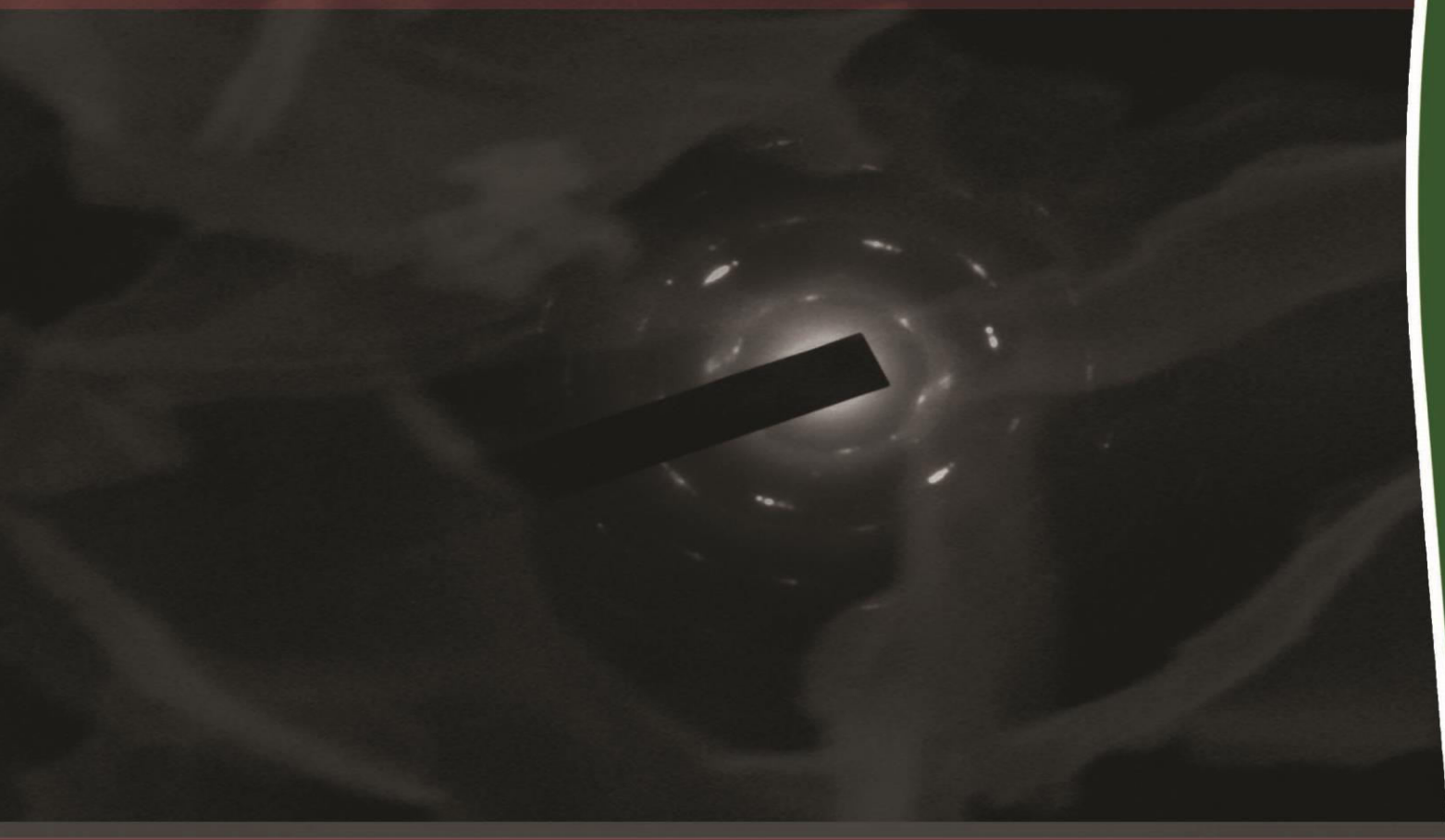
ISBN: 978-93-94174-20-7

Development of Biogenic Nanomaterials and their Benign Applications

Editors
Dr. R. Balachandar
Dr. K. Ashok Kumar



Excellent Publishers

EXCELLENT PUBLISHERS

Development of Biogenic Nanomaterials and their Benign Applications

Editors

Dr. R. Balachandar
Professor, Department of Biotechology,
Prathyusha Engineering College, Chennai, Tamil Nadu, India

Dr. K. Ashok Kumar
Associate Professor and Department of Biotechnology, School of Life Sciences, Vels Institute of Science Technology and Advanced Studies (VISTAS), Pallavaram, Chennai, Tamil Nadu, India

ISBN: 978-93-94174-20-7

https://doi.org/10.20546/978-93-94174-20-7

Excellent Publishers

Excellent Publishers
Kancheepuram, India
www.excellentpublishers.com
email id: excellentpublishers2013@gmail.com

Copyright © 2023 Excellent Publishers. All rights reserved.

Publisher: **Excellent Publishers**
Editors: **Dr. R. Balachandar and Dr. K. Ashok Kumar**
ISBN: 978-93-94174-20-7
DOI: https://doi.org/10.20546/978-93-94174-20-7

Note: No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the publisher.

Table of Contents

Preface

Nanotechnology is a multidisciplinary field that involves manipulating matter at the nanoscale, typically in the range of 1 to 100 nanometers. At this scale, the properties of materials can be significantly different from those at larger scales, leading to unique and often enhanced characteristics. Nanotechnology encompasses a wide range of scientific disciplines, including physics, chemistry, biology, materials science, and engineering. Here are key aspects of nanotechnology.

