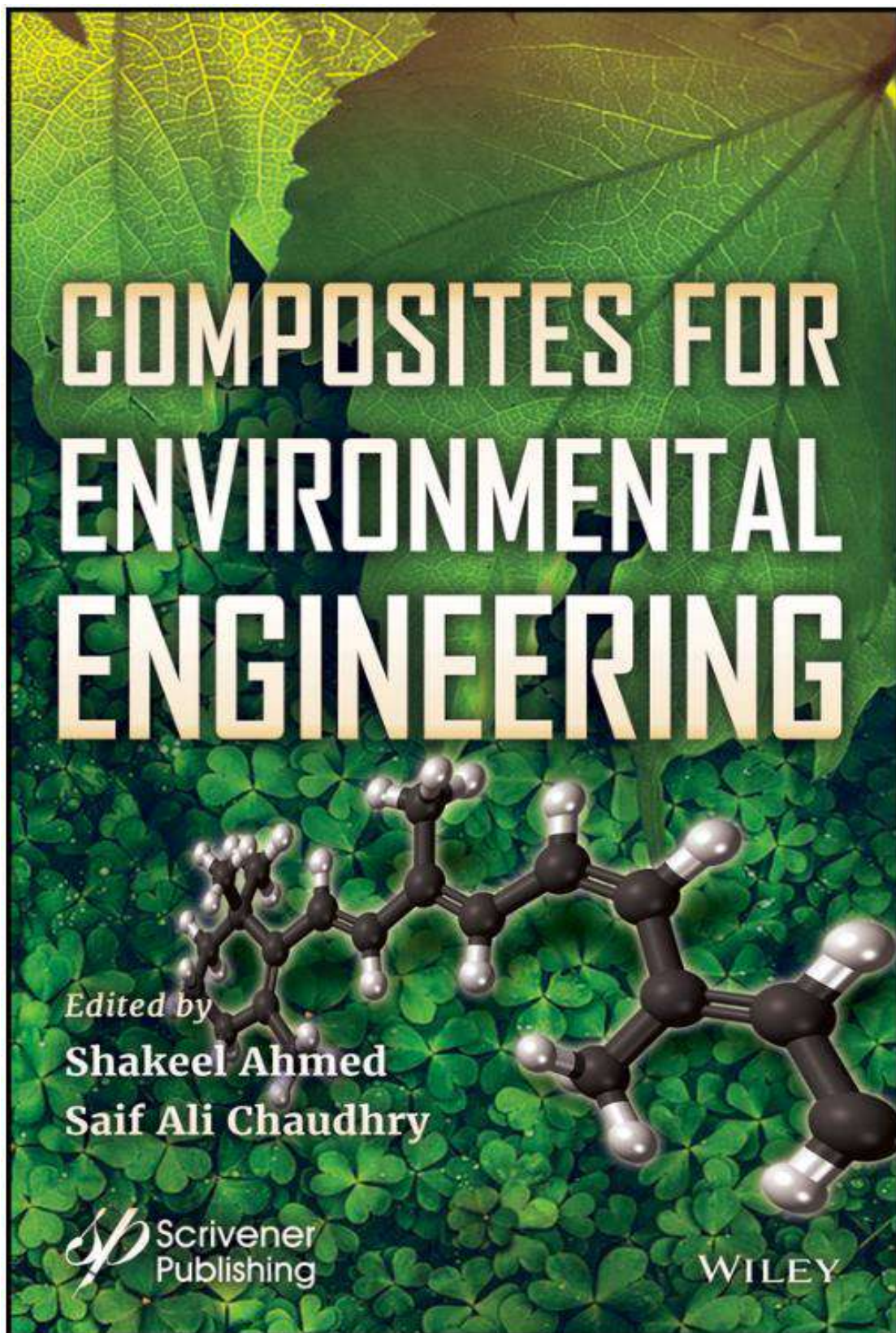


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Book Publication



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Shakeel Ahmed

and

Saif Ali Chaudhry



WILEY

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Chapter 1

Composites: Types, Method of Preparation and Application as An Emerging Tool for Environmental Remediation

Bushra Fatima, Geetanjali Rathi, Rabia Ahmad* and Saif Ali Chaudhry†

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Abstract

Pollution is one of the major problems in most of the developing and developed countries. Water pollution remains a source of constant concern for environmentalists. With the growth of industrialization and globalization this issue is rising day by day. Several types of methods and materials have been used to avoid these problems, but often the methods proved to be useless in the absence of proper method and materials. In order to streamline these methods such as ion exchange, membrane filtration and adsorption, continuous new types of effort and materials are being made. In the material used so far, the best features of composite materials have come out, which has opened a new door in the field of treatment technologies. Composite is made up of different types of material having unique properties. The combination of different desired material is required to obtain the desired results in the composites thus resultant composites prove to be highly advance, unique and beneficial. In this chapter, we have discussed the different types of composite materials, and their preparation strategies and applications. The detail study on matrix and reinforced material based composites, and green composites have been conducted. This chapter will definitely be the preferred choice of environmentalists.

Keywords: Environment, pollution, composites, types of composites, matrix and reinforcement, green composites

1.1 Introduction

Concerned with the problems of the environment, environmental engineers are developing the solutions by using the principles of biology and chemistry. Most common issues on which the engineers are focussed currently are disposal and recycling of the waste materials, air and water pollution, controlling the public health issues, removal of polluting substances from the surroundings, harmful effects caused by acid rain, global warming, auto mobile emissions, depletion of ozone layer etc. [1–3]. These effect the ecosystem which ultimately leads to human health problems and may sometimes even prove fatal. One such matter rising at the global level is water pollution [4–7]. Water which is a very precious resource is useful for

ALGINATES

Applications in the
Biomedical and
Food Industries

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Chapter 1

Alginates: General Introduction and Properties

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Abstract

Alginates (ALGs) are a group of naturally occurring anionic polysaccharides derived from brown seaweeds. They are linear biopolymers of 1,4-linked β -D-mannuronic acid (M) and 1,4 α -L-guluronic acid (G) residues that are arranged in homogenous (poly-G, poly-M) or heterogenous (MG) block-like patterns. The physiological and chemical characteristics of ALGs depend on this arrangement of residues. Alginates are primarily used as thermally stable cold-setting gelling agents, which are formed in presence of divalent cations. They are more efficient gelling agents than gelatin and can gel at far lower concentrations as compared to other agents. This ability to create a chemically set, irreversible gel has proved to be useful in many food applications. Among various ALGs, sodium ALG is most widely studied in the pharmaceutical and biomedical field. Its various properties favor its use for viscosity enhancement, encapsulation polymer, matrixing agent, stabilizer, bioadhesive, and film former in transdermal and transmucosal drug delivery. With well-established uses in dentistry, the ALGs also offer interesting possibilities in the field of medicine and cosmetics as a skin care ingredient. This chapter will include general introduction, understanding of structure and properties of ALGs, and different forms of ALGs used in industries.

Keywords: Alginates, biopolymer, polysaccharide, medicines, cosmetics

1.1 Introduction

Alginates (ALGs) are naturally occurring anionic polysaccharides that are present as a structural component in cell walls of brown algae, mainly from *Macrocystis pyrifera*, *Ascophyllum nodosum*, and *Laminaria hyperborea* and as a capsular polysaccharide in bacterial strains like *Azotobacter* and *Pseudomonas*. It is present in the cell wall of brown algae as the calcium, magnesium, and sodium salts; therefore, it is usually referred to as "alginic acid and its salts." Alginates are available commercially as sodium, potassium, or ammonium salts in filamentous, granular, or powdered forms. Their color ranges from white to yellowish-brown. The molecular weight of ALG generally ranges from 60,000 to 700,000 Da depending on the application [1]. The size (diameter) of ALG gel particles can be macro

Shakeel Ahmed *Editor*

Bio-based Materials for Food Packaging

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 Springer

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Bio-based Materials: Past to Future



Tanvir Arfin and Kamini Sonawane

Abstract The research related to biomaterial is just in its early step, but yet promising and enhanced chemical branch and methods are continuously being innovated along with the different publication in its fields in the upcoming years. The nanomaterial possessing low-dimensional and 3D structure competes with the challenges with the other biomaterials and enhances its application in different areas. In the present chapter, various methods for producing the biomaterial and constructing its derivatives needed for the food packaging are forwarded. In this context, the future aspect and the limitation to overcome the situation are briefly explained. It is believed that an extensive study related to the biomaterials will still explore in the upcoming years.

Keywords Biopackaging · Renewable based materials · Starch · Cellulose · Pectin

1 Introduction

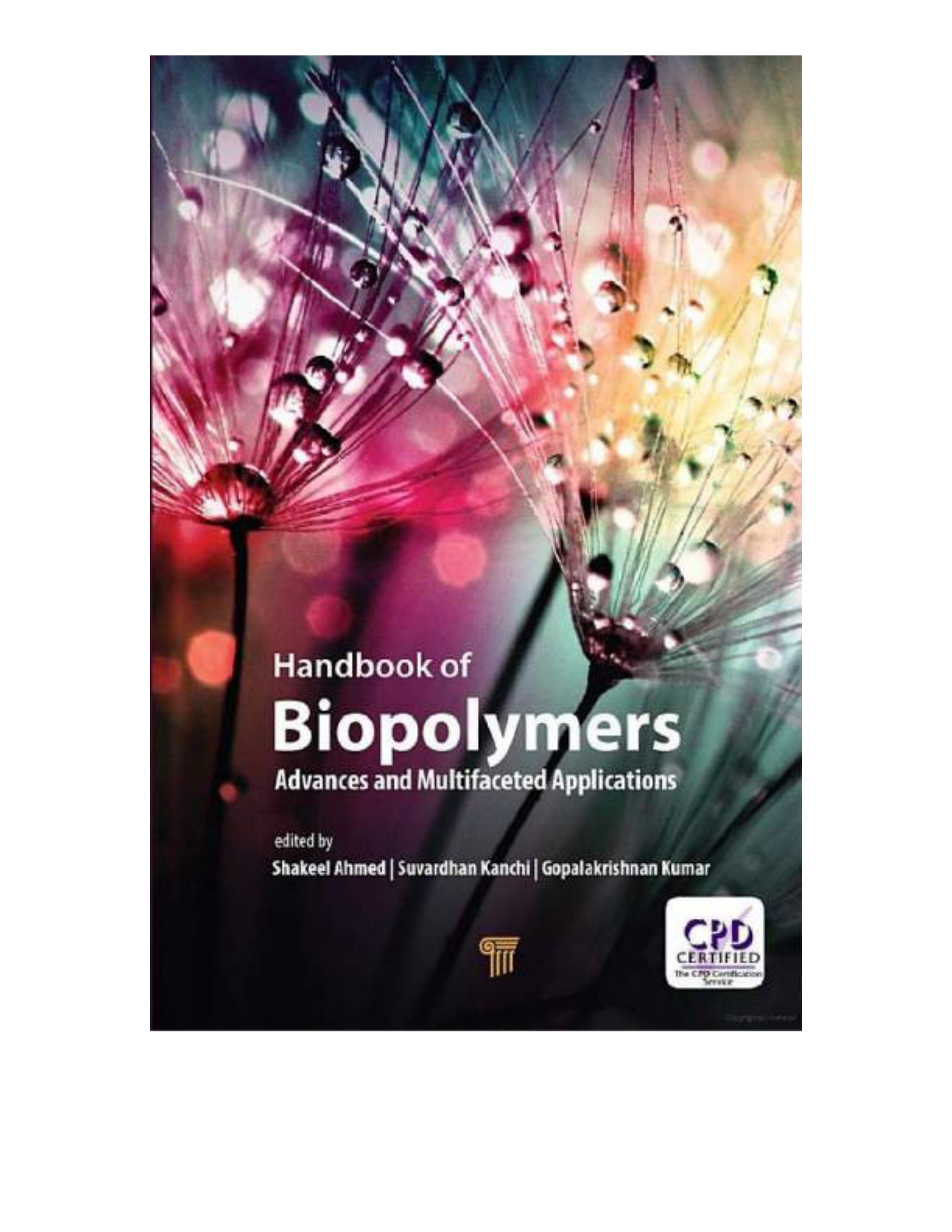
Food packaging approach is evolved mainly for food products to inculcate their quality, inform or provide knowledge to the consumer related to the features available in the products. The primary function enclosed for packaging includes restraint, shield and communication.

The various food-borne disease or illness provides awareness regarding the safety of food by the government in the different corners of the world. The bacterial pathogen is the agent contributing towards the concerns awareness, and a varied number of food producing organism are the critical source to be noted which results in the safeguard of the diseases or their treatment.

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Preface

1 Biopolymers: Classification and Applications

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2 Bio-Based Biopolymers and Their Potential

Chapter 1

Biopolymers: Classification and Applications

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Green and Sustainable Advanced Materials

Volume 1: Processing and
Characterization

**Shakeel Ahmed and
Chaudhery Mustansar Hussain**



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To place all of the collective understanding about green and sustainable advanced materials into perspective, add a touch of reality to the concepts, and to cover extensive expansion of the green and sustainable advanced materials, the book is divided into two volumes and each volume has subdivisions of several chapters. Volume 1 mainly discusses Processing and Characterization while Volume 2 is focused on the Applications of green and sustainable advanced materials.

In the first volume, the first chapter presents an overview and characterization of green and sustainable advanced materials. The subsequent chapters encompass details of biopolymers and biocomposite materials and nanomaterials. Subsequent chapters describe biogenic approaches for SiO₂ nanostructures nanofabrication, polymer and composite materials, design and processing aspects of polymer and composite materials. The following chapters incorporate seaweed-based binder in wood composites, coloration and functional finishing of textile materials using natural resources. The final two chapters discuss advances in bio-nanohybrid materials, selenium nanoparticles and their biotechnological applications.

In the second volume, the first presents a critical review of green sustainability, nanotechnology and advanced materials and provides a vision for the future. Valorization of green and sustainable advanced materials from a biomedical perspective and their potential applications are detailed in the next chapters. Applications of green and sustainable advanced materials in textile technology and environmental protection are described in a very comprehensive manner in the next batch of chapters. Synthesized nanostructures alloys for optoelectronic, biochar-supercapacitors, biomedical from synthetic and natural green and sustainable advanced materials green and sustainable advanced materials are then covered. Efficiency of transition metals at the nanoscale - as heterogeneous catalysts and emerging applications of green and sustainable advanced materials in agriculture and food industry take center stage in final two of chapters.

In conclusion, both volumes incorporate in-depth technical information without compromising the delicate link between factual data and fundamental concepts or between theory and practice.

Overall, this book is planned to be a reference book for researchers and scientists who are searching for new sustainable advanced materials. The contributors are well-known researchers and scientists of materials science and engineering. We are very thankful to the chapter authors for their enthusiastic efforts in the making of this book. Finally, we extend our thanks to Wiley-Scrivener for publishing the book.

Shakeel Ahmed & Chaudhery Mustansar Hussain (Editors)
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Green and Sustainable Materials

edited by

Shakeel Ahmed | Suvardhan Kanchi



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Chapter 1

Overview of Bionanocomposites

Irfan Hussain Lone^a and Arifa Akhter^b

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The authors describe the fundamentals of bionanocomposites and how they are different from conventional composites and the components that are made up of various bionanocomposites. Researchers are focusing on developing bionanocomposites and are using different types of innovative strategies to reduce the dependence on fossil fuels and other nonrenewable resources. Bionanocomposites have many advantages over conventional nonbiodegradable materials, such as plastic-based packing materials, because they possess properties like being lightweight, ecofriendly, and biodegradable. These applications can be more effective and useful if the metal oxides and biopolymer constituents are environment friendly as they will help to keep the environment pollution free and clean. The various properties and applications

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Chapter 1

Composites from Natural Fibers and Bio-resins

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There is an increasing urgency worldwide to develop bio-based products that can ease the widespread dependence on fossil fuels. The use of natural fibers and natural bio-based resin systems for the production of biocomposites has been pursued by researchers as they address environmental concerns.

This chapter focuses on biocomposites produced from natural fibers and bio-resins, specifically using banana fibers and banana sap (BS)-based bio-resin. More importantly, natural fibers and bio-resins from agricultural waste were utilized to produce the biocomposites. The biodegradability tests of the biocomposite via

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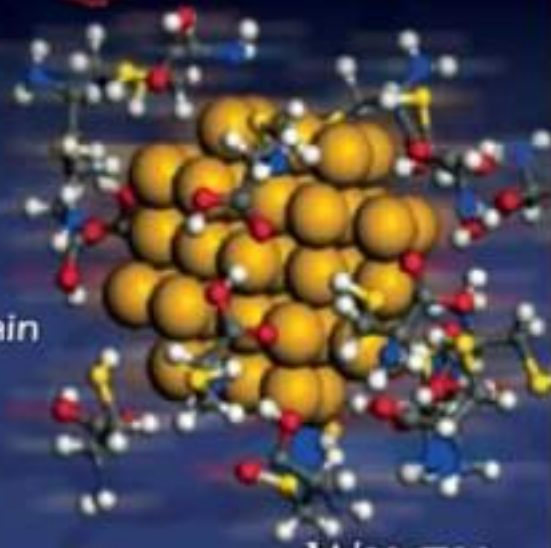
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NANOMATERIALS

Biomedical, Environmental, and Engineering Applications



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Shakeel Ahmed
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Chapter 1

Synthesis, Characterization and General Properties of Carbon Nanotubes

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Abstract

Carbon is among the most abundant elements found on Earth, forming different carbonaceous materials by bonding with various atoms, starting with hydrogen and ending with most of the elements on the periodic table. Besides, carbon atoms can react with each other to form different structures by using various types of hybridization: sp , sp^2 , and sp^3 . The most important hybridization for carbon atoms is sp^2 , which can form amazing and rare structures such as graphite, graphene, and fullerene. These carbonaceous nonomaterials have drawn great attention throughout the world as a result of their particular nano- and micro-structures, their unique physiochemical properties, and their potential unprecedented application in many fields. The most important nanostructures made of carbon material are carbon nanotubes (CNTs); the molecular structure of carbon nanotubes consists of pristine carbon atoms linked together to look like a polymer in a hexagonal arrangement in a monolayer of carbon atoms. This new carbon material consists of CNTs, which appear to become a reality for science, thanks to Iijima who synthesized one type of carbon nanotube and called it a single wall in 1991 with Ichihashi. This was a challenge and temptation at the same time due to its physiochemical properties being unknown to some extent, and the variety of types of single-walled carbon nanotubes (SWNTs), double-walled carbon nanotubes (DWNTs), few-walled carbon nanotubes (FWNTs), and multi-walled carbon nanotubes (MWNTs). Extensive studies and research were done on these materials due to their many specific physiochemical properties and representing The most abundant element in nature. There are three primary methods that are used for the synthesis of CNTs: chemical vapor deposition (CVD), arc-discharge, and laser ablation. In recent years, carbon nanotubes have been prepared under different labels for the various techniques used, and in fact represent the development of methods and techniques for the three methods mentioned above, with new titles. In any industrial application, the most important issues in the production process are represented by substrate cost, quality, and yield of

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Marine Polysaccharides

Advances and Multifaceted Applications



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Chapter 1

Marine Polysaccharides: An Overview

Tanvir Arfin

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The marine environment shows a lot of biodiversity, where polysaccharides are found representing chemical diversity in the species in a large amount. A polysaccharide is capable enough for the discovery of drug-containing natural products, and it also delivers advanced products derived from marine life for therapeutic utility. Substances with physical and chemical features justify the conditions of heterogeneous catalysis, acting as a backing. The material is predominant in organic solvents, available with a high surface area, and possesses distinct operative functionalities over the surface. The employment of a material as a catalyst or an absorbent paves the way for a minimum-energy-intensive approach to obtaining suitable substances. As a conclusion, the background behind marine polysaccharides is just in the processing form. Since marine science is successfully applying a new method for elaborating its scope and usefulness, it provides unique adhesive, medicine and enhanced food processing from the life in the sea.

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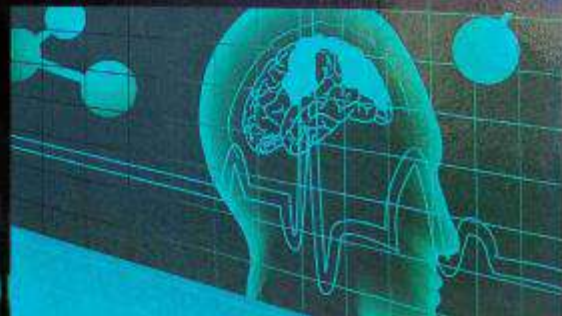
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with **VIVA VOCE**

(Strictly according to the Syllabus of University of Jammu)

Sarshad Hussain
Rewa Lakhnotra
Shiwali Sharma



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Section A

1

Study of Permanent Histological Sections of Mammalian Pituitary

Though pituitary gland is composed of anterior and posterior lobes but in histological studies stress is being laid on anterior lobe only because the posterior lobe has no any special types of cells and is having only nerve endings coming from hypothalamus. The two hormones released from posterior lobe are actually secreted in hypothalamus and are only stored in posterior lobe.

Comments

1. The pituitary gland is more or less glandular in shape and occurs at the base of brain in the region of diencephalon.
2. It is composed of three lobes namely, anterior lobe, intermediate lobe and posterior lobe.
3. The **anterior lobe** forms the largest part of pituitary gland and shows the following histological structures in its V.L.S.:
 - (i) It is formed of three distinct kinds of cells differing in their staining reactions.
 - (ii) Usually on the outside are the **basophil cells** which are stained by **basic stains**.
 - (iii) In the centre are found acidophil or oxyphil cells which take colour with acidic stains.
 - (iv) The third type of cells are **chromophobe cells** which are indifferent to either basic or acidic stains. They are found scattered throughout the anterior lobe.
 - (v) The anterior lobe produces many hormones namely somatotrophic hormone, thyrotrophic hormone, adrenocorticotrophic hormone, gonadotrophic hormone and thus controls growth, development of sex glands as well as the activities of thyroid, adrenal and parathyroid glands.

