

DR. VIVEK KUMAR GAURAV

T-10, Vikaskunj Hostel, IIT Roorkee, Roorkee, Uttarakhand, India-247667.

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Education

PhD (Environmental Engineering)

Indian Institute of Technology Roorkee

Awarded, August 2019

Masters, Biotechnology

Department of Biotechnology, HRD sponsored
Host- H.N.B. Garhwal Central University
Srinagar, Uttarakhand

Graduated, July 2012

Marks 71%

Division I

Bachelor, Chemistry (Hons.)

Institute of Science
Banaras Hindu University
Varanasi, Uttar Pradesh

Graduated, May 2010

Marks 70%

Division 1

10+2

Sunbeam School
CBSE Board
Varanasi, Uttar Pradesh

Graduated, July 2005

Marks 65%

Division 1

RESEARCH

- Monitoring and risk assessment of ecological health & human health in polluted areas.
- Hand on experience on Analytical instrument related to qualitative & quantitative estimation of contaminants in soil and groundwater.
- Field work, data collection, survey and data interpretation.

Publications

- **Gaurav, Vivek Kumar,** and Chhaya Sharma. "Estimating health risks in metal contaminated land for sustainable agriculture in peri-urban industrial areas using Monte Carlo probabilistic approach." *Sustainable Computing: Informatics and Systems* (2019). DOI: <https://doi.org/10.1016/j.suscom.2019.01.012>
- **Gaurav, Vivek Kumar,** and Chhaya Sharma. "Assessment of Metal Accumulation in the Vegetables and Associated Health Risk in the Upper-Most Ganga-Yamuna Doab Region, India." *Plants, Soil and Environment, AJPS*, (2018). DOI: <https://doi.org/10.4236/ajps.2018.912170>
- **Gaurav, Vivek Kumar,** et al. "Fuzzy-based Probabilistic Ecological Risk Assessment Approach: A Case Study of Heavy Metal Contaminated Soil, pp. 419-431.

" **Soft Computing: Theories and Applications**", Springer, (2018).
DOI: https://doi.org/10.1007/978-981-10-5699-4_39

- Kumar, Dushyant, **Vivek Kumar Gaurav**, and Chhaya Sharma. "Ecofriendly Remediation of Pulp and Paper Industry Wastewater by Electrocoagulation and Its Application in Agriculture." *American Journal of Plant Sciences* 9 (2018): 2462-2479.
- Tripathi, A., Bagchi, S., Singh, J., **Gaurav, V.**, & Pal Singh Negi, M. (2016). Effect of Different Firing Temperatures on Structural Changes in Porcelain. *Journal of Prosthodontics*. DOI: <https://onlinelibrary.wiley.com/doi/abs/10.1111/jopr.12484>

International Conferences

- **Gaurav, VK**, and Chhaya Sharma, "Heavy metal contamination and related risk in private and government installed handpumps. A comparative study in industrial area of Saharanpur district, India". International Conference on Water and Environmental Engineering (iCWEE-2017). **Western Sydney University (Parramatta Campus), Sydney, Australia (2017)**.
- **Gaurav et al.**, "Fuzzy based probabilistic ecological risk assessment", International conference on Soft Computing: Theories and Applications (SoCTA-2016), **Jaipur, India, 2016**.
- **Gaurav, VK**, and Chhaya Sharma, "Influence of pulp and paper industry wastewater on soil urease activity", Fifth International Conference on Plant & Environmental Pollution. **National Botanical Research Centre (CSIR), Lucknow, India, 2015**.

Book Chapter

- **Gaurav, VK**, & Rawat Garima, "Impact of Climate Change on Migration and Resultant Human Insecurities". **Science, Spirituality and Civilization**, Publisher: TBS PLANET (2018);
ISBN-10: 938687699X; Amazon link: <https://www.amazon.in/dp/938687699X>

Training/ Workshops

- BRNS-AEACI 10th School on Analytical Chemistry.
BARC, Trombay, Mumbai
2015
- Training Course on Cleaner Technology in Pulp & paper Industry
Department of Paper Technology, Roorkee
2014
- Advanced training program pollution monitoring techniques & instrumentations
Centre of Science & Environment, New Delhi
2014

