

Literature Review

Presented by

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Instructions

Ask Question after Presentation

Follow step by step online demonstration

Write review article from thesis literature Review

Use tools properly during LR

مطادة البحث العلمي
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Preliminary Literature Survey

Where to search

Scopus

Science direct

SciFinder

Google Scholar

Google

What to look for

Areas covered in this field

Recent trends in publication on that topic

Which publish paper look like your topic

- Scopus.
- .Science direct
- .Google Scholar
- .Writing Literature Review

- Review article
- .Thesis
- .Case Study

Contents

- Scopus-Facts and Figures
- Scopus-Go beyond search
- Authors
- Institution
- Sciencedirect



- Scopus
- Sciencedirect
- Google scholar
- Web of science

مملكة البيت العلمي
DEANSHIP OF SCIENTIFIC RESEARCH



No of Scopus Indexed papers : 499
Scopus H-index : 57
Google Scholar H-index : 69
No of citations in Scopus : 15470
No of citations in Google Scholar : 21914
Postgraduates Supervision : Graduated 26 PhD
(6-Chairman, 20-Member)
: 06 PhD ongoing as Main
Supervisor and 13 as Member
: 3 Masters passed as Main
Supervisor and 10 as Member
: 1 Masters ongoing as Main
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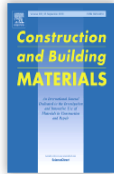


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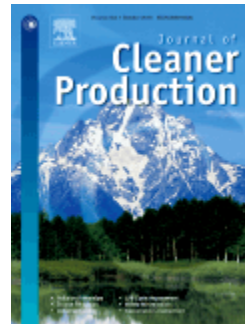
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Volume 172, January 2018, Pages 566-581

M. R. Sanjay | P. Madhu | Mohammad Jawaid | P.
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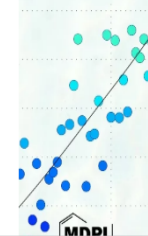
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Citations	Article
1288	Review: Poly Lactic-co-Glycolic Acid (PLGA) as Biodegradable Controlled Drug Delivery Carrier by Hirenkumar K. Makadia and Steven J. Siegel
582	Review: Cellulosic Bionanocomposites: A Review of Preparation, Properties and Applications by Gilberto Siqueira, Julien Bras and Alain Dufresne
491	Review: Thermoresponsive Polymers for Biomedical Applications by Mark A. Ward and Theoni K. Georgiou
335	Review: Antimicrobial Polymers in Solution and on Surfaces: Overview and Functional Principles by Felix Sledenbiedel and Joerg C. Tiller
286	Review: New Strategies in the Development of Antimicrobial Coatings: The Example of Increasing Usage of Silver and Silver Nanoparticles by Menno L. W. Knetsch and Leo H. Koole
280	Review: Dispersion of Carbon Nanotubes: Mixing, Sonication, Stabilization, and Composite Properties by Yan Yan Huang and Eugene M. Terentjev
225	Review: The Use of Natural Polymers in Tissue Engineering: A Focus on Electrospun Extracellular Matrix Analogues by Scott A. Sell, Patricia S. Wolfe, Koyal Garg, Jennifer M. McCool, Isaac A. Rodriguez and Gary L. Bowlin
223	Review: Water Soluble Polymers for Pharmaceutical Applications by Veeran Gowda Kadajji and Guru V. Betageri
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139	Review: A Review on Potentiality of Nano Filler/Natural Fiber Filled Polymer Hybrid Composites by Naheed Saba, Paridah Md Tahir and Mohammad Jawaid



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What were the key drivers of usage in 2014?

- Better links in Google Scholar so that the researcher at institutions who have opted-in to share holdings information with Google can see whether they have access to the authorized, full-text from ScienceDirect on the search results page of Google Scholar (for more detail on this visit elsevier.com)
- Streamlining the article page, based on behavioural data that allows the ScienceDirect team to continue to improve the article page, the most visited page on ScienceDirect, to better support the needs of the researcher
- Better quality service, driven by continually decreasing the amount of bugs and defects in ScienceDirect

Driving forces

- Speed – ScienceDirect is 10% faster by end of 2014 than end of 2013!
- More availability – downtime on a product such as ScienceDirect is detrimental to the researcher being able to effortlessly continue their research. Much focus in 2014 was therefore on managing ongoing reduction of the downtime
- Mobile website development – perhaps not the biggest usage driver itself, but nonetheless highly relevant in supporting the needs of the researcher to make full text content available on all mobile and tablet devices. Expect a lot more developments in this space in 2015!
- Further Mendeley integration - ScienceDirect is the biggest importer of content to Mendeley! We launched a number of areas in 2014 to allow for better integration with Mendeley, including seamless export of citation and full text to Mendeley, the export of 'recommended articles' and book citation content to Mendeley.