Development of Biogenic Nanomaterials and their Benign Applications: This book is an attempt to bring a perspective to the innovations that areconstantly evolving in the field of Nanotechnology towards Life Sciences.
Nanomaterial's application in the diverse fields of Biochemistry, Microbiology, Biotechnology, EnvironmentalSciences andPhytochemistry has come a long way in the field.

Development of Biogenic Nanomaterials and their Benign applications is an effort to bring together the knowledge of variousexperienced and talented science minds striving silently towards Nanomaterials and their biological applications. This book has chapters contributed by masterminds in the differentareas of Nanotechnology and Life Science.

The book has chapters on current and trending topics like the role of Nanotechnology and synthesized Nanoparticles in the fields of Agriculture, Environment Such as Bioremediation, Medicine and Eco-friendly synthesis of Nanoparticles.
Biogenic nanomaterials are nanoscale materials that are synthesized by biological entities such as bacteria, fungi, plants, and other microorganisms. These materials have gained significant attention due to their unique properties, eco-friendly synthesis processes, and potential applications in various fields. The development of biogenic nanomaterials and their benign applications involves several procedures. Microorganisms like bacteria, fungi, and algae can be used to synthesize nanomaterials. Plants can also be employed in the synthesis of nanomaterials. Plant extracts contain various phytochemicals that can act as reducing and stabilizing agents in the formation of nanoparticles.Thorough characterization of biogenic nanomaterials is crucial to understanding their size, shape, composition, and surface properties. Techniques such as transmission electron microscopy (TEM), scanning electron microscopy (SEM), X-ray diffraction (XRD), and Fourier-transform infrared spectroscopy (FTIR) are commonly used.

Benign Applications:

Medicine: Biogenic nanomaterials have applications in drug delivery, imaging, and diagnostics. They can be tailored to enhance the therapeutic efficacy of drugs and reduce their side effects.

Environmental Remediation: Biogenic nanoparticles can be utilized for the removal of pollutants from air and water. They can act as efficient adsorbents for heavy metals and other contaminants.

Food Industry: Biogenic nanomaterials can be employed in food packaging, preservation, and sensing applications to enhance food safety and shelf life.

Agriculture: Nanoparticles synthesized from plant extracts or microorganisms can be used in agriculture for crop improvement, nutrient delivery, and pest control.

Sustainability: Considerations for the sustainability of the synthesis processes and the overall environmental impact of biogenic nanomaterials are essential. Researchers aim to develop green and sustainable methods for the production of these materials.The development of biogenic nanomaterials and their applications is a multidisciplinary field that combines biology, chemistry, materials science, and engineering. As research progresses, it is expected that more innovative and environmentally friendly applications will be discovered, contributing to sustainable technological advancements.

Dr. R. Balachandar
Professor, Department of Biotechology,
Prathyusha Engineering College, Chennai,
Tamil Nadu, India

Dr. Ashok Kumar K
Associate Professor and Department of Biotechnology,
School of Life Sciences, Vels Institute of Science
Technology and Advanced Studies (VISTAS),
Pallavaram, Chennai, Tamil Nadu, India

About the Editors

R. Balachandar, Ph.D., is working as an Professor in the Department of Biotechology, Prathyusha Engineering College, His research interests include Microbiology, Micrbial Biotechnolgy, Genetic Engineering Nanobiotechnology, Vermicompost Technology, Biofuel and Waste management. He has Received a **"Best Research Paper Award"** from "Arupadai Veedu Institute of Technology", Chennai, India in the year of 2020.and he had received **"Best Teacher Award"** from Arulmigu Meenakshi Amman College of Engineering. He had filed two Indian patents and published more than 30 Research and Review articles in reputed journals with a cumulative impact factor of above 400 and published 13 Book chapters to his credit. He is serving as a Reviewer for several Indexed Journals. Presented papers and attended more than 20 National and International Conferences. He is also a life member of Society for Biotechnology and Indian Lichenological Society, Life Member in Indian Society for Technical Education (ISTE).

K. Ashok Kumar, Ph.D., is working as an Associate Professor in the Department of Biotechnology, School of Life Sciences, Vels Institute of Science Technology and Advanced Studies (VISTAS), Pallavaram, Chennai, Tamil Nadu, India. His research interests include Biochemistry, Environmental Biotechnology and Phytochemistry. He possesses more than 18 years of Teaching Experience. He has qualified for SET a prestigious Exam conducted by Mother Teresa University, Tamil Nadu for the Qualification of Lectureship. He has received many awards from International and National Conferences for best paper presentations Organized by reputed Institutes. He has published more than 35 Research and Review articles in reputed, SCI and Scopus Indexed Journals and has Published 10 book chapters and one book to his credit.He has published more than 25 research findings in International and National Conferences organized by renowned Institutes. He is also a Life member of the Indian Nano-Biologysts Association (INBA), a member ofEinstein Research Academy (ERA), and the American Society of Microbiology.

Development of Biogenic Nanomaterials and their Benign Applications

Edited by Dr. R. Balachandar and Dr. K. Ashok Kumar

Dr. R.Balachandar
Professor, Department of Biotechology,
Prathyusha Engineering College, Chennai, Tamil Nadu, India

Dr. K.Asok Kumar
Associate Professor and Department of Biotechnology,
School of Life Sciences, Vels Institute of Science Technology and
Advanced Studies (VISTAS), Pallavaram, Chennai, Tamil Nadu, India

EXCELLENT PUBLISHERS

ISBN 978-93-94174-20-7

Published by
Excellent Publishers
No.:38/48, Second Street,Ellappanagar, Kancheepuram, Tamilnadu, India
www.excellentpublishers.com e.mail: excellentpublishers2013@gmail.com
Mobile No.: +91-9842641794