A Manual of Practical Zoology



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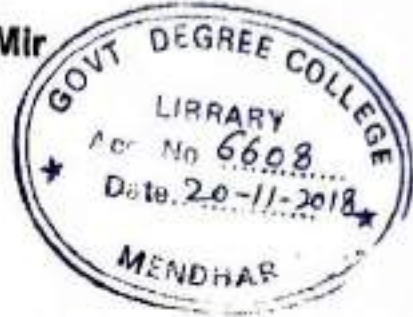
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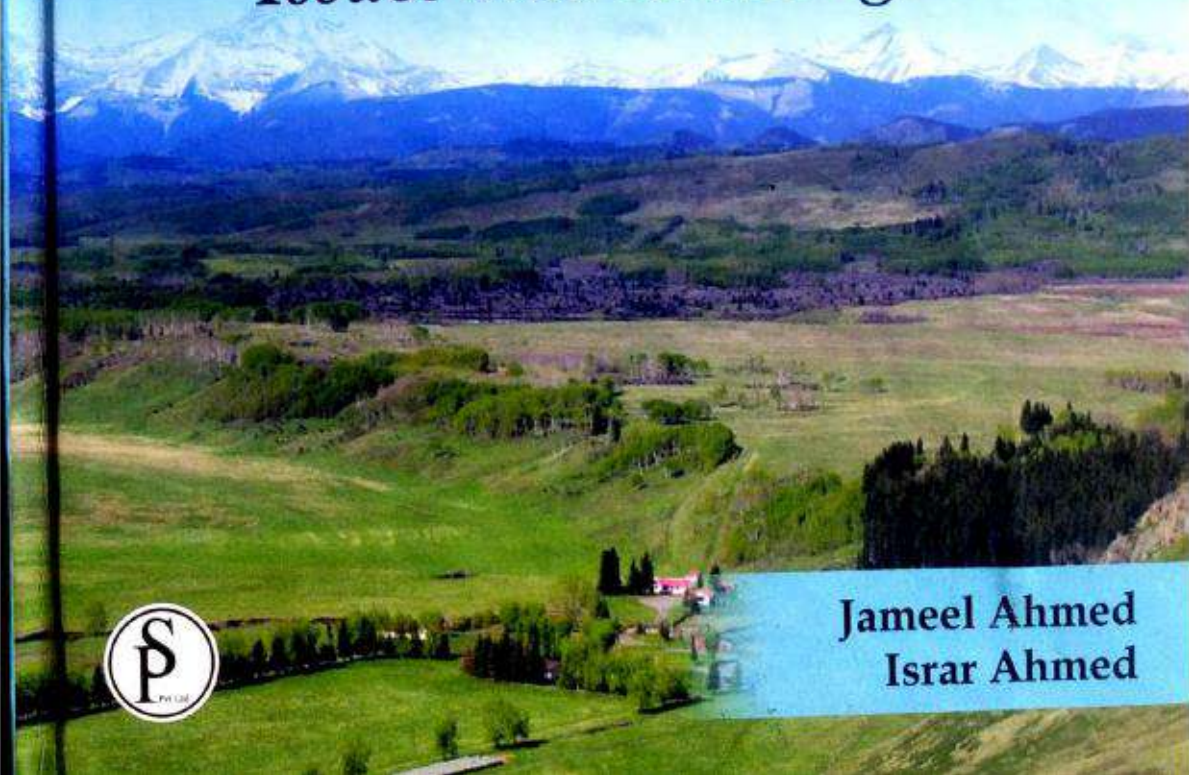
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Scheduled Tribes of Jammu & Kashmir

Issues and Challenges



Jameel Ahmed
Israr Ahmed

Scheduled Tribes of Jammu & Kashmir

Issues and Challenges

About the Book

Scheduled tribes are one of the backward sections and are officially designated as historically disadvantaged people in India. During British Rule they were known as the depressed class and later recognized in the constitution of India. Scheduled tribes are often termed as a community which is isolated from the mainstream population and living the life in their own traditional ways.

In Jammu And Kashmir State the status of Scheduled tribes has been given to 08 communities in accordance with the constitution (Jammu and Kashmir) Scheduled tribes order, 1989 and further to 04 communities in the constitution (Scheduled tribes) order (Amendment) Act, 1991. Scheduled tribes have 8.6% of population out of total population in India and 11.9% of the total population of the J&K State (according to 2011 Census). This community is lacking in many spheres of life and facing numerous challenges which results in their low literacy rate, poor economic condition, educational status, Health condition and less representation. According to the census of 2011 this community has 50.6% literacy rate in J&K compared 67.2% overall literacy rate of India.

This book aims to provide the current situation of scheduled tribes of Jammu and Kashmir and the major issues and challenges faced by these tribes in daily life. It covers Historical Background of the tribals, Ethnicity, Political Participation, Economic Condition, Educational Status, Women Empowerment, Constitutional Provisions for Tribes by GOI & State Govt., Language of tribes etc.

This book contains new areas of research and debate which would be extremely helpful to the Students, Scholars, Teachers and Policy makers.



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History and Genealogy of Tribals of Jammu and Kashmir: An Overview of Gujjars & Bakarwals

IKHLAQ AHMED^{1*}

ABSTRACT

The state of Jammu and Kashmir is ethnically plural and culturally a diverse state. It comprises of various ethnic groups including Gujjars, Bakarwal, Balti, Chibalis, Brokpa, Dogras, Hanjis, etc. Following Kashmiris and Dogras, Gujjars are the third largest ethnic group of the state. The Gujjars and Bakarwals of Jammu and Kashmir settled down in India since ancient times. Mostly, they settled in high altitude of Himalaya and North-Eastern regions. They are pastoral nomads and semi-nomads and further divided into various subgroups. Gujjars speak Gojari language and followed and well maintained their own culture. There are different theories of their origin and evolution, most of them will take into consideration in this paper. In current paper an attempt has been made to trace historical background and genealogy of Tribals (Gujjars and Bakarwals) of Jammu and Kashmir. It will begin with the conceptual understanding of term "Tribe" or "Tribal" and shows how it has undergone changes through the ages and then it discuss the origin and evaluation of these tribes. It will describe the constitutional understanding of Indian tribes in general and tribals of Jammu and Kashmir in particular. Finally, paper will be concluded by giving an outline history and contemporary

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جموں یونیورسٹی جموں

قاسمی کتب خانہ، تالاب کھٹیرکاں جموں

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تا بہ کی خرج تماشای جہان خواہی کرد
در سر انجام خود آخر نظری باید کرد

Azamal Husen · Muhammad Iqbal
Editors

Nanomaterials and Plant Potential

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Advanced Structured Materials

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Processing, Properties, and Applications

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Introduction to Green Nanomaterials



Pintu Pandit and T. Nadathur Gayatri

Abstract This chapter presents an introduction to nanomaterials, which can be synthesized by green chemistry, or nano-sized functionally advanced materials which have high-performance applications in energy generation and storage, carbon dioxide fixation, electronic devices and are sustainable in terms of production and application with respect to the environment. Methods in brief of preparation of nanoparticles and nanofibres, advantages of green synthesis, and limitations of nanomaterials are discussed. This chapter also provides information related to recent research work on green nanomaterials and the available methods for their synthesis. It also gives a comprehensive overview of the recent status and suggests future directions for employing green nanomaterials for possible various application mainly in the biotechnology, agriculture and biomedical areas. The sustainability of major natural resources utilized in green nanomaterials' synthesis is considered.

Keywords Green nanomaterial · Nanotechnology · Sustainability · Raw materials

1 Introduction

1.1 Nanotechnology and Nanomaterials

The word 'nano' refers to the dimension of length of the order of 10^{-9} m (Tolle 2007). Nanotechnology considers the knowledge area of engineering and understanding of nanoscaled materials and devices, wherein materials exhibit unusual phenomena leading to special applications. Comparison of the dimensions of objects occurring in the living world can be done by considering the red blood cell—7000 nm wide

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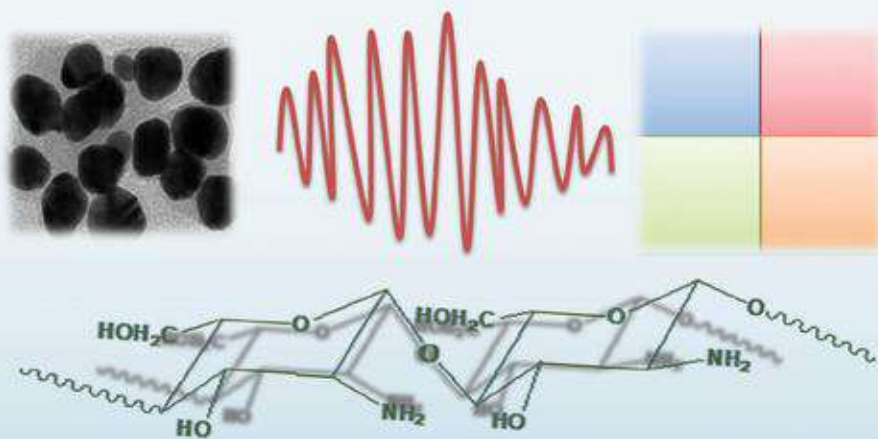
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1

Frontiers of Textile Materials

*Polymers, Nanomaterials,
Enzymes, and Advanced
Modification Techniques*



Edited by

Mohd Shabbir, Shakeel Ahmed, Javed N. Sheikh

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Frontiers of Textile Materials

Polymers, Nanomaterials, Enzymes, and Advanced Modification Techniques

Edited by

Mohd Shabbir, Shakeel Ahmed and Javed N. Sheikh



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Introduction to Textiles and Finishing Materials

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Abstract

Textile is one of the basic needs of the human being, and the modern human being has a lot of choices for their clothing. Textiles have various characteristics depending on the fibers they are made from, such as wool, silk, cotton, viscose, nylon, polyester, etc. and the finishing applied on them via materials such as finishing chemicals, nanoparticles, polymers, enzymes, etc. Thus, so many materials are available which can be utilized in the development of functional and smart textiles. In the era of technology (miniaturization of this world), flexible electronics based on textiles are gaining momentum. The chapter presents the emerging materials in the field of textiles with a major focus on the functionalization of textiles. In the next chapters of this book, all these are reviewed in great detail.

Keywords: Textiles, viscose, polyester, polymers, nanomaterials

1.1 Introduction

The textile industry is of great importance to the economies of every country in terms of trade, employment, investment, and revenue. Simultaneously, the chemical processes associated with textile production generate a lot of waste, greenhouse gases, and consume a large amount of water [1]. Innovative research and developments are very much needed for the textile industry to minimize waste production and maximize clothing production simultaneously. A series of steps are involved from textiles manufacturing to finishing and dyeing, need the attention of textile chemists as well as environmentalists. Technological advancements for functional finishing have emerged in recent years. Textile materials from the natural origin such as cotton, wool, and silk are prone to microbes, so antimicrobial finishing technologies are developed via application of polymers, nanomaterials, and dyes [2, 3].

This chapter overviews the advanced structural and finishing materials for textiles. All textiles fibers are polymers e.g. silk and wool are proteins made up of polymeric chains of amino acids, cotton is made up of glucose monomeric units and synthetic fibers Nylon and polyesters are the synthetic polymers. Chitosan, sericic, and tannins are a few examples of natural polymers used for functional finishing of textiles. Nanomaterials are considered as both present and future of every technological advancement including textiles. Various conventional methods of finishing have been replaced with new and technologically advanced techniques. In the next chapters of this book, all these aspects of the textiles industry are reviewed

Alginates

Applications in the Biomedical and Food Industries

Edited by
Shakeel Ahmed



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Recycling from Waste in Fashion and Textiles

*A Sustainable
and Circular
Economic
Approach*

Edited by
Pintu Pandit
Shakeel Ahmed
Kunal Singha
Sanjay Shrivastava



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Overview on Recycling from Waste in Fashion and Textiles: A Sustainable and Circular Economic Approach

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Abstract

Recycling is a procedure where rejected and older materials are converted into something of higher quality and include value in their life. It has been increasingly recognized as one of the good method to decrease energy and substance use and contribute to sustainable production and consumption. The notion of upcycling and recycling have got more attention from many designers and business professionals in the past few years. The value flows for accumulated post-consumer textiles continue to be analyzed over the global challenge to develop and use eco-friendly, yet sustainable and moral approaches within the fashion market. Recycling is a present strategy related to style creation, with waste and rejected materials utilized to design and create increased value goods, keeping them productive use for more. Recycling enables a sustainable layout alternative for reuse techniques to be employed for greatest environmental and economic benefit. where used garments and fabrics are sourced for the creation of freshly designed fashion solutions. The concept of taking waste and reimagining, reusing, and reinventing it is really a new-fangled idea since the substances are liberated and in frightful abundance, the after effects about the environment are none or minimal and consumers obtain the satisfaction of buying and using something potentially wasteful at a new and thrilling circumstance. This chapter focuses the recycling

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Pullulan

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Chapter 1

Polysaccharides: An Overview

S. Vijayanand,^a Ashwini Ravi,^a Aiswerya Soundararajan,^b
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Polysaccharides, commonly known as “Cinderella of biopolymers,” are molecules composed of monosaccharide residues, which are joined together by O-glycosidic linkages. Naturally, polysaccharides are produced by various biological entities such as plants, microbes, seaweeds, and animals. Polysaccharides were often found to have linear structure, and it may also contain various degrees of branching. Despite their structure, they also vary in various components such as monosaccharide composition, linkage type, pattern of linkage, chain type, degree of polymerization, etc. based on the source of production. This variable structure of polysaccharides is responsible

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ADVANCED GREEN MATERIALS

FABRICATION, CHARACTERIZATION
AND APPLICATIONS OF BIOPOLYMERS
AND BIOCOMPOSITES



Edited by
SHAKEEL AHMED

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Advanced Green Materials: Fabrication, Characterization and Applications of Biopolymers and Biocomposites is the complete handbook that provides complete information on green materials covering topics like processing, fabrication, characterization, analysis and applications of biopolymers and biocomposites.

Advanced Green Materials is an essential handbook for researchers, academicians, engineers and students who are interested to explore these materials for industrial applications. It has a vibrant approach making it suitable for both students and experts alike by providing a full explanation of all the fundamental concepts related to processing, fabrication and characterization of advanced green materials.

It summarizes in a comprehensive manner recent technical research accomplishments in natural materials either naturally available or synthesized. It discusses various aspects of natural materials from the point of view of the chemistry and engineering. The book is unique with contributions from experts working on hybrid biopolymers and bio-composites, bioactive and biodegradable materials, bio-inert polymers and composites, natural polymer and metallic natural materials. The book will be a useful reference for scientists, academicians, research scholars and biotechnologists.

Key features

- Includes up-to-date coverage on advanced green materials
- Covers new developments and technologies with a special focus on biopolymers and biocomposites
- Presents a unified approach to discuss in detail fabrication, characterization and analysis of advanced green materials

About the Editor

Shakeel Ahmed PhD, is working as an Assistant Professor of Chemistry at the Higher Education Department, for the Government of Jammu and Kashmir, and is also an Assistant Professor at the Department of Chemistry, Government Degree College, Mendhar, Jammu and Kashmir, India. He obtained a first degree in general science from the Government Postgraduate College Rajouri (University of Jammu) followed by his master's and doctoral degree in chemistry from Jamia Millia Islamia, a central university New Delhi. He gained post-doctoral experience in biocomposite materials at the Indian Institute of Technology, Delhi. He has published several research publications in areas of green nanomaterials and biopolymers for various applications including biomedical, packaging, and water treatment. He is a regular member of American Chemical Society (ACS), USA, the Royal Society of Chemistry (RSC), UK, and the International Association of Advanced Materials (IAAM), Sweden and a life member of the Asian Polymer Association and the Society of Materials Chemistry (India). He is an active reviewer and member of the editorial boards for many high-reputed journals. He has published more than 20 books in the area of nanomaterials and green materials with publishers of international repute.



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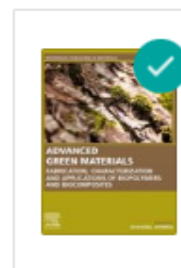
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Abstract

Advanced Green Materials: Fabrication, Characterization and Applications of Biopolymers and Biocomposites looks at their extraction, purification, modification, and processing for various industrial, biomedical, pharmaceutical, and construction applications. The book comprehensively summarizes recent technical research accomplishments in natural materials and discusses various aspects of natural materials from a chemistry/engineering point of view. The book is unique with contributions from experts working on hybrid biopolymers and biocomposites, bioactive and biodegradable materials, bio-inert polymers and composites, natural polymer and composites, and metallic natural materials. The book will be a useful reference for scientists, academicians, research scholars, and biotechnologists. Advanced biocomposite materials continue to become increasingly popular and important for a broad range of different science and engineering applications. In the race to exploit the unique mechanical, thermal, and electrical properties of these materials, researchers must also address new challenges to predict, understand, and manage the potentially adverse effects they could have on the environment and human lives. The book describes recent developments and applications of biopolymers and biocomposites for applications in various industrial fields. Chapters include original research and the latest reviews in similar fields. Biopolymers and biocomposites occupy an exceptional position in the exciting new world of novel biomaterials. Considering their sustainability, non-toxic properties, and their ability to have tailored properties and functions, they should be considered as a smart candidate in the advancement of biomaterials technology.

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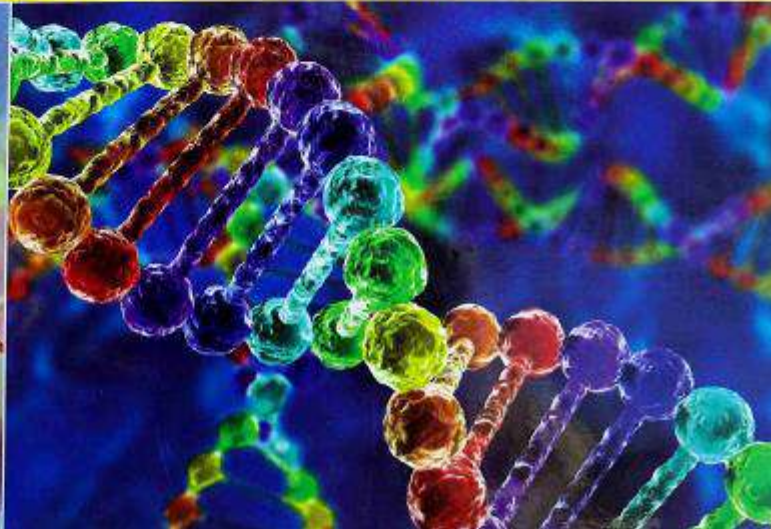
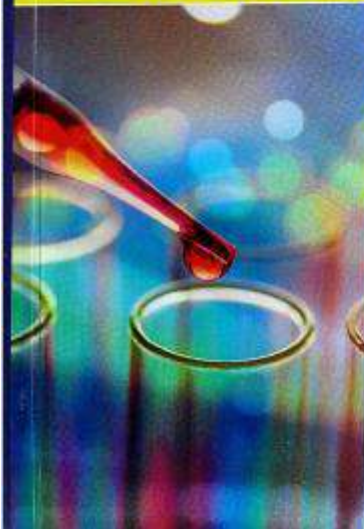
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Section A

1

Study of Various Stages of Mitosis from Permanent Prepared Slides

INTRODUCTION

The process by which the cell duplicates or produces new cells is called **Cell Division** or **Cell Cycle**. Cell division is of two type viz., Mitosis and Meiosis. Each cell division has three main stages viz., **Interphase** or **I-Phase** in which cell duplicates cell organelles including DNA, **Karyokinesis** or **Mitotic Phase (M-Phase)** in which nucleus duplicate and **Cytokinesis** or **C-Phase** in which division of cytoplasm takes place. Interphase and cytokinesis stages are same for both mitosis and meiosis while they differ in Karyokinesis only. Karyokinesis is accomplished in four sub-stages viz., Prophase, Metaphase, Anaphase and Telophase.

STUDY OF MITOSIS FROM PREPARED SLIDES

Term mitosis was coined by Flemming in 1882. It takes place in the somatic cells so is also called **Somatic Division**. Mitosis is the division of parent cell into two daughter cells with the same number of chromosomes and amount of DNA in daughter cells as was present in parent cells, so is also called **Equational Division**. Following stages are observed under microscope:

Interphase:

1. The cell contains a prominent nucleus with intact nuclear membrane and nucleolus.
2. DNA is present in the form of a network of fine fibres called the chromatin material.
3. It is the stage in which DNA, cell organelles including centriole duplicates.

Prophase (Gr., *pro*=first, *phasis* = appearance):

1. The centrioles already duplicated lie close to the nucleus and migrate in pairs to the opposite end of the cell.
2. Between the separating centrioles mitotic spindle is formed.

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Bionanocomposites: An overview

1

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1.1 Introduction

In general, composites are made from combining two or more different materials that after combining have different physical and chemical properties from individual components. Bionanocomposites are novel class of composite materials. Bionanocomposites are the composite materials where at least one component is coming from natural resources (mainly biopolymers) and one having dimensions in nanometer range, i.e., 1–100 nm. Due to the excellent features of these nanohybrid materials as structural or functional materials, materials scientists are making huge efforts in this area of research. These show similarities with nanocomposite materials but there is a fundamental difference in their preparation, properties, functionalities, biodegradability, biocompatibility, and applications. The large surface area of nanosized particles results in improved interaction between polymeric matrix and nanosized inorganic moiety that enhances the functional properties of bionanocomposites such as enhanced physical and mechanical strength, heat resistance, chemical resistance, barrier properties, biodegradability, biocompatibility [1].

The term “bionanocomposite” was first time used by Theng in the year 1970, but the idea behind bionanocomposite is quite older. The first evidence of this idea was reflected in the work of Wagner in the year 1941, where silica nanoparticles (10–100 nm) were incorporated into natural rubber as reinforcement material. Bionanocomposites is considered as an emerging field in the area of nanotechnology and has been developed to a greater extent after the introduction of advantageous instruments like scanning electron microscopy, scanning probe microscopy, and tunneling electron microscopy. By using these techniques, it is now possible to study the surface morphology of these materials with high resolution and check the particle size. Bionanocomposites became a subject of intensive research due to their inherent biocompatibility, biodegradability, and nontoxicity along with improved structural and functional properties that make them suitable for versatile applications most commonly in biomedical applications as biomaterials. Due to the renowned biocompatibility and nontoxicity of bionanocomposites, these are progressively used in biomedical applications such as wound dressings, drug delivery, vaccination, and tissue engineering. Additionally, bionanocomposites films find their applications in packaging industry due to their cost-effectiveness and ecofriendly nature with some additional characteristics such as antimicrobial, oxygen scavenging activity, good barrier properties, and enhanced tensile strength [1, 2].

