



# Pb intoxicated biomolecular changes in *Cladonia convoluta* studied using 2DCOS infrared spectroscopy coupled with chemometric analysis

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Polysaccharides  
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## ABSTRACT

Lead (Pb) is used in many industrial applications and is a toxic heavy metal that causes health hazards. Lichens are symbiotic associations that are environment friendly in removing toxic elements from the polluted environment. They can accumulate heavy metals and are therefore considered as bioindicator of metal pollution. In this study, biochemical markers due to lead toxicity on *Cladonia convoluta* were revealed using two-dimensional correlation (2DCOS) spectra analysis. The 2DCOS enhances the resolution of the spectrum and gives more information on the interaction of functional groups within and between molecules which cannot be revealed from conventional spectra. Thus, 2DCOS is an efficient tool in monitoring even minute spectral changes in complex spectra. The results of conventional IR analysis showed changes in the band area. It follows in the order polysaccharides > proteins > lipids due to lead toxicity. The results of 2D correlation spectra show predominant changes in the peroxide ring. The heavy metal toxicity may show correlation changes of peroxide ring with lipid and proteins. It reveals a change in carbohydrate synthesis due to toxicity. The highest positive and negative PCA loading values show deformation peroxide ring to glucose band. The results of HCA show samples are well separated into two major clusters with high separation values. RCC analysis gives good reliability of the test. Hence, 2DCOS coupled with chemometric analysis helps in understanding the biomolecular changes in *C. convoluta* effectively.

## 1. Introduction

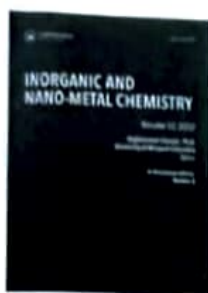
The increase of heavy metal pollution due to the growth of industrial activities results in environmental pollution. Lead (Pb) contamination arises from human activities (mining) and various factories. The toxic effect of Pb causes major concerns to living beings. Hence, an efficient and cost-effective method is necessary to remove heavy metals from the environment. Fungi is environment friendly and cost-efficient in removing toxic elements from the polluted environment [1]. Lichens are symbiotic organisms consisting of at least one green microalgae or cyanobacteria and fungi, which are considered as indicator of environmental quality. They can accumulate a variety of contaminants such as heavy metals and radionuclides [2]. Bio-sorbent can be effectively used in the removal of heavy metal ions from the wastewaters. The main advantage of this approach is its effectiveness in the reduction of pollutant concentration using low-cost biomass materials [3,4]. The biological effects of lichen polysaccharides are antioxidant,

immunomodulating, antiviral, etc. [5]. The immune-stimulating properties of polysaccharides, especially the  $\beta$ -glucans, enhance their capacity to the innate immune system and stimulate tumor rejection [6]. Hence, they are generally considered to be biological response modifiers. Besides the cell wall, extracellular polysaccharides attached to the cell surface are released into the surrounding, playing an important role in the sequestration of heavy metals [7,8]. The presence of charged groups in copolysaccharides has been related to the capacity to sequester positively charged metals [9].

The fungal cell wall plays an important role in the physiological adaptation to its environment [10]. Carbohydrates are important for fungal metabolism by providing energy for synthesis. The other mechanism includes hyphal growth and amino acid biosynthesis [11]. The carbohydrate component of the cell wall has been demonstrated to have extensive applications in medicine [12]. It is an important biological molecule because of its role in energy storage in the form of glucose and starch. They support defense operations on the surface of cells and serve

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## Investigations on synthesis, growth and physicochemical properties of organic nonlinear optical crystal: 2-aminopyridinium maleate

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## Article

# Growth and Characterization of Second and Third Order Acentric Studies of L-Phenylalanine L-Phenylalaninium Malonate Single Crystal

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**Abstract:** A single crystal of L-phenylalanine L-phenylalaninium malonate (LPPMA) was synthesized by slow evaporation and was subjected to nonlinear optical examination and physico-chemical characterization. Studies on single X-ray diffraction confirm the arrangement of monoclinic space group P21 which is a vital criterion for the NLO phenomenon. The assessment of functional groups and diverse vibration modes responsible for the characteristics of the material was performed with an FTIR analysis. The UV-visible spectral examination found the wavelength of UV-cut-off at 233 nm and various optical parameters were evaluated. The mechanical strength and different criteria associated with it were assessed. The electric field response of the material was examined in terms of the dielectric constant, dielectric loss, ac conductivity and activation energy. The spectra of emission were detailed. The efficacy of second harmonic generation was studied. The parameters of non-linearity were investigated to analyse the third-order acentric optical response in the LPPMA by Z-scan procedure.

**Keywords:** nonlinear optics; activation energy; fluorescence; SHG; Z-scan method

## 1. Introduction

Materials exhibiting second (SHG), third (THG) and higher harmonic generation occupy a versatile position in the area of optical data storage with information processing. The photo-electric interface occurs in the process of nonlinear SHG, and finds promising potential in the domain of storage of data with high intensity and spectroscopy [1]. The significance of the basic types with their orientations inside the material plays a substantial part in finding or understanding the physical and chemical features of the organic





# Nitrogen influenced biomolecular changes on *Physalis* L. species studied using 2DCOS spectral analysis coupled with chemometric and Receiver operation characteristics analysis

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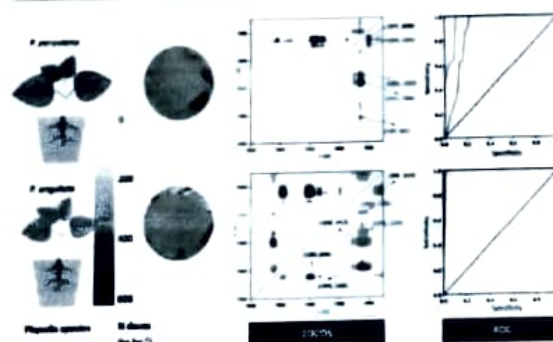
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## HIGHLIGHTS

- 2DCOS FTIR spectral analysis was used in monitoring the biochemical changes due to *Physalis* L. species under nitrogen fertilization.
- ROC analysis shows the area under the curve ranges from 0.84 to 0.92 indicating good reliability of the study.
- PCA signifies protein predominant in discriminating against the variation among the samples studied.
- HCA analysis shows high dissimilarity obtained in the dendrogram scale.

## GRAPHICAL ABSTRACT



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## ABSTRACT

The determination of the molecular composition of plant leaves is essential to assist in nutritional management, whether for cultivated or non-cultivated species. In this sense, the study aimed to apply FTIR technique in combination with chemometrics and ROC analysis for the evaluation of changes in compositional of plant leaves of *Physalis angulata* and *Physalis peruviana* due to nitrogen fertilization treatments. Both species were grown under different doses of nitrogen (0, 200, 400, and 600 Kg ha<sup>-1</sup>) and leaf samples were evaluated using ATR-FTIR. Our results demonstrate that the spectra of both species were influenced by the nitrogen doses. The computed band area from the lipid/amide, lipid/carbohydrates, degree of esterification and calcium oxalate shows nitrogen fertilization due to 400 Kg ha<sup>-1</sup> of N treatment is more effective for a better quality of yield. 2D correlation spectral analysis (2DCOS) reveals cellulose and pectin begins changes followed by amide of proteins due to nitrogen treatment in *P. peruviana* samples. The *P. angulata* plants shows hemicellulose changes predominating followed by proteins and polysaccharides. The obtained principle component analysis plot and loading values show the *Physalis* species samples distinctly separated from control with protein and carbohydrates are predominant in influencing separation among them. Receiver operation characteristic analysis shows a higher value of area under the curve reflecting better reliability of the experiments carried out. Hierarchical cluster analysis shows closed separation for a similar group on dissimilarity scale. Thus the use of 2DCOS coupled

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# Two-trace two-dimensional (2T2D) correlation infrared spectral analysis of *Spirulina platensis* and its commercial food products coupled with chemometric analysis

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## ABSTRACT

*Spirulina* plays an important role in the food industry due to its rich protein content and other nutritional values. 2D-COS spectral analysis is widely used nowadays in understanding the change in the molecular mechanism of biological samples. Two trace 2D-COS (2T2D-COS) is a technique that has gained much attention due to improved accuracy and higher spectral resolution. The selected band area measurement (Lipid/Amide I, Lipid/Carbohydrates, Amide I/ Amide II) shows that the samples S2 and S3 have higher quality among other samples. A positive correlation of increased lipid oxidation with lipid changes exists among all the samples studied. Synchronous spectra show auto peaks at  $2870\text{ cm}^{-1}$ ,  $1624\text{ cm}^{-1}$ ,  $1034\text{ cm}^{-1}$  for samples S2 and S3 which helps in assessing food quality. Asynchronous negative cross-peaks ( $2870$ ,  $2815$ ) indicate a higher presence of polysaccharides in the samples S1 and S4. The negative cross-peaks ( $1206$ ,  $1036$ ) show deformation in the pyranose ring of polysaccharides in the S4 sample due to food processing. The negative PCA loading at  $997\text{ cm}^{-1}$  shows the polymerization of carbohydrates mechanism occurring at glucan bands. Hierarchical cluster analysis shows clustering of dissimilar products occurring at a higher value. ROC curve depicts the higher reliability of our findings using 2T2D-COS.

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## 1. Introduction

Food quality and protection have become an important issue due to the increase in adulteration of food products. The adulteration of various food items causes serious adverse health effects. Food fraud includes adulteration and substitution of low-value nutrients to increase food quality. [1]. Hence, it is necessary to develop a fast and price efficient method to control and detect fraud in food products. *Spirulina platensis* is a blue-green alga with a rich source of biologically active compounds. They are recognized as the most nourishing and complete of all food supplements. It is easily digested and its an effective anti-cancer protection. It has high protein (70%), fatty acids, polysaccharides, minerals [2]. The commercialization of *Spirulina* has attained more attention for use as food products and in pharmaceuticals. Researches are in progress for evaluating the potential of *Spirulina* as an ingredient in the manufacture of various food products [3]. The sup-

plement of *Spirulina* is available as a tablet, capsule, or powdered form. This makes the algae species more popular and cultivated widely. A Spectroscopic method is a rapid, convenient, tool to control and detect adulterated food. FT-IR spectroscopy coupled with principal component analysis is highly informative in the analysis of metabolic changes and differentiation of the algal species in variable environmental conditions. It provides an accurate and effective method for quality detection and authentication.

Food processing is a critical step in improving bioaccessibility and produces beneficial nourishments [4]. The study reported that microalgae-containing food products have enhanced nutritional properties [5]. Bataller et al. [6], indicated that the characteristic amide band of proteins, carbohydrates, and lipids are predominant in *Spirulina* which is studied using FTIR spectroscopy. This complex composition results in superpositions of IR bands which complicates their analysis. The development of multiple images at selected wavelengths reveals compositional changes on the quality of food products [7]. However, spectroscopy in association with chemometric methods is used to extract more interesting information. The chemometric tool such as Cluster Analysis (CA), Hierarchical Cluster Analysis (HCA) and Principal Component Analysis

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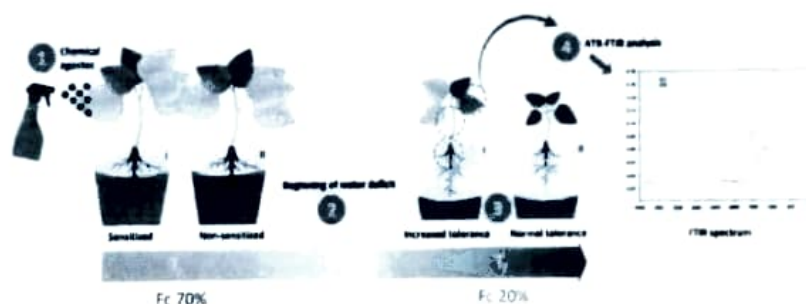
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Use of ATR-FTIR spectroscopy for analysis of water deficit tolerance in *Physalis peruviana* L.Romeu da Silva Leite<sup>a,\*,1</sup>, Marilza Neves do Nascimento<sup>a</sup>, Salvador Hernández-Navarro<sup>b</sup>,  
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## HIGHLIGHTS

- ATR-FTIR spectral analysis was used in monitoring the biochemical changes due to *Physalis peruviana* L. under water deficit conditions.
- Chemical priming was used for increasing water deficit tolerance.
- Water deficit promotes alterations in the functional groups, mainly lipids, proteins and carbohydrates.
- The application of pretreatment with sodium nitroprusside results in lipids and protein changes under water deficit conditions which are studied from ATR-FTIR spectra.
- The ATR-FTIR technique is able to assisting in the selection of priming treatments to increase tolerance to water deficit.

## GRAPHICAL ABSTRACT



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Goldenberry

## ABSTRACT

Treatments that allow plants to better tolerate water deficit become essential, such as the application of chemical priming. In addition, it is essential to use analyses capable of measuring these effects at the biomolecular level, complementing the other physiological evaluations. In view of the above, this study aimed to evaluate the use of attenuated total reflectance-Fourier transform infrared (ATR-FTIR) spectroscopy for analyses of water deficit tolerance in *Physalis peruviana* plants. For this, samples of leaves, stems and roots of plants subjected to different pretreatments with proline (10 mM and 20 mM), sodium nitroprusside (SNP 25  $\mu$ M and 50  $\mu$ M) and H<sub>2</sub>O as control, aiming at increasing tolerance to water deficit, were evaluated. The chemical agents used attenuated water deficit in *P. peruviana* plants, influencing phenotypic characterization and spectral analyses. Analysis of FTIR spectra indicates that different functional groups present in leaves, stems and roots were influenced by water deficit and priming treatments. Changes in lipid levels contributed to reducing water losses by increasing the thickness of cuticular wax. Accumulation of proteins and carbohydrates promoted osmoregulation and

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# Structural, electrical and thermal properties of nanocomposite polymer electrolytes PCL : ZnTr : $\text{Fe}_2\text{O}_3$ for applications in energy storage power devices

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## Abstract

A new nanocomposite polymer electrolyte based on poly (caprolactone) (PCL)-ZnTr dispersed with ceramic filler ( $\text{Fe}_2\text{O}_3$ ) have been studied for their ionic conductivity and thermal properties. The incorporation of nanofillers will yield polymer electrolytes with enhanced conductivity and mechanical properties. Nanocomposite solid polymer electrolyte films (80–100  $\mu\text{m}$ ) were prepared by common solvent-casting method. It was revealed that the incorporating 7 wt.%  $\text{Fe}_2\text{O}_3$  filler into PCL: ZnTr polymer electrolyte significantly enhanced the ionic conductivity [ $\sigma_{RT}(\text{max})=2.7 \times 10^{-5} \text{ S cm}^{-1}$ ]. It is suggested that the addition of nanofillers leads to a lowering of glass transition temperature and increasing the amorphous phase of PCL and the fraction of PCL-Zn<sup>+</sup> complex, corresponding to conductivity enhancement. The differential scanning calorimetry thermograms points towards the decrease of  $T_g$ , crystallite melting temperature, and melting enthalpy of PCL: ZnTr:  $\text{Fe}_2\text{O}_3$  nanocomposite polymer electrolyte after introducing plasticizers. The reduction of crystallinity and the increase in the amorphous phase content of the electrolyte and morphological, structural changes caused by the filler, also contributes to the observed conductivity enhancement.

**Keywords:** biodegradable polymer, conductivity, XRD, nanocomposite polymer electrolyte

## 1 Introduction

The field of polymers has a wide range of applications compared to any other class of materials available to mankind, polymer industry has grown up more rapidly than other industry in the recent past. Their application areas extend from adhesives, coatings, packaging to precursors for high-tech ceramics. More and more synthetic polymers are being added into the basket of such device materials possessing tailored properties suitable for specific applications [1]. Polymer electrolyte commonly serves as a matrix





# Biomolecular changes in gills of *Gambusia affinis* studied using two dimensional correlation infrared spectroscopy coupled with chemometric analysis

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## ABSTRACT

The pesticide use in agriculture production at reduced cost results in increased usage. Excessive use of this is en-routed to the aquatic environment causing serious threats. Fishes are used as a bioindicator of toxicants due to pollution in the aquatic environment. These are suitable biomarkers for assessment in the ecosystem. Hence the study of pesticides toxicity in fish provides useful information about the aquatic biota. 2DCOS infrared spectral analysis gives fine spectral resolutions of overlapping bands. The enhancement in spectral resolution and overlapping bands in second dimensions is an advantage in interpreting complex spectra. The synchronous 2DCOS spectra show amide of proteins as a predominant occurring followed by phospholipids esters of fatty acids at  $1771\text{ cm}^{-1}$ . The asynchronous +ve and -ve cross peaks  $+(1651, 1691)$  and  $-(1623, 1651)$  results in an overlapped contribution of  $\beta$  sheet ( $1691\text{ cm}^{-1}$ ) with a decrease in  $\alpha$  helix ( $1651\text{ cm}^{-1}$ ) of protein secondary structure. The principal component analysis (PCA) shows samples are well discriminated with a high loading value for 0.51 ppb (T3) treatment. The hierarchical analysis shows clustering of samples identical in nature. The Receiver Operation Characteristic analysis (ROC) validates experimental outcome as measured from the area under the curve.

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## 1. Introduction

The contaminated water bodies have become a major problem at a global level. They contain a large number of pollutants that arise from industrial and agricultural wastes. Insecticides are also a pollutant of aquatic habitats in the environment. This contaminant in the aquatic ecosystem is assessed using the biochemical parameters that respond to toxicity. The major routes of insecticides polluting aquatic ecosystems include rainfall-runoff and atmospheric deposition. They are finally directed to ponds, lakes and rivers [1]. The contamination of the aquatic ecosystem by pesticides causes harmful effects to humans since fishes are a source of food for human consumption.

The increased use of pesticides is harmful to animals and humans due to environmental compatibility, low volatility and poor

culture to replace traditional pesticides. The development of effective economical pesticides has profound effects to the battle against insects. They cause significant alteration in the biochemical process in the tissues of fish. It affects the growth and survival of fishes which constitute an important source of food for human consumption [2].

Lambda-cyhalothrin is a synthetic pyrethroid type II insecticide used widely to control insect pests in crops. It is used in cotton and other vegetable production. Lambda-cyhalothrin is highly soluble in water and highly toxic to aquatic animals. Gills are the major route of entry of toxicity and hence fishes are adversely affected. It is a thin fine respiratory structure that is in continuous contact with the water. Guedegba et al. [3] studied chronic effects of Lambda-cyhalothrin and other pesticides on *Oreochromis Niloticus* and confirmed the neurotoxicity on fishes. Lambda-cyhalothrin in-



# Annotated Checklist of Freshwater Crabs of Tamil Nadu, India

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## ABSTRACT

Tamil Nadu being a potentially biodiversity rich state in India is still in need of proper taxonomic revision on freshwater species especially on crabs. A proper inventory would describe the distribution and diversity of the species and also highlights the taxonomic revisions. This work aimed to provide annotated checklist of freshwater crabs of Tamil Nadu which describes about the distribution, ecology and current status of these species. About 21 species of freshwater crabs has been reported from Tamil Nadu so far and nearly 50% of species are data deficient in IUCN 2021.

**Key words:** Checklist, Distribution, Ecology, Freshwater crabs, IUCN, Tamil Nadu.

## Introduction

Tamil Nadu is one of the biodiverse states in India comprising dynamic and rich floral and faunal diversity. Among all ecosystem, freshwater ecosystem of the state is rich in floral as well as faunal population. But the diversity of this ecosystem is exclusively not well studied in this state especially on freshwater crabs. Even in India, the status of freshwater crab species is still unknown or poorly studied in this dynamic ecosystem (Cumberlidge, 2009). According to IUCN, about 27% of selected crustaceans are under threatened category which includes freshwater crabs as well (IUCN, 2019). Even in Western ghats (which also includes Tamil Nadu) about 22 species data are deficient and 31 species data are not evaluated by IUCN (Pati and Pradhan, 2020). These data deficient species require urgent need for conservation actions as it this group would fall into threatened or extinct category before acquiring proper data (Bland *et al.*, 2017). Therefore conservation becomes the need of the hour in conserving these species. Lack of documentation and aware-

ness about these species could lead to extinction of these species (Sruthi and Thirunavukkarasu, 2021). Checklists are important guide to view taxonomic hierarchies of organisms in the destined location and provide valid information about authors and distribution of those species (Laurenneet *et al.*, 2014) and also provide valid information about species diversity and current status. A proper inventory of this group in Tamil Nadu had been reported by Srivastava, 2009 after that no proper checklist has been reported so far. The present work is an annotated checklist of freshwater crabs of Tamil Nadu along with notes on distribution, ecology and IUCN status of the species. A total of 21 species from 2 families has been reported in Tamil Nadu so far.

## Materials and Methods

The present annotated checklist is prepared based on published literatures which indicated the distribution or reports from Tamil Nadu and also verified its current status in IUCN red list 2021.

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# Pollution Indicator Potential of amphipods from Pulicat Lake, Tamil Nadu, South East Coast of India

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## ABSTRACT

Heavy metals are naturally occurring elements that have a high atomic weight and a density at least 5 times greater than that of water. In recent years their concentrations were found to be raised in coastal ecosystems, as a result aquatic organisms were exposed to elevated levels of heavy metals. This study deals with the assessment of heavy metals (arsenic, lead, chromium, cadmium and mercury) in water, sediment and amphipods from four different ecosystems of Pulicat lake. The accumulation of heavy metals in water is high during monsoon and low in summer. Whereas, in sediments and amphipods the level is high in post monsoon and low in summer. In water, lead is high followed by arsenic, chromium, mercury and cadmium. In sediment and amphipods, cadmium were found to be high and mercury at lower rates. The metals enters into the Pulicat lake during monsoon in the waters and deposited during post monsoon seasons into the sediments and finally get accumulated in the body of amphipods.

**Key words:** Amphipods, Pollution indicator, Heavy metals, Pulicat lake

## Introduction

Heavy metals are finding their way into the system through chemical and physical weathering of rocks, decomposition of plant and animal detritus and plant exudates. The anthropogenic inputs are predominantly from pollution centers and industrialized regions. They cause undesirable changes in the physico chemical or biological factors of ecosystems, which in turn directly or indirectly affect the ecological balance of the environment and ultimately affect human beings. Heavy metals pollution in coastal environment has become a global phenomenon because of its toxicity, persistence for several decades in the environment, bioaccumulation and

biomagnifications in the food chain (Gochfeld, 2003). The impact of heavy metals on the aquatic environment can be assessed by monitoring their occurrence in the various components especially by living organisms in the system itself. There is no report on the bioaccumulation of heavy metals in amphipods in the Indian waters. Hence, the present study aimed to investigate the pollution indicator potential of amphipod, *Ampithoe ramondi* from four different ecosystems with respect to arsenic, lead, chromium, cadmium and mercury.

