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# **Academic Year 2023 – 2024**

**Details of books and chapters in edited volumes / books  
per teacher during the year**

## 3.4.4 Details of books and chapters in edited volumes / books per teacher during the year

| Sl. No. | Name of the Teacher   | Title of the Book published  | Title of the Chapter published   | Title of the proceedings of the conference | Name of the conference | National / International | Year and month of publication | ISBN of the Book/Conference Proceeding | Name of the Publisher         |
|---------|---|--|--|--|------------------------|--------------------------|-------------------------------|--|-------------------------------|
| 1       | Karthikumar S, Shyam Kumar R  | Sustainable Fillers/Plasticizers for Polymer Composites: Promising Resources                               | Present trends and prospects of synthetic and bio-plasticizers   | -  | -                      | -                        | 2024                          | 978-044315630-4; 978-044315631-1       | Elsevier                      |
| 2       | Shyam Kumar R   | Value Added Products From Bioalgae Based Biorefineries: Opportunities and Challenges                       | Nutraceuticals and functional foods from algae: Formulation and health benefits  | -  | -                      | -                        | May, 2024                     | 978-981971662-3; 978-981971661-6       | Springer Nature               |
| 3       | Amuthalakshmi R   | The Pulse of Cardiology  | Optimized transfusion and blood-saving techniques in cardiac anaesthesia   | -  | -                      | -                        | 2024                          | 979-889113819-3; 979-889113680-9       | Nova Science Publishers, Inc. |
| 4       | Mary Sindhuja NM  | Antennas for Industrial and Medical Applications with Optimization Techniques for Wireless Communication   | Design of microstrip patch antenna for skin cancer detection   | -  | -                      | -                        | 2024                          | 978-104025308-3; 978-103277497-8       | Taylor & Francis Group        |
| 5       | Alwyn Rajiv S   | Internet of Things and AI for Natural Disaster Management and Prediction                                   | Machine learning algorithms for natural disasters  | -  | -                      | -                        | 2024                          | 979-836934285-5; 979-836934284-8       | IGI Global                    |
| 6       | Balavairavan B  | Sustainable Fillers/Plasticizers for Polymer Composites: Promising Resources                               | Effective utilization of bio-fillers/plasticizers for biofilm preparation  | -  | -                      | -                        | 2024                          | 978-044315630-4; 978-044315631-1       | Elsevier                      |
| 7       | Sakthivel G, Prince Winston D Gurukarthik Babu B                                      | Renewable Energy for Plug-In Electric Vehicles: Challenges, Approaches, and Solutions for Grid Integration | Applications of possible renewable energy sources to electric vehicle powering   | -  | -                      | -                        | 2024                          | 978-044328955-2; 978-044328956-9       | Elsevier                      |
| 8       | Prithiviraj M, Kannan K, Palanikumar D, Sankara Narayana Murthy A, Muthu Natarajan S. | Springer Proceedings in Materials  | Multi Objective Optimization for Crashworthiness Parameters of Thin Walled Tubes with Optimal Alkali Treated Coir/Polyester Filled in Axial Quasi Static Loading Using Grey Relation Analysis and ANNOVA | -  | -                      | -                        | 2024                          | 10.1007/978-981-97-7071-7_35           | Springer                      |
| 9       | Shyam Kumar R   | Microorganisms for Sustainability  | The Beneficial Plant Microbial Association for Sustainable Agriculture   | -  | -                      | -                        | 2023                          | 10.1007/978-981-19-5029-2_7            | Springer                      |
| 10      | Rajavel A, Praveen Kumar P, Anandh A  | Internet of Things   | Fault Sensor Detection and Authentication Mechanism for Improving Quality of Services in Smart Homes   | -  | -                      | -                        | 2024                          | 10.1007/978-981-97-0052-3_13           | Springer                      |
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| 12      | Shyam Kumar R   | Cyanobacteria: Metabolisms to Molecules  | Cyanobacterial interactions and symbiosis  | -  | -                      | -                        | 2023                          | 978-044313231-5; 978-044313232-2       | Elsevier                      |
| 13      | Leelarani K   | Lecture Notes on Data Engineering and Communications Technologies  | A Review of Decisive Healthcare Data Support Systems   | -  | -                      | -                        | 2023                          |  | Elsevier                      |