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1.1 Introduction

Composite is a broad term that envisages a wide area of application. Bionanocomposite, as the name, suggests consists of one of its components derived from natural origin. The biocompatibility and biodegradability of these composites help in widening their spectrum of applications. The nanometer dimensions of the bionanocomposites offer the significant advantages of nanotechnology in the application of composites. The biopolymers used in the bionanocomposites overcome the environmental hazards posed by materials like plastic, hence serving as an environment-friendly component. Bionanocomposite is emerging to be a sustainable alternative to its existing counterparts. The preparation methods of the bionanocomposite impart different functionalities to the bionanocomposite thus making them significantly different from each other. The lightweight of these composites has eventually led to the replacement of heavyweight conventional composites by them.

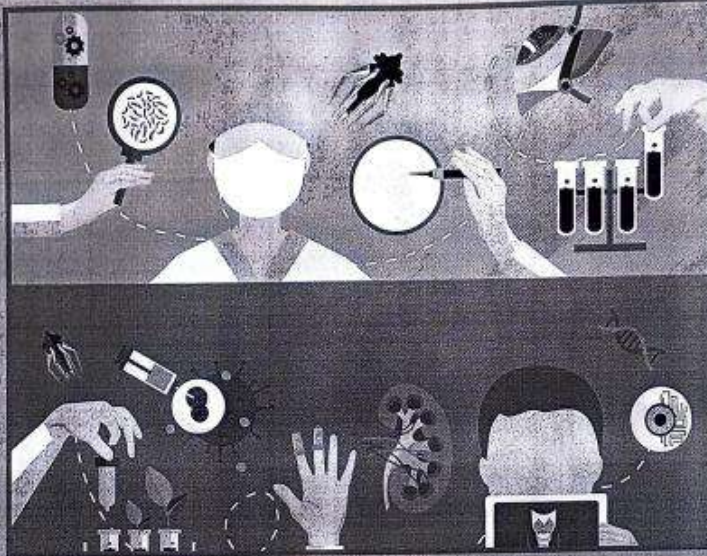
1.2 Methods of preparation of bionanocomposites

There are different methods for the preparation of the bionanocomposites. Some of them are discussed below (Ahmed & Kanchi, 2018; Das et al., 2021; Mohammad Taib et al., 2021; Zhao et al., 2008).

1.2.1 Solution method

The solution of constituent biomaterial and the dispersion of inorganic nanomaterial are mixed together. This mixing leads to interaction between the constituents resulting in jellification, thickening or precipitation. In case of incompatibility of the constituents, precipitation is observed. A strong interaction between the two indicates good compatibility. A nonuniform distribution of filler in the matrix is observed in

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BIONANOCOMPOSITES IN TISSUE ENGINEERING AND REGENERATIVE MEDICINE



Edited by
**SHAKEEL AHMED
ANNU**

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Bionanocomposites: An overview

1

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1.1 Introduction

In general, composites are made from combining two or more different materials that after combining have different physical and chemical properties from individual components. Bionanocomposites are novel class of composite materials. Bionanocomposites are the composite materials where at least one component is coming from natural resources (mainly biopolymers) and are having dimensions in nanometer range, i.e., 1–100 nm. Due to the excellent features of these nanohybrid materials as structural or functional materials, materials scientists are making huge efforts in this area of research. These show similarities with nano-composite materials but there is a fundamental difference in their preparation, properties, functionalities, biodegradability, biocompatibility, and applications. The large surface area of nanosized particles results in improved interaction between polymeric matrix and nanosized inorganic moiety that enhances the functional properties of bionanocomposites such as enhanced physical and mechanical strength, heat resistance, chemical resistance, barrier properties, biodegradability, biocompatibility [1].

The term “bionanocomposite” was first time used by Theug in the year 1970, but the idea behind bionanocomposite is quite older. The first evidence of this idea was reflected in the work of Wagner in the year 1941, where silica nanoparticles (10–100 nm) were incorporated into natural rubber as reinforcement material. Bionanocomposites is considered as an emerging field in the area of nanotechnology and has been developed to a greater extent after the introduction of advantageous instruments like scanning electron microscopy, scanning probe microscopy, and tunneling electron microscopy. By using these techniques, it is now possible to study the surface morphology of these materials with high resolution and check the particle size. Bionanocomposites became a subject of intensive research due to their inherent biocompatibility, biodegradability, and nontoxicity along with improved structural and functional properties that make them suitable for versatile applications most commonly in biomedical applications as biomaterials. Due to the renewed biocompatibility and nontoxicity of bionanocomposites, these are progressively used in biomedical applications such as wound dressings, drug delivery, vaccination, and tissue engineering. Additionally, bionanocomposites films find their applications in packaging industry due to their cost-effectiveness and ecofriendly nature with some additional characteristics such as antimicrobial, oxygen scavenging activity, good barrier properties, and enhanced tensile strength [1, 25].

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Book

Green Metal Nanoparticles: Synthesis, Characterization and their Applications-Nanoparticles Naturally

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Abstract

Nanoparticles are considered to be the basic element of nanotechnology as they are the primary source of several nanostructured devices or materials. Nanomaterials can be obtained either naturally or incidentally or can be manufactured. The particles with one or more peripheral dimensions in the size ranging from 1 to 100 nm are referred to as nanoparticles, which exist in unbound state or as an aggregate or agglomerate. Nanoparticles have various applications in the different fields of science and technology, including electronics to structural engineering and agriculture to medicine. Materials at the nanoscale do not exhibit the properties of the bulk material. The qualitative differences in material behavior at the nanoscale are attributable to the quantum mechanical effects that bring about new physical and chemical characteristics and the large surface-to-volume ratio of the nanoparticles. High demands have led to the large-scale production of nanoparticles. Therefore, a broad range of industrial methods has been developed to synthesize metal nanoparticles. However, some of these methods use toxic solvents or high energy, which has led to a growing awareness regarding the necessity of using clean, nontoxic and environmental-friendly methods to synthesize nanoparticles. The use of biological sources such as microbes and plants can help in synthesizing nanoparticles in a reliable and eco-friendly way. The synthesis of nanoparticles by these natural sources is characterized by processes that take place near to ambient temperature and pressures and also near neutral pH. The current multi-authored book has recent information and builds a database of bioreduction agents to various metal nanoparticles using different precursor systems. This book also highlights the different strategies such as simplicity, cost-effectiveness, environment-friendly and easily scalable, and include parameters for controlling the size and shape of the materials developed from the various greener methods. In order to exploit utmost potential metal nanoparticles synthesis from the different sources like Agricultural waste, Flora and Fauna, Food waste, Microbes and Biopolymer systems, it is also crucial to recognize the biochemical and molecular mechanism of production of nanoparticles and their characterization. Nevertheless, more research is focused on the application point of view such as biomedical sensors, antimicrobial, catalysis, packaging, water treatment, pharmacy, textile,

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Chapter 10

Phytomediated Synthesis of Cerium Oxide Nanoparticles and Their Applications



Annu, Akbar Ali, Rahul Gadkari, Javed N. Sheikh, and Shakeel Ahmed

Abbreviations

AZO	Azodicarbonamide
CeO NPs	Cerium oxide nanoparticles
CeO ₂	Cerium dioxide
DSC	Differential scanning calorimetry
FESEM	Field emission scanning electron microscopy
ROS	Reactive oxygen species
SAED	Selected area electron diffraction
SEM	Scanning electron microscopy
STM	Scanning tunnelling microscopy
TEM/HRTEM	Transmission electron microscopy/high-resolution transmission electron microscopy
TGA	Thermogravimetric analysis
WAXD	Wide-angle X-ray diffraction
XPS	X-ray photoelectron spectroscopy
XRD	X-ray diffraction

10.1 Introduction

Among the rare earth group elements, cerium is most abundant. Out of the 83 naturally occurring elements in the earth lithosphere, cerium ranks 28th position in its abundance. Jons Jakob Berzelius and Wilhelm Hisinger discovered cerium in

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Physical and chemical modification of chitosan-based green materials

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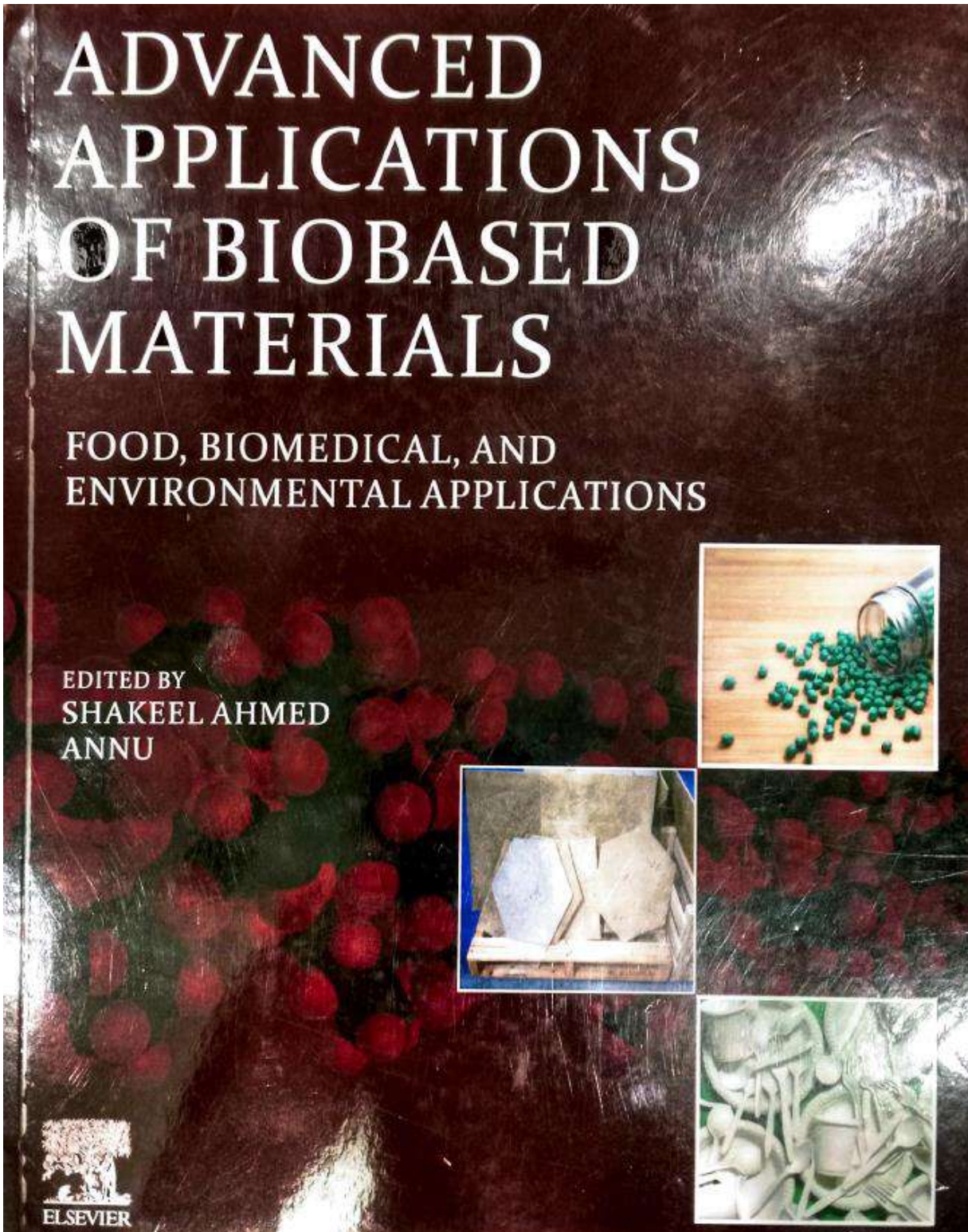
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Abstract

Chitosan a natural polymer, a fully or partially deacetylated form of chitin that is widely known to be present in many living organisms such as crustaceans, arthropods, fungi, etc., as an essential exoskeleton supporting structure. Owing to its advantageous properties, including nontoxicity, biodegradability, and biocompatibility as well as its chelating, growth-regulating, and film-forming ability, chitosan is profoundly used in the environment, agriculture, food industry, biotechnology, medicine, textiles, and cosmetics . The vast biomedical applications of chitosan are governed by its biocompatibility as well as its antitumor, antimicrobial, and mucoadhesion ability, making it a most promising biologically active polymeric material . Along with the beneficial properties of chitosan, it has some limitations also, such as poor aqueous solubility and other solvents as well, which enforce the requirements to improve its properties by different means either physically or chemically in order to make it amenable advance and can be applied to a broader fields. The whole scenario of modification needs different reaction conditions and reaction pathways. Meanwhile, the fundamental skeleton of chitosan should not be changed with modification. This is to keep the beneficial physicochemical and biochemical properties intact and bring new and improved properties, depending on the nature of the functional groups introduced to the chain.

1. Advanced Applications of biobased materials by Shakeel



Advanced Applications of Biobased Materials

Food, Biomedical, and
Environmental Applications

Edited by

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Biopolymers: An overview

1

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Introduction

In the current scenario, the growing concerns of environmental and health hazards are key topics in the field of science. As the population increases, to fulfill daily needs, people unthinkingly use nonbiodegradable and easily available polymer-made plastics in their everyday life from the kitchen to the healthcare sector. Due to overuse of nonbiodegradable polymers, it is currently a significant challenge to deal with plastic waste. Additionally, this nonbiodegradable polymer waste increases the risk of health issues. With growing awareness of a healthy environment, researchers have developed sustainable and eco-friendly biopolymer-based green composites which are mainly engineered, or have functionalized raw biopolymers with other degradable synthetic or biosynthetic polymers (George, Sanjay, Srisuk, Parameswaranpillai, & Siengchin, 2020; Gurunathan, Mohanty, & Nayak, 2015; Moraes, Silva, & Vieira, 2020). By 2030, it is expected that 20%–25% of biobased renewable composite materials will be utilized in different sectors of human life from industrial applications to biomedical applications (Rajeswari, Stobel Christy, & Pius, 2021; Silva, Rodrigues, Fernandes, & Reis, 2020b; Varma & Gopi, 2021). These natural renewable green composites are biocompatible and biodegradable, and are widely applicable in the fields of food science (Augustine, Rajendran, Cvelbar, Mozetič, & George, 2013; Mangaraj, Yadav, Bal, Dash, & Mahanti, 2019), pharmaceuticals (Deb, Kokaz, Abed, Paradkar, & Tekade, 2019; Nayak & Hasnain, 2020), tissue engineering (Pattanashetti, Heggannavar, & Kariduraganavar, 2017; Silva, Rodrigues, Fernandes, & Reis, 2020a; Sohrabi, Khorasani, Ahmed, & Annu, 2021), and bioadsorbents (Donner, Arshad, Ullah, & Siddique, 2019; Singh et al., 2020).

The word biopolymer comes from the Greek “bio” meaning “life” and “polymer” meaning “many parts.” Biopolymers are widely extracted or synthesized from living organisms which are mainly plants, animals, microorganisms, algae, fungi, etc. Additionally, the resources of biopolymers are agricultural waste, industrial biowaste, and forestry feed stocks. The main source of biopolymers are living organisms which make them biocompatible and biodegradable. Historically, biopolymers have been widely applicable in different fields (Deb, Al-Attaqchi, Chandrasekaran, & Paradkar, 2019).

ADVANCED APPLICATIONS OF BIOBASED MATERIALS

FOOD, BIOMEDICAL, AND ENVIRONMENTAL APPLICATIONS

Edited by: Dr. Shakeel Ahmed and Dr. Annu

Advanced Applications of Biobased Materials: Food, Biomedical, and Environmental Applications brings together the latest developments in the preparation and application of biobased materials. This book begins by providing an overview of biobased materials, their classification, and their physical and chemical modifications. This is followed by a section covering the latest techniques in fabrication, processing, and characterization. Subsequent chapters are grouped by application area, offering insights into advanced and emerging utilizations of biobased materials in food, biomedical, environmental, and other industrial applications. The final part of the book highlights other key considerations, including life cycle assessment, circular economy, sustainability, and future potential.

This book is a valuable resource for researchers, scientists, and advanced students across polymer science, sustainable materials, biomaterials, materials chemistry, composite science, nanotechnology, biomedical engineering, and environmental science as well as for engineers and R&D personnel with an interest in biobased materials for emerging applications in the areas of biomedicine, food, and environment.

Key Features

- Presents processing methods, characterization techniques, and the latest advances in biobased materials
- Focuses on advanced and emerging applications of biobased materials in the key areas of food, biomedicine, and environment and in other areas
- Considers sustainability issues relating to biobased materials, including environmental impact, health impact, life cycle assessment, and circular economy

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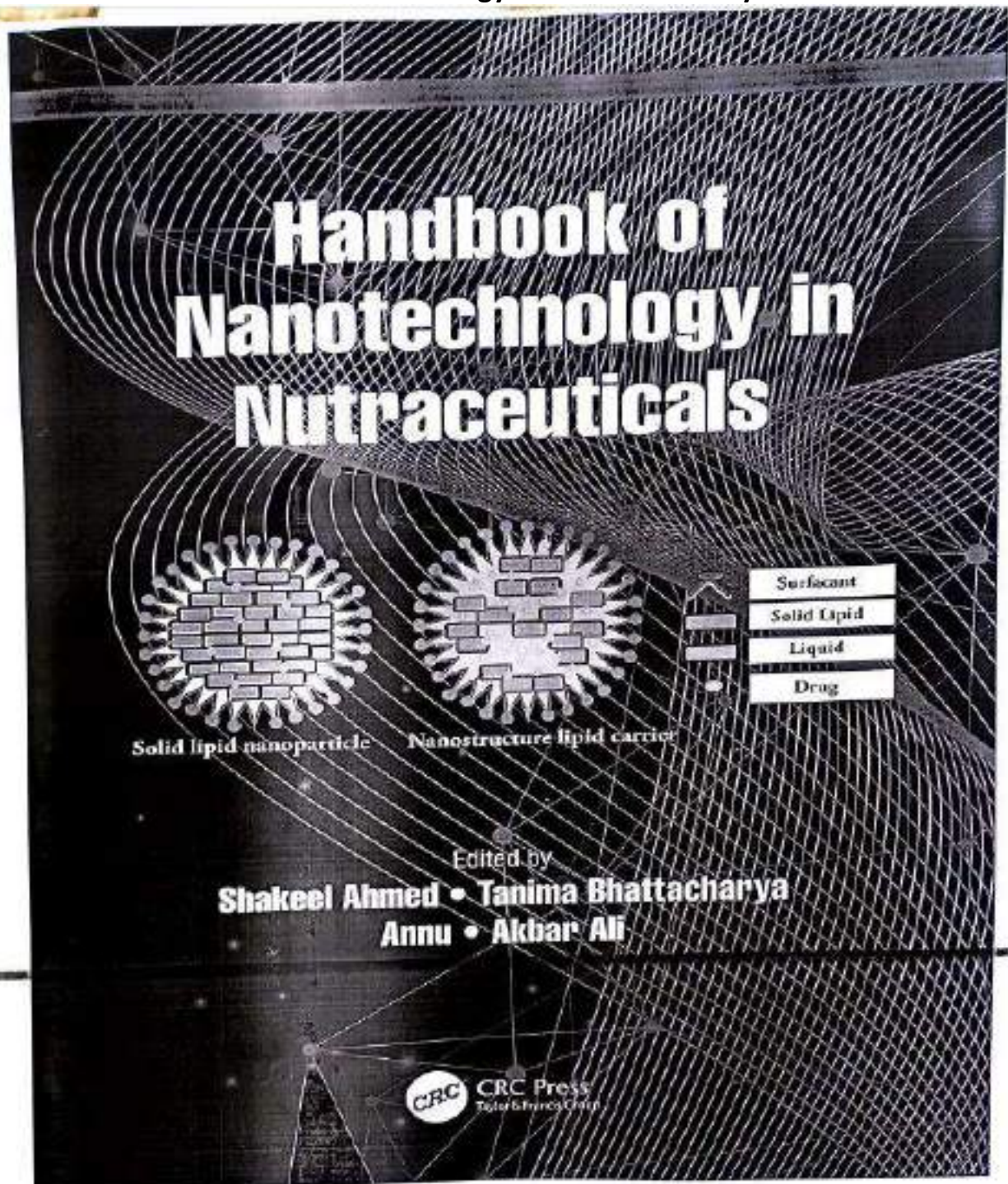
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2. Handbook of nanotechnology in Nutraceutical by Dr. shakeel



Handbook of Nanotechnology in Nutraceuticals

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1 Nanoceuticals

Mystifying Composites at the Interface of Nutrition, Medicine, and Technology

*Niloy Chatterjee and Pubali Dhar**

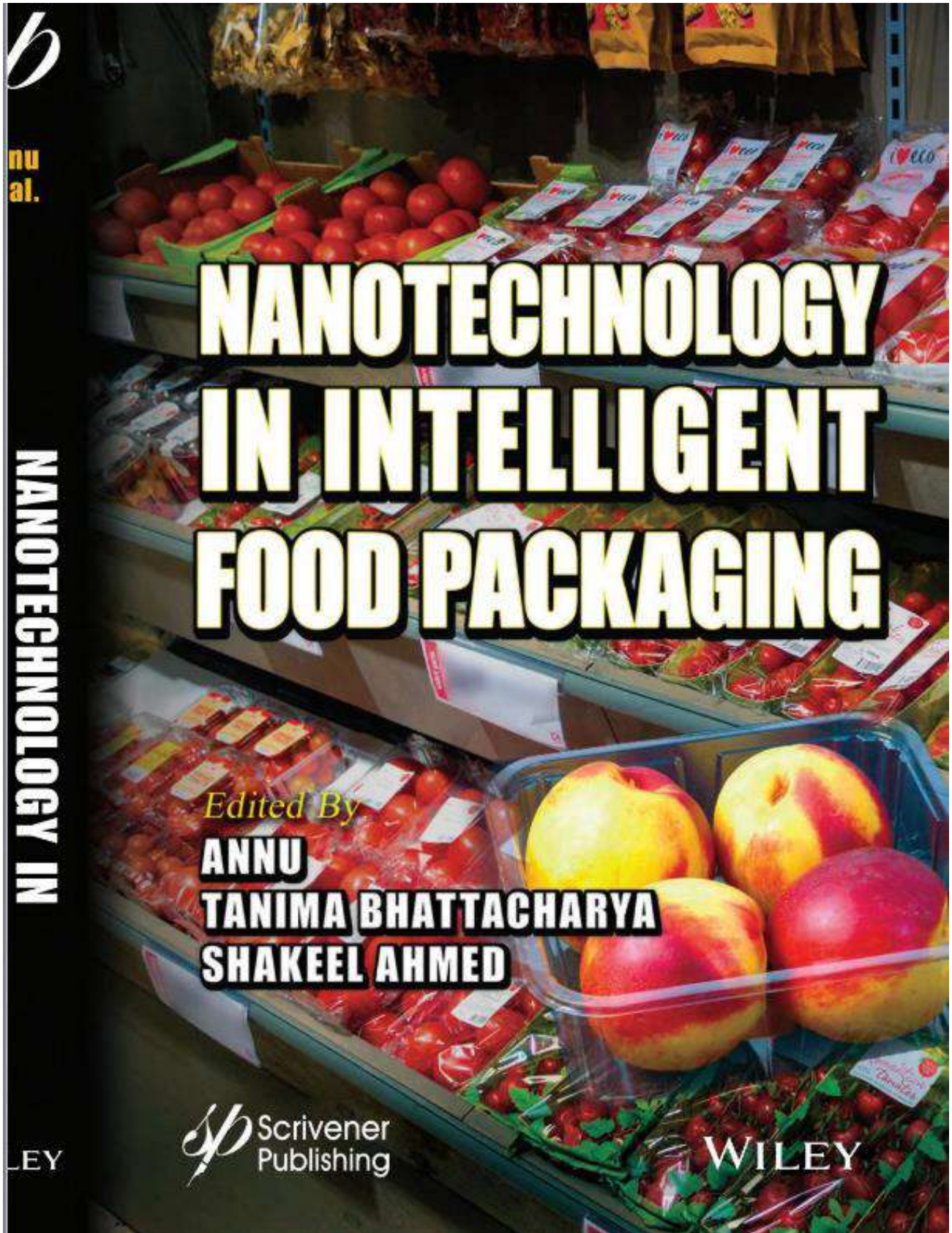
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ABBREVIATIONS

IOS	International Organization for Standardization
SLN	Solid-Lipid Nanoparticle
NP	Nanoparticle
NM	Nanomaterial
OECD	Organisation for Economic Co-operation and Development

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nu
al.