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- Identify and match an organization with its research output using Affiliation Identifier
- Identify collaborators or subject experts with Author Identifier
- Clarify your identity through integration with ORCID
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Analyze

- Track citations over time for a set of authors or documents, with Citation
- Overview/Tracker and set citation alerts
- Assess trends in search results with Analyze Results
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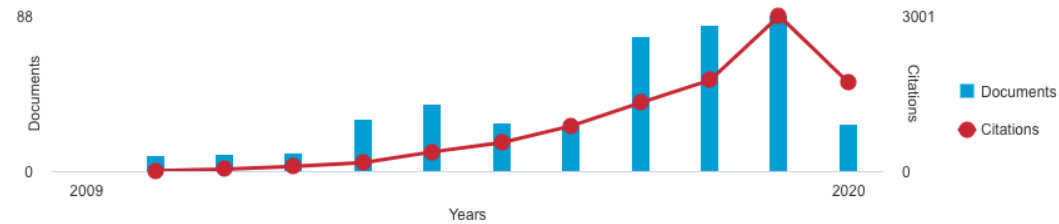


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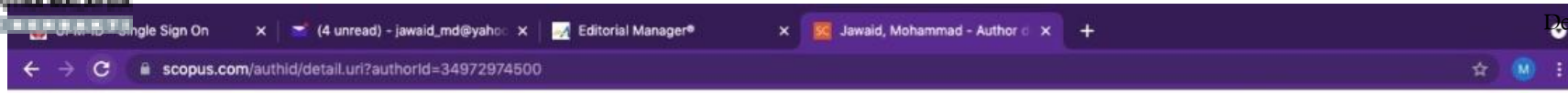
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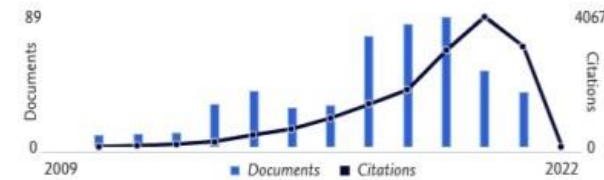
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Document & citation trends



Analyze author output Citation overview

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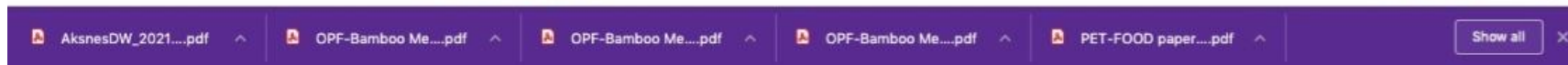
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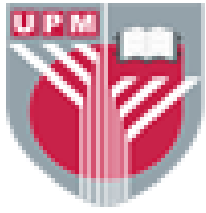
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- It aims to allow direct comparison of sources in different subject fields.



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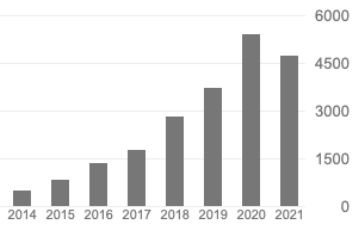
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Hybrid composites Biocomposite Natural fibre composites Polymer composites Composite Materials

TITLE	CITED BY	YEAR
Cellulosic/synthetic fibre reinforced polymer hybrid composites: A review M Jawaid, HPSA Khalil Carbohydrate polymers 86 (1), 1-18	1037	2011
Production and modification of nanofibrillated cellulose using various mechanical processes: a review HPSA Khalil, Y Davoudpour, MN Islam, A Mustapha, K Sudesh, ... Carbohydrate polymers 99, 649-665	938	2014
A review on natural fiber reinforced polymer composite and its applications L Mohammed, MNM Ansari, G Pua, M Jawaid, MS Islam International Journal of Polymer Science 2015	782	2015
Characterization and properties of natural fiber polymer composites: A comprehensive review MR Sanjay, P Madhu, M Jawaid, P Sentharamaikannan, S Senthil, ... Journal of Cleaner Production 172, 566-581	610	2018
Bamboo fibre reinforced biocomposites: A review HPSA Khalil, IUH Bhat, M Jawaid, A Zaidon, D Hermawan, YS Hadi Materials & Design 42, 353-368	578	2012
A review on dynamic mechanical properties of natural fibre reinforced polymer composites N Saba, M Jawaid, OY Alothman, MT Paridah Construction and Building Materials 106, 149-159	508	2016
Potential materials for food packaging from nanoclay/natural fibres filled hybrid composites K Maieed, M Jawaid, A Hassan, AA Bakar, HPSA Khalil, AA Salema	483	2013

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Literature Review



Outlines

- Introduction
- Literature Review
- Strategy and planning
- What things to choose and put in your Literature
- General Points consider before writing Literature Review
- Conclusions