# Present trends and prospects of synthetic and bio-plasticizers

9

*Sankar Karthikumar, Shyam Kumar R, Jeyavarshini B, Shamyuktha T and Yakna Devi M*

Department of Biotechnology, Kamaraj College of Engineering and Technology, Madurai, Tamil Nadu, India

## 9.1 Introduction

Plasticizers are synthetic chemicals that are added to polymers to improve mechanical characteristics such as processability and ductility. According to the International Union of Pure and Applied Chemistry, a plasticizer is defined as “any substance which will incorporate into a plastic or elastomer to increase its flexibility or distensibility.” Plasticizers are the most common additives used in the plastics industry. They are frequently found in polyvinyl chloride (PVC)-based goods, food packaging, children’s toys, healthcare devices, and adhesives. Around 30,000 compounds have the potential to be used as plasticizers. One of the most crucial additions needed for processing polymer materials is plasticizers, particularly 60% of auxiliary plastic production is accounted by PVC (Rajput et al., 2022). It is estimated that, globally 5 million tons of plasticizers are produced per year. More than 30 different plasticizers are commonly used to apply around 60 different polymers.

Plasticizers are one of the significant classes of low molecular and nonvolatile substances that are frequently employed as additives in the polymer industry. As shown in Fig. 9.1, plasticizers are capable of breaking intermolecular bonds between polymer chains and creating new bonds with OH groups on glucosidic units of polysaccharides. This makes chain motions easier and results in a more flexible substance with a lower glass transition temperature (Patrick, 2017). Further, the reduced crystallinity properties of a polymeric material greatly improve its plasticity. Plasticizers are primarily employed to reduce the rigidity, elastic modulus, brittleness, and hardness of a polymer (Vieira et al., 2011).

The most popular phthalate plasticizers are derived from petroleum. A significant amount of plasticizer manufacturing and usage is made up of phthalate plasticizers, but their usage is being regulated due to health and environmental concerns (Rahman & Brazel, 2004). Hence, strict guidelines for environmental safety and protection have been developed and are being followed. Research has focused on creating phthalate replacement. Biodegradable plasticizers that are safe to the environment offer a sustainable alternative to traditional additives, ensuring reduced ecological impact throughout their lifecycle. Global regulations for plastic additives are increasing as people’s awareness of environmental protection rises, particularly



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***Value Added Products From Bioalgae Based Biorefineries: Opportunities and Challenges*** • Pages 289 - 341 • 27 May 2024

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## Nutraceuticals and functional foods from algae: Formulation and health benefits

[Devaprakash M.<sup>a</sup>](#); [Thirumalaivasan R.<sup>a</sup>](#); [Sivakumar N.<sup>a</sup>](#) ; [Kumar, R. Shyam<sup>b</sup>](#); [Ponmurugan K.<sup>c</sup>](#)

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**Abstract**

Algae are a large and diverse group of autotrophic photosynthetic organisms in the aquatic environment that includes eukaryotic multicellular algae and unicellular prokaryotic cyanobacteria. Algae comprise proteins, amino acids, fatty acids (PUFA), vitamins, polysaccharides, pigments, and other secondary metabolites. Algae are considered as suitable vegetable-like food sources and are also used as supplements for healthy food. The presence of bioactive metabolites and beneficial compounds in some macro-and microalgae can be an active ingredient for various nutraceuticals and healthcare medicines. Algae also represent a valuable source of minerals, antioxidants, and natural colorants; hence, the whole algae biomass and the extracted compounds have used as active food and feed supplements for infant food and specialist food for some diseased patients. This chapter outlines the food, feed, nutrient, and nutraceutical uses of macro-and microalgae and their health benefits along with special function food formulations. © The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd. 2024. All rights reserved.

