Computational Biology for Stem Cell Research
2024, Pages 303-318

Chapter 22 - Bioinformatics approaches to the understanding of Notch signaling in the biology of stem cells

Achala Anand [1], N.S. Amanda Thilakarathna [1], B. Suresh Pakala [2], Ahalya N. [3], Prashanthi Karyala [1], Vivek Kumar [4 6], B.S. Dwarakanath [5]

https://doi.org/10.1016/B978-0-443-13222-3.00014-9
Get rights and content

Abstract

Notch is highly conserved signaling pathway throughout the evolution, which regulates tissue homeostasis in wide range of adult tissues as well as many aspects of embryonic development. Moreover, it plays a crucial role in the progression of numerous disease processes, including cancer during the carcinogenesis associated with cancer stem cells, as well as cancer progression and response to therapies. Our knowledge of the molecular characteristics of Notch signaling and pathways has substantially improved with the rise and development of accurate and reliable mass data collection tools. However, these technological developments have also made it more challenging to accurately analyze and interpret these ever-expanding datasets. Fortunately, the field of bioinformatics has evolved along with technologies, enabling the development of biological databases. These databases have offered a condensed resource of organized information that is easy to comprehend and retrieve. This has led to the development of theoretical models of information flow of Notch signal transduction from transmembrane receptor systems to physiological and pharmacological outcomes. In this chapter, we discuss the contribution of various bioinformatics and computational tools to the understanding of Notch signaling in the stem cells biology. Moreover, we also give a brief insight into how this knowledge has influenced the development of various diagnostic tools and therapeutic compounds targeting Notch signaling in malignancies.

ScienceDirect

Nanotechnology to Monitor, Remedy, and Prevent Pollution

Micro and Nano Technologies

2024, Pages 439-451

Chapter 18 - Nanotechnology for removal of personal care products and related compounds

Ramya Kumari Balakuntahalli Sakappa [1 2], Sikandar I. Mulla [1], Basheerabegum Faniband [3], Dilshad Begum Golgeri M. [1 4], Luiz Fernando Romanholo Ferreira [5], Abbas Rahdar [6], Ram Naresh Bhargava [7], Juliana Heloisa Pinê Américo-Pinheiro [8 9], Paul Olusegun Bankole [10]

Show more

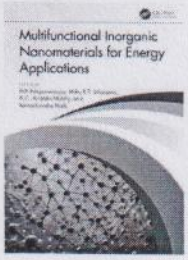
https://doi.org/10.1016/B978-0-443-15660-1.00017-4

Get rights and content

Abstract

In the current scenario, the pharmaceuticals and personal care items (PPCPs), including cosmetics and toiletries, cause pollution in various water bodies. In fact, it was found that extremely small amounts of these chemicals have negative effects on the environmental surroundings especially on living organisms. To understand the level of such problem(s), around the world, numerous research investigations have been conducted and reported on occurrence, effects, destiny, and removal processes of pharmaceutical compounds, personal care products (cosmetics and toiletries), natural water (all type water including lake, river, and sea), and wastewater produced by industries. The accidental existence of such useful chemicals (PPCPs) in various aquatic streams at lower concentrations capable of damaging aquatic creatures have observed more and more since last two decades. This has become a significant problem towards various organisms due to widespread and expanding use of PPCPs by human and also in veterinary medicine which eventually releases these chemicals into the environment. Hence, some of these chemicals listed as priority contaminants by the European Union and the US Environmental Protection Agency. Different research group have made a strategy to tackle this kind of problem. Here, this chapter discusses toxic effect and their removal using different methods. The chapter will provide information which is helpful to environmental engineering streams.

Chapter



Sustainable Approach in the Treatment of Industrial Dyes Based on Inorganic Nanomaterials

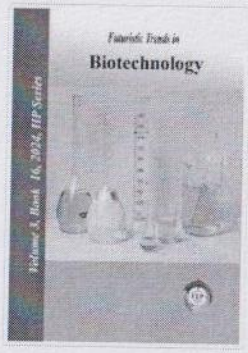
By N.G.R.H.R. Senevirathne (/search?contributorName=N.G.R.H.R. Senevirathne&contributorRole=author&redirectFromPDP=true&context=ubx), M. Dilshad Begum Golgeri (/search?contributorName=M. Dilshad Begum Golgeri&contributorRole=author&redirectFromPDP=true&context=ubx), Soumya V. Menon (/search?contributorName=Soumya V. Menon&contributorRole=author&redirectFromPDP=true&context=ubx), Asha Kademane (/search?contributorName=Asha Kademane&contributorRole=author&redirectFromPDP=true&context=ubx), Yashwanth Narayan (/search?contributorName=Yashwanth Narayan&contributorRole=author&redirectFromPDP=true&context=ubx), K.M. Nikhileshwar (/search?contributorName=K.M. Nikhileshwar&contributorRole=author&redirectFromPDP=true&context=ubx)

Book Multifunctional Inorganic Nanomaterials for Energy Applications (https://www.taylorfrancis.com/books/mono/10.1201/9781003479239/multifunctional-inorganic-nanomaterials-energy-applications?refId=ef2da5a3-43b7-4b8c-95b3-c85cb7c47f52&context=ubx)

Edition	1st Edition
First Published	2024
Imprint	CRC Press
Pages	24
eBook ISBN	9781003479239

ABSTRACT

< Previous Chapter (chapters/edit/10.1201/9781003479239-21/prospective-study-different-types-valuable-biopolymers-biosensors-biomarkers-future-challenges-nishant-shekhar-ashlesha-kawale-arti-srivastava-manoj-kumar-bharty-pravat-swain?context=ubx)
Next Chapter > (chapters/edit/10.1201/9781003479239-23/employing-artificial-intelligence-driven-computational-approaches-devise-ground-breaking-inorganic-nanomaterials-subbulakshmi-padma-priya-soumya-menon-vinutha-reddy-priyanshi-roshan?context=ubx)



Futuristic Trends in Biotechnology Volume 3 Book 16

Buy Now

e - ISBN : 978-93-6252-520-8
Publisher : Iterative International Publishers (IIP), Selfypage Developers Pvt Ltd.
Volume : 3-2024

AIM & SCOPE

Biotechnology is one of the emerging fields that can add new and better application in a wide range of sectors like health care, service sector, agriculture, and processing industry to name some. This book will provide an excellent opportunity to focus on recent developments in the frontier areas of Biotechnology and establish new collaborations in these areas. The book will highlight multidisciplinary perspectives to interested biotechnologists, microbiologists, pharmaceutical experts, bioprocess engineers, agronomists, medical professionals, sustainability researchers and academicians. This technical publication will provide a platform for potential knowledge exhibition on recent trends, theories and practices in the field of Biotechnology.The content of the book is as follows

PART 1

Dr. Shellina Khan
Principal
Vidhyashram College of Pharmacy
Shikargarh, Jodhpur, Rajasthan, India.

Dr. Arvinder Pal Singh
Associate Professor
Department of Biosciences
Chandigarh University
Mohali, Punjab, India.

Dr. Ramesh Malothu
Professor
School of Biotechnology
JNT University Kakinada
Andhra Pradesh, India.

Dr. Erumalla Venkata Nagaraju
Associate Professor
Department of Biochemistry
Indian Academy Degree College (Autonomous)
Bangalore, Karnataka, India.

https://www.iipseries.org/view-pub-book.php?bookid=234&bookname=futuristic-trends-in-biotechnology-volume-3-book-16

VALORIZATION OF GRAPE WINERY WASTE FOR VALUE ADDITION IN THE WINE INDUSTRY

Abstract

Wine is the most celebrated beverage due to its property of promoting health benefits, producing polyphenols and non-flavonoid compounds. The possible ways of valorization of grape agro-waste into productive bioactive compounds are dependent on the type of waste material obtained. All liquid waste extracted during the process of pressing contains high amounts of antioxidants. Techniques like solvent-based and pressurized liquid-based extractions are eco-friendly. The most important wastes produced while wine production includes pomace (64%), stalk (15%), lees (12%), and water waste (10%). Most of these wastes are used to produce by-products like methane, oil, and polyphenols whilst others undergo composting and result in the formation of biofertilizers. The process of wine-making or vinification has been discussed elaborately in this article, followed by the wastes obtained and the various methodologies implemented to improve the waste product for capitalization. The applications of the newly formed products across all fields have also been discussed. This current review aimed to provide an overview of the extensive research done from 2005 to 2022 on the conversion of vinification by-products into high-value-added products. These value-added products can be used for commercialization in agrochemical, industrial, and nutraceutical arenas and for the minimization of the pernicious effects. These products otherwise would have caused detrimental effects on the environment and the economy of the consistently developing human population.

Authors

Ms. Swati Bhatt
Department of Life Sciences
Christ (Deemed to be University)
Bengaluru, Karnataka, India.
swati.bhatt@science.christuniversity.in

Ms. Akanksha Tarafdar
Department of Life Sciences
Christ (Deemed to be University)
Bengaluru, Karnataka, India.
akanksha.tarafdar@science.christuniversity.in

Ms. Vinanthi Rajalakshmi K S
Research Scholar, Department of Life Sciences
Christ (Deemed to be University)
Bengaluru, Karnataka, India.
vinanthi.rajalakshmi@res.christuniversity.in

Dr. Erumalla Venkata Nagaraju
Associate Professor, Department of Biochemistry
Indian Academy Degree College (Autonomous)
Bengaluru, Karnataka, India.
venkatanagarajue@gmail.com

Dr. Kuppusamy Alagesan Paari
Assistant Professor, Department of Life Sciences
Christ (Deemed to be University)
Bengaluru, Karnataka, India.
paari.ka@christuniversity.in

PATHOGENESIS AND CONVENTIONAL REMEDIATION FOR T2DM

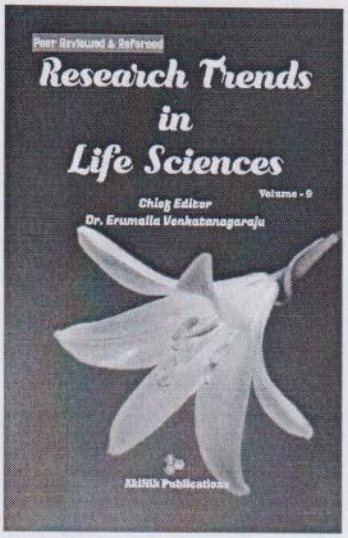
Abstract

Diabetes is a chronic metabolic disorder affecting greater than 400million people across the world. Type 2 Diabetes Mellitus (T2DM) is caused by two important factors such as defective insulin secretion by pancreatic β-cells of islets of Langerhans and the development of insulin resistance. Insulin resistance refers to when cells of the body including the muscle, liver and fat cells fail to respond to insulin eventhough adequate amount of insulin is secreted by β-cells. In fat cells, triglycerides are broken down to produce free fatty acids for energy; muscle cells are deprived of an energy source and liver cells fail to build up glycogen stores. To maintain glucose homeostasis, it is important to regulate the mechanism of insulin synthesis and release. Defects in the mechanisms results in metabolic imbalance which leads to the development of T2DM. It is characterized by chronic hyperglycaemia with disturbances of carbohydrate, fat and protein metabolism with its characteristic symptoms like thirst, polyuria, blurring of vision, weight loss and polyphagia. Present day survey states that there are 77 million people in India have Diabetes mellitus. Researchers disclosed that this statistical data will increase to 134 million by end of 2045 due to heredity and life style of the people. Ayurveda is a Science of life. Presently there is an ever-increasing demand for robust research work on traditional medicine to enhance the core competency of Ayurveda without compromising its fundamental principles. Since thousands of year's traditional Ayurvedic medicine has been used to treat various human diseases including diabetes. Many medicinal plants, natural products and food additives are potential treatments for diabetic control. Hence, this chapter is intended to observe the

