Plant Cell Reports (2024) 43:161
https://doi.org/10.1007/s00299-024-03239-2

FOCUS ARTICLE

Blue light perceiving CRY proteins: protecting plants from DNA damage

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Received: 11 April 2024 / Accepted: 17 May 2024 / Published online: 3 June 2024

Cryptochromes are flavin proteins that function as blue light photoreceptors in plants. These proteins were first discovered in Arabidopsis and were subsequently identified in other plants (Cashmore et al. 2003). These proteins have similarities with photolyases, the well-known enzymes associated with DNA repair (Cashmore et al. 2003; Guo et al. 2023). In Arabidopsis, there are three types of cryptochromes (CRY1 to CRY3) of which CRY1 and CRY2 are homologous (Cashmore et al. 2003; Yu et al. 2010; Guo et al. 2023). The primary function of cryptochromes involves hypocotyl elongation, floral initiation, photoperiodism, circadian rhythms, stomatal movement, tropic growth, root formation, and fruit development. It also regulates other processes such as cell cycle, programmed cell death, apical dominance, seed dormancy, and pathogenic responses (Liu et al. 2018; Yu et al. 2010; Guo et al. 2023). Besides, their role has also been reported in magnetoreception (Yu et al. 2010), where CRYs themselves act as magnetoreceptors (Guo et al. 2023).

CRY proteins have two domains at the N-terminus and C-terminus. The N-terminal domain possesses PHR (Photolyase-homologous region) which binds to the chromophore FAD (Flavin adenine dinucleotide) and CCE domain (CRY C-terminal extension). CRY proteins undergo light-dependent photophosphorylation and/or ubiquitination inside the nucleus which makes them adopt an open conformation, and this open conformation helps them to interact with different signaling intermediates. This interaction helps the cryptochrome to regulate developmental processes by regulating the respective gene expression [such as chlorophyll a/b binding protein gene (*CAB3* gene), chalcone synthase gene (*CHS* gene)], etc. (Yu et al. 2009, 2010). Moreover, the CRY proteins have also been shown to play an important role in DNA-double strand broken (DSBs) repair. DSBs are induced because of several exogenous as well as endogenous factors. The exogenous factors such as radiations, and chemical agents, and the endogenous factors such as oxidation, alkylation, and hydrolyses in DNA, result in various genetic errors in plants (Cannan and Pederson 2016; Da Silva 2021). In this focus article, we have discussed the role of CRY proteins in maintaining genetic stability through DSB repair in plants (Guo et al. 2023).

Importance of ADA2b in DNA-DSBs and its interaction with CRY1 and CRY2

Recently, Guo et al. (2023) have presented a new piece of work that describes the DSBs-repairing function of CRY proteins (Fig. 1). Authors have shown that DSBs-repair involves ADA2b, a transcriptional co-activator and a component of GCN5 complex (general control nonderepressible 5), (Kaldis et al. 2011), and chromosome 5/6 (SMC5/6) where SMC5/6 complex has an important role in DNA-repair (Uhlmann 2016). In this context, Guo et al. (2023) performed a yeast two-hybrid assay to establish the relation between CRY proteins and ADA2b. They found that amino termini of CRY1 and CRY2 (CNT1 and CNT2, respectively) do

Communicated by Neal Stewart.

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Plant Physiology and Biochemistry 208 (2024) 108471

Contents lists available at ScienceDirect

Plant Physiology and Biochemistry

journal homepage: www.elsevier.com/locate/plaphy

Arabidopsis BECLIN1-induced autophagy mediates reprogramming in tapetal programmed cell death by altering the gross cellular homeostasis

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ARTICLE INFO

Keywords:
Autophagy
BECLIN1
Anther tapetum
dPCD
Reactive oxygen species (ROS)

ABSTRACT

In flowering plants, the tapetum degeneration in post-meiotic anther occurs through developmental programmed cell death (dPCD), which is one of the most critical and sensitive steps for the proper development of male gametophytes and fertility. Yet the pathways of dPCD, its regulation, and its interaction with autophagy remain elusive. Here, we report that high-level expression of *Arabidopsis* autophagy-related gene *BECLIN1* (*BECN1 or AtATG6*) in the tobacco tapetum prior to their dPCD resulted in developmental defects. *BECN1* induces severe autophagy and multiple cytoplasm-to-vacuole pathways, which alters tapetal cell reactive oxygen species (ROS)-homeostasis that represses the tapetal dPCD. The transcriptome analysis reveals that *BECN1*- expression caused major changes in the pathway, resulting in altered cellular homeostasis in the tapetal cell. Moreover, BECN1-mediated autophagy reprograms the execution of tapetal PCD by altering the expression of the key developmental PCD marker genes: *SCPL48*, *CEP1*, *DMP4*, *BFN1*, *MC9*, *EXI1,* and Bcl-2 member *BAG5*, and *BAG6*. This study demonstrates that BECN1-mediated autophagy is inhibitory to the dPCD of the tapetum, but the severity of autophagy leads to autophagic death in the later stages. The delayed and altered mode of tapetal degeneration resulted in male sterility.

