

## Curriculum vitae

**Prof. (Dr.) NAVEEN KUMAR ARORA**

*Department of Environmental Science*

*Ex-Head*

*Department of Environmental Microbiology*

*School for Environmental Sciences*

*Co-coordinator, CIIPP*

*Babasaheb Bhimrao Ambedkar University,*

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South City Gardens (Unitech Apartment),  
South City, Rae Bareli Road,  
Lucknow – 226025, Uttar Pradesh  
India.

**Permanent Address** Shri Nath Kuti,  
Lane No. 1, Block A,  
Aryanagar, Hardwar – 249 407,  
Uttarakhand, India

**Date of Birth** 17<sup>th</sup> June, 1973

**Nationality** Indian

**Area of Specialization**

Environmental and Agriculture Microbiology

## **Education**

### **Ph.D. Microbiology**

1997 – 2001  
Influence of Physiological Stress Conditions on Rhizobia and Their Inoculant Production  
University – Gurukula Kangri Vishwavidyalaya, Haridwar.

### **M.Sc. Microbiology**

1994 – 1996  
First Division (73%)  
Dissertation – Studies on Nodulation of Two Strains of Rhizobia  
University – Gurukula Kangri Vishwavidyalaya, Haridwar.

### **B.Sc. (Hons.)**

1991 – 1994  
First Division (71.0%)  
Subjects – Zoology (subject in Honours), Botany and Chemistry  
University – Gurukula Kangri Vishwavidyalaya, Haridwar.

## **Scholarships**

1998  
Qualified Joint CSIR-UGC Test for Junior Research Fellowship and Eligibility for Lectureship (NET) in June 1998

## **Research Interests**

**Currently working in the field of plant growth promoting microbes including endophytes. This includes isolation, screening, interactions of potentially useful rhizosphere microbes for use as biopesticide and biofertilizers for reclamation of wastelands and arid lands. Developed bioformulations using PGP microbes and their metabolites.**

**Also working on aquatic microbiology particularly microflora of lotic water habitats with emphasis on allochthonous populations (related to human health).**

**Reported two new species of root nodulating bacteria (rhizobia) first time from India.**

## **Research/Teaching Experience**

November, 2017 to Present	Professor, Department of Environmental Science, BBA University, Lucknow
August 2014 to August 2017	Head, Department of Environmental Microbiology, Babasaheb Bhimrao Ambedkar University, Lucknow
June 2011 to July 2014	Associate Professor, Department of Environmental Microbiology, Babasaheb Bhimrao Ambedkar University, Lucknow
July 2009 to June 2011	Reader & Head, Department of Microbiology, CSJM University, Kanpur Director-in-Charge, Institute of Biosciences & Biotechnology, CSJM University, Kanpur, Uttar Pradesh, India
September 2004 to June 2009	Lecturer, Department of Microbiology, CSJM University, Kanpur, Uttar Pradesh, India.
April 2001 to August 2004	Lecturer, Department of Microbiology, Sardar Bhagwan Singh PG Inst. of Bio-Medical Sciences and Research Balawala Dehradun, Uttarakhand, India.
Jan. 2001 to March 2001	Senior Research Fellow (CSIR-NET) at Department of Botany and Microbiology, Gurukula Kangri University, Haridwar, Uttarakhand, India
Jan. 1999 to Dec. 2000	Junior Research Fellow (CSIR-NET) at Department of Botany and Microbiology, Gurukula Kangri University, Haridwar, Uttarakhand, India
July 1998 to Dec. 1998	Junior Research Fellow in the Research Laboratory at Department of Botany and Microbiology, Gurukula Kangri University, in a Council of Scientific and Industrial Research (CSIR), funded project.
July 1997 to June 1998	Project Fellow, Deptt. of Botany & Microbiology, Gurukula Kangri University, Haridwar, Uttarakhand, India.

## **Thesis Supervision**

PhD Thesis Awarded – Eight

PhD Thesis Submitted - One

PhD Guiding (currently) - Five

Guided 118 M.Sc. Dissertations and 01 M.Phil. in the field of Environmental Microbiology and Biotechnology

## **R& D Project(s) Completed/ Ongoing**

2012 - 2015	Screening of sewage pollution in Ganga water and assessment of its impact on ground water along the path of river flow in Kanpur Funding Agency – CST (UP), Lucknow Total Cost – 9.0 lakhs
2011 - 2014	Screening and identification of hot spots of sewage pollution containing multiple drug resistant E. coli in River Ganga at different locations of Kanpur Funding Agency – UGC New Delhi Total Cost – 9.88 lakhs
2009 - 2012	Designing multifaceted bioformulation technology utilizing fluorescent pseudomonads for cultivation and productivity enhancement of sunflower crop in arid and semi-arid regions infested with <i>Macrophomina phaseolina</i> Funding Agency – CST, Lucknow Total Cost – 6.96 lakhs
2007 - 2011	Revelation of mechanism and metabolites for biocontrol of deadly phytopathogens by plant growth promotory bacteria, designing reliable technology for future bioformulations and sustainable agriculture Funding Agency - CSIR, New Delhi Total Cost – 16.0 lakhs
2007 - 2011	Developing broad spectrum biocontrol technology by utilizing and optimizing secondary metabolites from indigenous PGP Pseudomonads for controlling soil borne phytopathogens and ecofriendly agriculture Funding Agency – Department of Biotechnology, Ministry of Science Technology, New Delhi Total Cost – 17.06 lakhs
2004 -2007	Development of ecofriendly, multirole, cost effective microcosmic bioformulation capable to act as biopesticide for sustainable agriculture Under Fast Track Young Scientist Scheme of DST, Ministry of Science & Technology, N. Delhi. Total Cost – 9.0 lakhs

## **Consultancy Services**

Providing consultancy services to Eureka Forbes (Aquaguard) which will be further expanded in form of research project

## Lectures Delivered in Seminars/Conferences

December 26-28, 1996	19 <sup>th</sup> Conference of Indian Botanical Society /National Seminar on Biotechnology: New Trends and Prospects held at Gurukula Kangri University, Hardwar, U.P., India
October 15-18, 1997	TCDC International Workshop on Application of Biotechnology in Biofertilizers & Biopesticides held at Indian Institute of Technology, New Delhi
September 23-25, 1998	National Seminar on Bioinoculants for Holistic Sustainable Rural Developments held at Gurukula Kangri University, Hardwar.
November 14-16, 1998	International Symposium on Microbial Sustainable Development and Productivity held at Rani Durgavati University, Jabalpur, India
October 14-16, 2000	XXIII Botanical Conference, Ch. Charan Singh University, Meerut, India
February 26-27, 2005	BIO-CON 2005 held at Sai College of Medical Science & Technology, Kanpur.
March 22-23, 2005	Workshop on 'Medicinal Plants' held at Department of Adult Education, CSJM University, Kanpur.
July 9-15, 2006	<b>18<sup>th</sup> World Congress of Soil Science, held at Philadelphia, USA. Organized by International Union of Soil Science. Travel support from Department of Science &amp; Technology, New Delhi (No. SR/PF/423) and Council of Scientific and Industrial Research (No 27/209/169/2006/ISTAD)</b>
August 24-25, 2006	DST Group Monitoring Workshop held at Agharkar Research Institute, Pune
June 21-24, 2009	First Asian PGPR Congress for Sustainable Agriculture, Acharya N G Ranga Agricultural University, Hyderabad.
February 25-27, 2010	International Workshop on Rhizosphere Biology of Agriculture, Horticulture and Forestry: Present and Future, held at G.B. Pant University of Agriculture & Technology, Pantnagar.
August 21-24, 2011	<b>Second Asian PGPR Congress for Sustainable Agriculture, Beijing, China. Organized by Asian PGPR Society. Travel support from Department of Science and Technology, New Delhi.</b>

