

# **Fungal Biology**

## **Series Editors**

Vijai Kumar Gupta  
AgroBioSciences and Chemical & Biochemical Sciences Department  
University Mohammed VI Polytechnic (UM6P)  
Benguerir, Morocco

Maria G. Tuohy  
School of Natural Sciences  
National University of Ireland Galway  
Galway, Ireland

## About the Series

Fungal biology has an integral role to play in the development of the biotechnology and biomedical sectors. It has become a subject of increasing importance as new fungi and their associated biomolecules are identified. The interaction between fungi and their environment is central to many natural processes that occur in the biosphere. The hosts and habitats of these eukaryotic microorganisms are very diverse; fungi are present in every ecosystem on Earth. The fungal kingdom is equally diverse, consisting of seven different known phyla. Yet detailed knowledge is limited to relatively few species. The relationship between fungi and humans has been characterized by the juxtaposed viewpoints of fungi as infectious agents of much dread and their exploitation as highly versatile systems for a range of economically important biotechnological applications. Understanding the biology of different fungi in diverse ecosystems as well as their interactions with living and non-living is essential to underpin effective and innovative technological developments. This series will provide a detailed compendium of methods and information used to investigate different aspects of mycology, including fungal biology and biochemistry, genetics, phylogenetics, genomics, proteomics, molecular enzymology, and biotechnological applications in a manner that reflects the many recent developments of relevance to researchers and scientists investigating the Kingdom Fungi. Rapid screening techniques based on screening specific regions in the DNA of fungi have been used in species comparison and identification, and are now being extended across fungal phyla. The majorities of fungi are multicellular eukaryotic systems and therefore may be excellent model systems by which to answer fundamental biological questions. A greater understanding of the cell biology of these versatile eukaryotes will underpin efforts to engineer certain fungal species to provide novel cell factories for production of proteins for pharmaceutical applications. Renewed interest in all aspects of the biology and biotechnology of fungi may also enable the development of “one pot” microbial cell factories to meet consumer energy needs in the 21st century. To realize this potential and to truly understand the diversity and biology of these eukaryotes, continued development of scientific tools and techniques is essential. As a professional reference, this series will be very helpful to all people who work with fungi and should be useful both to academic institutions and research teams, as well as to teachers, and graduate and postgraduate students with its information on the continuous developments in fungal biology with the publication of each volume.

More information about this series at <http://www.springer.com/series/11224>

Abd El-Latif Hesham  
Ram Sanmukh Upadhyay  
Gauri Dutt Sharma  
Chakravarthula Manoharachary  
Vijai Kumar Gupta  
Editors

# Fungal Biotechnology and Bioengineering

 Springer

### *Editors*

Abd El-Latif Hesham  
Department of Genetics  
Faculty of Agriculture  
Beni-Suef University  
Beni-Suef, Egypt

Gauri Dutt Sharma  
Atal Bihari Vajpayee Vishwavidyalaya  
Bilaspur, Chhattisgarh, India

Ram Sanmukh Upadhyay  
Department of Botany  
Banaras Hindu University  
Varanasi, Uttar Pradesh, India

Chakravarthula Manoharachary  
Department of Botany  
Osmania University  
Hyderabad, Telangana, India

Vijai Kumar Gupta  
AgroBioSciences and Chemical &  
Biochemical Sciences Department  
University Mohammed VI Polytechnic  
(UM6P)  
Benguerir, Morocco

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# Foreword

For more than a century, fungi have had an enormous impact on industrial biotechnology and bioengineering. They are used in industrial processes such as the production of enzymes, vitamins, polysaccharides, polyhydric alcohols, pigments, lipids, biofuels, and glycolipids. Some of these products are produced commercially, while others are potentially valuable in biotechnology.

Fungal secondary metabolites are important to our health and nutrition and have a tremendous economic impact. In addition to the several reaction sequences involved in fermentation, fungi are extremely useful in carrying out biotransformation processes.

Over the past 20 years, the tools of molecular biology have been successfully adapted for the study of filamentous fungi. These applications have elevated the status of fungal genetics to a fascinating and, at times, truly insightful field of study. Molecular genetics has provided a toolbox of immensely powerful experimental approaches, and it now entails virtually all groups of economically and environmentally important fungi and is having a significant impact on commercial bioprocesses.

Fungi, owing to their metabolic versatility, ecological diversity, complex life cycles, and essential role in nature, have attracted the attention of engineers, biologists, geneticists, ecologists, chemists, and biochemists in myriad ways.

