



Potent Biotechnological Applications of Psychrozymes

18

Burhan Hamid

Abstract

Psychrophilic yeasts possess the ability to live in extreme environmental condition (i.e. low temperature). This property makes them more valuable and more significant as they are adapted to these harsh conditions. It is well-known that major area of the earth is covered with cold environments. Psychrophilic yeasts are molecularly adapted to these cold conditions; due to these reasons researchers are getting attracted towards exploring adaptability of psychrophilic yeasts. Psychrophilic yeasts are capable of producing extremozymes having utmost stability and activity at low temperatures. Psychrozymes produced by psychrophilic yeasts show maximal activity at lower temperatures, they are having potential application in different fields. Psychrophilic enzymes produced by yeasts have proven to be economically feasible at industrial level and also keep process contamination free. These enzymes possess utility in different industries like food, pharmaceutical, detergent, leather, textile, biomedical, brewing for multiple low temperature process. The few potential enzymes secreted by psychrophilic yeasts are amylases, proteases, pectinases, lipases, lactases, etc., they are known as a valuable tool for various biotechnological processes. Climate change has directly or indirectly influenced the diversity of psychrophilic microorganisms including yeasts. Global warming leads to the negative impact on the habitats of cold-loving microorganisms and that is a matter of concern for researchers. In this chapter, industrial and biotechnological aspect of psychrophilic yeasts and their cold-active enzymes are reviewed and discussed. The focus has been given to their application in different sectors like food, pharmaceutical, detergent, leather, textile, biomedical, molecular, brewing, waste management.

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349

CHAPTER 14

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Nanoremediation: A Sustainable Reclamation Method for Future Deployment

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ABSTRACT

Nanotechnology has fascinated scientists and researchers for exploitation of unparalleled biological, physical, and chemical characteristics of nanoparticles. Nano-formed compounds are developed for utilization in a diverse number of fields from medicine to the space exploration. Because of high surface area to volume ratio, size-dependent attributes and high reactivity,

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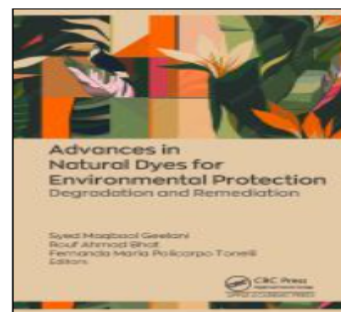
Non Commercial Use

Advances in Natural Dyes for Environmental Protection

Degradation and Remediation

Editors: Syed Maqbool Geelani, PhD
Rouf Ahmad Bhat, PhD
Fernanda Maria Policarpo Tonelli, PhD

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REVIEWS

“The most important aspects regarding textile pollution caused by dyes, its remediation, natural dyes as sustainable alternative to synthetic ones, challenges, and the market for the field are covered. . . . Comprehensive and up to date. The editors deserve to be complimented for their sincere

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13. The Global Scenario for the Management of Dyes: Recent Advances in Natural and Man-Made Dyes
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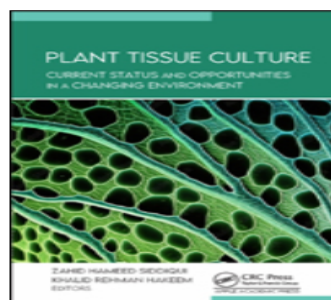
Index

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Plant Tissue Culture Current Status and Opportunities in a Changing Environment

Editors: Zahid Hameed Siddiqui, PhD
Khalid Rehman Hakeem, PhD

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Plants are sessile and constantly exposed to changing environmental conditions. Seasonal cues govern plant growth, development, and reproduction. In this era of climate change, the environment is unstable and takes a toll on the productivity of plants. This new book, **Plant Tissue Culture: Current Status and Opportunities in a Changing Environment**, explores this unique area of

This book will prove beneficial for plant biotechnologists, environmentalists, ecologists, and scientists in enhancing their understanding of the complexities of climate change under in vitro conditions.