Other Professional Credentials

- Member of **Association of Environmental Analytical Chemistry of India (AEACI)**
Bhabha Atomic Research Centre (BARC), Mumbai, India.
- Reviewer- **Journal of Exposure and Health, Springer Nature**
- Editorial Member of Acta Scientific Journal

COMPUTATIONAL SKILL

- Advance level applications of MS office
- Simulation based research on software (MATLAB, Origin & Crystal Ball-Monte Carlo Simulation)
- Mapping software (Arc GIS)

AWARDS

- GATE- 2012
- MHRD Teaching Assistantship (IIT Roorkee)- 2013
- UGC NET-2015 (Environmental Science)
- IIT R – Alumni travel grant- 2017

INTERNATIONAL VISITS

- Sydney, Australia – As a speaker in International Conference (ICWEE-2017)
- Sri Lanka- As a Project Officer, International Relations, IIT Roorkee (2020)

EXPERIENCE

Junior Research Fellow

Environment Research Lab, DPT, IIT Roorkee

01-01-2013 to
01-01-2015

Senior Research Fellow

Environment Research Lab, DPT, IIT Roorkee

02-01-2015 to
28-02-2019

Assistant Warden

Malviya Bhawan Hostel, IIT Roorkee

June 2016 to
March-2018

Research Associate

ONGC funded project, Department of Paper Technology, IIT Roorkee

01-03-2019 to
06-12-2019

Project Officer

International Relations Office, IIT Roorkee

10-12-2019 to
31-03-2020

PERSONAL INTERESTS

Musical instrument playing & composing, Travelling, Hiking and playing tennis.

PERSONAL DETAILS

Father's Name: Shri C. Lal

DOB: 8th Feb 1987

Permanent Address: N 9/38-G-20 A, Kedarnagar Colony,
Sunderpur-BHU Road, Varanasi 221005 (UP)

Marital status: Married

Nationality: Indian

DECLARATION

I, **Vivek Kumar Gaurav**, hereby declare that the information contained herein is true and correct to the best of my knowledge and belief.

A handwritten signature in blue ink, reading "Vivek", with a long horizontal stroke extending to the right.

Vivek KumarGaurav

Date: 23-06-2021

Place: Roorkee, Uttarakhand



LIST OF PUBLICATIONS

a) In Scientific Journals

- **Gaurav, Vivek Kumar**, and Chhaya Sharma. "Estimating health risks in metal contaminated land for sustainable agriculture in peri-urban industrial areas using Monte Carlo probabilistic approach." *Sustainable Computing: Informatics and Systems* (2019). DOI: <https://doi.org/10.1016/j.suscom.2019.01.012>
SCI (Thomson Reuter; IF: 2.798)
- Tripathi, A., Bagchi, S., Singh, J., **Gaurav, V.**, & Pal Singh Negi, M. (2016). Effect of Different Firing Temperatures on Structural Changes in Porcelain. *Journal of Prosthodontics*. DOI: <https://onlinelibrary.wiley.com/doi/abs/10.1111/jopr.12484>
SCI (Thomson Reuter; IF: 2.187)
- **Gaurav, Vivek Kumar**, and Chhaya Sharma. " Assessment of Metal Accumulation in the Vegetables and Associated Health Risk in the Upper-Most Ganga-Yamuna Doab Region, India. " *Plants, Soil and Environment, AJPS*, (2018). DOI: <https://doi.org/10.4236/ajps.2018.912170>
(Web of Science, IF: 1.41)
- Kumar, Dushyant; **Gaurav, VK** and Chhaya Sharma. "Eco-friendly Remediation of Pulp and Paper Industry Wastewater by Electrocoagulation and Its Application in Agriculture." *American Journal of Plant Sciences* 9 (2018): 2462-2479
DOI: <https://doi.org/10.4236/ajps.2018.912178>
(Web of Science, IF: 1.41)