NANOTECHNOLOGY IN

NANOTECHNOLOGY IN INTELLIGENT FOOD PACKAGING

Edited By
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SHAKEEL AHMED**

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Nanocomposite and Food Packaging

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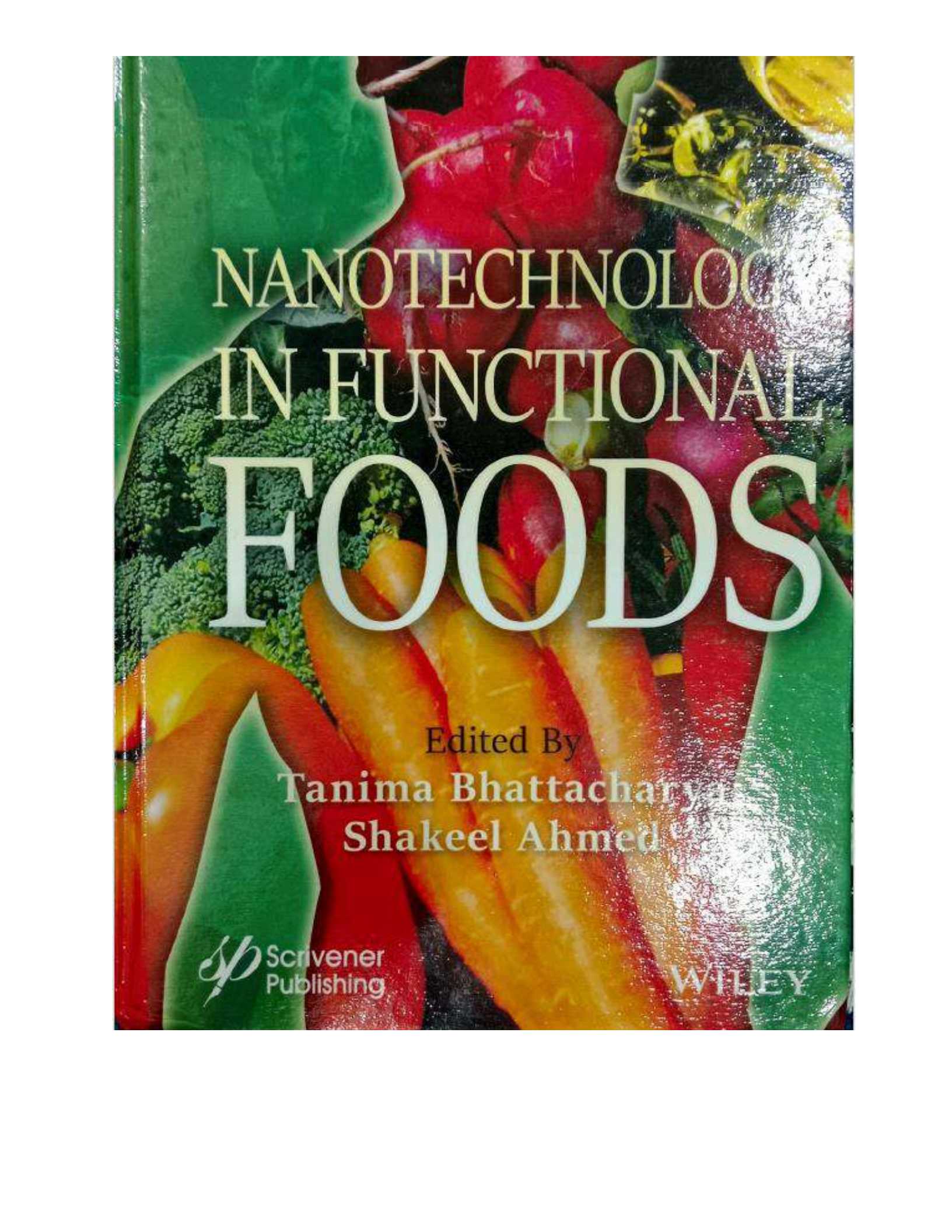
Abstract

The development of different packaging materials such as nanocomposites is a strong drive in food stuff industry for packaging resolutions that contribute to maintainable development by targeting a globular economy, which pivots around the recyclability of the packaging materials and it is a novel approach to enhance characteristics of polymers together with mechanical strength, barrier against gas and vapor as well as thermal stability, as they markedly upgrade the packaging properties because of their nanometer size dispersion. Properties such as increased water resistance, modulus and strength, and decreased gas permeability are improved. Additionally, antioxidant properties and antimicrobial can be also presented, which are very significant for food packaging applications. Although utilization of biopolymers is restricted because of their usual poor mechanical and barrier properties, but due to reinforcement of fillers, these properties can be improved. Nanocomposite is produced when fillers used are at least one nanoscale dimension (nanoparticles). This chapter will discuss many nanofillers and techniques to utilize them with different polymer matrices, focusing on the enhancement and improvement in the food packaging system.

Keywords: Nanocomposites, food packaging, polymers, nanofiller

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NANOTECHNOLOGY IN FUNCTIONAL FOODS

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Advancement of Nanotechnology in Developing Functional Foods: Nanotechnology in Functional Foods

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Abstract

Exposure of nanotechnology deals with several aspects of the food technology domain in the recent decade to provide significant quantity, safe, and healthy foods for human consumption. In this consequence, the research activities have been directed toward the advancement of nanotechnology in the food sector. Nano-based materials are not only involved in functional food development also uses in food processing, food packaging, and rapid detection of foodborne pathogens of food products. Other applications include the improvement of taste, flavor, color, the texture of foodstuffs. Recent research depicts the potential utilization of nanoparticles showing their efficacy in the delivery of bioactive ingredients, which explores the benefits not just within food products but also around food products. Nanoencapsulation is an emerging field in this regard, elevating the protection performance to sensitive bioactive ingredients by preventing unnecessary interactions with other constituents in foods. Moreover, the current data emphasizing the attributes of bioavailability and the degree of solubility of nanofoods ensure the optimum discharge of ingredients of food at an action taking place, thereby improving human health. However, successful applications of nanotechnology to

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✦ UNIT - I ✦

Computer and its characteristics, application of computers, digital and analog computer, generation of computers, computer types : mainframe computer, super computer, minicomputer, memory : RAM, ROM, PROM, EPROM, EEPROM, storage unit (Bit, Byte, KB, MB, GB, TB, PB), floppy disk, hard disk, optical disk, magnetic tapes CD, DVD, Input and output devices : Keyboard, Mouse, Light pen, joystick, Data Scanning Devices, scanner, monitor, printer and its types, Projectors.

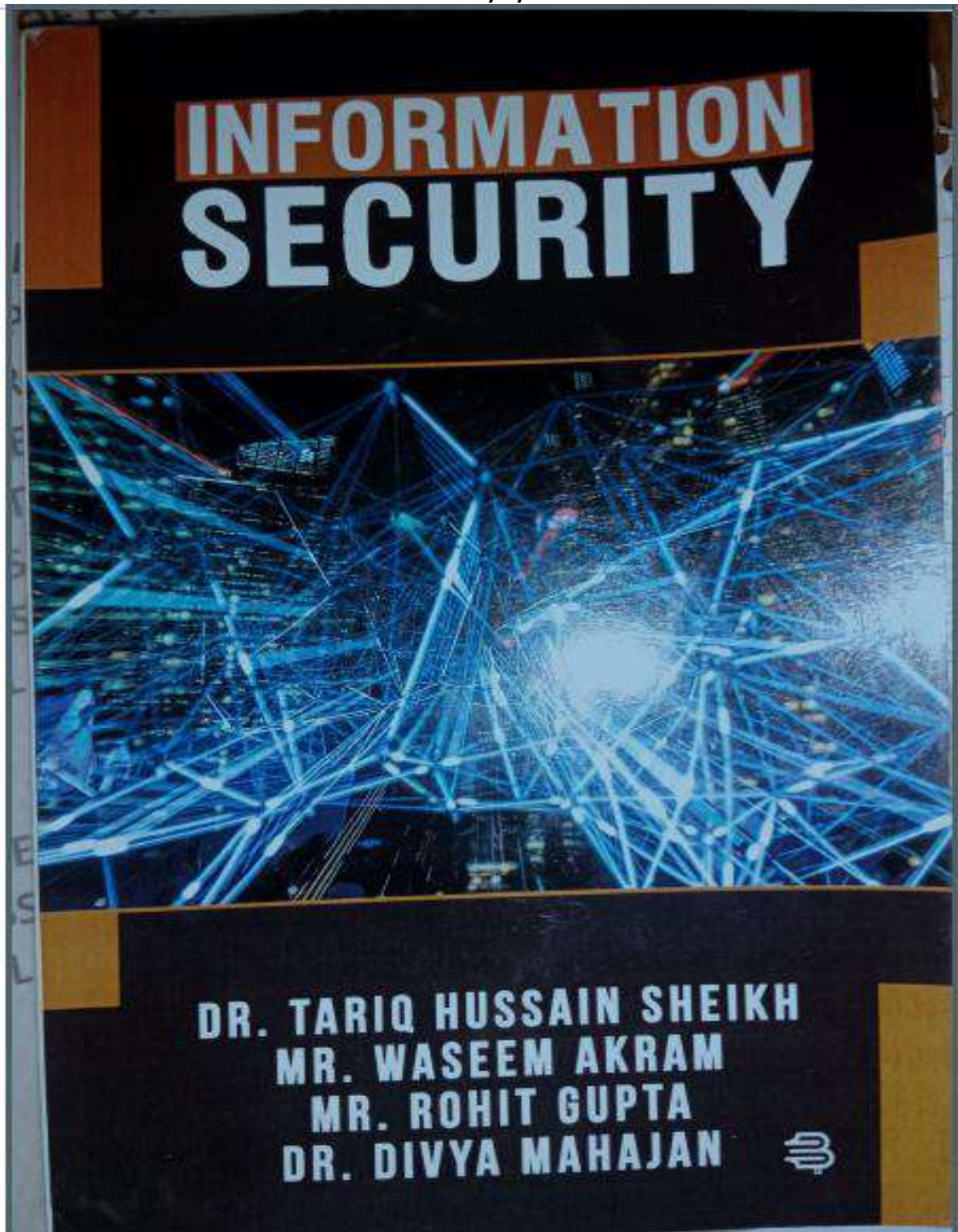
1. WHAT IS COMPUTER?

.....

The term computer is used to describe a device made up of a combination of electronic and electromechanical (part of electronic and mechanical) components. By itself, a computer has no intelligence and is referred to as hardware. A computer, or computer system, does not come to life until it is connected to the other parts of its system. A computer system is a combination of five elements **Hardware, software, users, procedures and data/information**. When one computer system is setup to communicate with another computer system, connectivity becomes a sixth element. Different writers has given different definitions of computer some of them are as under :

- ❖ A computer is a device that transforms data into meaningful information. It processes the input according to the set of instructions provided to it by the user and gives the desired output.
- ❖ A computer is an electronic device/machine which stores, reads, and processes data to produce meaningful information as output.
- ❖ A Computer is an electronic machine that can solve different problems, process data, and store& retrieve data and perform calculations faster and efficiently than humans".
- ❖ A computer is an electronic device that is used to process data. It operates as per the instructions produced by the user, in the form of programs.
- ❖ An electronic device that can automatically accept and store input data, process them, and executing programmed instructions.

Computer is a device that transforms data into meaningful information. Data can be anything like marks obtained by you in various subjects, It can also be NAME, AGE, WEIGHT, HEIGHT, etc. of all the students in a class.



INFORMATION SECURITY

This book Information Security: An Innovative Summary and Software as a Tool for Compliance with Information Security Standard, looks at information security & risk management associated with information security, and information security awareness within an association. The authors objective is to improve the overall ability of organizations to participate, forecast, and actively evaluate their information security circumstances.

The book is created to solve the problems for the students of B.A / B.Sc / BCA and B.Com. 4th semester skill enhancement course and compiled the syllabus under Jammu university colleges in general and particular for all the students of other Colleges & Institutions. It contains the solved material with innovative and evaluated approach of information security. It also generalises the syllabus with insistent and analytic style.



Dr. Tariq Hussain Sheikh is vigorously involved in teaching and learning techniques which led to proper supervision and counselling of the students at Undergraduate level, particularly students enrolled for Bachelor Programme in computer Applications for more than Nine years.

He is enthusiastically contributing for the Research programs, participating and presenting more than 28 Research Papers in various National and International Conferences, participated in various Workshops, Published more than 22 research papers in National and International Journals, and already published seven books which includes Software Testing and Quality Assurance, A Text book of VB. Net Programming, Fundamentals of Cloud Computing, An Introduction to C++ Programming, Internet and Web Technology, PC Assembly & Installation & Multimedia Computing

He is also awardee of prestigious award of YOUNG SCIENTIST IN COMPUTER SCIENCE APPLICATIONS by IMRF, and BEST RESEARCHER AWARD IN COMPUTER SCIENCE APPLICATIONS & BEST TEACHER AWARD from Govt. Degree College Poonch.



Waseem Akram Assistant Professor in Computer Applications at Govt College for Mendhar. As an Educationist he has more than 7 years of teaching experience at undergraduate level. He has published 7 research papers in reputed National & international journals. He has attended several national and international conferences&also participated in various workshops.



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Divya Mahajan, presently working at GDC Nowshera, she has 4 years of experience in teaching at college. She is also pursuing PhD from Bagwant University Rajasthan. She has attended many national and international conferences.

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Chapter I

Need for security, Principal of security- confidentiality, integrity and authentication, computer security concepts(CIA), Security threats/ Attacks, Vulnerabilities and protections, Type of Threats – DoS, DDos, Spoofing, Virus, Worms, Torjans, Backdoor, Phising and Spam, Information Security, Methods of Protection.

1.0 Introduction: The Internet has transformed our lives in many good ways. Unfortunately, this vast network and its associated technologies also have brought in their wake, the increasing number of security threats. The most effective way to protect yourself from these threats and attacks is to be aware of standard cybersecurity practices. This article on “What is Computer Security?” presents an introduction to computer security and its key concepts.

1. What is Computer Security?
2. Computer Security Threats
3. Why is computer security important?
4. Best computer security practices.

What is computer security?

Computer security basically is the protection of computer systems and information from harm, theft, and unauthorized use. It is the process of preventing and detecting unauthorized use of your computer system.

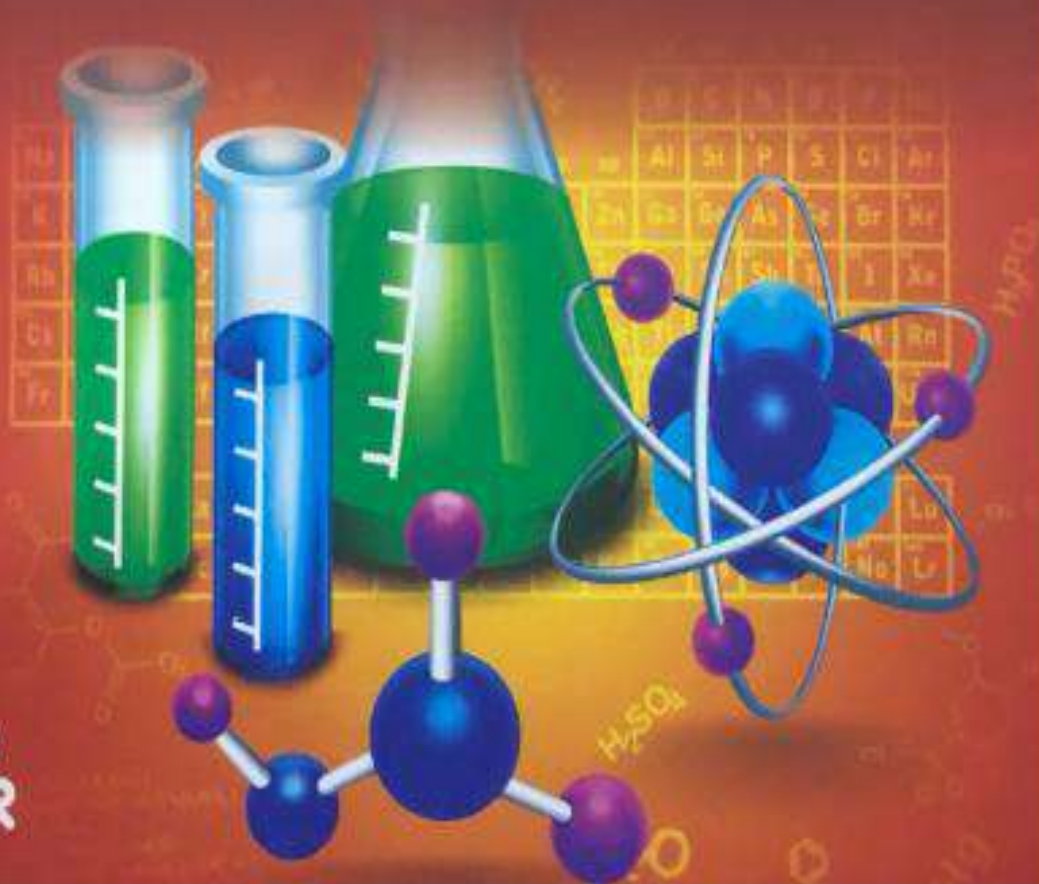
There are various types of computer security which is widely used to protect the valuable information of an organization.

B.Sc. SEMESTER-II
(MAJOR & MINOR COURSE)

FOUNDATION COURSE IN CHEMISTRY

AS PER NEP-2020 SYLLABUS JAMMU UNIVERSITY

Dr. Faheem Rasool • Dr. Altaf Ahmed • Prof. Mohd. Riaz,
Dr. Mohd. Saleem • Dr. Shakeel Ahmed



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1

States of Matter-II

Liquid: A liquid is a type of matter with specific properties that make it less rigid than a solid but more rigid than a gas. A liquid can flow and does not have a specific shape like a solid. Instead, a liquid conforms to the shape of the container in which it is held.

1.1. INTERMOLECULAR FORCES

Intermolecular forces, often abbreviated to IMF, are the attractive or repulsive forces that arise between the molecule of a substance. Intermolecular forces are forces that exist between molecules. IMF are responsible for most of the physical and chemical properties of matter. They are electrostatic in nature and include van der Waals forces and hydrogen bonds. IMF are separated into two groups: short range forces and long range forces. Short range forces happen when the center of the molecules are separated by three angstroms (10^{-8} cm) or less. Short range forces tend to be repulsive, where long range forces that act outside the three angstroms range are attractive. Long range forces are also known as van der Waals forces. They are responsible for surface tension, friction, viscosity etc. Intermolecular forces are responsible for physical and chemical properties of matter. The viscosity, diffusion and surface tension are examples of physical properties of liquid that depend upon intermolecular forces.

Types of Intermolecular Forces

An intermolecular force is an attractive force that arises between the positive components (or protons) of one molecule and the negative components (or electrons) of another molecule. Various physical and chemical properties of a substance are dependent on this force. The boiling point of a substance is proportional to the strength of its intermolecular force - the stronger the intermolecular force, the higher the boiling point.

