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Handover Between Wi-Fi and WiMAX Technologies Using GRE Tunnel



Authors: Arbof Almen, Saalim Hamid, Suhail Ahmad, Mohammad Ahsan Chisti, Suninder Singh Khurana, Amandeep Kaur

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Abstracts

The next era of wireless grid inclines to be heterogeneous in the composition; i.e., wireless technologies like Wi-Fi and WiMAX networks desire co-breathe, so there is a demand for the best utilization of the accessible mixed chains. This paper considers the issue of handover between Wi-Fi and WiMAX grids with seamless connectivity. For this, first, a mobile terminal that about both IEEE 802.11 and IEEE 802.16 technologies was designed in the simulator. The developed mobile node was then introduced in the simulation scenario to study the various metrics. Second, we present the incorporation of GRE tunnel between the home agent and base stations for doing away with latency and packet drop and thereby improving the MOS value of the interest of consumers, giving impetus to efficiency, as a test and data form.

Dielectric relaxation and AC conductivity of TiO₂ nanofiller dispersed polymer nanocomposite

AIP Conference Proceedings 2115, 030569 (2019); <https://doi.org/10.1063/1.5113408>Anil Arya¹, Mohd Sadiq², and A. L. Sharma^{1,a)}

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ABSTRACT

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TOPICS

- Dielectric properties
- Polymers
- Polarization
- Electrical conductivity
- Public policy and governance
- Nanomaterials

ABSTRACT

The Lithium-ion conducting polymer nanocomposite (PNC) has been synthesized by the standard solution cast technique in the skeleton of PEO-PVC blend with a different content of Titanium oxide (TiO₂) as nanofiller. The lithium hexafluorophosphate (LiPF₆) was used as the salt. The dielectric strength decreases with frequency and is attributed to the dominance of the electrode polarization effect. The highest dielectric strength and lowest relaxation time (1.88 ns) were achieved for the 15 wt. % TiO₂ (PPS15T) PNCs when compared to other concentrations. The PPS15T exhibits the highest dc conductivity 2.34×10^{-5} S cm⁻¹ at RT. The dielectric strength ($\Delta\epsilon$) and relaxation time (τ_v) were in good agreement with the dc conductivity (σ_{dc}). An interaction scheme has also been proposed to highlight the interactions between the polymer, salt and nanofiller in most visual manner.



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Tuning of Schottky barriers in borophene/MoS₂ van der Waals heterostructure by external electric field

AIP Conference Proceedings 2115, 030362 (2019); <https://doi.org/10.1063/1.5113201>Neha Katoch^{1,3)}, Rajesh Thakur², Ashok Kumar³, P. K. Ahluwalia², and Jagdish Kumar¹
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- Ohmic contacts
- Heterostructures
- First-principle calculations
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- Schottky barriers
- Electrostatics
- Density functional theory

ABSTRACT

A first principle study of structural properties, band bending and tuning of schottky barrier height (SBH) of borophene/MoS₂ Van der Waals heterostructure has been carried out within the framework of density functional theory (DFT). Studied binding energy shows that the interaction between borophene and MoS₂ is weak. Consequently, both borophene and MoS₂ are preserving their electronic nature in heterostructure. We have calculated the band bending 0.15 eV for borophene and -0.52 eV for MoS₂ in borophene/MoS₂ heterostructure which shows that the metal-semiconductor contact is in between p-type borophene and n-type MoS₂. On the application of external electric field, tuning of schottky barriers has been achieved and metal-semiconductor contact gets transformed into ohmic contact which is



Adsorption of nucleobases on different allotropes of phosphorene

AIP Conference Proceedings 2115, 030361 (2019); <https://doi.org/10.1063/1.5113200>Mukesh Jakhar^{1a)}, Ashok Kumar¹, Sunita Srivastava^{2,3}, Prakash Parida^{1b)}, and K. Tankeshwar^{2,3}
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ABSTRACT

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TOPICS

- Nucleobases
- Quantum mechanical systems and processes
- Biosensors
- Electronic devices
- Absorption spectroscopy

ABSTRACT

There has been tremendous interest in low-dimensional quantum systems during past two decades, fueled by a constant stream of striking discoveries and also by the potential for, and realization of, new state-of-the-art electronic device architectures. In this paper, our work includes the structural, electronic and optical properties of nucleobase (Adenine(A), Cytosine(C), Guanine(G), Thymine(T)) adsorbed on different allotropes of phosphorene (α , β , γ). From the optical absorption spectra of different nucleobases when adsorbed on the surface of phosphorene, we could optically probe different Nucleobases. As phosphorene

x

Improved ionic conductivity, potential window and dielectric strength in intercalated polymer nanocomposites

AIP Conference Proceedings 2115, 030585 (2019); <https://doi.org/10.1063/1.5113424>Pritam, Anil Arya, and A. L. Sharma*
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TOPICS

- Dielectric properties
- Polymers
- Ionic conductivity
- Electrical conductivity
- Nanocomposites

ABSTRACT

A nanocomposite solid polymer electrolyte has been synthesized using polyethylene oxide (PEO), sodium hexafluorophosphate (NaPF_6), and organomodified montmorillonite (DMMT) nano-clay, with an aim to improve the ionic conductivity, voltage stability window, transference number and dielectric properties. The DMMT intercalated PNCs exhibits an ionic conductivity of three order ($\sim 10^{-5} \text{ S cm}^{-1}$) higher as compared to the pure polymer ($\sim 10^{-8} \text{ S cm}^{-1}$). The DMMT based PNCs have ion transference number close to unity (0.99) and wide voltage stability window ($\sim 5 \text{ V}$). The dielectric constant and dc conductivity increases with nanoclay addition. The relaxation peak in loss tangent plot shift toward high frequency on nanoclay addition and indicates the decrease of relaxation time. The evaluated relaxation time τ_e' , $\tau_{tan \delta}$, τ_h , τ_m are in good correlation with each other and exhibits minima for the nanoclay based PNCs which infers the faster segmental motion of polymer chain and

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Stability and electronic structure of tricycle-type allotropes of pnictogen monolayers

AIP Conference Proceedings 2115, 030377 (2019); <https://doi.org/10.1063/1.5113216>Pooja Jamdagni^{1,a)}, Anil Thakur², Ashok Kumar³, and P. K. Ahluwalia¹
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- Spin-orbit interactions
- Electronic structure
- 2D materials
- Semiconductors
- Electronic transport
- Density functional theory

ABSTRACT

We report stability and electronic structure of tricycle-type allotrope of pnictogen monolayers within state-of-the-art density functional theory (DFT) calculations. The considered monolayer structure of two-dimensional (2D) As and Sb are found to be energetically more stable than the previously reported puckered and buckled structures, however, 2D Bi prefer zigzag-type high-buckled structure. Electronic band structure calculations suggest the considered monolayers structure to be narrow direct bandgap semiconductors with bandgap ranging 0.2–0.6 eV along with Dirac-cone features at band edges. Spin-orbit coupling (SOC) further reduce the bandgap by shifting the band edges towards Fermi level. We believe that our theoretical study will add more 2D materials with



Energetics and electronic structure of novel hybrid dumbbell monolayers

AIP Conference Proceedings 2115, 030382 (2019); <https://doi.org/10.1063/1.5113221>Sumandeep Kaur^{1,2}, Jaspreet Singh², Ashok Kumar², Sunita Srivastava^{1,3,a)}, and K. Tankeshwar^{1,3,b)}[Hide Affiliations](#) [View Contributors](#)¹Department of Physics, Panjab University, Chandigarh-160014, India²Department of Physical Sciences, School of Basic and Applied Sciences, Central University of Punjab, Bathinda 151001, India³Department of Physics, Guru Jambheshwar University of Science and Technology, Hisar, Haryana-125001, India^{a)}Corresponding Author: sunita@pu.ac.in^{b)}drtankeshwar@gmail.com

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- Crystallography
- Nanoelectronics
- Electronic structure
- 2D materials
- Intermolecular forces
- Energy economics
- Phase transitions
- Density functional theory

ABSTRACT

We report three new hybrid monolayers (C_6P_4 , C_6N_4 and N_6P_4) of group-IV and group-V elements in dumbbell structure using density functional theory calculations. C_6P_4 , C_6N_4 possess sp^2 as well as sp^3 hybridization in their honeycomb dumbbell structure while N_6P_4 possess only the sp^3 hybridization in its non-honeycomb but dumbbell structure. The magnitude of cohesive energy of these hybrid monolayers suggests that C_6N_4 is the most favorable monolayer to be formed. We found that C_6P_4 is metallic while C_6N_4 and N_6P_4 are semiconductors. Also, we report as a representative case, the systematic structural phase transition from LHD-C to a new phosphorous allotrope which has been suggested to exist in our cohesive energy calculations. The reported monolayers join the family of two dimensional materials and may possess application in nanoelectronic devices.



Dielectric relaxation and AC conductivity of TiO₂ nanofiller dispersed polymer nanocomposite

AIP Conference Proceedings 2115, 030569 (2019); <https://doi.org/10.1063/1.5113408>Anil Arya¹, Mohd Sadiq², and A. L. Sharma^{1,4)}[View Affiliations](#) [View Contributors](#)

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- Electrical conductivity
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Stability and electronic structure of tricycle-type allotropes of pnictogen monolayers

AIP Conference Proceedings 2115, 030377 (2019); <https://doi.org/10.1063/1.5113216>Pooja Jamdagni^{1,a)}, Anil Thakur², Ashok Kumar³, and P. K. Ahluwalia¹[Hide Affiliations](#) [View Contributors](#)¹Department of Physics, Himachal Pradesh University, Shimla, H.P., India, 171005²Department of Physics, P. G. College Solan, H.P. India, 173212³Department of Physical Sciences, School of Basic and Applied Sciences, Central University of Punjab, Bathinda 151001, India^{a)}Corresponding author: j.poojaa1228@gmail.com PDF E-READER

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Tuning of Schottky barriers in borophene/MoS₂ van der Waals heterostructure by external electric field

AIP Conference Proceedings 2115, 030362 (2019); <https://doi.org/10.1063/1.5113201>Neha Katoch^{1,a1}, Rajesh Thakur², Ashok Kumar³, P. K. Ahluwalia², and Jagdish Kumar¹[Hide Affiliations](#) [View Contributors](#)¹Department of Physics and Astronomical Science, School of Physical and Material Sciences, Central University of Himachal Pradesh, Dharamshala, Kangra, H. P., 176215 (India)²Department of Physics, Himachal Pradesh University, Shimla, H. P., 171005 (India)³Department of Physical Science, School of Basic and Applied Sciences, Central University of Punjab, Bathinda, 151001 (India)^{a1}Corresponding author: nehakatoch2@gmail.com

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- Ohmic contacts
- Heterostructures
- First-principle calculations
- Electronic devices
- Schottky barriers
- Electrostatics
- Density functional theory

ABSTRACT

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Stability and tunable electronic structure of planar phosphorus nanotubes

AIP Conference Proceedings 2115, 030383 (2019); <https://doi.org/10.1063/1.5113222>Shilpa Singh^{1,3}, Sumandeep Kaur^{1,2}, Sanjeev K. Gupta^{3,a)}, Ashok Kumar¹, and Sunita Srivastava^{2,4}[Hide Affiliations](#) [View Contributors](#)¹Department of Physical Sciences, School of Basic and Applied Sciences, Central University of Punjab, Bathinda, 151001, India²Department of Physics, Panjab University, Chandigarh-160014, India³Computational Materials and Nanoscience Group, Department of Physics, St. Xavier's College, Ahmedabad, 380009, India⁴Department of Physics, Guru Jambheshwar University of Science and Technology, Hisar, 125001, Haryana, India^{a)}Corresponding author: sanjeev.gupta@sxca.edu.in PDF E-READER

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TOPICS

- Nanoelectronics
- Materials properties
- Electronic structure
- Chirality
- Nanotubes
- Electrostatics
- Density functional theory

ABSTRACT

The stability and electronic properties of planar phosphorous nanotubes with different chirality are investigated within the formulation of density functional theory. Armchair phosphorous nanotube (APNT) is found to be energetically most favorable with very small formation energy (0.08 eV). APNT also possess highest tensile strength (~ 2 GPa), among the considered nanotubes. Armchair and helical PNTs are semiconducting while zigzag PNT is metallic in nature. We found that the application of strain and external electric field greatly modifies the electronic band structure of given PNTs. We believe that planar APNT can be realized and its tunable electronic properties may be useful for nanoelectronics.



