PREFACE

Biopolymer is well-known as an organic polymer that is produced naturally by living organisms. One of the most advantages of biopolymers is that they are capable of biodegradation at accelerated rates, breaking down cleanly into simple molecules found in the environment, such as carbon dioxide, water or methane, under the enzymatic action of microorganisms under definite period of time. Biopolymers possess various applications like drug delivery, wound healing, surgical implants, tissue engineering, agriculture film, waste bags and as packaging material. Therefore efforts are adapted to develop environmentally benign and sustainable bio-strengthened composites for use in automotive, construction, packaging and medical fields.

Over the years biopolymer based composites from renewable sources have attracted attention due to environmental concerns and rapidly depleting conventional energy resources. The biopolymer which is a type of bioplastic derived from renewable sources such as polysaccharides, lipids and proteins, unlike plastics from fossil fuel. Biopolymers results in conservation of fossil fuel and also minimizes the carbon dioxide emission. Biopolymers has been recently discovered as newer prospects to develop eco-friendly composites to improve their recyclability, degradation and play an important role in the field of automotive, packaging, electrical and electronic sector for sustainable development. It is evident that the current edge of research is an era of biopolymers as the future developments in biodegradable and renewable materials will focus mainly to the scaling-up of low cost production and improvement of product properties. Biopolymers can be produced from various renewable resources which are rich in carbohydrates either by biotechnological fermentation or chemical synthesis.

The present book describes about the biopolymers: structure, performance and applications. Book contains 13 chapters where chapter 1 describes the general introduction of biopolymers while chapter 2 deals with the biopolymers and environmental perspective. Chapter 3 deals with surface nanostructuring of biopolymers for tissue engineering and chapter 4 describes the nanomaterials are emerging opportunity to make safe drinking water. Chapter 5 is based on microalgal engineering of biopolymers while chapter 6 contains the lignocellulosic biomass to obtain polyhydroxybutyrate as biopolymer under bio-refinery concept. Chapter 7 discusses mainly about the chitosan as a biomedical material: Properties and Applications and chapter 8 talks details about gum ghatti (*Anogeissus latifolia*), a proteinaceous edible biopolymer and its multifaceted biological applications. Chapter 9 describes the recent advances in bio-polymers for innovative food packaging while chapter 10

discusses the potential production of polyhydroxybutyrate from renewable feedstocks. Chapter 11 contains information about biopolymer Stabilization of Fly ash and Coal Mine Overburden for Erosion Resistance whereas chapter 12 describes in details about biopolymers: structure, features and applications. Finally, the last chapter 13 which summaries the biopolymers: recent trends and their applications.

The current book will be highly beneficial to the researchers working in the area of biopolymers, polymer chemistry, materials science, engineering, drug delivery, medicine, waste management, environmental science and waste water research. Book also covers about natural biopolymers, biotechnology, bio-composites and bioplastics for variety of environmental applications. The potential researchers working in the area will benefit from the fundamental concepts, advanced approaches and applications.

The book also provides a platform for all researchers to carry out biopolymer research mainly towards the structure, performance and application and also covers fundamental and background in the area. The book also covers recent advancement in the area and prospects about the future research and development of biopolymers.

Ajay Kumar Mishra, CM Hussain, SB Mishra
Editors