). Culture maintenance, preservation, and strain improvement. In Basic Biotechniques for Bioprocess and Bioentrepreneurship (pp. 105-121). **Academic Press**.

11. Lepcha A, Manyapu V, Ali A, Sharma SK, Pandey KK, **Kumar R***. (2024) Microplastics in Soil-Plant Systems. In Microplastic Occurrence, Fate, Impact, and Remediation 2023 Aug 12 (pp. 251-280). Cham: **Springer Nature Switzerland**.

12. Dindhoria K, Manyapu V, Ali A, Kumar A. **Kumar R***. 2024. Overview and Applications of CRISPR/Cas9 Based Genome Editing in Industrial Microorganisms. Pp: 18-44 (27). https://doi.org/10.2174/9789815165678124010005

Popular Article

1. 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]
2. **Kumar R**. Microbial intervention in Himalayan Dry Toilets. In Himkatha, a bi-annual newsletter of Nature Conservation Foundation (NCF's) High Altitude Program. URL: https://www.himkatha.org/microbial-intervention-in-himalayan.
3. Datta B, Ahmed S, Rai S, **Kumar R**. 2025. Advancing microbial research in the North East Indian Himalaya: a pathway to sustainable hill agriculture. In The Microbiologist, a digital magazine published by Applied Microbiology International, a microbiology society of United Kingdom. URL: https://www.the-microbiologist.com/features/advancing-microbial-research-in-the-north-east-indian-himalaya-a-pathway-to-sustainable-hill-agriculture/5169.article

RESEARCH GUIDANCE:

Six PhD completed:

Academy of Scientific and Innovative Research (AcSIR),New Delhi:

i. Miss. Shruti Sinai Borker (UGC-SRF);
ii. Mr. Anil Kumar (DBT-SRF)
iii. Miss. Neha Baliyan (ICMR-SRF);

iv. Miss. Kiran Dhindhoria (CSIR-SRF)
v. Miss Sareeka Kumari (NMHS-JRF)

Guru Nanak Dev University, Amritsar:

i) Miss Srijana Mukhiya (ICMR-SRF)

TEACHING

2024 onward **Associate Professor at Tripura University (A Central University)**

2015- 2024 Designated as an Assistant Professor of the Academy of Scientific and Innovative Research (AcSIR) in the faculty of Biological Science for conducting PhD course work classes in the faculty of Biological Science. Supervised 05 B.Tech and 12 MSc dissertation projects pertaining to high altitude microbiology.

2013-2014 Conducted theory and practical classes for first & second Semester MSc Microbiology course in Sikkim Central University, Gangtok, Sikkim

2010-2012 Helped in conducting practical classes for Open Microbiology Course for MSc programme in Department of Biotechnology & Bioinformatics, North Eastern Hill University, Shillong, Meghalaya

2005-2007 Worked as faculty of Horticulture for senior secondary classes in Government Senior Secondary Schools of Assam Lingzey and Ranka of East Sikkim; and Namchi of South Sikkim

PROJECTS

1. **Captive production of *shiitake* and oyster mushroom and their processing for vitamin D2 enrichment** sanctioned by DBT Govt. of India February 2022- February 2025. Total project cost: Rs 24,30,300 /-
2. **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 2024. Total project cost: Rs. 1,17,67,463/-
3. **Integrated Scientific Solutions for Improving Legacy Municipal Solid Waste Management in the Indian Himalayan Region** sanctioned by NMHS (MoEF&CC). 01 August 2023-31 July 2024. Total project cost: Rs.1,45,65,920/

Completed Projects

R&D projects

1. **Design and development of Dry Bio-Toilet for the Himalayan region (Renamed as Utilization of compost booster for newly designed and developed sanitary dry**

toilets with the recovery of fertilizer from human urine in the Himalayan region (ComSan-DT) Sanctioned by CSIR. 08 August 2023-30 June 2024. Total project cost: Rs.2,0904000/-