1. Introduction

In flowering plants, the normal development of anther, the specialized male reproductive organ, is a complex biological process but crucial for sexual reproduction (Ma, 2005). The anther consists of 4 distinct somatic layers: epidermis, endothecium, middle layer, and the tapetum, which surrounds male reproductive cells in each of the four lobes (Goldberg et al., 1993) from exterior to interior. The development of male gametophytes (microspores or pollens) depends on the functional crosstalk between the gametophytic and the sporophytic tissues (Goldberg et al., 1993; Ma, 2005; McCormick, 1993; R. Scott et al, 1991). Tapetal cells line over the developing male reproductive cells and undergo a series of developmental changes concurrent with male gametophyte development to serve, nourish, and architecture the male gametophyte (Feng and Dickinson, 2010). Tapetal cells provide wall material, nutrients, and enzymes initially through secretion and finally by degeneration (Zhu et al., 2008). Tapetal degeneration is a programmed cell death (PCD) event (A. Papini and Brighigna, 1999; Huysmans et al., 2017; Jiang et al., 2021; Wu and Cheun, 2000; Xie et al., 2022). It is characterized by cytological abnormalities such as shrinkage of the cells, mitochondrial damage and cytoskeleton degeneration, nuclear condensation, oligonucleosomal cleavage of DNA, and swelling of the endoplasmic reticulum (A. Papini and Brighigna, 1999; Kawanabe et al., 2006; Li et al., 2006; Luo et al.; Varnier et al., 2005). The execution of the tapetal dPCD depends on reactive oxygen species (ROS) homeostasis (An et al., 2015; Hu et al., 2011; Xie et al., 2014a; Yan et al., 2020; Yu et al., 2017; Zhang et al., 2023; Zhao et al., 2023; Zheng et al., 2019). DNA and cellular biomolecules are irreversibly

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https://doi.org/10.1016/j.plaphy.2024.108471
Received 30 September 2023; Received in revised form 14 February 2024; Accepted 23 February 2024
Available online 7 March 2024

South African Journal of Botany 167 (2024) 82–93

Contents lists available at ScienceDirect

South African Journal of Botany

journal homepage: www.elsevier.com/locate/sajb

Genome-wide identification and expression analysis of autophagy-related genes (ATG) in Gossypium spp. reveals their crucial role in stress tolerance

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ARTICLE INFO

Article History:
Received 31 October 2023
Revised 21 January 2024
Accepted 4 February 2024
Available online xxx

Edited by: M. Kulkarni

Keywords:
Autophagy
Abiotic stress
Cotton fiber development
Genomics
ATG mechanism

ABSTRACT

Autophagy is an evolutionarily conserved process mediated by AuTophaGy (ATG) genes, in which cellular components are degraded and recycled within vacuoles or lysosome. Yeast ATG was extensively studied; their homologs are reported in plants including *Arabidopsis*. However, they have not been reported in cotton. In the present study, the ATG cascade genes were studied in four *Gossypium* species, namely *G. hirsutum, G. arboreum, G. herbaceum, and G. raimondii*. A total of 40 *GhirATG*, 33 *GaATG*, 34 *GherbATG*, and 25 *GrATG* genes were identified in these species. These ATG sequences exhibited conserved ATG domains and other overlapping domains, including Ras, Pkinase, Snf7, WD40, Glyco_hydro_17, and bZIP_1, and were named based on their phylogenetic relationships with *Arabidopsis* ATGs. A phylogenetic analysis revealed evolutionary relationships among ATG genes among these species, as well as significant sub-clades indicating patterns of gene retention. Based on synonymous and non-synonymous substitutions, cotton groups diverged at different times from Arabidopsis. Gene structure analysis and chromosome localization showed exon-intron patterns and locations. Expression analysis of ATGs in different tissues during development and under stress conditions indicated their functional specificity. The ATG8 subclass genes were significantly expressed under abiotic stress conditions, indicating their role in stress response. In addition, qRT-PCR analysis of selected 12 *GhirATGs* in leaves treated with stress elicitors, MeJA, SA, NaCl, and PEG for varying time intervals showed a pattern of their significant upregulation. The findings contribute to our understanding of autophagy-related processes in cotton, including their potential role in stress response and development.

1. Introduction

Autophagy is a highly conserved process of cellular degradation found in eukaryotes. It recycles damaged cellular components and eliminates unwanted cellular material to maintain material and energy balance (Bassham, 2007b; Bozhkov, 2018; Klionsky, 2005; 2007; Klionsky and Ohsumi, 1999). There are three main autophagy types: maro-autophagy, microautophagy, and chaperon-mediated autophagy (Klionsky, 2007; Reggiori and Klionsky, 2013). Autophagy is executed by the AuTophaGy (ATG) genes. Yeast autophagy was extensively studied, most of which have homologs in plants including *Arabidopsis thaliana*, foxtail millet, *Medicago truncatula*, tobacco, grapevine, tea, rice, banana, wheat, and poplar (Hanaoka et al., 2002; Li et al., 2016a; Shangguan et al., 2018a; Wang et al., 2021; Wei et al., 2017a; Xia et al., 2011; Yang et al., 2021; Yu et al., 2023a; Yue et al., 2018b; Zhou et al., 2015). In *Arabidopsis thaliana,* twenty-five genes that are homologous to 12 yeast genes essential for autophagy were discovered (Hanaoka et al., 2002). In Foxtail millet (*Setaria italica*), genome-wide 37-ATGs are reported (Li et al., 2016b). In *Medicago truncatula, 39 ATGs* are identified (Yang et al., 2021). In tobacco, 30 ATGs belonging to 16 different groups were reported (Zhou et al., 2015). In grapevine (*Vitis vinifera*) a total of 35-*VvATG* was reported (Shangguan et al., 2010). In tea, 35 *CsARGs* are reported (Wang et al., 2021). In Rice, genome-wide thirty-three *OsATG* homologs were classified into 13 ATG subfamilies (Xia et al., 2011), whereas in wheat (*Triticum aestivum*), a total of putative 108-*TaATG* divided into 13 subfamilies are reported (Yue et al., 2018a). In banana, genome-wide, 32-*MaATGs* are identified in its draft genome (Wei et al., 2017b). 48 ATG are reported in the poplar genome (Yu et al., 2023a).