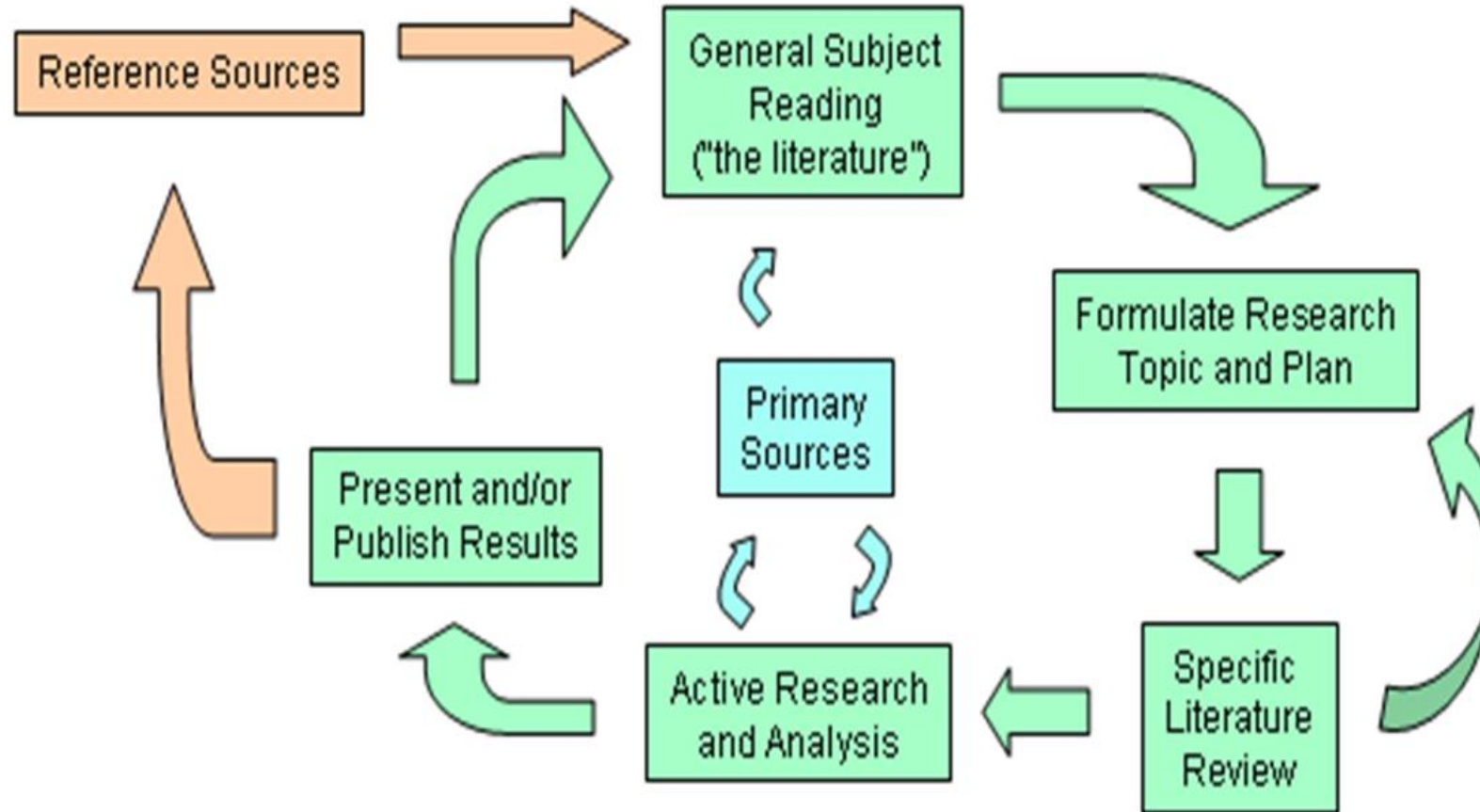
Literature Review

- A critical, analytical summary and synthesis of the current knowledge of a topic
- Compare and relate different theories and findings
- Should have a focus/theme to organize the review
- Does not need to be exhaustive but should cover significant, academic literature

Literature Review

- By literature review you able to find out what work done in this area and what not reported or carried out on specific topic.
- Cover basic information about topic, approaches, methodology, and specific issues or concepts
- Make it easier to examine contrasting perspectives, theoretical/practical approaches, Methodologies, Findings as well as try to find weakness and strength of present work and research gap.

Information Cycle in LR



Source: Missy Harvey, 2010

Writing the LR

- What is the purpose for the literature review and make sure your review specifically addresses your purpose(s).
- Write as you read, and revise as you read more.
- Writing a summary of an article when you read it helps you to think more carefully about the article.
- Having drafts and annotations to work with will also make writing the full review easier since you won't have to rely completely on your memory or have to keep thumbing back through all the articles.
- The first draft is for you, so you can tell yourself what you are thinking. Later you can rewrite it for others to tell them what you think.