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Strain controlled electronic and transport properties of Si-C atomic wire

AIP Conference Proceedings 2115, 030374 (2019); <https://doi.org/10.1063/1.5113213>Rajesh Thakur^{1,a)}, Ashok Kumar², P. K. Ahluwalia¹, and Raman Sharma¹[Hide Affiliations](#) [View Contributors](#)¹Department of Physics, Himachal Pradesh University, Shimla, H. P., 171005 (India)²Department of Physical Science, School of Basic and Applied Sciences, Central University of Punjab, Bathinda, 151001 (India)^{a)}Corresponding author: rajeshhpthakur@gmail.com

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TOPICS

- Electron tunneling
- Electronic transport
- Density functional theory
- Nanowires

ABSTRACT

An ab-initio Density functional calculations and Non-equilibrium approach have been used to study the effect of positive strain on the equilibrium geometry, electronic structure and transmission function of Si-C bi atomic wire. In the absence of strain, Si-C bi-atomic wire is found to be semi conducting. The equilibrium electronic structure of these nanowires is shown to change drastically on applying strain. The Si-C bi-atomic wire has wide zigzag (WZ) structure GM and has a direct band gap of 0.7eV and remains direct on applying small strain up to $\epsilon \sim 3.1\%$. At the strain value of $\epsilon \sim 3.1\%$ the band gap widen up to 1.77eV, and becomes indirect on further increasing the strain values. We observed that at the lower bias the conductance does depend on the strain applied on the wire. From density of states we have found that the strain value of $\epsilon \sim 3.1\%$ offers maximum band gap value up to the $\sim 1.55\text{eV}$ bias applied. At equilibrium state the transmission through Si bands is observed slightly more, and indicates the holes tunneling through device. Application of strain provides channels for electrons tunneling.

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Dimensional
Scaling of
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Stability and electronic properties of two dimensional pentagonal layers of palladium chalcogenides

AIP Conference Proceedings 2115, 030387 (2019); <https://doi.org/10.1063/1.5113226>Ashok Kumar^{1,a)}, Mukesh Jakhar¹, Sunita Srivastava^{2,3}, and K. Tankeshwar^{2,3}
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TOPICS

- Intermolecular forces
- Spin-orbit Interactions
- Density functional theory
- 2D materials

ABSTRACT

We report structural and electronic properties of pristine and hybrid monolayers/bilayers of Pd chalcogenides within state-of-the-art density functional theory (DFT) calculations. The calculated cohesive energy suggests hybrid systems to be more stable than pristine monolayer/bilayer system. The considered structures show indirect band gap which get reduced on going from monolayer to bilayers. Spin-orbit coupling (SOC) further reduce the bandgap by shifting the band edges towards Fermi level. The reduction in band gap of hybrid bilayers is more pronounced which is attributed to the electronegativity difference between chalcogen S/Se atoms and greater charge redistribution between the layers. We believe that our theoretical study will add more 2D materials in the fascinating class of new 2D family and may guide the experimentalists to realize them for various future nano-electronic applications.



Effect of 1-allyl-3-methylimidazoleum bromide on the motional dynamics and thermal stability of horse ferrocytochrome *c*

AIP Conference Proceedings 2142, 200002 (2019); <https://doi.org/10.1063/1.5122643>Mansi Garg^{1,a)}, Beeta Kumari^{1,b)}, and Rajesh Kumar^{1,c)}
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TOPICS

- Materials properties
- Denaturation (biochemistry)
- Bioacoustics of mammals
- Ionic liquids
- Proteins
- Inorganic compounds
- Physics of gases

ABSTRACT

The novel green solvent, ionic liquids emerged as potential solvents in executing the various *in-vitro* protein based applications. In the present study, we investigated the role of 1-allyl-3-methylimidazolium bromide ([Amim]Br) on motional dynamics and thermal stability of ferrocytochrome *c* (Ferrocyt *c*) at pH 7.0. Our results revealed that (i) the presence of low concentration of [Amim]Br reduces the levels of thermal motion of the Ω -loop of the native Ferrocyt *c* (ii) at relatively higher concentrations, the denaturing effect of [Amim]Br increases the thermal motions of the Ω -loop that lead to unfold the proteins, and (iii) [Amim]Br presence in reaction medium decreases the thermal stability of native Ferrocyt *c* at pH 7.0.

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Outline

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9.1. Introduction

9.2. Factors Driving Climate Change

9.3. Impacts of Climate Change on Crop Plants

9.4. Conclusion

Acknowledgments

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Further Reading

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Figure 9.2

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Table 9.1

WP **Climate Change and Agricultural Ecosystems**
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Chapter 9 - Air Pollution: Role in Climate Change and Its Impact on Crop Plants

Bhansu Pardey¹, Krishna Kumar Choudhary²

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Abstract

Global warming related to climate change is one of the most debated topics currently. There are various natural causes along with major anthropogenic influences leading to air pollution throughout the world. Several factors play a vital role in climate change and global warming leading to increases in temperature and changes in precipitation patterns globally. The consequences of global climate changes are difficult to predict owing to the complexity of and incomplete insight into several atmospheric processes and interactive relationships among different environmental variables, such as temperature, radiation, water availability, soil salinity and soil nutrition. These worldwide fluctuations in climatic variability are of serious concern to agricultural productivity and will lead to food crises for the growing population in future. At present, humanity is challenged with improving agricultural productivity to feed the global population adequately and to achieve future sustainability under such disastrous consequences of global climate change. The present chapter summarizes various natural and anthropogenic factors of air pollution and their effects on various crop plants.

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Encyclopedia of Toxicology, 2014, pp. 100-101

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- 14.5. Effects of Climate Change on Food Loss and Postha...
- 14.6. Effects of Climate Change on Food Quality
- 14.7. Food Security Under Climate Change
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Climate Change and Agricultural Ecosystems
Current Challenges and Adaptation
2019, Pages 355-377



Chapter 14 - Climate Change: A Challenge for Postharvest Management, Food Loss, Food Quality, and Food Security

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Available online 10 May 2019, Version of Record 10 May 2019

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Abstract

Climate change has been around since the time of the "big bang," resulting in both ice ages and periods of warmth. Hikes in temperature have resulted in the frequent occurrences of extreme droughts, flooding, and heat waves. Climate change has a strong impact on the food industry as it affects cultivation, postharvest management (PHM), food loss, food quality, and food security. These climatic factors (temperature, rainfall, greenhouse gases (GHGs)) have an intense impact on postharvest quality parameters of fresh produce including organic acids (citric, malic, tartaric, succinic, and fumaric). These factors also affect the...

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17.1. Introduction

17.2. Conceptual Understanding

17.3. Impacts of Climate Change on Society

17.4. Developing Adaptive Capability

17.5. Conclusion

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 Current Challenges and Adaptation
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Chapter 17 - Developing Adaptive Capability of Agricultural Societies in the Context of Climate Change

Sudhakar Singh Varma

Department of South and Central Asian Studies (Including Historical Studies), School of Global Relations, Central University of Punjab, Bathinda, India

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Abstract

Adaptation is a core part of human evolution and has become a culture of human society. Agricultural societies are more vulnerable to climate change. Climate change is affecting many agricultural sectors through extreme climatic events, such as unequal distribution of precipitation, flood and drought, cyclones, and others. The distribution of the impacts of climate change is unequal across geographical terrains and affects each society differently. The adaptive capacity of a particular society is dependent on the extent of its availability and access to resources—natural, human, financial, cultural, social and social institutions, and the development of social capital. This chapter attempts to explain how to develop the adaptive capacity of agricultural societies in the context of climate change.

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Chapter

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Abstract

Climate change is perhaps one of the major critical problems of recent times. It has become a subject of international concern since its increase at an alarming speed. Although atmospheric gases, surface solar radiations, volcanic activity, cosmic rays and alterations in earth's orbit are targeted as the potential causes of climate change, their consequences or impacts are not well documented. Sea level rise, flooding, extreme weather patterns, heat waves and drought are some of the pronounced consequences of climate change. Changes in biodiversity, ecosystem and ecosystem services and health caused by climate change have received minimal attention. A healthy ecosystem requires a wide diversity of microorganisms, plants and animals at different trophic levels. Removal of a single species from the niche or introduction of an invasive species might lead to ecosystem destruction. **Abnormal changes in the climate pattern can alter the ecosystem health through loss of species, extinction of species, migration of species and changes in behavioural pattern. However, these changes are invisible till a species get extinct or endangered.** Further the change in ecosystem health due to alterations in climate is difficult to record unlike other impacts. Sustainable practices that can reduce, sequester or capture the greenhouse gas emissions may halt the biodiversity loss, protect the ecosystem from further destruction and restore them. This chapter comprehensively describes the impacts of climate change on the health of various aquatic and terrestrial ecosystems. The detrimental effects, short- and long-term responses like changes in physiology, phenology and life cycle of organisms, loss of productivity and loss or migration of species have also been elaborated in

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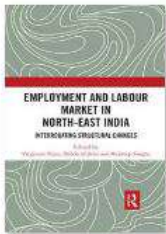
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Chapter

Employment potential of migrant workers in Meghalaya

An empirical exploration

By *Jajati Keshari Parida*

Book [Employment and Labour Market in North-East India](#)

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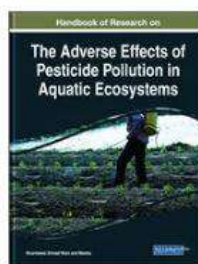
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ABSTRACT

This chapter studies the recent trends and changing pattern of migration and migrants' employment patterns in Meghalaya, using the national-level migration data. Major findings suggest that both the volume of in-migration and out-migration (exodus) are on the rise in Meghalaya. A changing pattern of out-migration is taking place with increasing urban to rural migration trends, a declining share in the population of women, and an increasing share of the younger population and relatively high-skilled workers contributing to the migration stream. Out-migration from Meghalaya is partly driven by a set of distressing factors like poverty, unavailability of higher education facility and inadequate job opportunities. This stimulates interstate youth migration from Meghalaya to other states of India. Most of the out-migrants from Meghalaya are engaged in informal employment as casual workers or are self-employed. This increases the chance of migrants being exploited by their employers, since these groups of workers hardly receive any kind of social security measures. To reduce the risk of migrants being exploited in other states, the government should focus on both skill development and employment generation (in manufacturing and service sectors) within Meghalaya. This would not only check the rampant exodus from Meghalaya but would also increase labour productivity within the state, hence boosting and sustaining the process of socio-economic growth within the state of Meghalaya.



Health Effects of Pesticides on Pregnant Women and Children

Mudasir Youssouf (Central University of Punjab, India), Arun Kalia (Central University of Punjab, India), Zahid Nabi (Central University of Jammu, India) and Zubair A. Malik (Government HSS, India)

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Abstract

Pesticides, along with hybrid seeds and fertilizers, are an integral part of the green revolution and are used to control and eradicate disease vectors for the improvement of agricultural production. Pesticides is an umbrella term for insecticides, nematocides, fungicides, herbicides, fumigants, repellents, and attractants. Pesticides are used against unwanted plants and animals to control diseases and losses. Efforts at different levels may help to reduce the impact of pesticides on newborn babies and on pregnant women. Different efforts can be considered at clinical, educational, and policymaking institutes. Use of risk assessment tools, encouragement of organic diets, educating parents working in agricultural fields from hazards of pesticides particularly in pregnancy and breast feeding, implementation of integrated pest management (IPM) programs, and encouraging policies supporting IPM can help in tackling the menace of pesticide hazards.