## Study area

Pulicat lake (13° 26' N, 80° 03' E) is situated in South East Coast of India on the border between the states

# Quality assessment of Physico-chemical parameters in Drinking Water at Pulicat Lake Fishermen Villages

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## ABSTRACT

In recent trends water pollution plays major role in human health and life threatening issues both directly and indirectly related with water utility. Present study based on the analysis of physiochemical parameters in drink water supplies in various fishermen villages Sathankuppam, Edamani, Thoniravu, Pulicat, Goonankuppam, Arangankuppam, Vairavankuppam and Koraiyupam around fishermen villages of Pulicat lake. Physiochemical parameters like pH, total dissolved solids, total suspended solids, conductivity and turbidity were recorded from the drinking water samples. Presence of minerals and heavy metals and total bacterial count also investigated in the water sample. Result shows highest value noticed in pH (8.17) at Vairavankuppam, TDS (1589 ppm), TSS (203.1ppm) and conductivity (2788  $\mu$ S) in Goonankuppam and turbidity (2NTU) from Thoniravu and Goonankuppam. The concentration of minerals, heavy metals and bacterial contamination also monitored. Based on the water quality results it does not good for the domestic usage. More knowledge and awareness are needed for the public to avoid water borne diseases.

**Key words:** Drinking water, Quality, Pulicat lake villages

## Introduction

The quality of drinking water depends on various chemical constituents and their concentration, which are mostly derived from the geological data of particular region. Many times the industrial wastes and municipal solid waste leads to pollution of surface and groundwater (Patil *et al.*, 2012). In India reported that 70% water is polluted, in that source of pollution identified 84 to 92 % is sewage and waste water (Joshi *et al.*, 2009). Around the world 780 million people do not access clean and safe water and 2.5 billion people do not have proper sanitation as result 6-8 million people die each year due to water-borne diseases and disasters (Rahmanian *et al.*,

2015).

In India 21% all communicable diseases related to unsafe water with diarrhoea causing alone hundred thousands of death annually (Veena *et al.*, 2014). According to WHO about 600 cases diarrhoea and 46,00,000 child deaths are reported annually due to contaminated water and improper sanitation (Khanet *et al.*, 2020). In India 80% diseases related with poor water quality and unhygienic conditions (Kumar *et al.*, 2019).

Water quality monitoring and physiochemical parameters are important. Because water quality index (WQI) gets affected by atmospheric activities and heavy metals (Bhagde *et al.*, 2020). Many local and global standards are enacted as to ensure that





## Isolation and Biochemical Characterization of Lactic Acid Bacteria from the Gut of Fresh Food Fishes

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**Abstract:** This study aimed to propose the characterization of lactic acid bacteria (LAB) from the gut of common five marine fishes using morphological, physiological and biochemical characteristics. Fishes *Sillago sihama*, *Rastrelliger kanagurta*, *Mugil cephalus*, *Sardinella longiceps* and *Nemipterus japonicus* were collected from Kaasimedu fish market, Chennai, India. Lactic acid producing bacteria were isolated by using MRS broth. From inoculum, the bacterial colonies were observed in MRS agar using streak plate technique and incubated. Different colonies were observed and the colonies were sub-cultured for further study. Five different types of pure cultures were obtained from *Sillago sihama*, *Rastrelliger kanagurta*, *Mugil cephalus*, *Sardinella longiceps* and *Nemipterus japonicus* in MRS agar plates and named as LAB 1, LAB 2, LAB 3, LAB 4 and LAB 5, respectively and subjected for gram staining and catalase test to confirm the Lactic acid bacteria by biochemical method. The different small white colonies with smooth, rounded, entire margins were observed LAB 1, LAB 2, LAB 3, LAB 4 and LAB 5 in *Sillago sihama*, *Rastrelliger kanagurta*, *Mugil cephalus*, *Sardinella longiceps* and *Nemipterus japonicus*, respectively. The antibiotics and susceptibility test for LAB 2 and LAB 5 showed reasonable activity against *Escherichia coli* and *Staphylococcus aureus*. LAB 1 was sensitive to gentamycin, erythromycin and ampicillin drugs. These antibiotics are therefore harmful and destroy this strain of gut flora. However, LAB 1 was resistant to norfloxacin, which is a common antibiotic used to treat stomach disorders like dysentery. This confirmed the action of norfloxacin drug, which restored the internal environment of the stomach without destroying gut flora. LAB 5 showed intermediate sensitivity to gentamycin and ampicillin. LAB 4 was also resistant to norfloxacin. It is suggested that the lactic acid bacteria isolated from the fish gut has probiotic properties, especially with reference to being able to inhibit pathogenic strains. Nevertheless, lactic acid bacteria have several beneficial properties and develop novel functional properties for inhibition of microbes by producing growth inhibiting substances and large amounts of lactic acid.

**Keywords:** Lactic acid bacteria, Marine fishes, Gut microflora, Antibiotic test

**Citation:** Vijayananth S., Nesakumari Sheeba A.C., Muthezhilan R. and Thirunavukkarasu N.: Isolation and biochemical characterization of lactic acid bacteria from the gut of fresh food fishes. Intern. J. Zool. Invest. 8(1): 272-280, 2022.

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# Assessment of the Conservation Value of Wetland Birds on the Pallikaranai Marsh, Chennai, Tamil Nadu, India

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**Abstract:** The present study was carried out to assess the status and conservation issues of wetland birds in Pallikaranai marsh, Chennai, India from March 2021 to February 2022. The dominant family was Ardeidae represented by 9 species followed by Anatidae with 6 species, Threskiornithidae and Scolopacidae with 4 species. The families with representation with one species were Accipitridae, Anhingidae, Ciconiidae, Dicruridae, Sturnidae, Pelecanidae, Muscicapidae, Phoenicopteridae, Podicipedidae, Rostratulidae, Laridae, Hirundinidae, Columbidae and Cuculidae. Totally 60 species were identified during the study period. Higher numbers of birds were recorded in the month of April. Birds migration status, feeding habits and IUCN status were investigated. Majority of the birds are under the least concern category, the birds viz. Painted stork, Black tailed godwit and Oriental darter are under Near Threatened category. The present study site is also facing tremendous conservation challenges by the impacts of anthropogenic alteration of the habitats in and around the marshy area. The diversity of avifauna that occur in large numbers in this area invites attention for conservation of the Pallikaranai wetlands and prevention from further degradation.

**Keywords:** Wetland birds, Diversity, Pallikaranai marsh, Conservation threats, IUCN

**Citation:** Thirunavukkarasu N. and Nesakumari Sheeba A.C.: Assessment of the conservation value of wetland birds on the Pallikaranai Marsh, Chennai, Tamil Nadu, India. Intern. J. Zool. Invest. 8(2): 117-129, 2022.

<https://doi.org/10.33745/ijzi.2022.v08i02.015>



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## Introduction

The birds which inhabit and dependent on wetland directly or indirectly for feeding, nesting or roosting are commonly called water birds/wetland birds. Selection of wetland by waterfowl is influenced by complex characteristics including water chemistry, aquatic vegetation, invertebrate fauna and physical features. Pallikaranai marsh

functions as habitat for indigenous and migratory birds. Every year huge number of water fowls and waders are sighted on the mudflats of the marsh land between June to December (during winter). Due to the availability of ideal climate for breeding and food resources, it is an important stopover for the migratory species for resting and refuelling.





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# Allometric Relationship of Freshwater Crabs *Oziotelphusa bouvieri* and *Spirallothelphusa wuellerstorfi* of Puzhal Lake, Chennai, Tamil Nadu, India

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**Abstract:** Freshwater crabs are the most dominant and specifically endemic species in India. Ecologically and nutritionally freshwater crabs proved to be the best alternative for marine crabs. Culturing of freshwater crabs are less tedious than freshwater fishes but lack of proper research on stock assessment becomes major drawback. Stock assessment helps in evaluating actual population dynamics in order to assess its population density which would be further used for designing aquaculture practices. Simple regression proved to be effective statistical tool for calculating relative growth. Due to very fragmentary work on allometry of freshwater crab species, there is an urgent need to evaluate the actual population dynamics of freshwater crabs.

**Keywords:** Allometry, Aquaculture, Fisheries studies, Freshwater crabs, *Oziotelphusa bouvieri*, *Spirallothelphusa wuellerstorfi*

**Citation:** Vijayananth S., Thirunavukkarasu N. and Sruthi H.: Allometric relationship of freshwater crabs *Oziotelphusa bouvieri* and *Spirallothelphusa wuellerstorfi* of Puzhal Lake, Chennai, Tamil Nadu, India. Intern. J. Zool. Invest. 8(2): 512-518, 2022.

<https://doi.org/10.33745/ijzi.2022.v08i02.064>



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## Introduction

Allometric studies deal with examining the differences between different morphological characters with each other. Simple allometric studies on fiddler crabs had been used to determine relative growth based on morphological characters (Huxley, 1924). Relative growth determines the growth of body with respect to other body parts (Hartnoll, 1974). Simple regression proved to be effective statistical tool for calculating relative growth. Allometric

studies using simple regression was used previously for variety of marine crabs but this work is a pioneer work on freshwater crabs *Oziotelphusa bouvieri* and *Spirallothelphusa wuellerstorfi*. Both the species are ecologically important and nutritious edible alternative for marine crab. Allometric study help in determining the growth pattern of the species in their habitat. Statistical approach of calculating allometry of specified species help in advancing the



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# Assessment of Microplastics in the Gastrointestinal Tract of the Indian Major Carps from Periyakulam, Kurichi and Singanallur Lakes of Coimbatore, Tamil Nadu, India

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**Abstract:** The investigation of microplastics has been carried out among Indian Major Carps from three lakes of Coimbatore, India. The gastrointestinal tract of fishes were isolated and examined to detect the presence of microplastics. The fishes of Indian major carps viz., *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala* were used in this study. Three lakes were selected namely Periyakulam Lake, Kurichi Lake and Singanallur Lake in Coimbatore district, India. The microplastics samples were confirmed with Bruker – Alpha FTIR ATR spectrophotometer in order to confirm plastics functional groups. The presence of microplastics in the fish from the sampling locations may be due to unmonitored dumping of wastes in the water. The presence of microplastics may affect the growth of fish which leads to poor commercial value. The future research should be aimed to evaluate the impact and the risk of microplastics to the fishes, environment as well as to human beings.

**Keywords:** Microplastics, Indian Major Carps, Periyakulam lake, Kurichi lake, Singanallur lake

**Citation:** Efgin Ann, Surya D., Thirunavukkarasu N., Nesakumari Sheeba A.C.: Assessment of microplastics in the gastrointestinal tract of the Indian Major Carps from Periyakulam, Kurichi and Singanallur lakes of Coimbatore, Tamil Nadu, India. Intern. J. Zool. Invest. 8(2): 389-396, 2022.

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## Introduction

In recent years, microplastics have become a major developing pollutant to both the freshwater and seawater ecosystem. In India people are consuming microplastics about 117 mg/year. There is a dearth of research information on microplastic pollution in the Indian aquatic ecosystems. The aim of this study was to analyze

the microplastics content in the Indian Major Carps such as Catla (*Catla catla*), Rohu (*Labeo rohita*) and Mrigal (*Cirrhinus mrigala*) from three major fishing hubs of Coimbatore namely Periyakulam lake, Kurichi lake and Singanallur lake. No previous study has been carried out along these freshwater ecosystems in Coimbatore,





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### Identification and Characterization of Micro and Mesoplastics Isolated from Commercially Important Marine Fishes of Pulicat Lake, Tamil Nadu, India

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**Abstract:** The investigation of microplastics have been carried out among the commercially important marine fishes at Pulicat lake waters. The gastrointestinal tract of fishes were isolated and experimented for further analysis to detect the presence of microplastics. The fishes viz., *Nemipterus japonicus*, *Mugil cephalus*, *Scomberomorus guttatus*, *Terapon puta*, *Sardinella longiceps*, *Caranx ignobilis*, *Stolephorus indicus*, *Rastrelliger kanagurta*, *Eleutheronema tetradactylum*, *Alectis indica*, *Leiognathus* sp., *Trichiurus lepturus*, *Trachurus lathamni*, *Selaroides leptolepis* and *Terapon jarbua* were examined in this study. The microplastics samples were confirmed with Bruker-Alpha FTIR ATR spectrophotometer in order to confirm plastics functional groups. Out of the 16 plastic particles isolated, 8 particles were mesoplastics and the rest of them were microplastics. The FTIR-ATR peaks were confirmed C-H stretching and N-H stretching (polyamide), C-H stretching, O-H stretching or N-H stretching (poly lactic acid), CH group (polythene) and C-H stretching, C=O stretching and C-O stretching (polyester). The presence of microplastics in the fish from the sampling locations may be due to unmonitored dumping of wastes in the water. The presence of microplastics may affect the growth of fish which leads to poor commercial value. The future research should be aimed to evaluate the impact and the risk of microplastics to the fishes, environment as well as human beings and to create awareness among the people, as well as the fishermen.

**Keywords:** Microplastics, Mesoplastics, Marine fishes, Pulicat lake

**Citation:** Surya D., Ann Efgin, Thirunavukkarasu N. and Nesakumari C. Sheeba Anitha: Identification and characterization of micro and mesoplastics isolated from commercially important marine fishes of Pulicat lake, Tamil Nadu, India. Intern. J. Zool. Invest. 8(1): 401-407, 2022.

<https://doi.org/10.33745/ijzi.2022.v08i01.044>

### Introduction

Marine pollution changes the physical, chemical and biological characteristics of the oceans, coastal zones and potentially threatens marine organisms, ecosystems and biodiversity which affect the quality and productivity of marine ecosystems. The main contaminants of the ocean include toxic

chemicals (e.g., organic compounds, DDT, PCB, metals, pharmaceuticals and gas), solid waste (e.g., plastics and microplastics), increased nutrient (e.g., nitrates and phosphates) and sediment inputs due to human activities (e.g., industry, agriculture, deforestation, sewage discharge and

**FEED PREFERENCE OF WETLAND BIRDS OF ATTAKANTHIPPA,  
NELAPATTU BIRD SANCTUARY, ANDHRA PRADESH**

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**Abstract**

The present study was carried out to assess the bird's population including adults and chicks pertaining to grey pelicans, open bill storks, white ibis, cormorants, coots, spot billed ducks and dab chicks. The temperature and the rain fall data were recorded during the study period of October 2020 to April 2021. The birds have arrived by the month of November, where the temperature is 31-33<sup>0</sup>C which is suitable temperature for breeding. The food availability and the food preference of white ibis and pelicans were investigated. The white ibis preferred snail (*Clithonoualanens* & *Cerithideacingulat*) for their food and it is available in shallow waters. The least preferred food items is tilapia, it assumes that white ibis prefer the shallow water than water filled area. The most preferred food items for pelicans is tilapia followed by shrimps and the least preferred items are polychaetes and toads. It assumes that the pelicans feeds in 1 meter depth of water in Attakanthippa.

**Key words:** Avifauna, Attakanthippa, Nelapattu Bird Sanctuary, Food preference

**Introduction**

Birds are of royalty in India's natural wealth. India's avifauna diverse with unique birds supporting an impressive diversity of 1235 species representing 14% of the world's total of around 9000 species. Accounting to the bird paradises in India the Nelapattu Bird Sanctuary is one among them and is a lesser known sanctuary. Nelapattu receives water only during the monsoon. The birds leave the sanctuary during April / May due to the insufficient of water. Birds built nest on *Barringtoniaacutangulat* trees. Birds starts breeding and nesting during October, they start arriving from September and check the area for feasibility of breeding, nesting site, availability of food source, adequate water and disturbance in the area.



**AN ASSESSMENT OF POST-HARVEST FISH LOSSES AND PRESERVATION  
PRACTICES IN FISHERMEN VILLAGES OF PULICAT, TAMILNADU –  
A CASE STUDY**

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**Abstract**

Pulicatlake is the second largest lagoon in India lying at the border of the states of Tamil Nadu and Andhra Pradesh. The lake harbours rich and valued floristic wealth because of its varied ecological habitat viz; salt marshes, mangroves, islands and low lying mud flat etc. This lake is an important source of livelihood for a large population living in the villages. The fishermen community of Pulicat has been greatly affected by the post-harvest losses in both fresh and dry/processed fish. Hence, the present study investigated on the post-harvest losses in fisheries and the common practices followed by the fishermen community of Pulicat. The post-harvest losses is estimated to be 19% and 5% for dryfish and fresh fish respectively. The reasons for losses in fresh fishes are shortage of ice, overlapping of fishes in the boat, improper handling of fishes by the fishermen, oil spill in the boat etc. Similarly the reasons for losses in dry fish are drying the fishery products on the sand, wooden boards, gunny bags and grass mats, where there is no protection to the product from rain, high humidity, infestation (maggot and beetle), rodents, ants, dogs, sand, silt, dust etc. The fish processors in Pulicat mostly follows three methods for drying the fishes i.e., sundrying (71%) followed by salt drying (26%) and turmeric drying/curing (3%) respectively.

## HYDROBIOLOGY OF DIFFERENT ECOSYSTEMS OF PULICAT LAKE, SOUTH EAST COAST OF INDIA

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### Abstract

The study was undertaken to determine the physico-chemical parameters like pH, temperature, salinity, dissolved oxygen, nitrite, nitrate, total suspended solids, reactive silicate, inorganic phosphate, calcium and magnesium at four different ecosystems (oyster bed, mangrove, seagrass and muddy substratum) of Pulicat lake during the period of January to December, 2018. The high pH (8.46) was recorded during monsoon and low (6.3) during summer in all the four different stations and there were no noticeable changes between stations. The temperature was recorded low (27.3°C) during monsoon and high (32.6°C) during summer in all the four different stations. The salinity was found to be high (34.8ppt) during summer and low (23.36ppt) during monsoon. The low level of dissolved oxygen (1.3mg/l) during summer and high level during monsoon (5.3mg/l) was recorded. The high value of nitrite (32.34µg/l) was recorded during monsoon and low value (0.78µg/l) during summer. The nitrate was low



**STUDIES ON FISHERY RESOURCES, FISHING OFF SEASON AND SOCIO-ECONOMIC STATUS OF FISHERMEN COMMUNITY AT KASIMEDU, ROYAPURAM, CHENNAI**

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**Abstract**

India is not only an agricultural country, but also remarkable in fisheries and aquaculture sector. Most of the people involved directly or indirectly in fishery oriented jobs. Kasimedu is one of the largest fishing market in India. The fishermen community details were collected from Kasimedu landing centre, Royapuram, Chennai. During the study period overall 50 individuals were taken for consideration in this study. The fishermen were classified as wholesalers, retailers and vendors. Various socio economic parameters of the fishermen have been analyzed in this study.

**Keywords:** Fish marketing, Kasimedu, Socio-economics

**Introduction**

India is not only an agricultural country, but also remarkable in aquaculture. Most of the people are involved in fishery job directly and indirectly. Kasimedu is one of the fishing market in Chennai. In recent years capture fishery production has been flat, at around 90 million tons per year, while aquaculture has continued to show sustained growth. Currently around 6.5 percent a year's faster than all other food sectors (FAO, 2011). In 2011 it amounted to 62.7 million tones. Some gains in capture fisheries might be possible by adopting better management through an ecosystem approach, but significant increases are unlikely. However, it has been estimated that if all inputs were available, aquaculture could provide 16 - 47 million additional tons of fish by 2030. Biodiversity is the quantity, variety and distribution across biological scales ranging through genetics and life form of populations, species, communities and ecosystems (Mace *et al.*, 2005). Biodiversity affects the capacity of living systems to respond to changes in the environment,

**PRESENT STATUS OF SOCIO-ECONOMIC CONDITIONS OF THE FISHERMEN  
VILLAGES OF PULICAT LAKE, SOUTH EAST COAST OF INDIA**

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**Abstract**

Pulicat Lake is the second largest lagoon in India, lying partly in Tamil Nadu and Andhra Pradesh has rich biological resources. This lake is the important source of livelihood for a large population living in the villages. The present study reveals the socio-economic conditions viz, age, gender, education, marital status, religion, type of family, capital source, type of housing, monthly income, savings, type of boats, government schemes and health care facilities of the fishermen community of eight villages surrounding Pulicat lake. From this study public are expecting from the government, can able to provide sufficient financial facilities at low rate of interest to the fishermen, establish cold storage facilities and freezing plant, provide fishing equipment at the subsidized cost, make available health care facilities at cheaper cost and conduct regular awareness camp of health care services and health insurance.

**Key words:** Socio-economics, Pulicat Lake, Fishermen villages



## EXTRACTION OF CHITIN AND CHITOSAN FROM THE EXOSKELETON OF *LOBSTER SCYLLARUS MARTENSII*

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### Abstract

The shells of lobster were collected from Royapuram fish landing centre, Kasimedu, Chennai. The chitin and chitosan were extracted from the lobster *Scyllarus mortensii*. The yield of chitin 3.35g and the yield was 16.75%. The chitosan yield was 1.818g and the yield was 11.0%. The extracted chitin from lobster *Scyllarus mortensii* were compared with standard chitin through FT-IR spectrum. The standard chitin shows the major peaks at 3527  $\text{cm}^{-1}$ , 3232  $\text{cm}^{-1}$ , 2887  $\text{cm}^{-1}$ , 1724  $\text{cm}^{-1}$ , 1539  $\text{cm}^{-1}$ , 1300  $\text{cm}^{-1}$ , 1122  $\text{cm}^{-1}$ , 1006  $\text{cm}^{-1}$ , 704  $\text{cm}^{-1}$ . The lobster *Scyllarus mortensii* shows the peaks at 2443  $\text{cm}^{-1}$ , 1762  $\text{cm}^{-1}$ , 1510  $\text{cm}^{-1}$ , 1381  $\text{cm}^{-1}$ , 1116  $\text{cm}^{-1}$ , 1028  $\text{cm}^{-1}$  and 655  $\text{cm}^{-1}$ . The extracted chitosan of lobster *Scyllarus mortensii* was compared with standard chitin through FT-IR spectrum. The standard chitosan shows the major peaks at 3849  $\text{cm}^{-1}$ , 3732  $\text{cm}^{-1}$ , 3601  $\text{cm}^{-1}$ , 3282  $\text{cm}^{-1}$ , 2912  $\text{cm}^{-1}$ , 2312  $\text{cm}^{-1}$ , 1728  $\text{cm}^{-1}$ , 1465  $\text{cm}^{-1}$ , 1290  $\text{cm}^{-1}$ , 1012  $\text{cm}^{-1}$ , 891  $\text{cm}^{-1}$ , 721  $\text{cm}^{-1}$ . The lobster *Scyllarus mortensii* shows the peaks at 3860  $\text{cm}^{-1}$ , 3719  $\text{cm}^{-1}$ , 3630  $\text{cm}^{-1}$ , 2372  $\text{cm}^{-1}$ , 1629  $\text{cm}^{-1}$ , 1261  $\text{cm}^{-1}$ , 1028  $\text{cm}^{-1}$ , 864  $\text{cm}^{-1}$  and 686  $\text{cm}^{-1}$ . The FT-IR peaks confirm the presence of OH and amine N-H symmetrical stretching vibrations,  $\text{CH}_3$  in amide group,  $\text{-C=O}$  stretching (amide I) and NH stretching (amide II) in the chitosan sample of lobster *Scyllarus mortensii*.