Authors

Dr. Vanitha G Ramesh
Professor in Life Sciences
Department of Biotechnology
Indian Academy Degree College
Autonomous
Bengaluru, Karnataka, India
vanitha.genetics@iadc.ac.in

Haridev
Scholar in M.Sc. Applied Genetics
Indian Academy Degree College
Autonomous
Bengaluru, Karnataka, India



Research Trends in Life Sciences (Volume - 9)

₹ 726

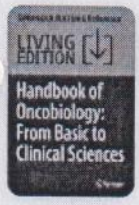
Chief Editor	:	Dr. Erumalla Venkata Nagaraju
Paperback ISBN	:	978-93-6135-876-0
Publisher	:	AkiNik Publications
Language	:	English
Pages	:	116
Publication Year	:	2024
Binding	:	Paperback
DOI	:	https://doi.org/10.22271/ed.book.2621

PRICE DETAILS

Advanced Therapeutic Approaches in Cancer Therapy

| Living reference work entry | First Online: 11 October 2023

| pp 1–26 | Cite this living reference work entry



Handbook of Oncobiology: From Basic to Clinical Sciences

Ranbir Chander Sobti ✉, Sunil Babu Gosipatala, Pushpa Reddy, Nivedita Bisht, Shruti R. Kuril, Kaja Madhuri, Gyan Chand, Tejinder Kaur & Manish Thakur

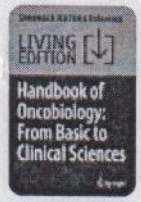
Abstract

Recent advancements in cancer research have led to improved methods for early detection, prognostic monitoring, and innovative therapeutic interventions, resulting in a reduction in overall mortality rates among cancer patients. The identification of crucial proteins, metabolites, and miRNAs that play a significant role in the regulation and proliferation of cancer cells has revolutionized the clinical approach to cancer treatment. The utilization of nucleotide sequencing, gene targeting/editing, cell and tissue engineering, and bioinformatics has provided novel perspectives in comprehending this multifaceted ailment. The promising treatment of various solid tumors and hematopoietic malignancies has been attributed to metabolic alterations and immune checkpoint inhibitors. This chapter presents a comprehensive survey of contemporary advancements in cancer treatment. These include innovative therapies such as gene editing, immunotherapy, and nanomedicine. The observed progressions have been attributed to a reduction in mortality rates and instill optimism for the eventual eradication of cancer.

Types of Cancers, Epidemiology, and Molecular Insights

| Living reference work entry | First Online: 10 October 2023

| pp 1–36 | Cite this living reference work entry



Handbook of Oncobiology: From Basic to Clinical Sciences

Ranbir Chander Sobti ✉, Sunil Babu Gosipatala, Monica Sharma, Pushpa Reddy, Raj Kumar Khalko, Tejinder Kaur & Manish Thakur

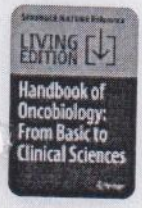
Abstract

This chapter takes the readers through a comprehensive journey through the multifaceted landscape of cancer with insights into the fundamental differences distinguishing normal cells from their malignant counterparts, exploring the intricate web of common and rare cancer types. The discussion then extends to the intricate relationship between epidemiology and etiology, unravelling the factors that shape cancer development across ages, genders, and lifestyles. Additionally, the discussion encompasses molecular insights, unearthing the mechanisms behind tumorigenesis, the fascinating world of cancer genomics, and the dynamic role of epigenetics and cancer stem cells.

Current Concepts and Advances in Oncobiology

| Living reference work entry | First Online: 30 September 2023

| pp 1–25 | Cite this living reference work entry



Handbook of Oncobiology: From Basic to Clinical Sciences

Sunil Babu Gosipatala ✉, Pushpa Reddy, Raj Kumar Khalko, Nivedita Bisht, Shruti R Kuril, Kaja Madhuri, Rishabh Kasaudhan, Saurabh Yadav, Gyan Chand, Tejinder Kaur, Manish Thakur & RanbirChander Sobti

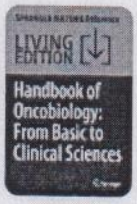
Abstract

Embarking on the dynamic landscape of oncology, this chapter navigates the interface between emerging concepts and transformative advancements in cancer research. It delves into the intricate symbiosis of viruses and cancers, spotlighting the diverse roles of small DNA tumor viruses, RNA oncoviruses, and their diagnostic potential. Additionally, the discourse examines the evolving vistas of cancer genetics, accentuating the significance of oncogenes and their interactions with energy metabolism pathways. By traversing these complex dimensions, the chapter contributes to an enriched understanding of contemporary oncobiological paradigms.

Technological Advancements in Cancer Diagnosis and Prognosis

| Living reference work entry | First Online: 27 September 2023

| pp 1–17 | Cite this living reference work entry



Handbook of Oncobiology: From Basic to Clinical Sciences

Pushpa Reddy, Pradyumn Singh, Shruti R. Kuril, Arti Priyadarshini, Sunil Babu Gosipatala ✉, Gyan Chand, Venkatesh Kumar R., Tejinder Kaur, Manish Thakur & Ranbir Chander Sobti

Abstract

Cancer diagnostics and prognosis, propelled by cutting-edge technologies, navigates the evolution from traditional methods to innovative approaches that revolutionize how we detect and predict cancer. The discussion encompasses various facets of modern diagnosis, starting with fluid biopsy and molecular profiling, which offer noninvasive insights into cancer's molecular signatures. Next-generation sequencing opens windows into the genetic landscape, facilitating personalized treatment strategies. The role of MRI as a robust diagnostic tool is explored, while advanced sensing systems like electrochemiluminescence (ECL) nanosensors and aptasensors present novel avenues for early detection. Beyond diagnostics, the chapter delves into staging and grading, vital components for prognosis. The significance of the TNM staging system is highlighted. As precision medicine becomes central, these staging methods empower clinicians to tailor interventions and anticipate disease progression accurately. This exploration underscores the critical role of

ScienceDirect

Epigenetics in Organ Specific Disorders

Volume 34 in Translational Epigenetics

2023, Pages 545-563

Chapter 22 - Epigenetics of radiation-induced GI damage: Role of protein modifications

Noopur Gupta [a], Anu Prakash [a], Paban K. Agrawala [a], B.S. Dwarakanath [b]

Show more

https://doi.org/10.1016/B978-0-12-823931-5.00012-8

Get rights and content

Abstract

Radiation-induced gastrointestinal syndrome (RIGS) remains one of the significant limiting factors in employing tumoricidal doses in the radiotherapy of intestinal malignancy. It also restricts the endurance of casualties in an unplanned exposure to higher radiation doses. Ionizing radiation (IR) could affect various processes within exposed cells and specifically cause changes in gene expression and interruption of cell cycle arrest, leading to immune imbalance and apoptotic cell death. Emerging evidence points towards the significant role of epigenetic regulation and biological processes induced by exposure to radiation in different types of cancers. Epigenetic systems, which include DNA and histone alterations, bring about the heritable silencing of genes without an alteration in their coding sequence. There is a great potential for the development of "epigenetic therapies" that comprise inhibitors targeting enzymes that modulate epigenetic modifications, specifically DNA methyltransferases and histone deacetylases, which have demonstrated promising radiomitigative effects. In addition, as this process is reversible and accompanied by a plethora of deregulated enzymes, inhibiting those histone-altering enzyme activities and modulating their level has been thought of as a potential path for radiation injury treatments. This chapter provides insight into the basic information of histone modification as well as modification of other key proteins and its application in the radiation-induced gastrointestinal syndrome treatment, thereby offering new potential targets for the treatment of radiation injuries.

Chapter - 4
Unravelling the Microbial Symphony Within: A Comprehensive Review of Gut Microbiota

Authors

Sidra Khousin
Department of Life Sciences-Microbiology, Indian Academy Degree College-Autonomous, Bangalore, Karnataka, India

M.P. Sandhya
Department of Life Sciences-Microbiology, Indian Academy Degree College-Autonomous, Bangalore, Karnataka, India

Dr. S. Anu Kiruthika
Associate Professor in Microbiology, Department of Life Sciences, Indian Academy Degree College-Autonomous, Bangalore, Karnataka, India

Chapter - 4

Unravelling the Microbial Symphony Within: A Comprehensive Review of Gut Microbiota

Sidra Khousin, M.P. Sandhya and Dr. S. Anu Kiruthika

Abstract

The gut microbiota is a complex ecosystem of microorganisms, including bacteria, viruses, fungi, and archaea, that inhabit the human gastrointestinal tract. This microbial consortium plays a crucial role in various physiological processes and has gained increasing attention in recent years. The gut microbiota's functions extend beyond digestion, contributing to nutrient metabolism, immune system development, and protection against pathogens. The balance and composition of gut microbiota are regulated by factors such as diet, host genetics, and environmental influences. Disruptions in this balance can lead to health issues. A diverse gut microbiota is associated with better health outcomes. The links between microbiota diversity and conditions like obesity, diabetes, and autoimmune diseases are discussed, with potential therapeutic implications. External and internal factors, such as dietary choices, antibiotic use, and stress, significantly impact gut microbiota composition. Imbalances in the gut microbiota, known as dysbiosis, have been implicated in a range of diseases, including inflammatory bowel disease, allergies, and mental health disorders. Understanding the composition, functions, and regulation of the gut microbiota provides opportunities for innovative therapeutic interventions. Future research holds promise for advancing our understanding of the gut microbiota's role in health and disease. This comprehensive review article offers insights into the gut microbiota, providing a foundation for future research and therapeutic developments.

Keywords: Gut microbiota, microbial diversity, host-microbiota interaction, dysbiosis, gut-brain axis

Introduction

Microbiome refers to the collective genomes of the microorganisms in a particular environment, and microbiota is the community of micro organisms themselves. The human gastrointestinal system contains 100 trillion

Molecular docking studies on the interaction of phytocompounds exploring the antifungal potency against *Candida* spp.