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https://doi.org/10.1016/j.sajb.2024.02.007
0254-6299/

Received: 24 July 2023 | Revised: 3 October 2023 | Accepted: 16 October 2023

DOI: 10.1111/ppl.14116

MINIREVIEW

Physiologia Plantarum

GABA in plants: developmental and stress resilience perspective

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Edited by P. Poór

Abstract

Gamma-aminobutyric acid (GABA), a ubiquitously present non-proteinogenic amino acid, has recently emerged as a key regulator of growth and development in plants during normal as well as challenging environmental conditions. GABA biosynthesis has been reported at multiple stages of plant development, particularly during vegetative and reproductive stages and in response to stress conditions. Accumulating evidence has highlighted the crucial roles of various cell cycle regulators such as type-D cyclins and CDK;A1, transcription factors such as E2Fa, as well as Ca^{2+}/Calmodulin proteins in GABA biosynthesis in plants. GABA is known to improve stress tolerance by improving photosynthetic activity, C/N metabolism, stomatal conductance, and stress-induced reactive oxygen species (ROS) detoxification. Here, we have reviewed recent studies that have explored the novel roles of GABA in plants with a focus on plant development and stress resilience.

1 | INTRODUCTION

Gamma-aminobutyric acid (GABA) is a four-carbon-containing non-proteinogenic amino acid that is ubiquitous in nature. It is found in a wide range of organisms ranging from prokaryotes to eukaryotes (Bouche et al., 2004; Mazzucotelli et al., 2006; Renault et al., 2011; Michaeli et al., 2015; Ramos-Ruiz et al., 2019; Gong et al., 2020; Sita et al., 2020; Mishra et al., 2023). The credit for the discovery of GABA goes to Eugene Robert and Sam Frankel who, in 1950, reported the presence of a major amine in the brain which was subsequently identified as GABA in 1957 (Spiering et al., 2018). In plants, GABA was first reported in *Solanum tuberosum* about half a century ago (Roberts et al., 1984; Spiering et al., 2018). Thereafter, continuous ongoing research has proven GABA as a key regulator of plant growth and development (Mazzucotelli et al., 2006; Krasensky et al., 2012; Bown et al., 2016; Sita et al., 2020; Li et al., 2021; Hasan et al., 2021; Mishra et al., 2023). Moreover, the involvement of GABA in the abiotic and biotic stress tolerance has also been reported; for instance, during drought (Abdel et al., 2021), heavy metals (Sita et al., 2020), salinity (Sita et al., 2020), flooding (Shiu et al., 2020) and pathogenic attack (Yang et al., 2017), among others (Mazzucotelli et al., 2006; Renault et al., 2011; Bown et al., 2016; Sita et al., 2020; Li et al., 2021; Hasan et al., 2021; Mishra et al., 2023). Its protective role is mainly achieved by modifying the photosynthetic activity (Sita et al., 2020), reprogramming C/N metabolism (Krasensky et al., 2012;), regulating stomatal conductance (Hasan et al., 2021), and maintaining reactive oxygen species (ROS) homeostasis (Shelp et al., 1999; Krasensky et al., 2012; Sita et al., 2020; Hasan et al., 2021; Li et al., 2021). GABA is also known to regulate the biosynthesis of various primary and secondary metabolites to promote stress tolerance (Mazzucotelli et al., 2006; Fait et al., 2008; Renault et al., 2011; Krasensky et al., 2012; Bown et al., 2016; Ramos-ruiz et al., 2019; Gong et al., 2020; Li et al., 2021; Mishra et al., 2023). In this review article, we have focused our attention on the role of GABA in regulating developmental and stress resilience aspects in plants.