**Keyword:** crustacean shell waste, *Scyllarus mortensii*, chitin, chitosan

### 1. Introduction

The term bycatch refers to the non-targeted species retained, sold or discarded for any reason (Alverson et al., 1994). Target catch is the species that is primarily sought after in the fishery and incidental catches is the retained catch of non-targeted species and the discarded catch is that portion of the catch that is returned to the sea due to economic, legal or personal

*Microarray Studies Reveal Pomc and IL-6 as  
Biomarker Genes Associated with  
Hyperprolactinemia-Induced Male Infertility*

Priyadharshini M, D. Leelavathi, V. Mathivanan and  
Balaji Munivelan

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*Delivery of Novel Anti-Microbial Chemical  
Compound Using In silico Chemical  
Repurposing Techniques*

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 C A R A S

## Delivery of Novel Anti-Microbial Chemical Compound Using *In silico* Chemical Repurposing Techniques

Hezinglila Grace<sup>\*1</sup>, V. Mathivanan<sup>2</sup>, Kevizano Jacinta Zashumo<sup>3</sup> and D. Leelavathi<sup>4</sup>Received: 15 Jun 2022 | Revised accepted: 01 Aug 2022 | Published online: 12 Aug 2022  
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### ABSTRACT

The objective of the present study will focus on increasing the efficiency of the existing antibiotic drugs with no toxic effect in the human biological system. 1-cyclopropyl-6-fluoro-4-oxo-7-piperazin-1-ylquinoline-3-carboxylic acid and 2-Acetoxybenzoic acid antibiotics were focused for this study. Canonical SMILES (Simplified Molecular-Input Line-Entry System) of the selected antibiotic were retrieved from NCBI PubChem and converted to 3D structure using online SMILES translator tool. The designed 3D structure was visualized using advanced molecular visualization tool - Discovery Studio. Drug Designing and Validation studies were done using automated Cheminformatics drug designing software - Molinspiration. The predicted chemical compound was validated using an advanced *In silico* toxicity prediction server-SwissADME to analyze the Physicochemical Properties, Lipophilicity, Water Solubility, Pharmacokinetics, Druglikeness and Medicinal Chemistry. The results obtained from Pharmacokinetic tests showed that the designed compound is devoid of lethal effects. Furthermore, the *de novo* compound has the potential to be employed as an antibacterial agent.

**Key words:** Discovery studio, *In silico*, Molinspiration, SwissADME, NCBI PubChem

Drug repurposing—finding new uses for existing drugs—is an intriguing use of computational pharmacology. This technique, which has already produced a number of intriguing candidates, has the potential to increase medication development efficiency and reach patient populations with previously unmet needs, such as those with rare disorders [1]. Drug repositioning has emerged as a potential substitute for conventional drug development, with the goal of finding new indications for authorised or investigational medications. While developing a totally new drug for treating diseases, medication repositioning offers the capability to minimize development time and boost success rates because it uses de-risked therapeutic molecules [2-3].

Antibiotics are currently the most important weapons in the fight against infectious diseases. However, the emergence of antimicrobial resistance, along with a shortage of newly produced antimicrobial medications, poses a serious threat to human and animal health [4-5]. Biological and chemical data has been generated at an ever-increasing rate throughout the years, ushering in the so-called “big data” age. Drug

repurposing requires a deeper understanding of the interactions between medications and their targets, as well as between targets and diseases [6-7].

The United States Food and Drug Administration (FDA) have approved 1-cyclopropyl-6-fluoro-4-oxo-7-piperazin-1-ylquinoline-3-carboxylic acid for the control and diagnosis of bacterial infections such as urinary tract infection, lower respiratory tract infection and skin infection [8]. It has been found to be effective *in vitro* and *in vivo* against a number of Gram-positive and Gram-negative bacteria isolates [9-10]. Bayer A.G. patented 1-cyclopropyl-6-fluoro-4-oxo-7-piperazin-1-ylquinoline-3-carboxylic acid in 1983, and the US Food and Drug Administration (USFDA) authorized it in 1987 [11-12].

2-Acetoxybenzoic acid is the world's most widely used analgesic and antipyretic medication, with nearly a century of clinical use. 2-Acetoxybenzoic acid is a non-steroidal anti-inflammatory drug that is taken orally [13]. It has a significant impact on the management of cancer, heart attack, strokes and cardiovascular diseases. Long-term use of 2-Acetoxybenzoic acid has been demonstrated in studies to lower the risk of a variety of cancers, including colorectal, esophageal, breast, lung, prostate, liver, and skin cancer [14].

Despite Antimicrobial overall success, the establishment and spread of Antimicrobial Resistance (AMR) among microorganisms has significantly affected their efficacy and reliability in recent years [15-16]. Antimicrobial resistance (AMR) is a global threat to human health and development [17]. Data in the biological, chemical, and clinical domains is rapidly growing, with the potential to speed up and inform drug

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development in novel ways. This is the goal of computational pharmacology, which use *in silico* approaches to better understand and anticipate how medications affect biological systems, hence improving therapeutic use, avoiding undesired side effects, and guiding treatment selection and development [1].

application that predicts physicochemical qualities, absorption, distribution, metabolism, elimination, and pharmacokinetic properties of molecules, which are all critical elements in the clinical trial process. Flexibility, lipophilicity, saturation, size, polarity, and solubility are among the six important physicochemical properties considered [23].



## ABSTRACT

The objective of the present study will focus on increasing the efficiency of the existing antibiotic drugs with no toxic effect in the human biological system. 1-cyclopropyl-6-fluoro-4-oxo-7-piperazin-1-ylquinoline-3-carboxylic acid and 2-Acetoxybenzoic acid antibiotics were focused for this study. Canonical SMILES (Simplified Molecular-Input Line-Entry System) of the selected antibiotic were retrieved from NCBI PubChem and converted to 3D structure using online SMILES translator tool. The designed 3D structure was visualized using advanced molecular visualization tool - Discovery Studio. Drug Designing and Validation studies were done using automated Cheminformatics drug designing software - Molinspiration. The predicted chemical compound was validated using an advanced *In silico* toxicity prediction server-SwissADME to analyze the Physicochemical Properties, Lipophilicity, Water Solubility, Pharmacokinetics, Druglikeness and Medicinal Chemistry. The results obtained from Pharmacokinetic tests showed that the designed compound is devoid of lethal effects. Furthermore, the *de novo* compound has the potential to be employed as an antibacterial agent.

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Drug repurposing—finding new uses for existing drugs—is an intriguing use of computational pharmacology. This technique, which has already produced a number of intriguing candidates, has the potential to increase medication development efficiency and reach patient populations with previously unmet needs, such as those with rare disorders [1]. Drug repositioning has emerged as a potential substitute for conventional drug development, with the goal of finding new indications for authorised or investigational medications. While developing a totally new drug for treating diseases, medication repositioning offers the capability to minimize development time and boost success rates because it uses de-risked therapeutic molecules [2-3].

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development in novel ways. This is the goal of computational pharmacology, which use *in silico* approaches to better understand and anticipate how medications affect biological systems, hence improving therapeutic use, avoiding undesired side effects, and guiding treatment selection and development [1].

## MATERIALS AND METHODS

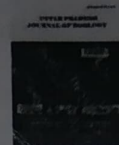
### Drug selection

The study focused on the antibiotics 1-cyclopropyl-6-fluoro-4-oxo-7-piperazin-1-ylquinoline-3-carboxylic acid and 2-Acetoxybenzoic acid. Using an online SMILES translator tool, canonical SMILES of the chosen antibiotics that were obtained from NCBI PubChem [18] were converted to 3D

application that predicts physicochemical qualities, absorption, distribution, metabolism, elimination, and pharmacokinetic properties of molecules, which are all critical elements in the clinical trial process. Flexibility, lipophilicity, saturation, size, polarity, and solubility are among the six important physicochemical properties considered [23].

## RESULTS AND DISCUSSION

Canonical SMILES of 1-cyclopropyl-6-fluoro-4-oxo-7-piperazin-1-ylquinoline-3-carboxylic acid and 2-Acetoxybenzoic acid were retrieved from NCBI PubChem and validation of molecular properties and the bioactivity of the designed structure were carried out using Molinspiration software (Fig 1) which illustrated the following properties-



## BIOCHEMICAL AND MOLECULAR ALTERATIONS IN THE GILLS OF FRESHWATER FISH *Oreochromis mossambicus* EXPOSED TO TANNERY EFFLUENT

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### AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Original Research Article

### ABSTRACT

The present study was to find out the effects of tannery effluent on the fingerlings of freshwater fish *Oreochromis mossambicus*. The fishes were maintained at 10% concentration of tannery effluent in laboratory conditions for 30 days based on the lethal concentration studies. The gill tissue of the fishes was chosen for this study. Spectrophotometric analysis revealed a decline in total protein, DNA and RNA contents of the gills was statistically significant after exposure of the fishes to tannery effluent probable due to stress factors. Difference in intensity of genomic DNA between 750 and 1000bp was observed in the gill tissue in fishes exposed to tannery effluent, when DNA was subjected to agarose gel electrophoresis separation. Protein subunit separation by SDS-PAGE show high and low intensities in the protein bands obtained from the gills in the control and experimental fishes. DNA damage in the gills was confirmed by an increase in DNA damage by tail migration and by increase in percentage of mean DNA comet tail length formation.

**Keywords:** *Oreochromis mossambicus*; tannery effluent; gills; genomic DNA; protein subunits; comet assay.

### 1. INTRODUCTION

Aquatic ecosystem forms the final reservoir for a variety of chemicals used in industries and agriculture which in present days is becoming an alarming a global problem [1]. Tannery effluents are ranked as

the highest pollutants among all industrial wastes. A number of tanning industries favour chrome tanning for processing leather. Only fraction of chromium (Cr) is utilized in tanning process and the rest is discharged as by-product of wastewater treatment [2]. Among the different forms of chromium hexavalent

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**CYTOTOXICITY AND ANTI-CANCER ACTIVITY OF AQUEOUS LEAF  
EXTRACT OF *SOLANUM TORVUM* ON NORMAL VERO AND HUMAN  
BREAST ADENOCARCINOMA MCF - 7 CELL LINE**

**SHANTHI D, RAJA K and SARAVANAN R\***

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Vyasarpadi, Chennai 600039, Tamil Nadu, India

**ABSTRACT**

Natural herbal products are formulated with a combination of phytoconstituents from plants which play a pivotal role because of their diverse medicinal properties. Limited plants have been screened for their complete biological and pharmacological nature. In the present research work an attempt was made to infer the medicinal value of aqueous extract of *Solanum torvum* (*S.torvum*) leaves. Phytochemical analysis of the aqueous extracts of *S.torvum* leaf in the present study ascertain the presence of flavonoids, phenols, saponins, alkaloids, coumarins, sterols, proteins and reducing sugars. Further, the potentiality of aqueous extract of *S.torvum* leaves was assessed for its cytotoxic effect on Normal Vero cell line and anticancer activity on Human breast adenocarcinoma cell line by 3- (4, 5 dimethyl thiazole-2-yl) -2, 5-diphenyl tetrazolium bromide assay. A 24-hour incubation cell proliferation study reduced the cell viability of MCF-7 breast cancer cell lines. *In vitro* studies on cytotoxicity analysis on Vero cell line revealed that the aqueous leaf extract of *S.torvum* has no toxicity and further it was found to be effective in the prevention of cell proliferation by MCF-7 cell lines.

**Keywords:** *Solanum torvum* leaves. Phytochemical analysis, Normal Vero cell line, Human breast adenocarcinoma cell line, Cell proliferation studies., Tryphan Blue, Selectivity index

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## POTENTIAL OF FEED SUPPLEMENTATIONS ON GROWTH PERFORMANCE OF CULTIVABLE INDIAN MAJOR CARP, *Labeo rohita* - INITIATIVE IN REPLACING FISH MEAL FOR SUSTAINABLE AQUACULTURE

E. REKA<sup>1</sup>, T. KUMARAN<sup>1</sup> AND R. SARAVANAN<sup>1\*</sup>

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### AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Original Research Article

### ABSTRACT

The study aimed to evaluate the feed supplementation on the growth performance of cultivable Indian major carp, *Labeo rohita*- initiative in replacing fish meal for sustainable aquaculture. The present experimental approach was designed for analyzing the importance of formulated feeding for a period of 90 days by providing feed supplements in the diet like minor millets comprising dried finger millet, Pearl millet and foxtail millet feed along with normal groundnut oilcake. Control fishes were fed with normal groundnut cake feed. Considerable increase was observed in the body weight, length and growth indices of the experimental fishes fed with millet diets, specifically when all the three varieties of minor millets were provided in combination which is highly recommended for improving the growth performance of fish.

**Keywords:** Feed formulation; pearl; finger and foxtail millets; groundnut cake; growth indices; major carp fishes.

### 1. INTRODUCTION

In our daily diet fish plays a vital role as it contains high protein source and is required in large quantity. Aquaculture industries increase their productivity by using different types of artificial feeds [1,2]. Artificial

feeds play vital role in semi – intensive and intensive fish culture. Fish is best ingredient due to its protein obtainability [3]. The aquaculture sector has expanded rapidly in recent years to maintain sustainable fish supply. Fish meal is the most expensive ingredient, with the predicted continuous growth of the

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# Phytochemistry, Antioxidant Nature of *Solanum Torvum* Unripe Fruit Extract and Its Effect on Anti-Proliferative Activity in Human Lung Cancer A549 Cell Line

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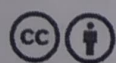
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## Abstract

This study will decipher the phytochemistry, antioxidant nature and the antiproliferative activity of *Solanum torvum* (*S.torvum*) unripe fruit extract on lung cancer A549 cell line. The aqueous extract was to ascertain its cytotoxic effect and anti-proliferative activity through *in vitro* studies by 3-(4,5dimethylthiazole-2-yl)-2,5-diphenyl tetrazolium bromide-MTT assay) on Normal VERO cell line and A549 (Human lung adenocarcinoma cell line). Aqueous extracts of *S.torvum* unripe fruits was found to be effective in the prevention of cell proliferation by lung adenocarcinoma celllines. Phases of cell cycle show alteration in molecular dynamics associated with the cancerous cells.

**Keywords:** *Solanumtorvum*, Phytochemistry, Antioxidants, VERO cell line, A549 cell line, MTT assay, Cell cycle

## Introduction

Cancer is stilla growing health problem world-wide characterized by their regular proliferation of the cells, as a cell progresses from normal to cancerous tissue, the biological imperative to survive and perpetuate, drives fundamental changes in cells behaviour. Cancer risk can be reduced by habitual consumption of cancer protective foods. Lung cancer has been the leading cause of cancer-related deaths for many years and incidence and mortality statistics vary widely worldwide [1]. There are two main subtypes of lung cancer: non-small cell lung cancer (NSCLC) and small cell lung cancer (SCLC). Around 80% of all lung cancers are determined to be



# GC–MS Analysis, Molecular Docking and Pharmacokinetic Properties of Phytocompounds from *Solanum torvum* Unripe Fruits and Its Effect on Breast Cancer Target Protein

R. Saravanan<sup>1</sup> · K. Raja<sup>1</sup> · D. Shanthi<sup>1</sup>

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## Abstract

This study was designed to identify phytocompounds from the aqueous extract of *Solanum torvum* unripe fruits using GC–MS analysis against breast cancer. For this, the identified phytocompounds were subjected to perform molecular docking studies to find the effects on breast cancer target protein. Pharmacokinetic properties were also tested for the identified phytocompounds to evaluate the ADMET properties. Molecular docking studies were done using docking software PyRx, and pharmacokinetic properties of phytocompounds were evaluated using SwissADME. From the results, ten best compounds were identified from GC–MS analysis against breast cancer target protein. Of which, three compounds showed very good binding affinity with breast cancer target protein. They are ergost-25-ene-3,6-dione,5,12-dihydroxy-,(5.alpha.,12.beta.) (–7.3 kcal/mol), aspidospermidin-17-ol,1-acetyl-16-methoxy (–6.7 kcal/mol) and 2-(3,4-dichlorophenyl)-4-[[2-[1-methyl-2-pyrrolidinyl]ethyl amino]-6-[trichloromethyl]-s-triazine (–6.7 kcal/mol). Further, docking study was performed for the synthetic drug doxorubicin to compare the efficiency of phytocompounds. The binding affinity of ergost-25-ene-3,6-dione,5,12-dihydroxy-,(5.alpha.,12.beta.) is higher than the synthetic drug doxorubicin (–7.2 kcal/mol), and the binding affinity of other compounds is also very near to the drug. Hence, the present study concludes that the phytocompounds from the aqueous extract of *Solanum torvum* unripe fruits have the potential ability to treat breast cancer.

**Keywords** *Solanum torvum* · GC–MS · Molecular docking · SwissADME · Breast cancer

## Introduction

Breast cancer is one of the major problems for most women worldwide. About 10% of breast cancer occurrences are due to gene mutations which are inherited [1]. The pharmacologic medications, some of which are under present use, are taxanes, doxorubicin, epothilones, vincristine, camptothecin, tamoxifen and orraloxifene to prevent

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## Ameliorative effect of *Nelumbo nucifera* seeds and wheat grass formulated feed against tannery effluent toxicity and stress in freshwater fish *Oreochromis mossambicus*

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(Received 10 July, 2021; Accepted 7 August, 2021)

### ABSTRACT

Amelioration of tannery effluent toxicity and stress revival was analysed through an approach by preparing a formulated feed with feed components comprising *Nelumbo nucifera* seeds and Wheatgrass as major ingredients in an enhanced formulation. The formulated feed was fed to fingerlings of *Oreochromis mossambicus* exposed to tannery effluent in laboratory confinement to observe its effect on growth and protective effect from toxic nature of the effluent. This study aimed to assess the effect of the sublethal concentration of tannery effluent over an exposure period of 45 days. The  $LC_{50}$  was analysed for the tannery effluent to select the suitable sublethal concentration. The body weight differences was be determined, the muscle tissue was analysed for biomolecular constituents by Fourier Transform Infrared spectroscopy (FT-IR) analysis. Alterations were observed in body weight and muscle tissue biochemical constituents in fishes exposed to the effluent fed on normal diet and formulated feed.

**Key words:** *Oreochromis mossambicus*, Tannery effluent, *Nelumbo nucifera* (lotus) seeds, Wheat grass powder, Muscle, FT-IR analysis, Biomolecules

### Introduction

The problem of water and soil pollution due to tanneries is a serious environmental threat especially in the developing countries. In India, there are more than 2,500 tannery units, scattered all over the country, with an annual capacity of processing 0.7 million tons of hides and skins (Rajamani, 1995; Ram *et al.*, 1997). Leather processing in a tannery generally comprises three categories: pre- treatment of skin/ hide, chrome or vegetable tanning of skin/ hide (tanning operation) and finishing operations (Stoop, 2003; Thanikaivelan *et al.*, 2004). Nearly 30m<sup>3</sup> of wastewater is generated during processing of one

tonne of raw skin/ hide (Suthanthararajan *et al.*, 2004).

These wastewaters contains high chemical oxygen demand (COD), color, sodium sulphide, nitrate, chloride, chromium and suspended solids (SS) (Szpyrkowicz *et al.*, 2001). The colored wastewaters hamper light penetration (Malaviya and Singh, 2011), whereas high COD resulted in decreased dissolved oxygen in the aquatic ecosystem (Raj *et al.*, 1996). Additionally, high concentrations of dissolved solids make the possible discharge of tannery wastewaters into water bodies problematic, as they cause eutrophication and other adverse environmental effects and also affecting aquatic organisms



## Length-Weight and Feeding Indices of Formulated Diet Supplemented with Millet Base and Combined with Commercial Probiotics Used as Feed for Cultivable Freshwater Fish, *Labeo rohita*

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**Abstract:** The nutritional indices of agro based millet feed conversion was determined based on improved nutrient content with commercial probiotic raised in the semi-intensive method which was formulated by four isonitrogenic diets and given as a trail feed to Indian major carp, *Labeo rohita*. The fish were fed on groundnut oil cake, pearl millet, finger millet as base feed and a combination of pearl, finger and foxtail millet. The experimental period was 90 days. Nutritional and protein values indices values have improved and proved to be remarkable in the experimental fish and suggesting that this feed may be a better alternative feed for fish reared during aquaculture practices.

**Keywords:** Pearl millet, Finger millet, Foxtail millet, *Labeo rohita*, Feed indices, Protein indices, Fingerlings

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### Introduction

In India fish play an important role in nutritive value for human. The better way to improve our nutritional need is to include fish in our diet. In the last five decades India has tremendous production and growth of fish. The availability of fish in India per capita is now 9.5 kg. Fish is one of the main sources of protein with all essential amino acids, fats and has become a healthier alternative to livestock during the last fifty year (Hana *et al.*, 2009). The world's most important type of aquaculture is rearing carps group in terms of production. The freshwater fish Rohu (*Labeo*

*rohita*) is one of the most popular species especially in Asia that has high market price. Over all global production is more than 1.5 million tons in 2012 (FAO, 2013).

Dietary protein is the major and most expensive component of formulated aquafeed. Fishmeal is generally considered to be the most ideal protein source for aquatic animals, despite its static global production, seasonal/geographical variability in quality and composition. Over the past decades, there has been rapid increases in global aquaculture with competition demand and





## $\beta$ -Ideals of $\beta$ -Subalgebras via Cubic Intuitionistic Set

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**Abstract** Cubic intuitionistic fuzzy sets are an effective and versatile technique for encoding ambiguous data. In this paper, the notion of  $\beta$ -ideals have been merged with cubic intuitionistic set. The perception of cubic intuitionistic ideals of  $\beta$ -algebra is established with relevant results. Moreover, various properties on Cartesian product and the homomorphism of cubic intuitionistic ideals of  $\beta$ -algebra are studied. Further, multiplication of cubic intuitionistic  $\beta$ -ideals is introduced and few of its related results were investigated.

**MSC:** 06F35; 03G25; 08A72; 03E72

**Keywords:**  $\beta$ -algebra;  $\beta$ -ideals; cubic intuitionistic fuzzy; cubic  $\beta$ -ideals; cubic intuitionistic ideals

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### 1. INTRODUCTION

After Zadeh's[1] fuzzy set, Atanassov[2] proposed the notion of intuitionistic fuzzy sets with degrees of membership and non-membership. Aub Ayub Ansari and Chandramouleeswaran[22] established the concept of fuzzy  $\beta$ -subalgebras of  $\beta$ -algebra and discussed some of its analogous outcomes. Sujatha, Chandramouleeswaran and Muralikrishna[3] introduced the notion of intuitionistic Fuzzy  $\beta$ -sub algebras of  $\beta$ -algebras. The thought of  $\beta$ -algebra was explored by Neggers and Kim[4], where two operations were coupled. The notion of interval valued fuzzy  $\beta$ -ideals were presented by Hemavathi, Muralikrishna and Palanivel[5, 6] and also they have extended the idea of interval valued intuitionistic fuzzy  $\beta$ -subalgebras and dealt some fascinating results. Borumand Saeid, Muralikrishna and

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## **RADIATION AND MAGNETOHYDRODYNAMIC EFFECTS ON CONVECTIVE NANOFLUID PAST AN INCLINED PLATE IN THE PRESENCE OF A CHEMICAL REACTION**

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This computational work explores the heat and mass transfer of copper water nanofluid flowing along an inclined plate with varying surface temperature and concentration in the presence of a magnetic field and radiation through a permeable medium. The dimensionless governing equations are solved numerically using an efficient finite-difference technique, which is fast convergent and unconditionally stable. The findings are reviewed and illustrated through graphs for pertinent parameters.