What is Literature Review

- A LR is a **synthesis of primary sources** (mainly research papers/books/periodical presented in academic literature) on a given topic.
- A LR demonstrates that the **writer has thorough understanding of the literature** and can formulate a useful analysis.
- LR synthesizes the results from several primary research papers to produce a **coherent argument about a topic** or focused description of a field.

Think and Plan for Literature Review

- By the time when you decided to write Literature Review, think on following issues:

Purpose of your LR

Topic of your interest or choosing topic

Researching Topic

How to write the LR

A Key aspect of literature Review

- It provides the evidence for a particular point of view in a field.
- A large focus of your paper should be description of the data that support or refute (To prove to be false) that point of view.
- You should inform the reader of the experimental techniques that were used to generate the data.
- You need to read several original research article on the same topic and make your own conclusions about the meanings of those papers.

General Points

- Take notes, including **full citations (authors' names, journal, date and page number)** from each paper as you read it. Use **index cards or a word processor**.
- Index cards are nice in that you can shuffle them around, color code ideas on them, highlight etc.
- The advantage of using a word processor is that you will later be able to use your notes to cut and paste together the first draft, plus you'll have all your citations there already which saves time when building your citation list.
- Organize your notes. "Where did I read that?" is the plague of all writers. The better organized your notes, the less this is a problem.

- **Outline your paper before setting pen** to paper for anything else! This will help you to organize your thoughts and will markedly improve the overall quality of your final product.
- Don't be afraid to write your ideas down before they are perfectly formed. If you can get them down on paper, **you can place them in a logical sequence** and develop them into a **flowing presentation later**.
- Use the draft system: **Write a first draft. Leave it for a day or two.** Come back to it and revise it as much as you can, then let someone read it. Once they have read it, revise the paper again.

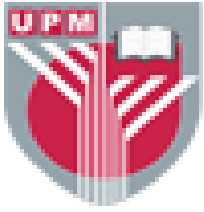


Choosing which sources to cite

- The number of sources you will have to go through depends mainly on **how much interest your topic** has generated among researchers.
- Try to choose **only the most representative and informative ones**.
- You should make sure that the number of sources you choose to cite is **reasonable for the total length of your article**. When in doubt, always consider your readers – you're not writing to show them how many studies you have read, but to **give them an informative and complete overview of the topic**.
- For example, if there are two sources that essentially cover the same content without offering different perspective, you can consider leaving out one of them.

Choosing which sources to cite

- When you are doing the literature research on your topic, always keep in mind that the **sources you choose to cite should be as up-to-date as possible**. Your readers won't get much insight of the problem if you're summarizing the state in which the theories were two decades ago.
- If you can't go into much detail about some theoretical perspective or experimental approach, **refer your readers to sources which will give them more information**.
- Don't just expect that they will figure out things just as easily as you do, because **some of your readers may have little knowledge in the topic**.
- The skillful and considerate writer is able to anticipate the questions of his readers and to answer them as they read along.



Evaluating the literature critically

- When you are reading the literature on your topic, **don't just passively assimilate all the information**. Try to analyze it critically and to detect any possible inconsistencies like theoretical issues, methodological flaws, sample size and generalizations.
- A good Literature Review will not only summarize the information, but also **point out weaknesses** in the experimental procedures as well as possible theoretical conflicts.
- It builds on the current knowledge by **identifying gaps in the available literature** and **suggesting future directions for research**.
- This will not only allow you to ask new questions about the problem, but also to put the old questions in new context.

Writing in an unbiased manner

- Your readers will **not gain much from reading your Literature review** if it fails to deliver a holistic and bias-free approach to the problem.
- The reviewers of your work will not be all too happy to read a literature **review that is clearly biased in favour of a single point** of view, since the odds are that at least one of them will have views different from your own (Sternberg, 2003).
- Make sure that **you're not leaving out works** that are clearly relevant to your topic.
- Ask yourself questions like: Did I **point out any weaknesses of my perspective**? Did I discuss studies contrary to it?

What goes in Literature Review

- When writing a Literature review your job is to present what is known about a specific topic and to **synthesize all the unconnected threads of the individual studies into an integrated** "State of the Science" type of literature review.
- In your LR you will outline the **overall picture of your topic area** it is currently understood by scientists in that field.
- Your LR should **clearly outline any problems** that are currently being addressed, and explain the basis of any conflicts that exist between experts in the field.

What goes in Literature Review

- If there are important conflicts **as a reviewer you are in a position to suggest which side of the conflict** has the weight of evidence supporting it and why.
- For conflicts which, in your opinion, do not yet have a clear resolution, you are also in a position to **make suggestions as to the types of experiments need to be done to resolve those arguments.**

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Conclusions

- Do literature review thoroughly while putting in mind that I want to write review article on my LR.
- Writing Literature Review is a difficult business.
- It is critical to comments and analyze published work in research field.
- Published Literature Review as Review article will give you respect and name in your field.
- Chances of getting higher citation of review article as compared to research article.
- But in the meantime, Review article published by high impact journals.