By comparing the boiling points of different substances, we can compare the strengths of their intermolecular forces. This is because the heat absorbed by the substance at its boiling point

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FOUNDATION COURSE IN CHEMISTRY

**Dr. Faheem Rasool • Dr. Altaf Ahmed • Prof. Mohd. Riaz,
Dr. Mohd. Saleem • Dr. Shakeel Ahmed**

"Foundation course of chemistry-II" is a comprehensive guidebook designed specifically for students pursuing a Bachelor of Science degree. Written by a team of expert from various colleges, the book offers a detailed understanding of the basic principles of chemistry. The book focuses on fundamental concepts such as states of matter, chemical bonding, molecular structure, and stereochemistry. The book is written in a clear and concise language, making it easy for students to understand even the most complex concepts. The authors have used simple language to explain the concepts, making it easier for students to grasp the subject matter. The book is intended to help students develop a strong foundation in chemistry and help them succeed in their academic pursuits. The authors have ensured that the book is aligned with the syllabus of B.Sc. semester-II (Major/Minor) of the University of Jammu as per the National Education Policy 2020. This ensures that the book covers all the essential topics required for students to succeed in their coursework. The book starts with an introduction to the states of matter, explaining the properties and characteristics of solids, liquids, and gases. It then moves on to chemical bonding, explaining the different types of bonds such as ionic, covalent, and metallic bonds. The authors have also discussed molecular structure and stereochemistry in great detail, including the geometry of molecules and how it affects their properties. Overall, "Foundation Course of Chemistry-II" is an excellent resource for students pursuing a Bachelor of Science degree, particularly those in the field of chemistry. With its clear and concise language, comprehensive coverage of essential topics, and focus on practical examples, this book is an indispensable tool for anyone seeking to build a strong foundation in chemistry.



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B.A. Semester-I



Dr. Jahangeer Ahmad Bhat

Mr. Murtaza Ahmed



Dr. Jahangeer Ahmad Bhat hailing from Hablishi, Kulgam. He is known columnist, Author and content writer besides teaching in Higher Education. He did his Bachelors from University of Kashmir. He has done M.A., M.Phil., Ph.D. in Political Science/International relations from the department of Humanities, social sciences and Public Administration, Vikram University (A grade), Ujjain. He was also a fellow scholar of Indian Council of Social Science Research (ICSSR), New Delhi. He have been absorbed in teaching in higher education department since 2017.

Furthermore, he has Published more than 20 Research papers in reputed National and International journals. The author has written many books and Book chapters with authenticity thereof. His taste on burning issues are usually seen in different Newspapers of J&K on editorial pages. The author has recently nominated to join best diplomats to Kuala Lumpur, Malaysia.

He has participated in many International/National Conferences/seminars and also presented more than 30 Research Papers. He was also awarded with best Research Paper presentations in many conferences.



Prof. Murtaza Ahmed hailing from a border village of Mendhar. He completed his basic education from his native place and joined GDC Poonch for pursuing his B.A. He completed his PG in Political Science from AMU, Aligarh and proceeded for B.ED from Kashmir University, through distance Education Jammu Chapter. Mr. Murtaza Qualified both NET conducted by UGC and JKSET conducted by Kashmir University before his appointment.

He was working in Kendriya Vidhalya No. 1 Gandhi Nagar Jammu as PGT Political Science for one and half year and then gave his services to the School Education Department. Mr. Murtaza Ahmed was selected as Assistant Professor by Jammu & Kashmir Public Service Commission and appointment in Higher Education department, Government of Jammu and Kashmir in 2017. Presently he is posted in Chottey Shah Memorial Degree College Mendhar (NAAC Accredited Grade B). He participated in many National and International conference and seminars and also presented many papers. Being Columnist he has written many articles on social issues. Beside his formal teaching he is also holding many other responsibilities in the College and strive himself for the service of the nation.



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POLITICAL METHODOLOGY

The subfield of political methodology is concerned with the philosophical bases of political science, social science, empirical research design and analysis, and practical field research experience.

Courses in the political methodology field cover philosophical issues regarding the possibility of a science of politics, the similarities and differences between political science and other social sciences, alternative modes of explanation, and the truth of knowledge claims. They also examine the formulation of experimental and non-experimental research designs for making causal inferences about political processes and behavior and explore the use of statistics, mathematics and computers for the analysis of political data generated by such research designs. Students are also provided an opportunity to conduct individual and group research projects through seminars. The political methodology faculty has current research and teaching interests in such diverse topics as mass media, feminist theory, language politics, political economy, rational choice theory, and public policy.

1.1. INTRODUCTION TO POLITICAL SCIENCE, POLITICS AND POLITICAL THEORY

► MEANING OF POLITICAL SCIENCE

It is well said that man is a social animal. For the satisfaction of his needs he has to depend upon the society. That is why, it is most essential for a man to live in the State which is a politically organised society. The state is the Pivot for the study of Political Science and Political Science studies everything that is concerning with the state. In the ancient times the word 'Politics' was used in place of Political Science.

The English word political or politics originates from three Greek words i.e. Polis (city state), Polity (government) and Politeia (constitution). So, in the original Greek sense it is a study of the city-state and its administration in practical as

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AS PER THE LATEST SYLLABUS OF JAMMU UNIVERSITY

Sajid Ahmed
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INTRODUCTION TO MACROECONOMICS - I

Sajid Ahmed
Dr. Tabarak Amin Khan

Recognizing that a course in economics may seem daunting to some students, we have tried to make the writing clear and engaging. Clarity comes in part from the intuitive presentation style, but we have also integrated a number of pedagogical features that we believe make learning economic concepts and principles easier and more fun. These features are very student-focused.

The chapters themselves are written using a "modular" format. In particular, chapters generally consist of three main content sections that break down a particular topic into manageable parts. Each content section contains not only an exposition of the material at hand but also learning objectives, summaries, examples, and problems. Our goal is to encourage active learning by including many examples and many problems of different types.



Mr. Sajid Ahmed, born in the Rajouri district of Jammu and Kashmir, graduated in Economics (Hons.) from Ramjas College, University of Delhi. He later qualified for various Master's Entrance Examinations, and then completed his Master's from Delhi School of Economics, one of India's premier institute. He has qualified UGC-NET and GATE exams at the all-India level in 2022.



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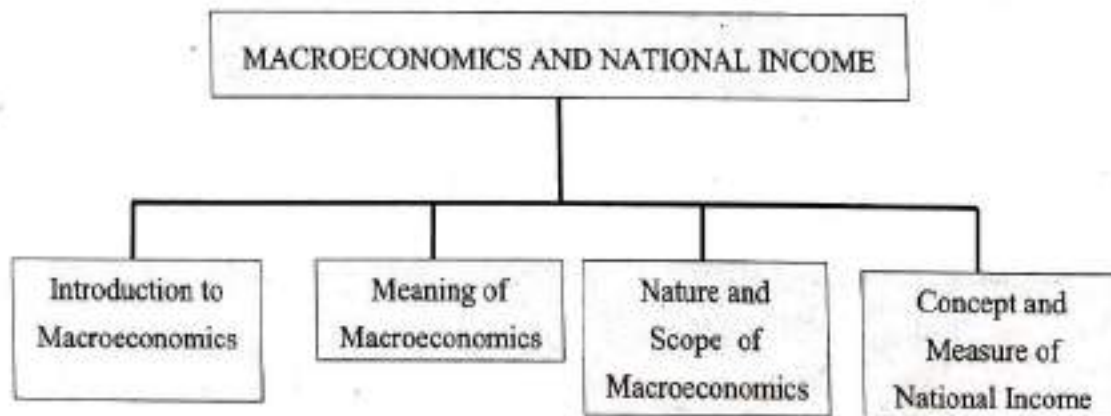
INTRODUCTION TO MACROECONOMICS

LEARNING OUTCOMES

At the end of this unit, you will be able to:

- Describe the Meaning and Nature of Macro Economics.
- Describe the Scope of Macro Economics.
- Explain various Concepts of Macroeconomics
- Explain the Method of Measure of National Income
- Explain Difficulties in the Measurement of National Income
- Why GDP is not a good measure of social welfare.

UNIT OVERVIEW





According to the Syllabus Prescribed by University of Jammu
(AS PER NEP - 2020)

A Text Book of

PHYSICAL EDUCATION-II

(MAJOR/MINOR)



Semester II

Course Work Covered:

- Health and Physical Education
(MAJOR)
- Basics of Health Education
(MINOR)

Dr. Mandeep Singh Nathial

Mr. Narender Paul Sharma

Mr. Sunil Kumar

Mr. Vikram Jamwal

Dr. Balbinder Singh

Mr. Mohd. Alyas

Dr. Mohd. Ibrahim

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INTRODUCTION

Chapter

- 1.1. Concept, definition and dimension of Health.
- 1.2. Definition, aim, objectives and principles of Health Education.
- 1.3. Personal Hygiene
- 1.4. School Health Program- Health Service, Health Instruction, Health Supervision, and Health Record. (Major Course Only)
- 1.5 Guiding Instructions in Personal Hygiene (Minor Course Only)

1.1. CONCEPT, DEFINITION AND DIMENSION OF HEALTH

1.1.1 Concept of Health

Health is the level of functional or metabolic efficiency of a living organism. In humans it is the ability of individuals or communities to adapt and self-manage when facing physical, mental or social challenges. Health is that balanced condition of the living organism in which the integral, harmonious performance of the vital functions tends to the preservation of the organism and the normal development of the individual.

Health can be seen as a multifaceted dimension of human life and as a 'reserve stock' of vitality, fitness and strength (whether psychological or physical or both) which individuals can draw upon to pursue their goals and actions. From a sociological viewpoint health can be seen as both 'attribute' and 'relation', simultaneously involving biological and social factors. This suggests a *dynamic* view of health and illness, changing across biographical and historical time. The experience of health, both good and poor, is likely to be influenced by the circumstances into which people are born and the contexts and actions which prevail at different stages of life.

The word originally came from Old English and it meant the state and the condition of being sound or whole. More precisely, health was associated not only with the physiological functioning, but with mental and moral soundness, and spiritual salvation, as well. Though the word health has often been preceded by both positive and negative qualifiers such as good, bad or poor, it has always been regarded as a positive entity.

The idea of health is capable of wide and narrow application, and can be negatively as well as positively defined. It is often said that the medical model of health is a negative one: that is, that health is essentially the absence of disease. Despite bold attempts by bodies such as the World Health Organisation (WHO) to argue for a definition of health as 'a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity', most medically related thought remains concerned with disease and illness. The phrase 'complete well-being' remains as elusive as it is positive. For the ancient Greeks, health was always an attribute of paramount importance. Their initial

A Text Book of PHYSICAL EDUCATION-II

ABOUT THE BOOK

This book is intended to serve as a textbook for Health & Physical Education students at Four Year under Graduation level program (FYUGP) and per NEP 2020 Guidelines. The book can be taken as a well-organized conceptual book for students in Health & Physical Education of Major and Minor Courses from semester II for the Colleges Affiliated under University of Jammu, J&K. This edition has been made more structured and simple to make the learning easy and systematic. Keeping in mind the need of accurate material for Examinations of University, point based content has also been written with expected Questions in Examinations. To make students in comfort this book has involved 'Practical Course' of 2nd Semester along with easy language based unit & sub-unit wise 'Theory Course'.

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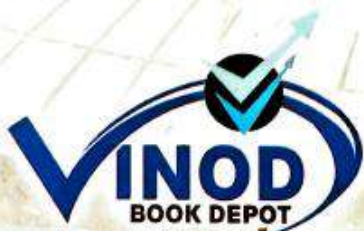
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PUBLIC SPEAKING : CONCEPT AND BASICS OF PUBLIC SPEAKING

Introduction: Public speaking is important in both business, education, and the public arena. There are many benefits to speaking in public whether you're an individual or a business. Basically, it's a presentation that's given live before an audience. Public speeches can cover a wide variety of different topics. The goal of the speech may be to educate, entertain, or influence the listeners. Often, visual aids in the form of an electronic slideshow are used to supplement the speech. This makes it more interesting to the listeners.

A public speaking presentation is different from an online presentation. The online presentation is available any time. A public speech is typically limited to a specific time or place. Online presentations often use slideshows. Or they use pre-recorded videos of a speaker. This includes recordings of a live public speaking presentation).

MEANING

Public speaking, also called oratory or oration, has traditionally meant the act of speaking face to face to a live audience. Today it includes any form of speaking (formally and informally) to an audience, including pre-recorded speech delivered over great distance by means of technology.

Public speaking is used for many different purposes, but usually as some mixture of teaching, persuasion, or entertaining. Each of these calls upon slightly different approaches and techniques.

Public speaking was developed as a primary sphere of knowledge in Greece and Rome, where prominent thinkers codified it as a central part of rhetoric.

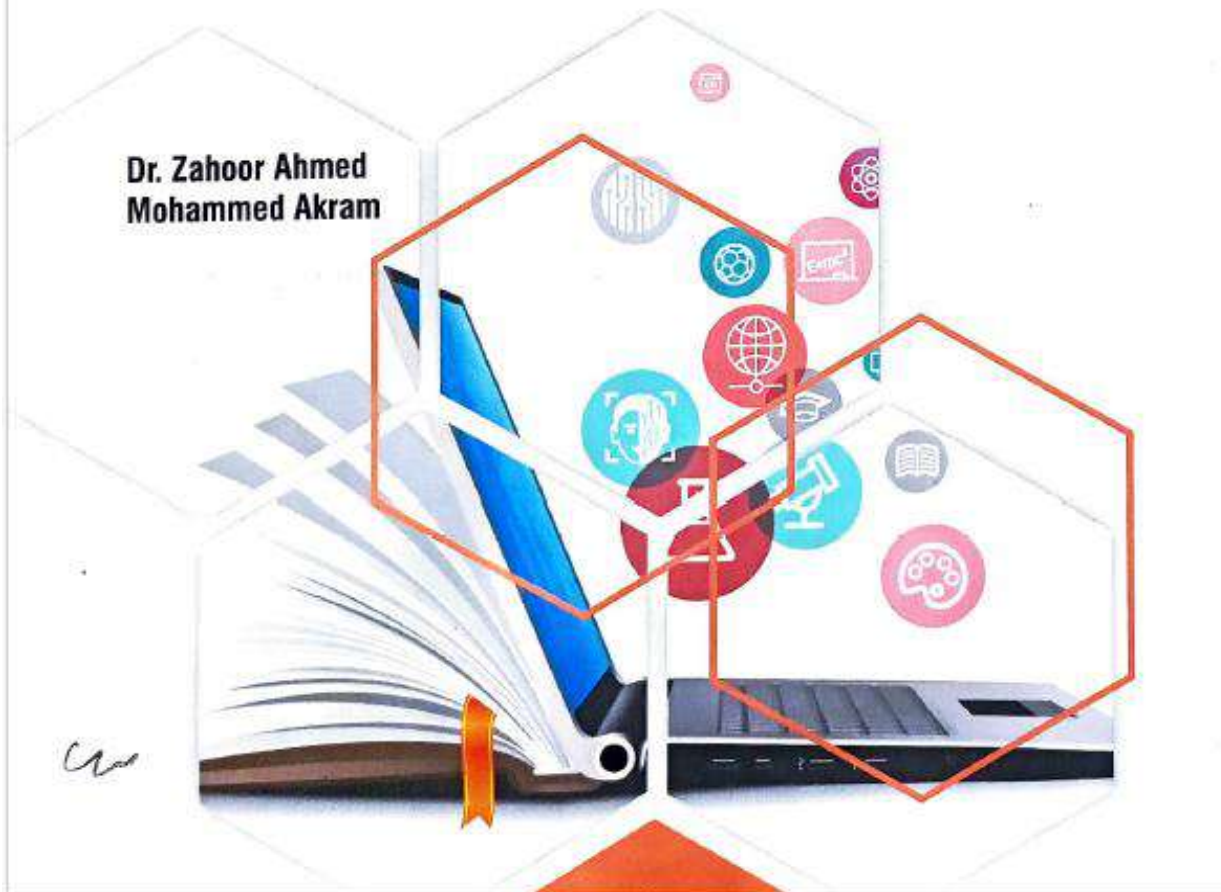


Modern Trends in **EDUCATION**

According to FYUP under CBCS as per NEP-2020

(MULTIDISCIPLINARY COURSE)
Semester-II

Dr. Zahoor Ahmed
Mohammed Akram



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HIGHER EDUCATION AS PER NEP 2020

Higher Education in the light of NEP 2020

- Concept
- Structure
- Objectives
- Main Features
- Challenges

CONCEPT & FEATURES OF NEP

NEP 2020 is the first education policy of the 21st century and replaces the thirty-four year old National Policy on Education (NPE), 1986. Built on the foundational pillars of Access, Equity, Quality, Affordability and Accountability, this policy is aligned to the 2030 Agenda for Sustainable Development and aims to transform India into a vibrant knowledge society and global knowledge superpower by making both school and college education more holistic, flexible, multidisciplinary, suited to 21st century needs and aimed at bringing out the unique capabilities of each student. The policy has been formulated after a very detailed consultative process, unprecedented in depth and scale. Consultation involved over 2 lakh suggestions from 2.5 lakhs Gram Panchayats, 6600 Blocks, 6000 ULBs, 676 Districts. The MHRD had initiated a collaborative, inclusive, and highly participatory consultation process from January 2015. In May 2016, 'Committee for Evolution of the New Education Policy' under the Chairmanship of Late Shri T.S.R. Subramanian, Former Cabinet Secretary, submitted its report. Based on this, the Ministry prepared

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Educational Psychology and Statistics/Psychological Bases of Education

According to FYUP under CBCS as per NEP-2020

(Major/Minor Course) Semester II

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UNIT-I



PSYCHOLOGY AND EDUCATION

- Concept of Psychology and Educational Psychology
- Relationship between Education and Psychology
- Scope of Educational Psychology

CONCEPT OF PSYCHOLOGY

Introduction

Psychology is the scientific study of the mind and behavior. Psychologists are actively involved in studying and understanding mental processes, brain functions, and behavior. The field of psychology is considered a "Hub Science" with strong connections to the medical sciences, social sciences, and education (Boyack, Klavans & Borner, 2005).

Psychology is the scientific study of behaviour and mental processes. Behaviour includes all of our outward or overt actions and reactions, such as verbal and facial expressions and movements. Mental processes refer to all the internal and covert activity of our mind such as thinking, feeling and remembering. It is a scientific study because to study behaviour and mental processes, the psychologists use the scientific methods for understanding more precisely and accurately.

Meaning of Psychology: The word, 'Psychology' is derived from two Greek word, 'Psyche' and 'Logos'. Psycho means 'soul' and 'Logos' means 'science' Thus psychology was first defined as "science of soul".

**BASIC APPROACHES
OF
EDUCATION**



The Present work is a humble attempt to satisfy the needs of the under graduate College students, affiliated to the University of Jammu and University of Kashmir and also shall be beneficial for the students Of B.Ed., M.Ed., M.A Education and PhD Education Entrance Test.

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EDUCATION

❖ Concept of Education

Education is a process which starts from birth and continuously going till death. Education is never ending process of inner growth and development and its period stretches from cradle to the grave. Education is to humanize humanity and to make life broad-minded, cultured and well educated. Through education individuals develop his thinking and reasoning, creativity, problem solving approach, attitudes, aptitude, intelligence, potential for seeking new knowledge, and moral values. Education is a dynamic as well as absolute and all inclusive concepts. It deals with all aspects of human life. Education plays an important role in the development of an individuals. Different educationalist have different views on education. We can say that education is the overall modification of behaviour.

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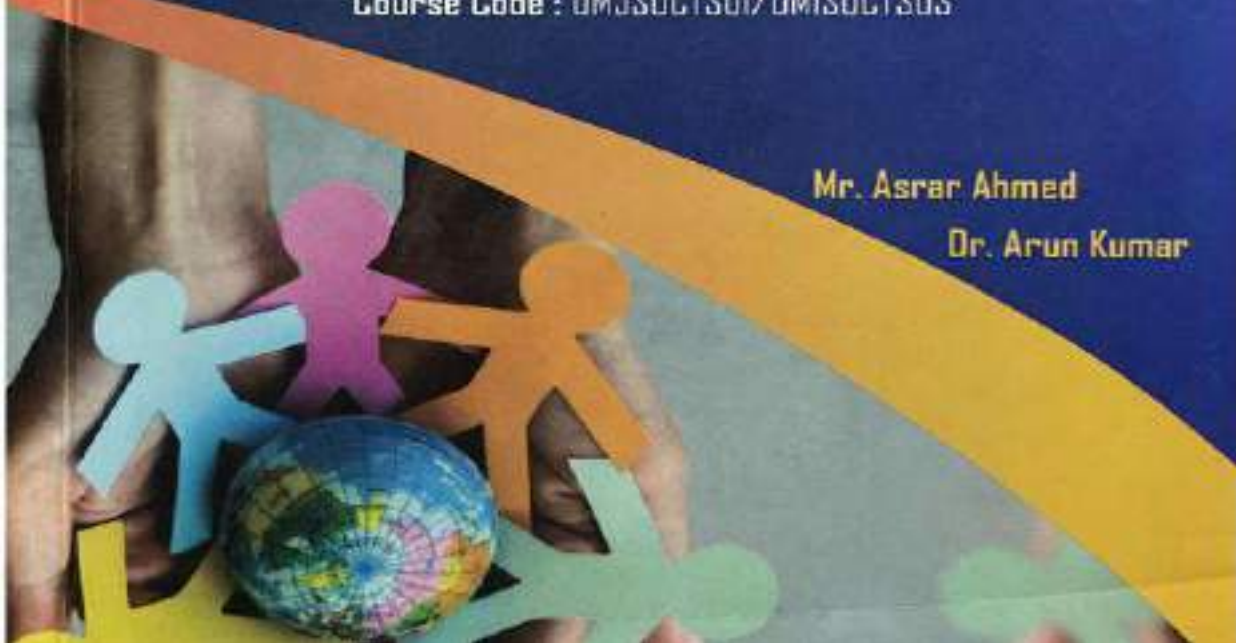
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Foundations of Sociological Thoughts I

This book is an exploration of the ideas and philosophies of influential thinkers, whose works spanned the nineteenth and early twentieth centuries. It seeks to delve into their intellectual frameworks, examine the social contexts in which they flourished, and reflect on the enduring relevance of their ideas in our contemporary societies.