**Key words:** finite difference, nanofluids, viscous dissipation, heat source, porous medium.

### **1. Introduction**

Nanoparticle study is currently a hot area for several researchers. Due to an innovative technique for increasing thermal conductivity, nanofluids have seen widespread use in engineering and medicine over the last few decades. Specifically convective heat transfer in nanofluids plays a significant role in engineering processes, such as heating or cooling technique of electronic components, highly developed nuclear systems, solar collector, thermal isolation systems, food processes, etc. Countless biomedical applications necessitate nanofluids, for example in, magnetic cell division, drug delivery, cancer therapeutics, nano-cryosurgery, etc.

Chien-Hsin Chen [1] studied MHD flow with Ohmic heating and viscous dissipation impact on a vertical surface and found that when viscous dissipation increases, the rate of heat transfer decreases. Rising Schmidt numbers or buoyancy ratio tend to raise the local Sherwood number and slow down the local skin friction. Palani and Kim [2] looked into the effect of viscous dissipation over a semi-infinite plate on a free convective flow with a changing temperature. They discovered that the velocity reaches a steady-state by raising the value of the Prandtl number and local skin friction rises for higher values of viscous dissipation, but a reverse effect is observed in the case of average Nusselt number. Vasu, Prasad, and Reddy [3] analyzed the transient free convective radiating flow past a vertical plate with thermal flux and noticed that velocity and temperature increase as radiation parameters decrease. Subhas Abel *et al.* [4] explored an MHD laminar flow over an upright permeable stretching sheet with the effects of buoyancy and viscous dissipation; and noticed that the influence of the suction parameter decreased and the injection parameter increased the longitudinal velocity. RamReddy *et al.* [5] analysed the impact of viscous dissipation and magnetic field on a free convective flow in a permeable medium and came up with the result that an increment in the viscous dissipation factor leads to increased velocity and temperature fields. Ganesan, Suganthi and Loganathan [6] discussed the

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# SIMILARITY SOLUTION OF STAGNATION - SPOT FLOW OF A MICROPOLAR FLUID ABOVE A FLAT EXPONENTIALLY ELONGATING PENETRABLE SURFACE WITH CONCENTRATION AND HEAT PRODUCTION/ABSORPTION

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## Abstract:

The current study aims to explore the stagnation spot flow of a micropolar liquid about a plain linear exponentially expanding penetrable surface in the incidence of the chemical reaction and in-house heat production/absorption. Through similarity mapping, the mathematical modeling statements are reformed as ODEs and numerical results are found by shooting techniques. The impact of varying physical constants on momentum, micro-rotation, temperature, and concentration is demonstrated through graphs. The computed measures including shear, couple stress, and mass transfer with distinct measures of factors involved in this proposed problem are presented in a table. The presence of heat source increases the temperature of the fluid but has no impact on the velocity, angular velocity, and concentration.

**Keywords:** Boundary layer, concentration, contracting panel (shrinking sheet), heat spring/drop, micropolar fluid, stagnation spot flow, and suction/injection.

## NOMENCLATURE

|           |                                    |
|-----------|------------------------------------|
| $C_p$     | specific heat at constant pressure |
| $C_r$     | shearing stress                    |
| $f'$      | dimensionless fluid velocity       |
| $g'$      | dimensionless angular velocity     |
| $j$       | microinertia density               |
| $K_c$     | reaction level factor              |
| $l$       | reference length                   |
| $L$       | length                             |
| $M_x$     | couple stress                      |
| $m_w$     | surface couple stress              |
| $n$       | boundary value factor              |
| $\hat{N}$ | micro-rotation                     |
| $Nu_x$    | Nusselt number                     |
| $Pr$      | Prandtl number                     |
| $Q$       | heat source/sink factor            |
| $q_w$     | surface heat flux                  |
| $Re_x$    | local Reynolds number              |
| $S_c$     | Schmidt number                     |
| $Sh_x$    | Sherwood Number                    |
| $s$       | suction/injection factor           |
| $\hat{T}$ | fluid temperature                  |

|                      |                                        |
|----------------------|----------------------------------------|
| $\hat{T}_\infty$     | free stream temperature                |
| $\hat{u}$            | velocity along the surface             |
| $\hat{u}_e$          | free stream velocity                   |
| $\hat{U}_1$          | wall stretching factor                 |
| $\hat{U}_0$          | free stream velocity factor            |
| $\hat{v}$            | velocity perpendicular to the surface  |
| $\hat{v}_w(\hat{x})$ | transpiration velocity                 |
| $\hat{x}$            | direction along the surface            |
| $\hat{y}$            | direction perpendicular to the surface |

## Greek symbols

|          |                           |
|----------|---------------------------|
| $g$      | spiral gradient           |
| $d$      | slip factor               |
| $D$      | micropolar factor         |
| $e$      | shrinking factor          |
| $h$      | boundary layer length     |
| $\theta$ | dimensionless temperature |
| $u$      | kinematic viscosity       |
| $k$      | vortex viscosity          |
| $m$      | dynamic viscosity         |
| $r$      | fluid density             |
| $t_w$    | surface shear stress      |



# Neutrosophic Cubic $\beta$ -subalgebra

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**Abstract.** The main objective of this paper is to extend the notion of neutrosophic cubic sets to  $\beta$ -subalgebra. Some captivating results based on the P-union, P-intersection, R-union, R-intersection of neutrosophic cubic  $\beta$ -subalgebra have been explored. Further, the engrossing properties of the lower, upper level sets and homomorphism of neutrosophic cubic  $\beta$ -subalgebras were discussed.

**Keywords:** cubic set; Neutrosophic set; Neutrosophic cubic set;  $\beta$ -subalgebra; cubic  $\beta$ -subalgebra; neutrosophic cubic  $\beta$ -subalgebra.

## 1. Introduction

In 1965, Zadeh [30] initiated the concept of fuzzy sets which is a generalisation of the classical notion of a set. The notion of intuitionistic fuzzy set was proposed by Atanassov [4] whose elements have both membership and non-membership degrees. Biswas [5] introduced Rosenfeld's fuzzy subgroups with interval valued membership functions and studied some interesting properties. The idea of  $\beta$ -algebras has been presented by Neggers and Kim [23] which is a generalization of  $BCK/BCI$ -algebras where two operations have been used. Samarandache [27] proposed a generalization of intuitionistic fuzzy sets, known as neutrosophic set in which the distinction between the neutrosophic set and intuitionistic fuzzy set are emphasised. The notion of cubic sets introduced by Jun et al. [10, 11] and investigated the characteristics of cubic subgroups. Maji [16] applied the idea of soft set into neutrosophic sets and studied some compelling results.





## An overview of cubic intuitionistic $\beta$ -subalgebras

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### Abstract

The conditions of  $\beta$ -algebra is enforced into the structure of cubic intuitionistic fuzzy settings. Furthermore, the concept of cubic intuitionistic  $\beta$ -subalgebra is expressed and its pertinent properties were explored. Also, discussed about the level set of cubic intuitionistic  $\beta$ -subalgebras and furnished some fascinating results on the cartesian product of cubic intuitionistic  $\beta$ -subalgebra. Moreover, the notion of  $(\bar{T}, \bar{S}, S, T)$ -normed cubic intuitionistic  $\beta$ -subalgebras have been introduced and relevant results are studied.

**Keywords:** Cubic set, Cubic  $\beta$ -algebra, Cubic  $\beta$ -subalgebra, Cubic intuitionistic set, Cubic intuitionistic  $\beta$ -subalgebra.

**AMS Classification:** 06F35, 03G25, 08A72, 03E72.

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## **SIMILARITY SOLUTION OF STAGNATION-POINT FLOW AND HEAT TRANSFER OF A MICROPOLAR FLUID TOWARDS A HORIZONTAL PERMEABLE EXPONENTIALLY ELONGATING SHEET WITH RADIATION, HEAT PRODUCTION/IMMERSION**

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The current study aims to explore stagnation spot flow of a micropolar fluid about a plain linear exponentially expanding penetrable surface in the incidence of radiation and in-house heat production/immersion. Through similarity mapping, the mathematical modeling statements are transformed to ODE's and numerical results are found by shooting techniques. The impact of varying physical constants on momentum, micro-rotation and temperature is demonstrated through graphs. The computed measures including shear, couple stress, mass transfer and the local surface heat flux with distinct measures of factors involved in this proposed problem are presented through a table.

**Key words:** exponentially stretching sheet, heat spring/drop, micropolar fluid, radiation, suction/injection.

### **1. Introduction**

Eringen's [1] micropolar fluids are non-Newtonian fluids which consist of randomly oriented particles exhibiting micro inertial phenomena that affect the undercurrents of the fluid flow. Suspension fluids, muddy fluids and biological fluids such as human blood are some examples of micropolar fluids. Eringen's theory can be applied to the investigation of micro scale fluids and in the exploration of non-Newtonian fluid mechanics.

The investigation of fluid flow over stretching sheets has been a popular research problem for the past few decades (see Mukhopadhyay [2]). The lateral velocity caused by the stretching surface disturbs the adjacent fluid, and the surface convective cooling (Mukhopadhyay *et al.* [3] and Mahapatra *et al.* [4]). Such studies have got many interesting industrial applications in processes such as the extrusion of plastic sheets from a die (see Mukhopadhyay and Gorla [5]), the manufacturing of glass by means of blowing, and the cooling of metal plates in a big tub. Uninterrupted casting and spiralling of fibers are some more examples of flow involving elongating surface. Crane [6] obtained an analytical solution of an incompressible viscous flow over an elastic sheet moving with varying velocity. Heat transfer problem over an elongating surface with varying temperature levels was studied by Carragher and Crane [7], Gupta and Gupta [8] and Chakrabarti and Gupta [9]. An analytical solution of heat transfer problem of a micropolar fluid above a non-isothermal penetrable elongating plane was studied by Hady [10]. Hady's problem including suction and injection was investigated using numerical methods by Hassanien and Gorla [11]. An analytical resolution of mixed convective current of micro-polar fluid on a nonlinear elongating plane sheet was given by Hayat *et al.* [12]. The heat transfer

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## A NUMERICAL APPROACH TO SLIP FLOW OF A MICROPOLAR FLUID ABOVE A FLAT PERMEABLE CONTRACTING SURFACE

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A plain linear penetrable contracting sheet with slip over a micro-polar liquid with a stagnation-point flow is analyzed. Through similarity mapping, the mathematical modeling statements are transformed as ODE's and numerical results are found by shooting techniques. The varying impacts of physical quantities on the momentum, micro-rotation, and temperature were demonstrated through graphs. The computed measures including shear and couple stress with distinct measures of factors involved in this proposed problem are presented through a table.

**Key words:** boundary layers, heat sink, micro-polar fluid, slip condition, and suction or injection.

### 1. Introduction

Heat transmission past a stretching surface has a lot of manufacturing applications which include optical filament manufacture, hot involution cable graphics, the aerodynamic expulsion of elastic foils, metal spinning, and pulling elastic foils. Miklavic and Wang [1] examined the viscid flow prompted by a contracting surface. The closed-form solutions were obtained. Wang [2] analyzed a stagnation point flow over a contracting surface and obtained that the heat exchange rate declines with the contracting rate because of the growth in the boundary layer thickness. Nadeem *et al.* [3] considered second quality liquid with the contracting surface and discussed axisymmetric and 2-dimensional shrinking flow. Bachok *et al.* [4] carried out an analysis to examine heat transfer and 2-D stagnation-point flow, a laminar liquid movement to an expanding/contracting surface. The pertaining equations were solved and the impact of various factors involved in the problem was analyzed. Fan *et al.* [5] studied the flow along a contracting surface and high accurate analytical approximations well agreed with the results provided by the Keller-Box scheme. In a porous medium, heat transfer, as well as stable stagnation flow along a contracting surface, was examined by Rosali *et al.* [6]. Heat transfer as well as flow behaviour for numerous values of the parameter involved into the problem, were analyzed and outcomes

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# Vehicle Detection And System Tracking Using Yolo V3 Model, A Computer Vision Technique

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## Abstract

Vehicle Detection and System Tracking is a real-time embedded system that recognises different types of vehicles automatically. This system is currently widely used in a variety of applications. The proposed method was created to recognise high-resolution digital photographs using the most up-to-date Computer Vision and Machine Learning approaches. A comparison of the different extant Computer Vision approaches utilised in YOLO v3 is made for this goal, as well as a detailed understanding of the operation and mode of use of the most often used Machine Learning algorithms, which are: Artificial Neural Networks, You Only Look Once (YOLO). Furthermore, a large vehicle picture dataset is required for the creation of an efficient, rapid, and trustworthy YOLO v3 model.

**Keywords:** YOLO V3, YOLO V2, Number Plate Detection, Darknet, Object Detection, Localization.

## 1. INTRODUCTION

The increased number of automobiles everywhere in today's scenario is obvious. During critical hours, it is extremely difficult to detect the numbers on the vehicle licence plate. As a result, this article proposes a Python method for detecting the vehicle number using the YOLO model. The YOLO (You Only Look Once) v3 model is a system capable of identifying vehicles without human intervention by using a high-speed image capturing technique with supporting illumination, detection of vehicles among the supplied images, and verification of the sequences as being those from a vehicle to convert image to xml [1], resulting in a set of metadata that identifies an image containing a vehicle and the associated



## THE INSIGHTS OF BLOCKCHAIN-DEMYSTIFIED

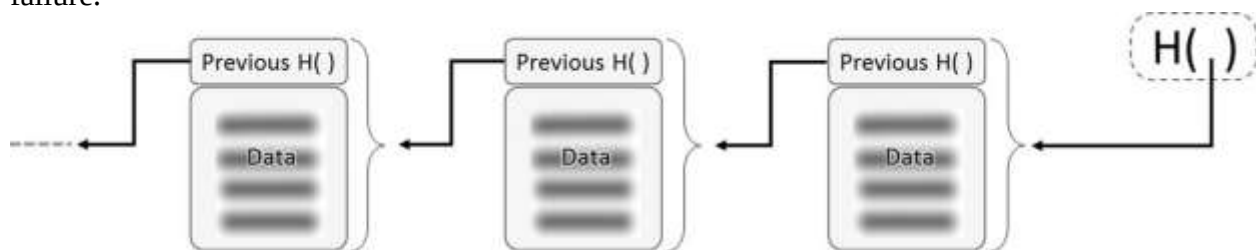
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**Abstract:** Everyone has come across the buzz word of the industry “Blockchain”. Today, Blockchain and the crypto-currencies have become parallel platforms where people have started performing their monetary/non-monetary transactions. It is a very popular technology that rules almost every sector in foreign country, but not approved fully by Indian government. Blockchain is the collection of blocks connected in a linear list fashion [1]. Each block encloses its own data, also holds the hash of the previous block which ties a new block to the previous one unlike linked list. If one of the blocks is removed from the blockchain, the entire chain will collapse because of loss of connectivity. Cryptography in hands with computer science ensures that nobody can change the data in blockchain network. Once information is added to the blockchain, it is impossible to remove or edit. The immutable nature makes the blockchain to serve as a trustworthy database of information. Once validated by the network’s consensus algorithm(s), these blocks are added to an existing sequential chain of cryptographic hash-linked blocks, to ensure the integrity of the data in blockchain[2]. Hence this paper brings about the structure of blockchain, the creation of blocks, the data structure-Merkle tree to store the transactions, the distributed consensus algorithms to achieve agreement among the nodes, the popular use-cases and applications of blockchain.

**Keywords:** Blockchain, Merkle tree, Transaction, Genesis block, Block hash, PoW, PoS, PBFT.

**Introduction:** Blockchain is a combination of business principles, economics, game theory, cryptography and computer science. A blockchain can be defined as a chain of blocks containing information as in the below diagram Fig.1. This technology aims to time-stamp digital documents so that they cannot be dated or tampered with. The purpose of blockchain is to solve the problem of duplicate records without the need for a central server. Blockchain doesn't work without the internet. Blockchain can be used to securely transfer money, property, contracts, etc. without the need for third-party intermediaries such as banks or governments. A blockchain is a peer-to-peer distributed ledger with algorithms cryptographically computed using immutable consensus (such as PoW). Blockchain technology not only helps users conduct cryptocurrency transactions, but also ensures the safety and anonymity of the users involved [3]. Blockchain can be called as the backbone of the entire cryptocurrency system. This is a data structure where each block is linked to another block with a timestamp. This is a connection-only transactional database, not a replacement for traditional databases. Each node/member of the blockchain network keeps a cryptographically protected copy of all past transactions. All information stored in the ledger is auditable and auditable, but cannot be edited. It is fault tolerant as it is decentralized and has no single point of failure.



**Fig.1. Blockchain arrangement**

Dr A Murugan

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## Object-Based Neural Model in Multicore Environments with Improved Biological Plausibility

R. Krishnan & A. Murugan

Conference paper | First Online: 15 June 2021

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### Abstract

It is generally known that the computational neuroscience is usually considered as a mathematics-driven model. Computational neuroscience maps the functions of the neural populations to computer-based mathematical functions. Presently, numerous efforts have been taken to provide neural models that mimic the biological functions of neurons. This

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## Timed neural network using object-based model of neurons for shortest path problem

Ramadurai Krishnan & Annamalai Murugan

*International Journal of Information Technology* 13, 2037–2042 (2021) | Cite this article

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### Abstract

The objective of this work is to construct a cooperative neural network where every neuron is a minimal computational processing routine. This paper shows the implementation of such a network for solving the familiar shortest path problem without compromising the objective set for the Object-Based Model (OBM). This paper also throws light on biological observations about the relationship between the time and functioning of a brain. Further, this problem maps the distance/costs in a graph into time and uses it to be the activation time of a neural routine. The cooperative functioning of such neurons producing the result for the shortest

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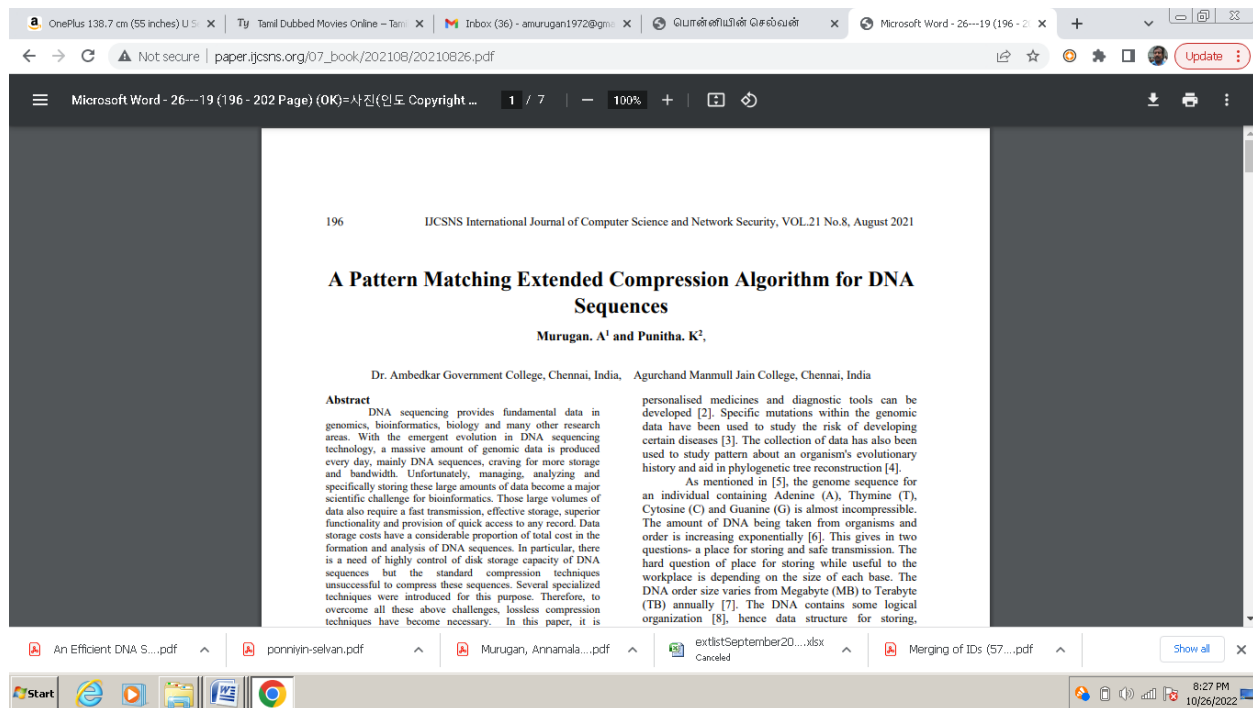
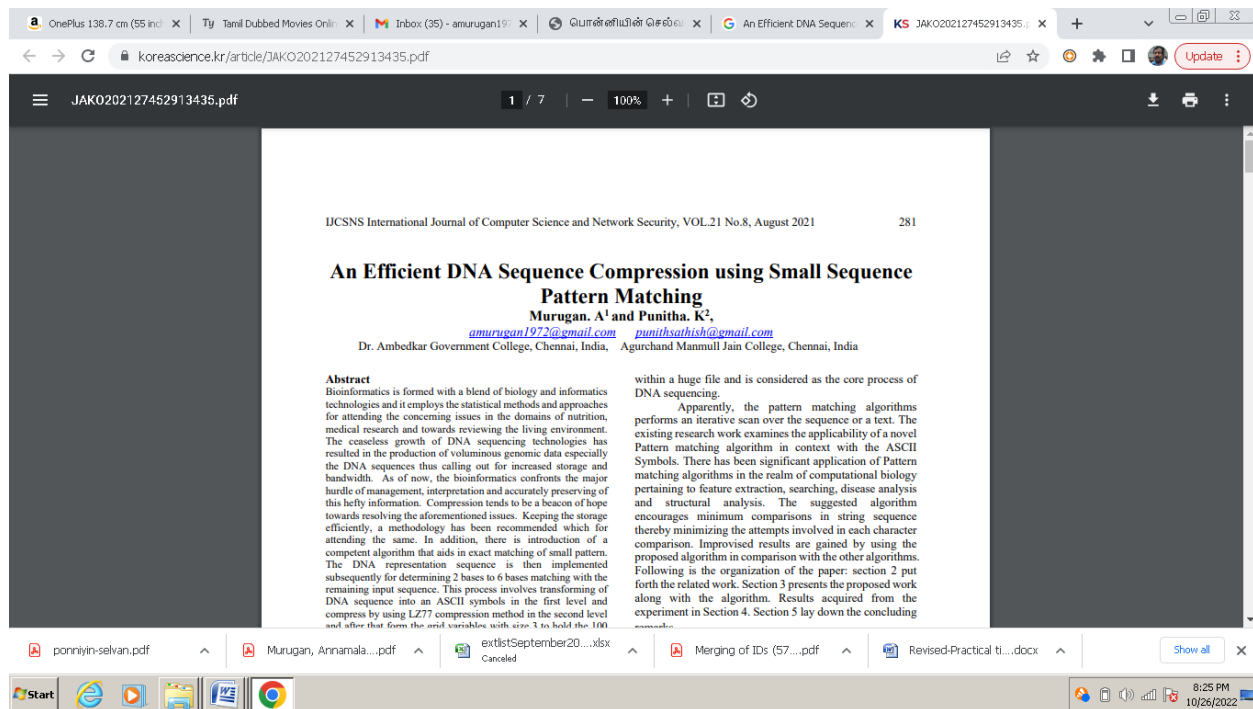
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## Hybrid Ensemble Learning for Stock Market Prediction Using Time Series