October 26-27, 2013	National Conference on Microbes promoting plant health, productivity and sustainability and zonal meeting. Organized by CSIR-CIMAP and CSIR-NBRI Lucknow
November 21-23, 2013	International conference on Environment, Health and Industrial BioSangam, Organized by Department of Biotechnology MNNIT, Allahabad
Feb 3-7, 2014	Plenary Lecture at 101 <sup>st</sup> Indian Science Congress, University of Jammu, J&K
Feb 21-23, 2014	International Conference on Environmental Technology and Sustainable Development: Challenges and Remedies. Organized by BBA University, Lucknow.
Oct 7-8, 2014	National Workshop on advances in PGPR research at Banaras Hindu University, Varanasi
May 3-6, 2015	4 <sup>th</sup> Asian PGPR Conference, Hanoi, Vietnam, <b>Organized by Asian PGPR Society. Travel support from Department of Biotechnology, New Delhi (Grant No. DBT/CTEP/02/201500217).</b>
July 12-18, 2015	8 <sup>th</sup> ISS Congress, Lisbon, Portugal, Organized by International Symbiosis Society. <b>Travel support from Department of Science and Technology, New Delhi (Grant No. ITS/1862/2015-16).</b>
Nov, 2015	Invited Talk at 3 <sup>rd</sup> Lucknow Science Congress LUSCON – 2015, Lucknow, UP, India
Sept, 15-24, 2015	Invited Talk in National Workshop on Advanced Techniques for Bioremediation and Management of Salt Affected Soils at Central Soil Salinity Research Institute (CSSRI), Lucknow, UP, India.
Jan 3-7, 2016	Invited Talk at 103 <sup>rd</sup> Indian Science Congress, Mysore University, Mysore, Mysore, Karnataka, India.
April 03, 2017	Invited Talk in International conference on Agriculture and Biotechnology, Pune
April 16, 2017	Invited Talk in International conference on Pharmaceutical, Medical & Environmental Health Sciences, Pune
July 15-16, 2017	Invited Talk in National Conference on Tourists and Green Spaces: Healthier lifestyle approaches from nature, BBA University, Lucknow
November 18, 2017	Lead Talk in 58 <sup>th</sup> Annual Conference of AMI- 2017 on Plant growth promoting rhizobacteria for combating saline stress in diverse crops, BBA

	University, Lucknow
Feb 10-11, 2018	Lead Talk in National Seminar on Transforming Agriculture to Doubling of Farmers Income, Organized by Samagra Vikas Welfare Society, BBA University, Lucknow.
Feb 24-25, 2018	Invited Talk in National Conference on Climate Change, Environmental Pollution and Biodiversity Conservation, Organized by CGES, Lko. And CSIR-NBRI, Lko.
March 09-11, 2018	Plenary Talk in International Conference on Innovations and Translational Dimensions: Food, Health and Environment Biotechnology (Biosangam-2018) at MNIIT, Allahabad.
	<b>Seminars/Conferences Organized</b>
Feb 19-21, 2007	<b>Organizing Secretary and Convener of National Conference on ‘Scope and Application of Microbes in Agriculture and Environment – <i>New Horizons and Technologies</i>’ from 19<sup>th</sup> – 21<sup>st</sup> February, 2007.</b> The conference was funded by Department of Biotechnology (DBT), Department of Science and Technology (DST), and Council of Scientific and Industrial Research (CSIR), New Delhi.
April 23-25, 2011	Organized Exhibition ‘ <b>Wild Splendor – An Awakening Call from Indian Jungles</b> ’ at International Centre CSJM University, Kanpur with the theme on wildlife conservation. Approximately 2000 delegates visited the exhibition.
March 10-11, 2014	Organizing Secretary of <b>National Workshop Innovation and Technology Transfer to Industries: Role of Universities</b> at BBA University. Lucknow 10 <sup>th</sup> and 11 <sup>th</sup> March 2014.
March 12-13, 2015	Organizing Secretary of <b>National seminar on University-industry partnership: A March towards sustainable growth</b> at BBA University. Lucknow 12 <sup>th</sup> and 13 <sup>th</sup> March 2015.
September 15, 2016	Organized <b>A Workshop on Waste Management</b> under ‘ <b>Swacch Bharat Pakhwara</b> ’ at BBA University, Lucknow from 1 <sup>st</sup> – 15 <sup>th</sup> September, 2016
February 28, 2017	Organized <b>One day Symposium on Science and Technology for Specially Abled Persons</b> under ‘ <b>National Science Day</b> ’ at BBA University, Lucknow, 28 <sup>th</sup> February, 2017
March 3-4, 2017	Convener, <b>4<sup>th</sup> Lucknow Science Congress</b> , held at BBA University, Lucknow from 3 <sup>rd</sup> to 4 <sup>th</sup> March, 2017.
November 16 – 19, 2017	Co-organizing Secretary of <b>58<sup>th</sup> Annual Conference of AMI- 2017</b> , BBA University, Lucknow from 16 <sup>th</sup> – 19 <sup>th</sup> November, 2017.

January 10-11, 2018 Convener, **1<sup>st</sup> North Indian Science Congress**, held at BBA University, Lucknow 10<sup>th</sup> -11<sup>th</sup> January, 2018.

### **Awards and Honors**

- 2014 Young Achievers Award for contribution in the field of Agricultural Microbiology by Asian PGPR society at BHU, Varanasi.
- 2014 Awarded certificate of appreciation in research by the Honorable Governor of Uttar Pradesh
- 2006 Travel support from DST and CSIR New Delhi to attend and deliver lecture in 18<sup>th</sup> World Congress of Soil Science, held at Philadelphia, USA. Organized by International Union of Soil Science, 09-15 July, 2006
- 2011 Travel support from DST New Delhi to attend and deliver lecture in Second Asian PGPR Congress for Sustainable Agriculture, Beijing, China. Organized by Asian PGPR Society. Travel support from Department of Science and Technology, New Delhi, 21-24 August, 2011
- 2015 Awarded Travel Grant from Department of Biotechnology, New Delhi (Grant No. DBT/CTEP/02/201500217) to attend in 4<sup>th</sup> Asian PGPR Conference, Hanoi, Vietnam, 3<sup>rd</sup> to 6<sup>th</sup> May, 2015, organized by Asian PGPR Society.
- 2015 Awarded Travel Grant from Department of Science and Technology, New Delhi (Grant No. ITS/1862/2015-16) to attend 8<sup>th</sup> ISS Congress, Lisbon, Portugal, 12<sup>th</sup> – 18<sup>th</sup> July, 2015

### **Membership of Learned Bodies/Societies**

Life Member of Association of Microbiologists (AMI) of India.

Life Member of Indian Science Congress Association, Kolkata, India.

