Preface

During the last few decades, there has been an escalating demand for clean, pollution-free environment and high urgency for minimising fossil fuel. It has led to an increasing demand for the development of high-performance cultured products from biological and renewable resources. Functional biopolymers and their respective composites as well as various other materials are one of the most suitable alternates to fulfil such alarming urgency. Biopolymers refer to the class of polymers having biological origin. These may be linear or cross-linked combinations of their respective monomer units. Biopolymers are generally classified into several categories depending on several factors such as (a) degradability (b) polymer backbone (c) monomers, etc. Biodegradable polymers are typical type of polymers which degrade or break down after their intended purpose and form by-products like environmental gases (CO_2, N_2), water, biomass and inorganic and organic salts. Non-biodegradable polymers are the substances that do not break down to a natural, environmental safe condition over time by biological processes. Depending on monomer, units like monosaccharide, amino acids, nucleotides, natural biopolymer are commonly classified into polysaccharides, proteins and nucleic acids. Biopolymers are currently being used as substitute to traditional synthetic materials because they are more sustainable, renewable and more importantly eco-friendly in nature. Furthermore, the functional materials prepared using biopolymers exhibit suitable properties such as high mechanical resistance, thermogravimetric, oxygen barrier, biodegradation and chemical resistance to name a few. In reality, there is not a single material which can achieve wide range of properties for which design of composites, in particular with biopolymers, is an attempt for substantial improvement of properties. The biopolymers can also be functionalised for better compatibility during preparation of composites and other materials.

In this book, different types of biopolymers and their functional materials are presented along with some critical issues, advantages and disadvantages. The prime aim and focus of this book is to present recent advances in the synthesis, processing and applications of *Functional Biopolymers* as new innovative sustainable materials. It reflects the recent theoretical advances and experimental results and open new avenues for researchers as well as readers working in the field of polymers and

sustainable materials. Different topics covered in this book include but are not limited to: Structural Analysis of Functional Biopolymers Based Materials; Nano-optical Biosensors; Functionalization of Tamarind Gum For Drug Delivery; Biopolymer Composite Materials With Antimicrobial Effects; Functional Biocomposites of Calcium Phosphate-Chitosan And Its Derivatives; Surface Properties Of Thermoplastic Starch Materials Reinforced With Natural Fillers; Functional Biopolymer Composites; Cellulose-Enabled Polylactic Acid (PLA) Nanocomposites; Epoxidized Vegetable Oils For Thermosetting Resins; Philosophical Study on Composites; Smart Materials For Biomedical Applications and Emulgels for Drug Delivery.

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