South African Journal of Botany 164 (2024) 209–220

Contents lists available at ScienceDirect

South African Journal of Botany

journal homepage: www.elsevier.com/locate/sajb

Development of *Allium cepa* potential intron polymorphism markers for molecular breeding of Alliums

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ARTICLE INFO

Article History:
Received 3 March 2023
Revised 2 July 2023
Accepted 28 November 2023
Available online xxx

Edited by Dr B. Ponnusamy

Keywords:
Allium cepa
Allium sativum
Allium cepa potential intron polymorphism markers (AcPIP)
Intron-length polymorphism (ILP)
DNA fingerprint
Markers
Total soluble solid (TSS)
Onion

ABSTRACT

Allium cepa is a widely grown crop for its spice and culinary properties. For molecular breeding of *Allium cepa*, mining and utilization of various sequence-based markers have been widely reported. Unfortunately, none has reported its molecular breeding using potential intron polymorphism (PIP) markers. Due to advantage of intron positioning prediction and practical utility, the PIP markers used for screening the possible polymorphism and cross-transferability in the Alliums. Screening results showed that among 500 *Allium cepa* potential intron polymorphism (AcPIP) markers, 275 are cross-transferable and polymorphic. Among the 275 AcPIP, 111 polymorphic markers were physically mapped on to 1st to 8th chromosomes of the *Allium cepa*. Out of the 275 AcPIP containing functionally significant markers, 118 were mapped in onion with Arabidopsis proteome. A set of 10 Alliums were utilized to interpret the polymorphic possibilities of the 500 AcPIP markers. In totality, 55 % AcPIP markers were polymorphic and cross-transferable among the Alliums. The polymorphic information content (PIC) of AcPIP markers ranged from 0.03 to 0.47 and heterozygosity index (H) varied between 0.16 and 0.80. The constructed phylogenetic tree based on the AcPIP markers of 10 Alliums revealed different clusters due to differences in their taxonomic positions. Out of 275 AcPIP markers, 10 AcPIP markers genotyping based Jaccard dissimilarity-based NJ tree of 96 individuals of *Allium cepa* showed two distinct groups (high total soluble solid; HTSS and low total soluble solid; LTSS). NJ tree and dissimilarity matrix reveal that group I genotypes are distinct, and dissimilar from group II and III genotypes hence it seems that group II and III genotype evolve from group I genotypes. Further we identified nine diverse *Allium cepa* subsample among which, genotype number 74 has HTSS and could be used for identification and introgression of HTSS coding genes in elite cultivars. Further DNA fingerprint of Alliums with 20 AcPIP markers suggested geographical reach of the released onion varieties. Hence results suggest that 275 AcPIP markers may be useful for accelerating the breeding programme of the Alliums and other species.

1. Introduction

Among numerous well-known spices, *Allium cepa, A. sativum,* and wild Alliums are being used for flavoring the foods. Besides gastronomic uses, they are also used as a nutraceutical due to the presence of quercetin and allicin (Kale et al., 2021; Benke et al., 2019; Manjunathagowda et al., 2021a, 2021b; Jayaswall et al., 2018). Quercetin has an antioxidant property (Robaszkiewicz et al., 2007), plays substantial role in the reduction of inflammation (Uchide and Toyoda, 2011), allergy and blood pressure by neutralizing free radicals (Kale et al., 2021; Ried and Fakler, 2014). It also reduces the risk of heart disease, cancer, degenerative brain disorders, blood sugar and works as an immune-protective agent (Nair et al., 2002).Due to its promising antiviral effects; together with vitamin C, the quercetin is being used in the treatment of current COVID-19 pandemic (Colunga Biancatelli et al., 2020). Foods that commonly contain quercetin include *Allium cepa*, apples, grapes, berries, broccoli, citrus fruits, cherries, green tea, coffee, red wine, and capers (Colunga

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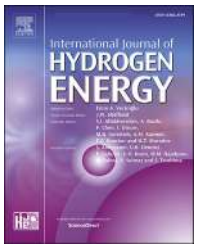
https://doi.org/10.1016/j.sajb.2023.11.050
0254-6299/

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/he



Biotransformation of food waste into biogas and hydrogen fuel – A review

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HIGHLIGHTS

- Reduced FW production has a positive environmental impact.
- Generation of biofuel and bioenergy FW are covered.
- Research gaps and technical challenges are addressed before commercialization.

ARTICLE INFO

Article history:
Received 5 May 2022
Received in revised form
13 July 2022
Accepted 8 August 2022
Available online 6 September 2022

ABSTRACT

The amount of waste generated globally is rising along with the growth of the population, including biological waste, which reaches billions of tons every year. An enormous amount of food waste (FW) is produced throughout the food production chain, which threatens human health and the environment. Waste-to-biogas conversion, as a prime example of waste-to-energy technology, offers a simple approach to simultaneously address the issue of the rising demand for renewable energy sources. Anaerobic digestion (AD) of FW produces biofuel, bioenergy, and fertilizers. In addition to providing a sustainable waste management alternative to landfills, the creation of hydrogen through resource recovery

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https://doi.org/10.1016/j.ijhydene.2022.08.081

stresses

MDPI

Review

Abscisic Acid: Metabolism, Signaling, and Crosstalk with Other Phytohormones under Heavy Metal Stress

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Abstract: Heavy metal (HM) stress poses a global risk to crops, ecological systems, and human health. It disrupts cellular ionic equilibrium, cell membrane integrity, metabolic balance, and the activities of enzymes and proteins, severely impacting physiological processes, plant development, and agricultural productivity. Although plants naturally activate defense mechanisms to mitigate the adverse effects of HM stress, they cannot completely prevent them. Phytohormones counter HM toxicity, aiding growth. External application and internal regulation via signaling/biosynthesis genes offer defense against HM-induced damage. A pivotal signaling molecule in plant adaptive responses to environmental stressors, including HM toxicity, is abscisic acid (ABA). Despite ABA's role in abiotic stress responses such as drought and salinity, its function and crosstalk with other phytohormones under HM stress remain poorly understood. Nonetheless, exogenously applied ABA serves as a strategic approach to enhancing plants' resistance to HM toxicity by promoting osmolyte accumulation and reinforcing antioxidant activity. ABA significantly regulates various plant growth and metabolic activities under diverse environmental conditions. This review highlights the effects of HM stress on plants and explores ABA involvement in production, signaling, catabolism, and transport within plant tissues. The purpose of this paper is to shed light on the complex interplay between the metabolism of ABA, its signaling, and its interactions with other phytohormones (e.g., auxins, gibberellins, and ethylene) during HM exposure. Furthermore, we delve into the function of ABA to mitigate HM stress and elucidate its interactions with other phytohormones.