Auguste Comte, known as the father of sociology, offered a systematic approach to understanding society through his theory of positivism. He envisioned a social science grounded in empirical observation, seeking to uncover the laws governing social phenomena and guide humanity towards progress and harmony.

Herbert Spencer, a staunch advocate of social Darwinism, developed a comprehensive theory of social evolution. Influenced by the principles of natural selection, Spencer applied them to human societies, emphasizing the importance of competition and adaptation in driving societal progress.

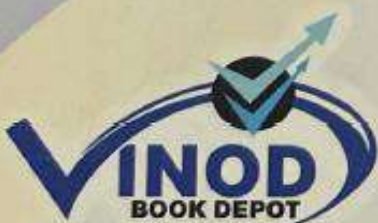
Emile Durkheim, a founding figure of sociology, shifted the focus from the individual to the collective conscience. He explored the role of social integration, the power of social norms, and the importance of social institutions in maintaining order and cohesion.

Karl Marx, the revolutionary thinker and economist, put forth a comprehensive critique of capitalism and introduced the concept of class struggle. Marx's analysis of the exploitative nature of the capitalist system and his vision of a communist society has had a profound influence on political thought, shaping ideologies and movements across the globe.

In this book, we embark on a journey through the thoughts and legacies of Comte, Spencer, Durkheim, and Marx. Through their writings, we explore the historical, cultural, and intellectual landscapes that gave birth to their ideas. We navigate their intellectual battles, their criticisms, and their enduring contributions to the understanding of society and human interaction.

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Chapter

AUGUSTE COMTE

Introduction

Auguste Comte (1798-1857) was a French philosopher and social theorist who is considered one of the founders of sociology. He is known for developing the concept of positivism and for his work in the field of social sciences.

Auguste Comte produced several significant works during his lifetime, among which are his six-volume "Cours de philosophie positive" (1830-1842), translated as "Course of Positive Philosophy" or "The Positive Philosophy of Auguste Comte." Another notable work is his four-volume "Système de politique positive" (1851-1854), known as "System of Positive Polity." These writings contributed greatly to Comte's philosophical and sociological theories and cemented his reputation as a prominent thinker in the field.

1.1 POSITIVISM

Positivism is a philosophical and scientific approach that prioritizes the use of empirical evidence and scientific methods to gain understanding and provide explanations about the world. This approach emerged in the early 19th century and was developed by the French philosopher Auguste Comte.

The concept of Positivism then developed through several stages known by various names such as Empiriocriticism, Logical Positivism, and Logical Empiricism. In its basic ideological posture positivism is worldly secular, anti-theological and anti-metaphysical. The philosophy of science is positivism and it's more a philosophical method rather than a theory.



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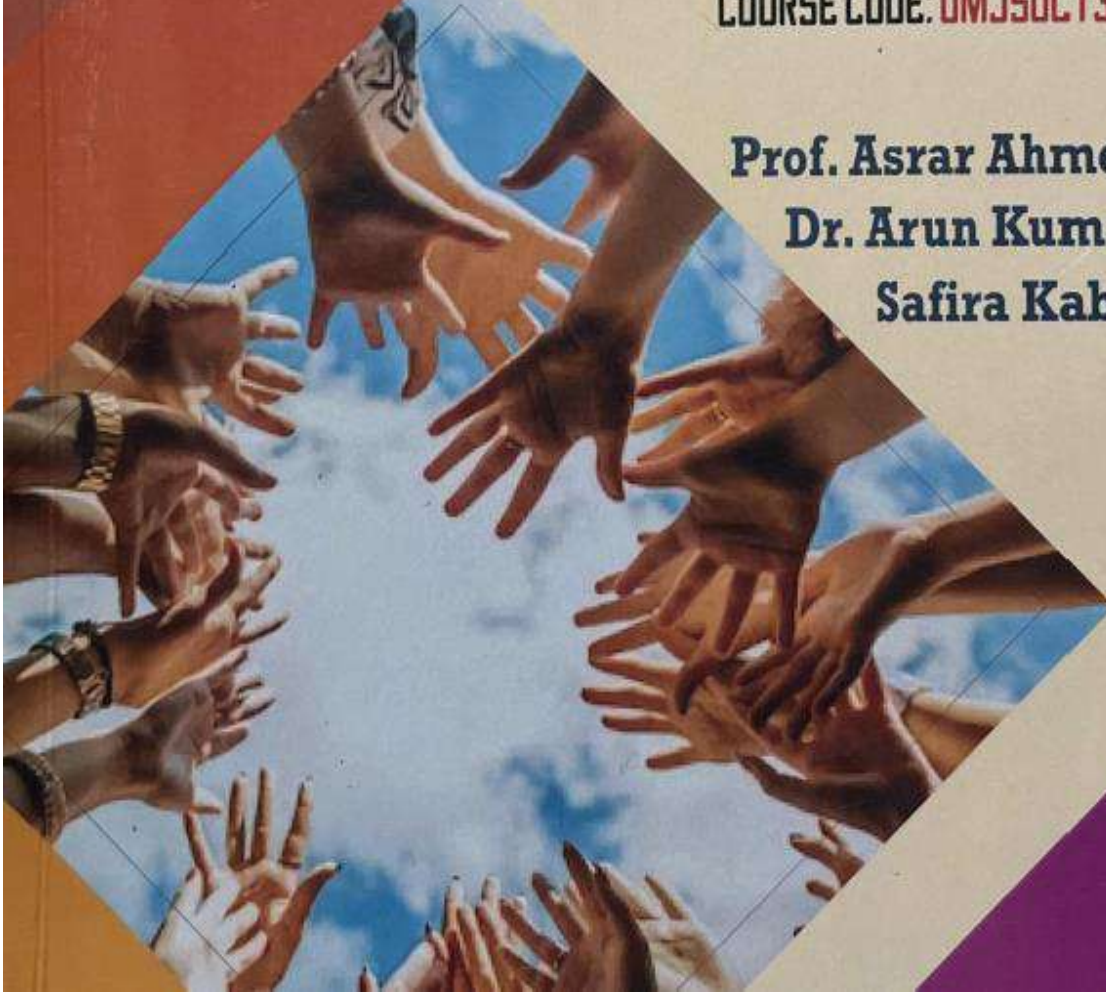
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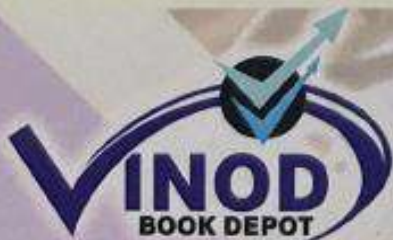
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1.1 MEANING AND CHARACTERISTICS OF SOCIAL PROBLEMS

Social problems refer to adverse situations that can have harmful consequences and disrupt the normal functioning of societies. These problems arise when societal norms and values are violated, resulting in dysfunctional behaviors. Examples of social problems include drug addiction, terrorism, youth unrest, juvenile delinquency, corruption, offenses against women, and environmental degradation.

It is important to note that not all violations of social norms and values lead to social problems. For instance, sporting an unusual hairstyle is not considered a social problem. Additionally, what is considered a social problem can vary with time and across different societies. Smoking, for example, was not widely recognized as a social problem in the past but is now seen as a significant issue due to increasing health consciousness. Similarly, practices like sati, which were not considered problematic in medieval India, are now viewed as social problems in modern India.

The perception of social problems can differ from one society to another due to variations in norms and values. Divorce, for instance, may be regarded as a serious problem in certain societies while being more accepted in others. Nevertheless, certain practices such as murder, terrorism, and rape are universally considered harmful across societies.

Initially, certain conditions that do not have significant adverse effects on the social system may be overlooked. However, over time, these conditions can accumulate



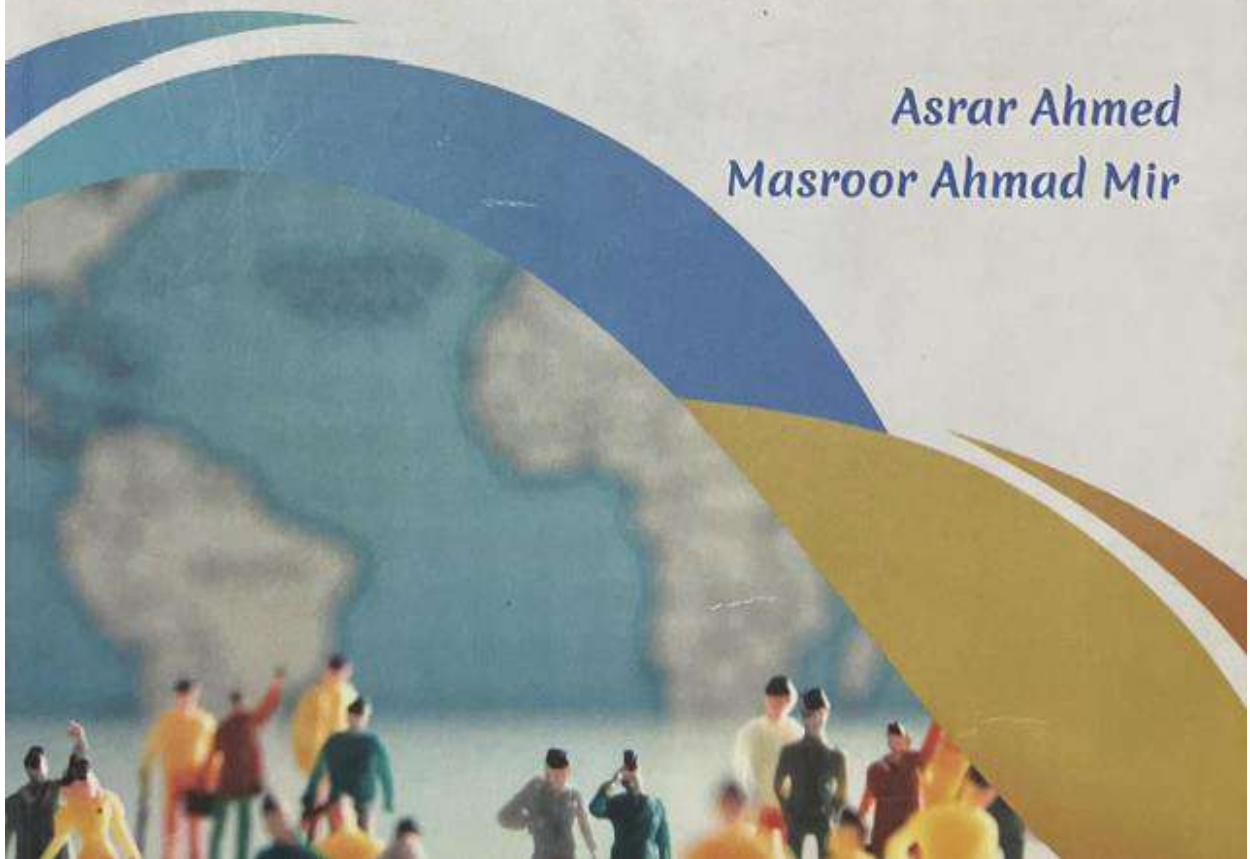
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Fundamentals of
SOCIOLOGY

(Major, Minor and Multidisciplinary)

SEMESTER - I

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Masroor Ahmad Mir



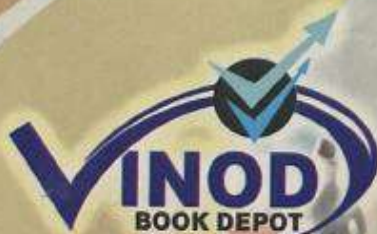
FUNDAMENTALS OF SOCIOLOGY

About the Book

Fundamentals of Sociology is an introduction to the genesis, fundamental concepts and perspectives of sociology as well as provide an introduction to the diverse aspects of sociology. Students will be introduced to the origin and growth of Sociology as a discipline and would get to explore relevant topics such as society, community, social groups, culture, social institutions. It establishes the connections between sociology and other disciplines such as history, political science, economics, psychology and anthropology to explore the interdependence between different realms of social life. Topics such as social stratification and sociological perspectives are also been discussed to give a complete overview of the subject. This book highlights the role of social institutions in the society particularly family and marriage with the significant changes that have occurred in the institutions of family and marriage system in India. Written in a simple and lucid language, this book will serve as a ready-reference material for aspirants from diverse backgrounds.

ASRAR AHMED currently holds the rank of Assistant professor and Head of the Department of Sociology Govt. Degree College Mendhar . He has obtained M.A. in Sociology from University of Jammu and qualified UGC NET-JRF. He has attended many national and international conferences, seminars and workshops. He has been teaching undergraduate classes from last five years.

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Chapter

Genesis of Sociology

1.1 Meaning, Nature and Scope of Sociology

Introduction: Have you ever wondered why individuals and societies are so varied? Do you ask what social forces have shaped different existences? The quest to understand society is urgent and important, for if we cannot understand the social world, we are more likely to be overwhelmed by it. We also need to understand social processes if we want to influence them. Sociology can help us to understand ourselves better, since it examines how the social world influences the way we think, feel, and act. It can also help with decision-making, both our own and that of larger organizations. Sociologists can gather systematic information from which to make a decision, provide insights into what is going on in a situation, and present alternatives.

Humans have always sought to live in aggregation or groups. When more than one individual live together reciprocal relationships develop among them. This living together creates a spirit of mutual cooperation, harmony, competition, animosity and struggle among them. This relationship established around these creates Society. The study of these networks of relationships is sociology. Sociology is the youngest of the social sciences. As an academic discipline it is only hundred fifty years old. It is mainly concerned with the study of society and in particular human behavior. There are other disciplines like political science, economic, anthropology, theology etc which study different aspects of human behavior. Sociology, however, is concerned



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A Text Book of **SOCIOLOGY**

(Major/Minor)

SEMESTER - II



Dr. Arun Kumar

Mr. Asrar Ahmed

A Text Book of **SOCIOLOGY**

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Mr. Asrar Ahmed did his M.A in Sociology in 2013 from University of Jammu and also qualified UGC NET-JRF and JKSLET in December 2013. Presently he is working as an Assistant Professor & Head department of Sociology in Government Degree College Mendhar. He also served in Government PG College Rajouri from 2017 to 2020. He has attended many National and International conferences and seminar and also published Research papers and Book chapters in various reputed journals and edited books respectively. He has teaching experience of more than six years.

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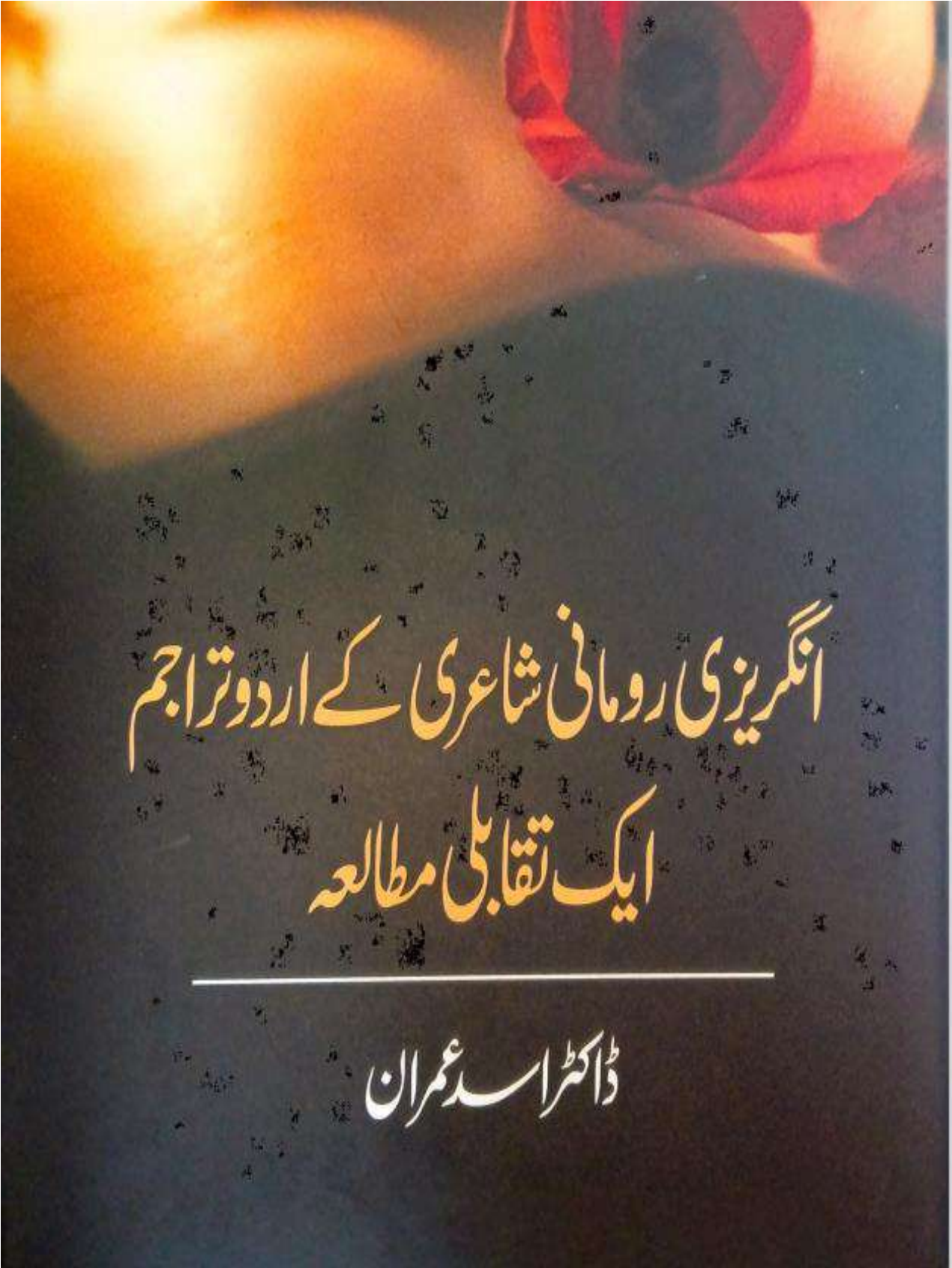
Society is dynamic. It is not static and so is family. The structure of family has continuously changed from time to time. All the societies large and small, primitive and civilized, ancient and modern have some form of family or the other. The word "Family" is derived from the Latin word "FAMILIA" which means 'a group of people affiliated by consanguinity'. Consanguinity means blood relation. Family apart from blood relation is also created through affinal bonds.

An individual generally belongs to a family which can be of two types:-

- > **Family of Orientation:** - It is the family in which one is born and consists of his/her parents and siblings.
- > **Family of Procreation:** - It is the family which is established after the marriage and consists of spouse and children.

According to **G P Murdock** "the family is a social group characterized by common residence, economic cooperation and reproduction. It includes adults of both sexes at least two of whom maintain a socially approved sexual relationship and one or more children own or adopted for sexually cohabiting adults". The family as a cornerstone serves a variety of functions in establishing a human society.