In this sense, *Fungal Biotechnology and Bioengineering* was edited by Abd El-Latif Hesham, R.S. Upadhyay, G. D. Sharma, C. Manoharachary, and V. K. Gupta. The topics were organized so as to provide a very important contribution to science and technological advances to be applied to the fields of biotechnology and bioengineering.

The 20 chapters of this book present, in detail, relevant information that can be useful to students, teachers, researchers, and professionals interested in the area of industrial biotechnology and microbiology.

Professor Helen Treichel  
Laboratório de Microbiologia e Bioprocessos  
Curso de Graduação em Engenharia Ambiental e Sanitária  
Programa de Pós-Graduação em Ciência e Tecnologia Ambiental  
Universidade Federal da Fronteira Sul  
UFFS – Campus Erechim  
Erechim, RS, Brazil

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# Contributors

**Ahmed M. Abdel-Azeem** Botany Department, Faculty of Science, University of Suez Canal, Ismailia, Egypt

**Sashie Abeywickrema** Department of Food Science, University of Otago, Dunedin, New Zealand

**Racheal Abuine** Department of Marine Biotechnology, Gangneung-Wonju National University, Gangneung, Republic of Korea

**Bushra Aleem** Department of Plant Biology, Rutgers University, New Brunswick, NJ, USA

**Wataru Aoki** Division of Applied Life Sciences, Graduate School of Agriculture, Kyoto University, Kyoto, Japan

**Esmil Beliya** Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India

**S. A. Belorkar** Microbiology and Bioinformatics Department, Atal Bihari Vajpayee University, Bilaspur, India

**Joan W. Bennett** Department of Plant Biology, Rutgers University, New Brunswick, NJ, USA

**Himashree Bora** Department of Forestry, North Eastern Regional Institute of Science and Technology, Nirjuli, Arunachal Pradesh, India

**Rituraj Borah** Department of Forestry, North Eastern Regional Institute of Science and Technology, Nirjuli, Arunachal Pradesh, India

**Jishuang Chen** Key Laboratory of Basic Pharmacology and Joint International Research Laboratory of Ethnomedicine of Ministry of Education, Zunyi Medical University, Zunyi, China

Bioresource Institute for Heathy Utilization, Zunyi Medical University, Zunyi, China

College of Biotechnology and Pharmaceutical Engineering, Nanjing Tech University, Nanjing, China

**K. Divakar** Department of Biotechnology, National Institute of Technology Warangal, Warangal, India

Sri Venkateswara College of Engineering (Autonomous), Sriperumbudur, Tamilnadu, India

**Mohamed M. H. El-Defrawy** Department of Genetics, Faculty of Agriculture, Assiut University, Assiut, Egypt

**Elsherbiny A. Elsherbiny** Plant Pathology Department, Faculty of Agriculture, Mansoura University, Mansoura, Egypt

**Anand Kumar Gaurav** Department of Environment and Sustainable Development, Institute of Environment and Sustainable Development, Banaras Hindu University, Varanasi, Uttar Pradesh, India

**Roshan Lal Gautam** Department of Biotechnology, Faculty of Science, Veer Bahadur Singh Purvanchal University, Jaunpur, Uttar Pradesh, India

**Erik N. Gomes** Department of Plant Biology, Rutgers University, New Brunswick, NJ, USA

**Vijai Kumar Gupta** AgroBioSciences and Chemical & Biochemical Sciences Department, University Mohammed VI Polytechnic (UM6P), Benguerir, Morocco

**María Lucila Hernández-Macedo** Postgraduate Program in Industrial Biotechnology, Institute of Technology and Research, Laboratory of Molecular Biology, University, Aracaju, Brazil

**Abd El-Latif Hesham** Department of Genetics, Faculty of Agriculture, Beni-Suef University, Beni-Suef, Egypt

**S. K. Jadhav** Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India

**Amit K. Jaiswal** Horticulture and Landscape Architecture, Purdue University, West Lafayette, IN, USA

**Sudisha Jogaiah** Laboratory of Plant Healthcare and Diagnostics, PG Department of Biotechnology and Microbiology, Karnatak University, Dharwad, Karnataka, India

**Polpass Arul Jose** Marine Biotechnology and Ecology Division, CSIR-Central Salt and Marine Chemicals Research Institute, Bhavnagar, Gujarat, India

**Madhu Kamle** Department of Forestry, North Eastern Regional Institute of Science and Technology, Nirjuli, Arunachal Pradesh, India

**Miki Karasaki** General Education Center and Graduate School of Pharmacy, Hyogo University of Health Sciences, Kobe, Japan

