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Publisher: Ramanujan Society of Mathematics and Mathematical Scie ISSN: 0972-7752 E-ISSN: 2582-0850 Subject area: (Mathematics: Algebra and Number Theory) (Mathematics: Applied Mathematics)	SJR 2022 0.133	0
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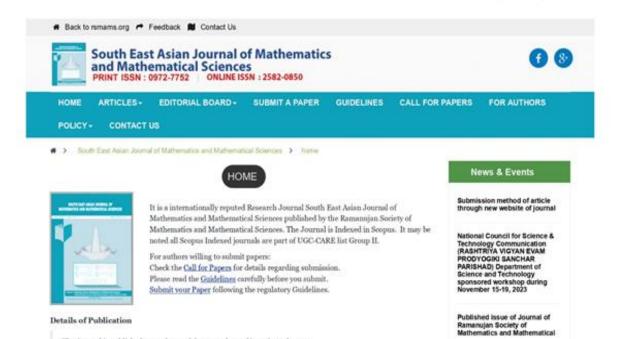
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South East Asian J. of Mathematics and Mathematical Sciences Vol. 19, No. 2 (2023), pp. 231-240

DOI: 10.56827/SEAJMMS.2023.1902.17 ISSN (Online): 2582-0850

ISSN (Print): 0972-7752

### FIRST ZAGREB MATRIX AND ENERGY OF A T2 HYPERGRAPH

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(Received: Aug. 22, 2023 Accepted: Aug. 26, 2023 Published: Aug. 30, 2023)

Abstract: Let H be a  $T_2$  hypergraph of order  $n \ge 4$ . The first Zagreb matrix of H, denoted by Z(H) is defined as the square matrix of order n, whose  $(i, j)^{th}$  entry is  $d_i + d_j$  if  $x_i$  and  $x_j$  are adjacent and zero for other cases. The first Zagreb energy ZE(H) of H is the sum of the absolute values of the eigenvalues of Z(H). It is shown that, for a  $T_2$  hypergraph  $ZE(H) \le \left\lceil \frac{\sqrt{2}(n^2+3n+1)}{\sqrt{3}} \right\rceil$ .

Keywords and Phrases: T<sub>2</sub> hypergraph, first Zagreb matrix, first Zagreb energy.
2020 Mathematics Subject Classification: 05C65, 05C50.

### 1. Introduction

The basic definitions and terminologies of a hypergraph are not given here and we refer to it [2] and [11]. The concept of hypergraph was introduced by Berge in 1967. In 2017, Seena V and Raji Pilakkat introduced Hausdorff hypergraph,  $T_0$  hypergraph and  $T_1$  hypergraph [7], [8] and [9]. Based on [8] and [9] S. Sujitha and D. Sharmila introduced  $T_2$  hypergraph and studied Randic matrix and the corresponding energy in [10]. In 1977, Gutman [3] defind graph energy. In 2007, Nikiforov [6] extended the concept of graph energy to matrices. The first Zagreb energy was introduced by Nader Jafari Rad, Akbar Jahanbani and Ivan Gutman in [4] and later the same was studied by many authors. In this article, we study



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### Shu Ju Cai Ji Yu Chu Li/Journal of Data Acquisition and Processing

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Edited by: Editorial Board of Journal of Data Acquisition and

P.O. Box 2704, Beijing 100190, P.R. China

Computing Technology, CAS & China Computer Federation Undertaken by: Institute of Computing Technology, CAS Published by: SCIENCE PRESS, BEIJING, CHINA Distributed by:

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ISSN: 1004-9037 https://sjcjycl.cn/ DOI: 10.5281/zenodo.777279

#### THE UPPER CERTIFIED DOMINATION NUMBER OF A GRAPH

#### A. Janani1 and J. Befija Minnie2

Register Number: 20213042092001

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Abishekapatti, Tirunelveli-627012

#### Abstract

A certified dominating set D of vertices in a connected graph G is minimal certified dominating set if no proper subset of D is an certified dominating set of G. The upper certified domination number  $\lceil_{cer}(G)$  is the maximum cardinality of a minimal certified dominating set of G. It is shown that for every positive integers A and A with A with A with A such that A certified dominating set of A. It is shown that A certified dominating set of A is a such that A certified dominating set of A.

Keywords: upper certified domination number, certified domination number, domination number.

AMS Subject Classification: 05C69

#### 1. Introduction:

Let G = (V, E) be a finite, undirected graph without loops and multiple edges. Unless and otherwise stated, the graph G = (V, E) has n = |D| vertices and m = |E| edges. For basic definitions and terminologies, we refer to [4]. Two vertices u and v are said to be adjacent if uvis an edge of G. The open neighbourhood of a vertex v in a graph G is defined as the set  $N_G(v) =$  $\{u \in V(G): uv \in E(G)\}$ . While the closed neighbourhood of a vertex v in a graph G is defined as the set  $N_G[v] = N_G(v) \cup \{v\}$ .

A set  $D \subseteq V(G)$  is called a dominating set of G if for every  $v \in V \setminus D$  is adjacent to atleast one vertex in D. A dominating set D is said to be minimal if no subset of D is a dominating set of G. The minimum cardinality of a minimal dominating set of G is called the domination number of G and is denoted by  $\gamma(G)$ . Any dominating set of cardinality  $\gamma(G)$  is a  $\gamma$ -set of G. Recently dominating number of a graph is studied in [4]. A dominating set D of G = (V, E) is a certified dominating set, if every vertex in D has either zero or atleast two neighbours in  $V \setminus D$ . The certified domination number  $\gamma_{cer}(G)$  of G is the minimum cardinality of certified dominating set. The certified domination number of a graph was studied in [5,6]. In this article, the upper certified domination number of a graph is introduced and studied.

#### 2. The Upper Certified Domination Number of a Graph Definition 2.1

A certified dominating set D of vertices in a connected graph G is minimal certified dominating set if no proper subset of D is an certified dominating set of G. The upper certified domination number  $\lceil_{cer}(G)$  is the maximum cardinality of a minimal certified dominating set of G

Example 2.2



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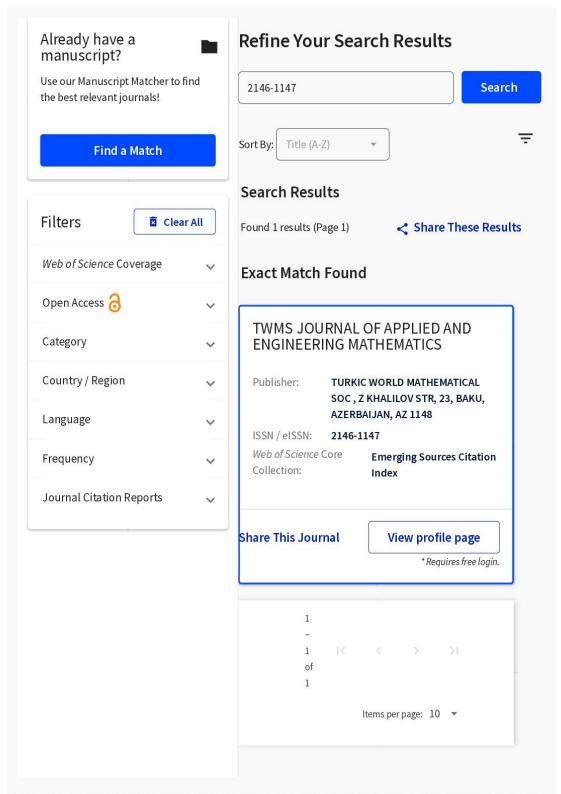
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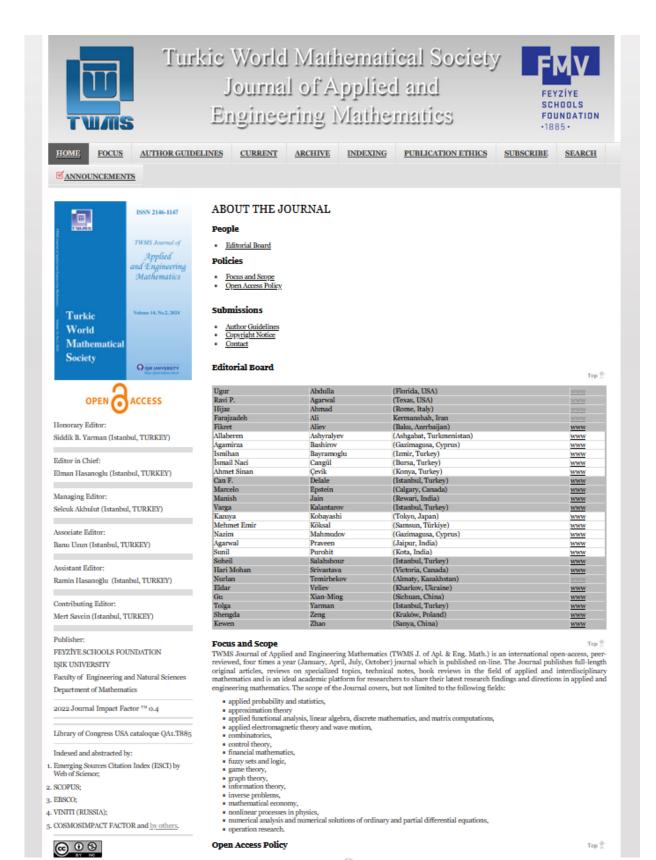
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#### K-PRODUCT CORDIAL LABELING OF FAN GRAPHS

K. J. DAISY<sup>1</sup>, R. S. SABIBHA<sup>2</sup>, P. JEYANTHI<sup>3\*</sup>, M. Z. YOUSSEF<sup>4</sup>, §

ABSTRACT. Let f be a map from V(G) to  $\{0,1,...,k-1\}$  where k is an integer,  $1 \le k \le |V(G)|$ . For each edge uv assign the label  $f(u)f(v)\{mod\ k\}$ . f is called a k-product cordial labeling if  $|v_f(i) - v_f(j)| \le 1$ , and  $|e_f(i) - e_f(j)| \le 1$ ,  $i, j \in \{0, 1, ..., k-1\}$ , where  $v_f(x)$  and  $e_f(x)$  denote the number of vertices and edges respectively labeled with x (x = 0, 1, ..., k-1). In this paper we prove that fan  $F_n$  and double fan  $DF_n$  when k=4 and 5 admit k-product cordial labeling.

Keywords: cordial labeling, product cordial labeling, k-product cordial graph, 5-product cordial graph.

AMS Subject Classification: 05C78.

#### 1. Introduction

All graphs considered here are simple, finite, connected and undirected. We follow the basic notations and terminology of graph theory as in [4]. While studying graph theory, one that has gained a lot of popularity during the last 60 years is the concept of labelings of graphs due to its wide range of applications. Labeling is a function that allocates the elements of a graph to real numbers, usually positive integers. In 1967, Rosa [13] published a pioneering paper on graph labeling problems. Thereafter many types of graph labeling techniques have been studied by several authors. Gallian [2] in his survey beautifully classified the labelings into graceful labeling and harmonious labelings, variations of graceful labelings, variations of harmonious labelings, magic type labelings, anti-magic type labelings and miscellaneous labelings. Cordial labeling is a weaker version of graceful and harmonious labeling was introduced by Cahit in [1]. Let f be a function from the vertices of G to  $\{0,1\}$  and for each edge xy assign the label |f(x) - f(y)|.

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<sup>§</sup> Manuscript received: August 25, 2020; accepted: January 22, 2021.

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The Indian Mathematical Society began publishing Progress Reports right from 1907 and then the Journal from 1908 (The 1908 and 1909 issues of the Journal are entitled "The Journal of the Indian Mathematical Club"). From 1910 onward, it is published as its current title The Journal of Indian

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### The Connected Edge-To-Vertex Geodetic Number of a Graph

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DOI: https://doi.org/10.18311/jims/2023/26328

Keywords: Geodesic, Edge-To-Vertex Godetic Number, Connected Edge-To-Vertex Geodetic Number.

05C12.

#### ABSTRACT

Let G = (V, E) be a graph. A subset  $S \subseteq E$  is called an edge-to-vertex geodetic set of G if every vertex of G is either incident with an edge of S or lies on a geodesic joining a pair of edges of S. The minimum cardinality of an edge-to-vertex geodetic set of G is  $g_{ev}(G)$ . Any edge-to-vertex geodetic set of cardinality  $g_{ev}(G)$  is called an edge-to-vertex geodetic basis of G. A connected edge-to-vertex geodetic set of a graph G is an edge-to-vertex geodetic set S such that the subgraph G[S] induced by S is connected. The minimum cardinality of a connected edge-to-vertex geodetic set of G is the connected edge-to-vertex geodetic number of G and is denoted by  $g_{cev}(G)$ . Some general properties satisfied by this concept are studied. The connected graphs G of size g with connected edge-to-vertex geodetic number g or g





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ISSN: 1001-4055

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Vol. 44 No. 3 (2023)

### Results on Eccentric Hypergraph of A K-Uniform Tight Cycle

<sup>1</sup>P. Selva Renuka, <sup>2</sup>M. K. Angel Jebitha, <sup>3</sup>S. Sujitha

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Abstract: Let  $\Re = (V, E)$  be a hypergraph. The eccentric hypergraph  $EH[\Re] = (V, E')$  of a hypergraph  $\Re$  is the hypergraph that has the same vertex set as in  $\Re$  and the edge set is defined by  $E' = \{S_x \subseteq V, x \in S_x \text{ for any } \}$ vertex other than x in  $S_x$  is an eccentric vertex of x). In this paper we study about some results on eccentric kuniform tight cycle.

Keywords: eccentric hypergraph, r-uniform hypergraph, tight cycle. AMS subject classification: 05C65

#### 1. Introduction

The Hamilton cycles plays a main role in graph theory, a classic result of O. Ore in 1960 is that if the degree sum of any two independent vertices in an n-vertex graph is at least n, then the graph contains a Hamilton cycle. We generalize it in hypergraph. This has led to the study on eccentric tight Hamilton cycle. In [3], the eccentric

graph was studied and in [5], the eccentric graph of a hypergraph was introduced and discussed. In this paper, we generalise this concept as eccentric hypergraph of a hypergraph.

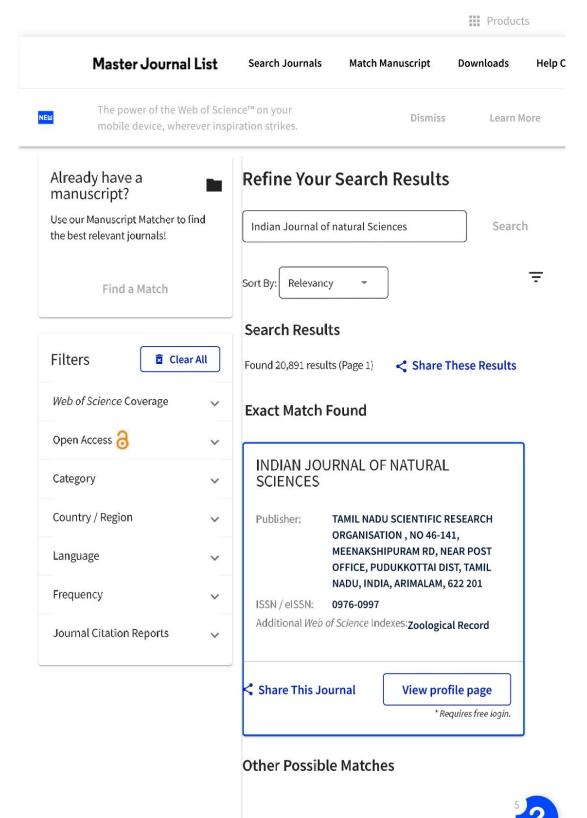
A hypergraph  $\mathfrak{R}$  is defined as a pair  $\mathfrak{R} = (V, E)$ , where V is a set of vertices and E is a set of non-empty subsets of V, known as hyperedges or edges. A hypergraph is called simple if it contains no induced edges. For satisfies of  $X_1$  and  $X_2$  and  $X_3$  and  $X_4$  are define complete x –uniform hypergraph to be the simple hypergraph  $K_n^x = (X, E)$  such that |X| = n and  $E(K_n^x)$  coincides with all the r –subsets of X. A hypergraph  $\Re = (X, E)$  is called bipartite if its vertex set X can be partitioned into two disjoint sets  $X_1$  and  $X_2$  in such a way that each hyperedge of cardinality greater than or equal to two contains vertices from both parts. It means that there is no such hyperedge inside  $X_1$ and there is no such hyperedge inside  $X_2$ . A complete r –partite hypergraph is an r –uniform hypergraph  $9\mathfrak{t}=(X,E)$  such that the set X can be partitioned into r –non-empty parts, each edge contains precisely one vertex from each part and all such subsets from E. It is denoted by  $K_{n1,n2,-nr}^r$ . In a hypergraph  $9\mathfrak{t}=(X,E)$ , an alternating sequence  $x_0E_0x_1E_1...x_{t-1}E_{t-1}x_t$  of distinct vertices  $x_0,x_1....x_{t-1}$  and distinct edges  $E_0,E_1....E_{t-1}$  satisfying  $x_i,x_{i+1} \in E_i, i = 0,1,....,t-1$  is called a path connecting the vertices  $x_0$  and  $x_t$ . If  $x_0 = x_t$  then it is called a cycle. The value of t is called the length of the path or cycle respectively. The eccentricity e(v) of vertex v is the maximum distance of v to any other vertex of G. maximum distance of v to any other vertex of G.

#### 2. Main Result:

In [2], A. Dudek and A. Frieze study about tight Hamilton cycles in random uniform hypergraphs and random

Structures. In this section, eccentric hypergraph of k-uniform tight cycle is disused. **Definition:2.1** Let  $\Re = (V, E')$  be a hypergraph. The eccentric hypergraph  $EH[\Re] = (V, E')$  of a hypergraph  $\Re$  is the hypergraph that has the same vertex set as  $\Re$  and the edge set is defined by  $E' = \{S_x \subset V, x \in S_x / \text{ for any } \}$ vertex other than x in  $S_x$  is an eccentric vertex of x}.

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RESEARCH ARTICLE

### Distance based Topological Indices of a Nanorod Graph

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Received: 18 Sep 2023 Revised: 10 Oct 2023 Accepted: 14 Dec 2023

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#### ABSTRACT

In this article, we determine the distance-based topological indices such as Wiener index, Hyper Wiener index, Vertex Szeged index, Edge Szeged index, Edge-vertex Szeged index, Total Szeged index, and Padmakar-Ivan index of a Nanorod graph constructed from NaOH concentration. Additionally, we values distance-based numerical of these with k = 0.1,0.09,0.08,0.07,0.06,0.05,0.04,0.03,0.02 and 0.01.

Keywords: Nanorod graph, Wiener index, Hyper Wiener index, Vertex Szeged index, Edge Szeged index, Edge-vertex Szeged index, Total Szeged index, Padmakar-Ivan index.

AMS Subject Classification: 05C90, 05C92

#### INTRODUCTION

For notation and graph theory terminology not provided here, we refer to [Gary Chartrand, 2006]. In recent years, graph theory has generated significant interest in the field of mathematical chemistry, attracting mathematicians to formulate chemical structures and material properties. Chemical graph theory has numerous real-life applications and has gained popularity among researchers. A topological index is a numerical invariant of a molecular descriptor. It is also referred to as a graph-theoretic index, representing a numerical quantity associated with the molecular







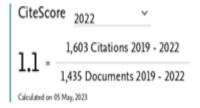
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#### Adjacent Line Graph in Ferrers Graph

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Holy Cross College (Autonomous), Nagercoil-629 004, India. email: sujitha.s@holycrossngl.edu.in Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli-627 012, Tamil Nadu, India

#### Abstract:

A simple graph G = (V, E) is a Ferrers graph if for all distinct  $x, y, z, w \in V$  if  $xy \in E$  and  $zw \in E$  then either  $xw \in E$  or  $yz \in E$ . In this paper, we study the adjacent line graph of a ferrers graphs. We also check the conditions for adjacent line graphs of Path, Cycle, Complete, Star graphs to be ferrers. Also a sufficient condition has been given for a graph sothat its adjacent line graph is not ferrers.

2000 Mathematics Subject Classification: 05C50, 05C25. Keywords: Ferrers graph, Infringe ferrers graph, line graph, adjacent line graph.

#### 1. Introduction

For graph theory notations and terminology not given here we refer it from [1]. The line graph of an undirected graph G is another graph L(G) that represents the adjacencies between edges of G. Let G = (V, E) be a simple graph with a least one pair of adjacent ledges. The adjacent line graph of G, denoted by AL(G), is a graph with the vertex set  $V_{AL} = \{v_{ij} / e_i \text{ and } e_j \text{ are adjacent in } G\}$  and two vertices  $v_{ij}$  and  $v_k l$  are adjacent in AL(G), if and only if, either  $e_i$  and  $e_k$  or  $e_i$  and  $e_k$  or  $e_j$  and  $e_k$  o

Ferrers relation was introduced in [2] for the first time has been utilized for different purposes in extensive and various science fields. The relation was used with concept lattices in formal concept analysis. Some graphs associated by the relation were linked together concept lattices again. We already proved some results [4] on Ferrer trees and its distance character. The upper bounds for distance function (u, v) for all  $u, v \in V$ . Throughout the paper, we consider connected graph.

In this paper our intention is to move a step forward in the investigation of the adjacent line graph of a Ferrers graph and its properties. We also check the conditions for adjacent line graphs of Path, Cycle, Complete, Star graphs to be Ferrers. Also a sufficient condition has been given for a graph so that its adjacent line graph is not Ferrers.

**Definition 1.1.** [2] A simple graph G is a Ferrers graph if for all distinct  $x, y, z, w \in V$  if  $xy \in E$  and  $zw \in E$  then either  $xw \in E$  or  $yz \in E$ . Since  $xy \in E$  if and only if  $yx \in E$  holds for all simple graphs, the definition of Ferrers graph must be extended to if  $xy \in E$  and  $zw \in E$ , then either  $xw \in E$  or  $yz \in E$  or  $zw \in E$ .

**Definition. 1.2.** [4] Graphs which do not satisfy the above conditions are classified as non-Ferrers graphs. Also, there are graphs which do not have at least four distinct vertices  $x, y, z, w \in G$  such that  $xy, zw \in G$ . That is, the graph does not exist at least two disjoint edges to verify Ferrers condition. This class of graphs is classified as infringe-Ferrers graphs. The obvious examples are  $C_3$  and  $P_3$ . The following Theorems are used in the sequel.

Theorem 1.3. [4] Let G be a tree. Then G is a Ferrers tree if and only if G has two internal vertices.



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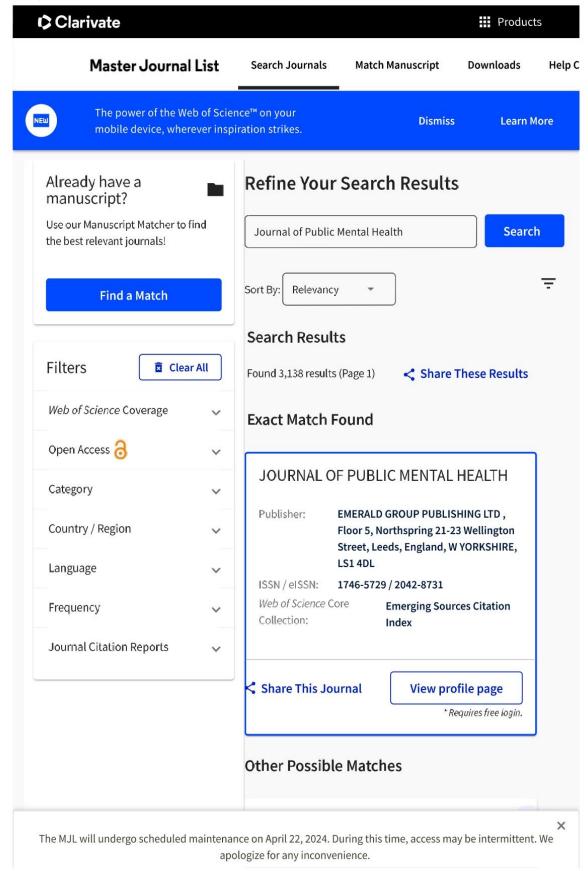
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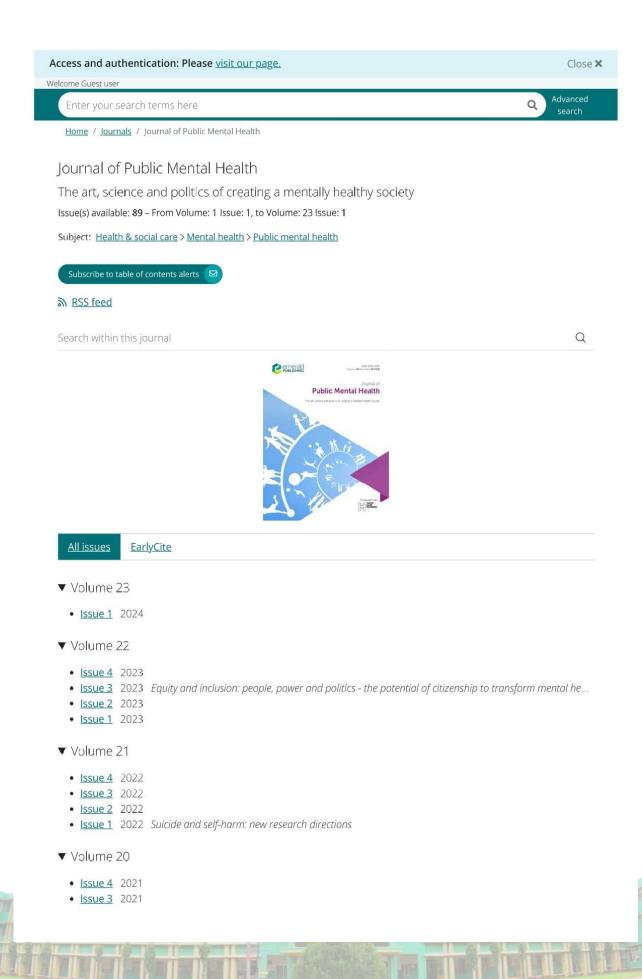
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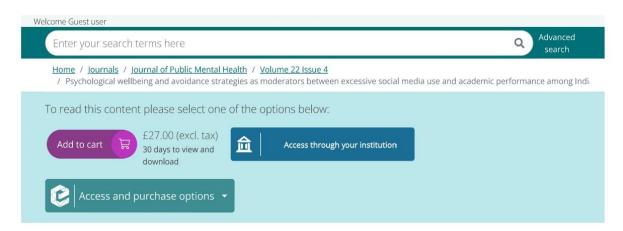
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Psychological wellbeing and avoidance strategies as moderators between excessive social media use and academic performance among Indian college students



#### **Abstract**

#### Purpose

This study aims to assess the negative aspect of social media use among co lege students in India. A conceptual model showing the relationship between excessive social media use (ESMU) and academic performance of college students has been developed and tested. Further, the moderating role of psychological well-being and avoidance strategies were investigated.

#### Design/methodology/approach

A survey instrument was developed, and data was collected from 557 college students from higher educational institutions in southern India. First, the psychometric properties of the measures were tested using the Lisrel software for covariance-based structural equation modeling. Second, the structural model was tested by using PROCESS macros.