Life Member of Asian PGPR Society

Life Member of Clean and Green Society, Lucknow

President & Life Member, Society for Conservation of Wildlife

Secretary & Life Member, Society for Environmental Sustainability



## **Editor/Member Editorial Board of Journal**

2018	<b>Editor in Chief, Environmental Sustainability (Springer Nature)</b>
2017	Guest Editor, Frontiers in Microbiology
2014 – present	Associate Editor, Climate Change and Environmental Sustainability
2014 – present	Associate Editor, International Journal of Science, Technology and Society
2014 – present	Executive Member, Asian PGPR Society
	Member, Editorial Board, Archives of Agriculture & Environmental Science

## **Extra/Co-curricular/Administrative/Research Activities**

2016-17	<b>Convener</b> , ‘Swachh Bharat Pakhwada’ at BBA University, Lucknow.
2017 - present	<b>Convener</b> , ‘Swachhta Abhiyan’ at BBA University, Lucknow.
2017 - present	<b>Convener</b> , ‘Ek Bharat Shrestha Bharat’, BBA University, Lucknow.
	<b>Nodal Officer</b> , Babasaheb Bhimrao Ambedkar University for Unnat Bharat Abhiyan Program of MHRD.
2017 - present	<b>Coordinator</b> , Foundation Courses of BBA University, Lucknow.
2006 - 2011	Member of Academic Council of CSJM University, Kanpur
2008 - 2011	Head of Rate Contract Committee for Chemicals and Glassware, CSJM University, Kanpur.
2006 – 2011	Member of Board of Faculty of Microbiology, CSJM University, Kanpur.
2006 - 2011	Involved in designing of ordinance and curricula for PG courses in Biotechnology, Microbiology, Biochemistry and Environmental Sciences at CSJM University, Kanpur
2010	Member of technical and core committee for organization of CPMT examination
2009 - 2011	Coordinator Academics, CSJM University, Kanpur.
2009 - 2011	Coordinator of Committee for designing of ordinances for campus courses of CSJM University, Kanpur.

2007 - 2011	Head, Institutional Technical Committee, CSJM University
2009 - 2011	Member, University Purchase Committee, CSJM University
2011 - 2014	Member, Departmental Research Committee, DEM, BBA University
2011 - 2014	Member, Departmental Purchase Committee, DEM, BBA University
2011 – 2014	Member, Board of Post Graduate Studies, DEM, BBA University
2013	Member, Organizing committee Lucknow Science Congress
2013	Member, University Space Auditing Committee, BBA University
2013	Member, Editorial Board, University Newsletter, BBA University
2014 – present	Chairman, Departmental Research Committee, DEM, BBA University
2014 – present	Chairman, Departmental Purchase Committee, DEM, BBA University
2014 – present	Chairman, Board of Post Graduate Studies, DEM, BBA University
12/07/2017 to 01/08/2017	Member, Board of Management, BBA University
2015	Editor, BBAU Research Bulletin
	Member, Academic Council, BBA University
	Member, Purchase Committee (Anti-Plagiarism Software for BBAU)
	Member, Departmental Admission Committee, DEM, 2017

### **Reviewer of High Impact Journals**

Reviewer of Current Microbiology (Springer Publication)

Reviewer of World Journal of Microbiology & Biotechnology (Springer Publication)

Reviewer of Water Research (Elsevier)

Reviewer of Chemosphere (Elsevier)

Reviewer of Crop Protection (Elsevier)

Reviewer of Archives of Agronomy and Soil Science (Taylor & Francis)

Reviewer of African Journal of Microbiology Research

Reviewer of Climate Change and Environmental Sustainability  
Reviewer of Journal of Environmental Biology  
Reviewer of African Journal of Agriculture Research  
Reviewer of African Journal of Biotechnology  
Reviewer of Applied Soil Ecology (Elsevier)  
Reviewer of Journal of Genetics  
Reviewer of Environmental Monitoring and Assessment  
Reviewer of Frontiers in Microbiology  
Reviewer of Physiology & Molecular Biology of Plants  
Reviewer of European Journal of Soil Biology (Elsevier)  
Reviewer of Symbiosis (Springer)  
Reviewer of Critical Reviews in Microbiology (Elsevier)  
Reviewer of Journal of Plant Interactions (Taylor and Francis)  
Reviewer of Biological Control (Elsevier)

## Books published

1. **Arora NK. 2013.** Splendid Wilds.....safari through Corbett. Shree Publisher, New Delhi, ISBN: 978-81-8329-507-9
2. **Arora NK. 2013.** Plant Microbe Symbiosis: Fundamentals and Advances, Springer. ISBN 978-81-322-1286-7
3. **Arora NK. 2015.** Plant Microbe Symbiosis: Applied Facets, Springer. ISBN 978-81-322-2067-1
4. **Arora NK, Mehnaz S, Balestrini R. 2016.** Bioformulations: for sustainable agriculture, Springer. ISBN 978-81-322-2777-9
5. **Sobti RC, Arora NK, Kothari R. 2018** Environmental Biotechnology: for sustainable future, Springer. ISBN 978-981-10-7284-0

## Arora NK. 2016. Book Series “Microorganisms for Sustainability”

6. Microbial Models: From Environmental to Industrial Sustainability, Springer. ISBN 978-981-10-2555-6.
7. Rhizotrophs: Plant Growth Promotion to Bioremediation, Springer. ISBN 978-981-10-4861-6.
8. Vol. 1 Microorganisms for Green Revolution, Springer. ISBN 978-981-10-6240-7
9. Vol. 1 Advances in Soil Microbiology: Recent Trends and Future Prospects, Springer. ISBN 978-981-10-6178-3
10. Plant Microbiome: Stress Response, Springer. ISBN 978-981-10-5514-0
11. Vol. 2 Microorganisms for Green Revolution, Springer. ISBN 978-981-10-7146-1
12. Vol. 2 Advances in Soil Microbiology: Recent Trends and Future Prospects, Springer. ISBN 978-981-10-7380-9
13. Extremophiles in Eurasian Ecosystems: Ecology, Diversity, and Applications, Springer. ISBN 978-981-13-0329-6

## Research Publications

1. Tewari S, **Arora NK.** 2018. Role of salicylic acid from *Pseudomonas aeruginosa* PF23EPS+ in growth promotion of sunflower in saline soils infested with phytopathogen *Macrophomina phaseolina*. *Environmental Sustainability*, DOI 10.1007/s42398-018-0002-6.
2. Upadhyaya S, Yadav D, Chandra R, **Arora NK.** 2018. Evaluation of antibacterial and phytochemical properties of different spice extracts. *African Journal of Microbiology Research*, DOI: 10.5897/AJMR2017.8731 pp- 27-37
3. **Arora NK,** Khare E, Singh S, Tewari S. 2018. Phenetic, genetic diversity and symbiotic compatibility of rhizobial strains nodulating pigeon pea in Northern India. *3Biotech*, DOI: 10.1007/s13205-017-1074-1 8: 52.