Chapter Preview

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Introduction

Drinking water is classified among the most precious resources of the earth, however by anthropogenic activities both the quality and quantity of available water is continuously deteriorating (Benner *et al.*, 2013). A large part of world's population is forced to use contaminated drinking water (WHO, 2010). Millions of deaths mostly in developing countries could be prevented if people adhere to reliable safe drinking water sources. Around 2.4 million deaths occur annually, mostly in developing countries by living in unhygienic conditions and having no access to potable water (Pruss-Ustun *et al.*, 2008). Among the two basic drinking water sources, surface water receives high extent of pollutants as compared to groundwater which is less exposed though groundwater can act as pollution source for decades due to higher residence times of pesticides and lower microbial activity as compared to surface water (Rodrigo *et al.*, 2014). With the varying pollutants and contaminants, the traditional water testing and monitoring processes and techniques (for microbial contamination) have also shifted to include the health risks of chemical contaminants, mostly when associated with chronic exposures (Fawell & Nieuwenhuijsen, 2003; Thompson *et al.*, 2007).

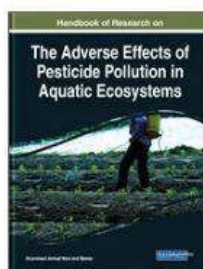
Due to widespread distribution, toxicity and persistence, pesticides are now the important class of water pollutants, even at very low concentrations pesticides can be hazardous to aquatic life because of bioconcentration process. Out of 22 identified POPs, 15 of them are pesticides mainly aldrin, dieldrin, endrin, chlordane, DDT, hexachlorobenzene, mirex, heptachlor, toxaphene, etc. Considering the severity of POPs a separate international environmental treaty (Stockholm conference) was signed in 2001 to eliminate or restrict the production and use of POPs (Xu *et al.*, 2013; Ali *et al.*, 2014). Properties like persistence in degradation process, ability to travel long distances, bioaccumulation, carcinogenic, hormone disruption and causing immunological and reproductive disorders has increased public concerns towards POPs (Vos *et al.*, 2000; Buccini, 2003; Sanpera *et al.*, 2003). Across the globe, 884 million people (13% of the world's population) depend on unprotected and distant water sources for drinking water collection and 3.6 billion people have well developed piped water system. However, in many low and middle-income countries, piped water system work for few hours and also are not safe, for example in Asian cities, more than one in five water supply schemes fail to meet national water quality standards (Bartram and Cairncross, 2010).

Pesticide contamination of surface water and groundwater can occur from both point sources (spill sites, disposal sites) and non-point sources which are the dominant source of pesticide pollution includes agricultural or urban runoff, infiltration from application sites, etc. (Fig. 1).

Figure 1. Schematic diagram depicting possible routes of pesticides into streams and groundwater

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Thodal *et al.*, 2009.



Impact of Pesticides on Aquatic Life

Zahid Nabi (Central University of Jammu, India), Mudasir Youssouf (Central University of Punjab Bathinda, India) and Javid Manzoor (Jiwaji University Gwalior, India)

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Abstract

Humans made use of pesticides to kill pests infesting crops. This was done to increase agricultural yields and improve public health. Pesticides however turn out to be damaging for the environment, causing many harmful impacts. Certain pesticides after being applied to the environment show long-term residual effects while others show acute fatal effects particularly to aquatic life. For example, organochlorine pesticides are persistent in the environment; as a result of this, these pesticides find their way to contaminate ground water, surface water, food products, air, soil, and may also affect human beings through direct contact. Pesticide exposure to humans has been found to be an important cause of some diseases such as cancer, respiratory diseases, skin diseases, endocrine disruption, and reproduction disorders. It is this aspect of pesticides in the environment that has raised concern among environmental scientists to study their behavior in the environment and then come out with a sound alternative so as to rescue the human population from their adverse effects. Fifty years (half a century) after Rachel Carson's warning to the world about the devastating effect pesticides have on birds and beneficial insects, pesticides continue to be in use. Continued usage of pesticides can be described as a massive chemical assault on our environment which threatens the survival of many birds, fish, insects, and small aquatic organisms that form the basis of the food web. More generally, pesticides reduce species diversity in the animal kingdom and contribute to population decline in animals and plants by destroying habitats, reducing food supplies, and impairing reproduction. Organisms in ecosystems exist in complex interdependent associations such that losses of one keystone species as a result of pesticides (or other causes) can have far reaching and unpredictable effects. A keystone species is a species that is disproportionately connected to more species in the food-web. The many connections that a keystone species holds mean that it maintains the organization and structure of entire communities. The loss of a keystone species results in a range of dramatic effects that alters trophic structure, other food-web connections, and can cause the extinction of other species in the community. A pesticide may eliminate a species essential to the functioning of the entire community, or it may promote the dominance of undesired species or it may simply decrease the number and variety of species present in the community. This may disrupt the dynamics of the food webs in the community by breaking the existing dietary linkages between species.

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Introduction

Water can be described as one of the most priceless gifts of nature; as a result it is also termed as the lifeline of earth. Evolution of life and beginning of human civilization would not have been possible without it. Throughout the history of humans, social and economic development of civilization has been closely related with the availability of sources of water. The world population has shown a tremendous growth with the volume of water remaining the same, this increase in population has led to over exploitation of water resources particularly post industrialization. Due to the impact of human activities, environmental disturbances on the water cycle have also increased (McMichael, 2009). Many factors such as unplanned urbanization, population explosion, and deforestation have caused pollution crisis on earth. Industrialization results in problems of pollution to lithosphere, hydrosphere and atmosphere based on the type of industry, the nature of raw materials, processes involved and types of equipments used (Hodges *et al.*, 1973). Most of the water bodies that are located in and around human settlements have been polluted by industrial effluent, which come out of different factories. All the chemicals of the industrial water are toxic to all forms of aquatic life ranging from minute organisms to giant fishes. Among the most prominent pollutants that have rendered aquatic resources polluted and caused huge damage to aquatic organisms are pesticides.

Pesticides may be described as a mixture of substances which can be of chemical or biological origin, used by human society to mitigate or repel pests such as bacteria, nematodes, insects, mites, mollusks, birds, rodents, and other organisms that affect food production or interfere with human welfare. They usually act by disrupting some component of the pest's life processes to kill or inactivate it. Pesticides also include substances such as insect attractants, herbicides, plant defoliants, desiccants, and plant growth regulators.

The concept of pesticides can be traced to 1000 B.C, when Homer referred to the use of sulfur to fumigate homes. By 900 A.D, the Chinese started using arsenic to control garden pests. Although there were outbreaks of pests, such as potato blight, which destroyed most of the potato crop in Ireland during the middle of nineteenth century, not until later that century were pesticides such as arsenic, pyrethrum, lime sulfur,

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Nanoparticle-Protein Corona: Biophysics to Biology

CHAPTER 9

Nanomaterial-Blood Interactions: A Biomedical Perspective

Priti Singh and Sunil Kumar Singh

Within the short span of a decade, nanotechnology has gained tremendous recognition in diagnostic and therapeutic applications owing to its unique physicochemical properties. Whenever nanomaterials (NMs) are intravenously injected inside the biological system, NMs encounter the complex physiological environment of blood. Blood is a connective tissue consisting of blood cells, plasma proteins and lipoproteins, and a coagulation system that maintains the haemostasis of the body. NMs can interact with blood constituents and trigger patho-physiological events such as complement activation and thrombosis. Therefore, in this chapter, the roles of blood constituents in a biological system and interactions between NMs and blood components is critically reviewed. The shape, size, functionalisation and surface charge of NMs may be deciding factors for their adverse toxic effects. A critical analysis of nanomaterial-blood interactions will help with designing engineered NMs and manipulating their properties for impeccable applications in nanomedicine.

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Liquid Phase Exfoliation of MoS₂ Nano-sheets and Observation of Resistive Switching Memory in MoS₂ Nano-sheets-PVDF-HFP Composite Films

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Abstract

To realise the true and versatile application potentials of 2-D materials like MoS₂, the preparation of mono-layer or few layer nano-sheets holds the key. In the present study, we report the successful exfoliation of bulk MoS₂ into few layer nano-sheets by adopting a two-step process of grinding and then two hours of ultrasonication by using a probe sonicator. The yield of exfoliation was 32 mg/10 ml and the exfoliated MoS₂ was very stable without any re-stacking for more than one month. Further, the exfoliated MoS₂ nano-sheets are added to Poly(vinylidene fluoride-co-hexafluoro-propylene) (PVDF-HFP) to prepare the nanocomposite thin films. Two-terminal devices are prepared with ITO and aluminium as bottom and top electrodes, respectively on a plastic substrate. Its electrical properties are investigated to observe the electrical bistability. Nanocomposite based devices showed bipolar resistive switching memory. For composite film with 1wt.% of MoS₂, resistance switching is observed with SET and RESET voltages at 2.74 V and

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Salt concentration and temperature dependent dielectric properties of blend solid polymer electrolyte complexed with NaPF₆

Anil Kaya^a, Mohd. Saifu^b, A.L. Sharma^{a, B}

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Abstract

Solid polymer electrolytes consisted of poly (ethylene oxide) (PEO) and poly (vinyl) pyrrolidone (PVP) with sodium hexafluorophosphate (NaPF₆) salt has been prepared by solution cast technique. The influence of salt concentration and temperature on the complex permittivity, complex conductivity, loss tangent, and complex modulus have been analyzed systematically. The complex permittivity decreases with the increase of frequency and high value of dielectric permittivity in the low-frequency window is attributed to the electrode polarization effect. The peak in the loss tangent plot shift toward high frequency with the addition of salt and increase of temperature clearly indicates the decrease of the relaxation time. The temperature dependent analysis suggests that dielectric properties, dc conductivity, and the molecular chain segmental dynamics increase with the increase of temperature owing to the thermal activation of dielectric properties. The ion migration and dc conductivity are effectively improved by the addition of salt. Aforementioned estimated results strongly convincing its use for the device applications

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Synthesis and characterizations (electrical and thermal stability properties) of the blended polymer nanocomposites

Mohd. Sadiq^{a,*}, Anil Arora^a, A.L. Sharma^a, P. R. B.

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Abstract

We report preparation and characterization of the Blend Polymer Nanocomposite (BPNC) based on PAN-PEO with Lithium hexafluorophosphate as a source of ion conductor and organomodified montmorillonite nanoclay as intercalated. All the polymer nanocomposites were prepared by the standard solution cast technique and effect of nano-clay was investigated through FESEM, FTIR, Impedance spectroscopy, TGA and cyclic Voltammetry analysis. The FESEM micrographs evidenced the change in morphology on the varying concentration of nanoclay in the polymer salt matrix. The various interactions between polymer, salt and nanoclay have been explored at the microscopic level through FTIR. The most responsible property of such system i.e. ionic conductivity has been estimated through impedance spectroscopy (IS). The detailed analysis of IS property has been done in the spectrum of 1Hz to 1 MHz at room temperature. The highest ionic conductivity has been estimated for the 3 wt. % nanoclay content and is about $\sim 10^{-5}$ S cm⁻¹. The electrochemical potential window of the prepared polymer nanocomposite has been recorded through slope of current rise on voltage axis and found to be 4 V. The thermal stability of the prepared polymer nanocomposites have also been recorded and observed that all the prepared films are thermally stable up to 200 °C.

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Diversity of Lichen Photobionts: Their Coevolution and Bioprospecting Potential

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Abstract

Lichens are the symbiotic association of green algae (phycobiont) or blue-green algae (cyanobiont) with fungus (mycobiont). Lichen-forming fungi consist of about 20,000 species, whereas the known photobionts are only about 156 species from 56 genera. A confounding reason for this disparity in the species richness is that most of the lichenologists are mycologists and their focus is on the mycobionts rather than photobionts. Therefore, mycobionts are comparatively well-characterized while the real diversity of photobionts remain elusive. Diversity and phylogeny of major photobiont lineages described till date are comprehensively covered in this systematic review, along with the data on ecology, patterns of phylogeography, and evolution. Current understanding of photobionts described from the Indian subcontinent is summarized revealing significant knowledge gaps in this field. Given that photobionts have relatively simple morphology and morphological plasticity, the relevance of DNA sequence-based molecular systematics for photobiont characterization is highlighted, and other challenges in photobiont research are discussed.