b) In books/Proceedings

- **Gaurav, Vivek Kumar**, et al. "Fuzzy-based Probabilistic Ecological Risk Assessment Approach: A Case Study of Heavy Metal Contaminated Soil, pp. 419-431. " *Soft Computing: Theories and Applications*", Springer, (2018). DOI: https://doi.org/10.1007/978-981-10-5699-4_39
- **Gaurav, VK**, & Rawat Garima, "Impact of Climate Change on Migration and Resultant Human Insecurities". **Science, Spirituality and Civilization**, Publisher: TBS PLANET (2018); ISBN-10: 938687699X; Amazon link: <https://www.amazon.in/dp/938687699X>
- **Gaurav, VK**, and Chhaya Sharma, "Heavy metal contamination and

related risk in private and government installed handpumps. A comparative study in industrial area of Saharanpur district, India”. International Conference on Water and Environmental Engineering (iCWEE-2017). Western Sydney University (Parramatta Campus), Sydney, Australia (2017). http://www.icwee.net.au/proceedings/1st/8_ICWEE2017.pdf ISBN: 978-0-6480147-4-4

- **Gaurav, VK**, and Chhaya Sharma, “Influence of pulp and paper industry wastewater on soil urease activity”, Fifth International Conference on Plant & Environmental Pollution. National Botanical Research Centre (CSIR), Lucknow, India, (2015).

Divek



Soft Computing: Theories and Applications pp 419–431 | Cite as

Fuzzy-based Probabilistic Ecological Risk Assessment Approach: A Case Study of Heavy Metal Contaminated Soil

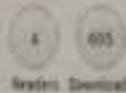
Authors

Authors and affiliations

Vivek Kumar Gaurav , Chhaya Sharma, Rakesh Bhatia, Sushanta K. Sethi

Conference paper

First Online: 25 November 2017



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Abstract

The ecological risk assessment tools, viz. index of geoaccumulation (I_{geo}) and enrichment factor (EF), are the classical models for the assessment of risk related to the soil and sediment contamination. These models are well classified into several classes for the assessment of contamination risk. The vagueness in the estimation of risk associated with these models creates voids for computational approaches. In the present study, fuzzy-based probabilistic model was developed to restrict the vagueness of risk estimation. Both I_{geo} and EF were taken as input variables for aggregate risk determination. The linguistic attributes were assigned for risk estimation and qualitative scale presented as trapezoidal fuzzy number. For the validation of methodology, a case study was taken into the account for risk determination. The fuzzy-based aggregate risk assessment revealed high risk of cadmium and arsenic toxicity in the study area with the risk score of 0.751 and 0.698, respectively. The fuzzy-based risk assessment is a conceptual methodology that restricts the vagueness in the estimation of risk for better decision-making approach.

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Keywords

1. Introduction

2. Material and methods

3. Result and discussion

4. Conclusion

Acknowledgements

Appendix A. Supplementary data

References

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Sustainable Computing: Informatics and Systems

Available online 5 February 2019

In Press, Corrected Proof



Estimating health risks in metal contaminated land for sustainable agriculture in peri-urban industrial areas using Monte Carlo probabilistic approach

Vivek Kumar Gaurav, Chhaya Sharma R. 22

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<https://doi.org/10.1016/j.susc.2019.01.012>

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Figures (4)



Highlights

- Heavy metal contamination and associated health risk was estimated.
- Significant risk was observed for Cr and As contamination.
- HQ and cancerous risk as found to be higher in children in comparison to the adults.
- Monte Carlo simulation was used for probabilistic risk assessment.

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Assessment of Metal Accumulation in the Vegetables and Associated Health Risk in the Upper-Most Ganga-Yamuna Doab Region, India

Vivek Kumar Gaurav, Dushyant Kumar, Chhaya Sharma*

Environmental Research Laboratory, Department of Paper Technology, Indian Institute of Technology Roorkee, Roorkee, India

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How to cite this paper: Gaurav, V.K., Kumar, D. and Sharma, C. (2018) Assessment of Metal Accumulation in the Vegetables and Associated Health Risk in the Upper-Most Ganga-Yamuna Doab Region, India. *American Journal of Plant Sciences*, 9, 2347-2358.