Dr. Sangeetha Annie George[1] and Dr. Shubha Bhadran[2]
[1]Department of Zoology, Indian Academy Degree College- Autonomous, Bengaluru, Karnataka, India.
[2]Department of Genetics, Indian Academy Degree College- Autonomous, Bengaluru, Karnataka, India.
E-mail: *sangeetha.zoology@iadc.ac.in*

Introduction

Given the convergence of prevalent ecological, socioeconomic, and demographic conditions, India unaccountably suffers from the burden of infectious diseases. It is critical to explore for new medications because the prevalence of multidrug resistant infections has significantly decreased the efficacy of current antibiotics and the future of antimicrobial treatments is still unclear. Opportunistic fungal infections are spreading more quickly worldwide. Despite the availability of a wide variety of medications for their treatment, invasive fungal infections are of great concern for people since they are linked to a high mortality rate that frequently exceeds 50%. Due to this, there is an ongoing and urgent need to find new antimicrobial agents with unique chemical structures and modes of action. Globally, the clinical *Candida* species that causes candidemia continues to be the most important source of opportunistic mycoses. The invasive fungal infections (IFI) with the highest prevalence are invasive candidiasis and candidemia. Despite the fact that *Candida albicans* predominates among all Candida species, new findings indicate that non-albican species, such as *Candida tropicalis*, *Candida glabrata*, and *Candida parapsilosis* are increasingly producing invasive infections, particularly in immune-compromised individuals. Among the non-albican species of *Candida* that are responsible for these nosocomial infections, *Candida tropicalis* and *Candida glabrata* are reported to be the most prevalent. *Candida tropicalis* and *Candida glabrata* were frequently found in bone marrow transplant recipients who were neutropenic, as well as in nosocomial UTI cases, meningitis-causing pathogens, and infections in cancer patients. The ongoing development of multi-drug resistant (MDR) fungus strains has forced

Progesterone and Its Relevance - A Multifaceted Hormone with Widespread Implications

[1]Shubha Bhadran and [2]Sangeetha Annie George

*[1]Department of Genetics, Indian Academy Degree College Autonomous, Bengaluru - 560043, India

[2]Department of Zoology, Indian Academy Degree College Autonomous, Bengaluru - 560043, India

*Corresponding Author Email: shubharajiv23@gmail.com

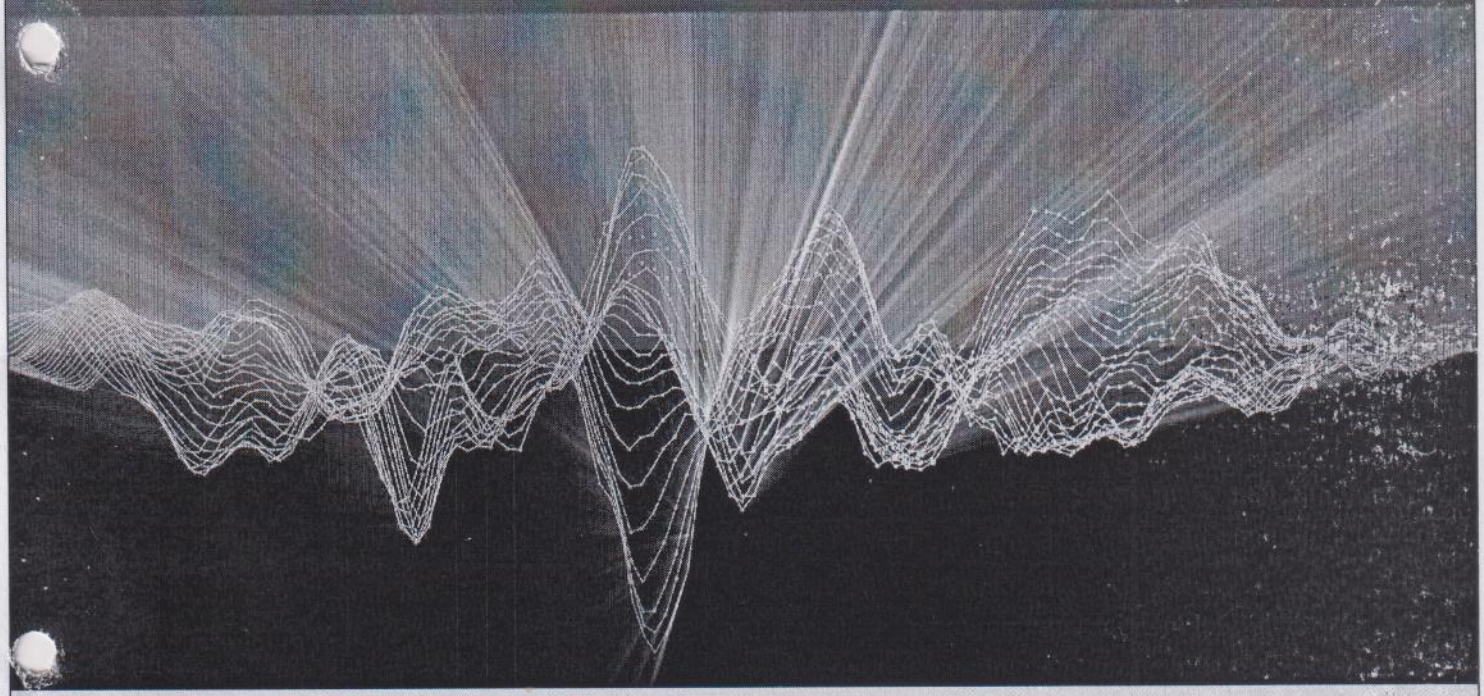
Abstract

Progesterone is a steroid hormone that plays a vital role in various physiological processes in both males and females. Progesterone primarily produced in the ovaries of females and the testes and adrenal glands of males, holds a prominent position in the field of endocrinology due to its multifaceted nature and widespread implications. Originally recognized for its involvement in reproductive functions, progesterone has been found to exert a wide range of effects beyond reproduction, including neuroprotective, anti-inflammatory and immunomodulatory actions. In the realm of reproduction, progesterone is essential for successful pregnancy. It prepares the endometrium for implantation, supports the maintenance of pregnancy by inhibiting uterine contractions, and facilitates the development of the mammary glands for lactation. Furthermore, progesterone plays a pivotal role in regulating the menstrual cycle and is intricately involved in the process of ovulation. The broad implications of progesterone opens up avenues for therapeutic interventions and sheds light on the complex interplay between hormones and diverse physiological process. This chapter provides a comprehensive overview of the multifaceted role of progesterone across various physiological systems and highlights its therapeutic potential.

ISBN: 978-93-88901-55-0

TRENDS IN INTERDISCIPLINARY RESEARCH

VOLUME II



Editor:

Dr. Vanitha G. Ramesh

Dr. Eramma N.

Prof. Renuka Jyothi S.

Miss. Maitreyee Dutta

Bhumi Publishing, India

First Edition: May 2023

BIOENGINEERING STRATEGIES THAT BRIDGE MEDICINE AND TECHNOLOGY

Abstract

Biomedical engineering is emerging as a unifying bridge between two evolving fields, medicine and engineering. It has been instrumental in combatting diseases and ailments by advancing tools like biosensors, biomaterials, computational imaging, and artificial intelligence. These technologies empower medical professionals in their research, diagnosis, and treatment efforts. This chapter highlights the pivotal role that technological advancements in medicine have played in shaping the modern healthcare system and underscores the contributions of biomedical engineers within the healthcare delivery system.

Keywords: bioengineering, bionanotechnology, Biomimetic nanomaterials, bioprinting

Authors

Ms. Cynthia Irene kasi
Department of lifesciences-genetics
Indian Academy Degree College
Bengaluru, Karnataka, India

Dr. Sharangouda J Patil
Department of Zoology
NMKRV College
Bengaluru, Karnataka, India

Chapter - 4
Alginate Production by Solid State Fermentation of Marine Algae

Authors

Maria Joy
Department of Life Sciences, CHRIST (Deemed to be University), Hosur Road, Bengaluru, Karnataka, India

Erumalla Venkatanagaraju
DR Biosciences, Research and Development Unit, Bettahalasur, Bangalore, Karnataka, India

Kuppusamy Alagesan Paari
Department of Life Sciences, CHRIST (Deemed to be University), Hosur Road, Bengaluru, Karnataka, India

Aishwarya B George
Department of Life Sciences, CHRIST (Deemed to be University), Hosur Road, Bengaluru, Karnataka, India

S. Induresmi
Department of Life Sciences, CHRIST (Deemed to be University), Hosur Road, Bengaluru, Karnataka, India

S. William Joseph Kamal
Department of Life Sciences, CHRIST (Deemed to be University), Hosur Road, Bengaluru, Karnataka, India

Vaddi Damodara Reddy
Department of Biotechnology, REVA University, Yelahanka, Bangalore, Karnataka, India

Research Trends in Life Sciences

Volume - 10

Chief Editor

Dr. Erumalla Venkata Nagaraju

Associate Professor, Department of Life Sciences, Indian Academy Degree College (Autonomous), Bangalore, Karnataka, India

AkiNik Publications®

New Delhi

SN Computer Science (2024) 5:575
https://doi.org/10.1007/s42979-024-02885-3

ORIGINAL RESEARCH

Fingerprint Recognition Model Using Improved Firebug Swarm Optimization and tanh-Based Fuzzy Activated Neural Network

J. Parvathy[1] · Poornima G. Patil[1]

Received: 4 January 2024 / Accepted: 6 April 2024

Abstract
Fingerprints play a crucial role in recognizing criminal suspects. In general, the acquired fingerprints are sometimes accomplished in bad resolution with background noises, thus making it hard for the forensics to process the matching. To recognize fingerprints, many top-notch methods were available. Owing to the poor resolution of the images, the majority of the prevailing approaches lack accurate matching of the fingerprints. To overcome this difficulty, a dominant approach named the fingerprint recognition model utilizing Improved Firebug Swarm Optimization (IFSO) and tanh-based Fuzzy activated Neural Network (tFNN) is proposed in this paper. Also, effective IFSO and tFNN are implemented in the research approach to perform Feature Se lection (FS) and classification, correspondingly. This model was tested with FCV2002 dataset with 4 folders, namely DB1, DB2, DB3, and DB4. The proposed model's efficient performance was demonstrated by the simulation results. The Fingerprint Images (FIs) are effectively classified by the proposed model with low error. The proposed model's accuracy, specificity, and sensitivity were 12%–200%, 25%–7%, and 25%–75%, respectively higher when compared to the prevailing approaches.

Keywords Fingerprint recognition · Improved firebug · Swarm optimization · Fuzzy activated · Neural network

Introduction

Since the fingerprint is easy to collect, analyze, and classify, it is the most widely utilized biometrics in person identification [1, 2]. Numerous persons' fingerprints are not unique; also, no two persons have similar fingerprints. The fingerprints never change throughout the age of the person as they are more unique than DNA. The twins cannot have similar fingerprints even though they can share similar DNA [3]. As exhibited in Fig. 1, the fingerprints are categorized into 3 classifications, such as roller fingerprints, plain fingerprints, and latent fingerprints. As per Tan and Ban [4], the fingerprint has a pattern of ridges and valleys on the surface of the fingertip. Minutiae are the crosspoints and endpoints of the ridges. Figure 2 presents the endings of minutiae and bifurcation. A ridge point in which a ridge bifurcates into two ridges is termed bifurcation. It is extensively accepted that the pattern of minutiae of every single finger is found to be unique; also, it does not alter over the lifetime. A good quality fingerprint typically encompasses 40 to 150 minutiae [5]. The fingerprints have been regarded as a good and secure biometrics. Confirming or refusing if a scanned fingerprint belongs to a particular person or not is the process of fingerprint recognition. The rising commercial applications and the number of civilians who rely on fingerprint-centric identification result in an enormous fingerprint database. It is computationally time-consuming to match specific fingerprints stored in the database. Furthermore, the fingerprints' manual observation is inclined to inconsistency and could prompt errors [6].