#### **Findings**

The results reveal that ESMU is a precursor to anxiety and academic performance. The findings also indicate that anxiety mediates the relationship between ESMU and academic performance. Psychological well-being and avoidance strategies were significant moderators in the relationship between ESMU and anxiety.

#### Originality/value

The multi-layered conceptual model was developed and tested in the context of a developing country (India) and investigated the effect of ESMU by college students on their academic performance and anxiety. The three-way interaction between psychological well-being (first moderator), avoidance strategies (second moderator) and ESMU



### Source details

### South East Asian Journal of Mathematics and Mathematical Sciences

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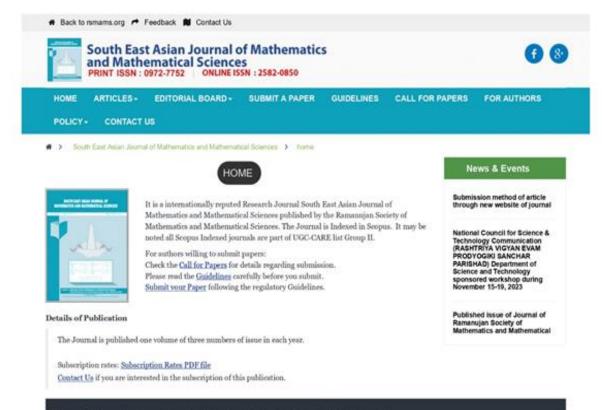
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South East Asian J. of Mathematics and Mathematical Sciences Vol. 19, No. 3 (2023), pp. 347-358

ISSN (Print): 0972-7752

# SUM CONNECTIVITY MATRIX AND ENERGY OF A $T_2$ HYPERGRAPH

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(Received: Oct. 21, 2023 Accepted: Dec. 23, 2023 Published: Dec. 30, 2023)

**Abstract:** Let H be a  $T_2$  hypergraph with  $n \geq 4$ . The sum connectivity matrix of H, denoted by SC(H) is defined as the square martix of order n, whose  $(i,j)^{th}$  entry is  $\frac{1}{\sqrt{d_i+d_j}}$  if  $x_i$  and  $x_j$  are adjacent and zero for other cases. The sum connectivity energy SCE(H) of H is the sum of the absolute values of the eigenvalues of SC(H). It is shown that, for a  $T_2$  hypergraph  $\lfloor SCE(H) \rfloor \leq \lfloor 1 + n - \sqrt{\frac{n}{\delta}} \rfloor$ , where  $\delta$  is the minimum degree of H.

**Keywords and Phrases:**  $T_2$  hypergraph, sum connectivity matrix, sum connectivity energy.

2020 Mathematics Subject Classification: 05C65, 05C50.

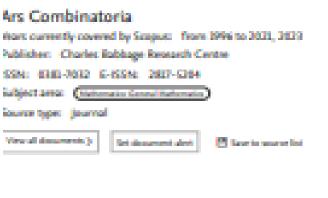
#### 1. Introduction

The basic definitions and terminologies of a hypergraph are not given here and we refer to it [1] and [5]. The concept of hypergraph was introduced by Berge in 1967. In 2017, Seena V and Raji Pilakkat introduced Hausdorff hypergraph,



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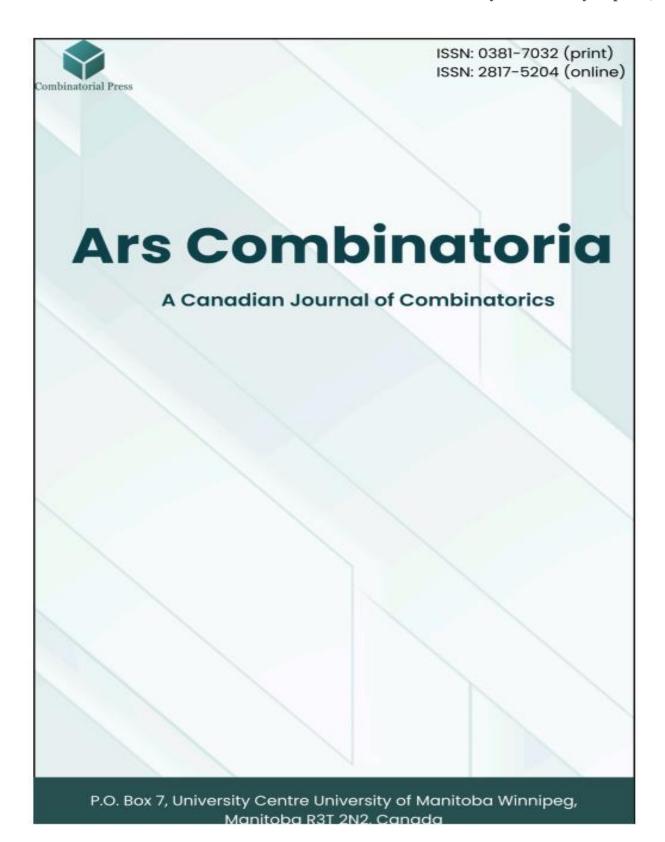


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Ars Combinatoria, 157: 109–120 DOI:10.61091/ars157-11 http://www.combinatorialpress.com/ars

Received 12 December 2023, Accepted 21 December 2023, Published 25 December 2023



Article

#### Independent Fixed Connected Geodetic Number of a Graph

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- Department of Mathematics, Holy Cross College (Autonomous), Nagercoil, India.
- \* Correspondence: titusvino@yahoo.com

Abstract: In this paper we introduce the concept of independent fixed connected geodetic number and investigate its behaviours on some standard graphs. Lower and upper bounds are found for the above number and we characterize the suitable graphs achieving these bounds. We also define two new parameters connected geo-independent number and upper connected geo-independent number of a graph. Few characterization and realization results are formulated for the new parameters. Finally an open problem is posed.

Keywords: Independent fixed connected geodetic set, Independent fixed connected geodetic number, Connected Geo-independent number, Upper connected Geo-independent number Mathematics Subject Classification: 05C12

#### 1. Introduction

The introduction of Graph Theory is a revolution in the field of Mathematics. Various concepts were made easily understandable by its simple expression through graphical models. By a graph G we mean V, the set of vertices; E, the set of edges together with a binary operation of association. We refer to [1-3] for basic graph theoretic terms. In G, a shortest x-y path is also known as x-y geodesic. The distance d(x,y) is defined as the number of edges of an x-y geodesic in G. For any two vertices x and y in G, the closed interval I[x,y] is the collection of vertices on an x-y geodesic. The closed interval I[S,S'], where  $S,S'\subseteq V(G)$ , is defined as the union of subintervals I[x,y] for some  $x\in S$  and  $y\in S'$ . i.e.,  $I[S,S']=\bigcup_{x\in S,y\in S'}I[x,y]$ . A vertex v in G is called an extreme vertex or simplicial vertex if the subgraph induced by its adjacent vertices is complete.

A set  $S \subseteq V(G)$  is called a geodetic set or geodomination set if every vertex of G is on some x-y geodesic where  $x,y\in S$ . The minimum cardinality of a geodetic set of G is called as the geodetic number of G, denoted by g(G) [4–8]. If G is a geodetic set of G and G is connected, then G is called the connected geodetic set of G. Its minimum order is named as the connected geodetic number of G, denoted by G is called a cg-set of G [9]. Again parameters upper connected geodetic number and forcing connected geodetic number were defined and investigated in [10]. Santhakumaran and Titus first introduced the vertex geodomination number in [11] and further studied in [12, 13]. For any vertex G in G is called an G is called an G if every vertex G in G is on an G is on an G geodomination number of G in G is defined as the G-geodomination number of G.



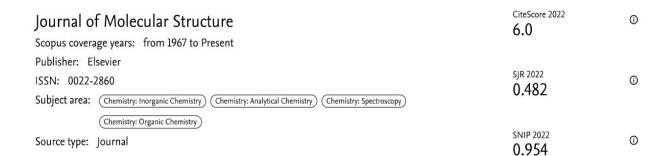


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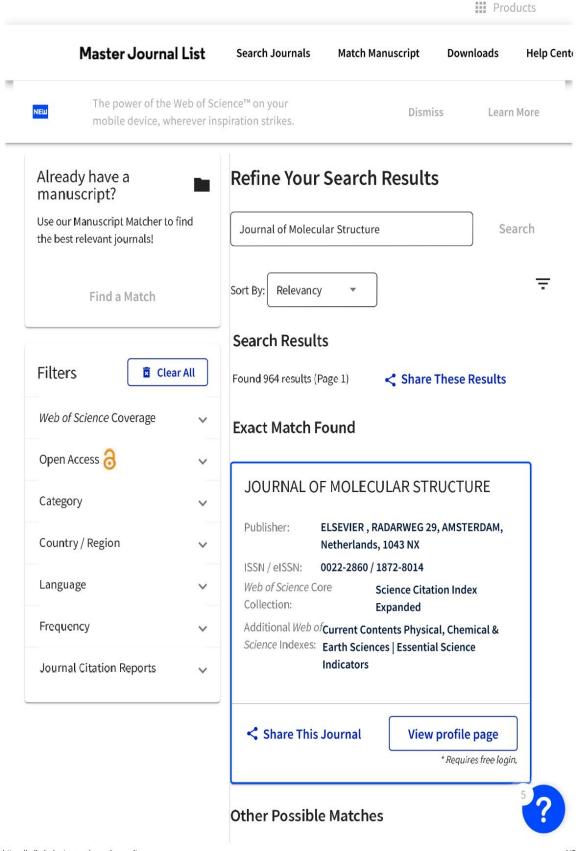
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- Cu-Fe NPs achieved high <u>photocatalytic</u> performance toward the removal of dyes.
- The copper ferrite NPs are suitable for <u>waste water treatment</u> and biomedical applications.

#### Abstract

The copper ferrite <u>nanoparticles</u>, recognized for their ferromagnetic characteristics, minimal conductivity, and superior electrochemical stability, were synthesized by a facile auto combustion approach using egg white as fuel via a green synthesis route. CuFe<sub>2</sub>O<sub>4</sub> nanoparticles' structural, morphological, and optical properties were examined. XRD is used to determine the phase formation, particle size, and lattice parameter of spinel ferrite. X-ray Diffractometer (XRD), Fourier Transform Infrared Spectrometer (FTIR), Scanning Electron Microscopy (SEM), and Energy Dispersive X-ray analysis were used to rigorously examine the phase purity of the synthesized spinel ferrite. For morphological analysis, SEM and TEM were employed, whereas EDAX was used for elemental analyses. For a better knowledge of the conduction band (CB) and valence band (VB) boundaries of the produced <u>nanoparticles</u>, optical experiments were conducted by UV Diffuse Reflectance Spectroscopy. The degradation of Rhodamine B dye determined the <u>photocatalytic</u> competence of the synthesized sample under visible light. At regular intervals of time, the entire process was observed with a spectrophotometer. CuFe<sub>2</sub>O<sub>4</sub> <u>nanoparticles</u> reveal a maximum photocatalytic degradation efficiency of around 94%, which is higher than that of CuFe<sub>2</sub>O<sub>4</sub> nanoparticles prepared via other chemical route.

#### Introduction

Wastewater management is a significant challenge in developing nations because of the numerous industrial processes that meet human needs. The dyeing and pigment industries are a significant source of non-biodegradable organic dyes in wastewater, which is a big worry for the environment. Humans use dyeing in a variety of applications, including textiles and food. Rhodamine B is an organic synthetic dye that is primarily water-soluble. Because of its luminous feature is used as a colouring agent in textiles, paper, plastics, cosmetics, leather, food, and many other sectors, resulting in significant dye effluent emissions. If effluents are not adequately handled, they pose a significant environmental risk to flora, fauna, and human health. Rhodamine B dye may cause cancer by



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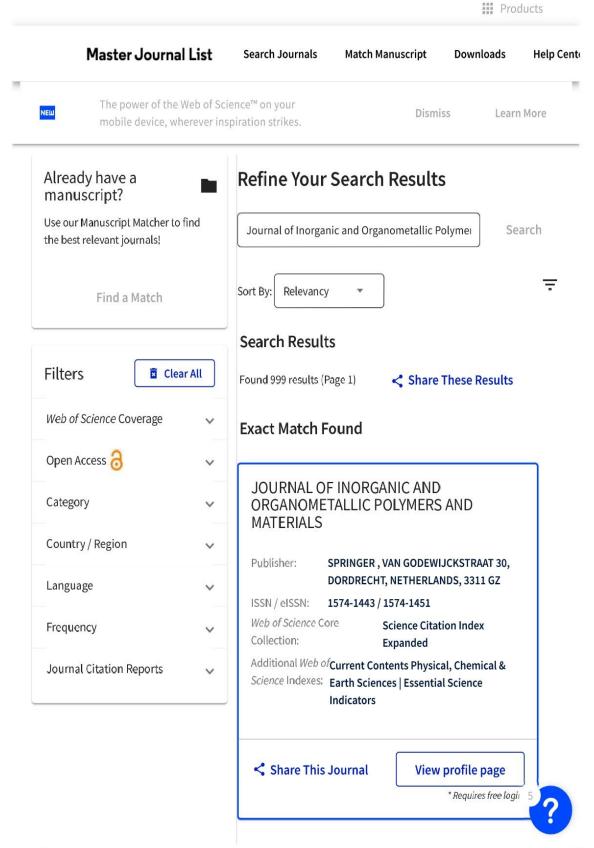
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R. Revathi, M. Sukumar , Anuj Kumar, Manish Gupta, P. Aji Udhaya, Satbir S. Sehgal, Bidhan Pandit, M. Sundararajan , A. Subramani, Chandra Sekhar Dash , N. Senthilkumar & Mohd Ubaidullah

#### Abstract

Nickel-doped magnesium cubic spinel ferrite nanoparticles (NPs) were prepared through the microwave combustion method (MCM). The structure of magnesium ferrite normal spinel is obtained from XRD analysis. The average crystallite size is between 26 and 17 nm. The elemental compositions and oxidizing states of Ni<sup>2+</sup> doped MgFe<sub>2</sub>O<sub>4</sub> ferrites were evaluated by using XPS analysis. The morphology of spinel nanoparticles was studied using HR-SEM images. The energy dispersive X-ray method is used for ensuring the presence of elements and the band gap value 2.09, 2.02, 1.85, and 1.82 eV have been obtained using the tau'c relation. The magnesium spinel structure is confirmed in the band at 434 and 561 cm<sup>-1</sup> which corresponds to the stretching vibration of the octahedral site (Mg<sup>2+</sup>-O<sup>2-</sup>) and tetrahedral site (Fe<sup>3+</sup>-O<sup>2-</sup>) respectively. From the hysteresis loops the magnetic features viz. H<sub>c</sub>, M<sub>r</sub>, and M<sub>s</sub> were determined. Further dielectric studies and AC conductivity of the prepared samples are performed.



# Source details

#### Journal of Materials Science: Materials in Electronics

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ISSN: 0957-4522 E-ISSN: 1573-482X

SJR 2022 0.496

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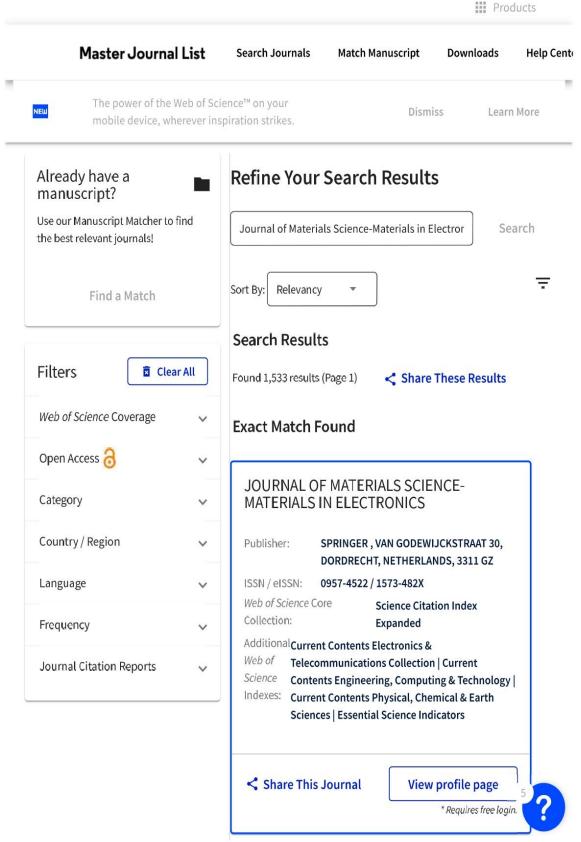
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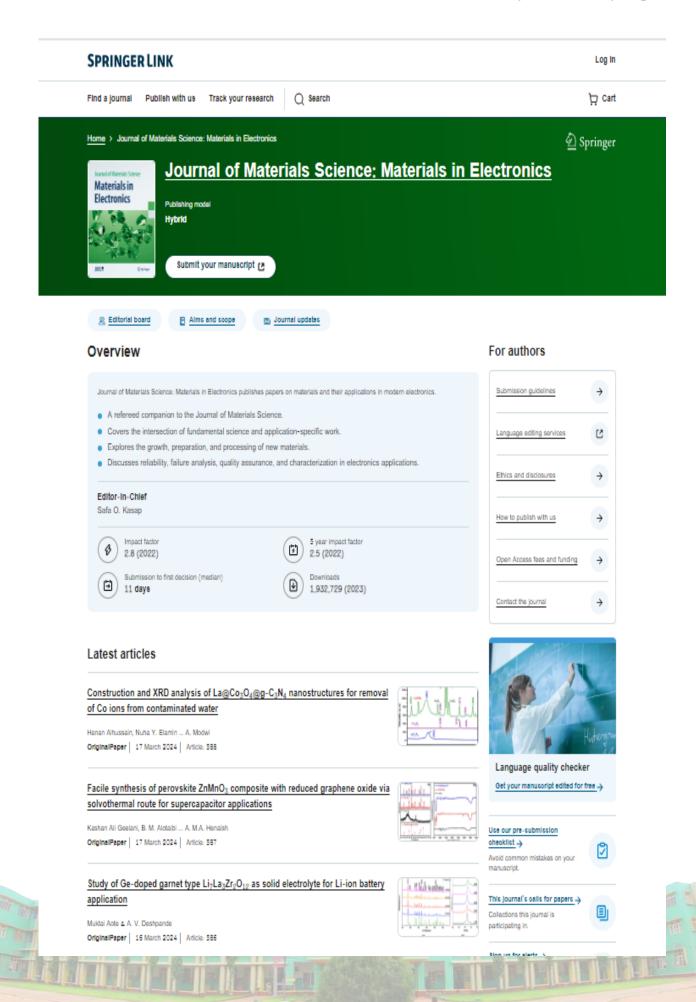
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Matter Physics			*

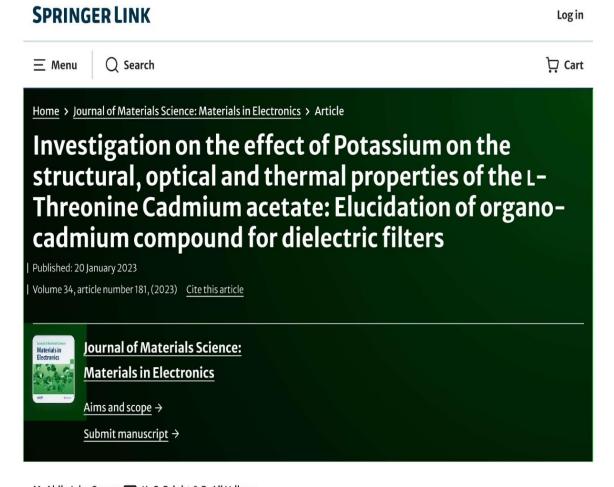
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M. Abila Jeba Queen , K. C. Bright & P. Aji Udhaya

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#### **Abstract**

In this study, the metal cation potassium—doped organo—cadmium compound has been prepared from the chemical reaction between amino acid and metal complexes by slow evaporation technique. The resultant compound belongs to monoclinic crystal system with two ligancies and a two-fold configuration. The presence of potassium metal via the organo—cadmium compound has been estimated using energy—dispersive X—ray analysis. The optical characteristics and bandgap edges calculations show that it is a good insulator for energy storage applications. The integration of potassium causes disruption within the parent compound's host lattice, resulting in an increase in static permittivity. Furthermore, the influence of potassium increases Fermi velocity, Fermi temperature, and plasma energy, according to theoretical studies. Potassium also improves thermal stability and magnetic properties. Using a Neodymium—doped Yttrium Aluminum Garnet (Nd–YAG) laser, the crystal's nonlinear optical property was investigated.

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ISSN: 2522-5758 E-ISSN: 2522-5766

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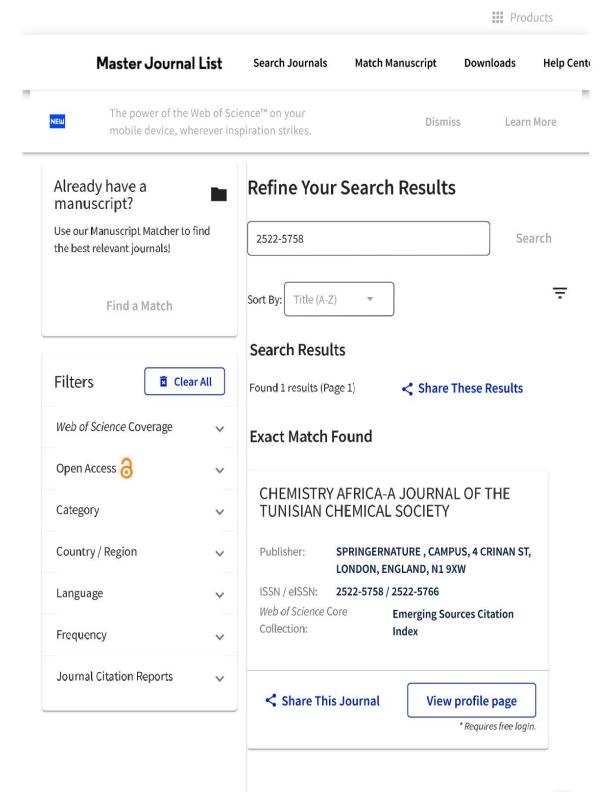
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T. Retna Kumar, M. Abila Jeba Queen , K. C. Bright, R. Ilangovan & K. Sankaranarayanan

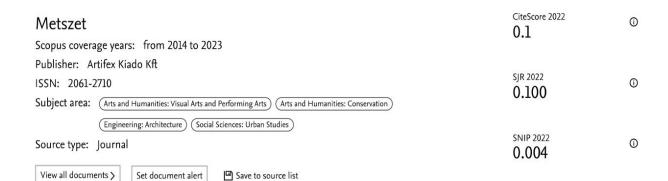
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#### **Abstract**

Here in, we reported the comparative study of L-Alanine Cadmium chloride (ACC) and Manganese L-Alanine Cadmium chloride (MnACC) crystal on its growth, structural, mechanical, optical and dielectric properties for NLO applications. Initially ACC and MnACC single crystals were grown at the ambient temperature by solvent evaporation solution growth technique. Both crystals are members of the monoclinic crystal system, according to an X-Ray Diffraction investigation. The crystals were identified as belonging to the soft material category by Vickers micro hardness investigations, which also measured the crystal's yield strength and tensile strength. Optical studies exhibit lower cut off wavelength and the linear and non linear transmittance enhances in the visible



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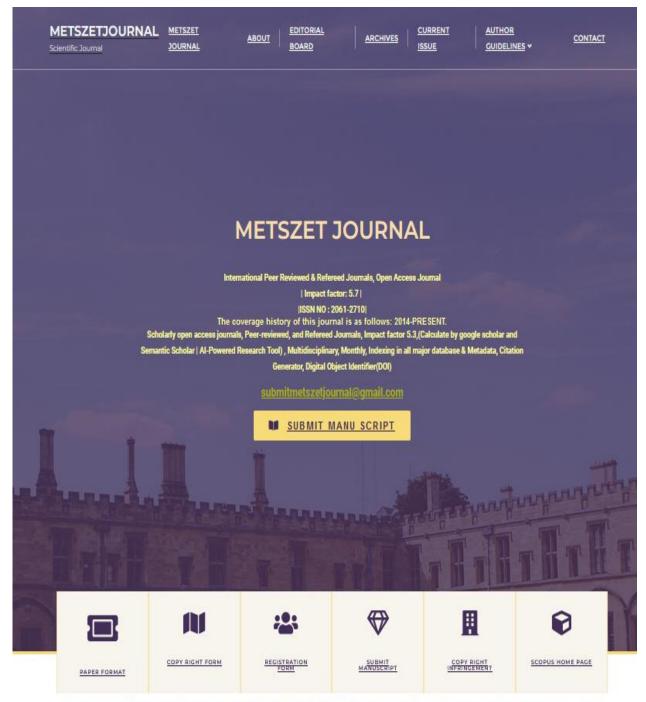
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#### Mechanically potent Organo-strontium crystal as optical filters in the Ultraviolet region

T. Retna Kumar<sup>1</sup>, M. Abila Jeba Queen<sup>2,\*</sup>, K.C, Bright<sup>3</sup> and R. Ilangovan<sup>4</sup>

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- <sup>2</sup> Department of Physics, Holy Cross College (Autonomous), Nagercoil -629004, India.
- <sup>3</sup> Department of Physics, Mar Ivanio's College, Thiruvananthapuram 695015, India.
- <sup>4</sup> National Centre for Nanoscience and Nanotechnology, Guindy Campus, University of Madras, Chennai 600025, India

#### Abstract

Organometallic complex crystals are evolving as a mechanically potent and chemically flexible for optical filters. Here we crystallised Alanine cadmium chloride (ACC) and strontium admixed Alanine cadmium chloride amino metallic crystals by a simple technique at normal atmospheric pressure and temperature. Density measurements of the grown crystals were carried out using the simple flotation technique. On the particular face of (101) plane high mechanical properties achieved for the strontium admixed crystal. Optical properties are analysed by means of the spectroscopic techniques, the higher transmittance in the region 250 -1800 nm. This property and calculated optical parameters favours the material is possible for optical filters in ultra violet region.

#### Keywords

L-Alanine Cadmium Chloride; Microhardness; Refractive index; Strontium.

#### Introduction

Single crystals of organometallic compounds have been assessed as a feasible material for an optical and mechanical properties therefore actively researched in the recent years [1, 2]. Organo-strontium is an organometallic compound that contains at least one or more linkage between the strontium carbon bonds. The main application of strontium compound considered as a high beta emitter which prevents X-ray emission [3, 4]. In the medical field also strontium plays an important role such as prevents teeth sensitivity, main composition in bones and dentals [5]. L-Alanine is the simplest and neutral amino acid which exists as zwitterions; it possesses high transparency with favourable mechanical and optical properties crystallized in orthorhombic crystal structure with space group  $P_{21}$  and the cell parameters are a =  $6\cdot032$  Å, b =  $12\cdot343$  Å, c =  $5\cdot784$  Å;  $\alpha = \beta = \gamma = 90$  [6]. The incorporation of L-Alanine Cadmium chloride and strontium have been developed as a potential organic crystals as organic waveguides in the visible region. As some of the organometallic compounds that stands before as a organic wave guides, their optical, physical and mechanical properties are accessible and tuneable [1].