Keywords

Symbionts Lichenized fungi Molecular systematics Mycobionts *Nostoc* *Trebouxia*

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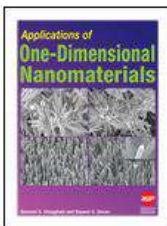


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ABOUT THIS BOOK

Nanomaterials with one dimension covering between 1–100 nm have attracted great interest among scientists due to their unique properties and high surface areas, compared to their counterparts; bulk materials. Because of their size confinement and dimensionality, one dimensional (1D) nanostructures are excellent model systems for electronic transport and optical, electrical, and mechanical systems. This has led to the fabrication of novel electronic and photonic devices, medical diagnostic tools, catalysts, drug delivery systems, therapeutics, and sensors based on 1D nanomaterials. This book on “Applications of One-Dimensional Nanomaterials” contains twelve review chapters and is intended to cover some major aspects of research covering synthesis of 1D nanostructures and their applications. This book will be a valuable source for researchers, professionals and students working in the fields of chemistry, physics, materials science, and nanotechnology.

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PGPR Amelioration in Sustainable Agriculture
Food Security and Environmental Management

2019, Pages 67-84



Chapter Four - PGPR Bioelicitors: Induced Systemic Resistance (ISR) and Proteomic Perspective on Biocontrol

Pooja Kanojia¹, Orinda Kumar Choudhary², Akhileshwar Kumar Srivastava³, Amit Kishore Singh⁴*

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Abstract

Control of plant disease is primarily reliable on the indiscriminant use of chemical pesticides including the bactericides, fungicides, and insecticides that are harmful for plant pathogens, or plant disease vectors. However, negative effect of these chemicals and their degradation products may pose hazardous effect for the environment and human beings that paved the researchers and growers for exploring the new and eco-friendly mode of disease control. To date, use of alternative methods such as, plant growth promoting rhizobacteria (PGPR) as biological control agents, have been found effective and are being increasingly applied in the field. PGPR directly and indirectly enhances the plant growth and reduces the disease development in plant system by various mechanisms that include: Production of antimicrobial metabolites, volatile compounds, induced systemic resistance (ISR), etc. These defense mechanisms can cause substantial changes in the plants structural and functional changes that lead to pathogen

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Emotion Detection of Autistic Children Using Image Processing

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Abstract: Facial Emotion Detection is an approach towards detecting human emotions through facial expressions. Autism Spectrum Disorder is an advance neurobehavioral disorder. Autistic people have repetitive, rude behavior. They are not ready to do social communication. People with this syndrome have problems with emotion recognition. This paper works on detecting the emotions of autistic children from the expression of their faces. This paper works on four emotions. These emotions are sad, happy, neutral, and angry. To detect the emotion of autistic children is performed with image processing and machine learning algorithms. The features are extracted from the faces of autistic children with local binary pattern. Machine learning algorithms are used for classification of emotions. Machine learning classifiers used in classification process are support vector machine and neural network.

Published in: 2019 Fifth International Conference on Image Information Processing (ICIIP)

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I. Introduction

Detection of emotion is a difficult area for researchers for a very long time. We express our feelings with facial expressions. Once

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Enzyme Immobilization on Chitin and Chitosan-Based Supports for Biotechnological Applications

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Abstract

Actual industrial enzymes have often high cost and instability. Such issues have restricted commercial application of such fragile biomolecules. Alternatively, immobilization of enzymes on suitable supports improves stability, cost-effectiveness and recyclability. Chitin and chitosan are ideal supporting material because they are biocompatible, biodegradable, plenty of reactive functional groups, non-toxic and cheap. Different derivatives of chitin support such as chitosan, chitosan film, chitosan nanoparticle, and chitosan nanocomposite has been used for enzyme immobilization. Chitosan-bound biomolecules display considerably improved biocatalytic potential as compared to native biomolecules. Chitosan immobilized enzymes have exceptionally high operational stability and reusability, and thus are suitable for industrial processing. This chapter reviews enzymes immobilized on chitin- and chitosan-based biomaterials, and applications to drug delivery and sustainable agriculture.

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3. Department of Zoology, Dyal Singh College, Delhi University, New Delhi, India

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Abstract

Robust and non-specific innate immune system and much specific adaptive immune system protect higher animals from harmful particles and antigens. Immunological research in last few decades has successfully illustrated the functional components and structural units of immune system. Biology of major immune responses against foreign or self-antigens are well classified and have been used extensively in biomedical sciences. Differential expressivity, multiple epitopes, array of newer/unknown antigens and heterogeneous host and pathogen genetic background has emerged as a major challenge. Technological advancements, high-throughput data generation and analysis have facilitated in studying biological systems more rapidly and efficiently. Such systems biology approach has been applied recently to decipher complex immune systems. *In silico* studies of conceptualization, stratification and several model based prediction of immune responses are known as immunoinformatics, which are being used extensively. In this chapter we have discussed several available *in silico* tools to study immune responses.

Keyword

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Immunomodulatory Potential of Phytochemicals: Recent Updates

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Phytochemicals perform wide array of functions related to plant physiology. Beside these they are often being used as therapeutics for prevention or cure of wide range of human diseases. Phytochemicals considered being exciting metabolites since ages as they play significant role in maintain good health through balanced nutrition and immune homeostasis. Various phytochemicals obtained from different parts of plant comprises of tremendous anti-oxidant, anti-inflammatory, anti-cancerous, neuro- protective and cardio protective properties. Beside these they are often being used as therapeutics for prevention or cure of wide range of human diseases. Easy and specific delivery as well as the bioavailability of phytochemicals considered to be important factors to get benefits of phytochemicals. Recent *in vitro* and *in vivo* studies have uncovered the molecular functions of several phytochemicals. Their role in modulating humoral as well as cell mediated immune system has been explored.

Keywords

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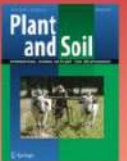
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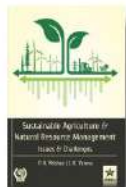
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Modified Difference Squared Image Based Non Local Means Filter

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Abstract:
Image denoising is one of the most important operations in computer vision. Among all the known existing denoising techniques, NLM has proved to perform much better. However, despite its effective performance, the implementation of NLM denoising is limited by a high computational complexity. Lots of Efforts have been put in to reduce this computational complexity and it has been found that summed square images (SSI) and its modified version of difference squared images (DSI) using integral image concept has been much successful in the said attempt. In this paper more contribution has been done to make the NLM faster using the same concept. However, here instead of SSI or DSI, an improved version of DSI has been introduced. The proposed version has been tested on a number of standard test images corrupted with Gaussian noise and the experimental results yielded show that besides increasing the speed, the proposed version also give better visual results than the existing methods. Further, this method has been modified in order to make it effective to remove rician noise in MRI images also. A number of numerical experiments have been conducted to support the above facts.

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Conference Location: Kharagpur, India

I. Introduction
Today image denoising has been one of the most important and widely studied problems in image processing and computer vision which guarantees the effectiveness and robustness of other image processing algorithms in different image processing steps, such as image restoration, image segmentation, etc. A large number of sophisticated filtering techniques have been proposed in the literature for removing noise while attempting to preserve image structures and avoiding image blurring. These noise removing filters can be linear or nonlinear, local or nonlocal smoothing filters. Linear filters such as mean filters have been very popular for their simplicity and speed but their usage is limited since they tend to blur sharp edges, destroy the lines and other fine details of image [1]. To resolve the issues raised with linear filters, nonlinear filters like median filters have been developed. However the drawback with these is that nonlinear methods are more time consuming. Also the local smoothing filters such as AD filter [2] [6], Total Variation (TV) based filtering or neighborhood filters remove the noise content from the image but at the same time they over smooth the details and texture. It is not feasible with these filters to preserve the edges while completely removing the noise. Also these methods considered only high frequency components as noise and did nothing to remove low frequency noise. Therefore as a remedy, Non local means of filtering was introduced by Buades, Coll & Morel [3]. Non-local means filtering estimates each pixel based on the similarity between the contributing and the target pixels. The weight of a contributing pixel is evaluated on the basis of 'similarity' between the contributing and the target pixels. Higher weights are given to pixels that have a neighborhood which is more similar to that of the target one. Since the essence of the NLM lies in finding 'good' similar pixels with high weights, its denoising performance outperforms prior denoising algorithms by a significant margin in edges and structured regions and results in better filtered or denoised image with a little loss of details like edges in comparison to the local mean algorithm. Though this filter brought a pixelwise improvement in denoising, it is computationally heavy than other denoising algorithms in restoring the original image. It is heavy in terms of execution runtime. The computational time can be reduced by a significant amount if the pixels in the image are grouped into similar clusters. In this paper, we have proposed a modified version of NLM which is computationally efficient and results in better denoised images. The proposed method is based on the concept of difference squared images (DSI) and its modified version of DSI using integral image concept. The proposed method is based on the concept of difference squared images (DSI) and its modified version of DSI using integral image concept. The proposed method is based on the concept of difference squared images (DSI) and its modified version of DSI using integral image concept.

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Scale Invariant Fast PHT based Copy-Move Forgery Detection

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Abstract:
Copy-Move forgery is a type of image forgery wherein a patch from the image is copied and pasted on the same image either to increase the occurrence of a particular object or to conceal some important detail in the image. This paper addresses the issue of copy-move forgery using the block-based method of feature extraction. In block-based methods of feature extraction, PHT is one of the competing solutions, but it is not much robust to scaling. This paper proposes Scale-Invariant Fast PHT (SIFFPHT) algorithm to detect the copy-move forgery which uses Fast PHT [1] for extracting the features from the blocks. Fast PHT has a higher convergence rate than the traditional PHT, and the results prove that the speed-up of almost 4 is attained for detecting the forgery. Moreover, the Fast PHT features so obtained from the blocks are normalized before comparison due to which the scaled forged segments are also identified. Further, Fast K-Means clustering is used to estimate the similarity in the blocks and hence detect the copy-move forgery.

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I. Introduction

Image forgery is one of the key issues in the current digital world. A mechanism of alteration of the actual images to convey the false meaning is called image forgery. Image forgery is not new. It dates back to 1540 when Hippolyte Bayard, a French photographer produced a fake photo of himself committing suicide due to some frustration. There are two broad domains of detecting the image forgery viz active/intrusive/proactive methods and the passive/non-intrusive/reactive ones [20], [37]. The active method requires prior information about the image. These methods are usually employed at the time of image acquisition by an authorized person and may require special cameras and associated hardware. The important method among the active methods is watermarking wherein the watermark may get distorted if any tempering is done. However, the watermarking tends to degrade the quality of the image as the extra bits are embedded in the image. Therefore the better mechanism is to go for the passive methods which are further split up into various types having one aspect in common, i.e., no extra efforts are required at the time of image acquisition, liberating the authorizers of the responsibility and preventing the degradation in the quality of the images. The passive methods are also termed as blind forgery detection as the detector has to check the tempered image in every direction to get the clue of the forgery. These passive methods are classified based on camera, pixel, format, source camera identification, physics, and geometry [13]. The camera-based methods are based on the artifacts produced during the acquisition of the image. They include color filter arrays, camera response, etc. The pixel-based methods differentiate pictures, pixel by pixel. Cloning or copy-move forgery, retouching, and copy-paste forgery are some of its types. The format based methods analyze the JPEG compression artifacts such as block truncation coding, JPEG quantization, and Double JPEG. The source camera-based methods deal with the camera response characteristics. They include lens aberration, sensor imperfection, CFA interpolation, etc. In physics-based methods changes in the illumination are observed and in geo-metric-based methods inconsistency in the location or position of objects is noted. Copy-Move forgery (CMF) [2] is a pixel-based image forgery technique wherein a patch from the image is copied and pasted on the same image either to increase the occurrence of a particular object or to conceal some important detail in the image. This type of forgery is very difficult to detect as the overall heterogeneity of the image is restored. It is because the false acts as an inherent watermark to the image and if the image is re-analyzed, the false components get detected including forgery. But in the case of Copy-Move forgery the copied segments overlap to the same image and hence the false components of the segment which is overlaid on the image and hence the overall heterogeneity of the image is restored. This type of forgery is very difficult to detect as the overall heterogeneity of the image is restored. It is because the false acts as an inherent watermark to the image and if the image is re-analyzed, the false components get detected including forgery. But in the case of Copy-Move forgery the copied segments overlap to the same image and hence the false components of the segment which is overlaid on the image and hence the overall heterogeneity of the image is restored.

