
Preface

Human beings are an integral part of the environment. Biological activities have a strong influence on physical and chemical components of the ecosystem. Plants are the major contributors as producers of bioproducts, to be used by animals and microbes. In the animal kingdom, human beings are the most aggressive consumers, and their needs are increasing geometrically with time. Unlike animals, human needs extend beyond food and shelter. The innovative nature of man has led to discoveries and inventions, which apparently are for the benefit of human beings. However, these developments are a big drain on the available natural resources with a cascade effect. At the base of this chain reaction, the most adversely affected is the energy sector. The demand for energy is increasing rapidly because of the needs and attitudes of humans, who are thus transforming to a society of high-end consumers. Since fossil fuels are the major source of energy, their consumption is the root cause of irreparable damage to the environment. Another factor which adds to the ever-increasing environmental pollution is the unmanageable quantities of wastes. The conventional means of disposal of wastes and waste waters, adopted in most parts of the world, pollutes the land, atmosphere, and the water bodies. Here, we may need to approach the most efficient organisms on the planet Earth. These efficient organisms are the microbes, which can metabolize organic matter content of the biowastes, especially those produced due to human activities. These bioproducts are eco-friendly, biodegradable, and highly energy efficient. Microbes can be exploited as factories for producing energy (biofuels), biopolymers (bioplastics), and bioactive molecules (antimicrobial, anticancer, antidiabetic, antioxidants, etc.). There has been a vigorous scientific pursuit to exploit microbes for the welfare of human beings. The most exciting are the possibilities of generating clean fuels (biohydrogen, biodiesel, etc.) and biodegradable plastics as an alternative to nondegradable plastics. Apart from these, the most curiosity-driven activities have been to learn about those microbes which are yet to be cultured. During the last 2–3 decades, many scientific activities have been demonstrated and published in scientific journals of repute; however, it is yet to reach the curious young minds – the graduate and postgraduate students – of our future scientists. This compilation, contributed by the experts in these research domains, speaks a lot about the present status of microbial factories and their future potential for the welfare of human beings. In principle, experts exist in all domains; however, most of the times, they are too busy in their pursuits to spare time for such activities. The young, curious, and tender

minds are eager to learn, but those who know what and how to say do not get the right platform and access. I am extremely thankful to all those who readily agreed to share their expertise for the *Ignited Minds*, to whom the book is dedicated. Although it is impossible to acknowledge the reality and true worth of the efforts of the contributing authors, however, I am still indebted to their prompt responses and dedicated efforts. My inspiration to learn well and transmit the knowledge to the next generation burgeons from the tireless efforts and constant support of my close ones – Mrs. Kanta Kalia and Mr. R.B. Kalia (parents); Amita (wife); Sunita and Sangeeta (sisters); Ravi, Vinod, and Satyendra (brothers); Daksh and Bhriugu (sons); and my teachers and friends Rup, Hemant, Yogendra, Rakesh, Atya, Jyoti, Malabika, Neeru, and Ritushree – to write this book. I must also acknowledge the selfless and dedicated support of my next-generation colleagues – Prasun, Sanjay, Subhasree, Shikha, Anjali, and Jyotsana.

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