CONTENTS:

Preface

1. History of Plant Tissue Culture

Yogesh Chandrakant Suryawanshi

2. Recent Advances and Future Status of Plant Tissue Culture

Komal Shoukat, Muhammad Mahrn Aslam, Zarrin Fatima Rizvi, Nazir Ahmed, Saman Zulfiqar, Iram Naz Sherazi, Javaria Fazal, Aniq Bashir, Sajjad Hyder, Samiya Rehman, and Jawad Ali

3. Application of Synthetic Seeds and Somatic Embryogenesis in Changing Climate Conditions

Irfan Bashir Ganie, Zishan Ahmad, and Anwar Shahzad

4. Influence of Phytohormones in Plant Tissue Culture

Zarrin Fatima Rizvi, Wajiha Sarfraz, Muhammad Mahrn Aslam, and Niaz Hussain Khohro

5. Asymbiotic Seed Germination and Micropropagation of Some Orchids of West Bengal, India

Soumi Bhattacharyya, Anindya Sundar Ray, Nirmalya Banerjee, and Chowdhury Habibur Rahman

6. Plant Tissue Culture and Its Role in Plant Breeding Programs

Zahara Sultan, Najeebul Tarfeen, Burhan Hamid, Zaffar Bashir, and Tufail Ahmad Bhat

7. Generation of Composite Cowpea Plants Expressing a STOP1 Transcription Factor

Md. Ramiz Raza

8. The Role of Tissue Culture and Endophytes in Plant Secondary Metabolites Synthesis in Changing Environmental Conditions

Sabaha Tabassum, Zishan Ahmad, Anwar Shahzad, Adila Wajid, and Muthusamy



Burhan Hamid and Fayaz A. Mohiddin

Abstract

Microorganisms living in extreme environmental conditions (extremophiles) are potential source of extremozymes; they possess utmost stability under extreme environmental conditions. Cold-active enzymes are extremozymes produced by the psychrophiles (extremophiles) and have attracted much attention as biocatalysts due to their capacity to resist unfavourable reaction conditions in the industrial process. Cold-active enzymes possess wide applications in the food industry; these enzymes are not only secreted by bacteria but also from yeasts and moulds. Although enzymes are derived from plant and animal sources, cold-active microbial enzymes have taken advantage, due to their productivity and thermostability. Psychrophilic microorganisms produce a wide range of cold-active enzymes with immune application in food processing. The use of β -galactosidase for the removal of lactose from refrigerated milk, application of pectinase for the reduction of viscosity and turbidity in chilled juice and use of amylase for hydrolysis of polysaccharides in starch processing industries and processing of meat with the help of cold-active proteases are the representative examples of application of cold-active enzymes. Cold-active enzymes possess exceptional molecular flexibility that has opened up newer areas of applications. In food processing industries, cold-active pectinases have been used for the removal of pectin which is important in fruit juice and wine processing, coffee and tea processing and macerating of plants and vegetable tissue, for degumming of plant fibres, for extracting vegetable oils and for adding poultry feed and in the alcoholic beverages. To fulfil the demand of industries, enzyme technology needs extension of biotechnological approach in terms of both quality and quantity. The potential of cold-active enzymes provides numerous opportunities for industrial

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383



Harnessing Soil Rhizobacteria for Improving Drought Resilience in Legumes

8

Parvaze A. Sofi, Zahoor A. Baba, Burhan Hamid,
and Ram Swaroop Meena

Contents

8.1	Introduction.....	237
8.2	Agricultural Importance of Legumes.....	238
8.2.1	Global Context: Rationale for Sustainable Intensification of Legumes in Cropping Systems.....	240
8.3	Implications of Drought Stress on Legumes.....	249
8.3.1	Implication of Water Stress on N-Fixation.....	250
8.4	Association of Legumes with Soil Rhizobacteria.....	251
8.5	Soil Rhizobacteria in Relation to Drought Stress Amelioration.....	254
8.6	Breeding Perspectives of Harnessing Soil Rhizobacteria.....	258
8.6.1	Selection for Differential Genotypic Response to Rhizobacterial Inoculation.....	259
8.6.2	Selection for Competitive Rhizobacterial Strains.....	261
8.6.3	Identification of Adaptive Crop-Microbial Associations.....	263
8.6.4	Genetic Modification of Rhizobacteria.....	263
8.7	Conclusion.....	263
8.8	Future Prospective.....	264
	References.....	265

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