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Sandeep Kaur¹, Sangeeta Khorana², Manpreet Kaur¹

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Abstract

Like many developing economies, services have emerged as crucial economic activities in South Asia; yet, this cannot increase the rapid growth in the intra-trade in the region. To find out the service trade potential in the region, this article uses revealed comparative advantage indices to assess the comparative advantage and the indicative trade potential of different South Asian countries in various services sub-sectors. The study reveals that there stands complementarities in the trade of services as Pakistan and Sri Lanka have a competitive advantage in Transport Services, while India has a competitive advantage in Computer and Information Services and Other Business Services. In travel services, Maldives and Nepal possess competitiveness, while Bangladesh in Government Services. The study reveals that competitive services have not explored the potential yet. India being the most robust economy of the region must provide a

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Abstract

Urban heat island (UHI) is one of the most important climatic implications of urbanization and thus a matter of key concern for environmentalists of the world in the twenty-first century. The relationship between climate and urbanization has been better understood with the introduction of thermal remote sensing. So, this study is an attempt to understand the influence of urbanization on local temperature for a small developing city. The study focuses on the investigation of intensity of atmospheric and surface urban heat island for a small urbanizing district of Punjab, India. Landsat 8 OLI/TIRS satellite data and field observations were used to examine the spatial pattern of surface and atmospheric UHI effect respectively, for the month of April, 2018. The satellite data has been used to cover the larger geographical area while field observations were taken for simultaneous and daily temperature measurements for different land use types. The significant influence of land use/land cover (LULC) patterns on UHI effect was analyzed using normalized built-up and vegetation indices (NDBI, NDVI) that were derived from remote sensing satellite data. The statistical analysis carried out for land surface temperature (LST) and LULC indicators displayed negative correlation for LST and NDVI while NDBI and LST exhibited positive correlation depicting attenuation in UHI effect by abundant vegetation. The comparison of remote sensing and in-situ observations were also carried out in the study. The research concluded in finding both nocturnal and daytime UHI effect based on

- Abstract
- Keywords
- References





Advanced Computing and Intelligent Engineering pp 377-389 | [Cite as](#)

Comparative Analysis of Salt and Pepper Removal Techniques for Binary Images

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Conference paper

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Abstract

Binarization is the most important step in the OCR system that converts the gray level or colored images into bi-level form. In the case of degraded images, results after binarization mostly contain noises. Salt and pepper noise of different sizes is the most prevalent noise in binary images. For the better results of OCR process, it is necessary to denoise image before proceeding to the next stage. This paper conducts experiments with different existing salt and pepper noise removal methods such as median filter-based techniques and kFill algorithm-based techniques for binary document images. The statistical measures, namely, PSNR, SSIM, and EPI are used to evaluate the performance.

Keywords

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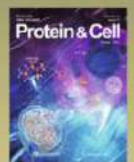
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On the conformal change of Douglas space of second kind with special (α, β) -metric

AIP Conference Proceedings 2261, 030011 (2020); <https://doi.org/10.1063/5.0016846>Sruthy Asha Baby^{1,a)} and Gauree Shanker^{2,b)}[Hide Affiliations](#) [View Contributors](#)¹⁾Department of Mathematics and Statistics Banasthali University, Banasthali Rajasthan-304022, India²⁾Centre for Mathematics and Statistics School of Basic and Applied sciences, Central University of Punjab, Bathinda, Punjab-151001, India Email: gsp.math.1978@gmail.com^{a)}Electronic mail: sruthymuthul23@gmail.com^{b)}Electronic mail: gsp.math.1978@gmail.com

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- Differential topology

ABSTRACT

The notion of Douglas space of the second kind of the Finsler space with (α, β) -metric was introduced by I. Y. Lee [1]. Since then, many of the geometers have studied this topic [2] [14]. In this paper, we prove that the Douglas space of second kind with special (α, β) -metric ([17] [18] [19]) $\alpha + \beta + k \frac{\beta^2}{\alpha}$ is conformally transformed to a Douglas space of second kind. Further, we obtain some results which prove that the Douglas space of second kind with certain (α, β) -metrics such as Randers metric, special (α, β) -metric $\alpha + \frac{\beta^2}{\alpha}$, first approximate Matsumoto metric and Finsler space with square metric is conformally transformed to a Douglas space of second kind. In [3], S. Baccso and M. Matsumoto developed the concept of Douglas space as an extension of Berwald space from view point of geodesic equations. Also, they considered the concept of Landsberg space as extension of Berwald space. In [4], S. Baccso and B. Szilagyi introduced the concept of weakly-Berwald space as another extension of Berwald space. In this paper, we introduce Douglas space of second kind and study the condition under which it is conformally invariant.



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Symmetry reductions and conservation laws of Rosenau Hyman equation with arbitrary constant coefficients

AIP Conference Proceedings 2253, 020002 (2020); <https://doi.org/10.1063/5.0018982>

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In this study, we consider the Rosenau Hyman (RH) equation with arbitrary constant coefficients to examine its classical as well as nonclassical symmetries. Further optimal system for Lie algebra and corresponding similarity reductions are presented. Moreover, conservation laws are derived for the understudying equation.



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Symmetry reductions and conservation laws of Rosenau Hyman equation with arbitrary constant coefficients

AIP Conference Proceedings 2253, 020002 (2020); <https://doi.org/10.1063/5.0018982>Pinki Kumar^{1,a)}, R. K. Gupta^{2,b)}, and Sachin Kumar^{1,c)}[Hide Affiliations](#) [View Contributors](#)¹Department of Mathematics and Statistics, Central University of Punjab, Bathinda 151001, India²Department of Mathematics, Central University of Haryana, Mahendergarh 123029, India^{a)}Corresponding author; yadav.pk1403@gmail.com^{b)}rajeshateli@gmail.com^{c)}sachin1jan@yahoo.com

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ABSTRACT

In this study, we consider the Rosenau Hyman (RH) equation with arbitrary constant coefficients to examine its classical as well as nonclassical symmetries. Further optimal system for Lie algebra and corresponding similarity reductions are presented. Moreover, conservation laws are derived for the understudying equation.

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Anisotropic and high carrier mobility of 2D α -te

AIP Conference Proceedings 2265, 030693 (2020); <https://doi.org/10.1063/5.0017367>Jaspreet Singh¹, Mukesh Jakhar¹, Ashok Kumar^{1,a)}, and K. Tankeshwar²[Hide Affiliations](#) [View Contributors](#)¹Department of Physical Sciences, School of Basic and Applied Sciences, Central University of Punjab, Bathinda, 151001, India²Department of Physics, Guru Jambheshwar University of Science and Technology, Hisar, 125001, India^{a)}Corresponding Author: ashokphy@cup.edu.in PDF E-READER

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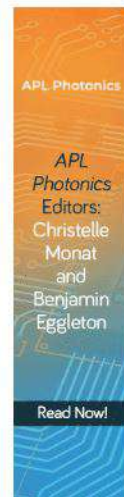
- Nanoelectronics
- Potential theory
- 2D materials
- Semiconductors
- Electronic transport

ABSTRACT

Owing to the exotic properties of two-dimensional (2D) materials, a number of new candidates are adding up in the family of 2D materials. Recently, monolayer of tellurium referred as tellurene is emerging as new contenders in 2D materials for various applications. In this paper, we have investigated the electronic structure and carrier mobility of α - phase of tellurene using first principles theory together with deformation potential theory and effective mass approximation. Electronic band structure calculations show α -Te to be indirect gap semiconductor. Our study suggest that the carrier mobility of α -Te is anisotropic and relatively high compared to transition metal dichalcogenides. Combining semiconducting property with high anisotropic carrier mobility, α -Te finds application in nanoelectronic devices.

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Existence of solutions for fractional Langevin equation involving generalized Caputo derivative with periodic boundary conditions

AIP Conference Proceedings 2214, 020026 (2020); <https://doi.org/10.1063/5.0003365>Amita Devi^{a1} and Anoop Kumar^{b1}
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ABSTRACT

In this article, we investigate the existence and uniqueness (EU) of solutions for non-linear Langevin fractional differential equation (FDEs) in term of generalized Caputo fractional derivative (GCFD) of two distinct orders with periodic boundary conditions involving generalized fractional differential operator. The existence result is derived by applying Krasnoselskii's fixed point theorem and the uniqueness of solution is determined by using Banach contraction mapping principle. An example is offered to ensure the validity of our obtained results.

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Magnetic ground state of the layered honeycomb compound $\text{Na}_2\text{Co}_2\text{TeO}_6$

AIP Conference Proceedings 1942, 130020 (2018); <https://doi.org/10.1063/1.5029090>A. K. Bera^{1,a)} and S. M. Yusuf^{1,2}

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- Quantum fluids
- Electromagnetism
- Phase transitions

ABSTRACT

The magnetic correlations in the 2D layered honeycomb compound $\text{Na}_2\text{Co}_2\text{TeO}_6$ has been investigated. The temperature dependent susceptibility curve reveals a transition to the magnetically ordered state at $T_N \sim 25$ K. The temperature dependent neutron diffraction study confirms an antiferromagnetic ordering below T_N . The magnetic ground state is determined to be a zigzag antiferromagnet that appears due to competing exchange interactions beyond nearest neighbors. The moments align along the crystallographic b axis with reduced ordered magnetic moment values of $2.72(2) \mu_B/\text{Co}^{2+}$ and $2.52(3) \mu_B/\text{Co}^{2+}$ for two Co sites, respectively. In comparison to the theoretical phase diagram the determined zigzag antiferromagnetic ground state suggests that the compound $\text{Na}_2\text{Co}_2\text{TeO}_6$ is situated in the proximity to the quantum spin liquid state in the phase diagram.

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Research Article | Published: 05 February 2020

Chemical characterization, phytotoxic, and cytotoxic activities of essential oil of *Mentha longifolia*

Narayan Singh, Harminder Pal Singh , Daizy Rani Batish , Ravinder Kumar Kohli & Surender Singh Yadav*Environmental Science and Pollution Research* **27**, 13512–13523 (2020) | [Cite this article](#)487 Accesses | 7 Citations | 1 Altmetric | [Metrics](#)

Abstract

The present study assessed the phytotoxic and cytotoxic potential of the essential oil (EO) extracted from aboveground parts of *Mentha longifolia* (L.) Huds. Gas chromatography–mass spectrometry revealed 39 compounds constituting 99.67% of the EO. The EO was rich in monoterpenoids (mostly oxygenated monoterpenes), which accounted for 89.28% of the oil. The major components in EO were monoterpene ketones such as piperitone oxide (53.83%) and piperitenone oxide (11.52%), followed by thymol (5.80%), and (*E*)-caryophyllene (4.88%). The phytotoxic activities of EO were estimated against *Cyperus rotundus*, *Echinochloa crus-galli*, and *Oryza sativa* (rice) through pre- and post-emergence assays at concentrations ranging from 10 to 250 µg/ml and 0.5–5%, respectively. In pre-emergence assay, the phytotoxic effect of EO was most pronounced on *C. rotundus*, thereby significantly affecting percent germination, plantlet growth, and chlorophyll content. On the contrary, the impact was comparatively lesser on rice, with ~40% germination in response to 250 µg/ml of EO treatment. In the post-emergence assay, the spray treatment of EO caused a loss of chlorophyll and wilting in test plants, and subsequently affected the growth of plants, even leading to death in some cases. The cytotoxic activity of EO (at 2.5–50 µg/ml) was studied in meristem cells in onion (*Allium cepa* L.) root tips. EO exposure to the onion roots induced various chromosomal aberrations such as chromosomal bridges, c-mitosis, stickiness, vagrant chromosomes, etc., and negatively affected the mitotic index. At 50 µg/ml, EO treatment triggered the complete death of roots. The study concludes that *M. longifolia* EO has phytotoxic activities due to the mito-depressive effect, along with other physiological effects on target plants. Therefore, EO of *M. longifolia* could be developed into a novel bioherbicide for sustainable management of weeds in agricultural systems.