The single crystal namely L-Alanine Cadmium Chloride was first crystallized by the team of Kathleen et al. [7] and its physico chemical properties are studied by different research groups due to its wide optical applications [8, 9]. The wide varying properties of the compound have been altered and reported by adding different metallic compounds as impurities [10-13]. This review proves that no such report based on the strontium added

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E-ISSN: 2053-1591

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(Materials Science: Polymers and Plastics) (Materials Science: Electronic, Optical and Magnetic Materials

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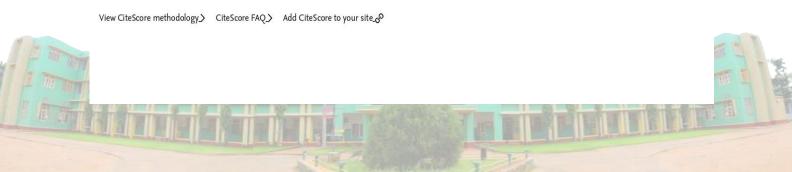
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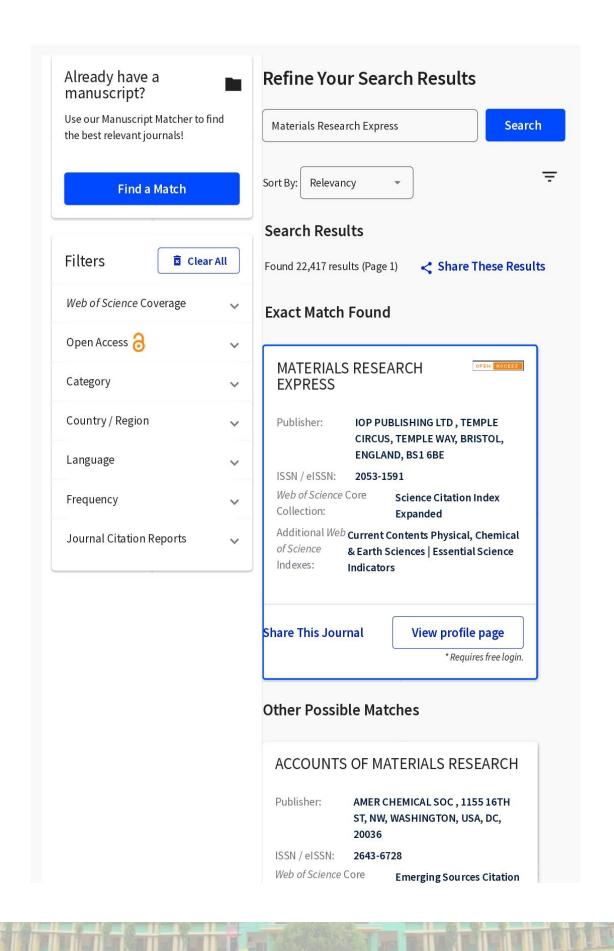
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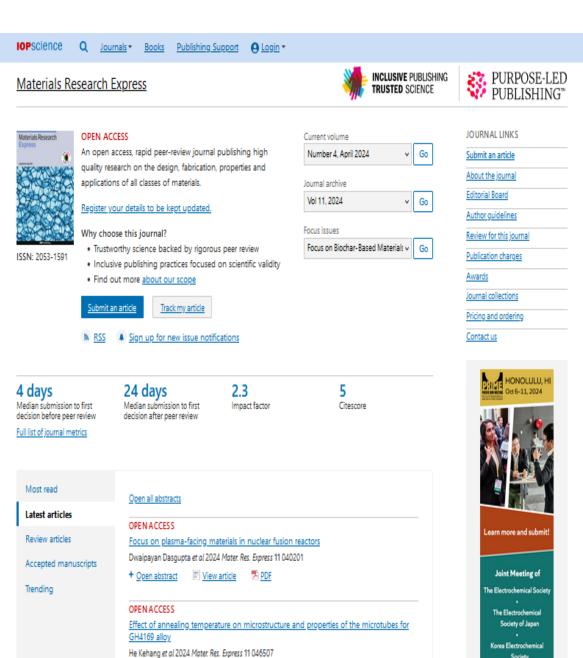
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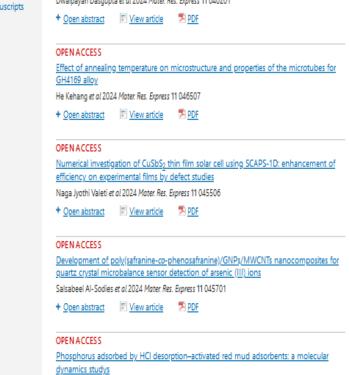
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Materials Science			
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Materials Science			
0-1	#56/163	65th	









Longjiang Li et al 2024 Mater. Res. Express 11 045507

JOURNAL INFORMATION

2014-present Materials Research Express doi: 10.1088/issn.2053-1591 Online ISSN: 2053-1591 IOP Publishing

Mater. Res. Express 10 (2023) 046509

https://doi.org/10.1088/2053-1591/acc7e4

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#### RECEIVED

9 January 2023

REVISED 21 March 2023

ACCEPTED FOR PUBLICATION 27 March 2023

PUBLISHED

7 April 2023

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#### PAPER

# Tribological and machining characteristics of AA7075 hybrid composites and optimizing utilizing modified PROMETHEE approach

M L Ajin 100, Jebeen Moses 1, 100 and M Priya Dharshini 200

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- <sup>2</sup> Department of Physics, Holy Cross College, Nagercoil, Tamil Nadu, India
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Keywords: tribology, surface topography, PROMETHEE, EDM, optimization

#### Abstract

In this research work an attempt was made to reinforce AA7075 composites with  $B_4C$  and SiC particles through stir casting route. SEM with EDS mapping revealed that the reinforcement were uniformly over the composites and hardness reduces with the addition of SiC particles owing to the inverse hall petch effect. The results revealed that wear rate reduces with addition of SiC particles owing to the formation of mechanically mixed layer and protective oxide layer confirmed through SEM with EDAX mapping. Three distinct cracks were formed, when slides at different temperature as confirmed through worn surface morphology, pits cracks and plasticization of material were the other features observed. The used motor oil properties were analyzed and results divulged that the oil suitable for dielectric fluid. Increase in Material Removal Rate (MRR), reduction in Tool Wear Ratio (TWR) and Surface Roughness (Ra) was observed with the incorporation of powder particles owing to the bridging effect. Black spots, craters, micro pits, globules and micro crack are the distinct observed on the machined surface topography. The modified Preference Ranking Organization METHod for Enrichment of Evaluations (PROMETHEE) optimization technique was utilized to find the optimal parametric combination.

#### Introduction

Aluminium Matrix Composites (AMC) were in great demand in the aerospace sector because of their high strength-to-weight ratio, improved tribological and mechanical properties [1]. The reinforcements were in the form of particulates, fibres and whiskers; powder metallurgy, casting, in situ fabrication and laminates are the distinct method utilized for the production of composites [2]. Attaining uniform distribution of reinforcement over the matrix material was the challenging task [3]. Preheating and addition of flux increases the wettability of composites. Stir casting, two step stir casting, ultrasonic stir casting, and electromagnetic stir casting are some of the stir casting technologies used in composite manufacturing [4-7]. In the stir casting technique, the mixture was heated to the molten state before being stirred by the mechanical stirrer [8]. In two step stir casting process, the material was heated above the liquidus temperature, and to keep the slurry semi-solid, it was gradually cooled below the liquidus temperature. Manual mixing was performed after the preheated particles were introduced. After reheated the composite slurry to a liquid state, mechanical mixing was performed for the prescribed time [9]. In the process of compo casting, the charge was heated to the alloy's melting point before being cooled to a semi-solid condition (0%-33% in solid fraction), using a paddle-like blade, semi-solid composites were whirled [10]. The electromagnetic field was produced by AC induction motor which was used for stirring of matrix and reinforcement hence uniform dispersion achieved [11]. An ultrasonic aided probe was employed for mixing in ultrasonic vibration followed by conventional stirring [12].

One of the most common industrial problems is wear, where the primary factors influencing the wear rate are velocity, temperature, distance and operating load. Composite pins wear less when lubricated, compared to unlubricated and abrasive surfaces [13]. When the particulates were added, it enhances the wear resistance because of the formation of Mechanically Mixed Layer (MML). Wear rate transfer from mild to severe when this

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Publisher: Multidisciplinary Digital Publishing Institute (MDPI)	SJR 2022	0
E-ISSN: 2073-4360	0.720	
Subject area: (Materials Science: Polymers and Plastics) (Chemistry: General Chemistry)		
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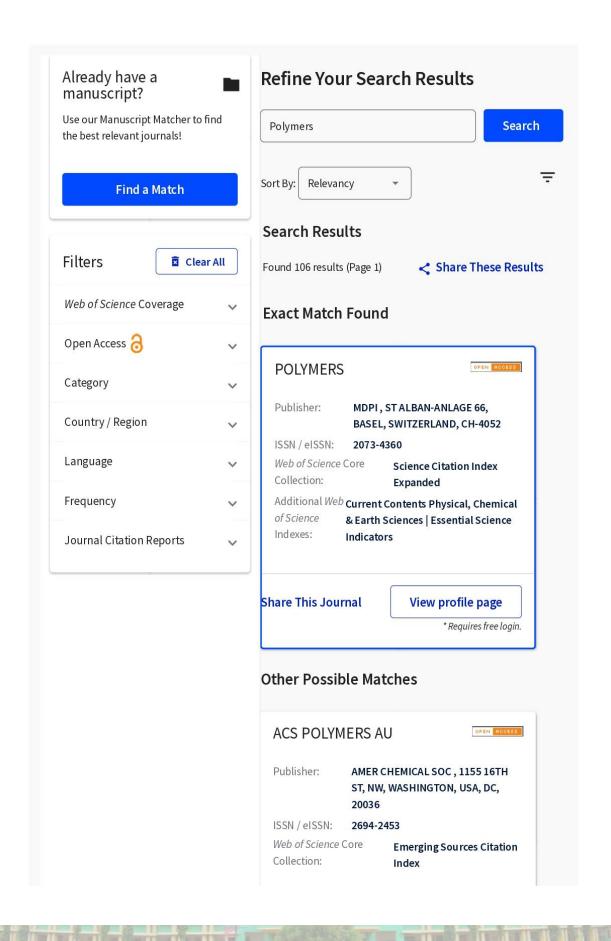
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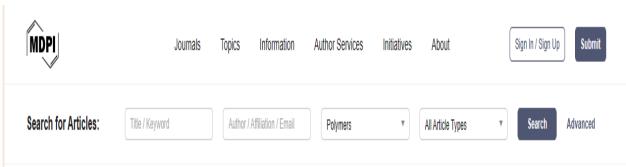
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Articl

## Investigation on Properties of Raw and Alkali Treated Novel Cellulosic Root Fibres of Zea Mays for Polymeric Composites

S. Anne Kavitha <sup>1</sup>, R. Krishna Priya <sup>1,\*</sup>, Krishna Prakash Arunachalam <sup>2</sup>, Siva Avudaiappan <sup>3,4,5</sup>, Nelson Maureira-Carsalade <sup>6</sup> and Ángel Roco-Videla <sup>7,\*</sup>

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- \* Correspondence: rkrishnapriya@protonmail.com (R.K.P.); aroco@udla.cl (Á.R.-V.)

Abstract: Today, new materials based on natural fibres have been emerging day by day to completely eradicate plastics to favour our environmental nature. In this view, the present work is based on the extraction and characterisation of the novel root fibres of the Zea mays (Zm) plant, grown by the hydroponic method. Both the dried untreated and alkali treated root fibres are investigated using a variety of structural, morphological, thermal, elemental and mechanical tests by subjecting both the samples to p-XRD, FT-IR, SEM-EDAX, TGA-DTA, CHNS and tensile strength analyses. Thermal conductivity of the untreated and treated fibres is found using Lee's disc experiment. From p-XRD analysis, the Crystallinity Index, Percentage Crystallinity and Crystallite size of the samples are found. FT-IR studies clarify the different vibrational groups associated with the fibre samples. SEM images show that the surface roughness increases for the chemically treated samples, such that it may be effectively utilised as reinforcement for polymeric composites. The diameter of the fibre samples is found using SEM analysis. According to the EDAX spectrum, Zm fibres in both their raw and processed forms have high levels of Carbon (C) and Oxygen (O). The TGA-DTA tests revealed that the samples of natural fibre have good thermal characteristics. CHNS studies show that Carbon content is high for these samples, which is the characteristic of many natural fibres. Chemical analysis is used to ascertain the prepared samples' chemical makeup. It reveals that both samples have significant amounts of cellulose. The density of the fibres is found to be in the range 0.3-0.6 g/cc, which is much less than any other natural fibre. Therefore, it can be used in light weight applications. From the tensile strength analysis, physical properties such as Young's modulus and micro-fibril angle are determined. The fibres in the roots exhibit a lower tensile strength. Thus, these fibres can be used in powdered form as reinforcement for natural rubber or epoxy composites. After examining all of its properties, it could be reasonably speculated that Zea mays root fibres can be considered as an efficient reinforcement for various matrices to produce attractive bio-composites.

Keywords: Zea mays (Zm); root fibres; structural; TGA-DTA; light weight; reinforcement



Citation: Kavitha, S.A.; Priya, R.K.; Arunachalam, K.P.; Avudaiappan, S.; Maureira-Carsalade, N.; Roco-Videla, Á. Investigation on Properties of Raw and Alkali Treated Novel Cellulosic Root Fibres of Zea Mays for Polymeric Composites. *Polymers* 2023, 15, 1802. https://doi.org/10.3390/ polym15071802

Academic Editors: Anamaria Irimia and Carmen-Mihaela Popescu

Received: 26 February 2023 Revised: 29 March 2023 Accepted: 30 March 2023 Published: 6 April 2023



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#### 1. Introduction

The prevailing philosophy of the modern world is "Go green and Earth will be clean". This credo inspires engineers and scientists to develop novel materials based on natural fibres. A group of cells with a small diameter relative to their length may be referred to as a natural fibre. Using a variety of extraction techniques, natural fibres are removed from



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E-ISSN: 2073-4360	0.720	
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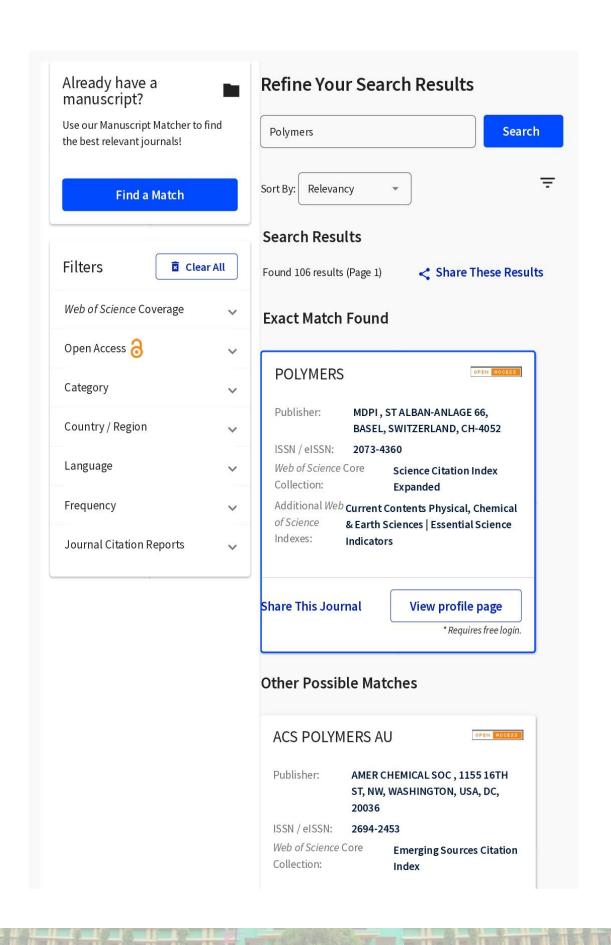
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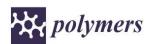
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Article

# Characterisation of Sodium Acetate Treatment on *Acacia pennata* Natural Fibres

Kasirajan Rajam Jaya Sheeba <sup>1</sup>, Retnam Krishna Priya <sup>1,\*</sup>, Krishna Prakash Arunachalam <sup>2</sup>, Siva Avudaiappan <sup>3,4,5</sup>, Nelson Maureira-Carsalade <sup>6</sup> and Ángel Roco-Videla <sup>7,\*</sup>

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Abstract: The present study concerns the physico-chemical, structural, mechanical and thermal characterization of Acacia pennata, a natural and almost inexpensive fibre, as a potential reinforcement in polymer composites. The effect of treating the fibre with sodium acetate to increase its qualities has been seen through the use of thermogravimetric analysis, scanning electron microscope (SEM) analysis, X-ray diffraction (XRD), mechanical property tester, and Fourier transform infrared spectroscopy (FTIR). According to XRD analysis, the elimination of lignin and wax-like impurities resulted in an increase in the AP fibre's crystalline index (79.73%). The fibre's thermal stability was also discovered to be 365 °C. Tensile strength (557.58 MPa) and elongation at break both increased by 2.9% after treatment with sodium acetate. The surface nature and quality of AP fibres improved after sodium acetate treatment. It was confirmed by the reduction of chemical compositions (such as hemicellulose, lignin and pectin). Given its density, the fibre can be suggested as a reinforcement in polymer composites for light-weight applications because its lightweight property will be more useful for composite manufacturing.

**Keywords:** chemical composition; X-ray diffraction; fourier transform infrared spectroscopy; thermal stability; tensile strength



Citation: Sheeba, K.R.J.; Priya, R.K.; Arunachalam, K.P.; Avudaiappan, S.; Maureira-Carsalade, N.; Roco-Videla, Á. Characterisation of Sodium Acetate Treatment on Acacia pennata Natural Fibres. Polymers 2023, 15, 1996. https://doi.org/10.3390/ polym15091996

Academic Editor: Sunil Kumar Ramamoorthy

Received: 28 February 2023 Revised: 14 April 2023 Accepted: 17 April 2023 Published: 23 April 2023





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#### 1. Introduction

In recent years, interest in the powerful use of bio-polymeric materials has expanded significantly. Natural fibres, sometimes referred to as non-wood lignocellulose materials, are being researched as potential environmentally friendly composites that could reduce or replace synthetic fibres and polymers. Environmentally friendly materials have come into consideration as a result of rising environmental awareness and public interest, new environmental rules, and unsustainable petroleum consumption. Natural fibre is regarded as one of the eco-friendlier materials with superior qualities to synthetic fibre [1]. Natural fibres are fibres that are not artificial or synthetic. They may come from either plants or animals [2]. The production of composite materials using natural fibres such as jute, flax, sisal and oil palm, both renewable and non-renewable resources, has attracted a lot of attention in recent decades [3–5].

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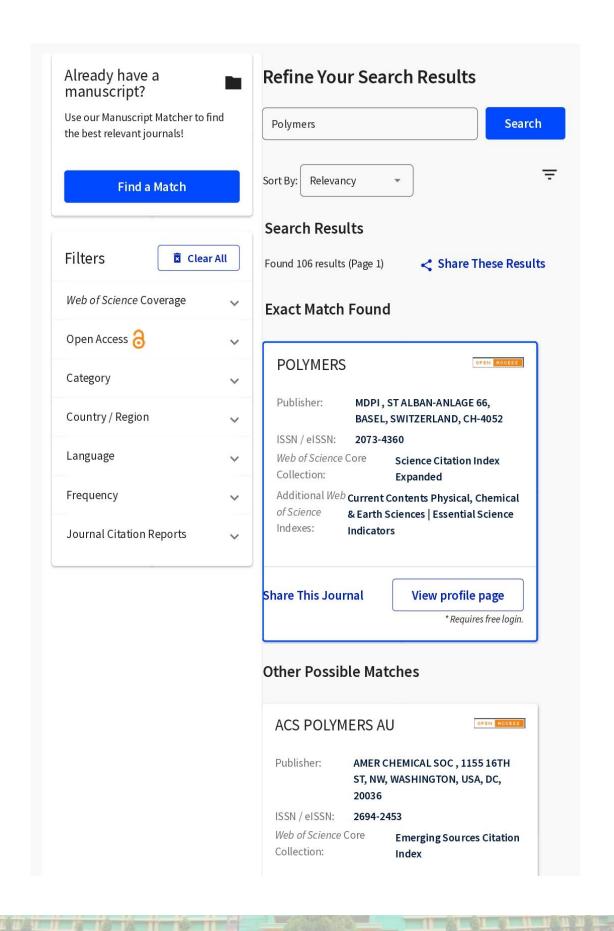
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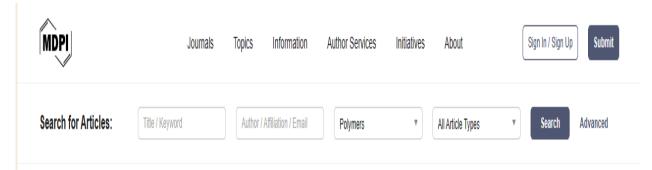
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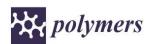
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Article

## Biodegradable Green Composites: Effects of Potassium Permanganate (KMnO<sub>4</sub>) Treatment on Thermal, Mechanical, and Morphological Behavior of Butea Parviflora (BP) Fibers

M. Abisha <sup>1</sup>, R. Krishna Priya <sup>1,\*</sup>, Krishna Prakash Arunachalam <sup>2</sup>, Siva Avudaiappan <sup>3,4,5</sup>, Erick I. Saavedra Flores <sup>6</sup> and Pablo Fernando Parra <sup>7</sup>

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Abstract: This study emphasizes the importance of utilizing biodegradable material Butea parviflora (BP) fiber for sustainable solutions. BP fiber offers numerous ecological benefits, such as being lightweight, biodegradable, and affordable to recycle. The study examines the effects of potassium permanganate (KMnO<sub>4</sub>) treatment on BP fiber and analyzes its physical and chemical behavior using various methods, including X-ray Diffraction (XRD) analysis, tensile testing, thermogravimetric analysis, thermal conductivity, Scanning Electron Microscopy (SEM), and Fourier Transform Infrared spectroscopic (FTIR) analysis. The results demonstrate that BP fiber possesses low density (1.40 g/cc) and high cellulose content (59.4%), which fosters compatibility between the matrix and resin. XRD analysis indicates a high crystallinity index (83.47%) and crystallite size (6.4 nm), showcasing exceptional crystalline behavior. Treated fibers exhibit improved tensile strength (198 MPa) and Young's modulus (4.40 GPa) compared to untreated fibers (tensile strength—92 MPa, tensile modulus—2.16 GPa). The Tg-DTA thermograms reveal the fiber's thermal resistance up to 240 °C with a kinetic activation energy between 62.80-63.46 KJ/mol. Additionally, the lowered thermal conductivity (K) from Lee's disc experiment suggests that BP fiber could be used in insulation applications. SEM photographic results display effective surface roughness for composite making, and FTIR studies reveal vibrational variations of cellulosic functional groups, which correlates with increased cellulosic behavior. Overall, the study affirms the potential of BP fiber as a reinforcing material for composite-making while emphasizing the importance of utilizing biodegradable materials for sustainability.

Keywords: cellulosic fiber; crystallinity; sustainability; green composites



Citation: Abisha, M.; Priya, R.K.; Arunachalam, K.P.; Avudaiappan, S.; Saavedra Flores, E.I.; Parra, P.F. Biodegradable Green Composites: Effects of Potassium Permanganate (KMnO<sub>4</sub>) Treatment on Thermal, Mechanical, and Morphological Behavior of Butea Parviflora (BP) Fibers. Polymers 2023, 15, 2197. https://doi.org/10.3390/ polym15092197

Academic Editor: Kristine V. Aleksanyan

Received: 20 March 2023 Revised: 17 April 2023 Accepted: 22 April 2023 Published: 5 May 2023



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#### 1. Introduction

Technological advancement provides valuable resources along with ruins that are primarily non-biodegradable. There are high hopes that bio composites infused with natural fibers will attain a pollution-free environment and reduce synthetic acquisition. Reduced mass fraction and density are the two key variables that prioritize the use of natural fibers as reinforcements. A key factor that impacts the utility and availability of product in the market is its structural design, which is predominantly overtaken by synthetic materials. Now, the natural fiber composites are turning out to be trend-setters with their adaptability



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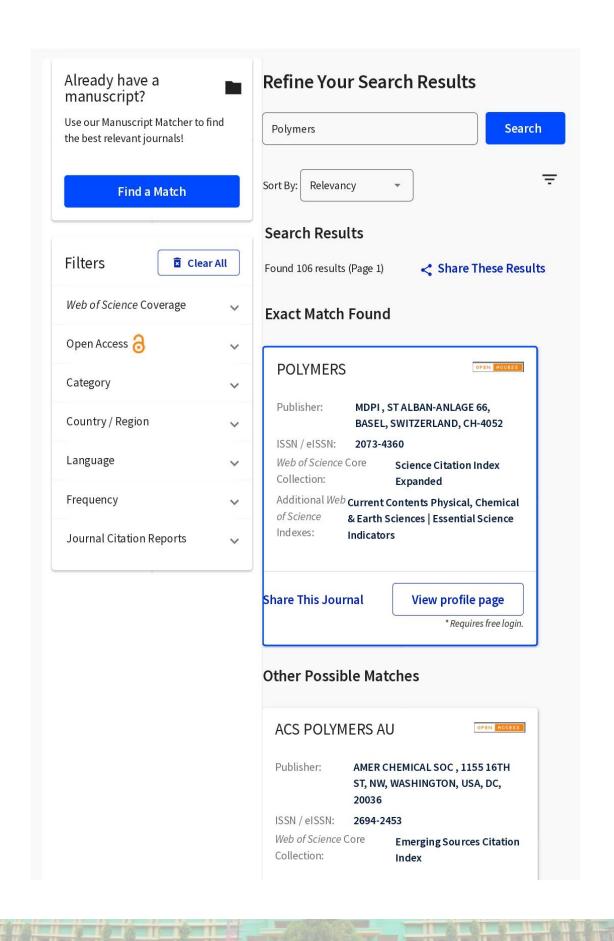
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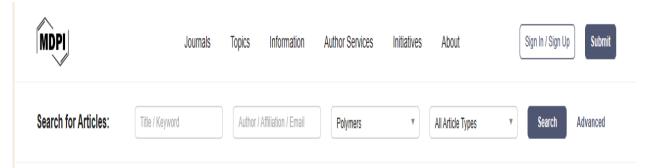
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Article

## Investigating the Mechanical, Thermal, and Crystalline Properties of Raw and Potassium Hydroxide Treated Butea Parviflora Fibers for Green Polymer Composites

Abisha Mohan <sup>1</sup>, Retnam Krishna Priya <sup>1,\*</sup>, Krishna Prakash Arunachalam <sup>2,\*</sup>, Siva Avudaiappan <sup>3,4,5</sup>, Nelson Maureira-Carsalade <sup>6</sup> and Angel Roco-Videla <sup>7,\*</sup>

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- Correspondence: rkrishnapriya@protonmail.com (R.K.P.); krishnaprakash3191@gmail.com (K.P.A.); aroco@udla.cl (A.R.-V.)