Review

Cellulosic/synthetic fibre reinforced polymer hybrid composites: A review

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Hybrid composites

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ABSTRACT

Present review deals with the recent development of cellulosic/cellulosic and cellulosic/synthetic fibres based reinforced hybrid composites. Hybrid composites made up of two different cellulosic fibres are less common compare to cellulosic/synthetic fibre, but these are also potentially useful materials with respect to environmental concerns. Hybrid composites fabrication by cellulosic fibres is economical and provide another dimension to the versatility of cellulosic fibre reinforced composites. As a consequence, a balance in cost and performance could be achieved through proper material design as per directive of Europe states by 2015. Recent studies relevant to hybrid composites have cited in this review. This work intended to present an outline of main results presented on hybrid composites focusing the attention in terms of processing, mechanical, physical, electrical, thermal and dynamic mechanical properties. Hybrid composites are one of the emerging fields in polymer science that triumph attention for application in various sectors ranging from automobile to the building industry.

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Review

Bamboo fibre reinforced biocomposites: A review

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ABSTRACT

The reduction in harmful destruction of ecosystem and to produce low cost polymeric reinforced composites, the researchers are emerging with policies of manufacturing the composites using natural fibres which are entirely biodegradable. These policies had generated safe strategies to protect our environment. The utilization of bamboo fibres as reinforcement in composite materials has increased tremendously and has undergone high-tech revolution in recent years as a response to the increasing demand for developing biodegradable, sustainable, and recyclable materials. The amalgamation of matrix and natural fibres yield composite possessing best properties of each component. Various matrices used currently are soft and flexible in comparison to natural fibres their combination leads to composite formation with high strength-to-weight ratios. The rapid advancement of the technology for making industry products contributes consumer the ease of making a suitable choice and own desirable tastes. Researchers have expanded their expertise in the product design by applying the usage of raw materials like bamboo fibre which is stronger as well as can be utilized in generating high end quality sustainable industrial products. Thereby, this article gives critical review of the most recent developments of bamboo fibre based reinforced composites and the summary of main results presented in literature, focusing on the processing methodology and ultimate properties of bamboo fibres with polymeric matrices and applications in well designed economical products.

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1. Introduction

The soaring prices of raw materials for engineering and standard plastics, the future sustainability of natural reservoirs and threat to environment have forced to use natural redeemable materials for development and fabrication of polymer composites [1,2]. The use

natural fibres are of vital economic importance: for example, cotton in some West African countries, jute in Bangladesh and sisal in Tanzania [1].

The countries where there is scarcity of forest resources, agricultural crops have been utilized for developments and research on polymer composites. Bamboo is one of the agricultural crops



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Review

Potential materials for food packaging from nanoclay/natural fibres filled hybrid composites

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ABSTRACT

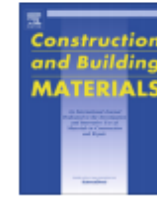
The increasing demand for new food packaging materials which satisfy people requirements provided thrust for advancement of nano-materials science. Inherent permeability of polymeric materials to gases and vapours; and poor barrier and mechanical properties of biopolymers have boosted interest in developing new strategies to improve these properties. Research and development in polymeric materials coupled with appropriate filler, matrix-filler interaction and new formulation strategies to develop composites have potential applications in food packaging. Advancement in food packaging materials expected to grow with the advent of cheap, renewable and sustainable materials with enhanced barrier and mechanical properties. Nanoparticles have proportionally larger surface area and significant aspect



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Construction and Building Materials

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Review

Mechanical properties of kenaf fibre reinforced polymer composite: A review



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HIGHLIGHTS

- Kenaf fibres regarded as potential materials for polymer composite based industries.
- Mechanical properties of kenaf fibre composite comparable to glass fibre composite.
- Kenaf composites nowadays used as construction materials for different buildings.

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ABSTRACT

Kenaf regarded as an industrial crop in Malaysia and also grown commercially in other part of world for different applications. It is certainly one of the important plants cultivated for natural fibres globally, next to cotton, which is endemic to ancient Africa. It has great potential to use as automotive and construction materials due its long fibres derived from outer fibrous bark, the bast. Natural fibres such as kenaf getting attention of researchers and industries to utilize it in different polymer composites based products due to environmental awareness of consumers and government regulation in some countries. In many research studies, kenaf fibres are reinforced with polymer matrix to form fibre reinforced polymeric composites which perfectly improve the features of the polymers. Mechanical properties of kenaf fibres is comparable to existing materials and it will play an important role to utilize as the material of choice for a varied range of structural and non-structural industrial products with polymer matrix. The innumerable properties of kenaf fibres in original and reprocessed plastics are demonstrated by many recent studies and research efforts make it suitable construction materials (such as boards of different densities, breadths, along with fire and insect resistance). In this review work, we try to explore and highlights the previous work involving mechanical properties of kenaf fibre reinforced polymer composites to provide a perfect source of literature for doing further research in this topic to explore it as construction and building materials.