**Kandasamy Kathiresan** Centre of Advanced Study in Marine Biology, Faculty of Marine Sciences, Annamalai University, Parangipettai, Tamil Nadu, India

**Sardar Khan** Department of Environmental Sciences, University of Peshawar, Peshawar, Pakistan

**Ana A. Kitazono** Laboratory of Biological Chemistry and Bioanalysis, La Molina National Agrarian University, Lima, Peru

**Pradeep Kumar** Department of Forestry, North Eastern Regional Institute of Science and Technology, Nirjuli, Arunachal Pradesh, India

**Asmaa M. M. Mawad** Biology Department, College of Science, Taibah University, Al-Madinah Al-Munawwarah, Saudi Arabia

Botany and Microbiology Department, Faculty of Science, Assiut University, Assiut, Egypt

**Davoodbasha MubarakAli** School of Life Sciences, B.S. Abdur Rahman Crescent Institute of Science and Technology, Chennai, Tamil Nadu, India

**M. Nandhini** Department of Studies in Biotechnology, University of Mysore, Manasagangotri, Mysuru, India

**Ram Naraian** Department of Biotechnology, Faculty of Science, Veer Bahadur Singh Purvanchal University, Jaunpur, Uttar Pradesh, India

**Javed Nawab** Department of Environmental Sciences, Abdul Wali Khan University Mardan, Mardan, Pakistan

**H. S. Prakash** Department of Studies in Biotechnology, University of Mysore, Manasagangotri, Mysuru, India

**Shweta Raj** Department of Biotechnology, National Institute of Technology, Warangal, Telangana, India

**B. RamyaSree** Department of Biotechnology, National Institute of Technology Warangal, Warangal, India

**Younes M. Rashad** Plant Protection and Biomolecular Diagnosis Department, Arid Lands Cultivation Research Institute, City of Scientific Research and Technological Applications, Alexandria, Egypt

**Anuruddhika Udayangani Rathnayake** Department of Marine Biotechnology, Gangneung-Wonju National University, Gangneung, Republic of Korea

**Alexandre Gomes Rodrigues** Institute of Pharmacy, Martin-Luther University Halle-Wittenberg, Halle, Germany

**Richa Salwan** College of Horticulture and Forestry (Dr. YSP- University of Horticulture and Forestry), Neri, Hamirpur, HP, India

**Kandasamy Saravanakumar** Department of Medical Biotechnology, College of Biomedical Sciences, Kangwon National University, Chuncheon, Gangwon, Republic of Korea

**Surendra Sarsaiya** Key Laboratory of Basic Pharmacology and Joint International Research Laboratory of Ethnomedicine of Ministry of Education, Zunyi Medical University, Zunyi, China

Bioresource Institute for Heathy Utilization, Zunyi Medical University, Zunyi, China

**Santanu Sasidharan** Department of Biotechnology, National Institute of Technology, Warangal, Telangana, India

**Prakash Saudagar** Department of Biotechnology, National Institute of Technology, Warangal, Telangana, India

**Anu Sharma** University Centre for Research and Development, Chandigarh University, Gharuan, Punjab, India

**Gauri Dutt Sharma** Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur, Chhattisgarh, India

**Vivek Sharma** University Centre for Research and Development, Chandigarh University, Gharuan, Punjab, India

**Jingshan Shi** Key Laboratory of Basic Pharmacology and Joint International Research Laboratory of Ethnomedicine of Ministry of Education, Zunyi Medical University, Zunyi, China

**Seiji Shibasaki** General Education Center and Graduate School of Pharmacy, Hyogo University of Health Sciences, Kobe, Japan

**Meghna Singh** Department of Biotechnology, IMS Engineering College, Ghaziabad, UP, India

**Neha Singh** Department of Biotechnology, IMS Engineering College, Ghaziabad, UP, India

**Ravi Kant Singh** Amity Institute of Biotechnology, Amity University of Chhattisgarh, Raipur, Chhattisgarh, India

**Saurabh Singh** Department of Environment and Sustainable Development, Institute of Environment and Sustainable Development, Banaras Hindu University, Varanasi, Uttar Pradesh, India

**Jalal Soltani** Plant Protection Department, Phytopathology Section, Bu-Ali Sina University, Hamedan, Iran

**Shubhra Tiwari** Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India

**Palistha Tuladhar** Department of Biotechnology, National Institute of Technology, Warangal, Telangana, India

**A. C. Udayashankar** Department of Studies in Biotechnology, University of Mysore, Manasagangotri, Mysuru, India

**Mitsuyoshi Ueda** Division of Applied Life Sciences, Graduate School of Agriculture, Kyoto University, Kyoto, Japan

**Jay Prakash Verma** Department of Environment and Sustainable Development, Institute of Environment and Sustainable Development, Banaras Hindu University, Varanasi, Uttar Pradesh, India