According to **Burgess and Lock** "the family is group of persons united by ties of marriage, blood or adoption; constituting a single household, interacting with each other in their respective role of husband and wife, mother and father, brother and sister, creating a common culture". These definitions highlight the fundamentals of the family as a type of social grouping:



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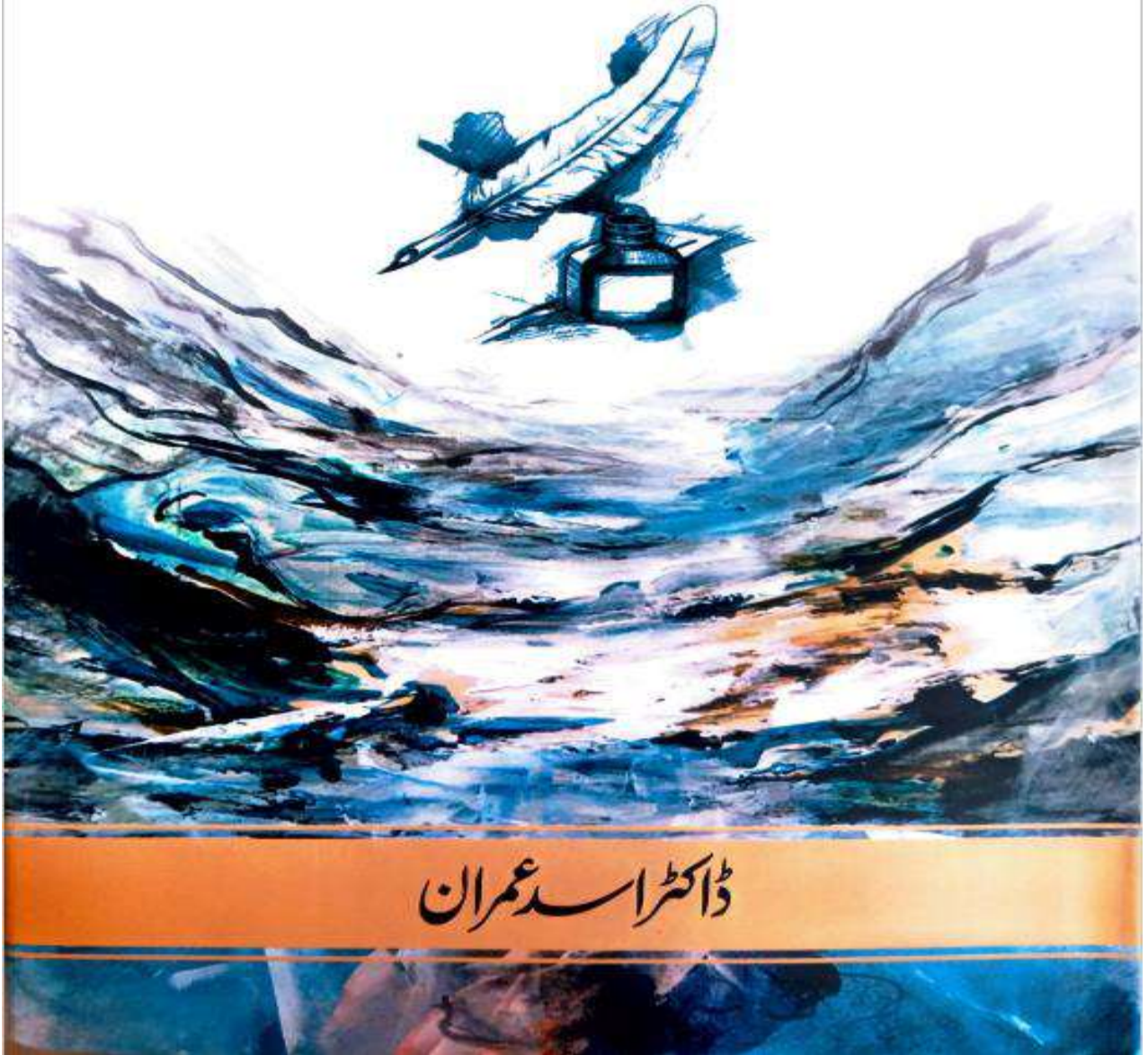
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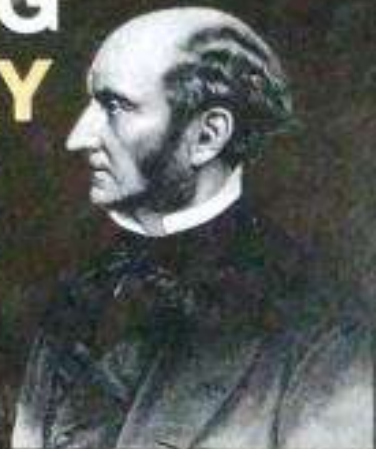
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UNDERSTANDING POLITICAL THEORY



CONCEPTUALIZING POLITICAL THEORY



B.A. Semester 1st

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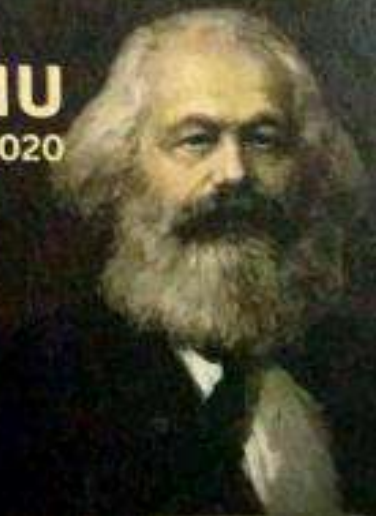
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POLITICAL THEORY AND POLITICAL SCIENCE

➤ INTRODUCTION TO POLITICAL SCIENCE

Meaning:- Political science is a subject concerned with the study of the state and the government. It was first developed as a systematic subject by the ancient Greeks with reference to the "city states". But in its modern form, the subject is comparatively a recent development. Till the dawn of the era of democracy and nationalism, the politics was considered as the Privilege of the princes, politicians, philosophers, and educationist. And the common men hardly bothered about politics and political theorizing. However, with the spread of the democratic and nationalistic ideas, politics has become everyone's affairs. The spread of education among the people has created new political awareness among the people and encourage them to take active part in political activities. As a result, political science is no longer the privilege of a few and has fallen within the reach of every common people.

Terminology: One important problem which confronts the study of political science is confusing regarding terminology. As Jellinek has observed "No science stands so much in needs of a precise terminology as political science". This confusion

FUNCTIONING OF INDIAN DEMOCRACY

UNDERSTANDING INDIAN DEMOCRACY

B.A. Semester III
MAJOR & MINOR COURSES
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Zain Bin Hussain Batt



Jahangeer Ahmad Bhat

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EVOLUTION, CONSTITUTIONAL AND COMPARATIVE PERSPECTIVES

1.1 EVOLUTION OF DEMOCRACY : A COLONIAL PERSPECTIVE

Democracy is a form of government in which the people have the power to choose their representatives and hold them accountable for their actions. Democracy is often considered as a modern and universal value that is essential for human dignity, freedom, and development. However, democracy has a long and diverse history that is influenced by different cultural, historical, and political contexts. One of the most interesting and complex cases of democracy is India, which is the world's largest democracy and one of the oldest civilizations. India's democracy is not a simple or straightforward outcome of its colonial past, but rather a result of a dynamic and contested process of decolonization, nation-building, and constitutionalism. India's democracy was shaped by various factors, such as the legacy of British colonial rule, the Indian freedom struggle, the partition of India and Pakistan, the drafting of the Indian constitution, the social and economic challenges of post-independence India, and the cultural and religious diversity of India's population.



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Modern Concepts of **PHYSICAL EDUCATION**

SEMESTER-III

**MAJOR/MINOR/
MULTIDISCIPLINARY**

**COURSE CODE:
UMIPET301/
UMIPET303/ UMDPET304**

Dr. Mandeep Singh

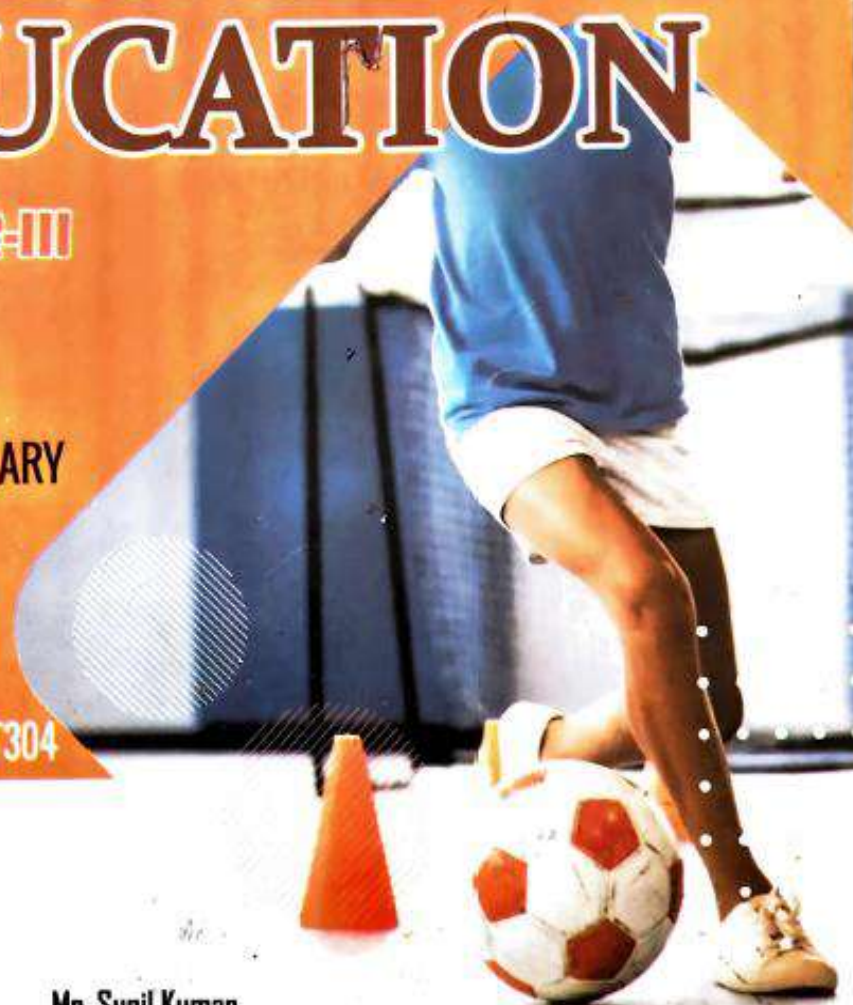
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- 1.1. Modern Concept of Physical Education
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1.1. MODERN CONCEPT OF PHYSICAL EDUCATION

The modern concept of physical Education does not refer physical Education as military exercises or limited to rhythms counting exercises. The new concept of physical education is not at all concluding physical education as a drilling/ marching programme or enjoying only with some sort of mass displaying activities. Modern concept of physical education is well emphasized, understood and recognized in the existing society. Below mentioned points may assist us in understanding the modern approach and trends in physical education. The modern concept of Physical Education (PE) has evolved to encompass a broader and more holistic approach to health, fitness, and well-being. While the traditional focus on physical fitness and motor skills remains, modern PE also takes into account the changing needs of individuals in a fast-paced and technologically driven world. Here are some key aspects of the modern concept of Physical Education:

1. **Philosophical approach:** In the modern era physical education has been accepted as a wide-philosophical approach, which is individual as well as society centric. Now every individual and society as a whole has understood the social values in physical education. It is no more misunderstood as limited to parade grounds or gymnasiums. Modern concept emphasized physical education as a influencing source of developing positive and progressive thinking in the society.
2. **Education process:** Modern concept of physical education refers physical activities as an Education approach. Physical activities present us many educational values not limited to physical development only. Physical education also involves education process as other general educational subjects. In modern era physical education is highly accepted, recognized and implemented in schools, colleges and universities.

Modern Concepts of PHYSICAL EDUCATION

About the Book

This book is intended to serve as a textbook for Physical Education students at Four Year under Graduation level program (FYUGP) and per NEP 2020 Guidelines. The book can be taken as a well-organized conceptual book for students in Physical Education of Major, Minor and Multidisciplinary Courses from semester III for the Colleges Affiliated under University of Jammu, JGK. This edition has been made more structured and simple to make the learning easy and systematic. Keeping in mind the need of accurate material for Examinations of University, point based content has also been written with expected Questions in Examinations and Sort Highlights for Quick Revision. To make students in comfort this book has involved 'Practical Course' of 3rd Semester along with easy language based unit & sub-unit wise 'Theory Course'.

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CLIMATOLOGY

UNIVERSITY OF JAMMU
(Major and Minor Course)

According to FYUGP under CBCS as per NEP-2020

SEMESTER-III

Mohd Qasim Mir

Dr. Z.A. Shah

Taseer Ahmed

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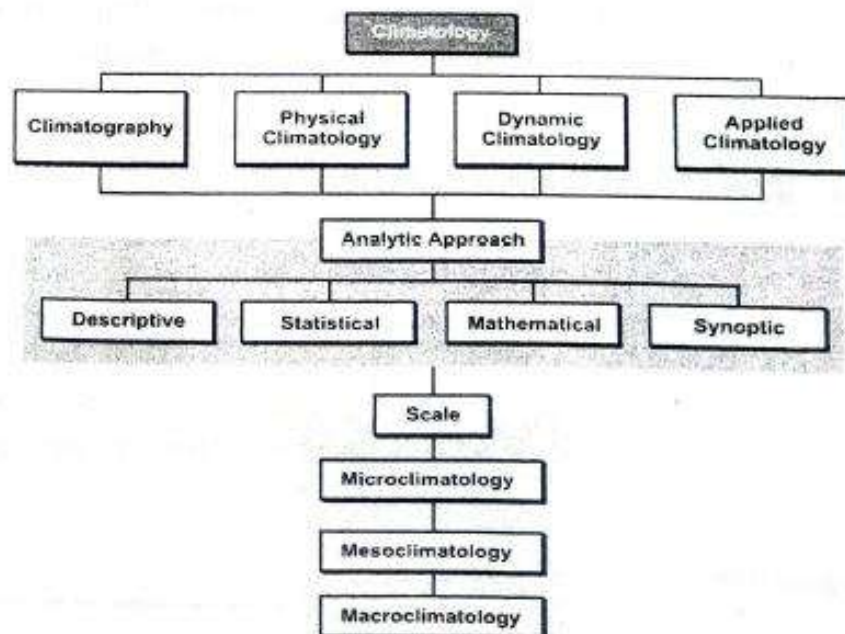
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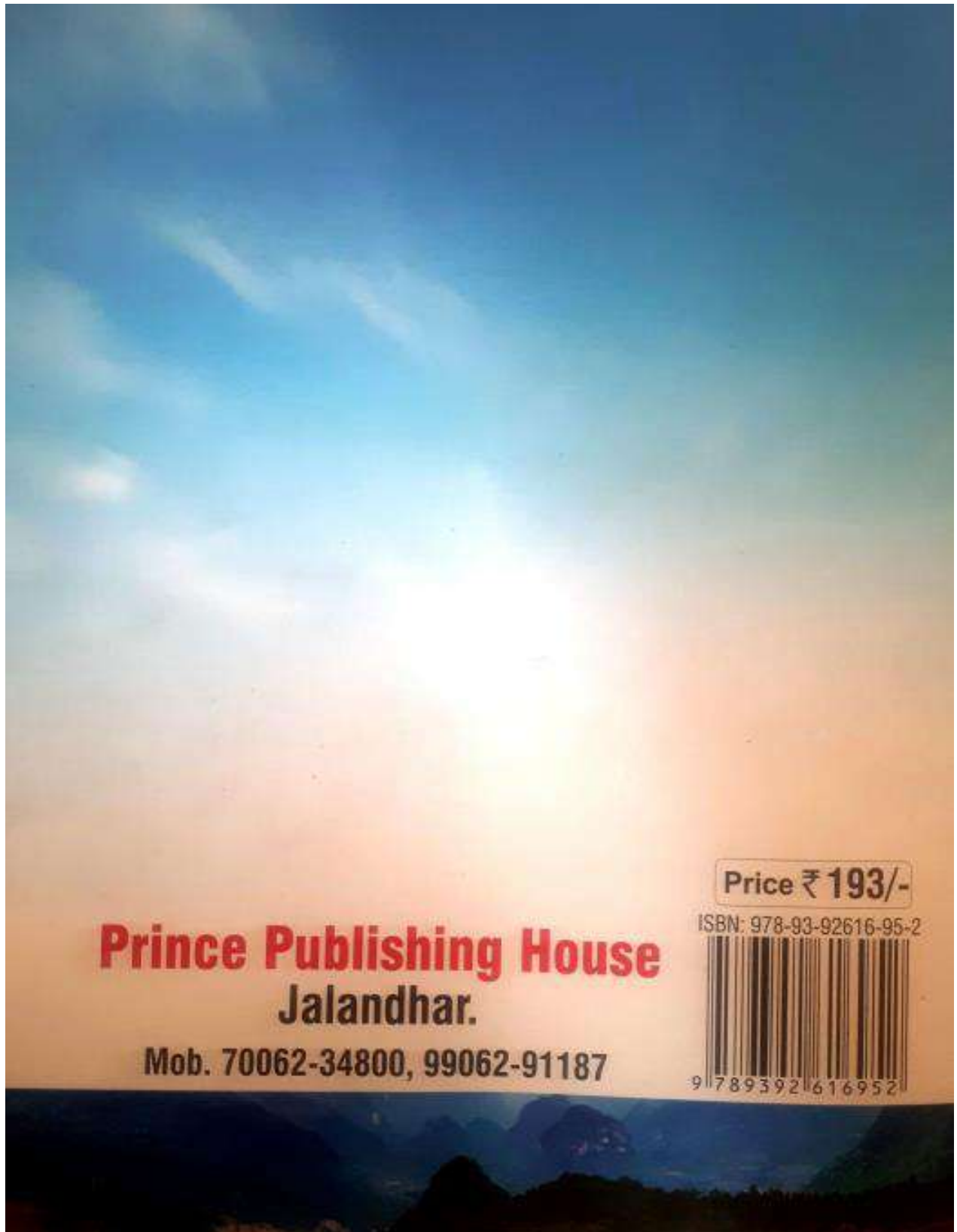
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- 1.1 Climatology: Definition and Elements of weather and Climate.
- 1.2 Composition and Structure of Atmosphere.
- 1.3 Factors affecting Distribution of Insolation.
- 1.4 Global Heat Budget.

CLIMATOLOGY

Atmospheric scientists often subdivide study of complexity of gaseous envelope that surrounds the earth into specific areas of interest. One such division identifies the fields of meteorology and climatology. Meteorology is a science that deals with motion and the phenomena of the atmosphere with a view to both forecasting weather and explaining the processes involved. It deals largely with status of atmosphere over a short period of time and utilizes physical principles to attain its goal. Climatology is the study of atmospheric conditions over a longer period of time. It includes the study of different kinds of weather that occur at a place. Dynamic change in the atmosphere brings about variation and occasionally great extremes that must be treated on the long term as well as the short-term basis. As a result, climatology may be defined as the aggregate of weather at a place over a given time period. There is diversity of approaches available in climate studies.





Chapters in Books

1. Ten Chapters in Book by Dr. Shakeel Ahmed

Advanced Applications of Biobased Materials

Food, Biomedical, and
Environmental Applications

Edited by

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Biopolymers: An overview

1

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Introduction

In the current scenario, the growing concerns of environmental and health hazards are key topics in the field of science. As the population increases, to fulfill daily needs, people unthinkingly use nonbiodegradable and easily available polymer-made plastics in their everyday life from the kitchen to the healthcare sector. Due to overuse of nonbiodegradable polymers, it is currently a significant challenge to deal with plastic waste. Additionally, this nonbiodegradable polymer waste increases the risk of health issues. With growing awareness of a healthy environment, researchers have developed sustainable and eco-friendly biopolymer-based green composites which are mainly engineered, or have functionalized raw biopolymers with other degradable synthetic or biosynthetic polymers (George, Sanjay, Srisuk, Parameswaranpillai, & Siengchin, 2020; Gurunathan, Mohanty, & Nayak, 2015; Moraes, Silva, & Vieira, 2020). By 2030, it is expected that 20%–25% of biobased renewable composite materials will be utilized in different sectors of human life from industrial applications to biomedical applications (Rajeswari, Stobel Christy, & Pius, 2021; Silva, Rodrigues, Fernandes, & Reis, 2020b; Varma & Gopi, 2021). These natural renewable green composites are biocompatible and biodegradable, and are widely applicable in the fields of food science (Augustine, Rajendran, Cvelbar, Mozetič, & George, 2013; Mangaraj, Yadav, Bal, Dash, & Mahanti, 2019), pharmaceuticals (Deb, Kokaz, Abed, Paradkar, & Tekade, 2019; Nayak & Hasnain, 2020), tissue engineering (Pattanashetti, Heggannavar, & Kariduraganavar, 2017; Silva, Rodrigues, Fernandes, & Reis, 2020a; Sohrabi, Khorasani, Ahmed, & Annu, 2021), and bioadsorbents (Donner, Arshad, Ullah, & Siddique, 2019; Singh et al., 2020).

The word biopolymer comes from the Greek “bio” meaning “life” and “polymer” meaning “many parts.” Biopolymers are widely extracted or synthesized from living organisms which are mainly plants, animals, microorganisms, algae, fungi, etc. Additionally, the resources of biopolymers are agricultural waste, industrial biowaste, and forestry feed stocks. The main source of biopolymers are living organisms which make them biocompatible and biodegradable. Historically, biopolymers have been widely applicable in different fields (Deb, Al-Attraqchi, Chandrasekaran, & Paradkar, 2019).

Biobased materials in nutraceuticals

8

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Introduction

According to epidemiological studies about the relationship between nutritional habits and illness risks, food products have a direct influence on health. This fact has prompted several health organizations throughout the world to recommend a higher intake of plant-based diets to promote human health and prevent the onset of certain diseases (Espín, García-Conesa, & Tomás-Barberán, 2007). In recent years, the tradition of using nutraceutical products for health promotion has expanded dramatically. Nutraceuticals serve as a bridge between nutrition and medicines (Faridi Esfanjani, Assadpour, & Jafari, 2018). It may be challenging to consume all the nutrients required to sustain the regular physiological functions and maintain optimum health. The assimilation of nutraceuticals into food items is a simple and easy technique for the development of novel functional foods (Gonçalves, Martins, Duarte, Vicente, & Pinheiro, 2018).

Nutraceuticals are defined as an emerging food category, consisting of dietary elements that provide health benefits in addition to their nutritional values. They are predicted to have relatively lowered toxicity and subsequent adverse effects compared to medications used to cure identical symptoms, since they are derived from natural nutritional resources (Ting, Jiang, Ho, & Huang, 2014). Several food elements, i.e., vitamins, proteins, folic acid, amino acids, minerals, functional lipids, and phytochemicals, known as bioactive food ingredients, are utilized to create functional foods that play a role beyond normal nutrition (Augustin & Hemar, 2009). Nutraceutical products play a vital role in several therapeutic areas, including cough and cold, blood pressure, digestion, sleeping disorders, diabetes, osteoporosis, arthritis, cholesterol control, depression, pain killers, and prevention of certain tumors (Das, Bhaumik, Raychaudhuri, & Chakraborty, 2012). Despite their widespread use, the therapeutic efficacies of nutraceuticals are frequently hampered by their limited oral bioavailability, which is caused by a variety of physical, chemical, physicochemical, and physiological variables. Researchers have been using various delivery mechanisms to enhance the bioavailability of nutraceuticals to improve their efficacy (Ting et al., 2014).

Biobased materials for increasing the shelf life of food products

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Introduction

With the increase in urban populations and hectic lifestyles, the demand for fresh, nourishing, fast, and accessible food resources is rising day by day. By 2050, the global population is predicted to increase from 7.7 billion to 9.7 billion. With the increment in the world's population, the most significant challenges are reducing food wastes, including 47% of all fruits and vegetables and 12% of meat and animal products, and achieving food security. Food is our primary requirement, so the manufacturing, handling, transportation, and primary storage of food are much more complicated when viewed from various aspects and these processes need to meet the prescribed standards to ensure health and environmental feasibility.

Food packaging has a prominent role in the storage and transportation of food items and, simultaneously, in keeping their quality intact and protecting them from harmful bacteria. It also impacts the shelf life of food products and protects them from physical, environmental, chemical, and microbial hazards. Furthermore, packaging also plays a vital role in a product's saleability and availability (Youssef & El-Sayed, 2018). In the food industry, the growth of pathogens takes place on the packaging and on the food surface. Due to contamination of foods and degraded or lost food products, millions of dollars are being spent by the food industry (Brooks & Flint, 2008). Packaging helps in keeping products away from the outer environment and ensures food protection against stagnant produce caused by mechanical forces, odors, dust, gases, moisture, and microorganisms. It also protects against radiation, light, and insects. Due to the contact of these harmful agents, the shelf life of food decreases. Therefore, adequate packaging should play the role of a barrier to decrease the effect of nearby food contaminations. Simultaneously, the packaging should be impenetrable, nontoxic, and inert to microorganisms.