Keywords: heavy metals; toxicity; mechanism; signaling; mitigation

Citation: Bano, A.; Singh, K.; Singh, S.P.; Sharma, P. Abscisic Acid: Metabolism, Signaling, and Crosstalk with Other Phytohormones under Heavy Metal Stress. *Stresses* **2023**, *3*, 665–686. https://doi.org/10.3390/stresses3040046

Academic Editors: Luigi Sanita di Toppi, Ewa Joanna Hanus-Fajerska and Martin Backor

Received: 8 August 2023
Revised: 17 September 2023
Accepted: 18 September 2023
Published: 22 September 2023

1. Introduction

Abiotic stresses, such as metal, heat, drought, cold, and salt, that have a direct impact on overall agricultural production are continually exposed to plants over a long period [1]. Heavy metal (HM) stress poses a more serious and challenging threat than pesticides and other major pollutants, including carbon dioxide and sulfur dioxide, making it a critical concern in the realm of abiotic stressors. HMs are metallic elements that are nonbiodegradable by nature and have a higher density than water [2]. The threat posed by HM contamination in soil on the worldwide agricultural system has grown significantly [3]. The buildup of these HMs and metalloids degrades soil quality, which undermines the stability of the entire food chain. The list of HMs and metalloids includes mercury (Hg), lead (Pb), chromium (Cr), iron (Fe), cadmium (Cd), zinc (Zn), copper (Cu), cobalt (Co),

Critical Reviews in Biotechnology

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/ibty20

Synergetic anaerobic digestion of food waste for enhanced production of biogas and value-added products: strategies, challenges, and techno-economic analysis

Pooja Sharma, Sheetal Kishor Parakh, To Hung Tsui, Ambreen Bano, Surendra Pratap Singh, Vijay Pratap Singh, Su Shiung Lam, Ashok Kumar Nadda & Yen Wah Tong

To cite this article: Pooja Sharma, Sheetal Kishor Parakh, To Hung Tsui, Ambreen Bano, Surendra Pratap Singh, Vijay Pratap Singh, Su Shiung Lam, Ashok Kumar Nadda & Yen Wah Tong (2024) Synergetic anaerobic digestion of food waste for enhanced production of biogas and value-added products: strategies, challenges, and techno-economic analysis, Critical Reviews in Biotechnology, 44:6, 1040-1060, DOI: 10.1080/07388551.2023.2241112

To link to this article: https://doi.org/10.1080/07388551.2023.2241112

Published online: 29 Aug 2023.

CRITICAL REVIEWS IN BIOTECHNOLOGY
2024, VOL. 44, NO. 6, 1040–1060
https://doi.org/10.1080/07388551.2023.2241112

Taylor & Francis
Taylor & Francis Group

REVIEW ARTICLE

Synergetic anaerobic digestion of food waste for enhanced production of biogas and value-added products: strategies, challenges, and techno-economic analysis

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ABSTRACT

The generation of food waste (FW) is increasing at an alarming rate, contributing to a total of 32% of all the waste produced globally. Anaerobic digestion (AD) is an effective method for dealing with organic wastes of various compositions, like FW. Waste valorization into value-added products has increased due to the conversion of FW into biogas using AD technology. A variety of pathways are adopted by microbes to avoid unfavorable conditions in AD, including competition between sulfate-reducing bacteria and methane (CH_4)-forming bacteria. Anaerobic bacteria decompose organic matter to produce biogas, a digester gas. The composition depends on the type of raw material and the method by which the digestion process is conducted. Studies have shown that the biogas produced by AD contains 65–75% CH_4 and 35–45% carbon dioxide (CO_2). *Methanothrix soehngenii* and *Methanosaeta concilii* are examples of species that convert acetate to CH_4 and CO_2. *Methanobacterium bryantii*, *Methanobacterium thermoautotrophicum*, and *Methanobrevibacter arboriphilus* are examples of species that produce CH_4 from hydrogen and CO_2. *Methanobacterium formicicum*, *Methanobrevibacter smithii*, and *Methanococcus voltae* are examples of species that consume formate, hydrogen, and CO_2 and produce CH_4. The popularity of AD has increased for the development of biorefinery because it is seen as a more environmentally acceptable alternative in comparison to physico-chemical techniques for resource and energy recovery. The review examines the possibility of using accessible FW to produce important value-added products such as organic acids (acetate/butyrate), biopolymers, and other essential value-added products.