K. Anusha, A. Murugan

Keywords: ARIMA Model, Ensemble Learning, Time Series Analysis

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### ABSTRACT

Every stock market investor is concerned with the right price to enter or exit the market, so as to maximize their returns. However, stock price prediction is a daunting task, as the stock markets are very volatile and even illogical. The machine learning algorithms are capable of finding

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## Title: Constructive system for double-spend data detection and prevention in inter and intra-block of blockchain

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**Abstract:** Currently, our global financial market faces lots of trouble due to migration from fiat currency to cryptocurrency and its underlying blockchain technology. Blockchain provides trust in a decentralised way for storing, managing, and retrieving the transactions. The double-spending issue arises due to the erroneous transaction verification mechanism in the blockchain. Research has shown that transaction malleability like double-spending creates millions of bitcoins losses to the owners as well as few bitcoin exchanges. This research aims to detect and prevent the double-spending of bitcoins in single and multiple blocks. In this context, double-spend data in a single block is identified using the DPL2A method. Further, the original transaction from the double-spend transaction list is identified using the ACRT method which acts as a prevention of double-spend in a forthcoming

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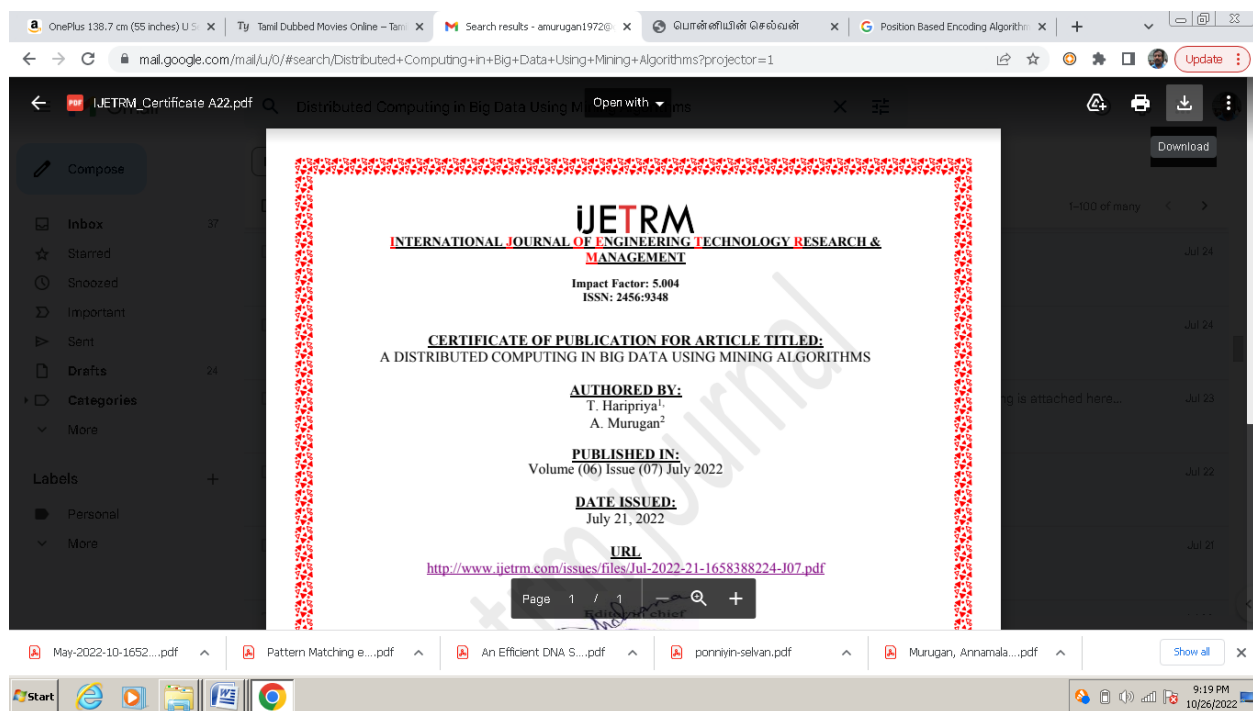
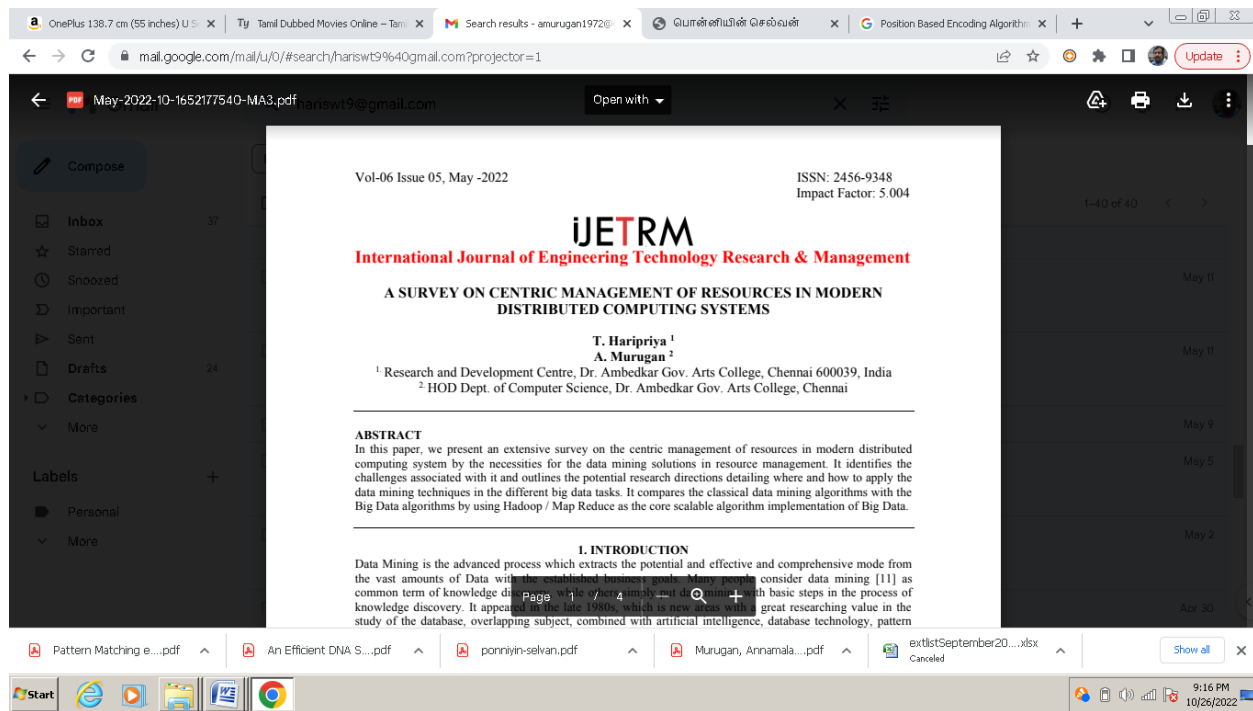
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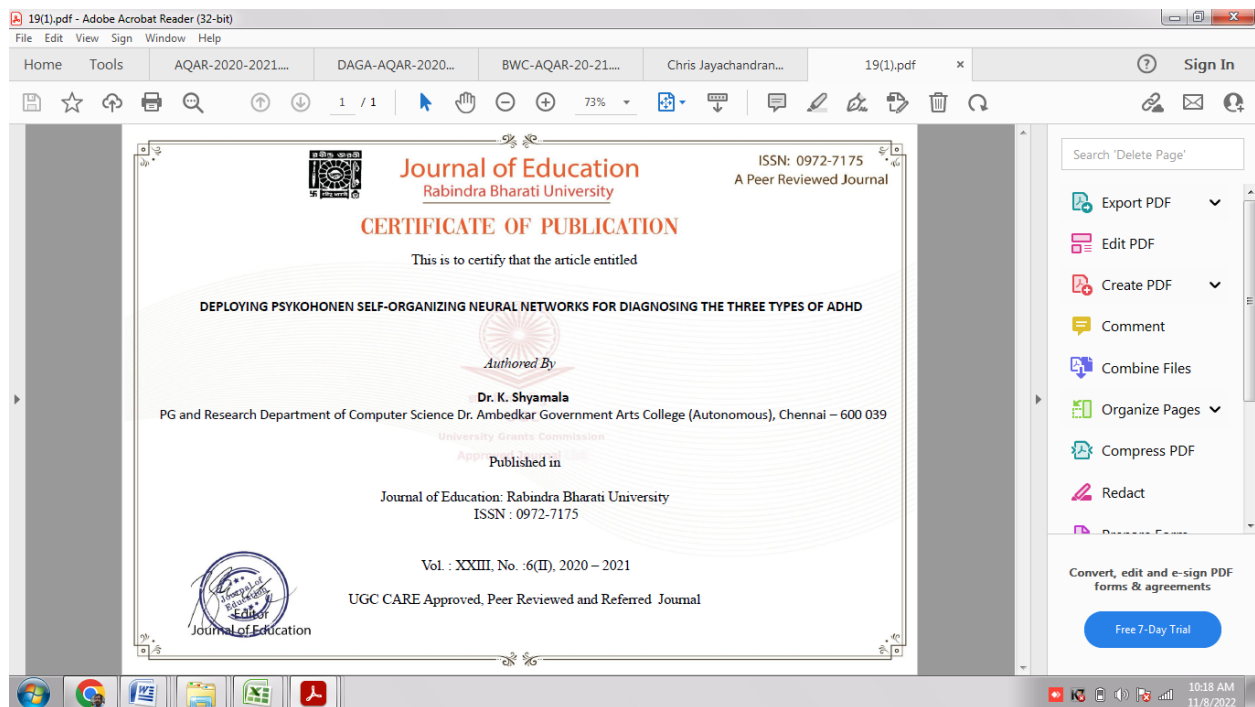
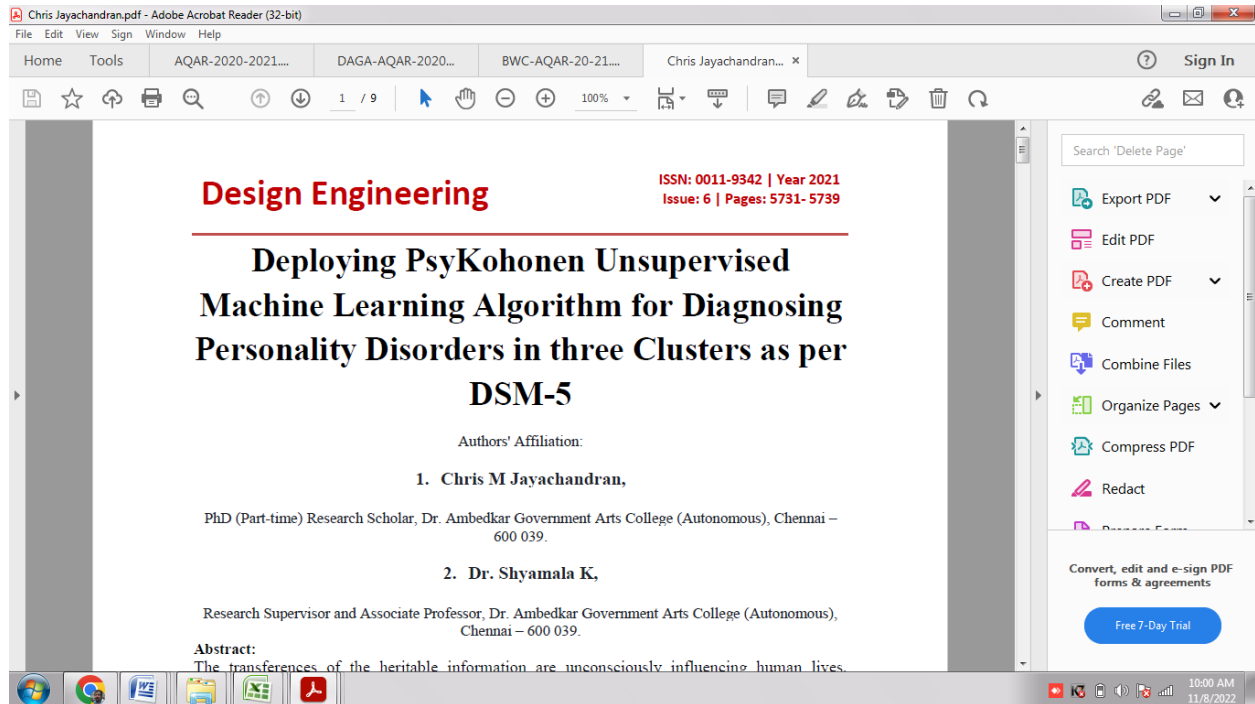


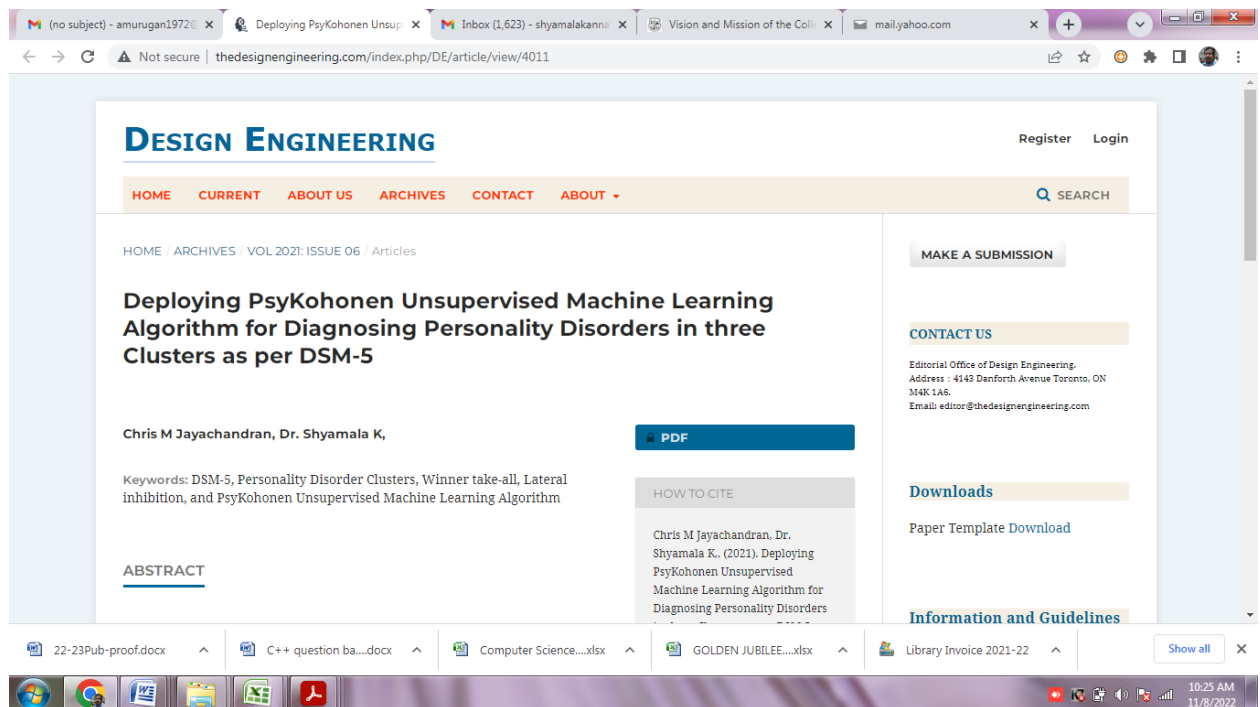


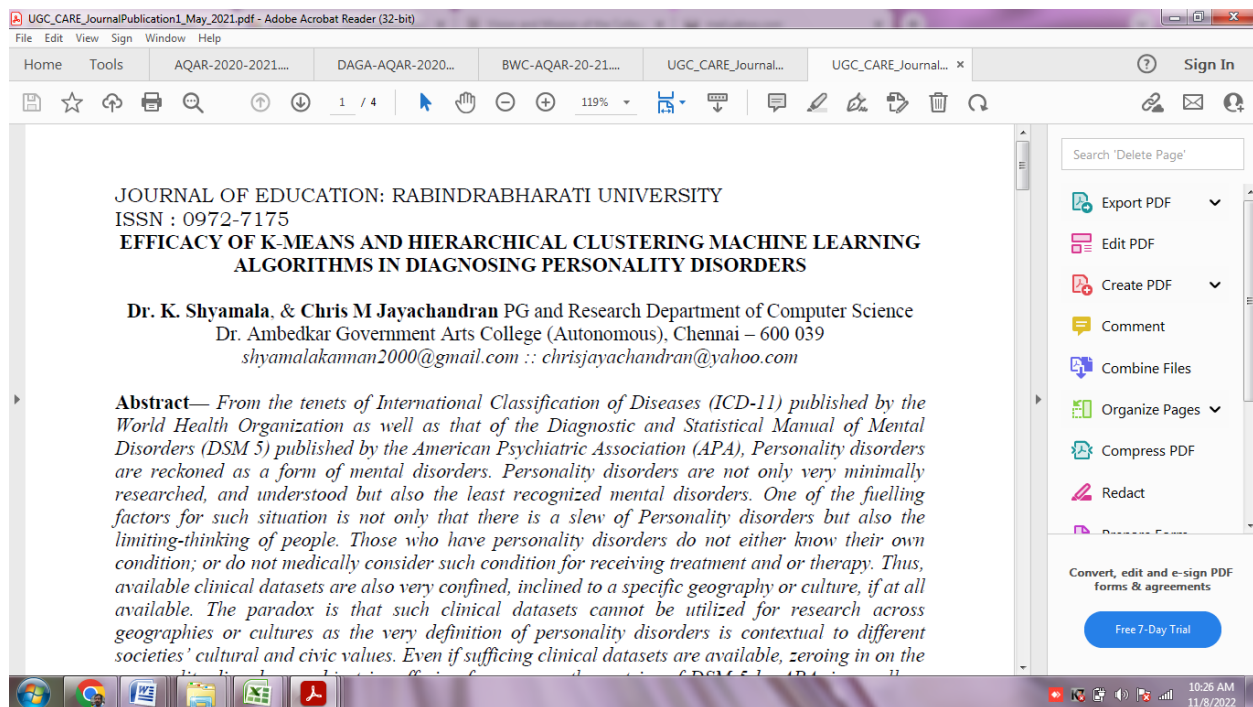
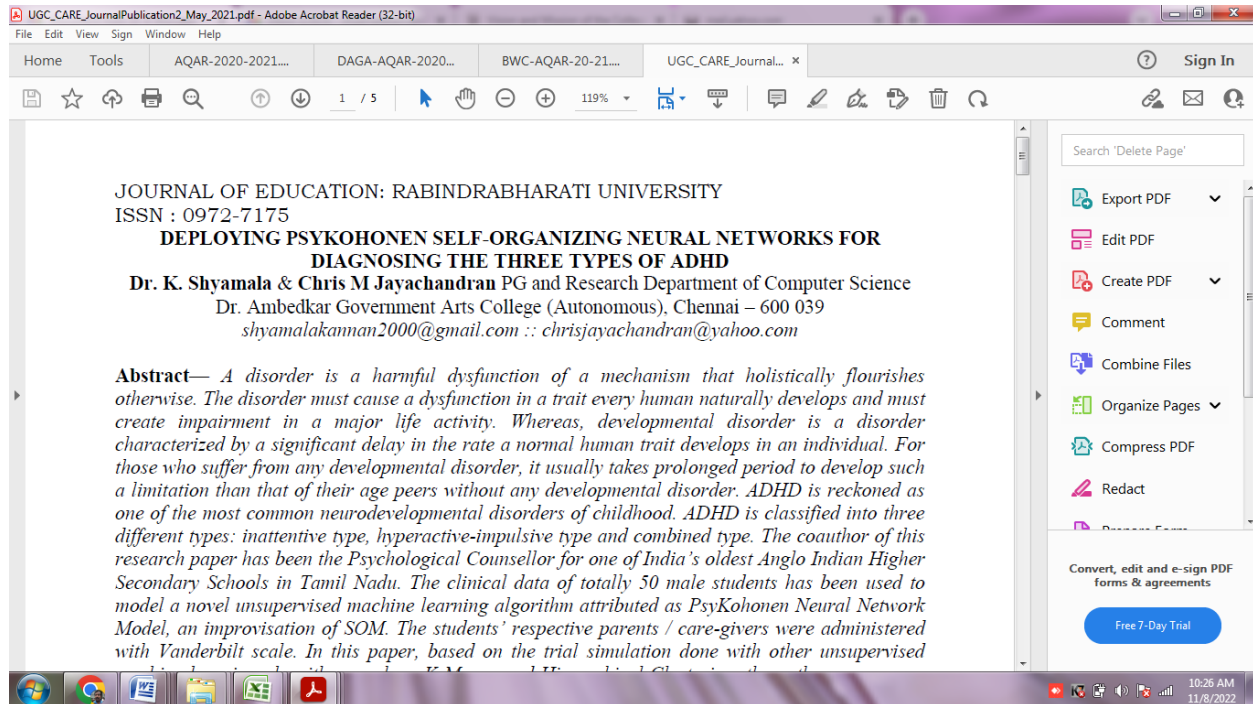