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Modification of Microencapsulate Protein Crude Extract Formula from *Chlorella vulgaris* and *Spirulina platensis* for Baby Biscuit

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Book Chapter

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Book

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979-889113819-3, 979-889113680-9

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# Optimized transfusion and blood-saving techniques in cardiac anaesthesia

[Cladiya, Cerli<sup>a</sup>](#); [Thabitha Zelin Rachel V.<sup>b</sup>](#); [Amuthalakshmi, Rajavel<sup>a</sup>](#); [Manibalan, Subramaniyan<sup>a</sup>](#)

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**Abstract**

Blood transfusion during cardiac anaesthesia is essential for improving patient outcomes and reducing the complications associated with blood transfusions. Patients who undergo cardiac surgery have a perilous risk of bleeding and often require a significant amount of blood transfusions. However, blood transfusions can cause unpropitious reactions such as transfusion reactions, infections, and immunological reactions, leading to complications and prolonged hospitalization. To address this, patient blood management (PBM) protocols have been implemented to minimize blood loss and optimize patient blood volume. PBM protocols involve preoperative evaluation, intraoperative blood conservation, and postoperative care. Intraoperative blood conservation techniques include the use of cell-saver machines that collect and re-imbue a patient's own blood lost in course of the surgery, which reduces the call for donor blood transfusions and minimizes the risks involved with blood transfusions. Antifibrinolytic agents, minimally invasive surgical techniques, and bedside testing devices are also accustomed to monitor coagulation status and guide the control of blood products and anticoagulants. Pharmacological interventions such as erythropoietin and iron supplementation can also multiply the patient's red blood cell mass, decreasing the need for blood transfusions. Moreover, setting transfusion triggers can determine when a patient requires blood transfusion, preventing unnecessary transfusions. Saving blood in transfusion during cardiac anaesthesia requires a comprehensive approach involving a multidisciplinary team of anaesthesia, surgery, and blood bank specialists. By using a combination of techniques and strategies, clinicians can cut back on blood loss, reduce the call for blood transfusions, and improve patient outcomes. This results in shorter hospital stay, reduced risk of complications, and improved complete quality of life for the patients. © 2024 Nova Science Publishers, Inc. All rights reserved.

**Author keywords**

And operative management; Blood conservation; Cardiac surgery; Coagulation; Transfusion

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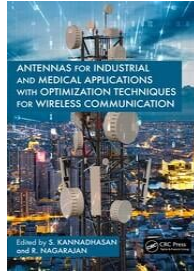
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## Chapter



## Design of microstrip patch antenna for skin cancer detection

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### ABSTRACT

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# Machine learning algorithms for natural disasters

Deborah, Nancy<sup>a</sup>; Rajiv, Alwyn<sup>b</sup>; Vinora A.<sup>a</sup>; Sivakarathi G.<sup>a</sup>; Soundarya M.<sup>a</sup>

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## Abstract

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## Abstract

Natural disasters require quick and precise reactions for preparedness, mitigation, and response activities because they pose serious risks to infrastructure, human lives, and the environment. The incorporation of machine learning (ML) algorithms has become a viable strategy to improve natural disaster management in a number of ways in recent years. Early warning systems and risk assessment frameworks are made possible by predictive models that are able to identify patterns, anomalies, and risk factors from a variety of data sources thanks to techniques like supervised learning, unsupervised learning, and deep learning. The application of machine learning algorithms to natural disaster management poses a number of issues and concerns, notwithstanding its potential advantages. By combining various data sources, sophisticated analytics, and real-time decision support systems, machine learning (ML) algorithms enable stakeholders to more effectively and resiliently prepare for, mitigate, and respond to natural catastrophes. © 2024, IGI Global. All rights reserved.

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# Effective utilization of bio-fillers/plasticizers for biofilm preparation

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**Abstract**

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**Abstract**

The bio-fillers and plasticizers are considered to add value (volume) to biocomposite films. The addition of bio-fillers with natural polymers leads to enhancing the biofilm characteristics. Agro-industrial waste and household garbage are used in this context as fillers to create biofilms for packaging applications because they are inexpensive and widely available. Biopolymers, such as starch, protein, and pectin, have been considered the most promising materials for generating biodegradable packaging films. Yet, because of the fragility and brittleness displayed during thermoformation, they often have poor mechanical characteristics in terms of processability and end-use. To address this issue, plasticizers are included to provide the required workability to the biopolymers. Natural and biodegradable plasticizers having low toxicity and good compatibility are utilized to enhance the properties of biofilms. This chapter discusses the effective utilization of bio-fillers and plasticizers in polymeric biofilms. © 2025 Elsevier Ltd All rights are reserved including those for text and data mining AI training and similar technologies.