<https://doi.org/10.4236/ajps.2018.912170>

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Abstract

The present study indicates the status of metal contamination in the vegetables/crops grown in the upper most Ganga-Yamuna doab region of India and associated health risk. Commonly grown vegetables and crops were sampled and analyzed for the metal contamination. Maximum concentration (mg/kg) of Cd and Cr, was observed in Radish (7.6) and Cabbage (56.24) respectively, whereas maximum concentration of Pb, Ni and Zn was observed in the edible parts of Mustard plant (95.4, 58.6, 756.43 respectively). Bio-concentration factor (BCF) value indicated the transfer level of metal from soil to crop; indicated high transfer value of Cd in Radish followed by cabbage and spinach. Considerably high BCF value was observed in the Mustard (8.13), Cabbage (4.18) and radish (3.07) for Zn contamination. Estimated daily intake (EDI) and Hazard quotient (HQ) or Non-carcinogenic health risk was calculated using the USEPA method. The result revealed that the metal intake and associated health risk were considerably high in the children population in comparison to the adult population.

Keywords

Heavy Metal, Bio-Concentration Factor, Estimated Daily Intake, Health Risk, Hazard Quotient

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Ecofriendly Remediation of Pulp and Paper Industry Wastewater by Electrocoagulation and Its Application in Agriculture

Dushyant Kumar, Vivek Kumar Gaurav, Chhaya Sharma*

Environmental Research Laboratory, Department of Paper Technology, Indian Institute of Technology Roorkee, Saharanpur Campus, Saharanpur, India

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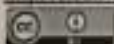
How to cite this paper: Kumar, D., Gaurav, V.K. and Sharma, C. (2018) Ecofriendly Remediation of Pulp and Paper Industry Wastewater by Electrocoagulation and Its Application in Agriculture. *American Journal of Plant Sciences*, 9, 2462-2479.
<https://doi.org/10.4236/ajps.2018.912178>

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Abstract

In the present study pulp and paper industry effluent was treated with the help of aluminum electrode using electrocoagulation (EC) process with feasible sludge management. The influences of pH, time, current density and electrolytes dose were investigated and optimum conditions were established to reduce the maximum amount of Chemical Oxygen Demand (COD) and color. At optimum conditions 70% of COD and 98% of color were removed. Additionally, the behavior of electrolytes (NaCl and Na₂SO₄) was determined; it has shown that Na₂SO₄ results in the generation of less secondary pollutants than that NaCl and thereby could be used as better replacement in paper industries for electrocoagulation mediated treatment of wastewater. The residual amount of operational parameters in EC treated water was compared to the World Health Organization (WHO) and Central Pollution Control Board (CPCB) of India. It was found to be safe for utilization in irrigation. Furthermore, sludge produced during the EC process has been analyzed for physicochemical characteristics. To understand the physical and elemental phases of sludge, the analytical technique such as field emission electron microscope coupled with energy dispersive spectroscopy has been used to find out the possible management alternative.

Keywords

Pulp and Paper Wastewater, Electrocoagulation, Reuse, Irrigation, Sustainable

Dr. Chhaya
SELF ATTESTED

Effect of Different Firing Temperatures on Structural Changes in Porcelain

Arvind Tripathi, MDS, FACS, MNAMS, FICD,¹ Soumyajeet Bagchi, BDS,² Juhi Singh, BDS,² Vivek Gaurav, M.Sc.³ & Mahendra Pal Singh Negi, M.Sc.⁴

¹Dean, Postgraduate Studies and Research, Saranwati Dental College and Hospital, Lucknow, India

²Department of Prosthodontics, Saranwati Dental College and Hospital, Lucknow, India

³Indian Institute of Technology, Varanasi Campus, Varanasi, India

⁴Institute for Data Computing and Training, Lucknow, India

Keywords

Porcelain; firing temperature; firing mode; temperature gradient; ceramic mass; porosity

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The authors declare any conflict of interest

Accepted February 27, 2016

doi:10.1111/jcpp.12484

Abstract

Purpose: To study the structural changes occurring in the dental porcelain mass fired at various firing temperatures using scanning electron microscopy (SEM) and X-ray diffraction (XRD) spectroscopy. Also, additional tests, namely compressive strength, abrasion resistance analysis, and the amount of oxides released, were conducted at different firing temperatures.