Abstract: The only biotic factor that can satisfy the needs of human species are plants. In order to minimize plastic usage and spread an immediate require of environmental awareness, the globe urges for the development of green composite materials. Natural fibers show good renewability and sustainability and are hence utilized as reinforcements in polymer matrix composites. The present work concerns on the usage of Butea parviflora fiber (BP), a green material, for high end applications. The study throws light upon the characterization of raw and potassium hydroxide (KOH)-treated Butea Parviflora plant, where its physical, structural, morphological, mechanical, and thermal properties are analyzed using the powder XRD, FTIR spectroscopy, FESEM micrographs, tensile testing, Tg-DTA, Thermal conductivity, Chemical composition, and CHNS analysis. The density values of untreated and KOH-treated fibers are 1.238 g/cc and 1.340 g/cc, respectively. The crystallinity index of the treated fiber has significantly increased from 83.63% to 86.03%. The cellulose content of the treated fiber also experienced a substantial increase from 58.50% to 60.72%. Treated fibers exhibited a reduction in both hemicelluloses and wax content. Spectroscopic studies registered varying vibrations of functional groups residing on the fibers. SEM images distinguished specific changes on the raw and treated fiber surfaces. The Availability of elements Carbon, Nitrogen, and Hydrogen were analyzed using the CHNS studies. The tensile strength and modulus of treated fibers has risen to 192.97 MPa and 3.46 Gpa, respectively. Thermal conductivity (K) using Lee's disc showed a decrement in the K values of alkalized BP. The activation energy Ea lies between 55.95 and 73.15 kJ/mol. The fibers can withstand a good temperature of up to 240 °C, presenting that it can be tuned in for making sustainable composites.

 $\textbf{Keywords:} \ green \ composites; stem \ fiber; crystallinity; thermal \ behavior; reinforcement \ material$ 

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Citation: Mohan, A.; Priya, R.K.; Arunachalam, K.P.; Avudaiappan, S.; Maureira-Carsalade, N.; Roco-Videla, A. Investigating the Mechanical, Thermal, and Crystalline Properties of Raw and Potassium Hydroxide Treated Butea Parviflora Fibers for Green Polymer Composites. *Polymers* 2023, 15, 3522. https://doi.org/ 10.3390/polym15173522

Academic Editor: Raffaella Striani

Received: 24 June 2023 Revised: 13 August 2023 Accepted: 17 August 2023 Published: 24 August 2023



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#### 1. Introduction

For centuries, the distinctive characteristics of natural fibers have made them valuable for diverse purposes. The properties of natural fibers, including their mechanical, physical, and chemical attributes, are contingent on factors such as the specific fiber type, the plant

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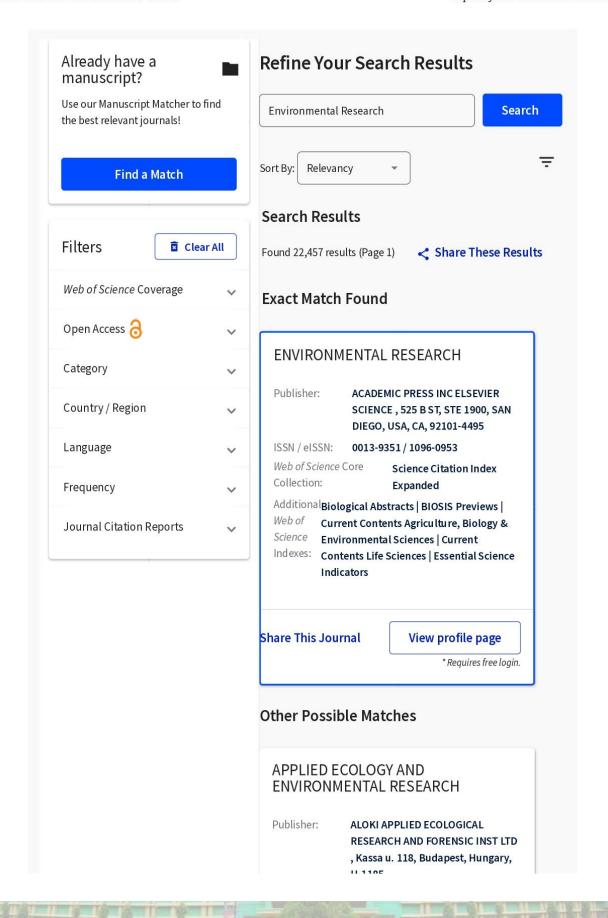
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# Physico-chemical and extraction properties on alkalitreated Acacia pennata fiber

 $\frac{\text{K.R. Jaya Sheeba}}{\text{Sundaram Arvindnarayan}^f}, \\ \underline{\text{Manoharan Vadivel}}^g, \\ \underline{\text{Moonyong Lee}}^c \\ \overset{\text{C}}{\nearrow} \\ \boxtimes_{\text{1}} \underbrace{\text{Krishna Priya Retnam}}^{\text{a b }}, \\ \underline{\text{Sundaram Arvindnarayan}}^f, \\ \underline{\text{Manoharan Vadivel}}^g, \\ \underline{\text{Moonyong Lee}}^c \\ \overset{\text{C}}{\nearrow} \\ \boxtimes_{\text{1}} \underbrace{\text{Krishna Priya Retnam}}^{\text{a b }}, \\ \underline{\text{C}} \\ \boxtimes_{\text{2}} \\ \boxtimes_{\text{3}} \underbrace{\text{Moonyong Lee}}^{\text{b }}, \\ \underline{\text{Moonyong Lee}}^c \\ \underline{\text{C}} \\ \underline{\text{$ 

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#### Highlights

- Optimization of water treatment and alkali treatment of Acacia pennata fibers.
- Relatively high <u>crystallinity</u> index (54.65%) was found for alkali-treated APF.
- TGA established the thermal stability to withstand polymerization temperature.
- · High cellulose content of APF provides good mechanical and tensile strength.
- Low density of untreated and alkali-treated APFs promotes light-weight applications.

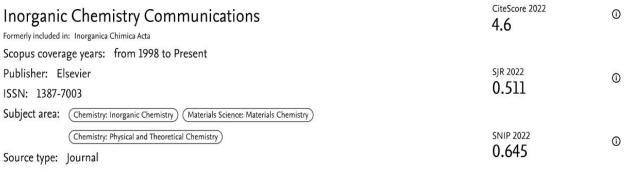
#### Abstract

The production of reinforced composite materials can generally benefit greatly from the use of natural cellulosic woody fibers as good sustainable resources. Natural plants like hemp, cotton, and bamboo are great options for knitters and crocheters looking to make eco–friendly goods. The current study examines the properties of <u>natural fiber</u> obtained from the stem of the Acacia pennata (AP) plant, as well as its basic physico–chemical, structural, thermal, and mechanical characteristics. The key goal of this work was to investigate how alkali treatment affected the AP fibers' morphology, chemical composition, tensile capabilities, morphological changes, structural changes, and <u>thermal degradation</u> (APFs). The <u>SEM</u> image and *p*XRD analyses support the improved <u>surface roughness</u> of the fiber, and that was seen after the alkaline treatment. From XRD analysis, the fiber <u>crystallinity</u> index (54.65%) was improved and it was connected to their <u>SEM</u> pictograms in comparison to untreated APF. Alkali–treated AP fibers include a higher percentage of chemical components including cellulose (51.38%) and ash (5.13%). Alkali–treated AP fibers have a lower amount of hemi–cellulose (30.30%), lignin (20.96%), pectin (8.77%), wax (0.12%), and moisture (13.44%) than untreated APF. Their low density and high cellulosic content will improve their ability to fiber matrices. The thermal behavior of AP fiber at various temperatures was demonstrated by TG–DTA analysis, and <u>tensile strength</u> was also investigated.



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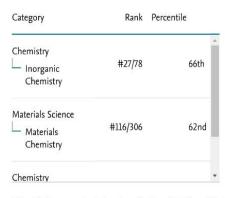
4.6 =  $\frac{12,146 \text{ Citations } 2019 - 2022}{2,624 \text{ Documents } 2019 - 2022}$ Calculated on 05 May, 2023

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 $5.5 = \frac{19,521 \text{ Citations to date}}{3,561 \text{ Documents to date}}$ 

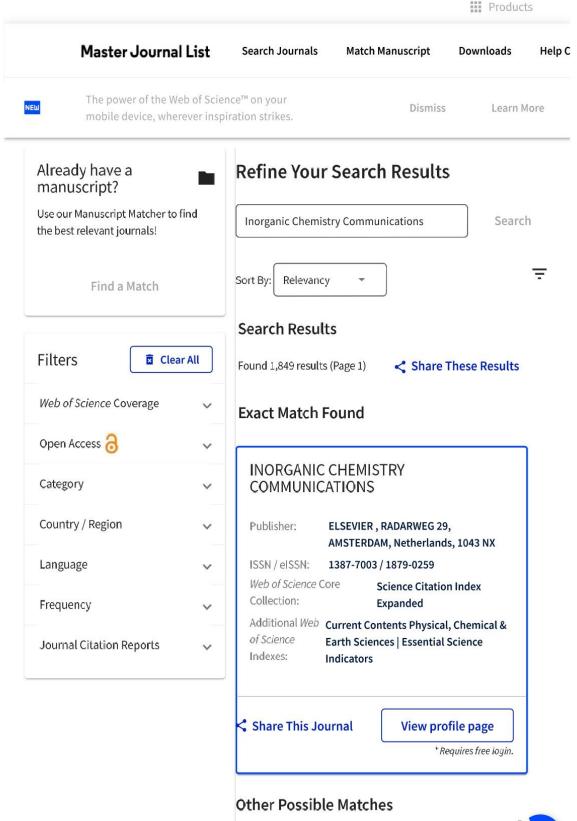
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#### **Inorganic Chemistry Communications**

Volume 158, Part 1, December 2023, 111455

Short communication

# Exploring the growth kinetics of novel and diverse morphologies in nickel oxide nanostructures

 $\underline{S.\ Virgin\ ]eba}^{\alpha}, \underline{S.\ Sonia}^{\alpha}, \underline{D.\ Sivaganesh}^{b}, \underline{Naidu\ Dhanpal\ ]ayram}^{c}, \underline{C.G.\ ]initha}^{\alpha}, \underline{R.\ Ramachandran}^{d}, \underline{N.\ Annlin\ Bezy}^{\alpha}, \underline{T.\ Satheesh\ Kumar}^{e}, \underline{A.\ Lesly\ Fathima}^{\alpha} \ \ \underline{\nearrow} \ \ \underline{\boxtimes}$ 

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https://doi.org/10.1016/j.inoche.2023.111455 
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#### Highlights

- The <u>hydrothermal synthesis</u> method was employed to fabricate <u>NiO</u>
   <u>nanostructures</u> including <u>nanoflowers</u>, <u>nanocapsules</u>, and nanosnakes.
- A unique morphology, referred to as "nanosnakes," was successfully synthesized and reported for the first time in this study.
- The growth mechanism of the synthesized <u>nanoflowers</u>, <u>nanocapsules</u>, and nanosnakes was elucidated, highlighting the involvement of crystallization, <u>Ostwald ripening</u>, and self-assembly processes.
- <u>Rietveld refinement</u> analysis was employed to determine the structural parameters of <u>NiO nanostructures</u>, providing precise information about their crystal structure, <u>lattice parameters</u>, and phase purity.
- The chemical bonding nature of NiO nanoflowers, nanocapsules, and nanosnakes was analyzed, and the 3D unit cells of these structures were displayed, providing valuable insights into their crystal structure and arrangement.

#### Abstract

This study focuses on the synthesis and characterization of nickel oxide (NiO) <u>nanostructures</u> with diverse morphologies, including nanoflowers, nanocapsules, and nanosnakes, achieved through a cost-effective hydrothermal method. Structural analysis using X-ray diffraction (XRD) confirmed the face-centered cubic crystal (FCC) structure of the NiO <u>nanostructures</u>, with accurate fitting of diffraction peaks achieved through <u>Rietveld refinement</u> within the Fm-3m space group. The Ni-O bond lengths were determined as 2.0789Å for nanocapsules, 2.1039Å for nanoflowers, and



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# Source details

Scientific Reports

Open Access ①

Scopus coverage years: from 2011 to Present

Publisher: Springer Nature ISSN: 2045-2322

Subject area: (Multidisciplinary)

Source type: Journal

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CiteScore 2022 **7.5** 

(i)

SJR 2022 **0.973** 

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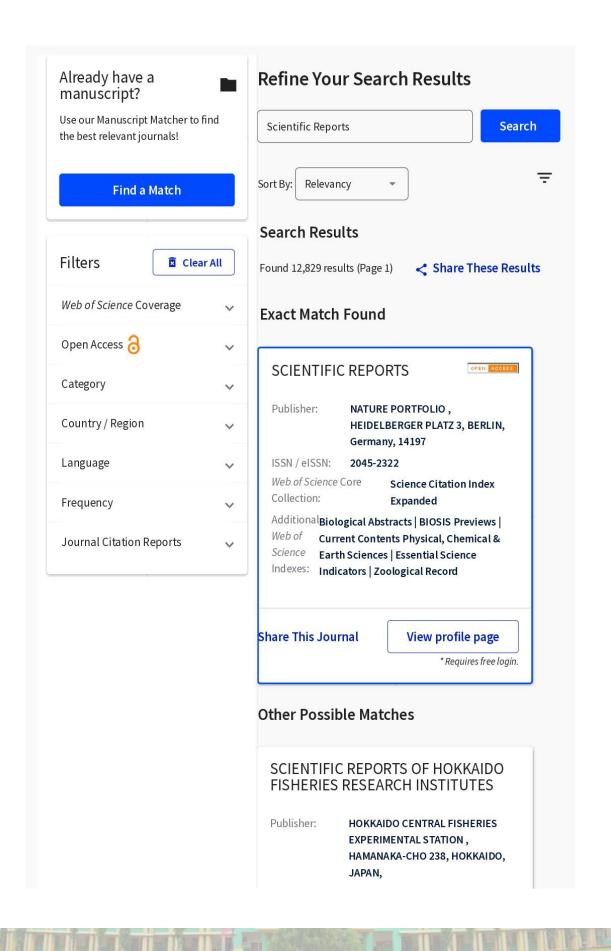
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Category	Rank	Percentile
Multidisciplinary  Multidisciplinary	#11/134	92nd

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# Examining the physico-chemical, structural and thermo-mechanical properties of naturally occurring Acacia pennata fibres treated with KMnO<sub>4</sub>

K. R. Jaya Sheeba<sup>1</sup>, Retnam Krishna Priya<sup>123</sup>, Krishna Prakash Arunachalam<sup>2</sup>, S. Shobana<sup>3</sup>, Siva Avudaiappan<sup>4,5,623</sup> & Erick Saavedra Flores<sup>7</sup>

Natural fiber is a viable and possible option when looking for a material with high specific strength and high specific modulus that is lightweight, affordable, biodegradable, recyclable, and eco-friendly to reinforce polymer composites. There are many methods in which natural fibres can be incorporated into composite materials. The purpose of this research was to evaluate the physico-chemical, structural, thermal, and mechanical properties of Acacia pennata fibres (APFs). Scanning electron microscopy was used to determine the AP fibers' diameter and surface shape. The crystallinity index (64.47%) was discovered by XRD. The irregular arrangement and rough surface are seen in SEM photos. The findings demonstrated that fiber has high levels of cellulose (55.4%), hemicellulose (13.3%), and low levels of lignin (17.75%), which were determined through chemical analysis and validated by Fourier Transform Infrared Spectroscopy (FTIR). By using FTIR, the functional groups of the isolated AP fibers were examined, and TG analysis was used to look into the thermal degrading behaviour of the fibers treated with potassium permanganate (KMnO<sub>4</sub>) Due to their low density (520 kg/m³) and high cellulose content (55.4%), they have excellent bonding qualities. Additionally, tensile tests were used for mechanical characterisation to assess their tensile strength (685 MPa) and elongation.

Our living planet Earth is the source of abundant wealth and resources. It provides shelter for over seven million species of plants and animals. Today's diverse cellulose fibers, which have evolved over the past few decades and include flax, hemp, sisal, cotton, kenaf, jute, bamboo, coconut, and date palm, provide a variety of advantages over synthetic fibers (mostly glass, carbon, and plastic) due to their renewable nature<sup>1, 2</sup>. A number of natural fiber materials can be distinguished by their place of origin in nature. According to specific classifications made by researchers<sup>3–8</sup> these materials fall into three categories: fibers produced from animals, minerals, and plants. These fibers are used in a variety of composite material manufacturing processes<sup>9–13</sup>. In comparison to standard reinforcing materials, natural fibres have greater thermal and acoustic insulating qualities, an acceptable specific strength, cheap cost, and low density<sup>14–18</sup>. The maturity and origin of the plant, as well as the methods and techniques used to extract the fiber from the stem, still affect the mechanical properties of the fibers<sup>19</sup>. For every good alternative material without sacrificing the mechanical properties of the fiber, these are some better fiber-yielding plants that are reasonably priced. Acacia pennata (AC) is one such plant, and it is most readily available in tropical

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CiteScore 2022 5.3

(1)

Open Access (i)

Scopus coverage years: from 2014 to Present

Publisher: Elsevier

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ISSN: 2214-5095

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Source type: Journal

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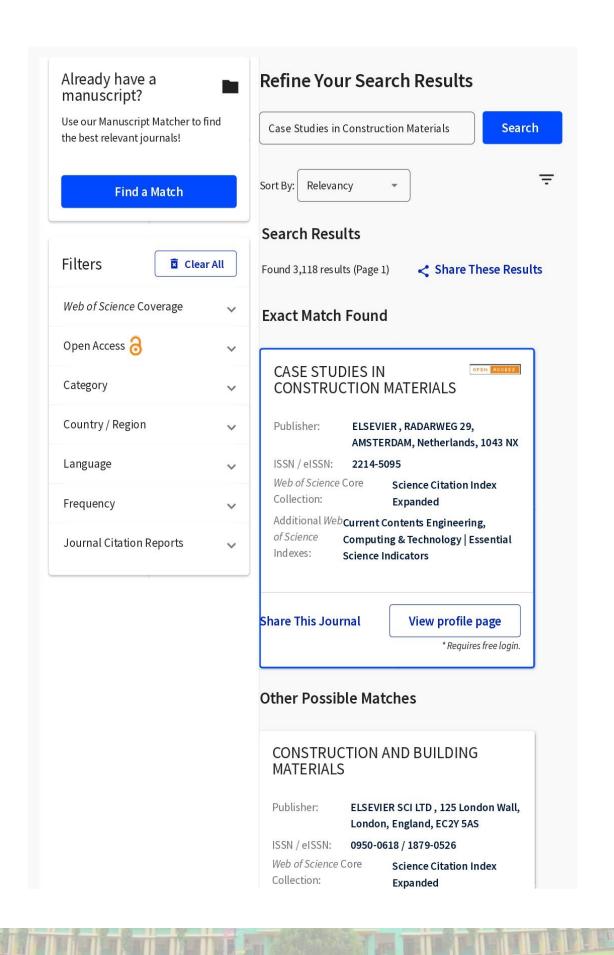
17,261 Citations to date 2,295 Documents to date

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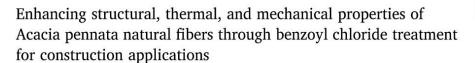


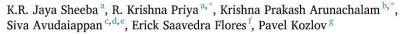
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#### Case Studies in Construction Materials

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#### ARTICLEINFO

Keywords: Acacia pennata Benzoyl chloride Crystallinity index Tensile strength and thermal stability

#### ABSTRACT

In recent years, there has been growing interest in exploring natural fiber reinforced composites as potential alternatives to conventional materials in various structural applications. The aim of this study on Acacia pennata fibers (APFs) and treating them with benzoyl chloride was to explore their potential as reinforcement in construction-related materials. The aim was to investigate the physico-chemical, thermal, and mechanical properties of these fibers to understand their suitability for applications in concrete reinforcement, retrofitting, roofing, and wall panels. By enhancing the understanding of the treated fibers' characteristics, this study contributes to the development of sustainable and high-performance construction materials. The fibers were extracted using both water retting and chemical retting methods. The physico-chemical properties of the fibers were assessed through X-ray diffraction (XRD) analysis, which determined a calculated crystalline index (CI) of 72.14% and a crystalline size of 2.6 nm. Thermo-gravimetric analysis was conducted to evaluate the thermal stability of the APFs, revealing a temperature of 366°C and a maximum degradation temperature of 226.7°C. Mechanical analysis included measurements of the APFs' tensile strength (467.86 MPa), tensile modulus (14.62 GPa), microfibrillar angle (14.79), and elongation at break (3.2%). The findings derived from these analyses suggest that the APFs that underwent treatment exhibit desirable mechanical characteristics, rendering them a viable option for utilization in construction-related materials like reinforcement in concrete, retrofitting, roofing and wall Pannels. This research presents a novel exploration of Acacia pennata fibers (APFs) treated with benzoyl chloride, aiming to establish their potential as reinforcements for construction materials. While natural fiber-reinforced composites have drawn interest, the unique application of APFs in construction and their treatment with benzoyl chloride to enhance properties remain relatively unexplored in the literature. This study fills a significant

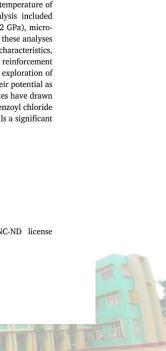
E-mail addresses: rkrishnapriya@protonmail.com (R.K. Priya), krishnaprakash3191@gmail.com (K.P. Arunachalam).

https://doi.org/10.1016/j.cscm.2023.e02443

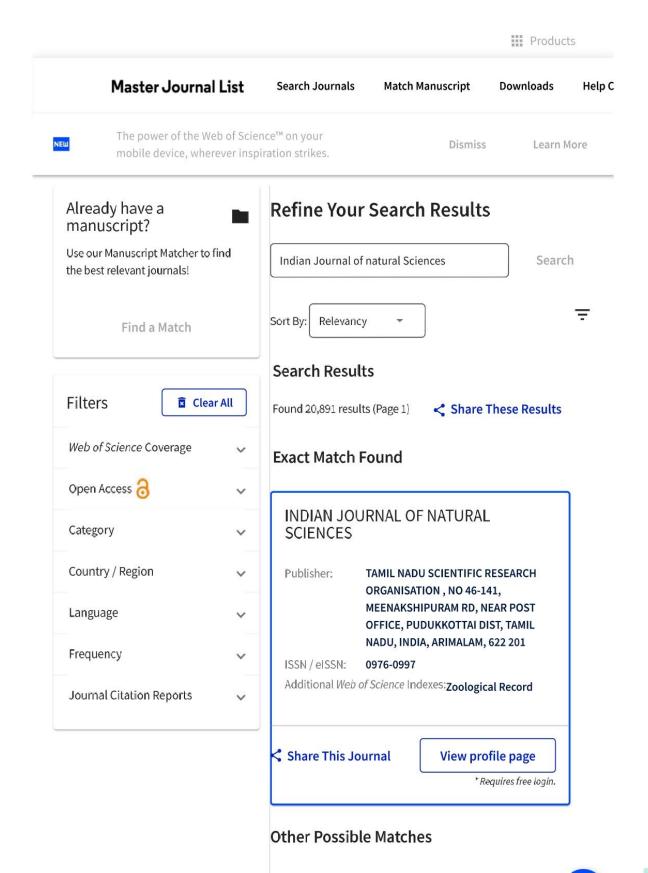
Received 9 March 2023; Received in revised form 27 July 2023; Accepted 30 August 2023 Available online 1 September 2023

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Vol.14 / Issue 81 / Dec / 2023 International Bimonthly (Print) - Open Access ISSN: 0976 - 0997

#### RESEARCH ARTICLE

#### Structural Properties Chitosan's which Extracted from Marine Crustacean

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Received: 25 Aug 2023 Revised: 20 Sep 2023 Accepted: 22 Nov 2023

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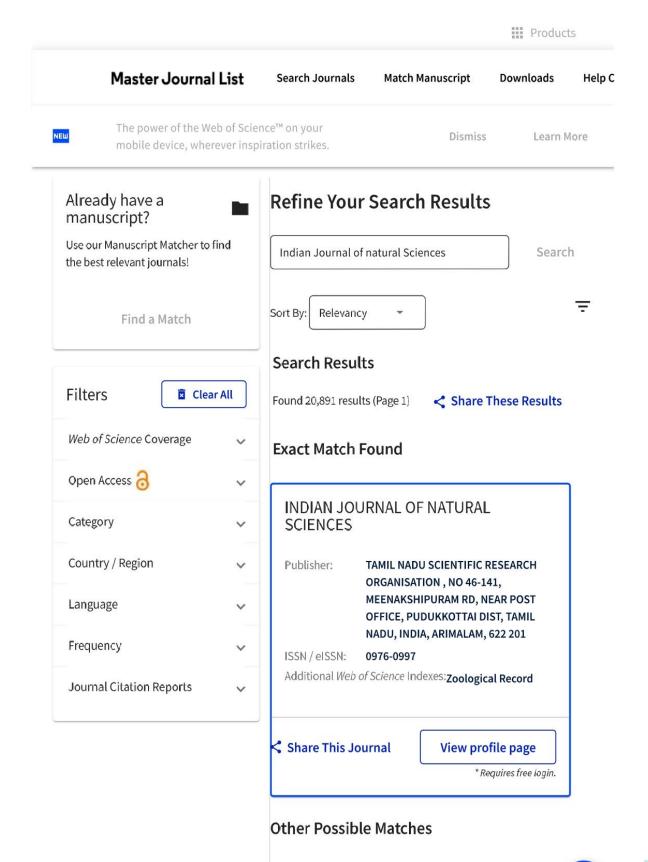
#### ABSTRACT

Chitosan, a polysaccharide derived from shells including crab, lobster, fish scales, and shrimp, is being used to produce improved products in paint, food, agriculture, textileindustries, and in water treatment. This study's goalis to improve chitosan's capacity to meet the demands in diverse fields. Chitosan is extracted by undergoing demineralizing, deproteinizing, and deacetylating of fresh shrimp shell that has been harvested locally. The FTIR and XRD measurements are made to confirm the isolated material is chitosan. The NH stretching and amide group is the major bond in chitosan and is observed in the taken FTIR. The SEM reveals the morphology of obtained chitosan hasuniform-sized porous. The extracted chitosan can be utilized for both home and industrial purposes, including filters, energy storage, medicine administration, etc., because of the porosity distributed over its surface. Chitosan's photoluminescence emission is found in 594 nm, which comes under the green shift region. In EDAX elements Carbon, Nitrogen, and Oxygenare detected that form the polysaccharide chain chitosan. Thus, the chitosan was successfully extracted with improves morphology from shrimp shells by eliminating the calcium and protein contents.