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Impact of Fraud Announcement on the Stock Price: Analysis of Indian Banks



ISBN: 978-1-943295-14-2

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The purpose of the study is to investigate the reaction of stock prices of Indian banks with respect to announcement of frauds by using the Event Study. The fraud cases are selected which amounted to ₹ 1,000 crores or more during the study period (January 2014 to December 2018). The empirical result indicates that announcement of frauds affect the stock price of banks. The study found negative significant abnormal loss on the event day which further increased in post-event period. The study has the importance for analyzing the behaviour of stock prices with respect to frauds.

Keywords: Stock Price, Event Study, Abnormal Returns, Frauds' Announcement, Indian Banking Sector

1. Introduction

The Indian banking sector has witnessed substantial growth and revolutionary modification since liberalisation of economy in 1991. Although, the banking sector is well regulated, yet it suffers from diverse obstacles such as financial distress and lack of ethical practices. According to the annual report of Reserve Bank of India (2019) and report of Economic Times (2019), frauds have increased substantially both in volume and value terms during the last ten years. The volume of frauds reported by banks was 4669 with a value ₹ 1998.94 crore during 2009-10, reached to 6801 with a value ₹ 71542.93 crore at the end of 2018-19. The number of cases of frauds increased by 45.66 per cent with the amount involved rising by more than 35 times from 2009-10 to 2018-19. The fraud in bank or any other corporate entity is entirely unpredictable phenomenon which results in enormous negative economic and social consequences.

The researches on fraud emphasised its harmful impact on shareholders. Song & Han (2017) examined the impact of corporate crime on the stock market in South Korea and found negative reactions to stock prices around the announcements. They found no significant difference in reactions between announcements of individual and organisational crimes followed the inferences of Kouwenberg & Phunnarungsi, (2013). In Germany, Ewelt-Knauer et al. (2015) indicated that shareholder wealth decreases more if at least one board member resigns due to the fraud case. Jayanti & Jayanti (2011) showed that filing for bankruptcy and shut down by major carriers resulted in negative abnormal returns around the announcement dates for respective firms and positive abnormal returns for rival firms. Davidson et al. (1994) reported negative abnormal stock returns around the announcements of financial reporting violations. These studies provide motive to conduct a research to analyze the reaction of stock price with respect to frauds' announcement in Indian context. The present study focuses on the research question:

Do frauds' announcements have significant impact on the stock prices of the bank that have experienced fraud?

The remainder of the paper is structured as follows. The second section reviews extant literature on frauds and announcement effect on stock price using event study. The third section presents the methodology followed by the fourth section which deals with empirical results. The fifth section concludes the research paper.

2. Review And Literature

Fraud announcement is an unscheduled event in the capital market that is likely to influence financial performance of the concerned firm. Most of the fraud literature provides the adverse effects of fraud on performance of firm and shareholders' wealth. This section deals with literature which demonstrates the relationship between fraud and its consequences.

In the recent studies, Eryiğit (2019) examined the effect of announcements of financial irregularities on the performance of stock of company in short term. The results indicated that news of financial penalty has almost no significant influence on the performance of stock in BorsaIntanbul. They also revealed that penalties have been absorbed into stock price before the announcement.

Ghafoor, Zainudin, & Mahdzan (2019) conducted the study to examine the firms' level of asymmetry of information in Malaysia for the study period of 200-2016. The study applied OLS regression, event study and simultaneous equation techniques and found that information asymmetry increases as fraud discover. The study revealed no evidence of divergence in asymmetry of information across regulator wise and fraud wise sub samples. Sane (2019) study the impact of accounting fraud disclosure on behaviour of investors. They found that investors exposed to accounting fraud using account holding data of investors. The study also shows no difference in the trading behaviour of the control investors over the period of one month.



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The analysis of a time delay fractional COVID-19 model via Caputo type fractional derivative

Pushpendra Kumar Vedat Suat Erturk

First published: 15 October 2020 | <https://doi.org/10.1002/mma.6935> | Citations: 1

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Abstract

Novel coronavirus (COVID-19), a global threat whose source is not correctly yet known, was firstly recognised in the city of Wuhan, China, in December 2019. Now, this disease has been spread out to many countries in all over the world. In this paper, we solved a time delay fractional COVID-19 SEIR epidemic model via Caputo fractional derivatives using a predictor–corrector method. We provided numerical simulations to show the nature of the diseases for different classes. We derived existence of unique global solutions to the given time delay fractional differential equations (DFDEs) under a mild Lipschitz condition using properties of a weighted norm, Mittag–Leffler functions and the Banach fixed point theorem. For the graphical simulations, we used real numerical data based on a case study of Wuhan, China, to show the nature of the projected model with respect to time variable. We performed various plots for different values of time delay and fractional order. We observed that the proposed scheme is highly emphatic and easy to implementation for the system of DFDEs.

1 INTRODUCTION

Novel coronavirus (COVID-19), a global threat whose source is not correctly yet known, was firstly recognised in the city of Wuhan, China, in December 2019.^{1, 2} Now, this disease has been spread out to many countries in all over the world. From the date of its origin, it grows exponentially in mankind and infected more than 20,254,685 with 738,930 deaths and 13,118,618 recoveries on 11 August throughout the globe. For the preventions to this disease, social control measures have been extended up by increased public awareness such as through social or physical distancing measures, good hygiene and not walking out in public. Billions of people have been infected by this virus, and in some

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Published: 20 August 2019

Insights into the Molecular Mechanism of Arsenic Phytoremediation

Sapna Thakur, Shruti Choudhary, Aasim Majeed, Amandeep Singh & Pankaj Bhardwaj *Journal of Plant Growth Regulation* **39**, 532–543 (2020) | [Cite this article](#)808 Accesses | 10 Citations | 1 Altmetric | [Metrics](#)

Abstract

Arsenic (As) is a widespread carcinogenic pollutant. Phytoremediation is the most suited technology for alleviating the As contamination of soil. In this review, we have discussed the uptake mechanism and the associated transporters for different As species. Glutathione, phytochelatins, metallothionins, and secondary metabolites play important role in As detoxification and enhancing tolerance. The roles of MAPK signaling and calcium signaling are highlighted in the perception of As stress along with phytohormones signaling in stress tolerance. Furthermore, transcription factors involved in regulation of gene expression under As stress are discussed. High-throughput sequencing has reduced the time duration and enhanced the knowledge regarding understanding the molecular mechanism of phytoremediation. The role of CRISPR/Cas9 and synthetic genes in context to phytoremediation is discussed. We have provided a holistic understanding of the present knowledge about phytoremediation in the context of mechanisms of the As uptake and tolerance. A complete understanding of the phytoremediation process is essential for As-risk mitigation and will help in augmenting its efficiency and true potential.

Introduction

Arsenic (As) is a ubiquitous toxic metalloid. The average concentration of As in earth's crust is estimated to be 2–5 mg/Kg (Moore 1993). Environmental sources of As are both anthropogenic and natural. The anthropogenic sources of As includes several insecticides, pesticides, and antifungal preservative for wood and leather. Furthermore, As is used in manufacturing textile dyes, alloy, paints and pharmaceutical products (Chung et al. 2014).

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Relationship between Macro Variables and Bitcoin: Evidence From Indian Market



ISBN: 978-1-943295-14-2

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This paper investigates the long-haul relationship between Bitcoin (INR) and the macroeconomic indicators such as Indian stock indices (NSE and BSE), exchange rate (USD and INR) and proxies of inflation rate (CPI and WPI) in the Indian market. For this, monthly data of the variables from October 2014 to September 2019 is considered. The result of Johansen cointegration approach emphasizes the long run association between Bitcoin and the economic variables. On the other hand the Granger Causality test demonstrates one-way causal relationship of NSE, BSE and CPI to the Bitcoin. Hence, concluded that Bitcoin prediction relies on stock Indices and inflation.

Keywords: Bitcoin, Macroeconomic Variables, Johansen Co integration, Granger Causality

1. Introduction

Identifying causes of change in any asset is one of the important questions in finance. In recent decade, the role of macroeconomic variables has been critically noted and researched by academicians and practitioner of financial economics. It is found that changes in macroeconomic variables or monetary indicators of an economy are one of the important reasons for the variation in prices of conventional assets such as equity, commodities, derivatives etc. Vast literature is available demonstrating that macroeconomic variables have impact on conventional markets such as stock market in varied time horizons across the globe (Chaudari, 1997; Kwon & Shin, 1999; Maysami, Howe & Hamsa, 2004; Ahmed et al., 2017).

Cryptocurrency is the new topic of research and discussion for academics, practitioners and investors around the globe since 2008, after it was first proposed by Satoshi Nakamoto in his white paper. Though it is a nascent market, it has spread across the world like a wild fire. Bitcoin market is alone expected to exceed the market cap than that of India's most valuable listed company (Varma, 2019). Thus, it becomes a topic of importance to understand if Bitcoin, the original crypto currency also gets affected by the economic indicators of a country alike the conventional investing assets such as stock, equity etc. This is of importance to investors, researchers and policy makers, to understand that Bitcoin also follows the basic economic criterions like any other traded investment assets.

Thus, the present study focuses on investigating the long-haul relationship between Bitcoin (INR) and the macroeconomic indicators such as Indian stock indices (NSE and BSE), exchange rate (USD and INR) and proxies of inflation rate (CPI and WPI) in the Indian market. For this purpose, monthly observations of Bitcoin and macro indicators with reference to Indian market are extracted from varied reliable sources for a period starting from October 2014 to September 2019. The econometric techniques of Augmented Dickey-Fuller, Johansen cointegration analysis and Granger causality are employed to examine the relationship and its causation direction between the variables. This will provide empirical evidence from Indian market about the long-run association of Bitcoin to the macro variables of India.

The present paper is structured as follows: Section 2 deals with the review of relevant literature related to the study; Section 3 briefs about the research framework used; Section 4 discusses empirical results, its analysis and interpretation; Section 5 offers the concluding remarks.

2. Review of Literature

Over the years, researchers have taken important monetary macroeconomic variables and employed varied econometric techniques to prove its relationship to developed, developing and emerging markets. Vast literature is available analyzing impact and relationship of varied macroeconomic variables such as Interest rate, inflation rate, GDP, exchange rate etc on major stock markets across the world (Ahmed, 2017; Maysami, Howe and Hamsa, 2004; Kwon & Shin, 1999; Chaudari, 1997).

Crypto currency being a relatively new market which is at its infancy stage, the empirical literatures studying this nascent market is now growing. The relationships between varied international currencies exchange rates, traditional asset class



Smart Systems and IoT: innovations in Computing pp 681-690 | [Cite as](#)

Analysis of Wormhole Attack on AODV and DSR Protocols Over Live Network Data

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Abstract

Wireless ad hoc networks due to their open deployment architecture, are highly exposed to many security compromising attacks. These attacks can cause a lot of damage to privacy, security, and robustness of networks. The wormhole attack is believed to be one of the malicious attacks to detect as it can be performed without breaching any key or breaking any cipher in any wireless ad hoc network. A wormhole attack form a tunnel in the network using two or more malicious nodes to replay the data stealthily from one malicious node to other malicious end nodes in same or different network. In this way, the ad hoc networks are exploited by the attacker by either using the flaws in protocol design or in network architecture. So, there is requirement of security methods to make MANET routing protocols thwarting wormhole attack. In this research work, the wormhole attack has been performed over AODV and DSR protocols using the real-time live data introduced in simulator. The prevention technique was noted to successfully handling the attack by restoring the performance of network and alleviates the effect of attack from the network.