The automatic verification of similarity between several fingerprints without the intervention of human participants is called the Automatic Fingerprint Recognition System (AFRS), which encompasses two phases, namely the enrolment and recognition phase. The person registers

This article is part of the topical collection "Computer Vision for Enhanced Learning Outcomes in Multimedia-based Education and Training Applications" guest edited by Adeleh Asemi Zavareh, Ali Alibeigi, Ali Akbari and Mutaz AlShafeey.

✉ J. Parvathy
Parvathyphd@outlook.com

Poornima G. Patil
poornima_g_patil@yahoo.com

[1] Department of MCA, Visvesvaraya Technological University, Belagavi, India

Published online: 23 May 2024

CURRENT RESEARCH IN

LIFE SCIENCES

Volume - 4

Chief Editor

Arti Prasad
Professor, Department of Zoology, Mohanlal Sukhadia University, Udaipur, Rajasthan, India

Co-editor

Dr. Deepak Rawal
Assistant Professor, Department of Zoology, University College of Science, Mohanlal Sukhadia University, Udaipur, Rajasthan, India

AkiNik Publications®
New Delhi

Published By: AkiNik Publications

AkiNik Publications
169, C-11, Sector - 3,
Rohini, Delhi-110085, India
Toll Free (India) – 18001234070
Phone No.: 9711224068, 9911215212
Website: www.akinik.com
Email: akinikbooks@gmail.com

Chief Editor: Arti Prasad
Co-editor: Dr. Deepak Rawal

Publication Year: 2023

Pages: 151

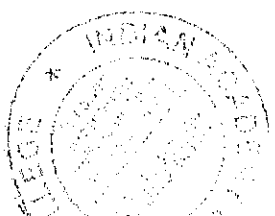
ISBN: 978-93-5570-864-9

Book DOI: https://doi.org/10.22271/ed.book.2456

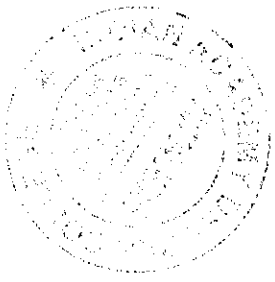
Price: ₹ 762/-

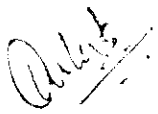
Registration Details

- Printing Press License No.: F.1 (A-4) press 2016
- Trade Mark Registered Under
  - Class 16 (Regd. No.: 5070429)
  - Class 35 (Regd. No.: 5070426)
  - Class 41 (Regd. No.: 5070427)
  - Class 42 (Regd. No.: 5070428)



Contents





INDIAN

Chapter - 4
Unravelling the Microbial Symphony Within: A Comprehensive Review of Gut Microbiota

Authors

Sidra Khousin
Department of Life Sciences-Microbiology, Indian Academy Degree College-Autonomous, Bangalore, Karnataka, India

M.P. Sandhya
Department of Life Sciences-Microbiology, Indian Academy Degree College-Autonomous, Bangalore, Karnataka, India

Dr. S. Anu Kiruthika
Associate Professor in Microbiology, Department of Life Sciences, Indian Academy Degree College-Autonomous, Bangalore, Karnataka, India

Chapter - 4

Unravelling the Microbial Symphony Within: A Comprehensive Review of Gut Microbiota

Sidra Khousin, M.P. Sandhya and Dr. S. Anu Kiruthika

Abstract

The gut microbiota is a complex ecosystem of microorganisms, including bacteria, viruses, fungi, and archaea, that inhabit the human gastrointestinal tract. This microbial consortium plays a crucial role in various physiological processes and has gained increasing attention in recent years. The gut microbiota's functions extend beyond digestion, contributing to nutrient metabolism, immune system development, and protection against pathogens. The balance and composition of gut microbiota are regulated by factors such as diet, host genetics, and environmental influences. Disruptions in this balance can lead to health issues. A diverse gut microbiota is associated with better health outcomes. The links between microbiota diversity and conditions like obesity, diabetes, and autoimmune diseases are discussed, with potential therapeutic implications. External and internal factors, such as dietary choices, antibiotic use, and stress, significantly impact gut microbiota composition. Imbalances in the gut microbiota, known as dysbiosis, have been implicated in a range of diseases, including inflammatory bowel disease, allergies, and mental health disorders. Understanding the composition, functions, and regulation of the gut microbiota provides opportunities for innovative therapeutic interventions. Future research holds promise for advancing our understanding of the gut microbiota's role in health and disease. This comprehensive review article offers insights into the gut microbiota, providing a foundation for future research and therapeutic developments.

Keywords: Gut microbiota, microbial diversity, host-microbiota interaction, dysbiosis, gut-brain axis

Introduction

Microbiome refers to the collective genomes of the microorganisms in a particular environment, and microbiota is the community of micro organisms themselves. The human gastrointestinal system contains 100 trillion

PAPER • OPEN ACCESS

Structural and Optical Properties of AgO Nanoparticles Synthesized using Solid State Combustion

Thejas Ramakrishnaiah, D Vinay, Ganesh S Hegde, T S Siddivinayaka, K T Vasudevan and Abhiram Jagannathan

Published under licence by IOP Publishing Ltd

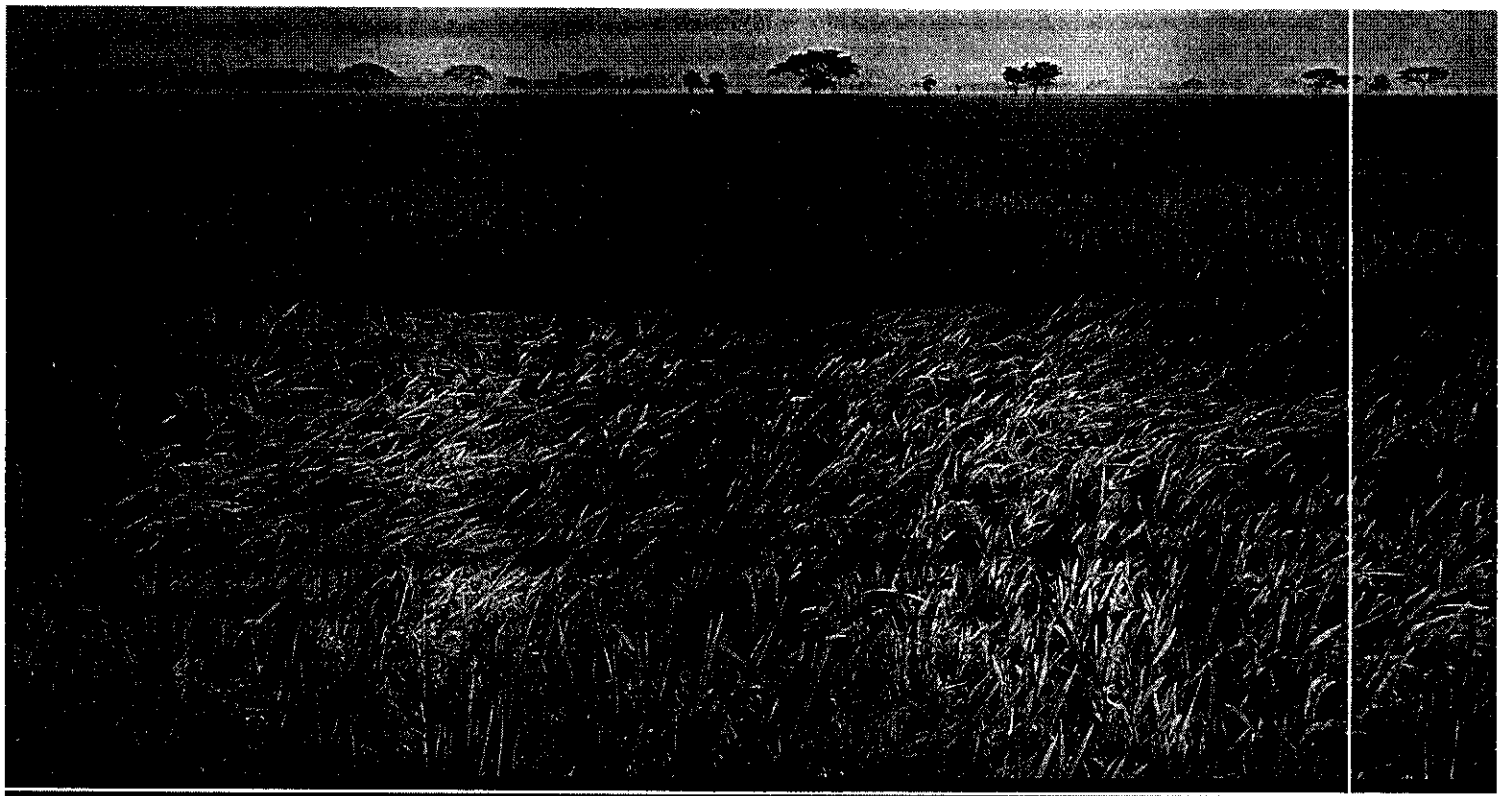
IOP Conference Series: Materials Science and Engineering, Volume 1300, International Conference on Physics of Materials and Nanotechnology (ICPN 2023) 21/09/2023 - 23/09/2023 Mangalore, India

Citation Thejas Ramakrishnaiah *et al* 2024 *IOP Conf. Ser.: Mater. Sci. Eng.* **1300** 012035

DOI 10.1088/1757-899X/1300/1/012035

Abstract

Silver oxide nanoparticles (AgO NPs) were synthesized by solid state combustion technique with $AgNO_3$ as a precursor and cow dung cake and cow urine as fuel. XRD results exhibit prominent peaks at 28°, 32°, 46° respectively indicating the AgO nanoparticles in cubic phase. Furthermore, structural elucidation through Rietveld refinement has confirmed the existence Ag_2O_3 nanoparticles, thereby indicating the formation of silver oxide nanoparticles. UV-Vis-NIR results are indicative that that the silver nanoparticles have exhibited a strong SPR peak at 435



RESPONSE OF FIELD CROPS TO ABIOTIC STRESS

Current Status and Future Prospects

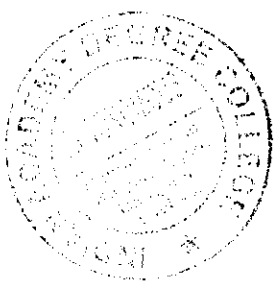
Edited by
Shuvasish Choudhury
Debojyoti Moulick

