Preface

Fungi, the second largest group of organisms after insects, are estimated to be about 1.5 million in number including those that are in various culture collections. Fungi grow and proliferate in soil, water (both fresh water and marine), and also in mangrove environments. They also grow on various other substrates and in different environments and, therefore, fungi are said to be of ubiquitous and cosmopolitan in nature. Some fungi also grow in or on the plants and animals as parasites, symbionts or as mutualists. These organisms have been in association with human beings since times immemorial. They have both good and bad effects on our lives. Fungi serve as a rich source of food, are a source of a variety of useful chemicals including many antibiotics, are used to make bread, variety of beverages and so on. With the advancement and development of science we have got many things like penicillin and cyclosporine from these fascinating but bewildering organisms. On the other hand they cause many diseases in plants, animals and human beings.

This book presents some aspects of fungi which have helped us to use them for human welfare. The book contains 17 Chapters covering some of the important new applications of these organisms in medicine, agriculture, industry, etc. Endophytic fungi produce secondary metabolites that are proving to be of great value for pharmaceutical applications directly or indirectly, hence the endophyes and their uses have been dealt with in the book. The importance of secondary metabolites as source of antifungal, antibacterial, antiviral, and antimycobacterial compounds cannot be ignored. Therefore, wider and deeper search for fungi for such compounds is needed. This aspect has been elaborated in different chapters. More so, there are still many silent genes or gene clusters in fungi that can be harnessed for the production of secondary metabolites, hence genetic engineering is now playing a greater role to get compounds from fungi which are not yet known to us. Statins, the cholesterol-lowering agents that are saving millions of lives worldwide, have been briefly dealt in one of the chapters. How thermophilic fungi are being used for getting variety of useful compounds and how their application can help us in solving energy crisis have been discussed. Some secondary metabolites of fungi are quite toxic—the mycotoxins. These are being given very serious attention worldwide to study their effect on the commodity and the consumers. This aspect is covered in two separate chapters that deal with mycotoxins. Besides describing the nutritive value of some important mushrooms and wood-inhabiting fungi, and their applied aspects, strategies

for the management of pathogenic fungi of rice and soybean have also been dealt with in two separate chapters. And, how the volatile organic compounds of fungi can be applied to arrest the other undesired fungal forms has been elaborated. In recent years, the nano-particles and their applications have attracted wider attention; therefore, a chapter is devoted to describe the green synthesis of nano-particles using fungal system.

The editors are indebted to all the contributors for their efforts in preparing and providing the chapters for the book.

Dr. S.K. Deshmukh is grateful to Dr. R.K. Pachauri, Director General and to Dr. Alok Adholeya, Senior Director, The Energy and Resources Institute, New Delhi for their encouragement. He also acknowledges the academic support of Dr. B.N. Ganguli, Emeritus Scientist (CSIR) and Chair Professor of the Agharkar Research Institute, Pune, India. Dr. J.K. Misra expresses his gratefulness to Justice V.K. Mehrotra, the Chairman and to Brig. R.N. Misra, the Secretary of the Management of the college for providing all encouragements and support. Dr. Rachna Mishra, Principal of the college also deserves thanks for all the help she rendered to Dr. Misra. Dr. Tamás Papp is grateful for the grants TÉT_12_DE-1-2013-0009 and OTKA NN 106394.

S.K. Deshmukh
J.K. Misra
J.P. Tewari
Tamás Papp