Highlights

- Population growth globally increases the generation of FW.
- FW generation, recycling, and reuse have been discussed.
- Biogas and bio-fertilizers can be recovered from FW through AD.

ARTICLE HISTORY
Received 16 May 2022
Revised 18 June 2023
Accepted 22 June 2023

KEYWORDS
Food waste; digestate; multistage system; organic fertilizer; anaerobic digestion; composting; bioenergy

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Indian Hydrobiology, 22(2): 263–268, 2023 Date of receipt: 30.09.2023; Date of acceptance: 30.11.2023

Performance assessment of aquatic macrophyte *Lemna minor* in Municipal Wastewater

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Abstract

The quality of water is disturbed day by day by various inorganic and organic pollutants. Among various strategies developed so far the technique of phytoremediation using aquatic plants is most preferable. Aquatic ecosystems are facing high levels of stress and depletion due to the inputs of polluting materials. In a laboratory-based study, it has been found that Municipal Wastewater can be reclaimed after *Lemna minor* treatment. The effluent characteristics are reasonably rational for non-potable reuses like gardening, agriculture and other industrial purposes. The fresh Municipal Wastewater from the source was brought to the laboratory and samples were tested for initial concentration of pH, Biochemical Oxygen Demand, Chemical Oxygen Demand, Total suspended solids, dissolved oxygen, Chloride content and Alkalinity. Results obtained showed that the *Lemna minor* can remove organic pollutants from municipal wastewater. There is a drastic change in the results obtained over a period of 15 days and also observed increase in biomass production.

Key words: Municipal Wastewater; Phytoremediation; *Lemna minor*; Inorganic Pollutant; Organic Pollutant.

Introduction

Ground water pollution has become one of India's most pervasive environmental problems. Cleanup of contaminated groundwater is often hampered by the complexity of the surface environment. Enhancing our understanding of that environment and developing technologies capable of addressing these complexities is critical to site cleanup. An overview of groundwater remediation technologies focused on chlorinated solvents contaminated sites will be presented. Water is probably the most important resource and humans can survive without food for several weeks, but without water, one would die in less than a week. On a slightly less dramatic note, millions of litres of water are needed every day worldwide for washing, irrigation of crops and for industrial uses. Municipal wastewater contains plant nutrients and has traditionally been used for crop irrigation, gardening and other purposes. The reuse of treated wastewater is encouraged to minimize the demand for freshwater resources.

Municipal Wastewater treatment and its proper disposal are major problems all over the world. The higher price of treatment plants has forced many of the municipalities to discharge municipal wastewater untreated. In developing cities, it is estimated that more than 90 per cent of sewage is discharged directly into rivers, lakes, and coastal waters, without treatment of any kind. In India, cities produce nearly 40,000 million litres of sewage every day. 75% of water pollution from domestic wastewater is today discharged untreated into local water bodies and rivers. This amounts to around 40,000 million litres per day MLD from its 300-odd cities. Irrigation with wastewater may cost less because of lower purification levels and also because crops serve as bio-filters and wastewater contains nutrients. At the same time, the water must remove harmful toxicity. (Shah, 2016).

To reduce the water crisis in India, we need to change both our recycling as well as supply mode. Integrating recycling water into the agriculture supply will solve two major problems. It is advantageous to dispose of

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BOTANY

Research article

Bupleurum milamense sp. nov. (Apiaceae) from Milam Valley, Western Himalaya, India

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Nordic Journal of Botany
2024: e04244
doi: 10.1111/njb.04244
Subject Editor: Ranee Prakash
Editor-in-Chief: Torbjörn Tyler
Accepted 12 April 2024
Published 10 June 2024

A new species, *Bupleurum milamense* (Apiaceae) is described from the alpine forest region of the Milam Valley, Uttarakhand, India. The new species is similar to *B. gracillimum* Klotzsch in the nature of the plant, leaf shape, number of bracts, shorter umbel rays, number, shape and size of bracteoles, bracteoles shorter than the flowers, and number of flowers per umbellules, However, it significantly differs by having an erect stem position, in the number of umbel rays, fruit shape and size, and number of vallecular and commissural vittae. A detailed description, photographs, distribution map, and a comparison with allied species are provided.

Keywords: *Bupleurum*, Milam Valley, Umbelliferae, Uttarakhand

Introduction

The genus *Bupleurum* is one of the largest genera in the family Apiaceae, mainly distributed in Eurasia and North Africa, with one species each in North America and South Africa (Plunkett et al. 2018). Worldwide, the genus is represented by 215 species (POWO 2023). In India, the genus is represented by 38 taxa (32 species and 6 varieties), of which six (*B. andhricum* Nayar & R.N.Banerjee, *B. distichophyllum* Wight & Arn., *B. khasianum* (C.B.Clarke) P.K.Mukh., B. *maddenii* C.B.Clarke, *B. plantaginifolium* Wight, and *B. sikkimensis* P.K.Mukh.) are endemic to India, mainly confined to the Indian Himalayan Region and Western Ghats (Clarke 1879, Mukherjee and Constance 1993, Singh et al. 2015, Mao and Dash 2020). The genus is characterized by the presence of linear simple leaves, umbels with five yellow corollae, presence of involucre and involucral bracts, laterally compressed fruits, terete seeds, and 2–6 commissural vittae (Rekha and Sujana 2022). While exploring the floristic diversity of Milam Valley of Kumaon Himalaya in Uttarakhand, we came across an unknown population of *Bupleurum* growing in a grassland during July 2021. Later, continuous observation of these areas and further taxonomic studies on the collected samples