Keywords: Shrimp shell, Fourier Transform Infrared, Scanning Electron Microscopy, Filtration, Porous



66605





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International Bimonthly (Print) - Open Access Vol.14 | Issue 81 | Dec | 2023

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RESEARCH ARTICLE

## Turkey Femur Bone Derived Hydroxyapatite: an Efficient Catalyst for Toxic Dye Degradation

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Received: 18 Aug 2023 Revised: 20 Sep 2023 Accepted: 25 Nov 2023

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#### ABSTRACT

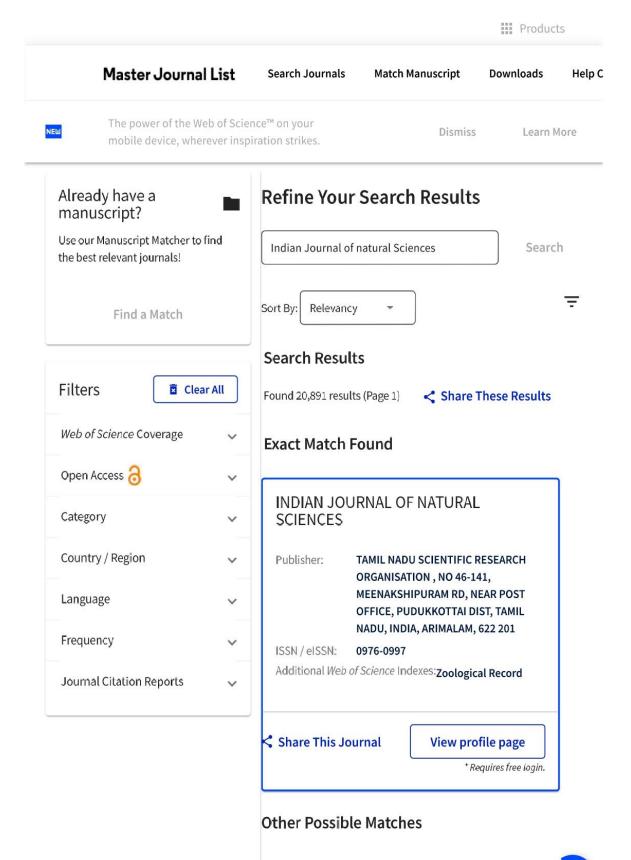
Water pollution has emerged as a critical global crisis due to various contaminating factors, especially from textile industries. The release of toxic dyes into water bodies causes significant environmental damage. This study focuses on the extraction of hydroxyapatite from turkey femur bone using a direct calcination process. X-ray diffraction analysis of the extracted HAp confirms the hexagonal structure with space group of P63/m and reveals agglomerated particles averaging 77.3 nm in size via scanning electron microscopy. Elemental analysis validates the presence of calcium, oxygen, and phosphorus elements. Identification of functional groups is analyzed through FTIR analysis. UV-Vis analysis provides valuable insights into absorbance and bandgap values. In terms of practical application, the extracted HAp showcases significant potential as a catalyst in the treatment of wastewater by photocatalytic experiment. Evidently, its efficiency in decomposing congo red and methylene blue dyes is significant, displaying degradation percentages of 90.5% and 99.4% respectively. These findings proved the remarkable catalytic potential of hydroxyapatite derived from femur bones.

Keywords: Turkey bone, Calcination, Optical properties, Waste water treatment, Photocatalysis,



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#### RESEARCH ARTICLE

# From Agri-Waste to High-Performance Material: Synthesis of Rice Husk Activated Carbon (RAC) and Rice Husk Activated Carbon / Copper Oxide (RACU) for Electrochemical Performance

Jinitha C.G1, Abisha.P2 and Sonia S3\*

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Received: 08 Aug 2023 Revised: 10 Nov 2023 Accepted: 16 Dec 2023

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#### ABSTRACT

Biomass-derived activated carbon is an economically viable and environmentally friendly option for electrochemical applications due to its low cost, renewable nature, and extensive availability. The primary objective of this study is to develop a method for extracting activated carbon from rice husk through the use of a carbonization procedure. Analyses conducted with scanning electron microscopy (SEM) produced precise renderings of the structure's unique characteristics. In addition, an X-ray Diffraction (XRD) study was performed, and the results confirmed the existence of graphitic peaks, as well as copper oxide. Cyclic voltammetry (also known as CV) was utilized to carry out electrochemical analysis at a scan rate that varied from five to one hundred. Notably, the scan rate of 10 m V/s corresponded to the point where the maximum capacitance was measured, which was 167.36 F g-1. The power density that was attained was 2083 W kg-1, and the energy density was also 5.2 Wh kg-1. The level



66594





# Source details

# Polycyclic Aromatic Compounds

CiteScore 2022 2.8

(i)

Scopus coverage years: from 1990 to Present

Publisher: Taylor & Francis

ISSN: 1040-6638 E-ISSN: 1563-5333

SJR 2022 0.286

(1)

Subject area: (Materials Science: Materials Chemistry) (Materials Science: Polymers and Plastics) (Chemistry: Organic Chemistry)

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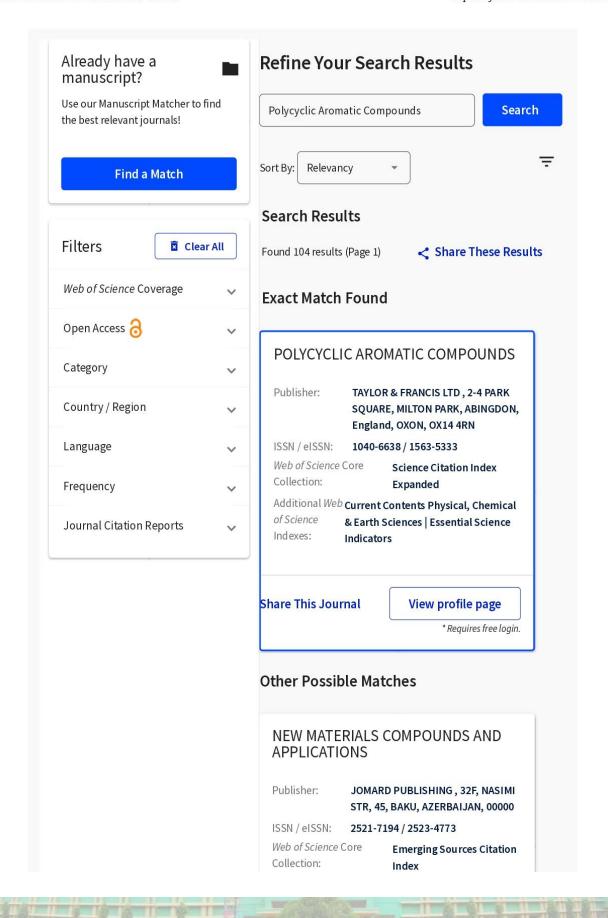
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Materials Science Polymers and Plastics	#100/163	38th
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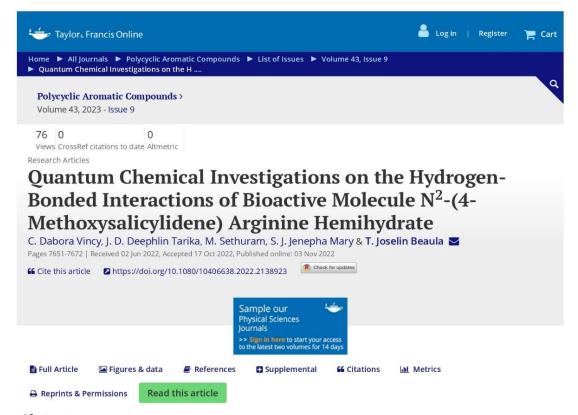


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#### Abstract

The geometry optimization, natural bond orbital analysis, and vibrational analysis of a Schiff base compound  $N^2$ -(4-Methoxysalicylidene) Arginine Hemihydrate (4MSAH) were carried out using the density functional B3PW91 method with the 6–31 G (d,p) basis set. Natural Bond Orbital (NBO) analysis is carried out to examine the various intra and inter molecular interactions of molecular system. Normal coordinate analysis was carried out to elucidate the vibrational modes and the assignments were made on the potential energy distribution. From the vibrational analysis, it is endorsed that the stretching wave number of hydrogen bond donor COO<sup>-</sup> and hydrogen bond acceptor  $NH_2^+$  is shifted due to the interaction. MO (Molecular Orbital) analysis was accomplished to propose the biological activity of the molecule and the impact of the transition of electrons from  $n\rightarrow \pi^*$  was studied using the UV transmittance spectrum. The molecular orbital contributions are studied by using DOS spectral analysis. Topological studies of 4MSAH were conducted utilizing the Electron Localization Function (ELF) and the Local orbital locator (LOL). Hirshfeld surface analysis and reduced density gradient analysis were conducted to investigate distinct covalent and non-covalent interactions. Molecular docking was employed on antifungal proteins to explore protein-ligand interactions and verify the compound's bioactivity.



#### Acknowledgment

The Authors thank Dr. I. Hubert Joe, Associate Professor of Department of Physics, Kerala University for granting us permission to do computational works in their Research Lab.

#### Disclosure statement



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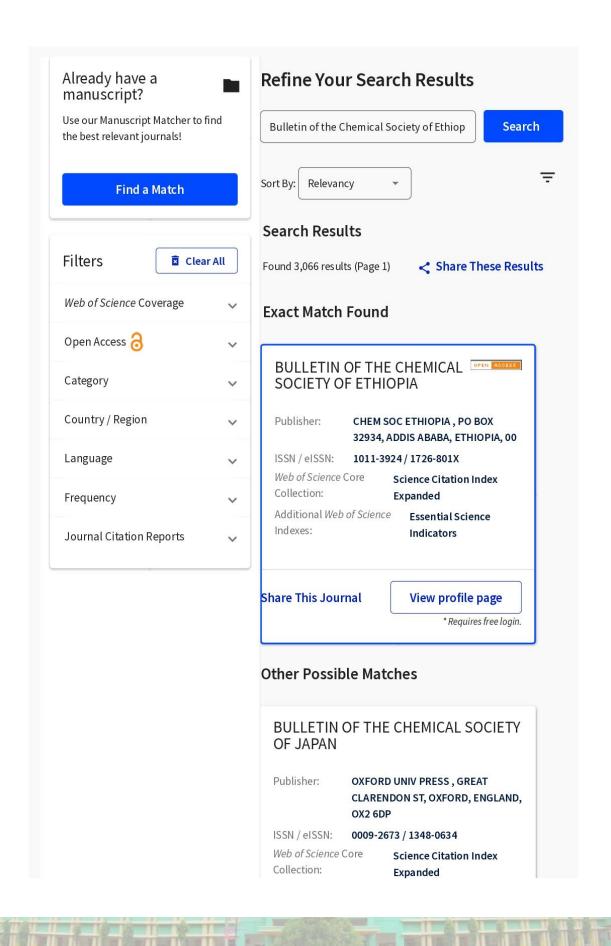
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Bull. Chem. Soc. Ethiop. 2023, 37(4), 917-929. © 2023 Chemical Society of Ethiopia and The Authors

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# SYNTHESIS AND CHARACTERIZATION OF QUERCETIN-LAYER DOUBLE HYDROXIDE (LDH) NANOHYBRID AND THEIR ENHANCED ANTIOXIDANT ACTIVITY

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(Received December 13, 2022; Revised February 24, 2023; Accepted February 25, 2023)

ABSTRACT. This research included the synthesis of pristine nitrate-type Zn<sub>2</sub>Al-LDH by means of Coprecipitation, which was then followed by hydrothermal treatment. Ion exchange is used to stabilize the produced
pristine LDH nano layer, which is used for the encapsulation of bioactive molecules. Quercetin, which has an
antioxidant function, is used. XRD was used to investigate the newly synthesized quercetin-LDH (QC-LDH)
compound. Quercetin was discovered to be entirely deprotonated as a result of XRD research, and it was also shown
to be stabilized in between LDH lattices as a result of electrostatic contact. On the basis of the diphenyl
picrylhydrazyl (DPPH) method, the anti-oxidant property was discussed, and it was discovered that the quercetin
that was free from the LDH layer helped as an owing antioxidant to scavenge DPPH radicals in ethanol solvent at
concentrations ranging from 80-100%, depending on the concentration level. The powder X-ray diffraction patterns
indicate that the incorporation of quercetin into the interlayer led to an expansion of the interlayer arrangement to
0.88 and 1.46 nm, respectively. According to the findings of a variety of characterization techniques, the QC-LDH
may be regarded as a good antioxidant material with potential drug delivery system.

KEY WORDS: Layer double hydroxide, Antioxidant activity, Quercetin, Biocompatibility

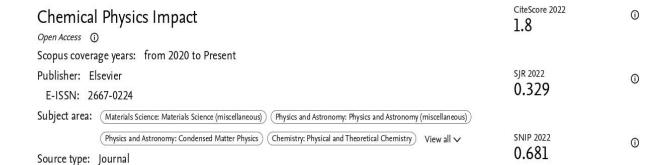
#### INTRODUCTION

Cancer has increasingly become one of the most significant obstacles to be faced in terms of the world's public health. According to the data published by the World Health Organization (WHO), cancer is responsible for the deaths of 8.97 million individuals worldwide each year. As a result of this, cancer has now surpassed coronary artery disease to become the second leading cause of death, falling just behind ischemic heart disease as the leading cause of death. Due to the fact that tumors are made up of cancer cells that are encircled by normal healthy cells within the extracellular matrix, such as adipocytes and immune cells, tumours can only be removed surgically and the microenvironment of a tumors is both complicated and distinct. In compared to typical rates of cell growth, it is distinguished by an abnormally rapid rate of cell growth, which is one of its defining characteristics. Because it is now common knowledge that the metabolic state and consumption power for nutrients of cancerous cells is significantly higher than that of normal cells and that they are distributed very widely, organisms are weak and are unable to compete with tumors for nutrition. This is because cancerous cells consume nutrients at a much



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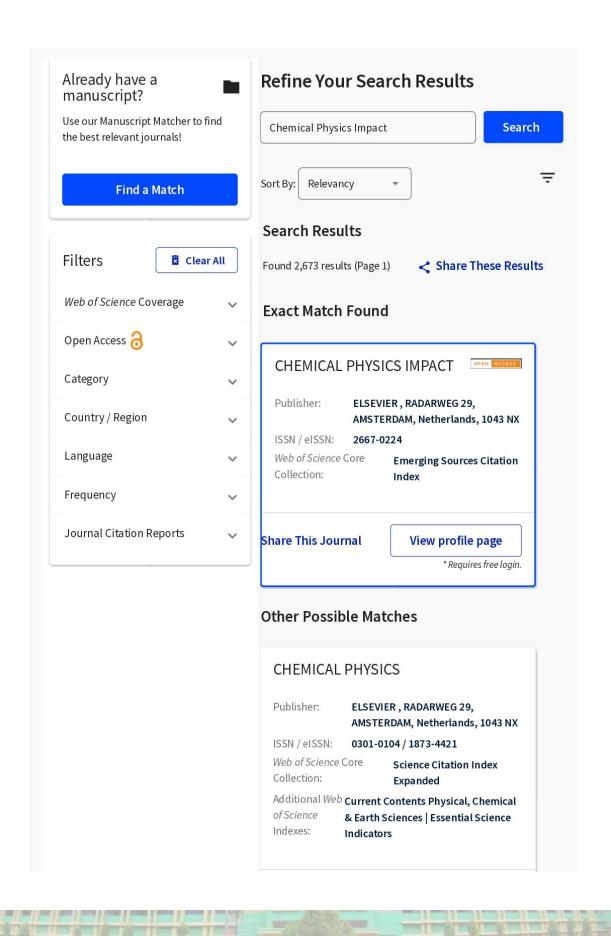
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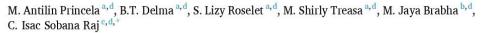
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## Biocompatibility of ionic liquid tagged terpyridine complexes with potent biological activity



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#### ARTICLEINFO

#### Keywords: Terpyridine Ionic liquids Antimicrobial activity Antioxidant activity Anticancer activity

#### ABSTRACT

The current work deals with the study of novel and bioactive ionic liquid tagged terpyridine ligand and their complexes were synthesized using first row transition metal ions. The synthesized IL tagged complexes were characterized by UV, FT-IR, <sup>1</sup>H NMR, <sup>13</sup>C NMR, HRMS spectroscopic studies and also the structure of the complexes was confirmed by its spectral data. Moreover, the antibacterial, antifungal, antioxidant and anticancer studies were carried out to exhibit the bioactivity of the complexes. The antimicrobial studies of newly synthesized complexes were tested against five bacterial and two fungal strains by disc diffusion method. The iron complexes of terpyridine shows outstanding activity than the reference with zone of inhibition of 22-32 mm against the evaluated microorganisms. Furthermore, the antioxidant activity of the terpyridine complexes was assessed by phosphomolybdenum and NO radical scavenging assay. The reducing power of the synthesized complexes has shown potent antioxidant activity than the standard. Especially, Cu-tpy-IL and Zn-ttpy-IL have shown good radical scavenging activity exhibits an IC50 value of 42.45 and 40.85 µg/mL respectively. In addition, the anticancer activity of the complexes was analyzed by SRB assay. The report suggested that the complexes of Cu-ttpy-IL and Zn-ttpy-IL exhibiting prominent role in anticancer activity against HeLa and HT-29 cell lines possessing a  $GI_{50}$  value of  $<10~\mu g/mL$ . The obtained results revealed that the bioactive synthesized complexes could be used as a derivative in the field of drug inventions.

#### 1. Introduction

Metal ions and its complexes were served as a key material in biological processes and it is responsible for various biological reactions in our daily life [1]. Metal complexes have a peculiar property to exist as multiple oxidation states, generating additional coordination site, increasing the reaction kinetics, altering the ligand affinity and mimicking the metalloenzymes and so on. Because of these properties, metals can easily bind with oxygen, sulphur and nitrogen atoms, which is present in the amino acids in DNA [2-4]. The recent trends in bioinorganic chemistry are to synthesize thermodynamically stable and kinetically labile, low-cost eco-friendly metal complexes [5] and to utilize these complexes for various biological targets especially for cancer treatment. Generally, the metal atom has a tendency like readily losing an electron from the outermost orbit and it existed as a cation,

hence metal containing biomolecules (Haemoglobin) carry the oxygen throughout the body. Since metal atom is electron deficient in nature, it exists in variable oxidation states based on the environment [6]. This tendency attracts electron rich biomolecules like DNA and proteins. Due to this peculiar property, metal complexes induce electron shuttling between biomolecules and metal complexes.

In addition to this, many metal ions are responsible for natural evolution and biological functions. Practically, haemoglobin is an iron containing allosteric protein which is present in blood and it carries oxygen as well as carbon dioxide [7]. Calcium and its compounds are present in bones; hence it decides the skeletal system [8]. Ceruloplasmin is the copper carrying protein made in liver, it stores and carries the mineral copper around our body [9]. Vitamin B-12 (cobalamin) is a cobalt containing vitamin, their contribution in the formation of red blood cell is a remarkable one [10]. Urease is a nickel containing

E-mail address: isacchemistry@gmail.com (C.I.S. Raj).

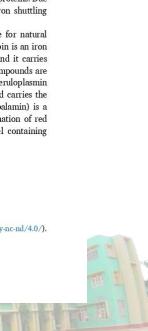
https://doi.org/10.1016/j.chphi.2023.100371

Received 2 June 2023; Received in revised form 5 October 2023; Accepted 5 November 2023

Available online 7 November 2023

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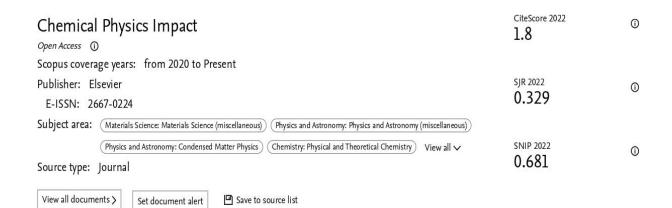


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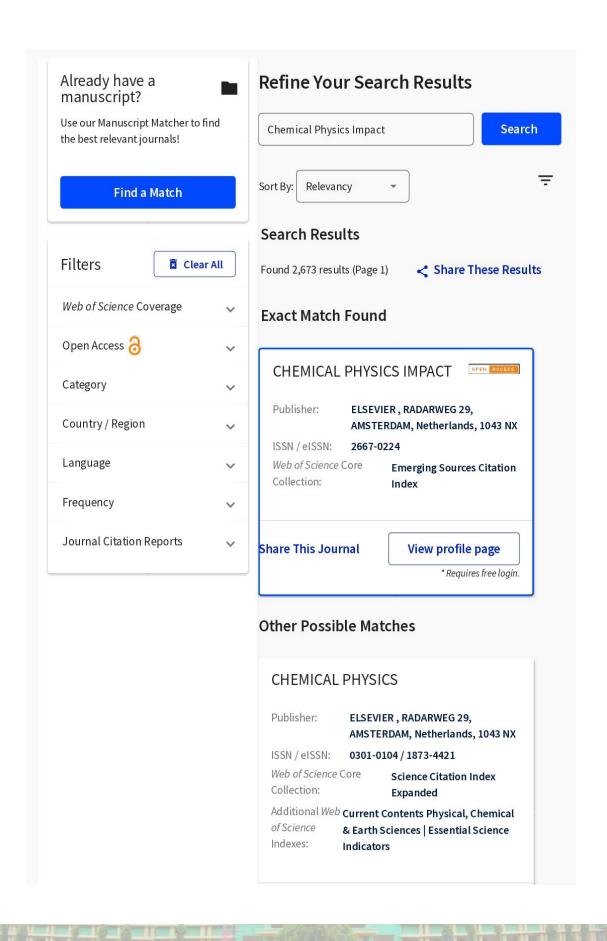
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# Synthesis, characterization and biological activity of zinc complexes of ethylenediamine and its derivatives

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Department of Chemistry, Holy Cross College, Nagercoil, Affiliated to Manonmaniam Sundaranar University, Tirunelveli, Tamil Nadu, India



Keywords: Anti-diabetic Alpha-glucosidase Alpha- amylase 1H NMR and CHNS

#### ABSTRACT

Inorganic Complexes are widely used in pharmaceutical industry. Especially chelating complexes are used as the scavengers of heavy metal ions. This present study is aimed to synthesis ethylenediamine and its derivative Zn (II) complexes, and identifies the biological efficiency of the complexes. The <sup>1</sup>H NMR spectra of ligands and Zn complexes are confirming the complexation. Downfield shifts of complexes further support the complexation. All the complexes are well crystalline and the average particle size is 80. The calculated percentage of an element in all the complexes is well agreed with the percentage of elements obtained from the CHNS analyzer. Applications of the complexes are studied by its Invitro Anti-diabetic activity. [Zn(pren)<sub>2</sub>]<sup>2+</sup>complex exhibits greater percentage inhibition (63.57%). The homo catenation of the ligand is response to increase the drug efficiency.

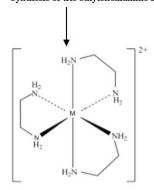
#### Introduction

The average human body contains 3 g of zinc, which makes it the second most abundant trace element in the body after iron [1-4]. Zinc is the only metal that appears in all enzyme classes [1,4]. It is mainly distributed in the blood, kidney, liver and bone [5]. Studies have shown that Zn(II) has important antibacterial and antiviral effects [6], and high zinc ion concentrations may have some antibacterial properties [7]. Metal ions are necessary for many important operation in humans and some diseases are caused due to deficiency of metal ions [8] iron deficiency might result in pernicious anemia. Zinc deficiency causes growth retardation, copper deficiency leads to heart disease in infants. A fundamental aspect of medicinal bioinorganic chemistry is to notice and interpret at the level of molecular of the diseases, initiated by unsatisfactory in function metal-ion. Especially chelating complexes are used as the scavengers of heavy metal ions [9]. This present study is aimed to synthesis and identifies the efficiency of chelating complexes. The scheme is performed for the synthesis of ethylenediamine and its derivatives are treated with Zn (II) salt. Empirical formula of complexes are analyzed by CHNS study, complexation are determined by 1H NMR and FTIR studies, crystallinity and grain size are identified by PXRD. Anti-Diabetic Activities of chelating metal complexes are determined by invitro alpha-glucosidase inhibition assay and invitro alpha-amylase inhibition assay.

#### Synthesis of chelating metal complexes

The chelating complexes of Zn(II) were prepared from zinc sulphate hepta hydrate, with ligands, ethylenediamine (en), N-methylethylenediamine (meen) and N-propylethylenediamine (pren). 2 mM aqueous solution of metal salts was taken in a separate beaker and 6 mM solution of en, meen and pren was added drop by drop to the separate beaker. To get proper mixing continuous stirring was performed for an hour, 2 mL of ethyl alcohol was added to each beaker for complete precipitation then the solution was transferred into three separate petri dish. The solvent was removed by hot air oven at 45°C. After 3 days, white-coloured complexes were formed [10].

Synthesis of tris ethylenediamine Zn(II) sulphate



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#### https://doi.org/10.1016/j.chphi.2023.100248

Received 1 January 2023; Received in revised form 15 May 2023; Accepted 8 June 2023 Available online 8 June 2023

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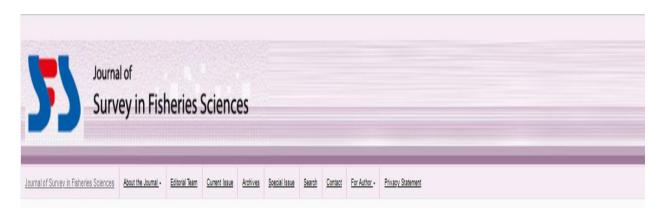
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#### Biological Analysis of Cocos Nucifera L Endocarp Extracts

<sup>1</sup>K Lavanya , <sup>2</sup>S Agneswari, <sup>3</sup>S Kala Vetha kumari, <sup>4</sup>K Indirani <sup>5</sup>M Murugan, <sup>6</sup>Abisha B

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#### ABSTRACT

Cocos nucifera. L commonly called as Coconut tree is used for its several beneficial health effects as antitumor, anthelminthic, antidotal, antiseptic, bactericidal activity, etc. Coconut shell or its endocarp is an agricultural waste and is available in very large quantities throughout the tropical countries of the world. Endocarp of C.nucifera. L was supposed to be the hardest part of the fruit but ionically richest source of phenolic and flavonoid compound which are responsible for diverse biological activities beneficial to human health and disease prevention. Therefore the present study was conducted to determine the phytochemical constituents and antioxidant activity of four different extracts of C.nucifera. L endocarp prepared by cold percolation (CNL-01), hot percolation (CNL-02), aqueous extraction (CNL-03) and by dry distillation (CNL-04) methods. All the investigated phytochemicals except amino acids, proteins and alkaloids were present in different extracts. Antioxidant activity of extracts using reducing power methods revealed CNL-02 as the better extract.

#### 1. INTRODUCTION

Cocos nucifera Linn commonly known as coconut belonging to Arecaceae family is considered as an important fruit tree in the world providing food and used in the world playing a significant role in the economic, cultural and social life of over 80 tropical countries. Currently coconut is mainly an oil crop rich in lauric acid with a variety of others uses in addition to commercial oil production. The most important coconut

producing countries in the world are India, SriLanka, Malaysia and Indonesia (Harries, 1995). For thousands of year, coconut products have held a respected and valuable place in Indian folk medicine. It is believed to be antiblenorrhagic, antibronchitis, febrifuga, antigingivitic, immunostimulant, antioxidant, antiparasitic etc. Endocarp of *Cocos mucifera* was supposed to be the hardest part of the fruit but ionically richest source of phenolic and flavonoid compound which are responsible for diverse biological

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## A Preliminary Qualitative and Quantitative Phytochemical Screening of *Annona muricata* L. Leaf Using Various Solvent Extracts

Jerin Asha T1\*, Medo Merina R2 and Bojaxa A Rosy3

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Affiliated to Manonmanium Sundaranar University, Abishekapatti, Tirunelveli, Tamil Nadu, India.