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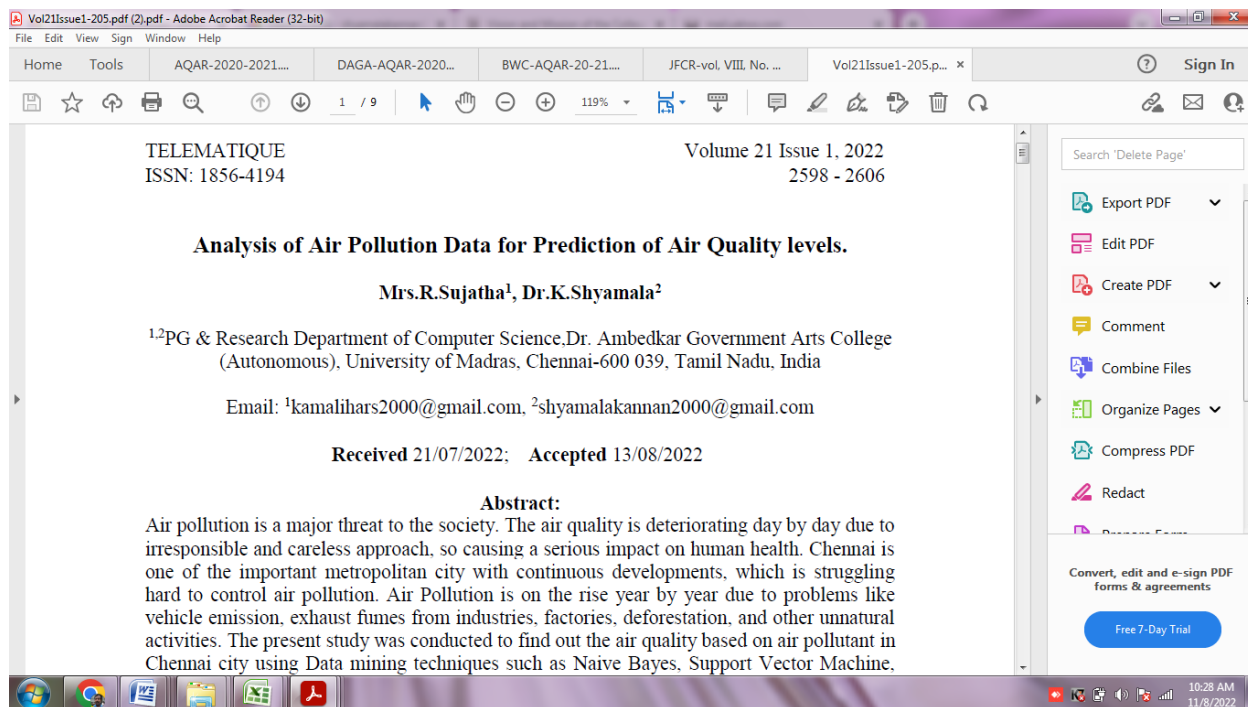
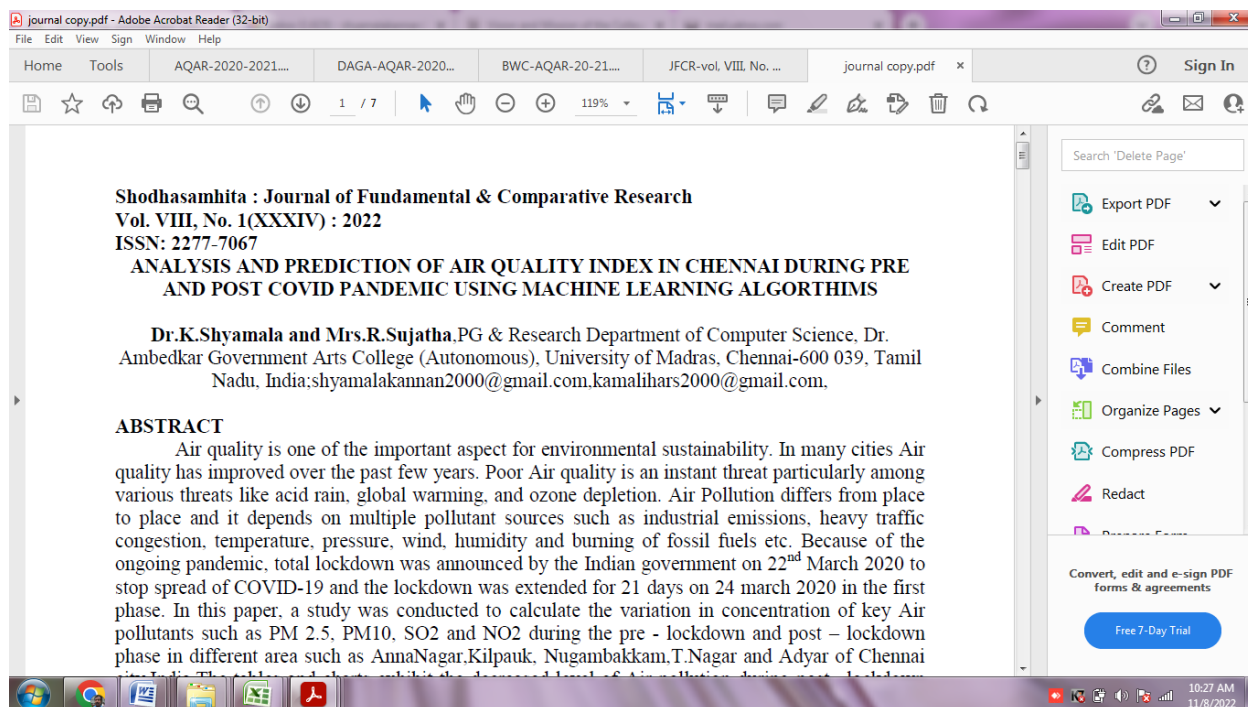


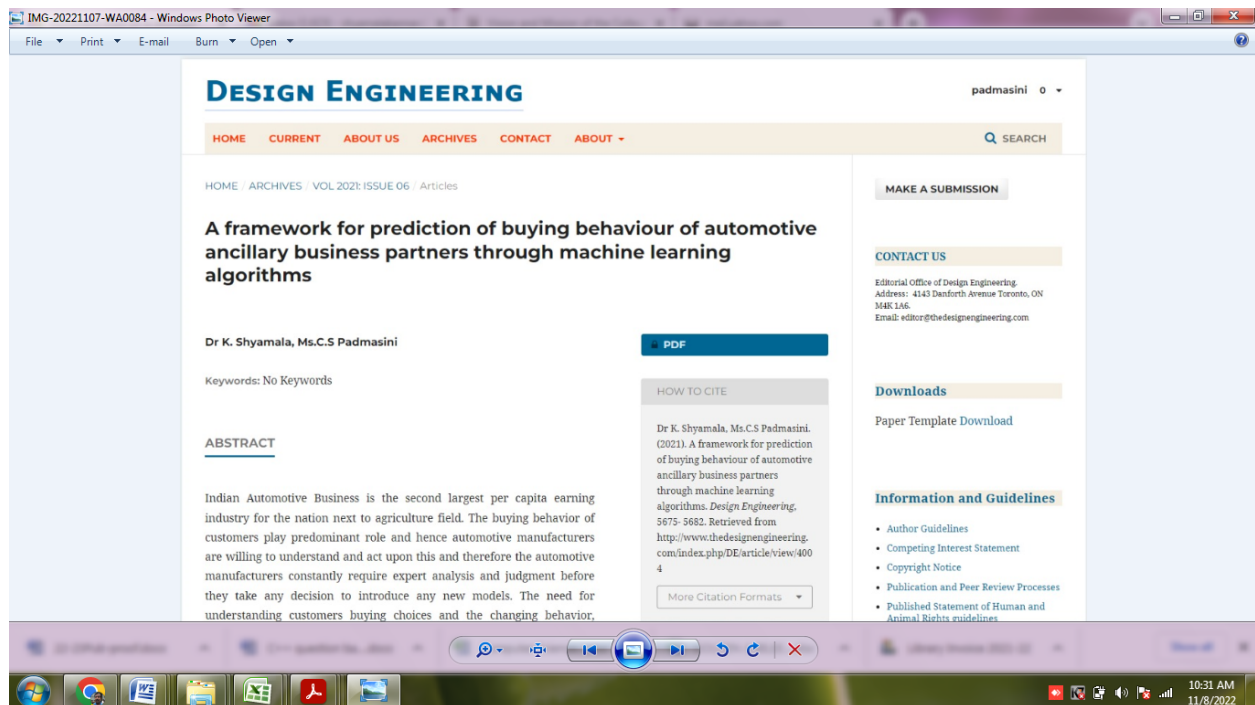
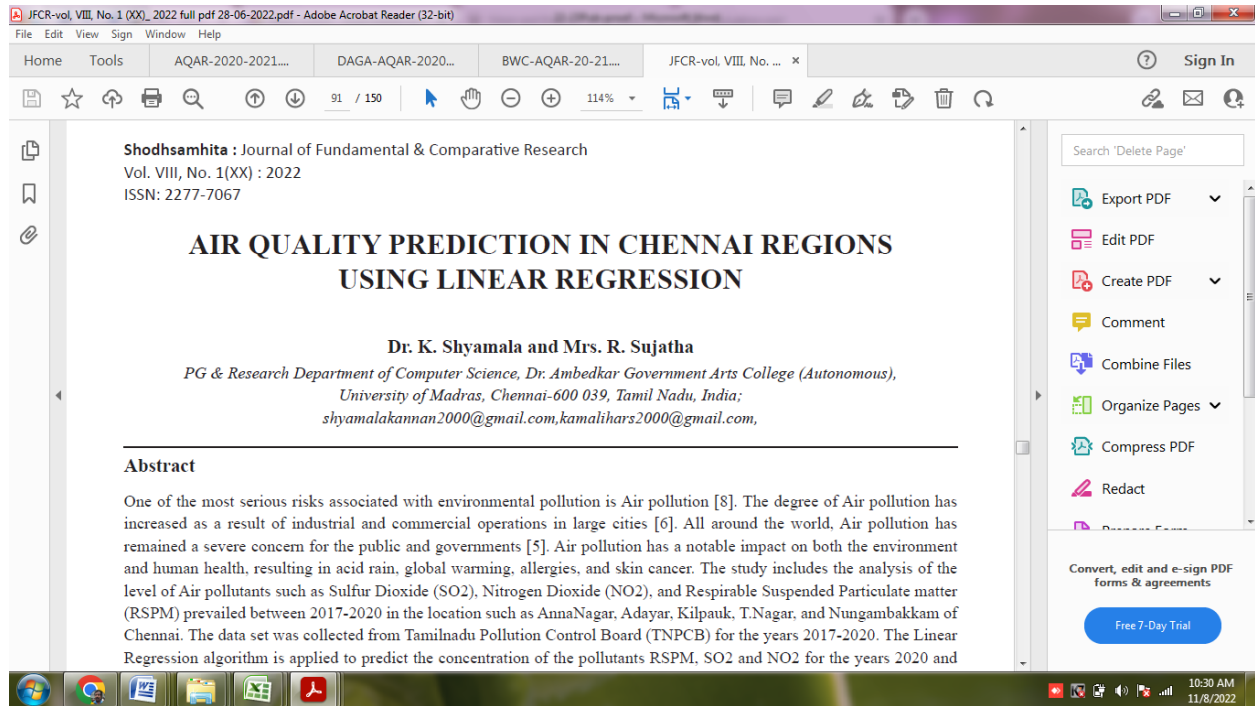


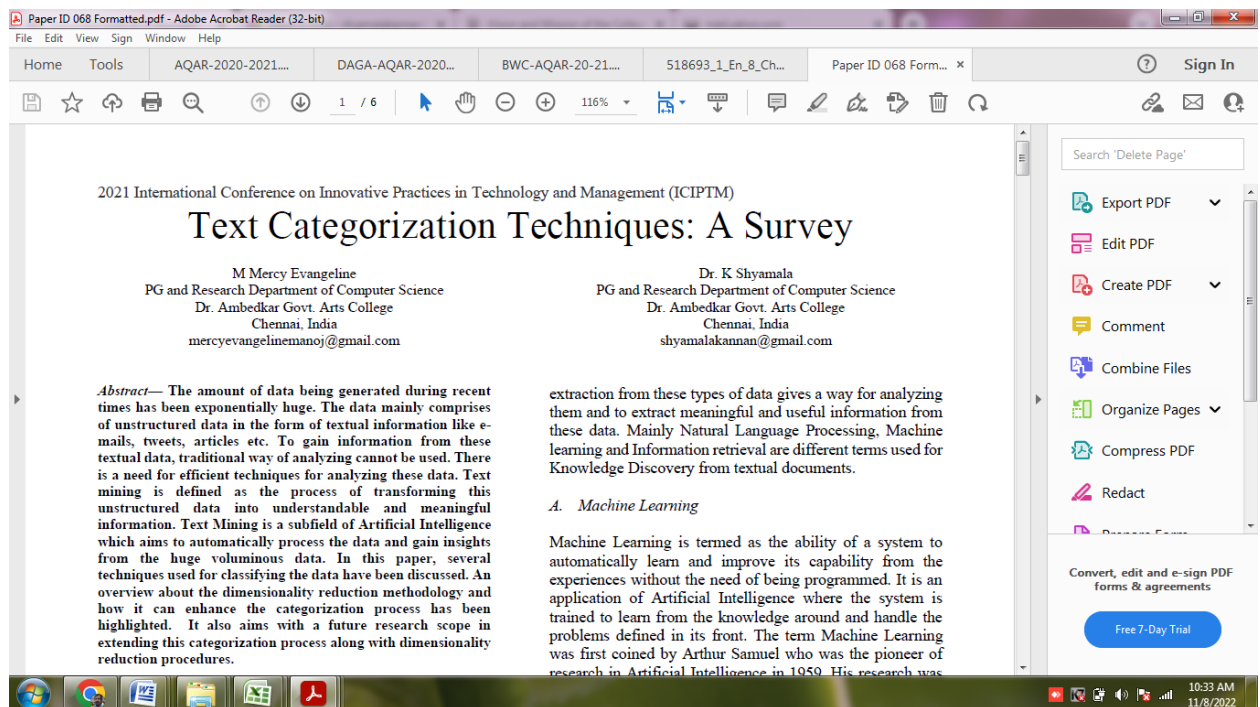
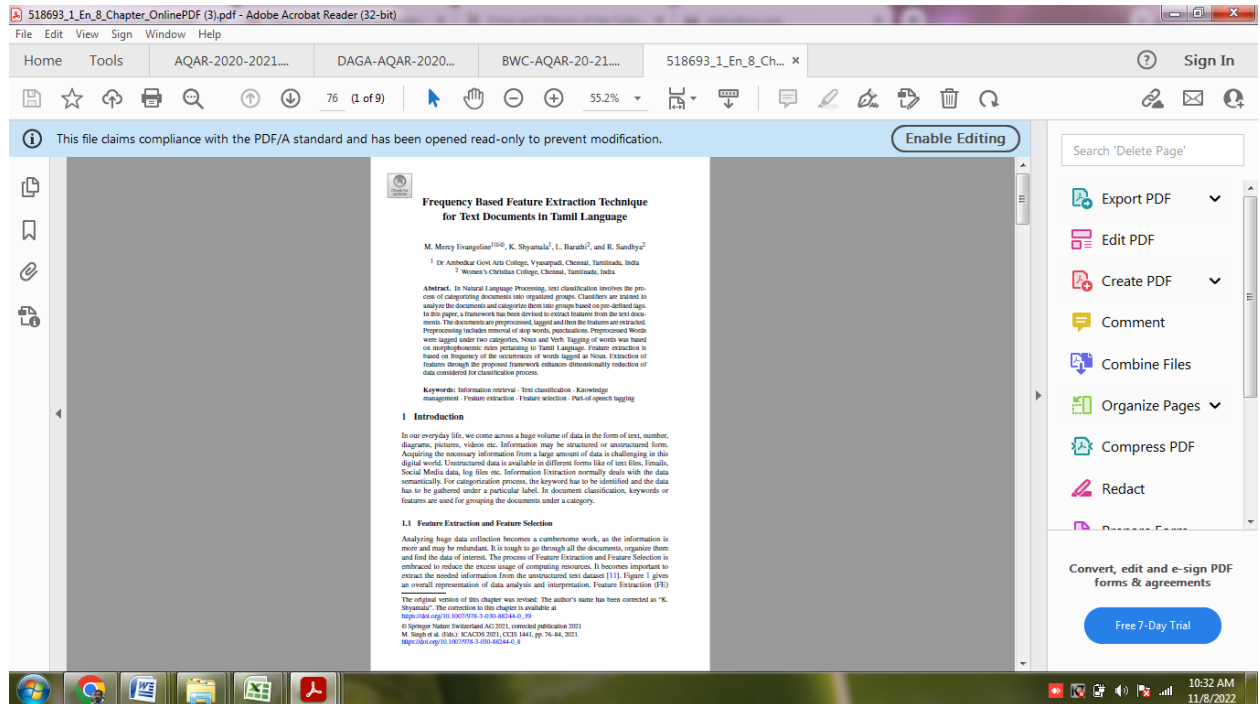














## **A Study of Investment Behaviour of Professional Women in Chennai city**

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### **Abstract**

The research study is based on the micro economic approach of estimating the responses of the respondents' i.e. professional women towards their investment pattern in Chennai city. The motive of the study was to determine the relationship between the income and level of savings and socio-economic features of respondents. The study was done on the different professional women from different sectors of industry. The data were collected by distributing a structured questionnaire to 480 professionals belonging to diversified fields in Chennai. In spite of low income the respondents have been saving for future needs. The major impact on savings is due to the level of income of the respondents. The research shows that the age, yearly savings and expected return on investments have significant relationship.

**Keywords:** Annual income, Annual savings, Investment, professional women, expected rate of return

### **Introduction**

Investment means is an asset or item that is purchased with the hope that it will generate income or appreciate in value at some point in the future. It is a deployment of time, energy, or other resources to earn profitable returns in the form of interest, income, or appreciation of the instruments. From the view point of economics, investment is the accumulation of newly produced entities such as inventories, equipment, buildings etc. On the other hand, finance experts treat investment as purchase of asset with the expectation of profits and/or capital appreciations. An investor is a person who distributes the capital with the expectation of financial return. Investment behavior depends on the mindset of investors. Every investor desires his/her hard earned savings to be invested in a highly secured, lucrative, and liquid sector. The study mainly focuses on the perception of female investors towards savings objectives, investment risk, and popular investment choices. Savings and investments are correlated. Savings creates new investments and benefit the economy in the long run by improving the standard of living. As an investor, and a woman, ensuring financial stability is as important as other roles in life. Today's women

## **A Study on Problems faced by Employees in Implementation of CRM by Retail Banks in Thiruvallur district Tamilnadu.**

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### ***Abstract***

Customer relationship management is involved in various sectors which provide enormous benefits to various sectors in order to maintain a better relationship with the existing customers. Implementation of CRM in industries allows them to understand the requirements of customers more effectively. Implementation of CRM provides space for development of new product and improvement in existing products. This makes the industries to gain reputation and to grow in the market. Even though there are many benefits by adoption of CRM system, there are some problems faced by various industries which include huge monetary investment and non-monetary investment. The important challenge faced by industries in adoption of CRM is slow return on investment.

**Keywords:** CRM, Implementation, Investment, Benefits, Problems.

### **Introduction**

In today's competitive world, Customer Relationship Management is considered as the most important asset in each and every business. As the margins are shrinking in the competitive world, adoption of new technology is tedious, but in order to satisfy the expectation of customers, CRM is essential. The main concept of CRM is the combination of business process of technology to optimize the revenue, profitability and customer loyalty. Many radical changes are faced by banking industry such as competition, technology advancement, consolidation and the need to be customer centric. Majority of the commercial banks have shifted their loyalty due to various introduction of financial products like commercial paper and other financial instruments as to raise resources directly from the market by offering a wide range of services.

Retail banks have to find out what to sell, whom to sell, how to sell, when to sell and how to be unique in the competitive world in order to generate profitability. They have to differentiate from others by offering various services such as value-added service, various offers, personalized services and to increase easy accessibility by building a long term relationship with the customers. The banks should target the customers who are in need and to serve the customers with greater cost and efficiency. To increase the customer loyalty, banks should build a good relationship by satisfying their needs and wants.



## Prospects And Pitfalls In Marketing Of Food Products In Chennai City

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### Abstract

In the field of food technology, there is only a small use of market analysis in developing nations, which makes it difficult to describe issues and turn up with suitable solutions. Many research initiatives aiming at enhancing food products or reducing malnutrition are launched in the lack of adequate data on the target market. The consumption for the processed food products has been growing at a steady rate as of late. The local industrial units, provide a negligible portion to the state's market for processed foods. The state government has implemented a number of programmes with the goal of bolstering the food processing business. The objectives of the Study was to analyze various factors considered by the consumers while buying food products, to measure the satisfaction of the consumers of selected food products and to study the problems of the consumers .The study has been carried out in Chennai City. It is a descriptive study made to analyze the consumer behaviour, satisfaction and problem in using the food products. 300 sample respondents have been selected using convenient sampling method. The data from the respondents have been collected through the interview schedule. For analyzing the data, factor analysis, paired sample t test and Friedman test are applied.

**Keywords:** Prospects and Problems of consumers, , Marketing of food products, Factors affecting consumers of Food Products

### Introduction-Food product

Food is both a need and a considered commodity for people. Aside from being a fundamental requirement, food has converted a commodity that, even in the twenty-first century, does not meet the needs of the whole world's population. According to the Food and Agriculture Organization (FAO), 795 million people were food insecure in 2017, while more than two billion were malnourished. Climate change on natural resources where food is produced may worsen it<sup>1</sup>. By making food more easily accessible and affordable, the use of information and communication technology in the food product commerce reduces food concerns. The use of information technology has been shown to have a substantial impact on

the food chain and provide market access for small enterprises, rural economies, and farmers. The value of online food product sales surged by approximately 30% in 2019 to \$1,452 billion. When compared to other online product sales like those for fashion, electronics, music, travel, and tourism, it has the highest growth rate. In this study, "food items" refers to all raw and processed foods that have been categorized as such by the Food Agriculture Organization (FAO) of the United Nations using the Codex General Standard for Food Additives (GSFA). Fruits and vegetables, vegetable oils, dairy products and their derivatives, eggs and egg products, meat and meat products, fish, fermented herbs and spices, beverages, salt, ice, bread goods, cereals, grains, and processed foods are the 16



# **An Empirical Study On Impact Of Employee Retention In IT Companies On The Employer Branding With Reference To Chennai City**

**Dr. N. Barathi Dasan**

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## **Abstract**

The technology market is overwhelmed making the bid for talented employees is higher and shows no sign of slowing down. The companies need to change their strategy in recruiting and in retaining the best staff. Information Technology has created a level playing field among countries and has a positive impact on the lives of millions. A country's IT potential is very important for it to compete globally and attain a healthy GDP. The IT industry has played a pivotal role in putting India on the global map. IT industry has been one of the most significant growth contributors for the Indian economy and its cost competitiveness in providing IT services continues to be its USP. It was instrumental in the transformation of the country from an agricultural based economy to a knowledge based economy and has contributed significantly towards social transformation in the country. This paper examined how important the concept of employer branding is gaining importance in today's corporate world in order to retain the key talent, therefore organizations are focusing on building their corporate image in order to attract and retain the talented employees. The primary objective of this research paper was to study the retention strategies followed in the IT companies and to measure the impact of the strategies of retention of employees in the IT companies on the employer branding. This is an empirical study carried out in Chennai city. Employer branding helps the companies to improve and efficient management of the human resource in the IT sector. Recruitment and retention of employees are strongly influenced by the employer branding. In this view, 200 employees have been selected for this study based simple random technique. The primary data have been collected through the Google forms.