2. **Low temperature Adapted Methanogenesis (LTAM) process for sustainable sewage management in Himalayan and Sub Himalayan climates (LTAM-HIMS).** Sanctioned by CSIR. 08 August 2023-30 June 2024. Total project cost: Rs.1,6200000/-
3. **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. 06 Nov 2019 to 05 Nov. 2021. Total project cost: Rs Rs.29,66,434/-
4. **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. 01 Jan. to 31 May 2022 Total project cost: Rs 47,040,00/-
5. **Study of bacteria from the ice core of East Rathong glacier of Sikkim with referenceto climate change**, sanctioned by DST, Govt. of India under INSPIRE Faculty programme. 10 Oct 2014 to 31 Oct 2019. Rs 35,00000/-
6. **Bioavailability Estimation of Vitamin D_2 enriched Shiitake mushroom in Humans deficient in 25- hydroxyl vitamin D_2,** CSIR Mission Project 07 April 2021-31 March 2023, Rs. 17,00,000/-
7. **Development of selenium and vitamin D2 enriched formulation from Lentinula edodes (Shiitake).** CSIR Mission Project. 10 August 2018-31 March 2020. Rs 90,00,000/-
8. **Indigenous enzymes for degumming of rice bran oil and other vegetable oils,** CSIR FTT Project. 08 August 2018 31 March 2020, Rs. 30,00,000/-
9. **Development of bacterial formulations and organic dustbin for organic waste degradation in cold hilly regions.** CSIR FTT Project. 27 August 2018-31 March 2020. Rs 75,00,000/-
10. **Bioprospection of the microbiome from Himalayan niches.** CSIR-NCP Project. 14 August 2018-31 March 2020. Rs 75,00,000/-

Livelihood Project (SFURTI and Consultancy):

1. **Triloki Enriched Composting/ Vermicomposting Cluster.** sanctioned by Ministry of MSME, Govt. of India under SFURTI, programme. Nodal Agency: Foundation for MSME clusters, New Delhi 17 April 2020-16 April 2023. Total project cost: Rs Rs 2,05,08000/-. Technical Agency Fee: Rs.13,90,000/-
2. **Moonew Tareybhir Enriched Composting/ Vermicomposting Cluster.** Sanctioned by Sanctioned by MoMSME, GoI under SFURTI Scheme. Nodal Agency: Foundation for

MSME clusters, New Delhi 17 April 2020-16 April 2023. Total project cost: Rs Rs 2,05,08000/-. Technical Agency Fee: Rs.13,90,000/-

3. **West Sikkim shiitake mushroom & other food processing cluster** Sanctioned by Sanctioned by MoMSME, GoI under SFURTI Scheme. Nodal Agency: KVIC, Gangtok. Manav Jiwan Sudhar Evam Kshamta Nirman Samity, Soreng, West Sikkim 17 February 2021-16 February 2024. Total project cost: Total project cost: Rs 2,44,90000/-. Technical Agency Fee: Rs.,16,29,000/-
4. **Sumbuk shiitake Mushroom and Other Food Processing cluster Sumbuk, South Sikkim** Sanctioned by Sanctioned by MoMSME, GoI under SFURTI Scheme. Nodal Agency: KVIC, Gangtok. Glen Leu Women's Service Cooperative Society Ltd, South Sikkim. 17 February 2021-16 February 2024. Total project cost: Total project cost: Rs 2,44,90000/-. Technical Agency Fee: Rs.,16,29,000/-
5. **Norbu Choelling shiitake Mushroom and Other Food Processing cluster.** Sanctioned by Sanctioned by MoMSME, GoI under SFURTI Scheme. Nodal Agency: KVIC, Gangtok. Lametan Tingmoo Organic Growers Cooperative Society Limited, Sikkim. 17 December 2020 – 16 December 2023. Total project cost: Total project cost: Rs 2,44,90000/-. Technical Agency Fee: Rs.,16,29,000/-
6. **Production and supply of "Compost Booster" and "Effective Microbial" solutions and consultancy for its usages for efficient organic waste/ night soil management.** Sanctioned by Different Parties Total project cost: Rs.1,17,000/
7. **Production and supply of "Compost Booster" and "Effective Microbial" solutions and consultancy for its usages for efficient organic waste management. Sanctioned** by Station Headquarter, Holta Camp Palampur Total project cost: Rs. 92,850/-

Industry-sponsored projects:

1. **Characterization of efficient Nitrogen fixing (NFB), Phosphorous solubilizing (PSB) and Potash mobilizing (KMB) bacteria from organic farmlands of Sikkim** Industrial sponsored science and technology sponsored Projects by an industry as per signed MoU. December 2018 to December 2023. Total project cost: Rs. 5,00,000/-
2. **Cultivation of *shiitake* mushroom and its enrichment with Vitamin D_2.** Industrial sponsored science and technology sponsored Projects sanctioned by four industry stakeholders as per signed MoU. March 2019 to March 2024. Total project cost: Rs. 20,00,000/-
3. **Development of Hand Sanitizer** Industrial sponsored science and technology sponsored Projects sanctioned by four industry stakeholders as per signed MoU. March 2020 march 2025. Total project cost: Rs. 8,25,000/ + GST
4. **Development of efficient psychrotrophic bacterial formulation for preparation of enriched compost/ vermicomposting in cold hilly region and production and testing of enriched compost.** Industrial sponsored science and technology sponsored Projectsby two industries as per signed MoU. August 2020 to august 2023.