4. Verma M, Verma S, **Arora NK**. 2018. Application of Rhizobium-Pseudomonas consortia for enhanced production of mungbean in sustainable manner. *International Journal of Science Technology and Society* Vol. 3 pp. 54-61
5. Vimal SR, Singh JS, **Arora NK**, Singh S. 2017. Soil-Plant-Microbe Interactions in Stressed Agriculture Management: A review *Pedosphere* 27(2): 177–192, DOI 10.1016/S1002-0160(17)60309-6
6. **Arora NK**, Verma M. 2017. Modified microplate method for rapid and efficient estimation of siderophore produced by bacteria. *3Biotech* DOI: 10.1007/s13205-017-1008-y. (IF – 1.36).
7. Adnan M, Shankar S, Shikha, **Arora NK**. 2017. Optimization of Process Parameters for Laccase Production From *Pleurotus ostreatus* for the Decolourization of Malachite Green. *Indian Journal of Environmental Protection*, UEP 37 (11): 920-928
8. Upadhyaya S, Srivastava P, Chandra R, **Arora NK**. 2017. Microbiological assessment and hazardous effect of ready-to-eat foods presented for sale in Lucknow City, *India*. *African Journal of Food Science*, DOI: 10.5897/AJFS2017.1630 pp. 346-352
9. Mishra J, **Arora NK** 2017. Secondary metabolites of fluorescent pseudomonads in biocontrol of phytopathogens for sustainable agriculture. *Applied Soil Ecology*, **125**: 35-45 (Accepted, IF – 2.8)
10. Mishra J, Singh R, **Arora NK** 2017. Alleviation of Heavy Metal Stress in Plants and Remediation of Soil by Rhizosphere Microorganisms. *Frontiers in Microbiology* DOI: 10.3389/fmicb.2017.01706 (IF-4.07)
11. Singh U, **Arora NK** 2017. Simultaneous biodegradation of phenol and cyanide present in coke-oven effluent using immobilized *Pseudomonas putida* and *Pseudomonas stutzeri*. *Brazilian Journal of Microbiology* DOI.org/10.1016/j.bjm.2016.12.013 (IF-1.09)
12. **Arora NK**, Singh R., 2017 Growth enhancement of medicinal plant *Withania somnifera* using phosphate solubilizing endophytic bacteria *Pseudomonas* sp. as bioinoculant *East Asian Science Technology and Society an International Journal* 2(2):13-18
13. **Arora NK**, Mishra J 2016. Prospecting the roles of metabolites and additives in future bioformulations for sustainable agriculture. *Applied Soil Ecology*. DOI 10.1016/j.apsoil.2016.05.020.

14. Tewari S, **Arora NK** 2016. Fluorescent *Pseudomonas* sp. PF17 as an efficient plant growth regulator and biocontrol agent for sunflower crop under saline conditions. *Symbiosis*. DOI 10.1007/s13199-016-0389-8
15. Mishra J, Rajnandani M, **Arora N K.** 2016. Biocontrol of ear rot fungi by plant growth promoting fluorescent pseudomonads. *Inter J Sci Tech Soc* 1(2) 45-52.
16. Tewari S, **Arora NK** 2015. Plant growth promoting fluorescent *Pseudomonas* enhancing growth of sunflower crop. *Inter J Sci Tech Soc* 1(1) 51-54.
17. Tewari S, **Arora NK** 2014. Ameliorating the growth of sunflower using stress-tolerant *Pseudomonas aeruginosa* PF23. *Climate Change Environ. Sustain.* 2(2): 116-121.
18. Tewari S, **Arora NK** 2014. Talc based EPS formulation enhancing growth and production of *Helianthus annuus* under saline conditions. *Cell. Mol. Biol.* 60 (5): 67-75
19. **Arora NK**, Tewari S, Singh R 2014 Comparative study of different carriers inoculated with nodule forming and free living plant growth promoting bacteria suitable for sustainable agriculture. *J. Pharma. Chem Biol Sci* 2(2):143-149
20. Tewari S and **Arora N K.** 2014 Multifunctional exopolysaccharides from *Pseudomonas aeruginosa* PF23 involved in plant growth stimulation, biocontrol and stress amelioration in sunflower under stress conditions. *Current Microbiology* 69(4), 484-494.
21. Singh S, Gupta G, Khare E, Behal K K and **Arora N K.** 2014. Effect of enrichment material on the shelf life and field efficiency of bioformulation of *Rhizobium* sp. And P-solubilizing *Pseudomonas fluorescens*. *Science Research Reporter* 4(1), 44-50.
22. Singh R., **Arora NK**, Gautam P, Lal S. 2013. Enhancement of plant growth of *Trigonella foenum-graecum* by Coinculation of fluorescent *Pseudomonas* and *Rhizobium* for the sustainability of agriculture. *Asian J Plant Sci and Res* 3(3):74-79.
23. Khare E., Chopra J., **Arora N.K.** 2013. Screening for MCL-PHA-Producing Fluorescent *Pseudomonads* and Comparison of MCL-PHA Production Under Iso-osmotic Conditions Induced by PEG and NaCl. *Current Microbiology* 68: 4, pp 457-462
24. **Arora N.K.**, Tewari S., Singh S. and Srivastava N. 2013. Analysis of water quality parameters of river Ganga during Maha Kumbha, Hardwar, India. *Journal of Environmental Biology*, 34, 799-803.
25. Maheshwari D.K., Dubey R.C., Aeron A., Kumar B., Kumar S., Tewari S. and **Arora N.K.** 2012. Integrated approach for disease management and growth

- enhancement of *Sesamum indicum* L. utilizing *Azotobacter chroococcum* TRA2 and chemical fertilizer. *World Journal of Microbiology and Biotechnology*, **28(10)**, 3015-24.
26. Mishra S. and **Arora N.K.** 2012. Management of black rot in cabbage by rhizospheric *Pseudomonas* species and analysis of 2, 4-diacetylphloroglucinol by qRT-PCR. *Biological Control*, **61**, 32-29.
  27. Aeron A., Khare E., **Arora N.K.** and Maheshwari D.K. 2012. Practical use of CMC amended rhizobial inoculants for *Mucuna pruriens* cultivation to enhance the growth and protection against *Macrophomina phaseolina*. *Journal of General and Applied Microbiology* **58**, 121-127.
  28. Mishra, S. and **Arora N.K.** 2011. Evaluation of rhizospheric *Pseudomonas* and *Bacillus* as biocontrol tool for *Xanthomonas campestris* pv *campestris*. *World Journal of Microbiology and Biotechnology*, **28(2)**, 693-702.
  29. Khare, E. and **Arora, N.K.** 2011. Dual activity of pyocyanin from *Pseudomonas aeruginosa*: Antibiotic against phytopathogen and signal molecule for biofilm development by rhizobia. *Canadian Journal of Microbiology* **57(9)**, 708-713 DOI 10.1139/w11-055.
  30. Khare E. and **Arora N.K.** 2011. Physiologically stressed cells of fluorescent *Pseudomonas* EK<sub>i</sub> as better option for bioformulation development for management of charcoal rot caused by *Macrophomina phaseolin* in field conditions. *Current Microbiology*, **62(6)**, 1789-1793.
  31. Khare, E., Singh, S., Maheshwari, D.K. and **Arora, N.K.** 2011. Suppression of charcoal rot of chickpea by fluorescent pseudomonas under saline stress condition. *Current Microbiology* **62**, 1548–1553.
  32. Khare E. and **Arora N. K.** 2010. Effect of Indole-3-acetic acid (IAA) produced by *Pseudomonas aeruginosa* in suppression of charcoal rot disease of chickpea. *Current Microbiology* **61(1)**, 64-68.
  33. **Arora, N.K.**, Khare, E., Singh S. and Maheshwari D. K. 2010. Effect of Al and Heavy Metals on Enzymes of Nitrogen Metabolism of Fast and Slow Growing Rhizobia under Explanata Conditions. *World Journal of Microbiology and Biotechnology*, **26**, 811-816.
  34. Naraian R., **Arora N. K.** and Garg S. K. 2009. Improved submerged fermentation of corn cob with mechanically broken oil seed cakes and decolorisation of textile dyes by enzyme extract of *Pleurotus florida* PF05. *Research in Environment and Life Sciences*, **2(2)**, 83-90.
  35. **Arora, N.K.**, Khare, E., Naraian, R. and Maheshwari, D.K. 2008. Sawdust as a superior carrier for production of multipurpose bioinoculant using PGP rhizobial