Materials and Methods: Six groups (40 specimens in each group) of porcelain mass were prepared. The dimensions and weight of all the specimens were kept constant. The specimens were then heat treated at different firing temperatures (660°C, 760°C, 860°C, 900°C, 960°C, 990°C). Half of the specimens of each group were subjected to a compressive strength test on a universal testing machine and then finely ground using an electrochemical grinder to prepare for XRD analysis. The other half of the specimens was weighed to analyze the amount of oxides released after each firing cycle. Following this, the specimens underwent an abrasion resistance test on a Nanoscan Tribometer. The unaltered surface was scanned using SEM. The data (numerical and graphical) for all the tests were recorded and analyzed using one-way ANOVA and post hoc Tukey test.

Results: The specimens fired at 900°C exhibited superior compressive strength and abrasion resistance. The quantity of oxides released by the specimens fired at 900°C was the least compared to specimens heat treated at the other firing temperatures. XRD analysis proved that the oxide released by the porcelain mass was calcium aluminum chromium oxide. Also, the fewer peaks obtained in the XRD graphs of specimens fired at 900°C signified lesser porosities in the porcelain specimens. SEM analysis depicted a homogeneous mass of porcelain at 900°C.

Conclusion: All the above findings validate the objective of studying the physical and internal structural changes of dental porcelain when subjected to an increasing firing temperature gradient. The specimens fired at 900°C exhibited superior strength and abrasion resistance. SEM analysis depicted a homogeneous mass of dental porcelain, implying that firing was complete at 900°C.

Dental porcelain contains metallic and non-metallic elements—aluminum and oxygen (alumina, Al_2O_3), calcium and oxygen (calcia, CaO), and silicon and nitrogen (silicon nitride, Si_3N_4).¹ The molecules of this material are held together by inter-atomic bonding, which is both ionic and covalent.²⁻⁴

Alumina was the first sintered industrial ceramic to be used in prosthodontics. The desirable properties are achieved through a heat treatment process called firing.⁵⁻⁶ The optimum firing temperature to which dental porcelains are heated is 960°C. It has been frequently observed clinically that on

application of masticatory stresses, the porcelain layer on fixed dental prostheses (FDPs) gets fragmented, resulting in prosthesis failure.⁷⁻¹¹ The condensed ceramic is dried before it is fired so that the remaining water is eliminated. This improves the green strength of porcelain.^{12,13}

As the ceramic mass is heated across a temperature gradient, the physical structure undergoes continuous transitions. Initially the feldspathic grain boundaries melt and this leads to the merging of grain boundaries among the neighboring particles. With rise in firing temperature, the larger grains receive

Arvind Tripathi
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Heavy metal contamination and related risk in private and government installed hand-pumps. A comparative study in industrial area of Saharanpur district, India.

Vivek Kumar Gaurav¹ and Chhaya Sharma²

¹Research Scholar, Indian Institute of Technology Roorkee, India

²Associate Professor, Indian Institute of Technology Roorkee, India

Corresponding author's E-mail: gaurav.vivek08@gmail.com

Abstract

Groundwater contamination is a major concern in industrial areas of Saharanpur district. Long term use of wastewater as irrigation source contributed considerably to the metal concentration in the groundwater. Serious health related issues are prevalent in the area due to contaminated groundwater. Hand-pumps are the major equipment for drawing groundwater for household purposes. Surveying with local people revealed the fact that 80% of the population suffering from health related issues use private hand-pumps, which was further justified by the estimation of heavy metal concentration sampled from both private and government installed hand-pumps. Total of 30 samples; 11 samples from government installed hand-pumps and 19 from private hand-pumps were collected and heavy metal contamination was analysed. Samples from private hand-pumps were found to be more contaminated than government installed hand-pumps. High concentration of As, Cd, Cr, Ni and Pb; 5.28 µg/l, 0.54 µg/l, 16.3 µg/l, 71.4 µg/l and 7.82 µg/l respectively were observed in the sample collected from private hand-pumps. Health risk was estimated by Health quotient (HQ) in both adult and children population; risk was found to be high in children. It has been observed that the depth at which hand-pumps are installed has a crucial impact on the quality of water. Survey also revealed that most of the private hand-pumps installed at the depth of 18.2 m to 56.38 m whereas government hand-pumps are installed on average of 67.05 m depth. The upper level of water aquifer is highly contaminated due to poor environmental management strategies, lack of environmental education in the population and various other factors which has been briefed in this work.