#### ABSTRACT

The main objective of the present study was to find out the phytochemicals present in aqueous, ethanol, chloroform, ethyl acetate and acetone extracts of *Annona muricata* L. (Soursop) by both qualitative and quantitative screening methods. In qualitative analysis various phytochemicals such as alkaloids, flavonoids, tannins, phenols, terpenoids, glycosides, saponins, steroids, carbohydrates, reducing sugars and proteins were present. In quantitative analysis total amount of available phytochemical constituents were quantified. The ethanol leaf extract showed maximum number of compounds, followed by ethyl acetate, chloroform and aqueous extracts. Least number of secondary metabolites present in acetone. The highest quantity of alkaloids shown in ethanolic leaf extract. The quantity of glycosides is remarkable in both ethanol and acetone. Among all phytochemicals present, terpenoids and reducing sugars showed the least quantity in all extracts. The results obtained during the study also highlights the value in the field of pharmacology to develop new drugs.

Keywords: Extracts, leaf, phytochemical screening, qualitative, quantitative, soursop,

#### INTRODUCTION

Plants represents a priceless tank of new bioactive molecules with various medicinal and pharmacological applications (Singh *et al.*, 2014). Plants have been thus known to be a reservoir of secondary metabolites which are being exploited as source of bioactive substance for various pharmacological purposes. Numerous studies have been carried out to screen extracts from medicinal plants for the

presence of novel compounds and to test their biological activities (Ahmedulla and Nayar,1999). Medicinal plants which contain phytochemicals are good for human health and for the prevention of diseases (Mlozi, 2022).

The phytochemical research that has been done based on the ethno-pharmacological information forms the effective approach in the discovery of new anti-infective agents from higher plants. It plays a vital role



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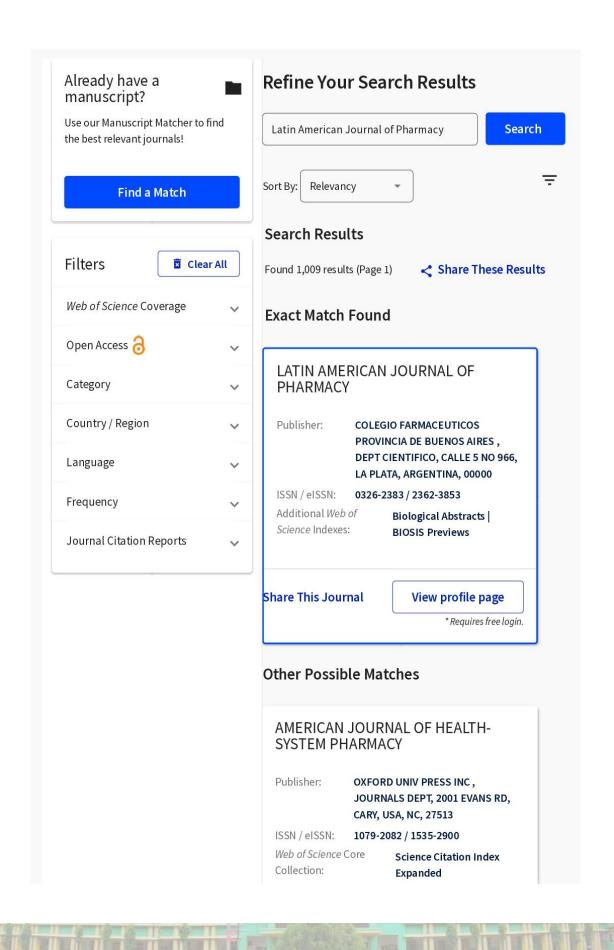
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# Phytochemical and anticancerous potential of the fruit extract of annona muricata I.

9

Jerin Asha T\*, Medo Merina R and Bojaxa A Rosy

Keywords: Analyse, Anti-cancerous, Metabolites, Pharmacological, Phytochemical.

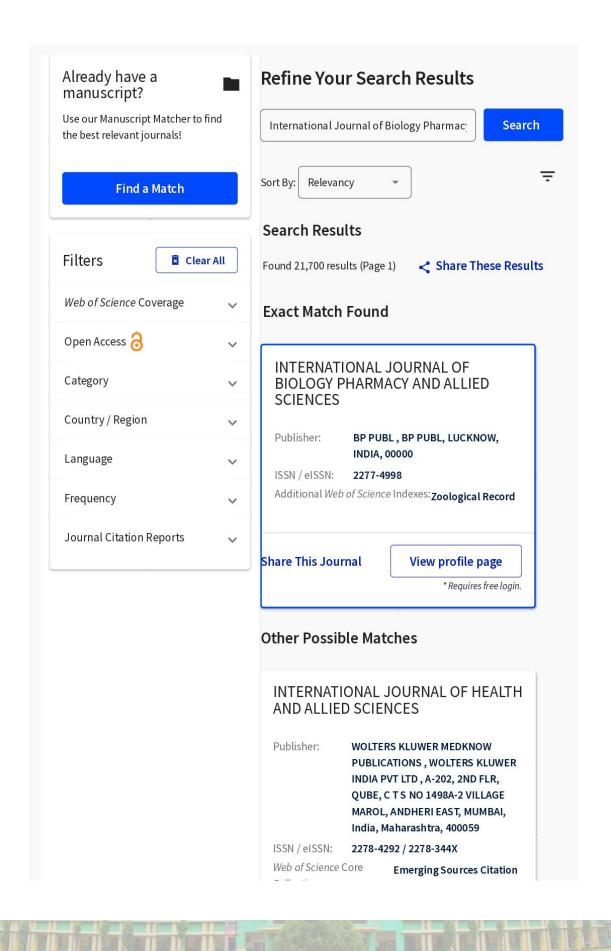
#### **ABSTRACT**

The objective of this research was to explore the preliminary phytochemical and anticancerous properties of Annona muricata fruit extract. The fruit parts like mesocarp and epicarp were selected for the study. Chloroform solvent is used for the extraction. The qualitative and quantitative analysis of the phytochemicals was determined. The anticancerous studies were made by MTT assay method. Various concentration of the extract was used for anticancerous analysis. The MCF-7 breast cancer cell line was used for the viability test and the IC 50 value was determined. The results of the qualitative and quantitative phytochemical analysis revealed the presence of alkaloids, flavonoids, tannins, phenols, terpenoids, glycosides, saponins, steroids, carbohydrates, reducing sugars and proteins. The phytochemical compounds were more in epicarp than mesocarp. The MCF-7 breast cancer cell line also showed the best results in mesocarp than epicarp.

PUBLISHED

2023-08-25

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ISSN:2277-4998

IMPACT FACTOR(ISI)2012-13:0-0.663

IMPACT FACTOR(ISI)2012-14:0-0.812 IMPACT FACTOR(ISI)2012-15:1.022

IMPACT FACTOR (ISI) 2017-2018: 1.318

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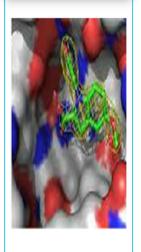
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## ETHNOMEDICINAL PLANTS USED BY THE PEOPLE OF THICKANAMCODE VILLAGE, KANYAKUMARI DISTRICT, TAMIL NADU, INDIA

# S. JAYAKUMAR<sup>1\*</sup>, T.S. SHYNIN BRINTHA<sup>2</sup>, C. DOMETTILA<sup>3</sup>, R. MARY SUJIN<sup>4</sup>, A. R. FLORENCE<sup>5</sup>, G. JEBIA CHINNA RANI<sup>5</sup>, A. AYUN VINUBA<sup>6</sup> AND V. SATHIA GEETHA<sup>7</sup>

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Received 8th April 2022; Revised 3rd May 2022; Accepted 25th July 2022; Available online 1st Feb. 2023

https://doi.org/10.31032/IJBPAS/2023/12.2.6897

#### ABSTRACT

Plants have been used since ancient times for the treatment of various ailments. The present study documents the commonly used medicinal plants used by the people of Thickanamcode village through Participatory Rural Appraisal (PRA) method and interview method. A total of 70



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Edited by: Editorial Board of Journal of Data Acquisition and Processing

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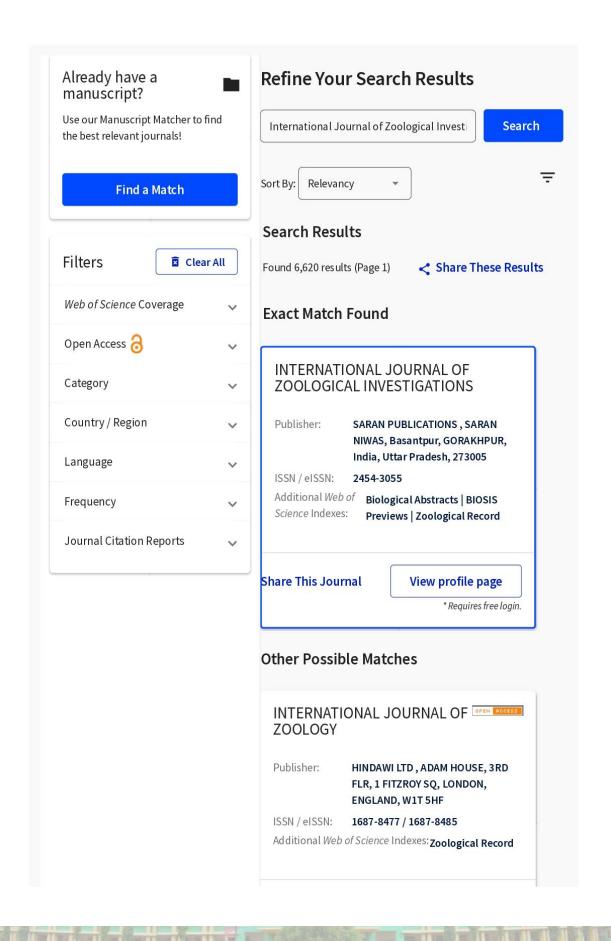
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#### Abstract

The natural resources of a country are the foundation for its economic and social growth. Natural resources are vital to a country's economy because they generate wealth and jobs, supply crucial materials for manufacturing, feed and power the population, and heal and cure the sick. Overexploitation causes resource exhaustion because of population growth. The depletion of natural resources has had a domino effect, driving up prices, altering weather patterns, and eroding the economic, social, and cultural gains made possible by those resources' earlier exploitation. Nations must learn to use these resources sustainably if they want current and future generations to reap the advantages. Due to the importance of properly managing these sensitive resources in light of recent developments in information technology, natural resource managers have placed a strong emphasis on remote sensing and geographic information system (GIS) technologies. Managers now have a solid foundation upon which to build data and knowledge that will guide sustainable development decisions thanks to these technologies. Therefore, the purpose of this study is to provide an overview of the use of GIS and Remote Sensing in the context of managing land resources and promoting long-term sustainability.

Keywords: Technology for Land Use Planning, Resource Management, and Remote Sensing





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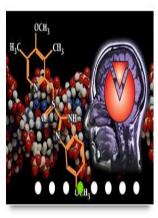
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In Vitro Antimicrobial Activity of Flower Extracts of Plumbago indica L. against Pathogenic Bacteria and Fungi

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Received: 4th April, 2023; Accepted: 14th May, 2023; Published online: 3rd June, 2023

https://doi.org/10.33745/ijzi.2023.v09i01.105

Abstract: Medicinal plants are traditionally used for the treatment of human diseases. Plumbago indica is popularly known as "chittiramulam" in Tamil and belongs to the family Plumbaginaceae. Its root contains plumbagin, sucrose, fructose and protease which possess antiseptic and antipyretic properties. The present study was undertaken to investigate Plumbago indica flower for potential activity against pathogenic bacteria and fungi. Plumbago indica flower extracts were prepared in ten different solvents like ethanol, methanol, butanol, chloroform, ethyl acetate, acetone, hexane, petroleum ether, aqueous and saline. The activity of flower extracts was evaluated against six bacterial pathogens, Bacillus subtilis, Enterococcus faecalis, Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli and Proteus vulgaris and three fungi, Aspergillus niger, A. flavus and Rhizopus stolonifer using standard disc diffusion method. The results of the flower extracts displayed possible activity against bacterial and fungal pathogens. The highest mean diameter of zone of inhibition was observed against bacterial pathogen Pseudomonas aeruginosa and highest mean diameter of zone of inhibition was observed against the fungal pathogen A. flavus in the ethanol extract. Together, the results of this study demonstrate, for the first time, the antimicrobiological effects of the flower of Plumbago indica which seems to possess therapeutic molecules capable of inhibiting, the growth of all the pathogenic bacteria and fungi.

**Keywords:** Antimicrobial activity, Chittiramulam, *Plumbago indica*, Microbes, *Bacillus subtilis*, *Enterococcus faecalis*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Escherichia coli*, *Proteus vulgaris*, *Aspergillus niger* 

Citation: Anitha C., Basil Rose M.R., Arokya Glory P.T., Prakash Shoba S. and Josephine Priyatharshini C.: *In vitro* antimicrobial activity of flower extracts of *Plumbago indica* L. against pathogenic bacteria and fungi. Intern. J. Zool. Invest. 9(1): 954-960, 2023.

#### https://doi.org/10.33745/ijzi.2023.v09i01.105

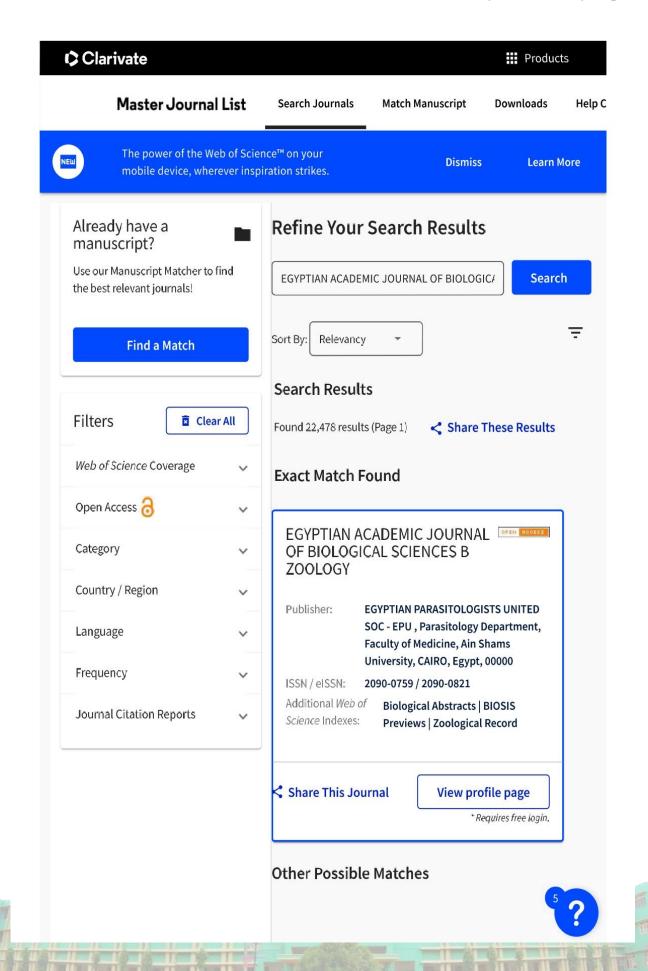


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#### Introduction

Disease is an integral part of human from the beginning of their existence. The subject of drugs

is also as old as disease and the search for remedies to combat it is perhaps equally old and





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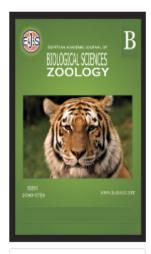


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## Analysis of Attitude of Public Towards Prenatal Screening for Diagnosis of Genetic Disorders

Prakash Shoba<sup>1</sup> S.\*, Arokya Glory<sup>1</sup> P. T., Princy Anusha<sup>2</sup> V., Varshaa<sup>2</sup>. T. B., Venci Candida<sup>1</sup> X., Punitha A.<sup>1</sup> and Anitha<sup>1</sup>. C

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E-mail\*: prakash.shoba06@gmail.com,

ARTICLE INFO

Article History Received:26/5/2023

Accepted: 27/6/2023 Available: 29/6/2023

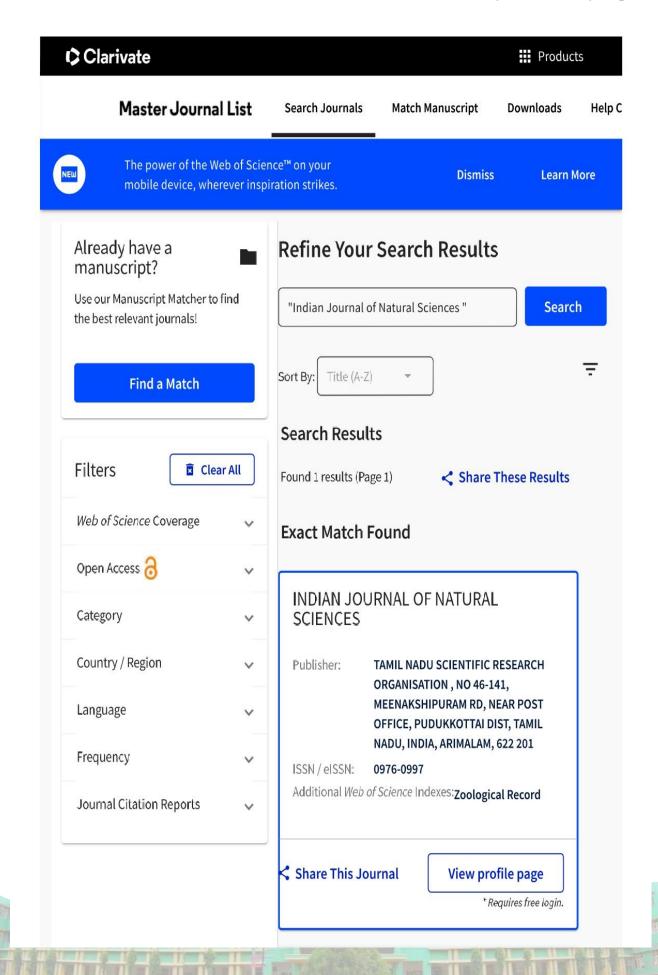
Keywords:

Prenatal diagnosis, Genetic disorders, Pregnancy, noncommunicable diseases.

With a very large population and high birth rate, and consanguineous marriage favored in many communities, there is a high prevalence of genetic disorders in India. The cross-sectional study was carried out in people of the Kanyakumari District, Tamil Nadu community males and, females both married and single with a wide range of ages and educational backgrounds as well as covering a diverse number of generic diseases. The cross-sectional survey was conducted among people of the Kanyakumari District, Tamil Nadu (n = 201) to determine their practices toward reproductive decision-making. The main objective of the study is to analyze the participant's knowledge of the practices towards prenatal diagnosis (PND) and termination of pregnancy. Genetic testing has the maximum possible potential to reduce the prevalence of genetic disorders by early detection. Studies found that general knowledge of genetic diseases in Tamil Nadu lacks an understanding of the fundamental characteristics of genetic diseases. Primarily due to the occurrence of consanguineous marriages 20%. The practice towards PND (61%) was more favorable than TOP (39%). PND was found to be a good opportunity for early diagnosis and gives parents choice. In Kanyakumari District, most people will have an awareness of genetic disorders, Prenatal diagnosis, and Termination of pregnancy. Mercy (22.60%), religious belief (12.8%), and sin (12.2%) is the main influence on the participant's practices concerning Prenatal diagnosis and Termination of pregnancy. The fetus was diagnosed with a genetic disorder before 120 days of pregnancy, they have undergone abortion favored by 61.2%, and unfavored by 48% of the people. 62% of members responded to the diagnosis of a fetus with genetic diseases before delivery, and 38% were not accepted in prenatal diagnosis. 50.8% of members not knowing the causes of a family history of genetic diseases. But 49.2% know the causes of a family history of genetic diseases. The reason for rejecting the above question was religious belief (12.8%), Ethics (10.4%), culture (9.8%) Mercy (22.6%), sin (12.2%), Others reason (32.3%). For accepting abortion before 120 days of pregnancy (50.2%) members for getting a healthy child (68.9%), to avoid the affected child (31.1%). The current challenge of the research is a comprehensive effort to revisit consanguineous marriages and their effects with more recent using statistical methods to assess the prevalence and effect of consanguineous marriages on pregnancy.

Citation: Egypt. Acad. J. Biolog. Sci. (B. Zoology) Vol. 15(1) pp:287-299 (2023)

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RESEARCH ARTICLE

#### Screening of Secondary Metabolites by FT-IR Spectroscopy

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Received: 15 Feb 2023 Revised: 25 Apr 2023 Accepted: 30 May 2023

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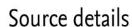
#### **ABSTRACT**

The secondary metabolites present in various vegetable products showed medicinal properties. Four common vegetable products which we often add in our diet were taken as samples for our study. The four samples Amla (Emblica officinalis), Drumstick leaves (Moringa oliefera), beetroot (Beta vulgaris) and turmeric (Curcuma longa) were selected for our study. The samples Amla and drumstick leaves were collected from local area and beetroot and turmeric were collected from the local market. The samples were cut into thin slices and shade dried for three weeks. When it is completely dried, it was ground in the mixer jar to a smooth powder. The smooth powder of the four samples were extracted with ethanol and tested for secondary metabolites by FT-IR analysis. The obtained peaks of each sample were identified using the standard IR values. From the results obtained, we could conclude that all the four samples Amla (Emblica officinalis), Drumstick leaves (Moringa oliefera), beetroot (Beta vulgaris) and turmeric (Curcuma longa) have sufficient diversity of secondary metabolites which have high medicinal properties.

Keywords: FT-IR, Phytochemicals, IR chart, Amla (Emblica officinalis), Drumstick leaves (Moringa oliefera), beetroot (Beta vulgaris), turmeric (Curcuma longa)







## Fish and Shellfish Immunology

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SJR 2022

1.108

Subject area: (Immunology and Microbiology: Immunology and Microbiology (miscellaneous))

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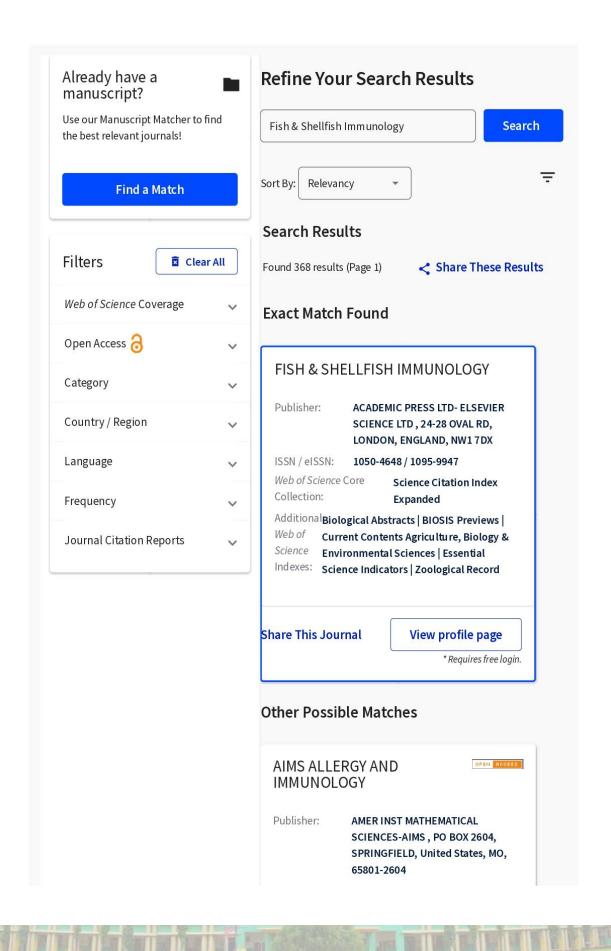
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Volume 141, October 2023, 109001

Full length article

## Antimicrobial, anti-inflammatory and anti-arthritic activity of hemolymph lectin (NagLec) isolated from the freshwater crab, Oziotelphusa naga

F. Vargila <sup>a</sup> 🙎 🔀 , <u>S. Mary Mettilda Bai</u> <sup>a</sup>, <u>J. Vinoliya Josephine Mary</u> <sup>a</sup>, <u>M. Ramesh</u> <sup>b</sup>

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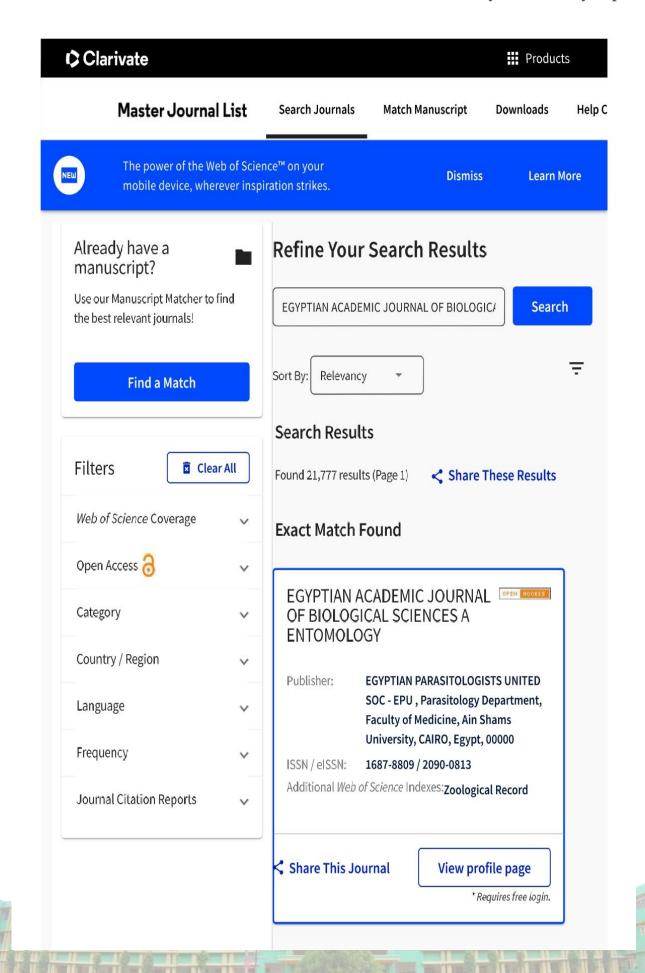
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#### Highlights

- · A sialic acid specific lectin was purified from the hemolymph of freshwater crab, Oziotelphusa naga.
- · The purified lectin, NagLec exhibited antimicrobial activity against Staphylococcus aureus, Proteus mirabilis, and Candida albicans.
- NagLec demonstrated bactericidal activity against Staphylococcus aureus, causing alterations in bacterial cells and protein leakage.
- NagLec inhibited COX and LOX enzymes and protein denaturation suggesting anti-inflammatory and anti-arthritic properties.

#### Abstract

Lectins are non-immune glycoproteins or proteins having a unique capacity to interact with carbohydrate ligands found on the surface of their host cells. In the present investigation, the lectin was purified from the hemolymph of freshwater crab, Oziotelphusa naga and its antimicrobial, anti-inflammatory and anti-arthritic activity was analysed. Thepreliminary characterization of the hemagglutinin was carried out to identify the erythrocyte and sugar specificity, optimum pH and temperature and cation dependency. The agglutinin was found to be highly specific to rabbit erythrocyte and inhibited by fetuin and  $\alpha$ -lactose. Maximum hemagglutination activity was noted at pH 7.5-8 and temperature 20–40°C. An O-acetyl sialic acid specific 75kDa hemolymph lectin, designated as NagLec was isolated from the freshwater crab, Oziotelphusa naga by affinity chromatography on fetuin coupled Sepharose 4B, with a purification fold of 185. The bacteria <u>Staphylococcus aureus</u>, <u>Proteus mirabilis</u> and fungus <u>Candida albicans</u> had the greatest <u>zone of</u> inhibition when treated with NagLec. The results of the Minimum inhibitory concentration (MIC) and Minimum bactericidal concentration (MBC) assays showed that the purified lectin inhibited the growth of Staphylococcus aureus at 0.031 and 0.065 µg/ml, which proved the bactericidal property of NagLec. NagLec generated alterations on the





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Assessment of Arthropod Biodiversity in Mulberry Plants During the Summer Season

Venci Candida, X. \*, Arokya Glory, P.T., Prakash Shoba, S., Ashmi Jose, G.S., Resebha, R., Arokiya Sheril, B. and Sahaya Jasmine Nilani, S.