- and pseudomonad strains and their impact on productivity of *Trifolium vapanse*. *Current Science*, **95(1)**, 90-94.
36. **Arora, N. K.**, Khare, E., Verma, A. and Sahu, R.K. 2008. *In vivo* control of *Macrophomina phaseolina* by a chitinase and  $\beta$ -1,3-glucanase- producing Pseudomonad NDN<sub>1</sub>. *Symbiosis*, **46**, 129-135.
  37. **Arora, N.K.**, Khare, E., Oh, J.H., Kang, S.C. and Maheshwari, D.K. 2008. Diverse mechanisms adopted by fluorescent *Pseudomonas* PGC2 during the inhibition of *Rhizoctonia solani* and *Phytophthora capsici*. *World Journal of Microbiology and Biotechnology*, **24**, 581-585. DOI 10.1007/s11274-007-9505-5.
  38. Sahu, R.K. and **Arora, N.K.** 2007. Bioassay as a tool for assessing susceptible and resistant plant species for field contaminated with industrial effluent. *World Journal Microbiology and Biotechnology*. **24**, 143-148. DOI 10.1007/s11274-007-9448-x.
  39. **Arora, N.K.**, Kang, S.C., Kim, M.J. and Maheshwari, D.K. 2007. Role of chitinases and beta 1.3-glucanases produced by fluorescent *Pseudomonas* and *in vitro* inhibition of *Phytophthora capsici* and *Rhizoctonia solani*. *Canadian Journal of Microbiology*, **53**, 207-212.
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## Proceedings

1. Verma M, Banerjee S, **Arora NK**. 2017 Characterization and optimization of exopolysaccharides produced by rhizobia isolated from root nodules of medicinal legume *Trigonella* (methi). In proceeding of International Conference on RTEASTN, IISR, Lucknow, Aura Publication, pp 83-91
2. Tewari S.and **Arora NK**. 2016. Exopolysaccharides based bioformulation from *Pseudomonas aeruginosa* combating saline stress. In Proceedings of 4<sup>th</sup> Asian PGPR Conference, Hanoi, Vietnam, Scientific Publishers India, pp 93-96
3. Dwivedi GR, Mishra A, **Arora NK**, Singh DP. 2016. Exploration of key mechanisms of multidrug resistance in soil bacteria. In Proceedings of IRF-ieeeforum International Conference, Pune India pp 27-30
4. Dwivedi G.R, Gupta D.K, Kumar V, **Arora NK** and Singh D.P 2017. Isolation and Characterization of Antifungal Producing *Pseudomonas* spp. In proceedings of *WRFER International Conference*, 16<sup>th</sup> April 2017, Pune ISBN: 978-93-86291-63-9.
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## Review Articles/ Book Chapters

1. Mishra J, Fatima T, **Arora NK**; 2018. Role of Secondary Metabolites from Plant Growth-Promoting Rhizobacteria in Combating Salinity Stress. In book: Plant

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2. Mishra J, Singh R and **Arora NK**. 2017. Plant Growth Promoting Microbes: Diverse Roles in Agriculture and Environmental Sustainability in Probiotics and Plant Health (Eds. Kumar V. et al.), Springer, DOI: 10.1007/978-981-10-3473-2\_4.
  3. Singh R, Mishra J, **Arora NK**; 2017. Composting of agricultural waste by wood decaying fungi: Switching the pollution-generating waste into organic fertilizer factories. In CGES Newsletter, pp. 13-14
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  4. **Arora NK**, Verma M. and Mishra J. 2017. Rhizobial Bioformulations- Past, Present and Future in Rhizotrophs: Plant Growth Promotion to Bioremediation (Eds. Mehnaz S.), *Springer*. DOI: 10.1007/978-981-10-4862-3\_4.
  5. **Arora NK**, Mishra J. 2017. **Microbial Inoculants in Sustainable Agricultural Productivity Vol. 1: Research Perspectives**. Dhananjaya Pratap Singh, Harikesh Bahadur Singh and Ratna Prabha (eds). Springer, New Delhi. 2016. xviii + 343 pp. Price: 139.99€/ £104.50/US\$ 179.00. ISBN: 978-81-322- 2645-.1 *Current Science* 112(2).
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  8. Tewari S and **Arora NK**. 2016. Soybean production under flooding stress and its mitigation using plant growth promoting microbes. In Environmental Stresses in Soybean Production (Ed Miransari M) Elsevier, DOI: 10.1016/B978-0-12801535-3.00002-4
  9. Mishra J, **Arora NK**. 2016. Bioformulations for plant growth promotion and combating phytopathogens. In **Bioformulations: for sustainable agriculture**, **Springer** (Eds **Arora NK**, Mehnaz S, Balestrini R), **Springer**. Doi: 10.1007/978-81-322-2779-3\_1

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11. Singh R, **Arora NK**. 2016. Bacterial formulations and delivery systems against pests in sustainable agro-food production. **Reference Module in Food Science**, **Elsevier**. ISBN: 978-0-08-100596-5.
12. Tewari S, **Arora NK** and Miransari M. 2015. Plant growth promoting rhizobacteria to alleviate soybean growth under abiotic and biotic stresses. In *Biotic and Abiotic Stresses in Soybean Production* (Eds Miransari M) Elsevier, ISBN: 978-0-12-801536-0.
13. Mishra J. Tewari S, Singh S, **Arora NK** 2015 Biopesticides: Where We Stand? In *Plant Microbes Symbiosis: Applied Facets* (Eds Arora NK) Springer publication Netherland pp 37-75.
14. Khare EK, **Arora NK** 2015 Effects of soil environment on field efficacy of microbial inoculants In *Plant Microbes Symbiosis: Applied Facets* (Eds Arora NK) Springer publication Netherland pp 353-381.
15. Tewari S. and **Arora NK** 2014 Plant growth promoting rhizobacteria for ameliorating abiotic stresses triggered due to climatic variability. *Climate Change Environ Sustain* 1 (2) 95-103.
16. Tewari S. and **Arora NK** 2013. Transactions amongst microorganisms and plant in the composite rhizosphere habitat. In *Plant Microbe Symbiosis* (Eds. Arora N K), Springer Publication, Netherland pp 1-50.
17. **Arora NK**, Tewari S, and Singh R. 2013. Multifaceted plant associated microbes and their mechanisms diminish the concept of direct and indirect PGPRs. In *Plant Microbe Symbiosis* (Eds. Arora N K), Springer Publication, Netherland pp 411-449.
18. **Arora N.K.**, Tewari S., Singh S., Lal N. 2012. PGPR for protection of plant health under saline conditions. In *Bacteria in Agrobiolgy* (Eds. Maheshwari D.K.), Springer Publication, Netherland, pp 239-258.
19. **Arora N. K.** and Khare E. 2010. Plant Growth Promotory Rhizobacteria: Constraints in Bioformulation, commercialization and future strategies. In *Bacteria and Plant Health* (Ed. Maheshwari D.K.), Springer Publication, Netherland, pp 97-116.
20. **Arora, N. K.** and Khare, E. 2008. Biocontrol of soil-borne phytopathogens by fluorescent Pseudomonads, as a sustainable alternative to agrochemicals. In *Potential Microorganisms for Sustainable Agriculture: A Techno-Commercial Prospective* (eds. Mahaeshwari D.K. and Dubey R.C.) I. K. International Publication, New Delhi, pp. 99-114.