CRC Press
Taylor & Francis Group

Response of Field Crops to Abiotic Stress

Current Status and Future Prospects

Edited by
Shuvasish Choudhury and Debojyoti Moulick



CRC Press
Taylor & Francis Group
Boca Raton London New York

CRC Press is an imprint of the
Taylor & Francis Group, an informa business

Designed cover image: © Shutterstock

First edition published 2023
by CRC Press
6000 Broken Sound Parkway NW, Suite 300, Boca Raton, FL 33487-2742

and by CRC Press
4 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN

CRC Press is an imprint of Taylor & Francis Group, LLC

Library of Congress Cataloging-in-Publication Data
Names: Choudhury, Shuvasish, editor. | Moulick, Debojyoti, editor.
Title: Response of field crops to abiotic stress: current status and future prospects / edited by Shuvasish Choudhury and Debojyoti Moulick.
Description: First edition. | Boca Raton, FL : CRC Press, 2023. | Includes bibliographical references and index.
Identifiers: LCCN 2022029321 (print) | LCCN 2022029322 (ebook) | ISBN 9781032191966 (hardback) | ISBN 9781032191973 (paperback) | ISBN 9781003258063 (ebook)
Subjects: LCSH: Crops–Effect of stress on. | Field crops–Effect of stress on.
Classification: LCC SB112.5 .R48 2023 (print) | LCC SB112.5 (ebook) | DDC 631.4/52–dc23/eng/20220822
LC record available at https://lccn.loc.gov/2022029321
LC ebook record available at https://lccn.loc.gov/2022029322

ISBN: 9781032191966 (hbk)
ISBN: 9781032191973 (pbk)
ISBN: 9781003258063 (ebk)

DOI: 10.1201/9781003258063

Typeset in Times
by codeMantra

Contents

1

Abiotic Stress Management through Elemental Biofortification in Field Crops

Sudhakar Srivastava and Vartika Jain
Banaras Hindu University

Kritika Sinha Nigam
Indian Academy Degree College

CONTENTS

1.1 Introduction

Stress is any factor, biotic or abiotic, that exerts pressure on individual plant or community causing it to deviate from normal system functioning and alters its growth and development (Rhodes and Nadolska-Orczyk 2001). The plant life is dependent on its interactions with environment, including individual components of soil, water and air. Since plants are static organisms, when components of the environment like temperature, elemental concentrations and water availability are beyond the optimum range, they suffer from stress as they cannot move/migrate to another place of optimum conditions. The well-known abiotic stresses include salinity, drought, extreme temperatures and metal(loid) concentrations. Abiotic stresses interfere with various physiological processes, affect biochemical machinery and alter molecular functions to alter the growth and metabolic activities of plants leading to reduced biomass accumulation and yields. Today's increasing demand for crop products has led to the requirement of management of crop growth by the available resources effectively (Ahmed 2020).

Nevertheless, owing to continuous exposure to one or other type of abiotic stress during its life cycle, plants have devised several defense strategies to effectively cope with the stresses and grow and reproduce. These strategies can operate temporarily for a specific duration causing short-term modifications, such as to tackle extremes of temperature during summer and winter, respectively. On the other hand, to tackle lifelong stresses, like in salinity-affected area or to low water availability in a desert, plants have adapted themselves with development of new or modified organs and physiological mechanisms (Tester and Bacic 2005; Pandey et al. 2017). Root growth or root architecture is a common feature that shows changes in response to a lot of abiotic stresses. In the case of drought conditions, root grows profusely to increase the surface area and root hairs for water uptake (Pavia et al. 2019). For metalloid stress like arsenic (As), the growth of roots may be reduced or specifically altered with induced growth of lateral roots or root hairs so as to reduce As uptake (Srivastava et al. 2021). The production of reactive oxygen species (ROS) as a byproduct of oxygen-dependent metabolism is a normal process. In fact, there are several pro-oxidant enzymes, which produce different ROS in their reaction, and these enzymes have a crucial role in normal plant growth (Grob et al. 2013). However, in the presence of most of the abiotic stresses, the production and quenching of ROS are disturbed and levels of ROS increase rapidly. ROS are highly reactive and can interact with proteins, lipids and DNA to start chain reaction of radicals and disturb structural features of cell (Mittler 2017). To fine-tune the ROS levels, plants are equipped with several enzymes and molecules having antioxidant functions. These include superoxide dismutase (SOD), enzymes of Asada-Halliwell pathway [ascorbate peroxidase (APX), dehydroascorbate reductase, monodehydroascorbate reductase, glutathione reductase (GR)], catalase (CAT) and peroxidases among enzymatic antioxidants and ascorbic acid (ASA), glutathione (GSH), carotenoids, proline, phenolics etc. among molecular antioxidants (Alscher et al. 2002; Shigeoka et al. 2002; Kováčik et al. 2011; Srivastava et al. 2016a; Awasthi et al. 2018). Another important feature of stresses is the reduction in photosynthetic efficiency due to altered gaseous and water vapor exchange that may be caused by stomatal closure or due to effects on

DOI: 10.1201/9781003258063-1

HEALTHINNOVATIVE SCIENCERESEARCH ARTICLE

LINK: HTTPS://KAHAAR.ORG/ARCHIVES/5810

Lab Grown Meat: A Low Carbon and Water Footprint Alternative

Akshita Singh, Shruti Rajkishore Kuril, Pushpa Reddy*, Nikku Yadav, Raj Kumar Khalko and Sunil Babu Gosipatala

Department of Biotechnology, Babasaheb Bhimrao Ambedkar University, Lucknow, U.P.

*Department of Biochemistry, Indian Academy Degree College- Autonomous, Bangalore-560043, Karnataka, India

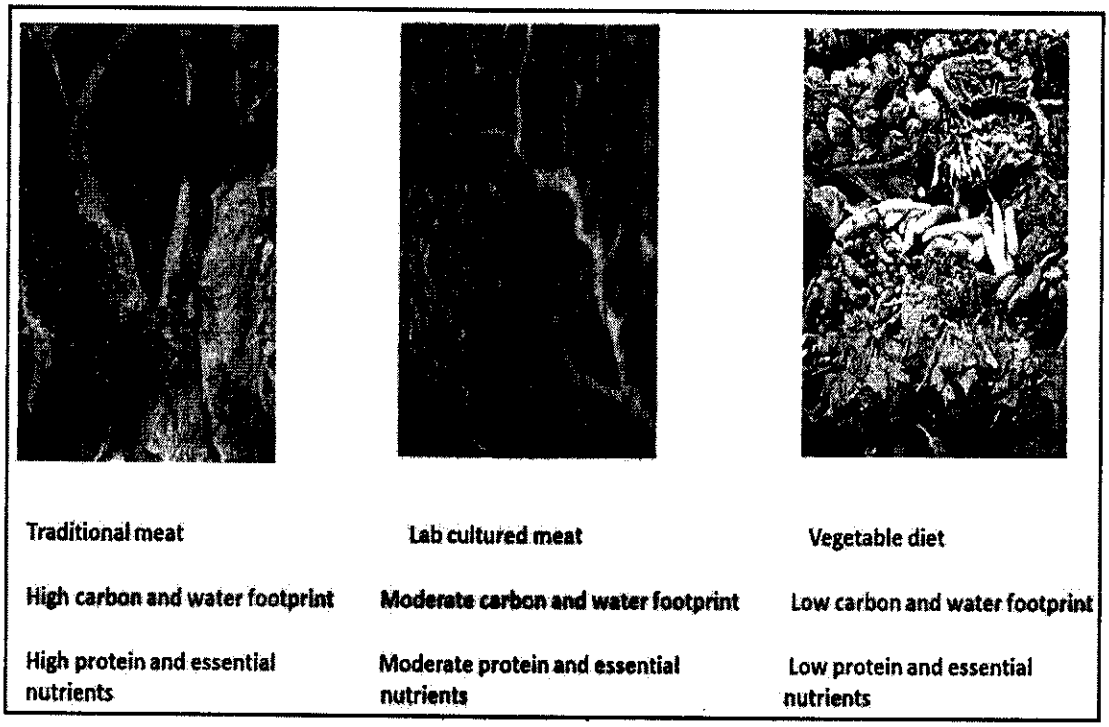


Figure 1: Comparison among traditional, lab-grown meat and vegetable diet.

Abstract

As the global population continues to grow and dietary patterns shift towards higher protein consumption, traditional meat production faces mounting challenges. Lab-grown meat, a cutting-edge technology that allows meat to be cultivated in controlled laboratory settings, offers a promising solution. This article explores the emergence and potential of lab-grown meat as a sustainable and eco-friendly alternative. Lab-

Chapter - 7

Endophytic Bacteria in Stress Tolerance of Agricultural Plants: Diversity of Microorganisms and Molecular Mechanisms

Monisha Iyappan, Shashank V, Harish KR and Ranjith Kumar GS

Abstract

A class of endosymbiotic bacteria known as bacterial endophytes is common among plants. A wide variety of bacterial taxa and host plants are involved in the connection of endophytic bacteria with plants. Focusing on the most recent findings acquired via metagenomic analysis, the present study provides an overview of the taxonomic makeup of the bacterial endophytes found in typical agricultural crops. The function and structure of the soil and endophytic microbial populations are significantly influenced by the endophytic microbiome, which is a component of the larger soil microbial community and is susceptible to direct or indirect effects of agricultural practices. In order to assure plant productivity and the quality of agriculture products, it is crucial to utilize agricultural techniques that preserve the natural variety of plant endophytic bacteria. On the other hand, it has been demonstrated that the endophytic microbiome itself has several impacts on the host plant, including the modification of pathways involved in phytohormone signaling, metabolic activity and plant defense responses. It has been shown that these effects could aid in the adaptation of plants to biotic or abiotic stressors. Consequently, using endophytic bacteria to boost disease resistance or crop performance under stress circumstances including cold, drought, salt and heavy metal pollution offers a significant opportunity for sustainable agricultural production.

Keywords: Diversity of endophytes, molecular analysis, secondary metabolites, phytohormones, biotic stress

Introduction

Throughout history, agricultural output intensification has been essential for sustaining population growth (Ellis *et al.*, 2013). Agricultural expansion has been substantially achieved during the last century through crop

Recent Advances in

Molecular Biology
and
Plant Physiology

Volume - 4

Chief Editor

Dr. Sukumar Taria
Scientist Plant Physiology, ICAR -CAFRI, Jhansi, Uttar Pradesh, India

AkiNik Publications®
New Delhi

Published By: AkiNik Publications

AkiNik Publications
169, C-11, Sector - 3,
Rohini, Delhi-110085, India
Toll Free (India) – 18001234070
Phone No. – 9711224068, 9911215212
Email – akinikbooks@gmail.com

Chief Editor: Dr. Sukumar Taria

Publication Year: 2023

Pages: 227

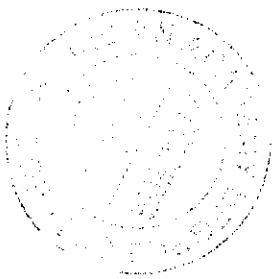
ISBN:

Book DOI: https://doi.org/

Price: ₹ 837/-

Registration Details

- Printing Press License No.: F.1 (A-4) press 2016
- Trade Mark Registered Under
  - Class 16 (Regd. No.: 5070429)
  - Class 35 (Regd. No.: 5070426)
  - Class 41 (Regd. No.: 5070427)
  - Class 42 (Regd. No.: 5070428)



Contents

Chapter - 2

Plantibodies and their Applications as Biopharmaceuticals

Shashank V, Anusha KP, Adhikari Pavan Kumar and Monisha Iyappa

Abstract

The production of antibodies, a vital component of the vertebrate immune system, is now possible by introducing genes from animals or humans that code for antibodies into plants. The plant-derived antibodies, also known as plantibodies, work in a manner similar to that of mammalian antibodies. Compared to other techniques of producing antibodies, the manufacture of plantibodies has a number of benefits, including inexpensive production costs, a high antibody yield, a short time commitment, etc. As a result, plants are increasingly being accepted as green bioreactors. Trials for several plantibodies are under underway. Plantibodies are frequently produced using agricultural products like tobacco, tomato, potato, soya bean, alfalfa, rice and wheat. Numerous techniques, including the standard approach, the cell tissue culture method, breeding and sexual crossing, transgenic seeds, targeting and compartmentalizing, are used for producing these plantibodies. Plantibodies are currently employed in medical research to treat inflammatory illnesses, malignancies and immunological disorders as well as to make vaccines and for diagnostic purposes. The manufacture and use of plantibodies, as well as the numerous categories of therapeutic antibodies produced in transgenic plants, are highlighted in this article.