**Gretty K. Villena** Laboratory of Mycology and Biotechnology, La Molina National Agrarian University, Lima, Peru

**Myeong-Hyeon Wang** Department of Medical Biotechnology, College of Biomedical Sciences, Kangwon National University, Chuncheon, Gangwon, Republic of Korea

## About the Editors

**Abd El-Latif Hesham** is Full Professor of Microbial Genetics and Environmental Meta-Genome Biotechnology, and presently working as Head of Genetics Department, Faculty of Agriculture, Beni-Suef University (BSU), Egypt. He graduated and got his M.Sc. from Genetics Department, Faculty of Agriculture, Assiut University, Egypt, and his Ph.D. degree from Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences in “Microbial Genetics and Environmental Meta-Genome Biotechnology.” He was awarded postdoctoral studies about “Meta-genome Biotechnology” from CAS-TWAS.

Before joining BSU he worked at Assiut University since his graduation in 1992 to July 2019 as a Demonstrator, Lecturer, Assistant Professor, Associate Professor, and then Full Professor. He also worked as Associate Professor of Microbial Genetics and Biotechnology for 5 years in the Department of Biology, Faculty of Science, King Khalid University, Saudi Arabia.

He is one of the leading experts in the areas of “Microbial Genetics and Biotechnology,” “Biodegradation, Bioremediation and Phytoremediation,” “Microbial community structure,” “Soil Microbiology and Enzyme activities,” “Biological Control,” “Anti-microbial activates,” “Biofertilizer,” “Biofuels,” and “Environmental Meta-genome Biotechnology.” He has coauthored more than 80 peer-reviewed publications in reputed Thomson Reuters impact factor journals and 4 book chapters in international reputed publishers like Elsevier, Springer-Nature, Taylor & Francis, and John Wiley & Sons. He is key person in many national and international research projects related to field of Microbial Genetics and Applied Biotechnology.

Prof. Hesham has been the scientific and organizing committee member and invited speaker in various international conferences. He is also a recipient of several prestigious national and international awards. Most recently, he has been elected as Member of the Egyptian National Biotechnology Network of Expertise (NBNE), and he has been appointed as the Country Representative for Egypt and the Arab Counties by International Biodeterioration & Biodegradation Society (IBBS) UK, which belongs to the Federation of European Microbiological Societies (FEMS).

He is also Fellow of Microbiology Society, UK; European Federation of Biotechnology, Spain; the Bio-Processing Network, Australia; and the International Biodeterioration & Biodegradation Society.

Prof. Hesham serves as Associate Editor and Editorial Board Member for international reputed journals such as *Scientific Reports*, *Frontiers in Microbiology*, *Frontiers in Plant Science*, *PeerJ*, *Current Bioinformatics*, *International Journal of Agriculture and Biology*, *Journal of Environmental Biology*, and *Biocatalysis and Agricultural Biotechnology*.

**Ram Sanmukh Upadhyay** is Professor and Head of Botany Department at the most prestigious University of India, Banaras Hindu University (BHU). He is credited with the discovery of the perfect state of *Fusarium udum*, the causal agent of the wilt of pigeon pea. He is also acclaimed for his contributions to the biology of this pathogen. He has published 143 research papers, 60 book chapters, 3 edited books, and 1 monograph of national and international repute. He has produced 27 Ph.D. students ranging on the topics such as biological control of plant pathogens, programmed plant cell death in response to pathogens, bioremediation of toxic effluents, induced resistance in plants and their immunization, plant growth promoting microbes, chitinase production from actinomycetes, mycorrhizal technology for reclamation of wastelands, role of rhizobacteria in detoxifying phytotoxic effect, development of molecular markers in tracking microbes in environment, effect of biotic and abiotic factors on plants, and molecular basis of plant-microbe interaction. Six Ph.D. students are currently working under his supervision. He has supervised more than 60 M.S./M.D. level dissertations. His current research interest focuses mainly on biological control of fungal plant pathogens, induced resistance in plants against pathogens, and microbial technology. He is a member of various scientific societies and is on the editorial board of various journals. Dr. Upadhyay is a recipient of the prestigious Young Scientist Award of the Indian National Science Academy (INSA) and Professor L. S. S. Kumar Memorial Award of INSA. He was conferred by the Prime Minister of India with Prof. Hira Lal Chakravorty Award of the Indian Science Congress Association in 1986. He has carried out collaborative research at Rothamsted Experimental Station (England; 1988–1989) with Dr. David Hornby as Visiting Fellow of the Royal Society of London; Illinois State University (USA; 1990–1991) with Prof. R. K. Jayaswal, Distinguished Professor; and an INSA-JSPS Fellow (Japan; 1994–1995) with Prof. Hajimu Komada at Shimane University. Dr. Upadhyay was the Coordinator of Environmental Science Program of BHU, and currently, he is the Program Coordinator of the Centre of Advanced Study (CAS) in Botany, Banaras Hindu University. He was the Convener of the Mycology and Plant Pathology Group of the CAS in Botany at BHU. His biography has been published by various biographical publishing houses including World Who's Who.