21. **Arora, N.K.**, Kumar, V. and Maheshwari, D.K. 2001. Constraints, Development and Future of the Bioinoculants with Special Reference to Rhizobial Inoculants. In *Innovative Approaches in Microbiology* (eds. Maheshwari, D. K. and Dubey, R. C.), B. Singh and M. Singh Publ., Dehradun. pp. 241-254.

### **General Articles**

1. Kumar A., Prakash J. and **Arora N. K. 2015**. Biofertilizers: an alternative sources of chemical fertilizer for sustainable crops in 21<sup>st</sup> century. *Microbiology World*, 10, 28-31.
2. **Prakash J., Singh R and Arora N. K. 2015**. Stevia rebaudiana: A herbal medicine and alternative source of calorie free sweetener. *Microbiology World*, 09, 53-55.
3. **Arora N.K.** 2011. Conserving our Natural Resources. **Times of India**.
4. **Arora N.K.** 2011. Wild Splendor – The Beauty of Indian Jungles. **Times of India**.
5. Preeti, Vineet and **Arora N.K.** 2011. Wild Heavens of Northern India. **Times of India**.
6. Khare E. and **Arora N.K.** 2011. Organic farming and its relevance. **Times of India**.
7. **Arora, N.K.**, Khare, E. and Verma, A. 2007. Biofertilizer Technology for Economical and Environmentally Viable Agricultural Production. **Kurukshetra**, vol. 55, 4, page 20-24.
8. Singhal, V and **Arora, N.K.** 2005. Career in Environmental Sciences. **Employment News**, vol. XXX, 26, page 1-2.
9. Singhal, V and **Arora, N.K.** 2005. Career and Courses: Environmental Sciences. **Employment News**, vol. XXX, 10, page 1-2.
10. **Arora, N.K.**, Maheshwari, S. and Maheshwari, D.K. 1997. Microbial Diversity of the Extreme Environments. *The Botanica*, **47**, 154-159.

## **Invited Talks in Conference/Seminar**

1. Second Asian PGPR Congress for Sustainable Agriculture, Beijing, China. Organized by Asian PGPR Society. Travel support from Department of Science and Technology, New Delhi. 21-24 August 2011
2. Invited talk and session co-chair at “National Conference on Microbes promoting plant health, productivity and sustainability and zonal meeting”. Organized by CSIR-CIMAP and CSIR- NBRI Lucknow, October 26-27, 2013
3. Invited talk at “International conference on Environment, Health and Industrial BioSangam”, Organized by Department of Biotechnology MNNIT, Allahabad- November 21-23, 2013
4. Plenary Lecture at 101<sup>st</sup> Indian Science Congress, University of Jammu, J&K- Feb 3-7, 2014
5. Resource person and Session Coordinator at “International Conference on Environmental Technology and Sustainable Development: Challenges and Remedies”. Organized by BBA University, Lucknow.- Feb 21-23, 2014
6. Invited talk at “National Workshop on advances in PGPR” research at Banaras Hindu University, Varanasi - Oct 7-8, 2014
7. Invited talk at “4<sup>th</sup> Asian PGPR Conference”, Hanoi, Vietnam, Organized by Asian PGPR Society, May 3-6, 2015
8. Oral presentation at “8<sup>th</sup> ISS Congress”, Lisbon, Portugal, Organized by International Symbiosis Society. July 12-18, 2015
9. Invited Talk at 3<sup>rd</sup> Lucknow Science Congress LUSCON – 2015, Lucknow, UP, India - Nov, 2015
10. Invited Talk at “National Workshop on Advanced Techniques for Bioremediation and Management of Salt Affected Soils” at Central Soil Salinity Research Institute (CSSRI), Lucknow, UP, India. - Sept, 15-24, 2015
11. Invited Talk and session Co-Chair at 103<sup>rd</sup> Indian Science Congress, Mysore University, Mysore, Karnataka, India. - Jan 3-7, 2016
12. Invited Talk in International conference on Pharmaceutical, Medical & Environmental Health Sciences, Pune, April 03, 2017
13. Invited Talk in International conference on Agriculture and Biotechnology, Pune April 16, 2017
14. Invited Talk in National Conference on Tourists and Green Spaces: Healthier lifestyle approaches from nature, BBA University, Lucknow July 15, 2017

15. Lead Talk in 58<sup>th</sup> Annual Conference of AMI- 2017 on Plant growth promoting rhizobacteria for combating saline stress in diverse crops, BBA University, Lucknow.
16. Lead Talk in National Seminar on Transforming Agriculture to Doubling of Farmers Income, Organized by Samagra Vikas Welfare Society, BBA University, Lucknow. Feb 10-11, 2018
17. Invited Talk in National Conference on Climate Change, Environmental Pollution and Biodiversity Conservation, Organized by CGES, Lko. And CSIR-NBRI, Lko. Feb 24-25, 2018
18. Plenary Talk in International Conference on Innovations and Translational Dimensions: Food, Health and Environment Biotechnology (Biosangam-2018) at MNIIT, Allahabad. March 09-11, 2018

### **Abstracts in Conferences/Seminar**

1. **Arora, N.K.**, Kang, S.C. and Maheshwari, D.K. *In vitro* inhibition of *Fusarium oxysporum* by *Rhizobium meliloti* (RMP1). In XXIII National Conference of Indian Botanical Society held at C.C.S. University, Meerut from 14-16, October, 2000.
2. **Arora, N.K.** Fluorescent pseudomonads as biocontrol agents against fungal pathogen *Macrophomina phaseolina*. In BIO-CON – 2005 held at Sai College of Medical Science and Technology, Kanpur from 26-27 February, 2005.
3. Naraian, R., Singh, R. and **Arora, N. K.** Effects of nitrogen supplements on decolourization of pulp paper mill effluent. In International Conference on Toxicology, Environmental and Occupational Health, held at ITRC, Lucknow from 14 – 17 November, 2005.
4. **Arora, N. K.** Role of chitinase and beta-1,3-glucanase activities of fluorescent Pseudomonad NDN1 *in vitro* inhibition of *Macrophomina phaseolina* and its *in vivo* control. In **18<sup>th</sup> World Congress of Soil Science: Frontiers of Soil Science – Technology and the Information Age, held at Philadelphia, Pennsylvania, USA, from 9 – 15 July, 2006.**
5. **Arora, N. K.** *In vivo* biocontrol of *Macrophomina phaseolina* and growth enhancement of non-legume by consortia of *Sinorhizobium* and *Pseudomonas*. Accepted in **11<sup>th</sup> International Symposium on Microbial Ecology – ISME-11: The Hidden Powers – Microbial Communities in Action, held at Vienna, Austria, from 20 – 25 August, 2006.**