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#### ARTICLE INFO

#### Article History Received:2/10/2023 Accepted:12/11/2023 Available:16/11/2023

Keywords: Silkworm, Insecta, Arachnida, Hemiptera, Araneae.

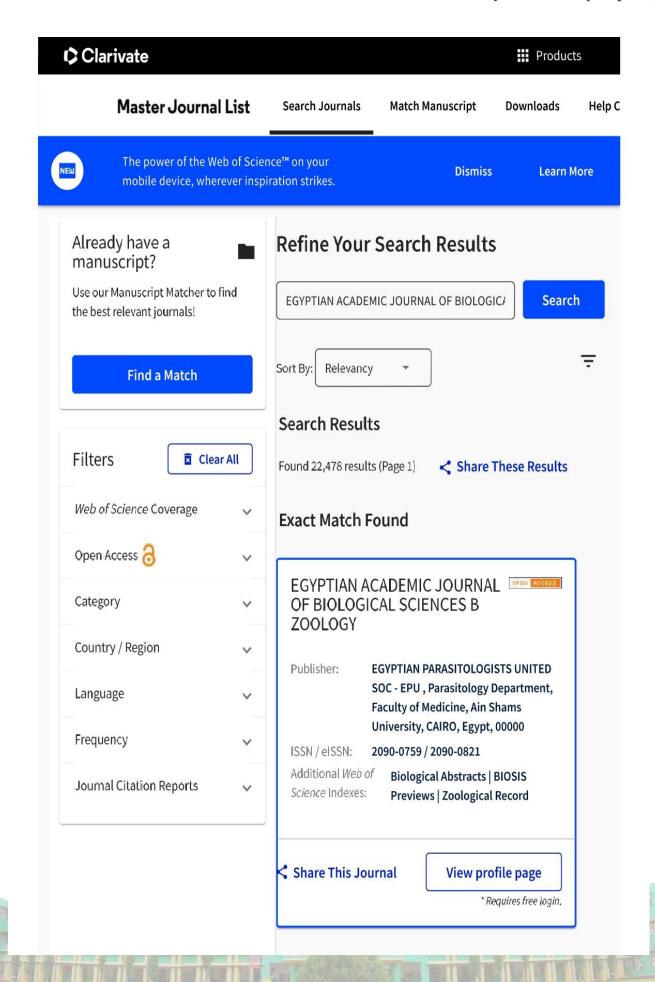
#### ABSTRACT

The silkworm industry plays a crucial role in providing employment opportunities, particularly in regions like Karnataka, Andhra Pradesh, Assam, West Bengal, Jharkhand, and Tamil Nadu. This industry heavily relies on mulberry plants (Morus alba L.) as the primary food source for silkworms (Bombyx mori). The quality of mulberry leaves directly influences cocoon quality and colour, making Moriculture pivotal in sericulture. Mulberry plants face various challenges, including diseases and pest infestations, affecting leaf growth and silk quality. This study, conducted at Holy Cross College, Tamil Nadu, aims to identify and analyze arthropods damaging mulberry leaves. Arthropods from two classes, Insecta and Arachnida, were identified and classified into orders, families, and genera. Hemiptera emerged as the most diverse order among Insects. Notably, sap-sucking insects like mealy bugs, hoppers, and jassids were observed, consistent with previous research. The Shannon Weinner index, Species richness and Species evenness were found to be more in the mulberry garden as per this study. The study's findings emphasized the need for integrated pest management strategies to enhance mulberry leaf production for the sericulture industry's sustainability.

#### INTRODUCTION

The sericulture industry, which revolves around the production of silk, plays a significant role in providing employment opportunities in various states of India, such as Karnataka, Andhra Pradesh, Assam, West Bengal, Jharkhand, and Tamil Nadu. This agrobased industry relies heavily on the cultivation of mulberry plants (*Morus alba* L.), as the leaves of the mulberry plant serve as the primary food source for silkworms (*Bombyx mori*). The quality and colour of the silk cocoon are influenced by the quality of mulberry leaves, making mulberry cultivation, also known as Moriculture, a critical aspect of the sericulture industry. Maintaining healthy mulberry plants through regular activities like watering, fertilizing, pruning, and protection from pests and predators is vital (Sakthivel *et al.*, 2019). Silk, often referred to as the "queen of textile fibres," is highly valued for its warmth, softness, and strength. While silk products are often associated with luxury, it's worth noting that the silk industry is also an essential source of employment for many people, including those from economically disadvantaged backgrounds. India, as the second-largest silk producer globally, boasts a unique position as the only country

Citation: Egypt. Acad. J. Biolog. Sci. (A. Entomology) Vol. 16(4) pp.39-51 (2023) DOI: 10.21608/EAJBSA.2023.325683





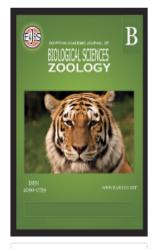
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Egypt. Acad. J. Biolog. Sci., 15(1):129-138(2023)



# **Egyptian Academic Journal of Biological Sciences** B. Zoology ISSN: 2090 - 0759





Preliminary Analysis of Gross Alpha and Beta Radiation in Coastal Areas

Venci Candida, X.1\*, Sherin Sheeba Shalini, P.1, Shenkani, K.2 and Jenifer, V.1

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#### ARTICLE INFO

#### **Article History** Received:21/1/2023 Accepted: 5/3/2023 Available: 10/3/2023

Keywords: Alpha activity,

Beta activity, radiation, Dual channel alpha beta counter.

#### **ABSTRACT**

Radioactivity is a form of natural radiation, and it is measured in becquerels (Bq) using the SI system. Both human activities and natural processes can produce radioactivity. For this study, three regions on the South Tamilnadu coastline in India, namely Manavalakurichi, Colachel, and Kudankulam, were chosen. A dual-channel alpha-beta counter was used to measure gross alpha and beta activity based on the scintillation principle. The radioactive nuclide activity concentrations in soil and water were measured, and the levels were considered acceptable. The alpha and beta radiation levels in soil and water samples did not significantly differ. The study's results suggest that the risk of radiation danger in the study area is not significantly increased because the values obtained are within the generally accepted limits. The ANOVA experiments also revealed that there was no significant difference in the gross alpha and beta activity of soil and water samples. Moreover, the alpha and beta activity in drinking water was lower in all three areas than what is recommended by the WHO. Therefore, it can be concluded that the drinking water in these three regions is safe for consumption.

#### INTRODUCTION

Radionuclides and radioisotopes such as uranium, thorium, radium, and potassium exist in small amounts in the Earth's crust. The levels of natural uranium (U) and thorium (Th) in igneous rocks range from 0.1 to 5 mg/kg and 1 to 20 mg/kg, respectively, depending on the rock type. Felsic rocks, such as granite, usually contain more U and Th than mafic rocks, such as basalt (Patak, B 2012). The higher amounts of these radionuclides in the soil can act as a source of radionuclide transmission down the food chain, depending on their chemical composition and how plants and animals absorb radionuclides (Jabbar et al., 2010). Radioactivity in water is mainly caused by the presence of radioactive materials in the Earth's crust. Therefore, it is crucial to measure the radiation content in drinking water for human health and environmental contamination purposes (Jibiri, 2007). Soil radioactivity is typically important when creating baseline data for

Citation: Egypt. Acad. J. Biolog. Sci. (B. Zoology) Vol. 15(1) pp:129-138(2023)





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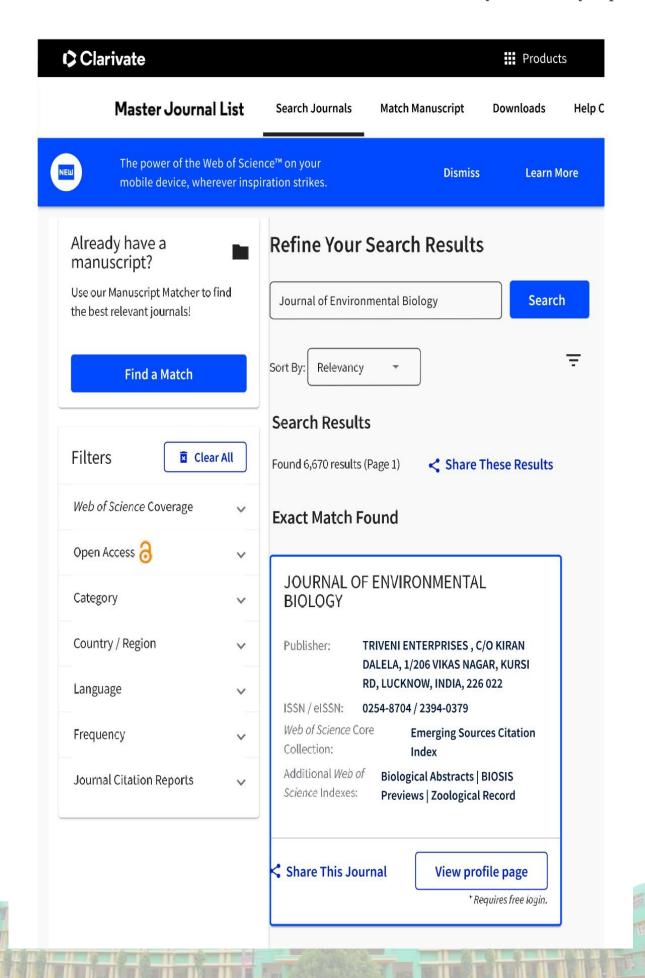
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Toxicologists, and the organizer of the conference **Dr. R. C. Dalela**, was entrusted the responsibility to take the necessary steps. After several meetings, *Journal of Environmental Biology* was launched on 7<sup>th</sup> October **1980** with **Dr. Dalela** as **Editor-in-chief**, and was registered with Government of India (GOI).

In 1996, the editorial office of the Journal shifted to Lucknow and the registration was revised by GOI, accordingly. Website (www.jeb.co.in) of journal was launched in 2006 with Open Access facility free-of-charge.

Thus, the Journal has actively been involved for the last **four decades** in publishing quality research papers related to all areas of Environmental Sciences and Toxicology from all over the world.

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DOI: http://doi.org/10.22438/jeb/44/6/5088

# Morphological and molecular identification of the freshwater crab, Barytelphusa cunicularis from Kanniyakumari, India

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Received: 23.08.2022 Revised: 10.05.2023 Accepted: 05.09.2023

#### Abstract

Aim: The present study aims to assess the taxonomical identification of commercially important freshwater crab, Barytelphusa cunicularis from Kumba River, Kanniyakumari using morphological and molecular tools.

Methodology: Samples of B. cunicularis were collected from Kumba River flowing in Kilamalai, Kanniyakumari district. The species identification was carried out through morphological keys constructed out of a coding matrix and phylogenetic tree (Maximum Parsimony) using Mesquite and PAUP4 software. 18S rRNA sequence was subjected to BLAST analysis, and the phylogenetic tree was constructed through Maximum Likelihood method using MEGA 11 software. Pairwise genetic distance of the species (p-distance,p = nd/n) was also assessed by comparing the K2P values involving phylogenetically close and distant

Results: Coding matrix prepared using the morphological keys, raised out of 28 distinctive characteristics of B. cunicularis and comparison with its phylogenetic relatives, have brought in valuable information on status of the species. These findings were further established by Maximum Likelihood Analysis, using the PCR amplicons of 18S rRNA. The phylogram prepared out of the sequence clearly reveals the candidate species' phylogenetic proximity to other members of the genus Barytelphusa. Further, the species' monophyletic status (with a BS value of 81%) suggests its early divergence from its congeners. The K2P pairwise genetic 'p' distance analysis (p = nd/n) of the 18S rRNA has helped us not only to further ascertain the extent of its genetic identity with its congeners, but as well has clearly provided us with the valuable cues per precise identification of the species.

Interpretation: Along with the morphological parameters, the present study, using molecular tools, provides valuable information for precise identification of the commercially important freshwater crab.

Key words: Barytelphusa cunicularis, Crustacea, Freshwater crab, Gecarcinucidae, Phylogram, Taxonomy

Collection of Barytelphusa cunicularis from Kilamalai Kanniyakumari District Morphological identification through coding matrix using 28 keys and MP phylogram DNA extraction and amplification of 18S rRNA gene Gene sequencing and construction of phylogenetic tree Precise identification of the freshwater

crab as Barytelphusa cunicularis through phylogram and K2P (p-distance) analysis

How to cite: Teeni Janet Raj, T.G., A. Shyla Suganthi, T.G. Tyni Joice Raj and G. Anilkumar: Morphological and molecular identification of the freshwater crab, Barytelphusa cunicularis from Kanniyakumari, India. J. Environ. Biol., 44, 804-810 (2023).

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Journal of Environmental Biology November 2023 Vol. 44 804-810



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ISSN: 1380-7501 E-ISSN: 1573-7721

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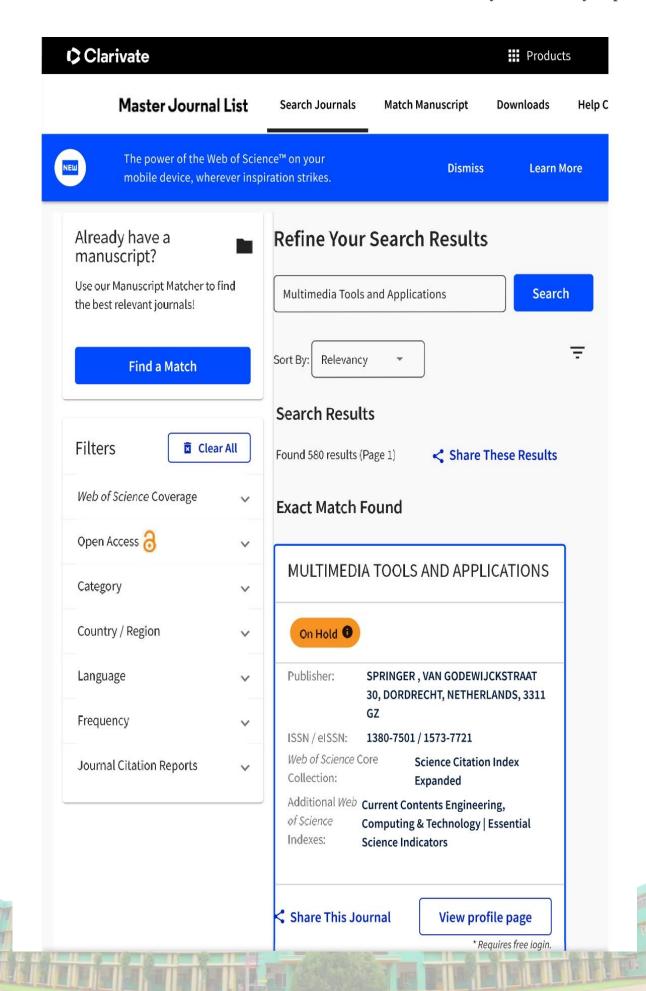
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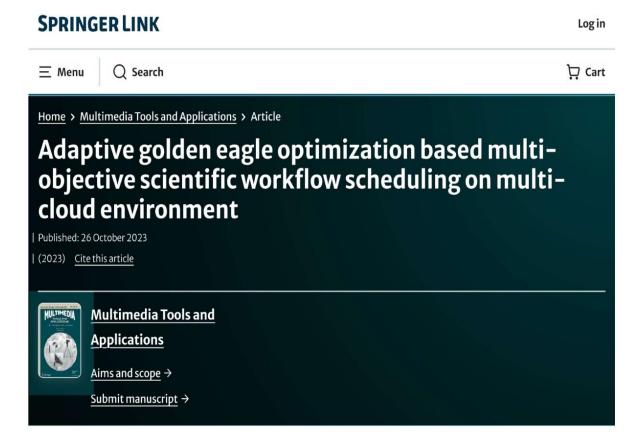


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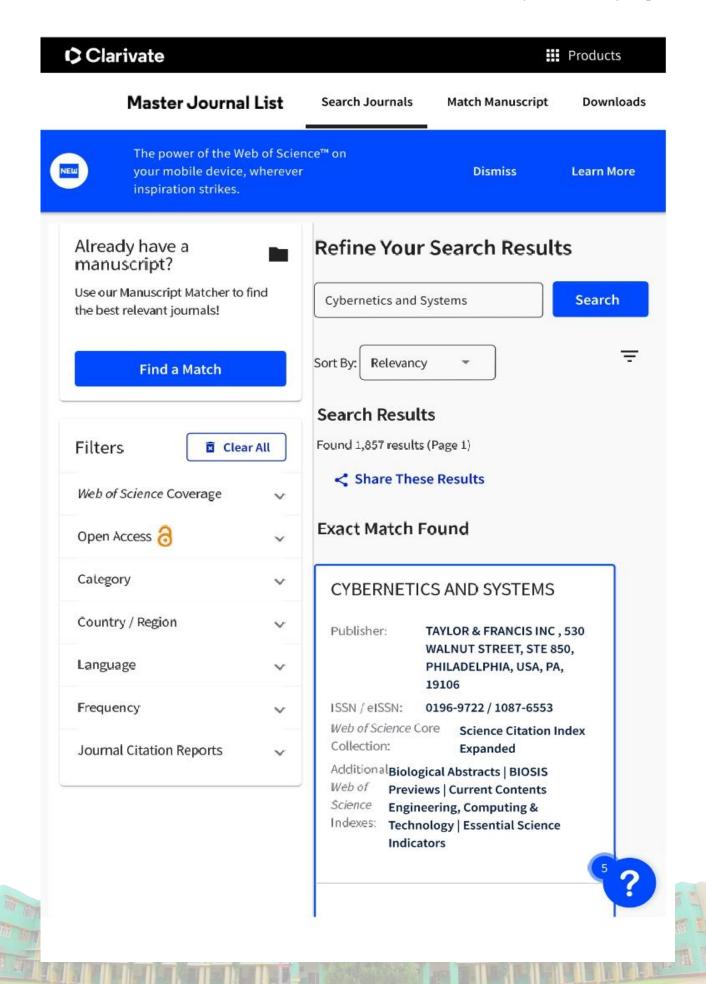


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# **Abstract**

An exemplary for emerging knowledges and the capacity to provide reliable cloud services, cloud computing. Giving consumers on-demand access to "unlimited" computer resources is one of the key components of cloud computing. Single cloud-holding resources, however, are typically constrained and might not be able to handle the unexpected spike in user demands. In order to support resource sharing amongst clouds, the multi-cloud concept is thus established. These days, offering resources and administrations across numerous clouds is unquestionably amazing. The goal of conventional research on cloud scheduling is to reduce costs or increase speed. However, the major indicator of QoS and a vital problem is the dependability of work process scheduling. As a result, multi-objective scheduling for a logical work process in a multi-cloud environment is suggested in this research with the goal of controlling the work process while also balancing cost and timeliness while satisfying the criterion of reliability. The adaptive golden eagle optimisation (AGEO) algorithm is created to realise this idea. The solution encoding, fitness analysis, and updating functions are used in the proposed algorithm's validation. Different workflow models are employed for the experimental study, and performance is assessed using various indicators. The projected approach attained 1920 utilization. Similarly, the PSO and GA achieved 1901 and 1900 utilization.





# Cybernetics and Systems Formerly known as: J Cybern

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(1)

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Years currently covered by Scopus: from 1980 to 2024

Publisher: Taylor & Francis

SJR 2023

0.390

ISSN: 0196-9722 E-ISSN: 1087-6553

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# Abstract

In various existing works, glaucoma detection is not predicted accurately, which may lead to irreversible vision loss. A new framework is designed for detecting glaucoma by transfer learning approach. In the initial stage, the source images are gathered from standard datasets. After collecting the raw images, it is fed for image enhancement, performed through the Retinex approach. Further, the segmentation process is carried out by Modified DeepLabV3, where the significant Regions of Interest (ROI) are extracted by enhanced images and segmented the abnormalities. To meet the optimal value, the parameters in DeepLabV3 are tuned optimally by the Improved Rain Optimization Algorithm (IROA). Once the image is segmented, it is



## Q

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Vol. 45 No. 04 (2024): Issue 04

Articles

#### Study of MHD Boundary Layer Flow Over a Stretching Surface in Porous Media

Awadhesh Pandey, Rakesh Singh Tomar, Mohammad Salim Ahamad, Vinay Kumar Jadon, P. N. Singh

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Journal of Harbin Engineering University ISSN: 1006-7043

Vol 44 No. 10 September 2023

# The Fragile Threads of Memory: Unraveling the Labyrinth of Memory Spectrum in Julian Barnes' the Sense of an Ending

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#### Abstract

In the realm of literature, memory is an intriguing canvas for exploration offering a rich tapestry for authors to portray the nuances of human memory and its role in shaping narratives and characters. Memory, a cornerstone of human cognition and experience holds an intricate relationship with one's sense of self, perception of reality and understanding of the past. Julian Barnes' The Sense of an Ending unveils the complexities of memory presenting it as an adaptive and transformative construct, susceptible to the passage of time, emotional influences and the dynamic interplay of subjective recollection. Memory studies, as a burgeoning field have become an imperative area of research that offers a profound lens through which to explore the ever-evolving nature of human recollection. By employing memory studies as a theoretical lens, the paper entitled, "The Fragile Threads of Memory: Unraveling the Labyrinth of Memory Spectrum in Julian Barnes' The Sense of an Ending" endeavors to unveil the intricate tapestry of memory depicted in the novel, emphasizing its subjective nature and how it intertwines with identity and perception of reality. The exploration begins by contextualizing memory as a fragile construct often susceptible to distortion and fragmentation. Barnes masterfully illustrates how memory is not a static archive of the past but a dynamic spectrum affected by the vicissitudes of time. The research deepens one's comprehension of memory's intricate mechanisms and the profound impact it wields on human experience. The study makes a substantial contribution to the ongoing discourse in memory studies and enriches one's understanding of the human psyche in relation to memory and its multifarious manifestations.

**Keywords:** Collective Memory, Memory Studies, Selective Memory, Memory Distortion, Reconstructive Memory, Narrative Memory

## Introduction

Julian Barnes' magnum opus, The Sense of an Ending intricately delves into the labyrinth of memory showcasing how it evolves and distorts with the passage of time. The novel navigates through the protagonist Tony Webster's reflective journey ruminating on the unreliable and often elusive nature of memory. Through the lens of Tony Webster, Barnes meticulously delves into the fragility of memory reflecting how its unreliability can alter personal narratives and understanding of reality. Barnes skillfully entwines memory with the aging process illuminating how memory is altered,

skewed and sometimes forgotten as individuals traverse the sands of time. The readers encounter memory's transformative power, its reconstructive nature and its significant impact on the construction of the self as they traverse the narrative landscape.

Memory studies is an interdisciplinary field of research that explores the intricate processes, mechanisms and implications of human memory. The study of memory can be traced back to ancient times but it gained prominence as a distinct discipline in the 20th century. Memory studies encompass psychology, neuroscience, philosophy, history, sociology, anthropology and literary studies.



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# Source details

# Tuijin Jishu/Journal of Propulsion Technology

Scopus coverage years: from 1991 to Present

Publisher: Journal of Propulsion Technology

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Vol. 44 No. 3 (2023)

# Beyond the Frames: Decoding John Crowley's Artistic Signature in *The Goldfinch* through Filmic Vision

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<sup>2</sup>M.Phil Scholar, PG & Research Department of English, Holy Cross College (Autonomous), Nagercoil-4, Affiliated to Manonmaniam Sundaranar University, Abishekapatti, Tirunelveli – 627012,

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#### Abstract

Film as a complex and multidimensional art form offers a canyas for artistic expression. narrative exploration and cultural reflection. Within the realm of film studies, auteur theory has emerged as a foundational principle placing the director at the forefront as the primary creative force shaping the film. The paper entitled, "Beyond the Frames: Decoding John Crowley's Artistic Signature in The Goldfinch through Filmic Vision" delves into the fascinating domain of film studies by applying auteur film theory to The Goldfinch, a cinematic masterpiece directed by John Crowley. The film, an adaptation of Donna Tartt's Pulitzer Prize-winning novel, The Goldfinch serves as a rich canvas to examine the director's imprint and analyze how Crowley's unique auteurial style informs the narrative, lending depth and coherence to the film. The paper presents an in-depth exploration of The Goldfinch through the lens of auteur film theory. The study aims to dissect and analyze the director's distinct imprint on the film, showcasing how Crowley's unique style, thematic inclinations and directorial choices echo the essence of auteurism. By examining various facets of the film including narrative structure, visual aesthetics and character development, this research seeks to illuminate the director's auteurial vision and the extent to which it enriches the film's cinematic experience. The paper examines the pivotal scenes, directorial decisions and stylistic elements that bear the signature of Crowley's auteurial influence. This research underscores the applicability of auteur film theory in understanding the director's role as a creative powerhouse in the realm of cinema and showcases the art of filmmaking as an avenue for profound personal expression and artistic vision.

Keywords: Auteurial Imprint, Cinematic Narrative, Filmic Vision, Thematic Resonance, Visual Aesthetics, Film Studies.



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SJR 2022 0.184

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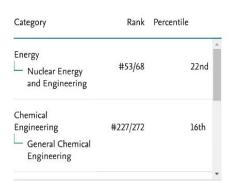


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Vol 44 No. 9 September 2023

# Captive Canaries and Splintered Frames: Unraveling the Tapestry of Trauma in Donna Tartt's the Goldfinch

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#### Abstract

In the realm of contemporary literature, Donna Tartt's exquisitely rendered prose, *The Goldfinch* stands as a poignant exploration of human psyche shadowed by the indelible imprints of trauma. *The Goldfinch* takes as its focal point a deeply embedded traumatic event that befalls its narrator, Theodore Decker and traverses the tumultuous journey of its protagonist, through a world marred by loss, tragedy and the haunting echoes of trauma. This paper entitled, "Captive Canaries and Splintered Frames: Unraveling the Tapestry of Trauma in Donna Tartt's *The Goldfinch*" aims to dissect the intricate web of trauma woven into the very fabric of the narrative, shedding light on how the protagonist grapple with and attempt to reconcile his traumatic pasts through the prism of trauma studies. The study is structured to examine the manifestations of trauma, its psychological repercussions and the coping mechanisms Theo adopts in response to his traumatic past. Furthermore, the paper analyses the role of art as a therapeutic outlet as exemplified by Theo's fascination with "The Goldfinch" painting, illustrating how artistic expression can serve as a means of healing and transformation in the aftermath of trauma. Ultimately, this research endeavors to contribute to the growing body of literature that explores the portrayal of trauma in contemporary fiction, illuminating the enduring impact of adverse life events on the human psyche.