Keywords

Ad hoc networks Routing protocols Ad hoc on-demand distance vector routing (AODV) Dynamic source routing (DSR) Wormhole attack Network simulator

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Analysis of Wormhole Attack on AODV and DSR Protocols Over Live Network Data

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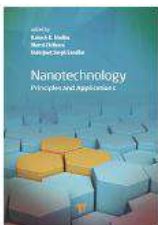
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Chapter

Nanobiosensors and Their Applications

By *Ankit Kumar Singh, Agnidipta Das, Pradeep Kumar*

Book [Nanotechnology](#)

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ABSTRACT

Nanobiosensors show high performance in selectivity, biocompatibility, nontoxicity, reversibility, rapid response, and the sensitivity of determination by utilizing nanomaterials to introduce lots of brand new signal transduction technologies, which have been used recently. Nanobiosensors are made from nanomaterials such as nanoparticles, nanotubes, quantum dots, or other biological nanomaterials.

Nanoparticle-based biosensors can be divided into three subtypes: acoustic wave biosensors, magnetic biosensors, and electrochemical biosensors. Acoustic wave sensors measure the changes in acoustic wave or mechanical waves as a detection mechanism to obtain medical, biochemical, and biophysical information about the analyte of interest. Electrochemical biosensors contain three electrodes: reference electrode, working electrode, and counter electrode. Conjugated gold nanoparticles have been used in the designing of electrochemical biosensors for the identification of glucose, xanthine, and hydrogen peroxide.

Electrochemical biosensors can further classified into four types depending on their working type: potentiometric, amperometric, conductimetric, and impedimetric.

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of the ports. The highest erosion and accretion observed between the year are -115 mts and 6.8 mts. Between the year 2008 to 2010 the highest erosion and deposition was? and 126 mts. The results calculated from the change analysis were given in Table. The highest amount of erosion occurred in the year 2015 to 2016 (-144 mts) along the northern part of Puzhuthivakkam were as the highest deposition occurred during the year 2012 to 2013 (147 mts) along the down drift side of the Kattupalli area.

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CHAPTER 14

Sustainable Management of Soils Contaminated with Heavy Metals

Naseer Ahmad and Puneeta Pandey

1. Introduction

Heavy metals refers to stable metals or metalloids whose density is greater than 4.5 g/cm³, viz. lead (Pb), cadmium (Cd), copper (Cu), nickel (Ni), mercury (Hg), chromium (Cr), and zinc (Zn) etc. (Chopra, 2009). They are non-biodegradable and non-thermo degradable and thus accumulate to toxic levels in no time. They are stable, difficult to degrade, extremely persistent in the environment and therefore they tend to accumulate in soils and sediments (Chopra, 2009). Heavy metals are natural components of the earth's system, but excessive use has affected the biochemical balance and geochemical cycles. This result in contamination of natural resources like soil and water due to the release of heavy metals such as nickel (Ni), cadmium (Cd), copper (Cu), zinc (Zn), lead (Pb) etc. Exposure to heavy metals for long periods and high concentrations may lead to serious effect on human health and other biotic systems. The plants and other micro-organisms play a key role in bio-transformation of heavy metals into non-toxic forms.

With a rapid growth in industrial activities, a significant amount of waste is being discharged into the earth's system, mainly soil and water, which has caused the heavy metal accumulation to a greater extent, especially in urban areas. The heavy metals excessive release into the soil and waters system is a threat to human health worldwide, because these are difficult to convert into non-toxic forms and thus posing long-term impacts on human health, plants, animals and aquatic life (D'amore *et al.*, 2005). Some of the metals like nickel (Ni), copper (Cu), chromium (Cr), arsenic (As), lead (Pb), zinc (Zn), etc. and these are carcinogenic and mutagenic in nature beside cytotoxic (Salem *et al.*, 2000). Though, some heavy metals are essential in small quantities for the growth and optimum performance of plants. But, the higher concentrations of metals in soil and water bodies has led to negative impacts on humans and aquatic life as a result of industrial revolution. In order to lessen the impacts of heavy metals and to improve the quality of soil, water and other components of environment, the contamination must be fixed.

Puneeta

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ਭਾਈ ਵੀਰ ਸਿੰਘ ਦੇ ਕਾਵਿ-ਅਨੁਭਵ ਦੀ ਅਨੁਭੂਤੀ

(ਕਾਵਿ-ਸੰਗ੍ਰਹਿ 'ਮੇਰੇ ਸਾਈਆਂ ਜੀਉ' ਦੇ ਆਧਾਰ 'ਤੇ)

-ਡਾ. ਰਮਨਪ੍ਰੀਤ ਕੌਰ

ਅਨੁਭਵ (experience) ਤੇ ਅਨੁਭੂਤੀ (realization) ਅੰਤਰ-ਸੰਬੰਧਿਤ ਹੋਣ ਦੇ ਬਾਵਜੂਦ ਵੀ ਦੋ ਵੱਖ-ਵੱਖ ਸੰਕਲਪ ਹਨ। ਅਨੁਭਵ ਨਿੱਜ ਕੇਂਦ੍ਰਿਤ ਹੁੰਦਾ ਹੈ, ਜਿਸ ਦਾ ਹਵਾਲਾ-ਬਿੰਦੂ (referent) ਪ੍ਰਕਿਰਤੀ ਤੇ ਸਮਾਜ ਹੁੰਦਾ ਹੈ। ਭਾਰਤੀ ਦਰਸ਼ਨ ਸ਼ਾਸਤਰ ਅਨੁਸਾਰ ਮਨੁੱਖ ਪੰਜ ਗਿਆਨ ਇੰਦਰੀਆਂ (ਅੱਖ, ਕੰਨ, ਨੱਕ, ਜੀਭ, ਚਮੜੀ) ਰਾਹੀਂ ਪ੍ਰਕਿਰਤੀ ਦੇ ਪੰਜ ਗੁਣਾਂ/ਤੱਤਾਂ (ਆਕਾਸ਼, ਵਾਯੂ, ਅਗਨੀ, ਜਲ, ਪ੍ਰਿਥਵੀ) ਨੂੰ ਪੰਜ ਤਨ-ਮਾਤਰਾ (ਰੂਪ, ਰਸ, ਗੰਧ, ਨਾਦ, ਸਪਰਸ਼) ਦੇ ਰੂਪ ਵਿਚ ਗ੍ਰਹਿਣ ਕਰਦਾ ਹੈ। ਇਹ ਪੰਜ ਤਨ-ਮਾਤਰਾ ਉਸ ਦੇ ਪਦਾਰਥਕ ਤੇ ਸੰਕਲਪਿਕ ਬੋਧ ਦਾ ਆਧਾਰ ਹੁੰਦੇ ਹਨ। ਇਨ੍ਹਾਂ ਦੇ ਗਿਆਨ ਤੇ ਬੋਧ ਲਈ ਸਾਧਨ ਵਜੋਂ ਛੇ ਪ੍ਰਮਾਣਾਂ (ਪਰਤੱਖ, ਅਨੁਮਾਨ, ਉਪਮਾ, ਅਰਥਾਪਤੀ, ਅਨਉਪਲਬਧੀ, ਸ਼ਬਦ) ਨੂੰ ਮੁੱਖ ਆਧਾਰ ਮੰਨਿਆ ਜਾਂਦਾ ਹੈ। ਇਨ੍ਹਾਂ ਵਿਚੋਂ ਪਹਿਲੇ ਪੰਜਾਂ ਦਾ ਸੰਬੰਧ ਇਕ-ਕਾਲੀ ਹੈ, ਜਦ ਕਿ ਛੇਵਾਂ (ਸ਼ਬਦ) ਤ੍ਰੈਕਾਲੀ ਹੈ। ਗਿਆਨ ਦੇ ਇਹ ਸਾਰੇ ਸਾਧਨ, ਪ੍ਰਕਿਰਿਆ ਦੇ ਪੱਧਰ 'ਤੇ 'ਸ਼ਬਦ' ਦੁਆਰਾ ਹੀ ਸੰਚਾਲਿਤ ਹੁੰਦੇ ਹਨ। ਇਸੇ ਲਈ ਇਕ ਮਨੁੱਖ ਦਾ ਗਿਆਨ ਤੇ ਬੋਧ ਉਸ ਕੋਲ ਪ੍ਰਾਪਤ 'ਸ਼ਬਦ-ਸੀਮਾ' ਦੇ ਘੇਰੇ ਵਿਚ ਵਿਚਰਦਾ ਹੈ। ਅਨੁਭੂਤੀ ਦਾ ਹਵਾਲਾ-ਬਿੰਦੂ ਕਿਸੇ ਹੋਰ ਦੇ ਅਨੁਭਵ ਦਾ ਪ੍ਰਗਟਾਵਾ ਹੈ। ਪ੍ਰਕਿਰਤਕ ਤੇ ਸਮਾਜਕ ਵਰਤਾਰਿਆਂ ਵਿਚ ਵਿਚਰਦਾ ਮਨੁੱਖ, ਪੰਜ ਤਨ-ਮਾਤਰਾ ਦੇ ਹਵਾਲੇ ਨਾਲ ਜੋ ਵੀ ਗ੍ਰਹਿਣ ਕਰਦਾ ਹੈ, ਉਹ ਉਸ ਦਾ ਅਨੁਭਵ ਬਣ ਜਾਂਦਾ ਹੈ। ਅਨੁਭਵ, ਗਿਆਨ ਇੰਦਰੀਆਂ ਦੁਆਰਾ ਪ੍ਰਾਪਤ ਹੁੰਦਾ ਹੈ, ਪਰੰਤੂ ਅਨੁਭੂਤੀ ਸ਼ਬਦ ਦੁਆਰਾ ਪ੍ਰਾਪਤ ਹੁੰਦੀ ਹੈ। ਇਸ ਲਈ ਪ੍ਰੇਮ ਦੀ ਅਨੁਭੂਤੀ ਹੋਵੇਗੀ, ਪਰ ਪ੍ਰੇਮ ਦਾ ਪ੍ਰਗਟਾਵਾ, ਉਸ ਦਾ ਅਨੁਭਵ ਹੋਵੇਗਾ। ਅਨੁਭਵ ਭੌਤਿਕਤਾ 'ਤੇ ਆਧਾਰਿਤ ਹੁੰਦਾ ਹੈ, ਭਾਵੇਂ ਉਹ ਭੌਤਿਕ ਵਰਤਾਰਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ ਹੋਵੇ ਜਾਂ ਫਿਰ ਪਰਾਭੌਤਿਕ ਵਰਤਾਰਿਆਂ ਨਾਲ। ਕਿਉਂਕਿ ਪਰਾਭੌਤਿਕ ਦਾ ਅਨੁਭਵ ਵੀ ਭੌਤਿਕਤਾ ਦੇ ਹਵਾਲੇ ਨਾਲ ਹੀ ਸੰਭਵ ਹੁੰਦਾ ਹੈ। ਕੋਈ ਵੀ ਸਾਹਿਤਕ ਰਚਨਾ, ਸਾਹਿਤਕਾਰ ਦੇ ਨਿੱਜੀ ਅਨੁਭਵ ਦਾ ਪ੍ਰਗਟਾਵਾ ਹੁੰਦੀ ਹੈ, ਪਰ ਪਾਠਕ ਦੁਆਰਾ ਇਸ ਅਨੁਭਵ 'ਤੇ ਆਧਾਰਿਤ ਸੋਝੀ ਅਨੁਭੂਤੀ ਅਖਵਾਉਂਦੀ ਹੈ। ਰਚਨਾ ਦੇ ਅਨੁਭਵ ਨੂੰ ਤਾਂ



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ਡਾ. ਰਾਜਿੰਦਰ ਕੁਮਾਰ ਸੇਨ
ਰਜਨਦੀਪ ਕੌਰ