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ORIENTAL JOURNAL OF CHEMISTRY
An International Open Access, Peer Reviewed Research Journal
www.orientjchem.org
ISSN: 0970-020 X
CODEN: OJCHEG
2024, Vol. 40, No.(3):
Pg. 646-659

Saffron: A Comprehensive Review of it's Cancer-Preventive and Curative Properties in Different Types of Cancer

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http://dx.doi.org/10.13005/ojc/400303

(Received: December 13, 2023; Accepted: May 25, 2024)

ABSTRACT

Cancer has emerged as an immedicable and fatal disease all around the world. It ranks as the second most common cause of death worldwide. Cancer is estimated by the WHO to be the cause of 1 in 6 deaths. Many modern cancer treatment methods like chemotherapy, photodynamic therapy, catalytic therapy and radiotherapy have been developed, albeit these are restricted, noncurative and generate certain side effects. Therefore, naturopathic medicines are used along with standard treatment procedures as an adjunct to treat cancerous cells without producing any deleterious effects. Due to several bioactive components, *Crocus sativus* L. (saffron) has been utilized in traditional herbal therapy since ancient times. Anticancer activities of saffron and its ingredients-crocin, crocetin, and safranal are established by several workers in various animal models. This review article has focused on the cancer-preventive and curative properties of saffron and its ingredients in different types of cancers, along with pharmaceutical importance and toxicity.

Keywords: Saffron, Cancer, Anticancer, Curative, Pharmaceutical, Toxicity.

INTRODUCTION

Cancer is an emerging health complication across the globe[1]. Modern cancer treatment methods like chemotherapy, catalytic therapy, photodynamic therapy and radiotherapy generate certain side effects, which insisted the researchers to discover other new ways of treatment[1]. Lately, naturopathic medicine has come out as a new alternative treatment option. Naturopathic therapies with the aforementioned standard treatment procedures reduce the reverse effects and increase the reclamation period, improving hunger and sleep quality. It also recovers the damaged cells and tissues and secures the normal cells and tissues. Ample research on consumable fruits, vegetables,

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Adsorptive removal of cadmium from electroplating wastewater using hybrid composite of thiol-grafted seed gum of *Tamarindus indica* and Teff hay biocarbon

https://doi.org/10.1515/zpch-2024-0715
Received February 24, 2024; accepted May 20, 2024; published online June 19, 2024

Abstract: This study examined the methods for preparing biocarbon from Teff hay (TBC) and thiol-grafted seed gum of *Tamarindus indica* (TH@TI-TBC) with the purpose of removing cadmium (Cd) from polluted electroplating waste water. To improve biocarbon adsorption, seed gum and thiol were added in a two-step combination. At a pH of 5.5, the most effective Cd adsorption was seen with TH@TI-TBC (261.47 mg g^{-1}). While comparing to the Freundlich and Temkin models, the Langmuir and pseudo-second-order kinetic models found to be the best fit to the obtained adsorption data. After being treated with electroplating wastewater having 30 mg^{-1} L of cadmium,

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Letters in Applied NanoBioScience
Open-Access Journal (ISSN: 2284-6808)

Article
Volume 13, Issue 1, 2024, 47
https://doi.org/10.33263/LIANBS131.047

Correlation Coefficient for Physico-chemical Parameters to Assess the Quality of Tannery Effluents at Kanpur

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Scopus Author ID 35119371500
Received: 13.02.2023; Accepted: 29.03.2023; Published: 8.06.2024

Abstract: In the present study, a monthly sample of tannery effluent was collected and analyzed from May 2021 to April 2022. The samples were collected from a tannery in the Jajmau area of Kanpur city. Based on the correlation matrix, Pearson's correlation coefficient (r) value was calculated to identify the highly correlated and interrelated water quality standards issued by the Bureau of Indian Standards (IS-10500:2012). Almost all of the samples from the tannery were found to be above acceptable limits and unusable. The analysis revealed that the effluent discharged by the above-stated tannery contained additional chemical loads such as iron, calcium, magnesium, carbonate, bicarbonate, chloride, and BOD. Different physicochemical characteristics of tannery effluents differ according to the month, and the results reveal certain relationships between these physicochemical characteristics.

Keywords: tannery; Pearson correlation; Regression equation; BOD; potassium permanganate.

1. Introduction

Blood in the human body is analogous to water on Earth. It is easy to imagine Earth without water as a sterile, desolate, gray hunk of rock orbiting the sun [1]. Humans pollute the Earth's blood, which is water, through urbanization and industrialization. Industrial processes primarily cause water pollution, and the nature of industries may vary widely. The wastewater from manufacturing units, employees' sanitary wastes, water discharged from washing factory floors, and relatively uncontaminated heating and cooling water comprise the wastewater from industries [2].