Keywords: Plantibodies, production, purification, therapeutic applications

Introduction

Immunoglobulins, or antibodies, are a class of intricate glycoproteins made by B-lymphocytes and found in the serum as well as tissue fluids of primates. They build up the humoral portion of the adaptive immune system and are able to recognize and bind to particular target antigens on infections or their toxic substances. Antibodies can be employed for a range of purposes, including the diagnosis, prevention, and therapy of illness (Andersen *et al.*, 2002), because of their unique and specialized binding ability. When a pathogen enters a vertebrate host, B-lymphocytes produce

RESEARCH TRENDS IN MEDICAL SCIENCES

Volume - 22

Chief Editor

Sergiy Fedorov (MD, Ph.D., MBA, D.Sc.)
Professor of Therapy and Family Medicine, Department of Postgraduate Faculty, Ivano-Frankivsk National Medical University, Ukraine

AkiNik Publications®
New Delhi

Published By: AkiNik Publications

AkiNik Publications
169, C-11, Sector - 3,
Rohini, Delhi-110085, India
Toll Free (India) – 18001234070
Phone No.: 9711224068, 9911215212
Website: www.akinik.com
Email: akinikbooks@gmail.com

Chief Editor: Sergiy Fedorov (MD, Ph.D., MBA, D.Sc.)

Publication Year: 2023

Pages: 143

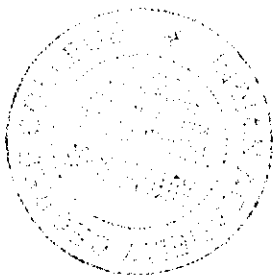
ISBN: 978-93-5570-693-5

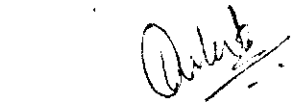
Book DOI: https://doi.org/10.22271/ed.book.2227

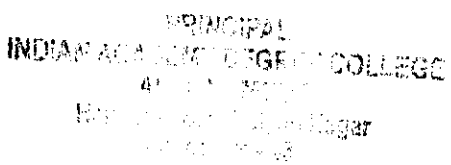
Price: ₹ 753/-

Registration Details

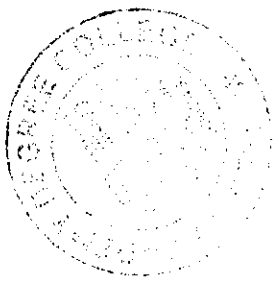
- Printing Press License No.: F.1 (A-4) press 2016
- Trade Mark Registered Under
  - Class 16 (Regd. No.: 5070429)
  - Class 35 (Regd. No.: 5070426)
  - Class 41 (Regd. No.: 5070427)
  - Class 42 (Regd. No.: 5070428)







Contents



Chapter - 6

Transplantation Immunology: Mechanism of Graft Rejection, Transplantation of Solid Organs and Bone Marrow

Monisha Iyappan, Shashank V, Joyce Madalene and Raksha R

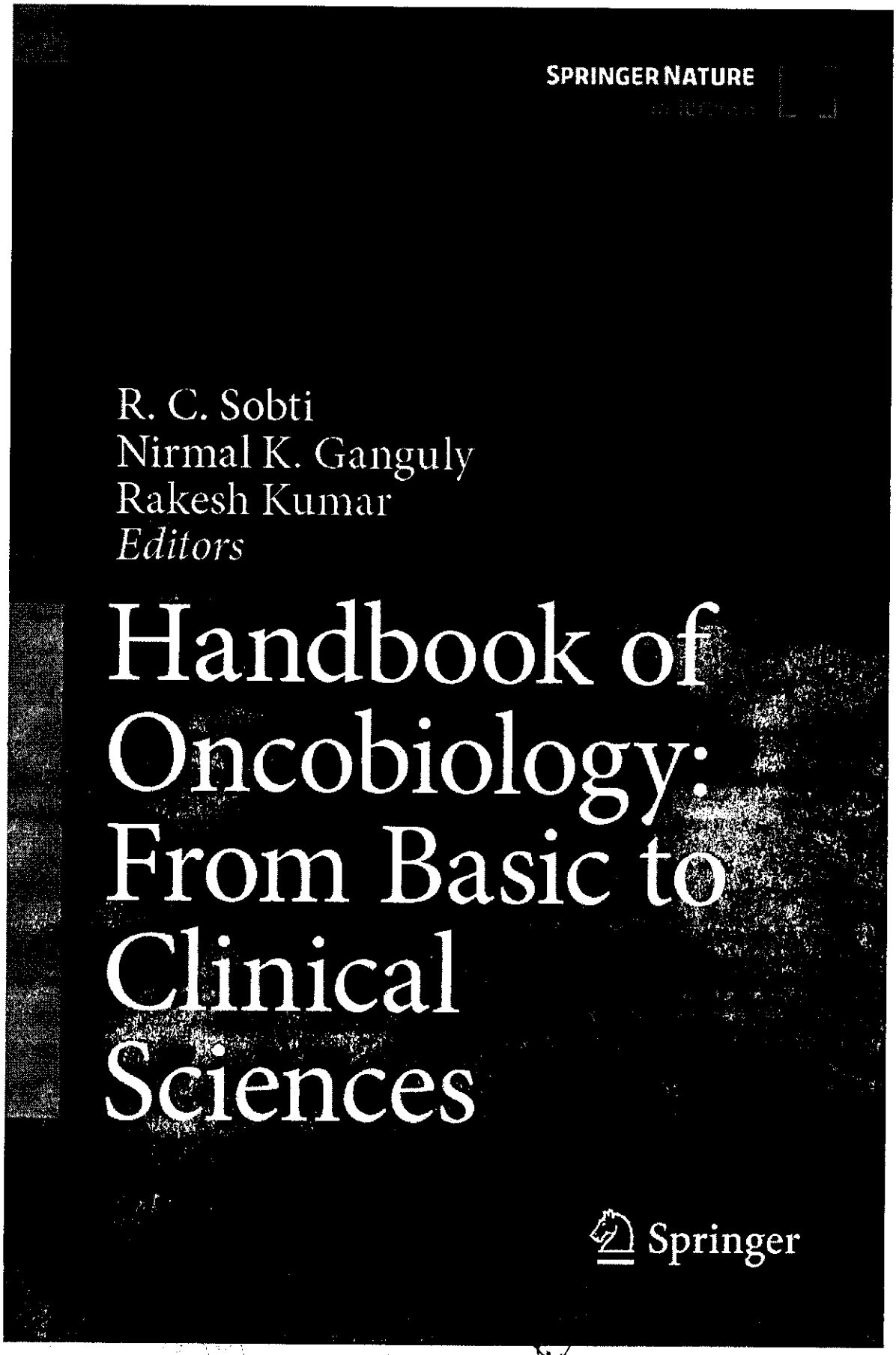
Abstract

The major histocompatibility complex (MHC) of humans was identified in 1967, and since then, the area of organ and tissue transplantation has advanced significantly. It has been demonstrated that graft acceptance is significantly increased when the MHC antigens of the donor and recipient are matched. The functions of the various immune system parts in the acceptance or rejection of transplants and in graft-versus-host disease have been elucidated. These elements consist of immune cell surface chemicals, antibodies, antigen-presenting cells, helper and cytotoxic T-cell subsets, signaling systems, and the cytokines that they produce. The effectiveness of organ transplantation has been significantly impacted by the discovery of pharmacologic and biological therapies that inhibit the alloimmune response and graft rejection. Combinations of these substances have a synergistic effect that results in lower immunosuppressive medication dosages and less toxicity. The kidneys, liver, heart, lung, and bone marrow are among the solid organs for which reports of a sizable number of successful transplants have been made. For many of these ailments, bone marrow transplantation has replaced other treatments for hematological illnesses, notably for primary immunodeficiency and hematological malignancies.

Keywords: Transplantation immunology, mechanism of graft rejections, solid organs, bone marrow

Introduction

The desire to perform transplants is fueled by the knowledge that several diseases can be cured by the donation of a healthy organ, tissue, or cells from one person (the donor) to another individual who requires the transplant (the recipient or host). Transplantation is defined in immunology as the process of transferring cells, tissues, or organs from one site to another (Platt, 2010).


SPRINGER NATURE
R. C. Sobti
Nirmal K. Ganguly
Rakesh Kumar
Editors
Handbook of Oncobiology: From Basic to Clinical Sciences
Springer

Current Concepts and Advances in Oncobiology

| Reference work entry | First Online: 15 May 2024

| pp 85–109 | Cite this reference work entry

Handbook of Oncobiology: From Basic to Clinical Sciences

Sunil Babu Gosipatala ✉, Pushpa Reddy, Raj Kumar Khalko, Nivedita Bisht, Shruti R. Kuril, Kaja Madhuri, Rishabh Kasaudhan, Saurabh Yadav, Gyan Chand, Tejinder Kaur, Manish Thakur & R. C. Sobti

Abstract

Embarking on the dynamic landscape of oncology, this chapter navigates the interface between emerging concepts and transformative advancements in cancer research. It delves into the intricate symbiosis of viruses and cancers, spotlighting the diverse roles of small DNA tumor viruses, RNA oncoviruses, and their diagnostic potential. Additionally, the discourse examines the evolving vistas of cancer genetics, accentuating the significance of oncogenes and their interactions with energy metabolism pathways. By traversing these complex dimensions, the chapter contributes to an enriched understanding of contemporary oncobiological paradigms.