Review

A Review on Potentiality of Nano Filler/Natural Fiber Filled Polymer Hybrid Composites

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Abstract: The increasing demand for greener and biodegradable materials leading to the satisfaction of society requires a compelling towards the advancement of nano-materials science. The polymeric matrix materials with suitable and proper filler, better filler/matrix



Natural fiber reinforced conductive polymer composites as functional materials: A review



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ABSTRACT

Recent progress in the field of intrinsically conductive polymers (ICPs) as well as conductive polymer composites (CPCs) filled with natural fibers is reviewed here systematically. The possibilities of utilizing natural fibers as fillers for ICPs as well as CPCs to form natural fibers-conducting polymer composite materials have wide potentials in the modern industries. The unique characteristics such as electrical conductivity, mechanical strength, biodegradability and recyclability enabled them to be implemented in many novel and exciting applications including antennas, chemical sensors, tissue engineering, neural probes, biosensors, drug delivery, bio-actuators, fuel cells etc. The effects of fiber contents, fiber size, chemical treatment, temperature and moisture content on the dielectric properties of the conductive composites were reviewed. On the other hand, it was reported that relatively short natural fibers could modify the dielectric response of the polymeric matrix, but chemical treatment had negative effects on such composites and could decrease the dielectric loss factor.

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Potential of bioenergy production from industrial kenaf (*Hibiscus cannabinus* L.) based on Malaysian perspective



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ABSTRACT

Nowadays, the energy requirement of increasing population is creating energy crisis, and it's become a serious and alarming threat for sustainability of natural resources. Moreover, upcoming demand of energy requirement is growing faster in developing countries as compared to developed ones. Malaysia is one of the fastest growing, developing countries, which is experiencing drastic and regular growth in population and economy in the recent years. It is an urgent requirement for the government and policy makers to explore alternative energy sources to accomplish upcoming demands of a growing population in the form of energy sufficiency. Malaysia is blessed with tropical and sub-tropical climates, which are suitable for exploring the green agriculture and forest potential. Most of the available energy resources in the form of fossil fuels have already been explored, and it is expected that energy demand will grow continuously by two to three fold in the next decades. Biomass resource is abundant in Malaysia. This can be considered as an alternative source of renewable and sustainable energy, with a promising future to fulfil continuous and uninterrupted supply of energy. Agricultural biomass such as Industrial Kenaf (*Hibiscus cannabinus* L.) has been successfully investigated as a great potential to be used as a renewable and sustainable feedstock for the production of bio-energy. Kenaf regarded as a traditional crop of Malaysia. Kenaf biomass would appear as a potential material for great sustainable energy (bioethanol, biohydrogen, bioenergy) supplier in the coming future. In this review, we have provided an insight of kenaf biomass, its morphology, structure, chemical compositions, storage and sowing, cultivation, harvesting, yield and different sustainable energy possible to get from it. We also discuss the feasibility of kenaf biomass as a sustainable energy source supplier in Malaysian prospective.

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A Review on Quality Enhancement of Oil Palm Trunk Waste by Resin Impregnation: Future Materials

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Oil palm trunk (OPT) is a solid waste obtained in large quantities after the felling of oil palm trees and is available year-round. Scientists and industrialists face difficulties in utilizing these solid wastes for different applications due to great variations in their physical and mechanical properties. Because OPT consists of lignocellulosic materials, its cellulosic material is utilized in the production of panel products such as particleboard, medium density fibreboard, mineral-bonded particleboard, block board, and cement board. In order to control the OPT waste, it is essential to consider its alternative utilization inside buildings as lightweight construction materials and furniture. The impregnation of different resins in wood and non-wood materials can improve the quality of the OPT, making it possible to utilize OPT as raw materials for different applications. The enhanced properties and good appearance of impregnated OPT have found use in high-grade furniture and housing materials. In order to further evaluate its potential, this review has been compiled for the detailed study of various properties, characteristics, and applications of OPT.