**Keywords:-**Employer Branding, Employee Retention, employer image, employer culture and IT companies

## **Introduction**

Employee retention refers to the policies and procedures in place at businesses to keep important employees from leaving. One of the most pressing issues confronting businesses in today's competitive environment is how to retain valuable staff. Companies used to view the "revolving door policy" as a necessary element of conducting business, and they were fast to fill a vacancy with another enthusiastic candidate.

Businesses nowadays frequently discover that they spend a significant amount of time, effort, and money training an employee only to have them develop into a valuable commodity and depart for brighter pastures. Employers should examine as many choices as possible when it comes to keeping employees, while also gaining their trust and loyalty so they have less of a desire to leave in the future, in order to build a successful firm. Staff must be kept because running a firm requires good, loyal, well-trained,

## STUDY ON THE INFLUENCE OF CELEBRITY ENDORSEMENT OVER THE PERCEPTION AND PURCHASE INTENTION OF COLLEGE STUDENTS

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### Abstract

In the current context, the modern marketing strategy employed by the majority of commercial enterprises places a significant emphasis on inventive forms of advertising in order to promote and sell their wares to the specific consumers they have identified as constituting their target markets. In highly competitive market places, basically having a product of excellent quality is not enough to ensure success on its own. Evidently, the shifts that are taking place in markets and the lifestyles of consumers are forcing marketers to concentrate on developing more appealing methods for advertising their products. As a result of this, regular customers are subjected to hearing and seeing thousands of different voices and pictures in various media, including magazines, newspapers, billboards, internet, radio, and television. The objectives of the study are to identify the student's perception towards the celebrity endorsement and to compare the influence of the celebrities from film and sports in endorsement. It is a qualitative study made in Chennai city. Purposively the college students (both arts & science and engineering college) are considered for the study. 300 sample respondents are selected from the city using convenient sampling technique. The questionnaire is prepared and circulated in Google forms to collect the primary data.

**Keywords:** Celebrity endorsement, perception, purchase intention and college students

### Introduction

In India, celebrities can refer to more than only actors and actresses. The television business has grown to the same level of popularity as the cinema industry. Recruiting well-known and successful athletes as spokespersons is one of the most prevalent marketing strategies. But in today's culture, it seems as though even if a newcomer plays well in a single match, they are instantly pulled into advertising. This is a tendency that is becoming increasingly common. Cricket players take home a substantial wage as a result of their profession. It is fair to say that celebrities have had a good deal of success in India in terms of effectively expressing the intended messages and influencing the customers' shopping habits<sup>1</sup>. Celebrity endorsements in India have resulted in a positive influence on consumer purchasing patterns, as seen by an increase in both public awareness and sales volume of the companies that are being sponsored by celebrities. This can be seen as evidenced by the fact that there has been an increase in the number of sales of the products being endorsed by celebrities. When the promotional merits of a product and photos of the product itself are coupled with the image of a celebrity, this has the ability to persuade a buyer to choose a particular brand out of a number of other possibilities that are available to them. In spite of the fact that it is straightforward, the design campaigns, as well as the subsequent success in achieving the desired result, requires an in-depth understanding of the product, the objective of the brand, the choice of a celebrity, the associating of the celebrity with the brand, and a framework for determining how effectively the campaign is working (Subeer et al 2012)<sup>2</sup>. The objective of the advertising strategy of today is to convince clients, who are not only educated and smart but also

<sup>1</sup> Amit (2011), "Effectiveness of celebrity endorsers", Journal of Advertising Research, Vol. 23, No. 1, pp. 57-61.

<sup>2</sup> Subeer, Richa and Manoj (2012) "Celebrity endorsement: does it make any impact on consumer buying behaviour", International Journal of Research in Commerce and management, Vol. 3, No. 4, pp.6-9



## **ELECTRONIC SHOPPING A PARADIGM SHIFT IN BUYING BEHAVIOUR AMONG INDIAN CONSUMERS**

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### **ABSTRACT**

Internet technology, users now have access to a wider range of alternatives in addition to the more conventional, which may be more time-consuming techniques. A consumer, for example, can search for and retrieve the required information via the Internet rather than having to physically visit different stores to compare prices or relying on circulars, pamphlets, and newspapers. This is because the consumer is able to search for and retrieve the information via the Internet. The objectives of the study are to study the socio—economic nature of the respondents and to analyze the buying behaviour of the customers towards the online shopping and to identify the reason for shifting to online shopping from the traditional marketing. It is a qualitative study conducted in Chennai city during the month of May 2022. Using convenient sampling technique, 300 sample respondents have been selected from the study area. The customers of the online shopping were selected and the information is collected through the Google forms. It is concluded from the study that the convenience, availability of wide range of products, information provided in the websites are major factors to buy in the electronic market. The reasons make major impact in the shift to the electronic market from the traditional retail market system.

**Keywords:** Electronic shopping, paradigm shift, buying behaviour and Indian Consumers

### **ELECTRONIC SHOPPING IN INDIA – THE CHANGING PARADIGM**

In today's increasingly interconnected and worldwide economy, e-commerce and the internet have fundamentally altered the manner in which we conduct our shopping for products and services online. There is evidence that internet shopping has been more popular in India over the last several years, but the industry is still in its infant stages. The widespread use of internet technology has had a significant influence on the pace of expansion. Although there are still many people who prefer to purchase in physical locations since they can get a better sense of the goods there, it is impossible to deny the ease of shopping online. One of the most significant advantages of buying online is that it enables customers to investigate items made by a variety of manufacturers and read reviews written by other customers or industry professionals in order to help them make more educated purchasing decisions. When it comes to shopping, customers' views are the most essential factor, and internet shopping makes it possible for them to reduce the amount of trash produced by the retail eco system. Online shopping in India is also proving to be a godsend for a large number of small and medium businesses, who are now teaming up with big Indian online portals in order to market their services and exhibit their goods. The majority of people who use the internet to shop encourage using the internet for shopping, which has contributed to the rise of online shopping as the newest trend in India. According to the findings of a survey that was carried out by the Internet and Mobile Association of India (IAMAI, 2006) in conjunction with cross tab marketing services, people-to-people (P2P) references are by far the most common kind of reference used in online buying.<sup>1</sup> The expansion of access to broadband internet has been one of the most major change drivers, both for individuals and for businesses. Increased computer proficiency makes the convenience of purchasing online more appealing. When making purchases online, ease of use is a significant component; nonetheless, consumers often express unease over the safety of online payment methods and delivery protocols, which are seen as undesirable characteristics of the

<sup>1</sup> Virdi S, Puri, Modi and Sehgal (2007); Pragmatic Buyers or Browsers? A study of online buying behaviour. Journal of Indian Management Studies Vol II pp141-166.



# Emotional Intelligence of Employee in Electrical Workshop, Chennai

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**ABSTRACT :**Our perception of the relationship between thought and emotions turns out to be somewhat misguided. The majority of us tacitly subscribe to the idea that thought is most appropriate when not clouded by emotions. And, sure enough, strong emotions make it difficult to think straight. Rationalists have even made the elimination of emotion from thought their credo. Yet, clinical experiments show that thought devoid of emotions renders satisfactory decision-making impossible. The problem is not with emotions as such, but with the appropriateness of emotion and its expression. The task is not so much to suppress emotions - every feeling has its value and significance - but to strike a balance between rational thought and emotions. One of the keys to sound decision-making is a greater awareness of our emotions and those of others.

## I. INTRODUCTION:

EI refers to the capacity for recognizing our own feelings and those of others, for motivating ourselves, and for managing emotions in us and in our relationships. EI describes abilities distinct from, but complementary to, academic intelligence or the purely cognitive capacities measured by IQ. Emotional intelligence is the ability to understand one's emotional make-up and the emotional make-up of others and to use insight from this knowledge to effectively manage and regulate one's own emotions to make good decisions and to act effectively. Emotions are not just present when we fly off the handle or jump for joy, but are omnipresent in the most subtle ways in all our acts. How often are we in the sway of our emotions without even realizing it? The message of El Chura in the quote above from Henri Gougoud's book points to the need for a vigilant self-awareness at all times, not to be mistaken for a rigid self-control.

## OBJECTIVES OF THE STUDY

- to find the level of emotional intelligence of the employees
- to find the most prominent factors among the employee in electrical workshop
- to analyze self awareness among the employees
- to identify social-awareness of employees in electrical workshop
- To identify the role of emotional intelligence in developing interpersonal relationship among the employees
- To know the inner feelings of the employee
- To know how the employees are controlling their emotions in the work place

**NEED FOR THE STUDY:** In present scenario ELECTRICAL WORKSHOP EMPLOYEES faces problems such as strangled relationship between the individuals and poor decision making capabilities which is due to low level of EI. Low level of EI leads to unmanaged stress which leads to multitude of organizational probes. In order to eliminate the above scenario an organization should be effective in following proper management development and communication process. This can be achieved by focusing on basis of EI viz., Self Awareness and Self management. Thus a need arise to know how people perceive, appraise, express and control their own emotions. The study helps the organization to understand how emotions can influence goals, decision making, thoughts, and behavioral relationships. It helps the respondents to know their effectiveness of EQ factor and helps to understand them in a better manner and to openly express their feeling and views, and also helps the management to deal with employees according to their traits

## **Customer Perception Towards Online Shopping In Chennai City, Tamilnadu**

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### **ABSTRACT**

Online shopping assists customers to ascertain the products available in the market and help them to compare the price and quality of the products before they purchase. Customers' repeated preference Changing life style of customers has induced them to prefer online shopping than traditional shopping. Online shopping acts as a major growth in the domain of Electronic Commerce and certainly be the future buzz of shopping across the world. In India, few business houses carry out their trading activity through online in order to offer to offer their products or services at cheaper cost to their customers. The revolutions in Internet leads to a paradigm shift in the way things are done. Internet has radically changed the method of the customers' look for and make use of information. The Internet, which was previously mentioned as an instrument for enhancing information, has become an important part of business in these days. Thus, the future survival of any business depends on how well they can integrate this medium in their business. Manufacturers before entering into online trading have to ascertain their customers' taste and preference, financial status, buying behaviour, product preference, etc., Online shopping assists customers to the product available in the market and help them to compare the price and quality of the products before they purchase. Customers with repeated preference towards online purchase. When the, customer are not satisfied with regard to products purchased through online, they may switch over to new E commerce operator for next purchase. Thus, in this study an attempt has been made to ascertain the customer's satisfaction towards their online shopping and to identify the factors that assist their satisfaction.

**Keywords:** Online shopping, Mode of Payment, Rate of Quality, Preference and Defects

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Date of acceptance: 28-11-2021

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### **I. Introduction:**

Online shopping is the process whereby consumers directly buy goods or services from a seller in real-time, without an intermediary service, over the Internet. It is a form of electronic commerce. The sale or purchase transaction is completed electronically and interactively in real-time such as in Amazon.com for new books. However in some cases, an intermediary may be present in a sale or purchase transaction such as the transactions on eBay.com. An online shop, e-shop, e-store, internet shop, web shop, webstore, online store, or virtual store evokes the physical analogy of buying products or services at a bricks-and-mortar retailer or in a shopping centre. The process is called Business-to-Consumer (B2C) online shopping. This is the type of electronic commerce conducted by companies such as Amazon.com. When a business buys from another business it is called Business-to-Business (B2B) online shopping. A large percentage of electronic commerce is conducted entirely in electronic form for virtual items such as access to premium content on a website, but mostly electronic commerce involves the transportation of physical items in some way. Online retailers are sometimes known as e-tailers and online retail is sometimes known as e-tail. Almost all big retailers are now electronically present on the World Wide Web.

Online marketplaces such as eBay and Amazon Marketplace have significantly reduced financial and reputational barriers to entry for SMEs wishing to trade online. These marketplaces provide web presence, marketing and payment services and in the case of Amazon, fulfilment. This allows SMEs to focus on their core competencies e.g. managing supplier relationships. Moreover, SMEs have choices online, as these marketplaces compete with each other (some retailers sell across several marketplaces) and retailers' own websites. They also compete with paid search providers and others in providing marketing to SMEs.



## A STUDY ON EFFECTIVENESS AND IMPLEMENTATION OF MENTORING IN EDUCATIONAL INSTITUTIONS

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**Abstract:** *Mentoring is the process of helping and giving advice to a younger or less experienced person, especially in a job or at school. In the point of organization the mentoring programs are a way to increase the company's competitive advantage . Workplace mentoring increases employee satisfaction and talent retention. Mentors not only develop mentees as successful professionals, but also provide psychological support. As a sponsor, they utilize their influences and connections to support the career advancement of mentees. The importance of mentoring in education lies in the fact that a mentor may provide instruction, inspiration, emotional support, and role modelling to a mentee, while also sharing knowledge about his or her career path. A mentor can assist with career exploration, goal-setting, networking, and resource discovery.*

*This study examines the literature, research and past practice of mentoring in educational institutions. The author brings with it some potential components that could make mentoring a useful tool for building a productive and positive relationship. Learning environment in an educational institution*

**Keywords** – *Mentoring, Educational Institution, Career Mentoring, Networking.*

### INTRODUCTION

A mentor essentially helps the student make informed decisions at every stage of their academic and professional career. They are the signposts that show us the way, whether we are stuck in our career choice or need help at a crucial time in our life. According to mentoring theory, mentor perform career – related functions including sponsoring, exposure-and-visibility, coaching, protection, and challenging assignments. They also provide



## ORGANISATION FINANCIAL RISK MANAGEMENT CONTROL SYSTEM USING ARTIFICIAL INTELLIGENCE

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**Abstract:** Financial risk management aims to detect and manage several risks of any organization. The institutions can match several payment obligations and income streams if the employees can manage the entire system. Artificial intelligence can possess a particular change within its application as financial functions are highly automated. The risks can be easily measured with the help of machine learning and the leaders can solve the problems. Using the .cpp file has helped to mitigate the financial risks in the companies.

**Keywords:** *Artificial Intelligence, Organization financial risk, Management control, competitive advantage, machine learning*



## COVID-19 TWEETS OF SENTIMENT ANALYSIS USING MACHINE LEARNING ALGORITHMS OF VADER METHOD

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**Abstract:** This research paper attempt to identify the Sentiment Analysis of COVID-19 tweets corpus from various countries. The secondary sources of tweets COVID-19 corpus collected from Kaggle.com database during this period from March 2020 to May 2021 with 3798 tweets. Sentiment Analysis is a part of NLP (Natural Language Processing), it shows that emotions of emoji, tweets, product promotion feedback, social media apps etc. In this research paper attempt to identify five features of COVID-19 tweets corpus using Sentiment Analysis Vader Method (SAVM) and Machine Learning Algorithms (MLA). The five categories of features are labelled as Extremely Positive Sentiment Emotion (ESPE), Positive Sentiment Emotion (PSE), Neutral Sentiment Emotion (NSE), Negative Sentiment Emotion (NSE) and Extremely Negative Sentiment Emotion (ESNE). In addition the corpus to cross validate machine learning algorithms, confusion matrix and visualized with the help of scatter diagrams. All the algorithms achieved hundred percent Classification Accuracy of five sentiment features of COVID-19 corpus except Support Vector Machine (SVM) algorithm. The distribution of sentiment analysis in the following hierarchy and they are . Negative Sentiment Emotion (NSE), Positive Sentiment Emotion (PSE), Neutral Sentiment Emotion (NUSE), Extremely Positive Sentiment Emotion (EPSE), and Extremely Negative Sentiment Emotion (ESNE).

**Keywords:** COVID-19 Tweets Corpus, Sentiment Analysis, VADER (Valence Aware Dictionary and sEntiment Resoner) Method, Machine Learning Algorithms, Heat Map, Confusion Matrix, Scatter Plot and Distribution.

### 1. Introduction

Sentiment analysis is a technique to promote almost all field in data science and statistical science. Its visualize their emotion in different formats. Every emotion of human may be positive, negative or neutral ways to express their views in a particular issue. In the recent years it occurs feedback of product promotion, Natural Language Processing (NLP), authorship attribution. Twitter is a most popular social media, the user make use of this media to express their views in various aspects. In the pandemic period more tweets occupied COVID-19 from various countries of the world. Every tweets are emotionally positive, negative and neutral views are their messages.

Twitter, allows users to post tweets, status message with length up to 280 characters [1]. These tweets regularly carry personal views or emotions towards the subject mentioned in the tweets. Sentiment analysis is a technique that extracts the user's opinion and sentiment from tweets. It is an easier way to retrieve user views and opinions, compared to questionnaire or surveys.

### 2. Review of Literature

In Sentiment Analysis, many scholars and professors produced their results using various machine learning and statistical methods. In the following section reviewed in the previous research work and their methods of Sentiment Analysis. Shabina Dhuri studied about Sentiment Analysis can be used for analyzing opinions in blogs, articles, Product reviews, Social Media websites, Movie-Review websites where a third person can narrates the views. It has many applications and is an important field to study. Different types of features and classification algorithms may be combined for efficient analysis. Applications of sentiment analysis and challenges are also discussed in his research paper [2].





## PREVALENCE OF CARDIO VASCULAR DISEASE RISK FACTORS IN SUBURBAN OF CHENNAI, SOUTH INDIA : A COMMUNITY ASSESSMENT

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### ABSTRACT

*In a cross-sectional survey, 240 subjects aged  $\geq 20$  years were studied from June 2015 to March 2016 in Pammal Suburban Chennai, a south Indian city. Demographic history, anthropometry and blood pressure were assessed. The descriptive statistics and one way ANOVA analysis was carried out to show the sub urban of Pammal, South Chennai, India activities towards scientific production in the field of CVD patient's significance during this period. In this study population 53.8% are female, 46.2% are male with mean age (in years) of  $(56.48 \pm 13.503)$ ; 63.3% are found with S1S2 (+) Cardiovascular System (Heart Beat Sound). The age group of above 50 years (57.1%) is more prone to first stage of heart attack; 30.8% got cured at initial phase itself through artificial respiratory Oxygen therapy. There is significant association between Gender and age at first heart attack ( $p < 0.05$ ). Mean and Standard deviation of Length of stay in Hospital (L) of 240 subjects is  $(8.96 \pm 16.701)$  days; for female it is  $(11.6 \pm 21.520)$  and for male  $(5.9 \pm 7.038)$  days. Using One way ANOVA, it is found that Duration of stay ( $p < 0.05$ ), Temperature ( $p < 0.05$ ) and Pulse Rate ( $p < 0.05$ ) is significant with respect to Gender. Age ( $p > 0.05$ ), Blood Pressure ( $p > 0.05$ ), Respiratory Rate ( $p > 0.05$ ) has no significant with respect to Gender and identifies pulse rate as significant contributing factor to the model. The length of stay in hospital with cardiovascular disease is more among females when compared to male.*

**Keyword :** Pammal Suburban, Greater Chennai, Cardiovascular Disease (CVD), Descriptive Statistics and One Way ANOVA.

### 1. INTRODUCTION

Pammal is a suburban city in greater Chennai, town in Chengalpeta district of Tamil Nadu, India. Leather and tannery factories are present in and around Pammal suburban which has labour intensive and employs many people. Pammal Sambandha Mudaliar, the father of modern Tamil theatre, was born in Pammal which is very close to Chennai International Airport.

According to 2011 census, Pammal had population of 75,870 with a sex-ratio of 998 females for every 1,000 males, much above the national average of 929. A total of 8,264 were under the age of six, constituting 4,223 males and 4,041 females. Scheduled Castes and Scheduled Tribes accounted for 19.28% and 0.16% of the population respectively. The average literacy of the town was 81.13%, compared to the national average of 72.99%. The suburban had a total of 18,812 households. There were a total of 29,090 workers, comprising 105 cultivators, 154 main agricultural labourers, 370 in household industries, 24,304 other workers, 4,157 marginal workers, 47 marginal cultivators, 63 marginal agricultural labourers, 127 marginal workers in household industries and 3,920 other marginal workers.





## EVALUATION OF FIRST AND SECOND DOSAGE OF COVID-19 VACCINATION USING K-MEANS CLUSTERING MODEL AND VISUALIZATION OF INDIAN STATES AND UNION TERRITORIES

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### ABSTRACT

*Application of Orange Data mining software determines the clusters and plots the graph of vaccination data for various states and union territories. The file widget open new vaccination data set and perform k-mean++ from 2 to 9 with silhouette distance. The silhouette scores and cluster information are achieved. The three zones are visualized and the zones are labeled as green, Blue and Red: The green zone indicates that states and union territories are high vaccinated, the blue zones indicates states and union territories are Moderatelyvaccinated, and the red zone are low vaccinated states and union territories of India. The states and union territories' of Sikkim, Tripura, Ladakh and Lakshadweep have low population butfalls in high vaccinated states of first and second dose. The states and union territories of Goa, Mizoram, Delhi, Arunachal Pradesh, Chandigarh, Uttarakhand, Gujarat, Rajasthan, Kerala, Jammu and Kashmir, Dadra and Nagar Haveli, Daman and Diu, Himachal Pradesh, Chhattisgarh and Andaman Nicobar Islands have diverse population and come in the category of low vaccinated states of first and second dose. The states and union territories of Manipur, Meghalaya, Nagaland, Odisha, West Bengal, Haryana, Karnataka, Andhra Pradesh, Maharashtra, Telangana, Jharkhand, Madhya Pradesh, Punjab, Assam, Uttar Pradesh, Tamil Nadu Puduchery and Bihar have high population and are moderately vaccinated states of first and second dose. The open source tools like Orange Data mining found useful for exploring appropriate and applicable functions in data science. Several partitions with different values of k- number of clusters or partitions are recommended to review along with cluster quality index for optimum solution. K-means can be adapted to micro-level demarcation of containment zones. The clusters formed based on COVID-19 patient's vaccination data using Data Science techniques specifically K-means will be active, unbiased, accurate, visible, economic and easy to apply.*

**Keywords:** *k-means++, Visualization, COVID-19, Vaccination of first and Second Dosage and Indian States and Union Territories.*

### 1. INTRODUCTION

COVID-19 is a Data Science issue" (Callaghan, 2020) the comprehensive article gives various ideas and inspiration to think about the data and how it can be effectively used in current pandemic situation. Quarantine is nothing but the separation and restriction of movement or activities of persons who are not ill but who are believed to have been visible to infection, for the purpose of avoiding transmission of diseases. People are usually isolated in their homes, but they may also be quarantined in community-based accommodations. Considering the increasing volume of number of



## Synthesis and characterization of cadmium and zinc dithiocarbamate complexes derived from $\alpha$ -amino acid L-proline

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Dithiocarbamate metal complexes have been used to prepare nanoparticles and nanowires of a variety of semiconducting metals including CdS, ZnS, PbS, and LaS. The two new cadmium (II) L-Proline Dithiocarbamate and zinc (II) L-proline dithiocarbamate complexes have been synthesized. Both of the metal complexes are able to produce semiconductor sulphides, nanoparticles which are applicable in the electronic industries. The amino acid L-proline has the unique property, it is the only DNA determined amino acid which has a secondary five membered cyclic amino group alpha to the carbonyl group in the biosystem. Metal dithiocarbamate which is derived from L-proline is able to produce the corresponding metal sulphides as nanoparticles and nanowire. This is very much applicable in Thin Film Technology. Besides, the Zinc complex is used as a drug in increasing the immune system of the body against bacteria and viruses. Zinc dithiocarbamate derived from alpha amino acid L-proline is biocompatible as that it can be used as pharmaceutical products. The two complexes exhibit the important  $\nu(\text{C}=\text{S})$  peak from 202.74-215  $\text{cm}^{-1}$   $^{\circ}\text{C}$  NMR, attributing to the presence of the dithiocarbamate ligand. A resonance signal around 4.4  $\delta$  is due to C=O/H proton in  $^1\text{H}$  NMR. The complexes also shows the important IR frequencies,  $\nu(\text{C}=\text{N})$ ,  $\nu(\text{C}=\text{O})$  and  $\nu(\text{C}=\text{O})$  in the ranges 1443-1430  $\text{cm}^{-1}$ , 954-943  $\text{cm}^{-1}$ , and 1720-1712  $\text{cm}^{-1}$ , respectively. LMCT transitions have been observed at  $\lambda$  214 nm for the Cd complex. Based on the thermo gram the complexes are stable up to 280 $^{\circ}\text{C}$ , and last decomposed to produce  $\text{M}(\text{SCN})_2$  at 480 $^{\circ}\text{C}$ , and finally  $\text{M}(\text{SCN})_2\text{G}$  as residue at 600 $^{\circ}\text{C}$  by slow steps. From FTIR,  $^1\text{H}$ ,  $^{13}\text{C}$  NMR, only dithiocarbamate sulphurs are coordinated to metal and not the carboxylate oxygen in the two complexes.