Current Concepts and Advances in Oncobiology

| Living reference work entry | First Online: 30 September 2023

| pp 1–25 | Cite this living reference work entry

Handbook of Oncobiology: From Basic to Clinical Sciences

Sunil Babu Gosipatala, Pushpa Reddy, Raj Kumar Khalko, Nivedita Bisht, Shruti R Kuril, Kaja Madhuri, Rishabh Kasaudhan, Saurabh Yadav, Gyan Chand, Tejinder Kaur, Manish Thakur & RanbirChander Sobti

Abstract

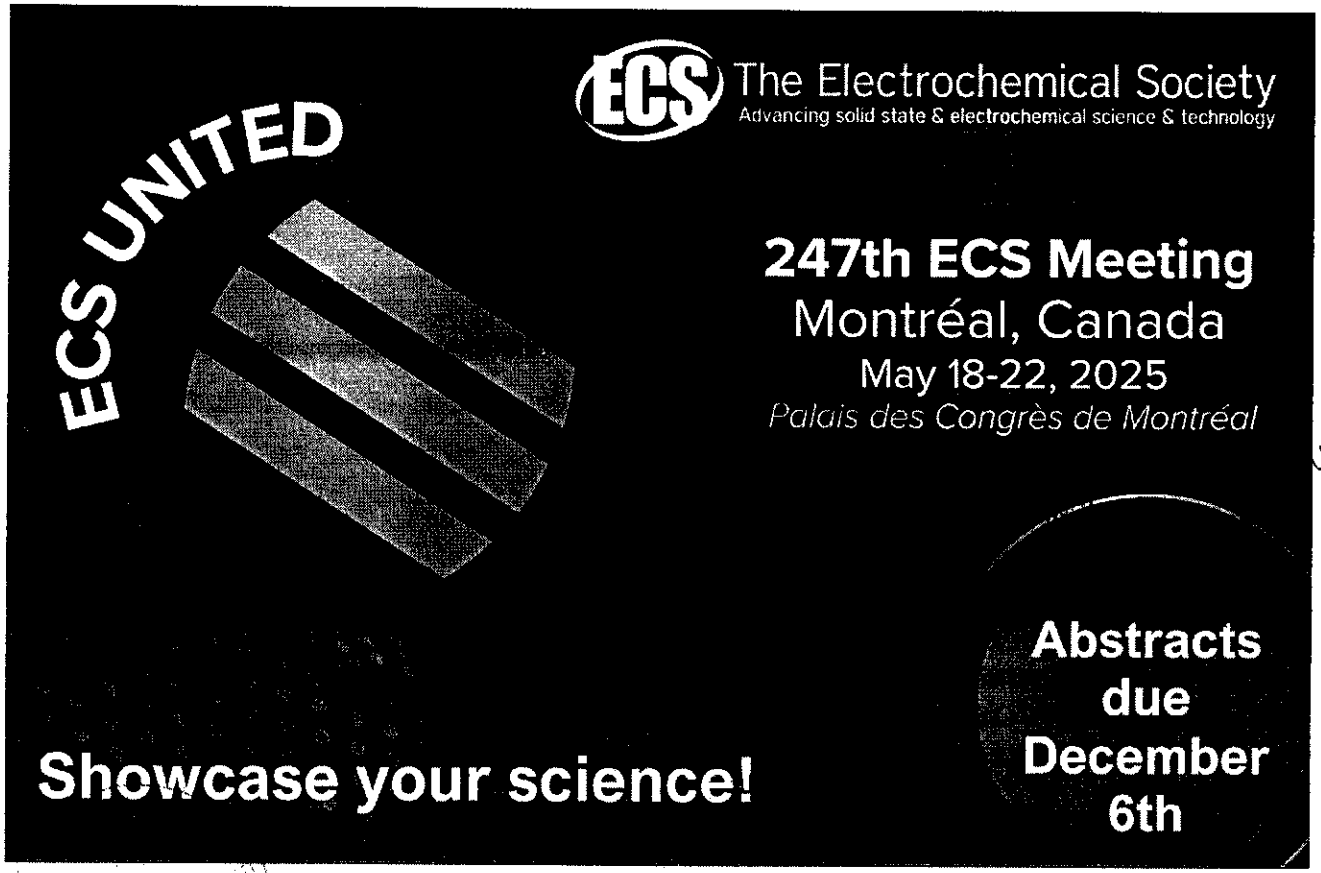
Embarking on the dynamic landscape of oncology, this chapter navigates the interface between emerging concepts and transformative advancements in cancer research. It delves into the intricate symbiosis of viruses and cancers, spotlighting the diverse roles of small DNA tumor viruses, RNA oncoviruses, and their diagnostic potential. Additionally, the discourse examines the evolving vistas of cancer genetics, accentuating the significance of oncogenes and their interactions with energy metabolism pathways. By traversing these complex dimensions, the chapter contributes to an enriched understanding of contemporary oncobiological paradigms.

IOP Conference Series:
Materials Science and
Engineering

PAPER • OPEN ACCESS

Effect of Sn on Physical and Optical Properties of Lithium Zinc Borate Glasses

To cite this article: K Mohamed Haneen *et al* 2024 *IOP Conf. Ser.: Mater. Sci. Eng.* 1300 012041



Effect of Sn on Physical and Optical Properties of Lithium Zinc Borate Glasses

Mohamed Haneen K[a], Akshay K Thammaiah[a] Abhishek R[b], Shivamurthy C B[b], Vivek Thirumalaimurugan[a], Jagadeesha B Gangadaraiah[b,c] , Abhiram Jagannathan[a,b*]

a) *Department of Physical Sciences, Indian Academy Degree College - Autonomous, Hennur Cross, Kalyan Nagar, Bangalore-560 043, Karnataka, India*
b) *Department of Post Graduate Studies and Research in Physics, The National College, Jayanagar, Bangalore- 560 070, Karnataka, India*
c) *Department of Physics, Sri Kuvempu Mahavidyalaya First Grade College, Kengal Channapatna 562 161, Ramanagara(Dist.), Karnataka, India*

*Corresponding author: abhi.ram.jagan@gmail.com

Abstract: 22.5 Li_2O_3-(20-x) ZnO-57.5B_2O_3 – x$SnCl_2$ (x = 0, 0.5. 1) glasses were synthesized using the conventional melt quench technique. Glass composition with larger concentration of lithium oxide exhibits excellent transport properties. Introducing intermediate element like zinc into the matrix will lead towards slight modification in structure by not varying much in its intrinsic properties. Thus, incorporation of Sn as dopant into the matrix has tailored the physical and optical properties of glasses. In this study, it is interesting to note that, the density of the glass has reduced for 0.5 mol % $SnCl_2$ in the matrix and on the contrary, the density of glass was found to be increased for the $SnCl_2$ with 1 mol % concentration. It indicates that, there could be a possibility of slight modification in the structure of glasses which eventually leads towards tuning of the optical bandgap due to existence of Sn.

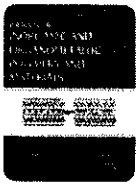
1. Introduction

Glass is an inorganic non-crystalline solid that is often transparent, hard, brittle, and chemically inert. Glass find its applications in variety of fields like optics, architecture, medical, house wares etc[1–3]. Borate glass network consists of BO_3 and BO_4 structural units and the combination of these units gives rise to di, tri, tetra, and penta borate groups in glass network[4,5]. Borate glasses have many advantages over silica glasses and soda-lime glasses like lower melting and softening temperature[1,6], better thermal shock resistance, chemical durability and higher electric resistivity[1]. Li_2O in B_2O_3 network modify the host structure through the transformation of the structural units of the borate network from [BO_4] to [BO_3] with the creation of non bridging oxygen(NBO) which forms more ionic bonds which results in higher ionic conductivity and refractive index values[5,7] and also results in the decrease of optical energy band gap for both direct and indirect band gap[8]. Addition of transition metals in borate glasses has shown great potential in technological applications like electrooptic, electronic, electrochemical devices and radiation dosimetry[9–12]. Addition of zinc to lithium borate glass will increase the strength and enhance the electron emission[11]. Presence of zinc in lithium borate glasses can alter or increase the glass transition temperature[13], thermal expansion coefficient and density. SnO_2 is a semiconductor material, and its incorporation into borate glasses improves their electrical conductivity which has very important applications in sensors, optoelectronic devices, and solid state batteries[14].SnO_2 acts as a network modifier and also as network former in borate glasses[15]. This work discusses about the physical and

Enhanced Catalytic Reduction and Electrochemical Sensing Properties of Magnetic Fe_3O_4@benzothiazole-Cu(II) Nanoparticles

Research Published: 06 May 2024

Volume 34, pages 4349–4363, (2024) Cite this article



Journal of Inorganic and Organometallic Polymers and Materials

Aims and scope

Submit manuscript

Guddappa Halligudra, Prasanna D. Shivaramu, Chitrabanu C. Paramesh, Kunal Roy, Chetana Sabbanahalli, Manikanta P. N., Vinaya K., Ananda Kumar C. S. & Dinesh Rangappa

Abstract

The preparat
nanoparticle
this manusc
characterize
TGA and VSM

Title

POTENTIAL INHIBITORY ACTIVITIES OF CATHARANTHUS ROSEUS ALKALOIDS ON PTP-1B IN RELATION TO ENHANCING INSULIN USAGE FOR TYPE II DIABETES TREATMENT.

Authors

Ramesh, Vanitha G.