Keywords: Heavy metal, groundwater contamination, health risk, health quotient.

1. INTRODUCTION

Industrial expansion without adequate environmental management is a serious concern in developing countries like India. Unmanaged disposal of industrial effluents and long term application of industrial effluents for irrigation purpose has resulted into severe groundwater contamination in

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5th International Conference on Plants & Environmental Pollution (ICPEP-5)

International Society of Environmental Botanists (ISEB) and National Botanical Research Institute, Lucknow (NBRI)

Fifth International conference on Plants & Environmental Pollution (ICPEP-5) | XIV / P-5

INFLUENCE OF PULP AND PAPER INDUSTRY WASTEWATER ON SOIL UREASE ACTIVITY

Vivek Kr. Gaurav*, Chhaya Sharma

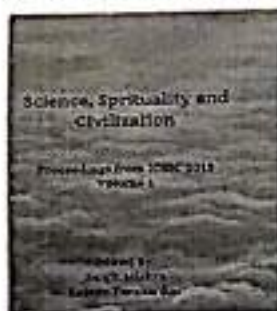
Environmental Research Laboratory, Indian Institute of Technology Roorkee, Saharanpur Campus, Saharanpur-247001, India.

Abstract

Effluent from pulp and paper industries are highly toxic, this toxic nature is on account of the presence of several chemical compounds which are formed and released during various stages of papermaking. The biochemical and microbiological status of the soil has often been proposed as a sensitive indicator of soil ecological stress. Urease is an important enzyme responsible for nitrogen metabolism and particularly gained attention due to agricultural importance of urea as its substrate. Influence of pulp and paper industry wastewater on Urease activity of twelve soil samples from the area situated near by paper mill discharge at Saharanpur district were investigated. Soil samples were collected from 13 sites at a depth of 5-10 cm and the distance between the collecting sites was in the range of 50-100 m, including one reference site which was considerably far from the discharge and supposed to be uninfluenced with paper mill effluent contamination. Out of twelve samples, six samples were taken from agriculture land and rest from non-agricultural sites situated in vicinity to the paper mill discharge area. The average pH of soil samples collected from different sites varied from 5.8 to 7.6 whereas moisture content and soil organic carbon content ranged between 28.6-36.6% and 12.40-7.88% respectively. Considerable reduction in urease activity was observed both in the samples from agricultural site and non agricultural site near by paper mill drainage in comparison to the activity at reference site which was observed 7.70 mg $\text{NH}_4^+\text{-N g}^{-1} \text{h}^{-1}$. Urease activity in the samples from agricultural field and non-agricultural field was observed to be 54.41% to 75.06% and 76.10% to 97.53% respectively lesser than the urease activity at the reference site. Heavy metal analysis was also performed to support the inference.

Keywords: Soil enzyme; Urease; Pulp and paper industry; Effluent; Saharanpur; toxicity.

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TABLE OF CONTENTS

Chapter 1: Science and Civilization

Ethics as Philosophical Foundations of Science	Dr. Olga V Pchelina	13
Today's Modern Science, An Offspring of Yesterday's Metascience	Harshal N. Deota, Nilambar P.	26
Role of Human Values in Artificially Civilized Society	Dr. Jyoti Kulshreshtha	32
Avoiding Technology Overuse In Science Education for Holistic Well Being of School And College Students	Manoj Kannan, Sandhya Marathe, Paritosh Shukla And Pankaj Kumar Sharma	46
Synthesizing Science and Spirituality for A Holistic Development of Human Civilization	Ms. Malabika Sen, Dr. Pooja Gupta	61
Evolution of Civilized Society Through Science and Technology: A Study	Dr. Sandhya Singh	81
Impact of Climate Change on Migration and Resultant Human Insecurities	Vivek Kumar Gaurav, Garima Rawat	88
Rabindranath Tagore's Views on Science and Spiritualism	Dr. Kiran Sharma	103

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