**Keywords:** Childhood Trauma, Disordered Psyche, Memory Distortion, Dissociation, Substance Abuse, Trauma Studies

Trauma studies which trace its origin in the 1990s explore the impact of trauma in literature and society by analyzing its psychological, rhetorical and cultural significance. Psychological trauma, its representation in language and the role of memory in shaping an individual are the central concerns that define the field of trauma studies. The concept of trauma is generally comprehended as a grievously disruptive experience that profoundly impacts the self's emotional organization and perception of the external world. A poignant effect of trauma is the necessity to reconfigure one's identity against a

new and unstable reality. Cathy Caruth elucidates trauma as "a shock that appears to work very much like a bodily threat but is in fact a break in the mind's experience of time" (Trauma: Explorations in Memory). Freudian trauma model proposes trauma as an unrepresentable event that fundamentally fragments the psyche. Michelle Balaev recounts trauma as "a person's emotional response to an overwhelming event that disrupts previous ideas of an individual's sense of self and the standards by which one evaluates society" (Balaev 148).



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Vol. 45 No. 04 (2024): Issue 04

#### Articles

#### Study of MHD Boundary Layer Flow Over a Stretching Surface in Porous Media

Awadhesh Pandey, Rakesh Singh Tomar, Mohammad Salim Ahamad, Vinay Kumar Jadon, P. N. Singh 1 - 12



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Journal of Harbin Engineering University ISSN: 1006-7043 Vol 44 No. 12 December 2023

# Exploring the Entanglement of Toxic Relationships: Literary Insights and Psychological Perspectives in the novel *My Year of Rest and Relaxation* by OttessaMoshfegh

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Corresponding Author: J. Alisha Josephine

#### **Abstract**

The paper entitled, "Exploring the Entanglement of Toxic Relationships: Literary Insights and Psychological Perspectives in the novel *My Year of Rest and Relaxation* by OttessaMoshfegh" integrates insights from both literature and psychology. It scrutinizes the protagonist's struggle with the legacy of a toxic upbringing marked by parental neglect and societal influences, highlighting how early interpersonal interactions shape adult relational patterns and psychological health. Through a close reading of the novel, supported by psychological theories of toxic relationships, the research delineates the profound impact of familial and societal environments on the protagonist's emotional development. The study also contrasts Moshfegh's narrative with broader literary works that address toxic relational dynamics, thus situating the novel within a larger discourse on the subject. By employing a multidisciplinary approach, the paper reveals the complex interplay between literary representation and psychological reality, offering a nuanced understanding of the effects of toxic relationships. It advocates for the therapeutic potential of narrative and the importance of an interdisciplinary perspective in addressing the aftermath of such relationships. The findings call for a continued scholarly dialogue that bridges literary analysis and psychological inquiry, contributing to a holistic view of interpersonal toxicity.

**Keywords:**Toxic Relationships, Psychological Trauma, Parental Influence, Emotional Development, Narrative Therapy, Interdisciplinary Study.

#### Introduction

The study, "Exploring the Entanglement of Toxic Relationships: Literary Insights and Psychological Perspectives in OttessaMoshfegh'sMy Year of Rest and Relaxation" probes the complex dynamics of toxic relationships as experienced by the protagonist of Moshfegh's novel. The pivotal roles of society and family in upbringing are examined, particularly how initial human interactions within these spheres during a child's formative years are social and self-understanding development. However, a toxic environment in these settings can inflict substantial trauma, compromising emotional, psychological, and Characteristics of toxic health. relationships often include feelings of being

unsupported, misunderstood, demeaned, or relentlessly criticized.

While parental influence is paramount in child development, societal factors, especially educational systems and community environments, also significantly impact shaping children's psychological and physical growth. Early interactions in these spheres are essential as they influence a child's beliefs and behaviors, especially during formative years when primary social relationships are established. These myriad environmental influences are critical for acquiring social competencies essential for overall development. The community's influence on a child's development is profound. A child's maturation is closely tied to their neighborhood



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Scopus coverage years: from 1991 to Present

Publisher: Journal of Propulsion Technology

ISSN: 1001-4055

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TuijinJishu/Journal of Propulsion Technology ISSN: 1001-4055

ISSN: 1001-4055 Vol. 44 No.6 (2023)

# Beyond Irony and Disillusionment: Decoding Cultural Paradigms in David Foster Wallace's *Infinite Jest*

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Affiliated to ManonmaniamSundaranar University, Abishekapatti, Tirunelveli- 627012, Tamilnadu, India.

<sup>2</sup>M. Phil Scholar, Department of English, Holy Cross College, Nagercoil-4, Affiliated to ManonmaniamSundaranar University, Abishekapatti, Tirunelveli- 627012, Tamilnadu, India.

Abstract:-The paper "Beyond Irony and Disillusionment: Decoding Cultural Paradigms in David Foster Wallace's Infinite Jest" explores David Foster Wallace's novel as a critique of late 20th and early 21st-century American culture. Set in a hyper-consumerist, postmodern society, the narrative comments on culture, media, and individual identity, focusing on irony and consumerism. The study examines Wallace's satirical depiction of American culture's response to environmental and biological challenges, reshaping human existence. It situates Infinite Jest within postmodern literature, comparing it with works by Thomas Pynchon and Kurt Vonnegut, and reflects on theories by Roland Barthes and Jacques Derrida. The paper highlights Wallace's anticipation of post-postmodernism, emphasizing a rejection of traditional coherence and truth in favor of a diversified, subjective human experience. It addresses existential crises in a media-saturated, corporatized environment, with insights into U.S. societal and individual consciousness. Infinite Jest is presented as a pivotal text in understanding contemporary cultural and societal influences, extending beyond postmodernism to offer commentary on the human condition. The study emphasizes Wallace's novel as a vital text in discerning contemporary culture, irony, and entertainment's impact on civic responsibility and personal identity. It explores how Infinite Jest presents a satirical critique of American culture, focusing on media influence, existential challenges, and the human condition, marking the transition from postmodernism to post-postmodernism.

**Keywords-**Postmodernism, Cultural Critique, Media Influence, American Society, Satire, Millennial Generation, Consumerism, Existential Crisis

#### 1. Introduction

In "Beyond Irony and Disillusionment: Decoding Cultural Paradigms in David Foster Wallace's Infinite Jest," embark on a comprehensive exploration of the intricate layers and themes presented in Wallace's magnum opus. Infinite Jest, renowned for its dense narrative and intricate structure, is not just a novel but a cultural artefact that encapsulates the ethos of the late 20<sup>th</sup> and early 21<sup>st</sup> centuries. Wallace, through his uniquely layered storytelling, dissects the multifarious aspects of American life, delving into the complexities of postmodernism and its evolution into post-postmodernism. This paper aims to unravel the various threads of societal critique, technological influence, addiction, and the human quest for meaning, as presented in Wallace's seminal work. By closely examining the novel's portrayal of a society caught between the ironies of freedom and the disillusionments of progress, seek to understand the deeper cultural paradigms that Wallace challenges and redefines in his narrative.

In Infinite Jest, David Foster Wallace embarks on a profound cultural critique, encapsulating the transition from postmodernism to post-postmodernism. Wallace's narrative sharply satirizes American culture, particularly highlighting how societal values and norms have been reshaped in the late twentieth and early twenty-first centuries. This period, marked by a shift from the scepticism and irony of postmodernism, delves into the complexities of post-postmodernism, which attempts to reconcile the cynicism of the previous era with a



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1

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SJR 2022 0.184

1

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Subject area: Energy: Nuclear Energy and Engineering Chemical Engineering: General Chemical Engineering

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0.382

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Vol. 45 No. 04 (2024): Issue 04

Articles

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# Economic Factors of Happiness Among Working Women

PDF (Rtps://kastinengineeingjournal.com/index.php/journal/article/view/2201/1600)

S. Virgal Dolls

## Abstract

Happiness is a psychological concept with several definitions and dimensions. In the field of psychology, the happiness is a positive emotion that is deeper than a good temporary mood. Happiness is one of the most important concepts in the field of mental health and defined as a sustainable approach and pleasant feeling. Happiness in mental health, includes positive emotions such as joy, peace, a sense of involvement and enthusiasm in tifs. Many psychologists believe that there are at least three fundamental elements of happiness, including emotional, social and cognitive conceptions. Emotional component causing a positive emotional state while social component has led to widespread and positive social relationships with others. The cognitive component causes the individual to interpret everyday events with optimism. Center, income, married status, education level, the jub satisfaction, health promote education and increase knowledge are the man effective factors on human happiness. The stress levels are more overwhelming in the case of women due to the greater need among them to strike a balance between their personnal and professional lives. Recent years have seen a shift in the role played by women, wherein they are no longer handling the expectations of the family and society atoms. The women face lots of challenges to make her life static in her dual rule. This study is to find out the economic factors of happiness among working women.

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Vol. 64 No. 12 (2020): Issue 12 (Mijos Phattinengineeringiournal convindes phylipumatissue/vew/36)

Standard Comment

Addition.

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Open Access (i)

Scopus coverage years: from 2009 to Present

Publisher: Multidisciplinary Digital Publishing Institute (MDPI)

SJR 2022 0.664

0

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ISSN: 2071-1050 E-ISSN: 2071-1050

Subject area: (Social Sciences: Geography, Planning and Development) (Computer Science: Computer Science (miscellaneous)) (Environmental Science: Environmental Science (miscellaneous)

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Environmental Science: Management, Monitoring, Policy and Law View all V

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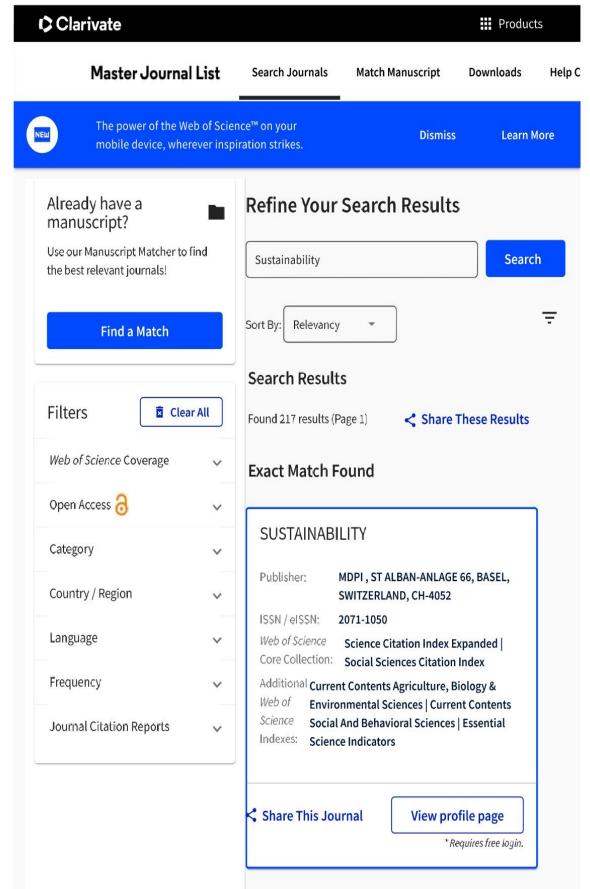
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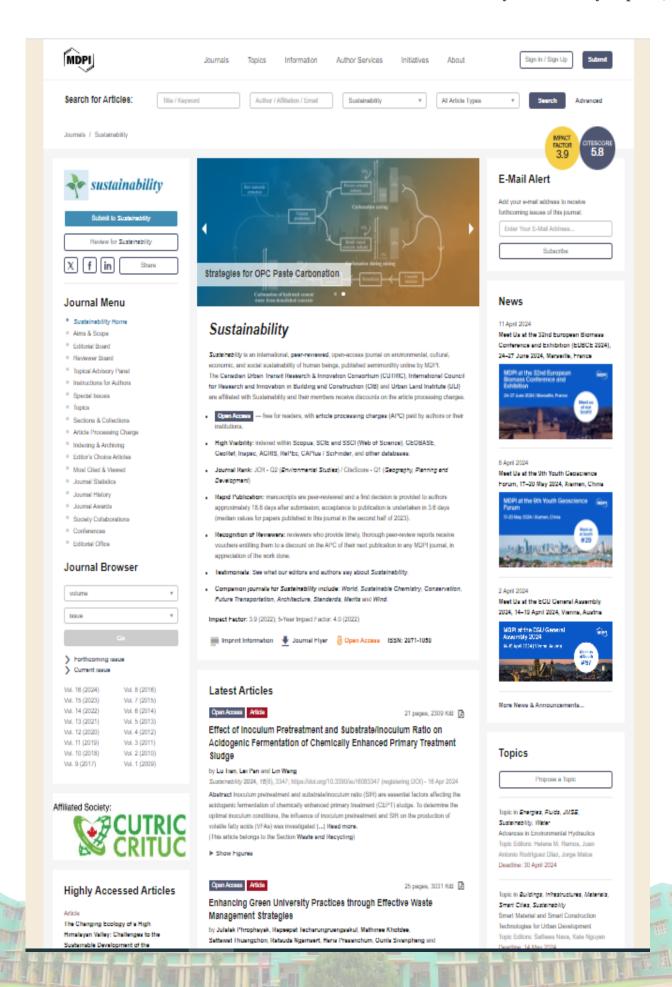
Category	Rank	Percentile	
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Article

# Quality of Work Life as a Precursor to Work–Life Balance: Collegiality and Job Security as Moderators and Job Satisfaction as a Mediator

Samuel Jayaraman 1, Hesil Jerda George 2, Mariadoss Siluvaimuthu 3 and Satyanarayana Parayitam 4,\*

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- <sup>2</sup> Holy Cross College (Autonomous), Manonmaniam Sundaranar University, Tirunelveli 627012, India
- 3 St. Xaviers College (Autonomous), Manonmaniam Sundaranar University, Tirunelveli 627012, India; mdoss87@gmail.com
- 4 Charlton College of Business, University of Massachusetts Dartmouth, North Dartmouth, MA 02747, USA
- \* Correspondence: sparayitam@umassd.edu

Abstract: The current study investigates the relationship between quality of work life (QWL) and work-life balance (WLB) among construction workers in a developing country, India. A multi-layered conceptual model involving collegiality and job security as moderators in the relationships were developed. A survey instrument was used, and data were collected from 592 construction workers from southern India. After checking the psychometric properties of the measures using LISREL 9.30 software for covariance-based structural equation modeling (CB-SEM), a structural model was analyzed using Hayes's PROCESS macros. The findings indicate the following: (i) QWL is positively associated with (a) WLB and (b) job satisfaction; (ii) job satisfaction positively predicts QWL; and (iii) job satisfaction mediates the relationship between QWL and WLB. The results also support the following: (i) work environment (second moderator) moderates the moderated relationship between QWL and collegiality (first moderator) in influencing job satisfaction; and (ii) work hours (second moderator) moderates the moderated relationship between job satisfaction and job security (first moderator) to influence WLB. The first three-way interaction between QWL, collegiality, and work environment and the second three-way interaction between job satisfaction, job security, and work hours have been investigated for the first time concerning construction workers in a developing country context and make a novel contribution to the advancement of literature on QWL and WLB. Further, this study contributes to the socio-economic well-being of workers and contributes to the sustainable working environment. The implications for theory and practice are

**Keywords:** quality of work life; work–life balance; job satisfaction; job security; collegiality; work environment; work hours; moderated-mediation; construction workers; India

Citation: Jayaraman, S.; George, H.J.; Siluvaimuthu, M.; Parayitam, S. Quality of Work Life as a Precursor to Work Life Balance: Collegiality and Job Security as Moderators and Job Satisfaction as a Mediator. Sustainability 2023, 15, 9936. https:// doi.org/10.3390/su15139936

Academic Editor: Hyo Sun Jung

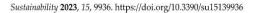
Received: 27 May 2023 Revised: 13 June 2023 Accepted: 20 June 2023 Published: 21 June 2023



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# 1. Introduction

During the past three decades, scholars in organizational behavior and human resource management have focused on two fundamental constructs: quality of work life (QWL) and work–life balance (WLB) [1–9]. A recently-hit global pandemic has significantly influenced the QWL of employees because of frequent lockdowns, social distancing, work-from-home or remote working, increased stress, and burnout when dealing with the unprecedented changes in work [10–13]. As a result, employees struggle to balance challenging work demands and personal priorities, resulting in a work–life imbalance [1,14]. Realizing the importance of maintaining WLB, earlier scholars have suggested





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(i)

Open Access (1)

Scopus coverage years: from 2018 to Present

Publisher: Emerald Publishing

E-ISSN: 2531-0488

SJR 2022 0.598

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Subject area: (Social Sciences: Education) (Business, Management and Accounting: General Business, Management and Accounting)

Source type: Journal

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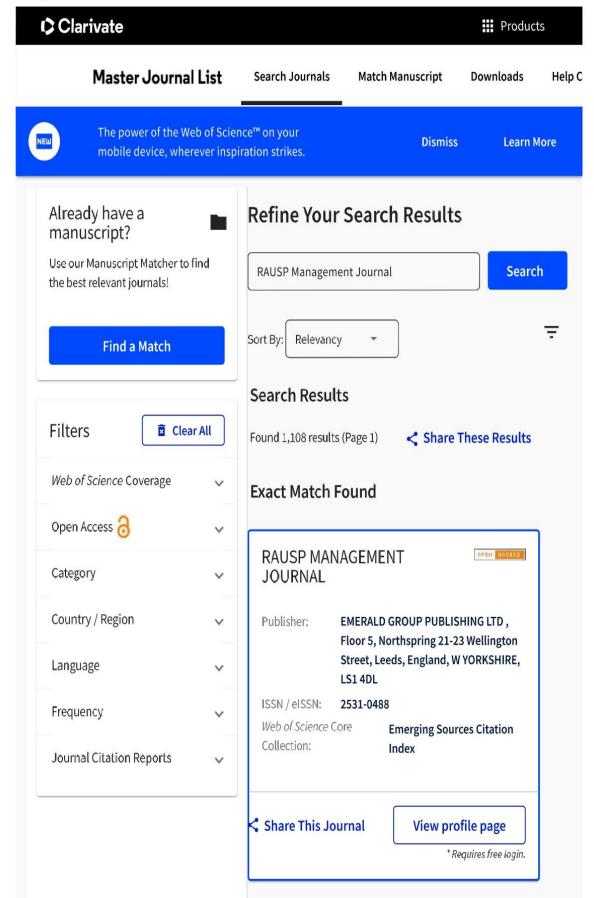
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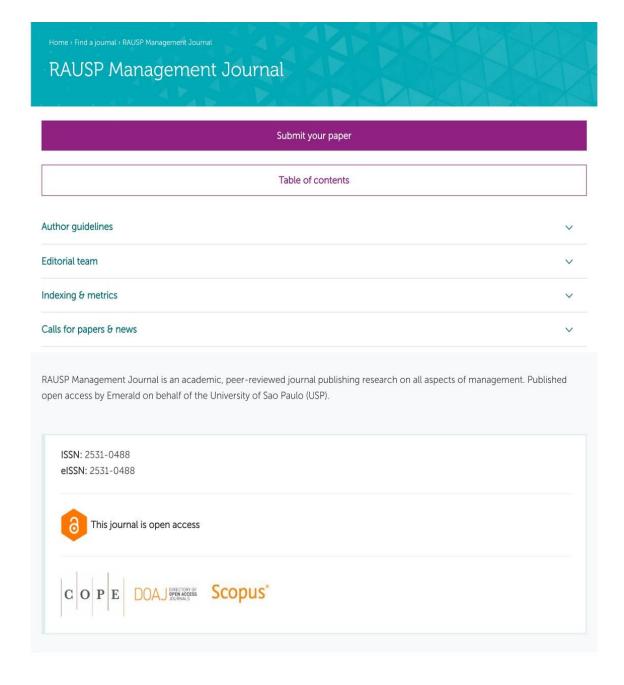
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Category	Rank	Percentile
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Business, Management and Accounting	#65/214	69th
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RAUSP 58,4

#### 286

Received 13 January 2023 Revised 9 May 2023 17 August 2023 27 August 2023 14 September 2023 Accepted 15 September 2023

# The relationship between green packaging awareness, initiatives, and behavior: an exploratory study on India rural population

Hesil Jerda George and Sahayaselvi Susainathan Department of Commerce, Holy Cross College (Autonomous), Nagercoil, Manonmaniam Sundaranar University – MSU, Tirunelveli, India, and

# Satyanarayana Parayitam

Department of Management and Marketing, Charlton College of Business, University of Massachusetts Dartmouth, North Dartmouth, Massachusetts, USA

#### Abstract

Purpose – This study aims to investigate the antecedents and consequences of green packaging behavior (GPB). A conceptual model has been developed wherein green packaging awareness (GPA) and green packaging initiatives (GPI) are precursors of GPB, and environmental concern and availability of various green packaging alternatives are moderators. The outcomes of GPB in terms of environmental and personal benefits are examined.

Design/methodology/approach — Unlike most papers focusing on green packaging from a marketing perspective, this study explores the behavior of rural households from 47 villages in southern India. A carefully crafted survey instrument was developed, and data were collected from 395 respondents. After checking the instrument's psychometric properties, the results were analyzed using Hayes's PROCESS macros.

Findings — The results indicate that GPA and GPI are positively associated with GPB, GPA predicts GPI, and GPI mediates the relationship between GPA and GPB. Furthermore, findings suggest that environmental concern moderates the relationship between GPI and GPB, and the three-way interaction between the availability of green packaging (second moderator), environmental concern (first moderator), and GPI influences the GPB. Moreover, the outcomes of GPB in terms of environmental and personal benefits are established.

Research limitations/implications – This research has several theoretical implications. It documents that individual awareness of green packaging is a precursor to GPB. This study focused on the rural population from a developing country (India) and hence may suffer from a lack of generalizability across developed nations. However, the results could be generalizable across other developing nations worldwide.

Practical implications – This study motivates individuals to engage in proenvironmental behavior.
Moreover, it highlights the importance of GPB in deriving environmental and personal benefits. It is also



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The authors want to thank the coeditor, Professor Kavita Miadaira Hamza, the Associate Editor, Professor Marina Suter and the anonymous reviewers for their constructive suggestions to the earlier versions of the manuscript.



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# Source details

# Journal of Environment and Development

CiteScore 2022 **5.2** 

(i)

Scopus coverage years: from 1992 to Present

Publisher: SAGE

ISSN: 1070-4965 E-ISSN: 1552-5465

SJR 2022 1.017

(i)

(i)

X

Subject area: (Social Sciences: Development) (Social Sciences: Geography, Planning and Development)

(Social Sciencesi Geography), Hamming

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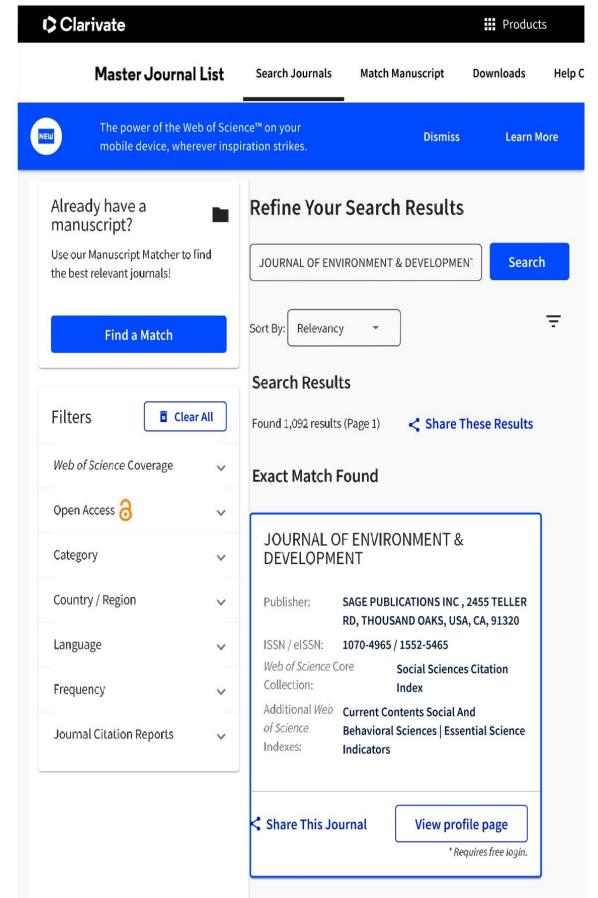
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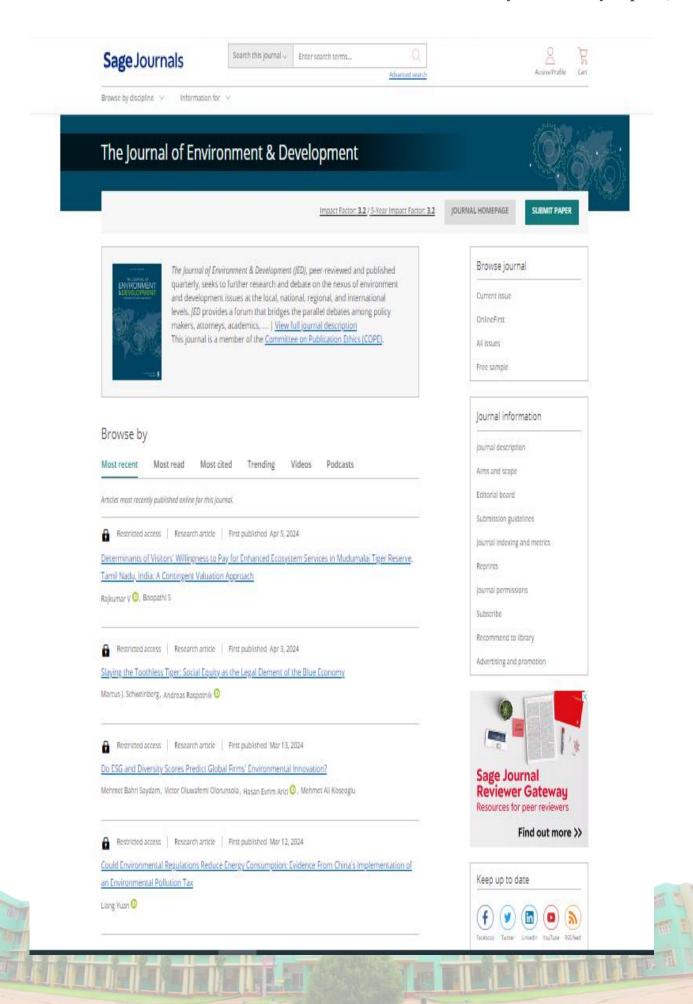
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# Green Packaging as a Precursor to Sustainable Environment: Evidence From Rural India

The journal of Environment & Development 2023, Vol. 32(4) 466–494 © The Author(s) 2023 Article reuse guidelines: sagspub.com/journals-permissions DOI: 10.1177/10704965231211587 journals-sagspub.com/home/jed

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#### Abstract

This research aims to investigate the effect of green packaging on a sustainable environment. A double-layered complex conceptual model was developed, and the relationships between green packaging awareness (GPA), green packaging behavior (GPB), and environmental benefits were tested. A carefully crafted survey instrument was used in collecting data from 389 respondents from 41 villages in southern India. After checking the psychometric properties of the survey instrument using the LISREL package of structural equation modeling (SEM), the hypothesized relationships were tested using Hayes's PROCESS macros. The results indicate (i) GPA and GPB are positively associated with environmental benefits and (ii) GPB mediates the relationship between GPA and environmental benefits. The findings also support the three-way interaction between GPA, green packaging initiatives (GPI), and environmental concern in enhancing GPB. The double-layered moderation tested in this research adds to the novelty of the study, thus making a unique contribution to the bourgeoning literature on sustainability.

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