Abstract

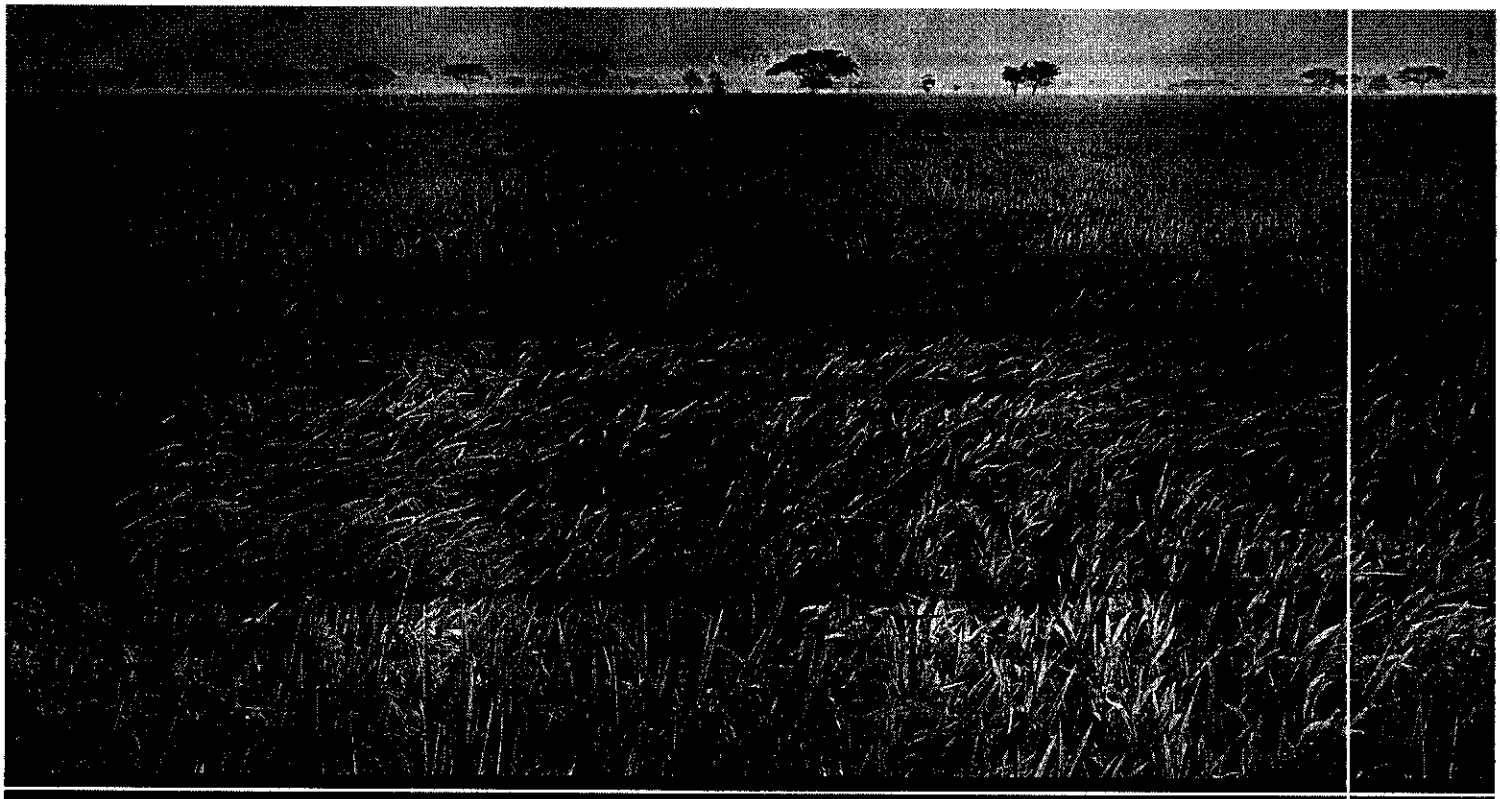
Even with the emergence of hypoglycaemic drugs, diabetes mellitus remains one of the major endocrine and metabolic disorders, affecting approximately 10% of the global population. It stands among the top five global causes of death. Type II diabetes has been managed by using a variety of plant extracts. Due to the side effects of taking insulin and oral hypoglycaemic drugs, patients are growing more and more interested in natural products with antidiabetic properties. Ancient societies made widespread use of Catharanthus roseus (C. roseus) and other herbal plants as therapeutic therapies to treat Type-II Diabetes mellitus. C. roseus extract has been demonstrated in several tests to dramatically lower blood glucose levels. Studies examining the genetic make-up of people, animals and cells have shown that Protein Tyrosine Phosphatase-1B (PTP-1B) is an enzyme that functions as a negative regulator of the insulin signalling pathway by removing phosphate groups from certain tyrosine residues on insulin receptor substrates (IRS). PTP-1B inhibitors have been examined in an effort to boost glucose metabolism and insulin sensitivity. This study focuses on the alkaloid which exhibits the most potent activity in hampering PTP-1B and less cytotoxicity in overseeing the insulin signaling pathway. It also uses Auto Dock bioinformatic tools for demonstrating the mechanism of potential inhibitory activities of four alkaloids of C. roseus in the active sites of PTP-1B, namely vindoline I, vindolidine II, vindolicine III and vindolinine IV.

Subjects

TYPE 2 diabetes; CATHARANTHUS roseus; INSULIN therapy; ALKALOIDS; INSULIN sensitivity; AMARYLLIDACEAE

Publication

Biochemical & Cellular Archives, 2024, Vol 24, Issue 1, p929



RESPONSE OF FIELD CROPS TO ABIOTIC STRESS

Current Status and Future Prospects

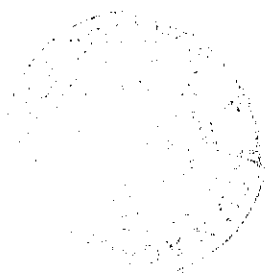
Edited by
Shuvasish Choudhury
Debojyoti Moulick

CRC Press
Taylor & Francis Group

Response of Field Crops to Abiotic Stress

Current Status and Future Prospects

Edited by
Shuvasish Choudhury and Debojyoti Moulick



CRC Press
Taylor & Francis Group
Boca Raton London New York

CRC Press is an imprint of the
Taylor & Francis Group, an informa business

Designed cover image: © Shutterstock

First edition published 2023
by CRC Press
6000 Broken Sound Parkway NW, Suite 300, Boca Raton, FL 33487-2742

and by CRC Press
4 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN

CRC Press is an imprint of Taylor & Francis Group, LLC

Library of Congress Cataloging-in-Publication Data
Names: Choudhury, Shuvasish, editor. | Moulick, Debojyoti, editor.
Title: Response of field crops to abiotic stress: current status and future prospects / edited by Shuvasish Choudhury and Debojyoti Moulick.
Description: First edition. | Boca Raton, FL : CRC Press, 2023. | Includes bibliographical references and index.
Identifiers: LCCN 2022029321 (print) | LCCN 2022029322 (ebook) | ISBN 9781032191966 (hardback) | ISBN 9781032191973 (paperback) | ISBN 9781003258063 (ebook)
Subjects: LCSH: Crops–Effect of stress on. | Field crops–Effect of stress on.
Classification: LCC SB112.5 .R48 2023 (print) | LCC SB112.5 (ebook) | DDC 631.4/52–dc23/eng/20220822
LC record available at https://lccn.loc.gov/2022029321
LC ebook record available at https://lccn.loc.gov/2022029322

ISBN: 9781032191966 (hbk)
ISBN: 9781032191973 (pbk)
ISBN: 9781003258063 (ebk)

DOI: 10.1201/9781003258063

Typeset in Times
by codeMantra

Contents

1

Abiotic Stress Management through Elemental Biofortification in Field Crops

Sudhakar Srivastava and Vartika Jain
Banaras Hindu University

Kritika Sinha Nigam
Indian Academy Degree College

CONTENTS

1.1 Introduction

Stress is any factor, biotic or abiotic, that exerts pressure on individual plant or community causing it to deviate from normal system functioning and alters its growth and development (Rhodes and Nadolska-Orczyk 2001). The plant life is dependent on its interactions with environment, including individual components of soil, water and air. Since plants are static organisms, when components of the environment like temperature, elemental concentrations and water availability are beyond the optimum range, they suffer from stress as they cannot move/migrate to another place of optimum conditions. The well-known abiotic stresses include salinity, drought, extreme temperatures and metal(loid) concentrations. Abiotic stresses interfere with various physiological processes, affect biochemical machinery and alter molecular functions to alter the growth and metabolic activities of plants leading to reduced biomass accumulation and yields. Today's increasing demand for crop products has led to the requirement of management of crop growth by the available resources effectively (Ahmed 2020).

Nevertheless, owing to continuous exposure to one or other type of abiotic stress during its life cycle, plants have devised several defense strategies to effectively cope with the stresses and grow and reproduce. These strategies can operate temporarily for a specific duration causing short-term modifications, such as to tackle extremes of temperature during summer and winter, respectively. On the other hand, to tackle lifelong stresses, like in salinity-affected area or to low water availability in a desert, plants have adapted themselves with development of new or modified organs and physiological mechanisms (Tester and Bacic 2005; Pandey et al. 2017). Root growth or root architecture is a common feature that shows changes in response to a lot of abiotic stresses. In the case of drought conditions, root grows profusely to increase the surface area and root hairs for water uptake (Pavia et al. 2019). For metalloid stress like arsenic (As), the growth of roots may be reduced or specifically altered with induced growth of lateral roots or root hairs so as to reduce As uptake (Srivastava et al. 2021). The production of reactive oxygen species (ROS) as a byproduct of oxygen-dependent metabolism is a normal process. In fact, there are several pro-oxidant enzymes, which produce different ROS in their reaction, and these enzymes have a crucial role in normal plant growth (Grob et al. 2013). However, in the presence of most of the abiotic stresses, the production and quenching of ROS are disturbed and levels of ROS increase rapidly. ROS are highly reactive and can interact with proteins, lipids and DNA to start chain reaction of radicals and disturb structural features of cell (Mittler 2017). To fine-tune the ROS levels, plants are equipped with several enzymes and molecules having antioxidant functions. These include superoxide dismutase (SOD), enzymes of Asada-Halliwell pathway [ascorbate peroxidase (APX), dehydroascorbate reductase, monodehydroascorbate reductase, glutathione reductase (GR)], catalase (CAT) and peroxidases among enzymatic antioxidants and ascorbic acid (ASA), glutathione (GSH), carotenoids, proline, phenolics etc. among molecular antioxidants (Alscher et al. 2002; Shigeoka et al. 2002; Kováčik et al. 2011; Srivastava et al. 2016a; Awasthi et al. 2018). Another important feature of stresses is the reduction in photosynthetic efficiency due to altered gaseous and water vapor exchange that may be caused by stomatal closure or due to effects on

DOI: 10.1201/9781003258063

PROBIOTICS, PREBIOTICS & SYNBIOTICS – IMPACT ON HEALTH

S Anu Kiruthika[1] and Abhilasa Bhattacharya[2]

[1]Corresponding author: Dr. S. Anu Kiruthika, Associate Professor, Department of Microbiology, Indian Academy Degree College - Autonomous, Bangalore – 560043

[2]M.Sc Student, Department of Microbiology, Indian Academy Degree College - Autonomous, Bangalore: 560043.

ABSTRACT:

Probiotics are live, nonpathogenic microorganisms that are given to patients to help with microbial balance, especially in the digestive system. They are controlled as dietary supplements and foods and are made of *Lactobacillus* and *Bifidobacterium* species or *Saccharomyces boulardii* yeast. Probiotics work to benefit the body through a number of processes, including as reducing intestinal pH, preventing the colonisation and invasion of the body by harmful organisms, and altering the host immune system. Benefits of probiotics linked to a particular species or strain may not apply to others. Probiotics may help prevent conditions such antibiotic-associated diarrhoea, travellers' diarrhoea, irritable bowel syndrome (IBS), ulcerative colitis, Crohn's disease and vulvovaginal infections, hypertension, mental illness although more research is required to fully understand this. A probiotic should normally contain several billion germs to improve the likelihood that proper gut colonisation will occur, but there is no agreement on the minimum quantity of microorganisms that must be consumed to have a positive effect. Probiotics are typically seen to be safe and well tolerated, with bloating and flatulence being the most common side effects. Since systemic infections can infrequently happen, they should be used cautiously in patients who are very ill, highly immunocompromised, or those who have central venous catheters. Probiotics made from bacteria should be taken at least two hours apart from antibiotics.

Keywords: Probiotics,Traveller's diarrhoea , irritable bowel syndrome (IBS),Hypertension .

Introduction

The word "probiotics" is a Greek word that means "for life" Probiotics were described by an expert panel FAO (Food and Agriculture Organisation) and WHO commissiond as "live micro-organisms" which, when provided in sufficient proportions, impart a health benefit on the host. The bacterial genera *Lactobacillus, Bifidobacterium, Escherichia, Enterococcus, Bacillus,* and *Streptococcus* are the most frequently employed in probiotic formulations. Additionally, some Saccharomyces-related fungal strains have been utilised. Eli Metchnikoff, the 1908 Nobel Prize laureate, proposed that the long life of Bulgarian peasants was due to their consumption of fermented milk products, which is when the idea of probiotics first emerged. Lilly and Stillwell