6. Katiyar, N., Mishra S. and **Arora, N. K.** Microbe-microbe interaction for improvement and stability of agrosystem. In National Conference on Scope and Applications of Microbes in Agriculture & Environment – *New Horizons and Technologies*, held at Department of Microbiology, CSJM University, Kanpur from 19-21 Feb, 2007, pp 25.
7. Dixit, S., Shikha and **Arora, N. K.** Isolation and characterization of fluorescent Pseudomonads from rhizosphere of different plants. In National Conference on Scope and Applications of Microbes in Agriculture & Environment – *New Horizons and Technologies*, held at Department of Microbiology, CSJM University, Kanpur from 19-21 Feb, 2007, pp 29.
8. Khare E., Maheshwari, D.K. and **Arora, N. K.** Diverse mechanisms involved in inhibition of phytopathogens *Rhizoctonia solani* and *Phytophthora capsici* by fluorescent pseudomonads. In National Conference on Scope and Applications of Microbes in Agriculture & Environment – *New Horizons and Technologies*, held at Department of Microbiology, CSJM University, Kanpur from 19-21 Feb, 2007, pp 39.
9. Verma A., Sood, D. and **Arora, N. K.** Enhanced growth promotion of mustard (*Brassica campestris*) on co-inoculation of rhizobia and pseudomonads. In National Conference on Scope and Applications of Microbes in Agriculture & Environment – *New Horizons and Technologies*, held at Department of Microbiology, CSJM University, Kanpur from 19-21 Feb, 2007, pp 42.
10. Khare E., Verma A., Arora, N. and **Arora, N. K.** Sawdust based bioformulation of PGP *Rhizobium* and *Pseudomonas* as the best option for enhancement of plant productivity. In National Conference on Scope and Applications of Microbes in Agriculture & Environment – *New Horizons and Technologies*, held at Department of Microbiology, CSJM University, Kanpur from 19-21 Feb, 2007, pp 44.
11. Mishra S. and **Arora, N. K.** Biocontrol ability of rhizospheric bacteria on the bacterial phytopathogens. In National Conference on Scope and Applications of Microbes in Agriculture & Environment – *New Horizons and Technologies*, held at Department of Microbiology, CSJM University, Kanpur from 19-21 Feb, 2007, pp 55.
12. Singh U., Ahuja, S. and **Arora, N. K.** Remediation of complex industrial effluent rich in phenols and cyanides by immobilized *Pseudomonas* isolates. In Scope and Applications of Microbes in Agriculture & Environment – *New Horizons and Technologies*, held at Department of Microbiology, CSJM University, Kanpur from 19-21 Feb, 2007, pp 66.
13. Verma A. and **Arora N. K.** Positive interaction between *Rhizobium* and *Pseudomonas* results in better crop production. In 49<sup>th</sup> Annual Conference &

- International Symposium on Microbial Biotechnology: Diversity, Genomics and Metagenomics, held at University of Delhi, Delhi from 18-20 Nov, 2008, pp119.
14. Mishra S. and **Arora N. K.** Integrated biological control of black rot of *Brassica campestris* by synergistic use of rhizospheric *Bacillus* and *Pseudomonas* strain. In 49<sup>th</sup> Annual Conference & International Symposium on Microbial Biotechnology: Diversity, Genomics and Metagenomics, held at University of Delhi, Delhi from 18-20 Nov, 2008, pp119-120.
  15. Khare E. and **Arora N. K.** Role of bacterial indole acetic acid (IAA) in suppression of charcoal rot disease caused by *Macrophomina phaseolina*. In 49<sup>th</sup> Annual Conference & International Symposium on Microbial Biotechnology: Diversity, Genomics and Metagenomics, held at University of Delhi, Delhi from 18-20 Nov, 2008, pp120-121.
  16. Khare E., Singh S. and **Arora N.K.** Biocontrol potential of salinity tolerant *Pseudomonas aeruginosa* against *Macrophomina phaseolina* under saline stress conditions. In First Asian PGPR Congress for Sustainable Agriculture held at Acharya N G Ranga Agricultural University, Hyderabad from 21-24 June, 2009, pp 80-81.
  17. Khare, E., Singh, S. and **Arora, N.K.** Effects of carbon starvation and osmotic stress on shelf life of bioformulation of fluorescent pseudomonad and its activity in soil. In 50<sup>th</sup> Annual Conference of Association of Microbiologist of India, held at National chemical Laboratory, Pune, from 15-18 December, 2009, pp. 104.
  18. Verma, A., **Arora, N.K.** Enhancement of plant growth of *Trigonella foenum-graecum* in pots and field by coinoculation of *Rhizobium galegae* and *Pseudomonas* sp. In 50<sup>th</sup> Annual Conference of Association of Microbiologist of India, held at National chemical Laboratory, Pune, from 15-18 December, 2009, pp. 103
  19. Singh, U., Katiyar, N. and **Arora, N.K.** Simultaneous degradation of phenol and cyanide present in coke-oven effluent using bacterial cells immobilized on sawdust. In 50<sup>th</sup> Annual Conference of Association of Microbiologist of India, held at National chemical Laboratory, Pune, from 15-18 December, 2009, pp. 9.
  20. Tewari, S. and **Arora, N.K.** Antagonistic action of *Lactobacillus* isolates against pathogens and its relevance as probiotics. In 50<sup>th</sup> Annual Conference of Association of Microbiologist of India, held at National chemical Laboratory, Pune, from 15-18 December, 2009, pp. 42
  21. Gupta, G., Khare, E. and **Arora, N.K.** Role of Bacterial Indole-Acetic Acid on Growth Promotion of *Pisum sativum*. In 50<sup>th</sup> Annual Conference of Association of Microbiologist of India, held at National chemical Laboratory, Pune, from 15-18 December, 2009, pp. 5