**Keywords:** Cadmium, Dithiocarbamate, Insecticides, Zinc, L-Proline, Sensors, Nanoparticles

A number of metal dithiocarbamates have been synthesized and characterised in recent years. Special interest in the study of metal dithiocarbamates have aroused because of the striking structural features exhibited by this class of compound<sup>1</sup>. Dithiocarbamate complexes have received most attention in the previous decades because of their number of applications such as insecticides herbicides, fungicides in agriculture, accelerators in vulcanization, scavengers in wastewater treatment<sup>2-5</sup>, supramolecular chemistry<sup>6,7</sup>. The metal dithiocarbamate complexes have been used to prepare nanoparticles and nanowires of a variety of semiconducting metals including CdS, ZnS, PbS and  $\text{EuS}^{8-10}$ . Many reviews have appeared about the preparation, application and structural aspects of the dithiocarbamate complexes<sup>11-12</sup>. Preparation of amino acid dithiocarbamate complexes is a new avenue in dithiocarbamate chemistry<sup>13-16</sup>. Both of the metal complexes are able to produce semiconductor sulphides, nanoparticles which are applicable in the electronic industries. The amino acid L-Proline has a

unique property where it is the only DNA determined amino acid which has a secondary five membered cyclic amino group alpha to the carbonyl group in the biosystem<sup>17</sup>. Metal dithiocarbamate derived from L-proline is able to produce the corresponding metal sulphides in nanoparticles and nanowire. This is very much applicable in Thin Film Technology. Besides, the Zinc complex is used as a drug in increasing the immune system of the body against bacteria and viruses. It has been noted that the dithiocarbamate formed with  $\alpha$ -amino acid L-proline is able to provide tetradentate digative binding sites from their two sulphurs and carboxylate oxygen for complexation. A perusal of the literature reveals that metal complexes with dithiocarbamate derived from amino acids are very few. Besides Cd (II) and Zn (II) dithiocarbamates have wide spectrum of application in smarter material synthesis as precursor. Present study focusses on the preparation of the ligand, L-proline dithiocarbamate and synthesis of Cd (II) and Zn(II) complexes of L-proline dithiocarbamate following the method of synthesis as described by



## Synthesis, nucleation kinetics, spectral, structural, mechanical, and thermal studies of semi-organic barium-doped $\gamma$ -glycine single crystal

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### ABSTRACT

The single crystal of barium ion-doped  $\gamma$ -Glycine (BGG) has been synthesized by slow evaporation technique. The grown crystal was subjected to the characterization studies such as XRD, nucleation Kinetics, UV, FTIR, micro-hardness, SEM with EDAX, SHG analysis, NMR, and thermal Studies. The cell parameters  $a = b = 7.210$ ,  $c = 5.845$ ,  $\alpha = \beta = 90^{\circ}$ , and  $\gamma = 120^{\circ}$  revealed that BGG belongs to the hexagonal crystal system with  $P6_3$  space group. The nucleation kinetic parameters were derived from nucleation studies and in agreement between the experimental and theoretical values of interfacial surface energy has been established. Optical transparency of the grown crystal was investigated by UV spectrum. The lower optical cutoff wavelength and the band gap values have been found to be at 328 nm and 3.5 eV, respectively. The vibrational frequencies of various functional groups in the crystal have been derived from FTIR spectrum and further employed to identify the molecular structure of the crystal. Microhardness mechanical studies carried out by Vickers microhardness method showed that hardness number ( $H_v$ ) increases with load for BGG crystal. Surface morphology of the grown crystal has been examined through SEM with EDAX. Kurtz Ferry technique has been adopted to measure the Second harmonic generation (SHG) efficiency of the title crystal and has been found to be 1.16 times as that of standard KDP. The chemical structure and the molecular arrangement position of the grown crystal were established by  $^{13}\text{C}$  and  $^1\text{H}$  NMR spectrum. The thermogravimetric and differential thermal analysis showed that BGG is thermally stable up to 320.43  $^{\circ}\text{C}$ . The results of the aforementioned characterizations attested that the grown BGG crystal can be used as a potential fabrication material in nonlinear optical devices.

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(2E)-2-(4-ethoxybenzylidene)-3,4-dihydro-2H-naphthalen-1-one single crystal: Synthesis, growth, crystal structure, spectral characterization, biological evaluation and binding interactions with SARS-CoV-2 main protease

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**ABSTRACT**

A new  $\alpha$ -lirane based chalcone compound, (2E)-2-(4-ethoxybenzylidene)-3,4-dihydro-2H-naphthalen-1-one (**EBN**) has been synthesized by Chalcone-Schiff base condensation reaction of  $\alpha$ -lirane (1) with 4-ethoxybenzaldehyde (2) in basic medium. Then it was allowed to grow through slow evaporation solution growth technique. The molecular structure of compound **EBN** has been systematically characterized by XCRD, FTIR, <sup>1</sup>H NMR and <sup>13</sup>C NMR spectroscopy studies. The micro-hardness, thermal (TGA & DTA) and photoluminescence studies of the synthesized **EBN** were also examined. The **EBN** was screened for its anti-inflammatory, antidiabetic and anti-oxidant activity. It has shown admirable anti-inflammatory and antidiabetic activity. Protein-ligand interaction of **EBN** with SARS-CoV-2 main protease (PDB code: 6W67) also performed.

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**1. Introduction**

Chalcones [(E)-3-diphenylprop-2-en-1-one, Fig. 1] are one of the most overabundant classes and a modest chemical scaffolding of numerous naturally occurring compounds across the plant kingdom (vegetables, spices, fruits, tea and etc.) [1–5]. Chalcones belong to the family of flavonoids and they are also known as chalconoids. Which exhibits prooxidant sources cis and trans, and the thermodynamically more stable one is the trans isomer (Fig. 1).

Chalcones are organic compounds possessing acceptor and donor groups, which enhance their importance in various fields. The chalcone compounds have attained significance because of their excellent NLO properties [6]. The NLO response was found to increase as the donor strength of the molecules increased.

The chalcone family has drawn a lot of attention not only from synthetic and biogenetic perspectives, but also from pharmacological applications because they have revealed a lot of biological actions that include the treatment of medical disorders like microbial and viral infections [8–11], cancer [12–15], cardiovascular diseases and their risk factors [16–19], anti-inflammatory [20] and antioxidant activities [21–23]. The maximum reactive moiety is due to the [2,2]  $\alpha,\beta$ -unsaturated carbonyl bridge, which is related to chalcone biological actions [24]. Some chalcone-motif containing compounds have additionally been permitted for clinical use. For example, meniscladone [(E)-1-(2,4-dimethoxyphenyl)-3-(4-methoxyphenyl)prop-2-en-1-one] was approved as a cholesteric while saliclorone was approved as an anticancer and macroprotective drug [25–31].

1-liranes are an essential fragrance of compounds, and their numerous derivatives have proven important biological applications, including antimicrobial activity [27], anti-tumor activity [28], and neurological disorders [29,30,41]. Several (E)-2-(4-substitutedbenzylidene)-1-liranes (Fig. 2) have been synthesized, characterized by using spectroscopic tools and also performed their biological applications [31–38].

Since it's unveiling at the end of December 2019, SARS-CoV-2 has remained in great chop-chop throughout the world. Despite the fact that the number of deaths caused by COVID-19 is rapidly increasing, an effective drug treatment other than vaccines has yet to be developed. The existing literature comprises many investi-

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**DESIGN AND IDENTIFY THE NOVEL PRIMAQUINE DERIVATIVES AS A POTENTIAL CANDIDATE DRUG AGAINST SELECTIVE ANTIBIOTIC-RESISTANT ORGANISMS**

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**ABSTRACT**

In terms of mortality and economic loss, antimicrobial resistance (AMR) continues to be a major public health problem. Several countries' health authorities, including India's, have established containment plans. Multidrug-resistant tuberculosis (MDR-TB), methicillin-resistant *Staphylococcus aureus* (MRSA), and antibiotic-resistant *Escherichia coli* (AEREC) are all on the rise (R-E. coli), SICI, SM18 and MCoYA are found important targets for MDR, TB, MRSA and R-E. coli. In this present work 100 novel primaquine derivatives were designed and evaluated their binding affinity in SICI, SM18 and MCoYA receptors, ADMET and Toxicity studies were applied to identify the potent PQ-13, PQ-24, PQ-36, PQ-38, PQ-53, PQ-69, PQ-82, PQ-85, PQ-92, PQ-93 derivatives. These derivatives show more binding interactions in MDR-TB, MRSA and R-E. coli receptor and least toxicity effect compared to standards.

**Keywords:** Primaquine, Molecular Docking, MCoYA Receptor, ADMET, Toxicity Analysis.

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**INTRODUCTION**

The crucial public health issue, which can disrupt modern healthcare, is antimicrobial resistance (AMR).<sup>1</sup> Drug-resistant organism infections could lead to increased death and lengthy hospitalization, which could produce an immense financial strain on the infected people, health services and obstruct the priorities of sustainable development.<sup>2</sup> The World Health Organization (WHO) implemented the Global Action Plan in 2015 on AMR, which acknowledges the severity of the situation and the danger posed by AMR to health.<sup>3</sup> After that, several countries formed national action plans themselves (NAPs). A national action Plan to Control AMR was released in April 2017 by the Indian Ministry of Health and Family Welfare. It was presented in May 2017 at WHA 70 in Geneva. This 5-year AMR NAP (2017–2021) lays out India's AMR curbing goals and execution strategies.<sup>4</sup>

AMR itself has more deaths than cancer and road traffic collisions associated with 700,000 people losing battle to combat antimicrobial resistance (AMR) each year and another 10 million people are expected to die of this by 2050.<sup>5</sup> Economic forecasts indicate that AMR would decrease the GDP by 2–3.5% by 2050, with livestock declines of 3–8%, which cost the world 100 trillion USD.<sup>6</sup> Economic predictions are expected. A World Health Organization (WHO) and many other stakeholders were aware of the global development of AMR. With AMR as a focus region declared by WHO and other European world leaders who are drawing up their, Action Plans to contain AMR. The sincere attempts against this popular enemy are being made. India's National Action Plan (NAP) on AMR is also being devised. It is necessary to note that AMR is multiple matters and requires a multi-progress solution to its containment. The One Health principle underlines the interconnections between human health, animal health, food and the environment, and promotes coordination between the health authorities in this field.<sup>7</sup>

To properly manage AMR, each of these components must be given adequate consideration. Unfortunately, while the focus of most studies was on the unfair use of antimicrobial agents for human and animal welfare, environmental AMR remained widely unnoticed to date. The fact that the environmental contributions of

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**Studies on the Characterization of *Adirachta indica* L. Bark Activated Carbon and *Vigna unguiculata* L. Seed Shell Activated Carbon**

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**ABSTRACT**

The attempt was made to study a number of characterizations for *Adirachta indica* L. Bark Activated Carbon and *Vigna unguiculata* L. Seed Shell Activated Carbon. The number of parameters of characterization such as pH, conductivity, bulk density, moisture content, volatile matter, fixed carbon, ash content, solubility in 0.25 M HCl, solubility in water, porosity, specific gravity, phenol adsorption capacity, particle size and surface area. The instrumental studies are done by using Fourier Transform Infrared Spectroscopic Study and Scanning Electron Microscope Study for activated carbons. Based on the above studies, predict the efficiency of activated carbons to use for removal of dyes and impurities present in aqueous solution.

**Keywords:** Activated carbons, Characterization, Adsorption, FTIR, SEM.

**1. INTRODUCTION**

Contamination intended for generous threats worldwide for equally biotic creature and surroundings. Peroxides are unique significant and elementary contaminants in H<sub>2</sub>O contamination. Hastened method of industrialization growth, supplementary and added wastewater comprising peroxides is liquidated several social deeds and buses stern extortions to the surroundings [1-3]. Principally, the peroxide wastes release in the H<sub>2</sub>O indications adversative. Owing to relief as a fine collapse of produces with toxic, carcinogenic, mutagenic





## Mesoporous zirconia nanostructures embedded Polyvinylidene difluoride conducting films for EMI shielding applications

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### ABSTRACT

In this study, we synthesized mesoporous zirconia (ZrO<sub>2</sub>) reinforced Polyvinylidene difluoride (PVDF) conductive nanocomposite and studied for its EMI shielding efficiency. The mesoporous ZrO<sub>2</sub>, synthesized by sol-gel method, are subjected to X-ray diffraction analysis (XRD) and Transmission electron microscopy (TEM) studies to confirm the crystal structures. The mesoporous ZrO<sub>2</sub> dispersed PVDF nanocomposites are characterized for their thermal properties using Differential Thermal Analysis (DTA), Thermogravimetric Analysis (TGA) and Differential scanning Calorimeter (DSC) analysis. The data obtained from thermal characterization suggest that the mesoporous ZrO<sub>2</sub> induced a better thermal stability to PVDF matrix. The conductivity of 4K mesoporous ZrO<sub>2</sub> loaded PVDF was found to be 3.36 at 1 MHz and that of 6K mesoporous ZrO<sub>2</sub> is 8.09 at 1 MHz. The mobile charge carrier that are found between the mesoporous ZrO<sub>2</sub> and the PVDF polymer are the noteworthy factor for the enhancement in the conductivity values. The value obtained for EMI SE was found to be 7.0 dB at 11 GHz for 6K mesoporous ZrO<sub>2</sub>/PVDF nanocomposites which is higher than that of unmodified PVDF matrix.

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### 1. Introduction

The rapid propagation and prominent usage of electronic equipment have led to a dramatic rise in electronic pollution such as electromagnetic interference (EMI), electronic noise, and radiofrequency interference (RFI) which lead to improper functioning of electronic devices [1–4]. Metals, alloys and magnetic material [5–8] are found to shield the EM radiation effectively, however, the usage of metals and alloys for EMI shielding is limited due to their weight, low corrosion resistance and high cost [9–10]. Further, the material with reflection behaviour is the most suitable to prevent the radiation from other sources, similarly the materials which absorb EM radiation can be useful to minimize the radiation. The polymer composites having EM absorption as well as reflection behaviour are considered to be an alternate to metal and metal

alloys used in EMI shielding. The polymer composites possess exceptional features such as superior thermal, dielectric, electrical and mechanical characteristics that are highly helpful for shielding electromagnetic waves. Among various conductive polymers used for EMI Shielding, PVDF find important role due to its higher electromechanical [14–19], piezoelectric and crystalline properties [20–22].

Qi & co workers reported a greater EMI SE values for sandwich PVDF/GNP-Ni-CNT composites resulting from multilayered structure and numerous interfaces that provide electric loss and magnetic loss [23]. Dinakaran et al reported effective EMI shielding from PVDF polymer nanocomposites with a value of 28.5 dB at 12 GHz by incorporating metallic nanoparticles in the multiwalled carbon nanotube/graphene oxide loaded PVDF (MWCNT-rGO/PVDF) composites [24] and higher conductivity values for Ag/Au-MnO<sub>2</sub> embedded PVDF composites [25]. In past decade, ceramic materials have grabbed a huge attention, because of its having a low thermal conductivity, chemical resistance, ionic conductivity and mechanical characteristics [26]. Among various ceramic materials, Zirconia (ZrO<sub>2</sub>) is an n-type semiconductor and significant

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# SYNTHESIS OF VIRTUALLY SCREENED POTENT NOVEL PRIMAQUINE DERIVATIVES AND EVALUATE THE BIOLOGICAL ACTIVITY AGAINST ANTIBACTERIAL RESISTANCE MICROORGANISMS

K. Kavitha<sup>a</sup>, P. Krishnamoorthy<sup>b</sup>\*

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**Abstract:** The emergence of multidrug resistance among pathogens has become a global challenge for bacterial infection treatment. The methicillin-resistant *Staphylococcus aureus*, multi-drug resistant tuberculosis and antibacterial resistant *E. coli* is the leading cause of mortality among infectious diseases worldwide. Finding a novel chemical to combat antibiotic resistance microorganisms is critical right now in the world. In this study we synthesized five novel primaquine derivatives and evaluated their efficacy against methicillin-resistant *Staphylococcus aureus*, multi-drug resistant tuberculosis and antibacterial resistant *E. coli*. All the molecules show excellent antibacterial activity against antimicrobial resistance microorganisms compared to standard drugs.

**Keywords:** Primaquine, Synthesis, Antimicrobial resistance, MRSA, *E. coli*, MDR, TB

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## INTRODUCTION

Antibiotic's efficacy, which has revolutionized medicine and saved millions of lives, is being jeopardized by the fast rise of resistant bacteria around the world [1-3]. Bacterial diseases have manifested many decades after the initial patients were treated with antibiotics. The overuse and misuse of antibiotics, as well as a lack of new drug research by the pharmaceutical sector due to limited economic incentives and difficult regulatory requirements, have all been blamed for the antibiotic resistance crisis [4,6]. The Center for Disease Control and Prevention (CDC) has identified a number of bacteria as posing urgent, serious, and worrying dangers, many of which have already wreaked havoc on the US healthcare system, patients, and their families [7-10]. Coordinated efforts to enact new regulations, foster research initiatives, and explore cross-management strategies are critical.

Antimicrobial resistance (AMR) is a severe global danger to human, animal, and environmental health that is gaining traction. This is related to multidrug-resistant (MDR) bacteria's development, dissemination, and persistence [11-13]. MDR bacteria can be found in the animal, human, and environmental niches, and these pathogens are all related in this way. Excessive use of antibiotics in animals (feed, pest, aquatic), antibiotics sold over the counter, increased international travel, poor sanitation/hygiene, and release of nonmetabolized antibiotics or their residues into the environment through manure/feces are all possible causes of

"the global resistance" or AMR [14-18]. These variables lead to the emergence of MDR bacterial illnesses in the community due to genetic selection pressure. The global use of antimicrobials in cattle has recently shown hotspots of antibiotic usage across continents, which will have economic and public health implications in the coming years. Antibiotics are commonly used in food animals such as cattle, fish, and pigs, and it is predicted that by 2030, their use would have increased by 67 percent in the world's most populous countries [19].

To overcome these AMR problems, we have planned to discover of novel drugs against antimicrobial resistance strains. In our previous study, we have already reported ten PQ-13, PQ-24, PQ-36, PQ-38, PQ-53 as potential molecules against *E. coli*, *M. tuberculosis*, *S. aureus*, *C. difficile*, resistant *E. coli* (CPR *E. coli*), Methicillin-resistant *Staphylococcus aureus* (MRSA), multidrug-resistant tuberculosis (MDR TB) by *in silico* study. In this study we synthesized these novel primaquine derivatives and evaluate the antibacterial activity of super antimicrobial resistance strains.

## METHODOLOGY

### Instrumentation

The melting points were calculated in an open capillary tube and are unadjusted. On a PerkinElmer spectrometer, IR spectra were recorded in KBr. On a Gemini 300 MHz instrument, <sup>1</sup>H NMR spectra were recorded in DMSO-*d*<sub>6</sub> as the solvent and TMS as the internal standard. A Shimadzu LC/MS spectrometer was used to record the mass spectra.

### Synthesis of Schiff base intermediate molecules

Equivalent (0.01M) amounts of primaquine and various aldehydes were dissolved in methanol (10 mL), then acetic acid (0.5 mL) was added and the mixture was refluxed for two hours. After the reaction was completed (as measured by TLC), the reaction mixture was cooled and put into water, where the solid separated. To obtain equivalent Schiff bases

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## A STUDY ON PHYSICAL HEALTH AND EMOTIONAL STATUS OF SANITARY WORKERS CHILDREN IN VYASARPADI, CHENNAI

\*S. Sakthi Devi

\*\*Dr. M. Arivanandan

### Abstract

Developing Countries have rapid urbanization growth, led to the formation urban poor settlements. The high prevalence of poverty, overcrowding, and poor sanitation observed in these settlements commonly referred to as "slums". The slum residences constitute a major number of sanitary workers and having health risk too. Children are significant population in slums. There are facing lots of health and nutritional and emotional challenges as they grow and due to environment and social structure children are getting into various issues. In this milieu the study focuses on the health and emotional status of the sanitary workers children living in Vyasarpadi slum area in Chennai. It is an empirical study which involves slum children and their health, eating habits, life style, and emotional status based on their current socio economic and parental occupations. The data was collected through interview schedule using non random sampling methods in the study area. The major findings of the study were all the sanitary workers children belong to Schedule caste and they all are studying in Government schools. When it comes to hygiene – they have poor hygiene practices like not washing hands, not taking baths, wearing the unwashed clothes etc., out of 12 female respondents all have obtain puberty and during menstruation they have habit of using clothes, and they don't have the habit of frequently changing their sanitary napkins. Overall study found that there is a direct association between their physical health condition and emotional problems in their daily routine.

**Keywords:** Children, Urbanization Growth, Sanitary Workers, Health and Nutritional, Socio Economic, Emotional Challenges.

### INTRODUCTION

Children are the future of any state. Their performance in the education sports and other development activities are important, to achieve these developmental activities they are in need of good physical health and emotional conditions. Children are facing various problems from the birth. Tamilnadu is far better than the northern states where IMR rates and nutritional issues are high, that is due to the lack of nutritional content in the mother of the children. Parents are influencing children in many factors. Sanitary workers children health and emotional status are depending on their Parents. There is a need to study about the health and emotional status of sanitary workers children because of three

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## Investigations on synthesis, growth and physicochemical properties of organic nonlinear optical crystal: 2-aminopyridinium maleate

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