Keywords: Quality enhancement; Oil palm trunk; Impregnation; Characteristic of oil palm trunk

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Review Article

A Review on Pineapple Leaves Fibre and Its Composites

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Natural fibre based composites are under intensive study due to their ecofriendly nature and peculiar properties. The advantage of natural fibres is their continuous supply, easy and safe handling, and biodegradable nature. Although natural fibres exhibit admirable physical and mechanical properties, it varies with the plant source, species, geography, and so forth. Pineapple leave fibre (PALF) is one of the abundantly available wastes materials of Malaysia and has not been studied yet as it is required. A detailed study of chemical, physical, and mechanical properties will bring out logical and reasonable utilization of PALF for various applications. From the socioeconomic prospective, PALF can be a new source of raw material to the industries and can be potential replacement of the expensive and nonrenewable synthetic fibre. However, few studies on PALF have been done describing the interfacial adhesion between fibres and reinforcement compatibility of fibre but a detailed study on PALF properties is not available. In this review,

Recent advances in epoxy resin, natural fiber-reinforced epoxy composites and their applications

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Abstract

The versatile characteristic of epoxy and its diversity made it suitable for different industrial applications such as laminated circuit board, electronic component encapsulations, surface coatings, potting, fiber reinforcement, and adhesives. However, the pervasive applications in many high-performance field limited the epoxy use because of their delamination, low impact resistance, inherent brittleness, and fracture toughness behavior. The limitations of epoxy can be overcome by incorporation and modification before their industrial applications. Currently, modified epoxy resins are extensively used in fabrication of natural fiber-reinforced composites and in making its different industrial products because of their superior mechanical, thermal, and electrical properties. Present review article designed to be a comprehensive source of recent literature on epoxy structure, synthesis, modified epoxy, bio-epoxy resin, and its applications. This review article also aims to cover the recent advances in natural fiber-based epoxy composites and nanocomposites research study, including manufacturing techniques and their different industrial applications.

A review on flammability of epoxy polymer, cellulosic and non-cellulosic fiber reinforced epoxy composites

N. Saba^a, M. Jawaid^{a,b*}, M. T. Paridah^a and O. Y. Al-othman^b

Natural fiber is well-known reinforcement filler in polymer-matrix composites. Composite components like organic polymers and natural fibers are natural fire conductors as the natural fiber consists of cellulose, hemicellulose, and lignin, and hence are as highly flammable as wood. Natural fiber reinforced composite materials are progressively being used in a variety of applications where their fire response is a hazardous consideration, for example, in the automotive (transportation) and building-construction industries. As a result, an awareness of their performance or response during a fire and the use of conventional fire retardants are of great importance, as they are subject to thermal decomposition when exposed to intensive high heat or fire sources. In this review paper, fire flammability is the main concern for cellulosic and non-cellulosic fiber-reinforced polymer composites, especially epoxy composites. This paper reviews the literature on the recent developments in flammability studies concerning polymers, epoxy polymers, cellulosic-fibers, and non-cellulosic fiber-reinforced epoxy bio-composites. The prime objective of this review is to expand the reach of “fire retardants for polymer materials and composites” to the science community, including physicists, chemists, and engineers in order to broaden the range of their applications. Copyright © 2015 John Wiley & Sons, Ltd.

Keywords: natural fiber; epoxy polymer; composite; fire retardants; flammability properties

INTRODUCTION

Because natural fiber is renewable and sustainable, natural fiber-reinforced polymer composites (NECs) have received much

applications as it leads to loss of mechanical properties of the composite, it is also associated with major health risks during incidental fire events, consequently a major challenge.^[9] However, the addition of fire retardants will preserve its thermal

A Review on Roselle Fiber and Its Composites

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Recently, due to increasing environmental concerns, scientists and researchers have been replacing synthetic fibers with natural fibers as the main component in composites. Roselle is one suitable natural fiber. The plant's history, physical description, cultural methods, and usages were explained to further understand this potential plant. Based on a literature review, it is clear that extensive research has been performed on the fiber extraction methods, morphology, properties, and possible surface treatments of roselle to enhance its properties in the manufacturing of natural-fiber-reinforced polymer composites; however, no review has covered the properties and applications of roselle fibers in detail. Therefore, a review was performed on roselle to determine its potential to enable a better selection of materials to produce composites for potential applications in the construction and building, automotive, and aerospace industries.

Keywords: roselle fiber, mechanical properties, morphology properties, applications

Cassava: Its Polymer, Fiber, Composite, and Application

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Cassava is a type of plant which has different purposes of use. It is used to produce various foods, bio-fibers, bio-composites, and bio-polymers. Besides, it is now used as renewable energy source of starch. The intention of the paper is to focus on the importance of cassava fibers, polymers, and composites as well as its potential applications, another focus point of this research is the biodegradable polymer development which is taken out from cassava starch. Moreover, this work gives a comprehensive review about surface treatments as well as the most recent developments of cassava polymer/fiber based bio-composites and the summary of main result presented in the literature, focusing on properties of cassava composite and applications. These applications were related to various industrial application as well as others such as the production of xylenes, ethanol and bio-fuel, food, food packaging and cassava foam. POLYM. COMPOS., 38:555–570, 2017. © 2015 Society of Plastics Engineers

years, natural fibers have been used quite a lot and there seems to be an overall increase in the interest in its use. There are various advantages of these composites such as less tool wear, biodegradability, low cost, low density and availability. The generally common plant which is used in such applications is bast fibers like sisal, hemp, kenaf, jute, and flax [2]. Biodegradable plastics which are rich in cellulose and starch fibers apparently are the ones that undergo persistent growth with respect to usage. This is the time when researchers and scientists should study the potential hidden in fiber and polymer. They can be used for the development of biodegradable polymer with respect to the development of technology and science. With all that said, the environment should be taken care of during the aforementioned development [3]. With rice an maize being the first and second most significant source of calo-