22. Khare, E., Singh, S. and **Arora, N.K.** Coinoculation of fluorescent *Pseudomonas* and *Rhizobium* for growth improvement of sunflower and biocontrol of charcoal rot disease. In International Workshop on Rhizosphere Biology of Agriculture, Horticulture and Forestry: Present and Future, held at G.B. Pant University of Agriculture & Technology, Pantnagar, from 25<sup>th</sup> – 27<sup>th</sup> February 2010, pp. 115
23. Khare, E., Behera, P. and **Arora, N.K.** Endophytic bacteria with biocontrol ability against *Fusarium oxysporum*. In 51<sup>th</sup> Annual Conference of Association of Microbiologist of India, held at Ranchi, from 14-17 December, 2010, pp. 150.
24. Tewari, S., **Arora, N.K.** Plant growth promotory and biocontrol activity of fluorescent *Pseudomonas* under extreme conditions. In 51<sup>th</sup> Annual Conference of Association of Microbiologist of India, held at Ranchi, from 14-17 December, 2010, pp. 150.
25. Sriastava, N., Singh, S., Tewari, S. and **Arora, N.K.** Physico-chemical and microbial analysis of river Ganga at Kanpur in 2010. In 51<sup>th</sup> Annual Conference of Association of Microbiologist of India, held at Ranchi, from 14-17 December, 2010, pp. 150.
26. Khare, E., Lal, N. and **Arora, N.K.** Effect of compost and talk based bioformulation of *Pseudomonas* on growth of groundnut. In National Conference on “Traditional Conservation of Plant Biodiversity and Energy Resources Vis-à-vis Biotechnological Tools for Sustainability (NCBEB), Organized by ‘Society for Plant Research’, held at Meerut, from 25-26 December, 2010, pp. 42.
27. Misra, A., Lal, N. and **Arora, N.K.** Assessment of fluorescent *Pseudomonas* as biocontrol agents against *Fusarium* isolates infecting flowering plants. In National Conference on “Traditional Conservation of Plant Biodiversity and Energy Resources Vis-à-vis Biotechnological Tools for Sustainability (NCBEB), Organized by ‘Society for Plant Research’, held at Meerut, from 25-26 December, 2010, pp. 40.
28. Tewari, S., Lal, N. and **Arora, N.K.** Multistress tolerating fluorescent *Pseudomonas* in reclamation of stress sites. In National Conference on “Traditional Conservation of Plant Biodiversity and Energy Resources Vis-à-vis Biotechnological Tools for Sustainability (NCBEB), Organized by ‘Society for Plant Research’, held at Meerut, from 25-26 December, 2010, pp. 67.
29. Singh S, Khare E, Singh S and **Arora NK.** Solubilization of rock phosphate and plant growth promotion by rhizobial strain in buffering condition. In 2nd Asian PGPR Conference, held at Beijing, China, from 21-24 August, 2011, pp. 516.
30. Tewari, S and **Arora NK** *In vitro* activity of exopolysaccharides as biopriming agents (2011). In 2<sup>nd</sup> Asian PGPR congress, Beijing from 21-24 August 2011, pp 517

31. Khare E. and **Arora N.K.** Physiochemical and structural characterization of biosurfactant from fluorescent *Pseudomonas* with biocontrol activity against *Macrophomina phaseolina*. In 2<sup>nd</sup> Asian PGPR congress, Beijing from 21-24 August 2011, pp 101
32. Tewari, S. and **Arora, N.K.** EPS from fluorescent *Pseudomonas* as biopriming agent for ameliorating saline alkaline stress. In 52<sup>nd</sup> Annual Conference of association of Microbiologist of India (AMI 2011) International conference on microbial biotechnology for sustainable development. Organized by Panjab University, Chandigarh India 3-6 Nov 2011. pp 126-127.
33. Gupta G. and **Arora N.K.** Seed borne micro flora of ground nut from general and seed stores. In 52<sup>nd</sup> Annual Conference of association of Microbiologist of India (AMI 2011) International conference on microbial biotechnology for sustainable development. Organized by Panjab University, Chandigarh India 3-6 Nov 2011. pp 419.
34. Khare E. and **Arora N.K.** Multiple mechanism followed by fluorescent *Pseudomonas* EK1 for plant growth promotion and inhibition of *Macrophomina phaseolina*. In 52<sup>nd</sup> Annual Conference of association of Microbiologist of India (AMI 2011) International conference on microbial biotechnology for sustainable development. Organized by Panjab University, Chandigarh India 3-6 Nov 2011. pp 80-81.
35. Arora NK, **Singh S**, Khare E and Behal KK. Determination of effect on plant growth by co-inoculation of *Rhizobium* and *Pseudomonas* on mustard (*Brassica campestris*). In 52<sup>nd</sup> Annual Conference of Association of Microbiologist of India, held at Chandigarh, from 3-6 November, 2011.
36. Singh S., Tewari S. and **Arora N.K.** (2012) Multiple Antibiotic Resistances in *E.coli*. strains isolated from different stretches of river Ganga in Kanpur city. In 53<sup>rd</sup> Annual Conference of Association of Microbiologist of India, held at Bhuvaneshwar, from 21-24 November 2012.
37. Tewari S. and **Arora N.K.** Plant health protection and management of charcoal rot by fluorescent *Pseudomonas* under stress condition. In 53<sup>rd</sup> Annual Conference of Association of Microbiologist of India, held at Bhuvaneshwar, from 21-24 November 2012. pp 309
38. Khare E. and **Arora N.K.** Pyocynin from *Pseudomonas aeruginosa* helps in biofilm development by root nodulation bacteria. In 53<sup>rd</sup> Annual Conference of Association of Microbiologist of India, held at Bhuvaneshwar, from 21-24 November 2012. pp 309
39. Tewari, S., **Arora N.K.** Plant Growth Promotion and Disease Management by Fluorescent *Pseudomonas* Under Stress Conditions. In 1<sup>st</sup> Lucknow Science Congress: Innovations in science for better tomorrow (LUSCON- 2013),

- Organized by Babasaheb Bhimrao Ambedkar University, held at Lucknow from 20-21 March, 2013, pp. 11.
40. Mishra, J., **Arora N.K.** Biopesticides: An Emergent Need for Sustainable Agriculture. In 1<sup>st</sup> Lucknow Science Congress: Innovations in science for better tomorrow (LUSCON- 2013), Organized by Babasaheb Bhimrao Ambedkar University, held at Lucknow from 20-21 March, 2013, pp. 12.
  41. Singh, R., **Arora N.K.** Endophytes: Hidden Microbial World with Great Ecological Relevance. In 1<sup>st</sup> Lucknow Science Congress: Innovations in science for better tomorrow (LUSCON- 2013), Organized by Babasaheb Bhimrao Ambedkar University, held at Lucknow from 20-21 March, 2013, pp. 9.
  42. Singh, R., **Arora N.K.** Exploration of endophytic diversity of *Withania somnifera* and investigation of their biocontrol potential against *Alternaria* and *Fusarium* National Conference on Microbes promoting plant health, productivity and sustainability and zonal meeting. Organized by CSIR-CIMAP and CSIR-NBRI, Lucknow 26-27, 2013 pp 54
  43. Singh S, Behal KK, Arora NK Screening of competent phosphate solubilizing rhizobia and their ability to promote plant growth by providing both nitrogen and phosphorus to the plant. National Conference on Microbes promoting plant health, productivity and sustainability and zonal meeting. Organized by CSIR-CIMAP and CSIR- NBRI Lucknow 26-27, 2013pp 58
  44. Tewari S, **Arora NK** Mutistress tolerating strain of *Pseudomonas aeruginosa* PF23 for remediation of stressed sites, National Conference on Microbes promoting plant health, productivity and sustainability and zonal meeting. Organized by CSIR-CIMAP and CSIR- NBRI Lucknow 26-27, 2013 pp 107
  45. **NK Arora** Diverse mechanism adopted by fluorescent *Pseudomonas* in biological control of phytopathogen National Conference on Microbes promoting plant health, productivity and sustainability and zonal meeting. Organized by CSIR-CIMAP and CSIR- NBRI Lucknow 26-27, 2013 pp 07
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