Total project cost: Rs. 10,00,000+ GST.

REVIEW EDITOR

- Frontiers in Microbiology, Frontiers in Bioengineering and Biotechnology, and Frontiers in Environmental Science

REVIEWED PAPERS FOR (BY INVITATION)

- Bioresource Technology, Genomics, Frontiers in Microbiology, Gene, Journal of Food Science and Technology, International Journal of Energy Research, Journal of Basic Microbiology, Applied Biochemistry and Biotechnology, Gene Reports, South African Journal of Botany, Proceedings of the National Academy of Sciences, India Section B: Biological Sciences, International Journal of Tropical Biology and Conservation

PRESENTATIONS

Oral

1. "Probiotics: Indigenous fermented foods as a source of potential medicinal microbes" in **National Seminar on Biodiversity: Herbal Medicine** at Synod College, Shillong, Meghalaya. (September 20-21, 2007).
2. "Metal tolerant *Bacillus* and *Pseudomonas* from Uranium rich soils of Meghalaya" in **1ST International Society Biotechnology Conference** at Sikkim Manipal Institute of Technology, Gangtok, Sikkim, India. (December 28-30, 2008).
3. "Metal-resistant Bacterial strains isolated from Uranium rich environment of Domiasiat in Meghalaya" in **Environmental Sciences Section of 96th session of the Indian Science Congress**, at North Eastern Hill University, Shillong, Meghalaya. (January 3-7, 2009).
4. "Diversity of metal tolerant bacteria from pre-mined uranium rich areas" in **Seminar on Biodiversity of North-East India-Issues and Concerns,** at North Eastern Hill University, Shillong, Meghalaya. (May 22, 2010).
5. "Metal tolerance potential in different growth media by the identified uranium (U) - tolerant bacteria from the sub-surface soil of U rich ore bearing site of Domiasiat in Meghalaya" in **National Conference on Biology and Bioinformatics of Economically Important Plants and Microbes,** at University of North Bengal, Siliguri, West Bengal. (Feb 17-19, 2012).
6. "Relevance of bacterial study from glaciers in terms of climate change" in **Microbial World 2014: National Seminar on Applied Microbiology**, at University of North Bengal, Siliguri, West Bengal. (March 14, 2014).
7. "Study of the diversity of thermo tolerant bacteria of the hot springs of Sikkim and Meghalaya in north-east India" in **The National Symposium on Himalayan**

Biodiversity: Prospects and Challenges, at North Eastern Hill University, Shillong (March 20-21, 2014).

8. "Microbial diversity from extreme environments and their preservation" in National Seminar on "**Preservation of Bio-diversity and Cultural Diversity**" organised by School of Life Sciences, Sikkim University (central university) and Centre for Studies in Civilization, New Delhi (November 1, 2014)

Poster

1. "Metal tolerant bacterium from uranium rich site of Meghalaya" in **National Seminar on toxicity of chemicals & their hazards with special reference to heavy metals** at St. Edmund's College, Shillong, Meghalaya. (October 23-24, 2008).
2. "Characterization of Culturable Aerobic Uranium Tolerant Bacteria from Sub-surface Soils around the Dumping Sites of Uranium Exploratory Drilling and Test Recovery Plant of Domiasiat in India" in **International Symposium on Recent Advances in Cross-disciplinary Microbiology: Avenues & Challenges** at 51st Annual Conference of Association of Miocrobiologists of India (AMI) at Birla Institute of Technology, Mesra, Ranchi. December, 2010.

PERSONAL DETAILS

Father's name	:	Madhur Kumar Chhetri
Born	:	August 10, 1982-Shillong, Meghalaya
Marital status	:	Married
Permanent Address	:	Flat No. 4B Anusuya Annda Apartment Baghorbari, Pnjabari Dist: Kamrup Metropolitan Guwahati-781003, Assam, India

I declare that the information furnished above is true and correct to the best of my knowledge and belief, and that no related information is concealed.

Date: 17-09-2024
Place: Agartala

Rakshak Kumar

(RAKSHAK KUMAR)