CASE REPORT

Case study: survey of patient satisfaction with prosthesis quality and design among below-knee prosthetic leg socket users

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ABSTRACT

The aim of this case study was to explore patient satisfaction with the quality of prosthetic leg sockets intended for persons with lower limb amputations. A qualitative study based on in-depth interviews, preceded by a questionnaire session, was carried out with patients from the Rehabilitation Center and Hospital in Malaysia. Twelve out-patient and in-patient amputees with lower limb amputations, specifically below-knee amputations, were chosen randomly. The analysis of patients' narratives aimed to identify the functional and esthetic characteristics of currently used prosthetic leg sockets and any problems related to them. The obtained results indicated that out of the 12 participants, 41.7% and 25% were satisfied and somewhat satisfied with their current prosthetic sockets. Durability and comfort were rated by the participants as the most important characteristics of prosthetic sockets, with 83.3%. As regards the esthetic appearance of the socket, 66.7% of the respondents considered that the most important feature was the material from which the socket was fabricated. Thus, we conclude that current satisfaction levels with the quality of prosthetic sockets among amputees in Malaysia are suitable, prosthesis being preferred by many amputees. The results can be used to direct future research on cosmesis and functionality of prosthetic socket design.

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KEYWORDS

Qualitative study;
satisfaction and quality;
design of prosthesis socket;
below-knee amputation

► IMPLICATIONS FOR REHABILITATION

- Case study will help participants to get cost effective prosthetic leg socket.

REVIEW ARTICLE

An Overview on Polylactic Acid, its Cellulosic Composites and Applications

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Abstract: Poly lactic acids (PLA) received greater attention among other biodegradable plastics as they exhibit higher strength, stiffness, molecular weight and biocompatibility. PLA are polymers in which the stereo chemical structures are modified by polymerizing according to different versatile and flexible applications. The increased demands for PLA resins create a promising and attractive positive impact on the global agricultural economy by being nontoxic for both human body and the environment. However, the inherent brittleness of PLA essentially hampers its wide applications frame. PLA surface modification through blending, polymerization, filler and fiber reinforcement for fabricating high end composite products perfectly overcomes its shortcomings for various purposes. Present review article is designed to be a comprehensive source of recent literature on PLA structure, synthesis, modification and its different applications. This review article also aims to cover the reported research work of PLA biocomposites and nanocomposites, including manufacturing techniques and there diverge industrial applications.

Keywords: Biopolymer, lactic acid, polylactic acid, natural fibers, composites, nanocomposites.

1. INTRODUCTION

Bacterial fermentation of the renewable waste materials or
waste leads to the production of lactic acid. It is commercially



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Biomass and bioenergy: An overview of the development potential in Turkey and Malaysia



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Biogas

ABSTRACT

Among renewable energy sources, the share of biomass in total energy consumption in Turkey is increasing. Fuelwood and animal waste biomass are extensively used for heating and cooking in urban and rural areas. It has been estimated that Turkey has recoverable energy potential mainly originating from agricultural, livestock breeding, wood and forest processing, and municipality wastes. Annual production of wastes in the country amounts to 30 million tons. Turkey also produces 1.5 million tons of biodiesel, 3 million tons of bioethanol and 2.5–4.0 billion m³ of biogas per year. In Turkey, total biomass production is expected to reach a level of 52.5 Mtoe by 2030. Malaysia produces annually approximately 168 million tons of biomass, including timber, oil palm waste, rice husks, coconut trunk fibers, municipal and sugarcane wastes. Every year, nearly 58 million tons of palm oil mill effluent are produced in Malaysia. It has been estimated that the country has the potential to generate around 15 billion m³ of biogas annually. Estimates also show that Malaysia can produce more than 2400 MW of biomass and 410 MW of biogas, however, only 773 MW of the total potential was harnessed until 2011. The National Biomass Strategy 2020 proposes a scenario according to which an additional 20 million tonnes of oil palm biomass could be utilized by the year 2020 for higher value uses, which could significantly contribute to improving Malaysia's economy. Both countries have good potential to use biomass resources, but political backing and sustainable planning are necessary. In this review article, we try to compare future energy scenarios, renewable energy and biomass potentials of Turkey and Malaysia, while providing an insight into data on different biomass availability and its probable contribution to both nations' economies.

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