Other than this, the material utilized for food packaging products is a significant factor, as packaging is not just for covering the products. It also provides information like the quantity that the buyers are purchasing, protects against pollution and outer environmental damages, and benefits in stimulating the storage and shipping of products (Moustafa, Youssef, Darwish, & Abou-Kandil, 2019).

Packaging materials can be considered a part of our life. For many years, conventional materials such as petroleum-based synthetic polymers, paper, metal, glass, etc. have been utilized for food

Biobased nanomaterials as functional food ingredients

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Introduction

Nanotechnology in food industry applications

It has not been long since science has presented to us one of its most innovative advancements in the form of nanotechnology and nanoscience. The applications of nanotechnology in agriculture and the food sector are relatively new than are their applications in medicine and pharmaceutical sciences. Food nanotechnology aims to metamorphose the developing agri-food industry by elevating production, nutritional value, quality of products, and food safety (Chung et al., 2017; Sekhon, 2014). Nanotechnology-based processing techniques will reshape the face of food manufacturing in terms of not only better food protection and preservation but also development of nutraceuticals or nanofoods (Pathakoti, Manubolu, & Hwang, 2017). Currently, there is an need to develop more sensitive and fast techniques that are rapid and economically feasible for biosensing applications in food quality assessments.

There are five categories of applications of nanotechnology in the food industry (Fig. 10.1), which are broadly enlisted here:

- Synthesis of nanoencapsulated or nanoscale additives for foods.
- Processing of food ingredients to form nanoscale structures.
- Nanomaterial incorporation into food products to enhance their flavor, aroma, shelf life, etc. or to develop edible/nonedible smart food packaging materials.
- Development of nanomaterials and devices for processing and treatment, e.g., nanofiltration for potable water treatment.
- Nanosensors for food quality and contamination assessments (Chaudhry et al., 2008).

Overall, the scope of nanofoods and nutraceuticals in the food and wellness industry cannot be undermined; however, the potential risk assessment in human health safety remains a top priority for studies.

Chitin as a biobased material in osteoporosis

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The bone

The fundamental constituent of the vertebral skeleton is the bone, which is a solid composite living material (Sheikh et al., 2015). This dynamic tissue helps in the control of electrolyte concentrations, such as Ca and P, in the human body, first and foremost through collaborating with the digestive and renal systems (Salgado, Coutinho, & Reis, 2004; Stevens, 2008). Second, due to its rigid and slightly elastic structure, it can serve as a framework for supporting and attaching smoother tissues like muscles and it can also serve to protect bone marrow and vital organs. Finally, it provides complete support to the entire body's necessary movement and muscle contraction (Legard & Schluter, 2010).

Biology of the bone structure

A solid bone layer (also known as the cortical bone) surrounds a spongy bone structure within most bones, which is protected by an exterior layer of solid bone (also called cancellous or trabecular bones). A trabecular bone is composed of trabeculae that are defined in a honeycomb pattern on the surface of the bone. The proportion of trabecular and cortical bones is diverse based on the function of the skeletal segment. The fundamental distinction between a trabecular bone and a compact bone is porosity, which varies from 5% to 30% in compact bones, and, in trabecular bones, it varies from 30% to 90%. A compact bone has a porosity of 5%–30%, and a trabecular bone has a porosity of 30%–90%. Long bones are made up of the diaphysis or the main shaft, the epiphysis or the bulbous extremities, and the metaphysis that is located in the center of the two (humerus and femur). Medullary (or marrow) cavities are found in the center of the shaft and contain red bone marrow, which is used during childhood for hematopoiesis, and yellow bone marrow, which is used for storage of energy throughout maturity. Longer bones comprise the carpals and tarsals, and flat bones include the scapula, ribs, pelvic girdles, and the parietal and frontal bones of the cranium. Irregular bones comprise the sacrum, coccyx, and vertebrae, in addition to some skull bones like ethmoid and sphenoid (Currey, 2006; Scanlon & Sanders, 2018). Because of the way genetics works, the bone shape is adamant in direction to meet certain necessities depending on anatomical position and function. Remodeling, which is based on

Chitosan-based biomaterials in biomedical applications

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Introduction

Chitin is the second-most abundant and natural polysaccharide on Earth after cellulose. It is hard, inelastic, and is made up of nitrogenous compounds. The main sources of chitin are marine species, such as crustaceans, crabs, and lobsters, exoskeletons of mollusks and insects, and fungal cell walls (Bakshi, Selvakumar, Kadirvelu, & Kumar, 2020; Yeul & Rayalu, 2013; Younes & Rinaudo, 2015). Chitin was first identified in 1811. It is composed of *N*-acetylated glucosamine units linked to the β -1,4 linkage and has a linear structure (Ahmed & Ikram, 2017). Generally, chitin exists in three forms, i.e., α , β , and γ , with different microfibril orientations, and each form has unique structural properties. The α -form is the most common and has strong hydrogen bonds with an antiparallel orientation, whereas the β -form has parallel orientation with weak hydrogen bonds. Due to the presence of strong hydrogen bonds, in the α -form, it is insoluble in water and most organic acids, whereas as the β -form has weak hydrogen bonds, it is soluble in most acids. The less known form is the γ -form having both antiparallel and parallel chains. Chitosan is a valuable form of chitin. It is formed by deacetylation of chitin or by replacement of the acetyl group by enzymatic or chemical hydrolysis. Chitosan-based biomaterials have properties like nontoxicity and are biodegradable in nature. Chitosan is a homopolymer of *N*-acetyl-D-glucosamine with less molecular weight and crystallinity than chitin. The structure of chitosan is identical to that of cellulose, except for the replacement of the hydroxyl group ($-\text{OH}$) at position C-2 by the amino group ($-\text{NH}_2$) in chitosan (Ahmed & Ikram, 2016, 2017).

Due to its unique physicochemical and biological properties, chitosan has found applications in the fields of biomedicine, food, cosmetics, wastewater treatment, extraction of metals from soil and water, food science, and agriculture. Chitosan is insoluble in aqueous solution, and this limits its applications. The functional group of chitosan allows modification to improve its unique properties. Chemical modification in the structure of chitosan produces derivatives of chitosan that are more compatible, less toxic, and biodegradable. Due to these modifications and because of their antimicrobial, antioxidant, and antitumor properties, chitosan-based biomaterials have found applications in drug delivery, tissue engineering, food packaging, and bioimaging (Ahmed & Ikram, 2017).

Biobased materials in tissue engineering

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Introduction

Recently, there is a drive toward search and exploration of bio-based materials for various wide end applications. The main aim of using biobased materials is to obtain an improved quality of life by limiting the different ill-effects caused by some conventional therapies. Biologically friendly materials are occupying the mainstream end-uses, altering the available materials in the 21st-century and their use in different research objectives. Due to the increase in consciousness and the heavy demands of the health management sector, engineering new materials is said to be one of the effective solutions to mitigate the adverse effects caused by conventional practices. Such types of materials are a motivating cause for scientists belonging to this field; they also offer various effective chances for enhancing our standard of living (Nair & Laurencin, 2007). Various researchers have reported large numbers of new materials based on polyhydroxyalkanoates, chitin, and alginate. These biobased materials are biologically compatible, nontoxic, and nonimmunogenic in nature. Their biocompatibility aids in the development of the extracellular matrix, and they are utilized for the development of various tissues like the cartilage, bone, and skin (Annu, Ahmed, Nirala, Kumar, & Ikram, 2021; Edgar et al., 2016; Yalcin & Ahmed, 2021). Furthermore, developing biobased materials is a complicated manufacturing process when compared to developing synthetic materials. Natural materials exhibit poor mechanical properties and deteriorate as time passes. Therefore, to overcome this problem, scientists are using a combination of biomaterials and synthetic materials to upgrade the mechanical structure, stability, and degradability of the materials for certain applications (Radhakrishnan, Jose, & Kurup, 2015). Besides these disadvantages, natural polymers are largely utilized in tissue engineering prospects, given that they are derived from natural sources, and also give rise to enhanced differentiation of cells and offer cells with flexible nature. In the construction of scaffolds, some requirements of biobased materials include adhesion of cells, interaction with cells, mechanical support, and microstructures that will allow the exchange of major factors for the survival of cells. Such requirements make biomaterials an outstanding candidate for developing tissue-based engineering structures.

Tissue engineering and regenerative medicine are part of the biomedical field with a heavy impact on health-care issues. They incorporate principles like biotechnology, mechanics, cell biology,

Chitosan biobased materials
in textile industry

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Introduction

Increase in industrialization and unhealthy agricultural activities led to further enhances in the severe water, air, and soil pollution. To overcome from these environmental problems, it is necessary to develop adsorbents or filtration materials which halted or diminished the level of hazardous gases, metals, pesticides, organic wastes, etc. It is also necessary to develop such an adsorbent materials which must be biocompatible, environment-friendly, biodegradable, cheaper, and easily available. In those criteria, biopolymer-based composite materials are widely used for preparation of water treatment and adsorbent materials. Among those biopolymers, ionic natured biopolymers widely applied as adsorbents due to their ionic nature, they can selectively remove hazardous wastes from water. In those ionic biopolymers, Chitosan is well-known biopolymer due to its cationic nature in acidic medium. Additionally, chitosan can be easily modified with different kinds of organic compounds to monomers which further led to increase its applicability in different fields of science (Ahmed, Annu, & Ikram, 2017).

From the past decades, chitosan has gained tremendous attention as a very promising material in almost every field of sciences whether it is electronics, biomedical sciences, wastewater treatment or textile industries. Owing to its superior absorption capacities of various polluting matters from water, including organic water-soluble agents like phenols, pesticides, herbicides, dyes, heavy metals, etc. Research studies deduced that chitosan-based materials shown excellent adsorption capability toward herbicides and pesticides. Chemically modified cross-linked chitosan exhibits the pesticide adsorption as high as of 39.1 mg/g that is better than the grafted chitosan (35.4 mg/g) and pure chitosan (24.4 mg/g) (El Harmoudi et al., 2014). Various chitosan-based adsorbents are developed for the removal of dye molecules from wastewater. Chitosan films and scaffolds are suitable for the removal of food colors from water (Esquerdo, Cadaval, Dotto, & Pinto, 2014). Chitosan-enhanced ultrafiltration is very successful

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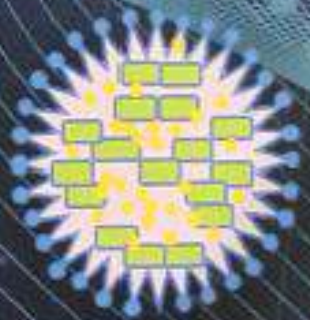
Introduction

The materials industry provides inputs for textiles, furniture, automotive, and many other important consumer products. Biobased products are used in many applications in various fields and attract the attention of researchers. In recent years, the use of biobased polymers especially in the consumer-packaged goods (CPG), aerospace and automotive industries in the form of bulk materials, matrices, and adhesives have been expanding rapidly (Bachmann et al., 2021; Cavalcanti et al., 2021; Kreibich & Marcantonio, 2006). The CPG market relies heavily on the packaging (Theagarajan, Krishnamoorthy, Moses, Anandharamakrishnan, & Ahmed, 2021). Now a days, researchers are exploring bionanocomposite materials to be used in food packaging (Banerjee, Bairagi, Wazed Ali, Ahmed, & Ahmed, 2022) which can be an alternative to the conventional packaging (El Bourakadi et al., 2022). Packaging of products allows them to reach consumers undisturbed and intact. Packaging also contributes to extending the shelf life of meat and food products, delaying mold formation and reducing waste (Salwa, Sapuan, Mastura, Zuhri, & Ilyas, 2021). The transportation of a product without a suitable packaging design may cause damage to the product. Depending on the characteristics of the product to be transported, the raw material used in the design and construction of the packaging varies. This ensures the correct handling of the product, extending its shelf life, or preventing damage from biological/chemical hazards. Today, glassware, metals (such as aluminum, foil, and tin), paper, and cardboard are used to package traditional food products (Salwa et al., 2021). By utilizing the functional properties of the raw material of the packaging, different materials are usually combined to form food packages for the product. Petroleum-based materials used in disposable food packaging pose a serious global environmental problem because they do not degrade in nature for many years. An important feature of the products used in the packaging of foods is that they have moisture and gas barrier properties. This is extremely important in terms of prolonging the shelf life of the product. Today, the use of plastic packaging is widespread due to its flexibility in various applications and forms. In a report on the

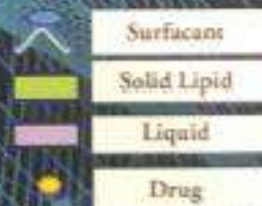
Handbook of Nanotechnology in Nutraceuticals



Solid lipid nanoparticle



Nanostructure lipid carrier



Edited by

Shakeel Ahmed • Tanima Bhattacharya
Annu • Akbar Ali

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12 Applications of Nanotechnology-Based Approaches for Targeted Delivery of Nutraceuticals

Hitesh Chopra, Shivani Sharma, Saba Yousaf,
Rahat Naseer, Shakeel Ahmed, and Atif Amin Baig*

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12.1 INTRODUCTION

Food, shelter, clothing, and medicine are the four essential components everyone needs to survive. People have known and utilized medications to manage diseases for thousands of years. An overall healthy diet is required in addition to medicines for the treatment of illness. Food is recognized as the primary source of nourishment for everyone. An essential biological activity, feeding, is responsible for sustaining normal physiological functions in the body (Panagiotou and Nielsen 2009). According to current research, food may be utilized as a medicine for illness prevention, treatment, and health promotion. This is where nutraceuticals originated (Subbiah 2007; Zelig and Rigassio Radler 2012). Eating as a therapy offers many potential benefits. Food is a safer option than medicines. Food is regarded as a source of sustenance in nutraceutical products to regulate and alter physiological processes inside the human body.

Nutraceuticals are extensively utilized in modern therapeutic practice (Kour et al. 2022). The focus is usually on the active component that may be useful in medicine. A significant issue in assessing nutraceutical product quality (Costello and Coates 2001). Medicines, dietary supplements, and food components are examples of nutraceuticals today. Many nutraceutical products are now accessible on the market due to the idea that nutraceuticals are "natural and safe, and may prevent illness, substitute prescription medications, and make up for a bad diet" (Pawar et al. 2013). The Dietary Supplements Office says ongoing nutraceutical research is essential to improving

14 Nano-Nutraceuticals and Oxidative Stress

Rahat Naseer, Sadia Nawaz, Muzna Munir,
Hitesh Chopra, Uday Younis Hussein Abdullah,
Shakeel Ahmed, and Atif Amin Baig*

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14.1 NUTRACEUTICALS

14.1.1 DEFINITION

Nutra means nutrient, and *ceutical* is a refined healing item or therapy suffix. Although this concept dates back to the prehistoric period, this proposed name was formally expressed by Stephen

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15 Nano-Nutraceuticals for the Treatment of Cancer

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Zoya Laisal Muniba Khaliq, Aiza Talat,
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Uday Younis Hussein Abdullah, Shakeel Ahmed
and Atif Amin Baig**

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15.1 INTRODUCTION

Nutraceuticals are an emerging subject in the realm of the life sciences. The term was created in 1989 by Stephen L. DeFelice, founder of the Foundation of Innovation Medicine (Kalra Ekta 2003). It is a combination of two words: nutrition + medicines. According to Hippocrates (a Greek physician who was the founder of medicine), “let food be your medicine”; prevention is the prime focus behind the concept of nutraceuticals. One of the most appealing research areas is their application in human nutrition, which has far-reaching consequences for users, professionals of health

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6 Nano-Nutraceuticals in Neurodegenerative Disorders

Wardah Ali, Zirwah Tahir, Uday Younis Hussain Alshillali, Shakeel Ahmed, and Atif Amin Baig

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16.1 NEURODEGENERATIVE DISORDERS

Neurodegenerative disorders are considered one of the significant healthcare issues worldwide. Multiple factors, such as current lifestyle changes in combination with a nutrient-deficient diet, have drastically increased the risk for these disorders. Globally, the healthcare and financial burden is deeply rooted in society. Specialized treatment with significantly fewer side effects against distinct disorders has been provided by multiple researchers. In Western countries, 3.1% of the population aged 70–79 years suffer from neurodegenerative disorders. Widespread neurodegenerative disorders exist today, such as Lewy body disease, Huntington's disease (HD), spinal muscular atrophy, Parkinson's disease (PD), amyotrophic lateral sclerosis (ALS), Alzheimer's disease (AD), etc. The detailed molecular basis of occurrence and detection of all these neurodegenerative disorders will be discussed in the following (Bungau and Popa, 2015; Rashida et al., 2020).

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A CASE STUDY OF ENVIRONMENTAL EDUCATION'S ROLE IN BIODIVERSITY CONSERVATION



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❖ ABSTRACT:

Biodiversity is the term used to describe the diversity and variability of life on Earth. It is a measure of genetic variation, species diversity, and ecosystem diversity. Biodiversity, in all of its forms, is under threat. Education and awareness is one method for making people aware of the importance of biodiversity. The study found that, environmental education, especially raising people's awareness of the need to conserve biodiversity, is essential for doing so. In the study undertaken, the public's understanding of biodiversity conservation, however, is found to be insufficient or too limited to inspire them to implement biodiversity conservation practices into their daily routines. In addition, promoting early education on biodiversity conservation might help people become more conscientious as people of all ages and social classes can learn about the values, motivations, abilities, and responsibilities associated with sustaining the environment's quality and human health through education.


Keywords: biodiversity conservation, environmental education, anthropogenic activities.

worldwide. According to the findings of the study, the purity of air and water has improved during the pandemic period when compared to the period prior to the outbreak of the COVID-19 virus. Waste generated by self-quarantine houses, hospitals, and people's self-hygiene practices has had a massive impact on the environment and the waste management sector. This article suggests that waste treatment methodologies must be improved, along with a policy framework in the event of such types of pandemic in the near future.

Keywords: Environment, COVID-19, Lock down, Pollution, Biomedical

◆ INTRODUCTION:

The Corona virus (COVID-19) outbreak first emerged in late December 2019 and within weeks the World Health Organization declared it an international public health emergency (WHO, 2020). COVID-19 is an infectious disease caused by coronavirus-2 that causes severe acute respiratory syndrome. Although its intermediate origin and human-to-human transmission are still unclear, the potential for rapid human-to-human transmission of this virus has been identified (Hui et al., 2020). Transmission of the virus mainly occurs from person to person through direct contact or through droplets produce by coughing, sneezing and talking (Wang et al., 2020). As of 6 September 2020, the virus has spread to 116 countries, with a mortality rate of 876,616 out of a total of 16, 63,217 confirmed cases. Typically, symptoms of COVID-19 infection include fever, chills, cough, sore throat, shortness of breath, fatigue, nausea, vomiting, and diarrhea, followed by respiratory failure, and respiratory distress syndrome, acute respiratory failure and even death (Huang et al., 2020). The elderly, along with other underlying medical conditions, have a high risk of mortality. At the time of the outbreak of the disease, many domestic and international authorities and experts suggested the use of non-pharmaceutical measures such as wearing masks and gloves, washing hands with soap, frequently using disinfectant solution and maintaining social distance (Sajed and Amgain, 2020). To control the spread of the virus and reduce the death rate, the governments of most of the affected countries have begun restricting the movement of people and forcing them to quarantine.



The top half of the cover features a microscopic view of several COVID-19 virus particles. These particles are spherical with a textured surface and numerous small, protruding spikes. They are set against a light blue, slightly hazy background. A white and orange wavy line separates this image from the dark blue background below.

EFFECTS OF COVID-19 PANDEMIC

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ENVIRONMENTAL INTERPRETATION OF THE COVID-19 OUTBREAK



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❖ ABSTRACT:

The global Corona virus disease (COVID-19) outbreak has impacted every aspect of human life, including the physical world. Most of the countries responded by implementing social distancing policies and drastically reducing economic and other activities. This study presents and summarises the environmental perspective of the COVID-19 outbreak as documented in the literature for various countries



SCIENCE AND TECHNOLOGY
IN
SUSTAINABLE DEVELOPMENT



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Overview of Health and Environmental Sanitation in Poonch District of Jammu and Kashmir, India

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ABSTRACT

Dangerous synthetic substances depart to the climate by various normal and additionally anthropogenic exercises and may cause unfavourable impacts on human wellbeing and the climate. The expanded explosion of petroleum derivatives somewhat recently is liable for the dynamic change in the climatic organization. Air toxins, like Carbon monoxide (CO), Sulfur dioxide (SO₂), Nitrogen oxides (NO_x), unstable natural mixtures (VOCs), Ozone (O₃), heavy metals, and respirable particulate matter (PM_{2.5} and PM₁₀), vary in their substance organization, response properties, discharge, the season of disintegrating and capacity to diffuse in long or brief distances. Pollution has both intense and constant impacts on human health, influencing various frameworks and organs. It goes from minor upper respiratory bothering to ongoing respiratory and coronary illness, cellular breakdown in the lungs, intense respiratory contaminations in youngsters and constant bronchitis in grown-ups, irritating prior heart and lung sickness or asthmatic assaults. Furthermore, short-and long drag openings have likewise been connected with unfortunate mortality and diminished future. Pollution free Environment is the main expect of the strong life. The present study analyzed the status of Health and Environmental sanitation in the Poonch district of Jammu and Kashmir, India. Shortage of potable water and poor sanitation were found to be the major challenges faced by the people in the area. Poor environmental sanitation conditions in the area have resulted in the pollution of air, water, and soil besides posing a health risk to the local population. Various factors responsible for unhygienic conditions in the area were found to be the rural and tribal background of population, socio-economic status of people, superstitions, lack of awareness regarding sanitation, and availability of open areas for defecation and open dumping of garbage. This study also emphasized the sensitization of local people of the area on different aspects of health, hygiene, and environmental cleanliness.

KEYWORDS: Sanitation, Water, Facility, Households, Poonch.