



Trends in Biological Research: Applications and Significances



Editors:

Dr. M. Salman Khan

Dr. Uzma Afaq

Dr. Arshi Siddiqui



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PREFACE

Trends in Biological Research: Applications and Significances provides discussions on diverse research topics and methods in the biological sciences in a single platform. This book delivers the latest technologies, advanced methods, and untapped research areas involved in miscellaneous fields of biological sciences such as bioinformatics, proteomics, microbiology, medicinal chemistry, and marine science. Each chapter is written by renowned researchers in their respective fields of biosciences and includes future advancements in life science research.

Bioactive compounds play a central role for the development of high-value product in the field of medicinal industry. Bioactive compounds have been identified from diverse sources for their therapeutic benefits, nutritional value and protective effects in human and animal healthcare system. The orderly study of biologically active products and the exploration of potential biological activities of these secondary metabolites, including their clinical applications, standardization, quality control, mode of action and potential biomolecular interactions, have emerged as one of the most exciting developments in modern natural medicine.

The book entitled ***“Trends in Biological Research: Applications and Significances”*** describes the current stage of knowledge on the production and uses of bioactive compounds from microbial, algal and plant sources. In addition, the molecular approach for screening bioactive compounds as well as applications of these compounds on

human health is also discussed. Moreover, the book reviews synthetic approaches, as well as selected bioactivities and biotechnological and biomedical potential. An overview of the usage of bioactive compounds as antioxidants, anti-inflammatory and anti-allergenic agents, as well as in stem cell research is also presented, along with an overview of the medicinal applications of plant-derived compounds.

The present book would cater to the needs of undergraduate and postgraduate students and researchers who are keen to explore the potential role of bioactive natural compounds to treat various diseases. This book is sure to be a welcomed reference for all who work on bioactive compounds, new product development and nutritional science, etc.

Lucknow

May, 2022

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Chapter- 02

Application and Perspective of Plant Growth Promoting Microbes in Development of Sustainable Agriculture

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Summary

Microbial communities in natural soil environments exhibit a cooperative link with crop productivity *via*. Plant Growth Promoting Microbes (PGPMs). One particular group of microbes known as Plant Growth Promoting Rhizobacteria (PGPR) is capable of alleviating the effects of biotic and abiotic stress factors either directly or indirectly. The PGPR injections have emerged as a beneficial tool for environmental sustainability as these are efficient in increasing seedling growth matrices as well as against certain plant infections that too with minimum usage of toxic pesticides. Plant Growth Promoting Bacteria (PGPB) have the ability to chelate iron, phosphate solubilization, creation of ACC deaminase enzyme under saline stress, generation of phytohormones and many others. This enormous potential makes them a truly unique microbiological candidate for bioinoculants, capable of promoting plant growth under both favourable and adverse situation. Sulfur, nitrogen and carbon cycles are only a few examples of the