**Author keywords**

agro-industrial waste; Bio-fillers and plasticizers; bio-fillers reinforced packaging films; cellulose-based biofilms; lignocellulosic bio-fillers; sources of bio-fillers and plasticizers

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# Applications of possible renewable energy sources to electric vehicle powering

Sakthivel G.<sup>a</sup>; Prince Winston D.<sup>a</sup>; Gurukarthik Babu B.<sup>a</sup>; Gokila M.<sup>b</sup>

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<sup>a</sup> EEE, Kamaraj College of Engineering and Technology, Tamil Nadu, Virudhunagar, India

<sup>b</sup> Government College of Engineering, Anna University, Tamil Nadu, Coimbatore, India

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Abstract

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## Abstract

Globally, the electric vehicle markets have seen a surge in the last decade despite having several challenges. The usage of electric vehicles has grown significantly in the places like Europe, China, North America, and India. In the automotive sector, electric vehicles have seen a small increase in the market share. Electric cars and scooters have become popular. In order to support the growing electric vehicle (EV) market, the charging facilities have to be increased. Several factors like very high initial cost and limited charging facilities influence the selection of EVs to internal combustion EV. This section compares the state of charge of batteries used in electric vehicles that are charged from various sources like solar photovoltaic, wind, and fuel cells. © 2024 Elsevier Inc. All rights reserved.

## Author keywords

automotive engineering; chemical reaction; electrochemical energy conversion; electromagnetics; Power engineering

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Analyzing the Outdoor Performance of Different Types of PV Module Technologies

# Multi Objective Optimization for Crashworthiness Parameters of Thin Walled Tubes with Optimal Alkali Treated Coir/Polyester Filled in Axial Quasi Static Loading Using Grey Relation Analysis and ANNOVA



M. Prithiviraj, K. Kannan, D. Palanikumar, A. Sankara Narayana Murthy, and S. Muthu Natarajan

**Abstract** In the quest of enhancing crashworthiness while maintaining lightweight characteristics in transportation manufacturing, this study focuses on optimizing the crashworthiness parameters of thin-walled steel tubes filled with Coir, a natural fiber material, using a combination of optimal alkali-treated Coir and Polyester as matrix under axial quasi-static loading conditions. The circular tubes were taken for the experiment due to its natural high specific energy absorption nature than all other shapes. The experiment involves gradually filling the tubes with Coir, ranging from empty, 33%, 66% to 100% filling, to investigate its impact on parameters such as energy absorption, compressibility, mean absorbing load, and specific energy absorption capacity. The bumper element is packed internally with the Coir to seek the advantage of natural fiber environmental benefits. And by experiment the initial force (3.4%) required to trigger the displacement in the thin-walled tube were compared and found to be of much less difference even though the energy absorption capacity (25.51%), compressibility (84.3%), mean absorbing load (19.59%) and Specific energy absorption capacity (69.08%) is seemed show the improvements by fiber fill in the thin-walled tube. The study also employs Grey Relation Analysis and ANNOVA to optimize and validate the multi-objective optimization process.

**Keywords** Impact absorbers · Quasi static loading · Grey relational optimization

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Virudhunagar, Tamil Nadu, India  
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# The Beneficial Plant Microbial Association for Sustainable Agriculture

[Natesan, Sivakumar<sup>a</sup>](#) ; [Rajaram, Shyamkumar<sup>b</sup>](#); [Manoharan, Devaprakash<sup>a</sup>](#); [Ramachandran, Thirumalaivasan<sup>a</sup>](#)

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<sup>a</sup> Department of Molecular Microbiology, School of Biotechnology, Madurai Kamaraj University, Tamil Nadu, Madurai, India

<sup>b</sup> Department of Biotechnology, Kamaraj College of Engineering and Technology, Tamil Nadu, Virudhunagar, India

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**Abstract**

Microbes are ubiquitous and can associate to colonize plants and exhibits different modes of interactions. Plant beneficial microbes could colonize both the phyllosphere and rhizosphere to promote the various aspect of plant growth and other various compartments in plants. These beneficial microbes are generally called plant growth-promoting microbes (PGPMs), they can become an excellent alternative to remove or reduce the use of various toxic agrochemicals including synthetic chemical fertilizers and biocides. The association of PGPMs provides nutrients, protection against pathogens as well as various environmental stress responses either direct or indirect mechanisms. The soil and rhizosphere microbes beneficially associate either the root surface or phyllosphere region

