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Bioplastics for Sustainable Development

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Dedicated to our beloved supervisors . . .

Preface

Plastics are unquestionably the world's most versatile polymer that can be turned into anything and everything for human benefit at a very low cost. But to tackle the pollution generated from discarded plastics is very difficult. Whole marine and soil ecosystems are literally drowning in plastics. The worst part of these polymers is that they are synthesized from expensive and nonrenewable resources and oil and petroleum products. Therefore, there is a requirement for materials that are degradable, recyclable, and eco-friendly. This brings the picture of bioplastics to the world that are synthesized from natural materials. Bioplastics are synthesized by many microbes and accumulated inside the cells under stress conditions as a storage material. Microbial enzymes also play a crucial role in their degradation.

Ironically, all bioplastics do not show the same fate and leave toxic residues or plastic fragments behind that are unsuitable for composting. Bioplastic waste makes a difference to the environment only when they are buried in landfills. Moreover, some require industrial composting facilities to break down and the majority do not have access to this. When these wastes are not left in landfills to degrade, then these are incinerated and thereby give similar environmental impact as conventional plastics do. These "green" plastics, which are supposed to be a great alternative as a replacement, in fact are not better for the environment also increase the level of pollution on land and in water. So, there are benefits and drawbacks of these bioplastics at the same time. Now, it is up to the producer and consumer to decide how they deal with this significant but controversial issue.

This book will be a comprehensive reference in the most progressive field of bioplastics and will be of interest to professionals, scientists, and academics related to biotechnology and polymer science. This book covers 23 chapters that provide an updated knowledge of bioplastics and biodegradable plastics which is currently a burning topic for today's need. It will clarify the accurate difference between biodegradable, recyclable, and bioplastics that are actually the same for a common man. The chapters highlight the potential impact of bioplastics and its significant applications in various medical and biotechnological sectors. Alternate cheap substrates like agro-wastes and fruit waste are also explored for the production of these biopolymers. Other chapters explain the novel source and technologies adopted for the production of bioplastics, which are continuously added to the literature reports day by day. Some chapters also discuss the role of these bioplastics

in food packaging, agricultural and horticultural applications, also in bioremediation. These chapters also present future perspectives for the development of specific and more active polymers for sustainable environment.

In conclusion, this book is an updated reference in the most progressive field of bioplastic polymer that will be useful for professionals, scientists, and academics related to this field. Last but not least, we would like to express our deepest sense of gratitude and regards to our family for their love and moral support, which helped us to complete this comprehensive book. We would also like to thank all the authors who have eagerly contributed their chapters to this book. Finally, we also express our sincere gratitude to Springer for providing us this opportunity.

Hail, Saudi Arabia — Mohammed Kuddus
Lucknow, Uttar Pradesh, India — Roohi
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