**Gauri Dutt Sharma** is the Vice-Chancellor of Atal Bihari Vajpayee Vishwavidyalaya, Bilaspur, India. Prof. Sharma has been the Vice-Chancellor of Nagaland Vishwavidyalaya. He was also Professor and Dean, School of Life

Science, and Pro-vice Chancellor, Assam Vishwavidyalaya. Prof. Sharma has done master's degree in Botany and Ph.D. in Ecology of Mycorrhiza. He is expert in Microbial Ecology and Microbiology Technology. Prof. Sharma is the Chairman of several quality of higher education committee by NAAC, Bangalore. He is the Fellow of Indian Mycological Society (FIMS), Indian Botanical Society (FBS), and International Natural Resource and Environment Society (FINRES). He has got several awards in his career including Dr. Narsimhan Medal Award by Indian Phytopathology Society, Rashtriya Ratna Award, International Study Center, DEED Award by Confederation of Indian University, IAEWA, UNESCO, Birbal Sahni Award by Indian Botanical Society, and Education Excellency Award by CCLP Worldwide. He is the editorial member of various journals of international and national repute. His ResearchGate score is 35.04. He has 297 research/review publications along with 11 edited books published from publishers of international repute like CABI, UK; CRC Press; Taylor and Francis.

**Chakravarthula Manoharachary** has served Osmania University for 45 long years in different capacities including as Dean. He has served as Vice Chancellor of Oriental University, Indore. He has guided 50 students for Ph.D. and has published 640 research papers and 30 books including that of Springer Publications, USA. He has discovered 20 new fungal genera and 82 new fungal species. He has immensely contributed for the advancement of teaching and research in Mycology and Plant pathology besides establishing excellent infrastructure. He is recipient of five national awards including Dr. E. K. Janaki Ammal National Award by the Ministry of Environment and UGC J.C. Bose Award. Furthermore, he received five awards from state government including best teacher award and outstanding scientist award. He has been honored with six lifetime achievement awards, served as president of IPS, IBS, MSI, ISCA Botany section, and others. He has served as Chairman/Expert Member of UGC, DST, DBT, MOENF, ICAR, CSIR, and others. He did his post-doctoral work in UK, USA, and Germany. He is also Fellow of National Academy of Sciences, India, Fellow of National Academy of Agricultural Sciences, and others.

**Vijai Kumar Gupta** has previously worked as- Senior Scientist, ERA Chair VALORTECH, Estonian University of Life Sciences (EMU), Estonia. Currently, he is working as Associate Professor of Biochemistry at UM6P University, Morocco.

Before joining EMU, he worked as *Senior Research Scientist*, in prestigious ERA Chair of Green Chemistry, Tallinn University of Technology (TalTech), Tallinn, Estonia, for 3 years and as *Senior Researcher* for 6+years at Molecular Glycobiotechnology Group (MGBG) at the Department of Biochemistry, National University of Ireland Galway (NUIG), Ireland. He worked as Assistant Professor of Biotechnology at MITS University, India, before moving to NUIG Ireland.

He is one of the leading experts in the area of *Bioactive Natural Products, Microbial Biotechnology and Applied Mycology, Enzyme and Bioprocess Technology, Biofuel and Biorefinery Research, and Glycobiotechnology of Plant-Microbial Interactions*.



He is the Secretary of *European Mycological Association* and Country Ambassador of *American Society of Microbiology*. He has received several international awards. He is the Editor of few well-reputed Thomson Reuters impact factor journals and edited 28 books, for internationally reputed publishers like *Elsevier Press*, *Wiley-Blackwell*, *Frontiers*, *Taylor & Francis*, *Springer-Nature*, *CABI*, and *De Gruyter*. Also, his author h-index is 37, and he has 122 publications in internationally well-reputed journals. He has also developed 2 IPs in the area of microbial biotechnology/sustainable product developments.