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Phytoremediation: Harnessing plant power and innovative technologies for effective soil remediation

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# Fault Sensor Detection and Authentication Mechanism for Improving Quality of Services in Smart Homes

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Abstract

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## Abstract

Smart city improves the welfare of the citizens using information and communication technology. The Smart city also helps to increase the efficiency of government operations as well as the quality of government operations. Smart homes are an integral component of a smart city, empowering individual home owners to contribute a sustainable and livable urban environment. A Smart home uses various Internet of Things (IoT) sensors. Sensors are critical components of the system because they collect valuable informations and the accompanying communication networks that convey the data in real-time. The precise values measured by sensors indicate the sort of regulating measure that must be done. Malfunction will likely lead to a fluctuation in the measured value of sensors, which will have an impact on the smart home's overall optimization. It is therefore essential to determine if all of the sensors attached to a smart home system are functioning properly as a result of this. Furthermore, the data measured from the sensor must be confirmed to ensure that it is received from the actual device. Data hacking by another device may cause unintended complications. Thus, in this chapter, we propose a fault sensor detection and authentication mechanism for improving the quality of services in smart homes. This chapter presents a fault identification

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# Healthcare technologies for pregnant women

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### Abstract

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### Abstract

Monitoring the health conditions of pregnant women is very important and a vital task for ensuring the wellbeing of the pregnant women and the fetus. Technological advancements are exponentially increasing and the same can be used to provide healthcare services for pregnant women. Healthcare for mothers and children is widely valued by governments as a component of public health. During this time, pregnant women and their unborn children are especially vulnerable to medical crises. To avoid health issues and guarantee a baby's healthy development, prompt medical care is essential. Pregnant women can completely manage their own health with the help of data mining, analysis, interpretation, and expert medical guidance. What's more crucial is that wearables for pregnant women quickly assist in disclosing health concerns and high-risk factors, allowing hospitals to perform prompt interventions. This leads to the increasing need for healthcare technologies for pregnant women. © 2023, IGI Global. All rights reserved.

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## Cyanobacterial interactions and symbiosis

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 [Thirumalaivasan, Ramachandran<sup>a</sup>](#);
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### Abstract

Cyanobacteria, also known as blue-green algae, are photoautotrophic, morphologically diverse groups of Gram-negative prokaryotes that have evolved oxygenic photosynthesis. Cyanobacteria consist of unicellular and filamentous forms that can grow either as free-living or in colonies to produce biofilm or bloom-like growth. Cyanobacteria are ubiquitous, important components of the biosphere, and occur in both terrestrial and aquatic habitats. The filamentous cyanobacteria have different specialized cells, such as short vegetative hormogonia, nitrogen-fixing heterocyst, and thick-walled akinetes. Many unicellular and filamentous cyanobacteria grow in association with other single-cell prokaryotes and eukaryotic protists, metazoans, or plants. The long-lasting mutual symbiotic is called symbiosis, which provides an ambient environment for the survival of both associative partners along with desirable physiological modification and gene expression. This chapter summarizes the knowledge related to the interaction of cyanobacteria with another host for developing symbiosis, specifically with protists

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# A Review of Decisive Healthcare Data Support Systems

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## Abstract

Health practice has to be accountable not only for expertise and nursing abilities but also for the processing of a broad variety of details on patient treatment. By successfully handling the knowledge, experts will consistently establish better welfare policy. The key intention of Decision Support Systems (DSSs) is to provide experts with knowledge where and when it is needed. Therefore, these systems have experience, templates and resources to enable professionals in different scenarios to make smarter decisions. It seeks to address numerous health-related challenges by having greater access to these services and supporting patients and their communities to navigate their health care. This article describes an in-depth examination of the classical intelligent DSSs. Also, it discusses the recent developments in smart systems to support healthcare decision-making. A comparative analysis is presented regarding their strengths and challenges in such DSSs to suggest a solution to make smarter decisions. © 2023, The Author(s), under exclusive license to Springer Nature Singapore Pte Ltd.

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