ਸਾਹਿਤ ਮਨੁੱਖੀ ਭਾਵਨਾਵਾਂ ਦੇ ਪ੍ਰਗਟਾਵੇ ਦਾ ਪ੍ਰਭਾਵਸ਼ਾਲੀ ਸਾਧਨ ਹੈ। ਮਨੁੱਖੀ ਜੀਵਨ ਦੇ ਸਮਾਜਿਕ, ਆਰਥਿਕ, ਸਭਿਆਚਾਰਕ, ਰਾਜਨੀਤਿਕ, ਅਤੇ ਧਾਰਮਿਕ ਪੱਖ ਸਾਹਿਤ ਵਿਚ ਕਿਸੇ ਨਾ ਕਿਸੇ ਰੂਪ ਵਿਚ ਉਜਾਗਰ ਹੁੰਦੇ ਹਨ। ਸਮਾਜ ਦੇ ਸਕਰਾਤਮਕ ਪਹਿਲੂਆਂ ਦੇ ਨਾਲ-ਨਾਲ ਸਾਹਿਤ ਇਸਦੇ ਨਕਰਾਤਮਕ ਪੱਖਾਂ ਤੇ ਵੀ ਚਾਨਣ ਪਾਉਂਦਾ ਹੈ। ਸਾਹਿਤ ਸਮਾਜ ਵਿਚ ਹੋ ਰਹੇ ਅਨਿਆਂ, ਭੇਦ-ਭਾਵ, ਅਤੇ ਜੁਲਮ ਨੂੰ, ਚਾਹੇ ਉਹ ਕਿਤੇ ਵੀ, ਕਿਸੇ ਤੋਂ ਵੀ, ਕਿਸੇ ਵੀ ਰੂਪ ਵਿਚ ਹੋ ਰਿਹਾ ਹੋਵੇ, ਨੂੰ ਇਨ-ਬਿਨ ਸਾਡੇ ਸਾਹਮਣੇ ਪੇਸ਼ ਕਰਦਾ ਹੈ। ਸਾਹਿਤ ਇਸ ਪ੍ਰਗਟਾਵੇ ਦੇ ਨਾਲ ਸਾਨੂੰ ਆਪਸੀ ਭੇਦਭਾਵ ਅਤੇ ਵਿਤਕਰੇ ਤੋਂ ਉੱਤੇ ਚੁੱਕਣ ਲਈ ਯਤਨਸ਼ੀਲ ਰਹਿੰਦਾ ਹੈ, ਫਿਰ ਉਹ ਭੇਦਭਾਵ ਜਾਤੀ ਨੂੰ ਲੈ ਕੇ ਹੋ ਰਿਹਾ ਹੋਵੇ ਜਾਂ ਫਿਰ ਲਿੰਗ, ਨਸਲ, ਸ਼੍ਰੇਣੀ ਆਦਿ ਦੇ ਅਧਾਰ ਤੇ ਕੀਤਾ ਜਾ ਰਿਹਾ ਹੋਵੇ। ਭਾਰਤੀ ਸਮਾਜ ਵਿਚ ਵੀ ਇੱਕ ਵਰਗ ਅਜਿਹਾ ਹੈ ਜੋ ਸਦੀਆਂ ਤੋਂ ਹੀ ਵਿਤਕਰੇ ਦਾ ਸ਼ਿਕਾਰ ਹੁੰਦਾ ਆ ਰਿਹਾ ਹੈ- ਉਹ ਹੈ ਦਲਿਤ ਵਰਗ।

ਦਲਿਤ ਸ਼ਬਦ ਦਾ ਅਰਥ ਹੈ-ਜਿਸਦਾ ਦਲਣ ਅਤੇ ਦਮਨ ਹੋਇਆ ਹੈ, ਦਬਾਇਆ ਗਿਆ ਹੈ, ਪੀੜਤ, ਸੋਜਿਤ, ਸਤਾਇਆ ਹੋਇਆ, ਭੋਗਿਆ ਹੋਇਆ, ਅਣਗੌਲਿਆ, ਪ੍ਰਿਣਤ, ਲਤਾੜਿਆ ਹੋਇਆ, ਮਸਲਿਆ ਹੋਇਆ, ਕੁਚਲਿਆ ਹੋਇਆ, ਵਨਿਸ਼ਟ, ਮਰਦਿਤ, ਹਿਮਤ ਹਾਰਿਆ ਹੋਇਆ, ਵੰਚਿਤ ਆਦਿ। (ਵਾਲਮੀਕਿ 13)

“ਦਲਿਤ ਸ਼ਬਦ ਸਮਾਜ ਦੇ ਸਭ ਤੋਂ ਨੀਵੇਂ ਪੱਧਰ ਤੇ ਜੀਵਨ ਬਤੀਤ ਕਰਨ ਲਈ ਮਜਬੂਰ ਕਰ ਦਿੱਤੀ ਗਈ ਅਣਗੌਲੀ ਜਾਤੀ ਲਈ ਪ੍ਰਚਲਿੱਤ ਹੈ।”

(ਪਾਠ 24) ਦਲਿਤ ਸਦੀਆਂ ਤੋਂ ਹੀ ਸਮਾਜ ਵੱਲੋਂ ਨਕਾਰੇ ਅਤੇ ਡਿਗਸਕਾਰੇ ਸਾਹਿਤ ਹੋ ਰਹੇ ਹਨ ਅਤੇ ਉਹਨਾਂ ਨੂੰ ਹਮੇਸ਼ਾ ਉਹਨਾਂ ਦੇ ਬਣਦੇ ਹੱਕਾਂ ਤੋਂ ਵਾਂਝਾ ਰੱਖਿਆ ਗਿਆ ਹੈ। ਕਿੱਤਿਆਂ ਦੇ ਅਧਾਰ ਤੇ ਇਹਨਾਂ ਨੂੰ ਸ਼੍ਰੇਣੀਬੱਧ ਕੀਤਾ ਜਾਣਾ ਰਿਹਾ ਹੈ। ਉੱਚ ਸ਼੍ਰੇਣੀ ਦੇ ਲੋਕਾਂ ਦੀ ਸੁਵਿਧਾ ਅਤੇ ਸੇਵਾ ਲਈ ਦਲਿਤ ਲੋਕਾਂ ਦੇ ਕਿੱਤੇ ਨਿਯਤ ਹੁੰਦੇ ਸਨ ਅਤੇ ਉਹਨਾਂ ਦੀ ਸੰਝਾਨ ਵੀ ਅੱਗੇ ਉਹੀ ਰਿਹਾ ਆਪਣਾ ਕੇ ਉੱਚ ਵਰਗ ਦੇ ਲੋਕਾਂ ਦੀ ਖਿਦਮਤ ਕਰਦੀ ਸੀ। ਇਸ ਤਰ੍ਹਾਂ ਇਹਨਾਂ ਦੀ ਸਾਰੀ ਸ਼ਿਦਗੀ ਆਪਣੇ ਆਪ ਨੂੰ ਵੱਡਾ ਸਮਝਣ ਵਾਲੀ ਸ਼੍ਰੇਣੀ ਦੇ ਆਖਿਆਂ ਦੇ ਰੂਪ ਵਿਚ ਹੀ ਗੁਜਰ ਜਾਂਦੀ ਸੀ।

ਪਰ ਹੁਣ ਸਥਿਤੀ ਬਹੁਤ ਬਦਲ ਚੁੱਕੀ ਹੈ, ਹੁਣ ਦਲਿਤ ਲੋਕ ਪਹਿਲਾਂ ਵਾਂਗ ਚੁੱਪਚਾਪ ਵਧੀਕੀਆਂ, ਵਿਤਕਰਾ, ਅਤੇ ਅਪਮਾਨ ਸਹਿਣ ਨਹੀਂ ਕਰਦੇ। ਉਹ ਆਪਣੇ ਹੱਕਾਂ ਨੂੰ ਲੈ ਕੇ ਜਾਗ੍ਰਿਤ ਹੋ ਰਹੇ ਹਨ। ਭਾਰਤੀ ਸੰਵਿਧਾਨ ਵਿਚ ਮਿਲੇ ਆਪਣੇ ਹੱਕਾਂ ਤੋਂ ਉਹ ਹੁਣ ਪਹਿਲਾਂ ਵਾਂਗ ਅਨਜਾਣ ਨਹੀਂ ਹਨ। ਉਹ ਆਪਣੇ ਨਾਲ ਹੁੰਦੀ ਨਾਇਨਸਾਫ਼ੀ ਅਤੇ ਜੁਲਮ ਦਾ ਵਿਰੋਧ ਕਰਦੇ ਹਨ, ਇਹ ਵਿਰੋਧ ਦੀ ਭਾਵਨਾ ਹੀ ਉਹਨਾਂ ਦੀ ਚੇਤਨਾ ਦਾ ਪ੍ਰਤੀਕ ਹੈ ਕਿ ਉਹ ਹੁਣ ਵਿਚਾਰੇ ਜਾ ਨਿਤਾਣੇ ਨਹੀਂ ਰਹੇ ਸਗੋਂ ਆਪਣੇ ਨਾਲ ਹੋ ਰਹੇ ਵਿਤਕਰੇ ਖਿਲਾਫ਼ ਆਵਾਜ਼ ਚੁੱਕ ਰਹੇ ਹਨ। ਸਾਹਿਤ ਵਿਚ ਦਲਿਤ ਵਰਗ ਦੇ ਹੋ ਰਹੇ ਸੋਸ਼ਣ ਦੇ ਪ੍ਰਗਟਾਵੇ ਦੇ ਨਾਲ ਨਾਲ ਉਹਨਾਂ ਵਿਚ ਪੈਦਾ ਹੋ ਰਹੀ ਚੇਤਨਾ ਵੀ ਦ੍ਰਿਸ਼ਟੀਮਾਨ ਹੁੰਦੀ ਹੈ। ਸਾਹਿਤ ਬਾਗੂਲ ਦੀ ਧਾਰਨਾ ਹੈ:

ਦਲਿਤ ਚੇਤਨਾ ਸਾਹਿਤ ਅਤੇ ਆਮ ਆਦਮੀ ਦੇ ਸੰਬੰਧਾਂ ਨੂੰ ਵਿਆਪਕਤਾ ਦਿੰਦੀ ਹੈ। ਦਲਿਤ ਸਾਹਿਤ ਇਨਸਾਨ ਨੂੰ ਕੇਂਦਰ ਬਣਾਉਂਦਾ ਹੈ। ਇਨਸਾਨ ਨੂੰ ਮਹਾਨਤਾ ਦਿੰਦਾ ਹੈ। ਇਨਸਾਨ ਕੁਦਰਤ ਦਾ ਇਕ ਛੋਟਾ ਜਿਹਾ ਰੂਪ ਹੈ। ਕੁਦਰਤ ਹਮੇਸ਼ਾਂ ਗਤੀਸ਼ੀਲ ਅਤੇ ਸਿਰਜਣਸ਼ੀਲ ਹੋਣੀ ਚਾਹੀਦੀ ਹੈ। ਪ੍ਰਤੀਤਰਤਾ, ਸਮਾਨਤਾ, ਅਤੇ ਭਾਈਚਾਰੇ ਦੀ ਮੂਲ ਭਾਵਨਾ ਦਲਿਤ ਸਾਹਿਤ ਦੀ ਮੂਲ ਗਰਭ ਚੇਤਨਾ ਹੈ। ਦਲਿਤ ਸਾਹਿਤ ਦਾ ਅਨੁਭਵ ਪਰੰਪਰਾਗਤ ਸਾਹਿਤ ਤੋਂ ਮਿਲਕੂਲ ਵੱਖਰਾ ਹੈ ਕਿਉਂਕਿ ਦਲਿਤ ਚੇਤਨਾ ਮਨੁੱਖ ਦੀ ਮੁਕਤੀ ਦੀ ਗੱਲ ਕਰਦੀ ਹੈ। (ਵਾਲਮੀਕਿ 30)

ਦਲਿਤ ਚੇਤਨਾ ਵਾਲਾ ਸਾਹਿਤ ਜਿੱਥੇ ਦਲਿਤ ਸਮਾਜ ਵਿਚ ਆ ਰਹੀ ਸਾਹਿਤੀ ਦਾ ਪ੍ਰਤੀਕ ਹੈ ਉੱਥੇ ਹੀ ਇਹ ਅਨਿਆਂ ਸਹਿਣ ਕਰ ਰਹੇ ਲੋਕਾਂ ਲਈ

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