One of the most polluting and water-intensive industries is the tanning industry. During the tanning process, raw materials and auxiliary agents (proteins, acids, bases, chromium salts, sulfides, chlorides, tannins, solvents, dyes, auxiliaries, and other compounds) are the main

REVIEW ARTICLE

A REVIEW IN CURCUMINOIDS: CHEMISTRY, ANTICANCER ACTIVITY AND FUTURE PROSPECTS

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(Received 09 May 2023) (Accepted 04 April 2024)

ABSTRACT

Curcumin is a biologically active phytochemical which manifests therapeutic activities in numerous health conditions, including cancer. Several curcuminoids obtained naturally and synthesized artificially also showcase anti-cancer and anti-tumorigenic effects. However, its water insolubility poses difficulties in its application to biological systems, lowering its availability in living tissues, which can be overcome by using various micro-encapsulation and nano-formulations of curcumin. When used in combination with other chemotherapeutic drugs, curcumin enhances the anti-carcinogen potential and reduces the side effects induced via chemotherapy. Structural modelling of basic pharmacophores of curcumin can enhance its biological and pharmacokinetic properties, as revealed by structure-activity relationship studies of curcumin. Various clinical trials of curcumin have proven its worth as an anti-neoplastic agent in humans, with minimal side effects. Its mechanism of action involves blockage of cell-signalling pathways and cellular enzymes, promotion of immunomodulatory effects and induction of programmed cell death in cancerous cells. Curcumin is an interesting molecule with diverse effects on various diseases, but its absolute potential has yet to be reached. Hence, more in-depth studies and clinical trials are needed. This review outlines curcumin's chemical properties and summarizes its anti-cancer and pharmacokinetic potential.

Keywords: Cancer, natural products, curcumin, anticancer, SAR, clinical trials

INTRODUCTION

Spices impart colour, aroma and taste to food and have been used as condiments worldwide for ages. Due to the presence of several bioactive compounds such as antioxidants, some spices are also used as medicine and have various health benefits. For example, curcumin in turmeric, eugenol in cloves and capsaicin in red pepper are known to control cellular oxidation. These prevent the production of oxygen-free radicals and also interfere with the signal transduction pathways[1,2]. Compounds such as curcumin and thymoquinone regulate various inflammatory processes. Some spices belonging to the genus *Cinnamomum* possess antimicrobial properties[3,4]. Certain compounds in spices, such as thymoquinone, exhibit regulatory effects on the immune system[5,6]. In short, spices elicit antioxidant[7-12], immunomodulatory and anti-inflammatory[13-15] effects. Since growth and metastasis of cancer are linked with inflammatory reactions[13-14] immune responses and oxidative stress, spices can be used as an alternative to treat and prevent cancer[16-19].

The majority of deaths across the globe are caused due to cancer. As per the data of 2020, out of the 19 million new cases of cancer reported, there were about 9.9 million deaths across the globe. This number will increase by about 70% in the next 20 years. The most extensive

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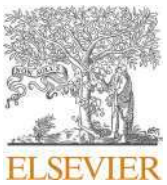
https://doi.org/10.53879/id.61.05.14041

Journal of Organometallic Chemistry 1014 (2024) 123196



Contents lists available at ScienceDirect

Journal of Organometallic Chemistry

journal homepage: www.elsevier.com/locate/jorganchem

Pure and doped graphene as a suitable material for the detection of hazardous gases

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ARTICLE INFO

Keywords:
Toxic gas
Density functional theory
COX_2 gases
Sensor
Van der Waals interactions

ABSTRACT

The need for highly sensitive toxic gas sensors is significant, and achieving this sensitivity is possible. Researchers have utilized density functional theory (DFT) computations to examine adsorption of different gas molecules (COX_2, where X is F, Cl, or Br) over Au-doped and pristine graphene. This investigation aims to determine possibility of employing Au-doped graphene as a basis for gas sensors. Multiple adsorption positions and orientations were examined for each gas molecule. The configuration that exhibited the highest stability was identified, and adsorption energy (E_{ads}) values, considering van der Waals (vdW) interactions, have been computed using NCI analyses. In addition, the electronic properties, including LUMO—HOMO orbital density and charge transfer, were analyzed to acquire a deeper understanding of process by which adsorption occurs. Findings indicated that gas molecules under investigation exhibited weak adsorption on pristine graphene, with low E_{ads} values. In contrast, E_{ads} values of every gas molecule on Au-doped graphene displayed varying degrees of increase. Notably, COX_2 exhibited a high sensitivity to Au-doped graphene. Furthermore, in the effect of doping Au into graphene, the E_{ads} absorption of $COCl_2$ gas has increased from 0.155 to 1.028 eV. This indicates the strong tendency of Au-doped graphene to interact with gas $COCl_2$ compared to two other COX_2 gas species. This strong adsorption can be ascribed to significant substantial charge transfer (CT) between $COCl_2$ and Au-doped graphene and orbital hybridization. The charge transfer amount of the doped states has increased by more than double compared to the pure state. The band gap of Au-doped graphene has decreased from 2.14 to 1.83 eV due to the absorption of gas $COCl_2$, indicating the highest amount of reduction compared to other gases. Moreover, the enhanced electrical conductivity of Au-doped graphene renders it more valuable and sensitive in the context of sensing COX_2 gases.

1. Introduction

Various sensors for detecting different chemicals are commonly utilized for different purposes, including aerospace, quality control, agriculture, medical diagnoses, food safety, and environmental monitoring [1–5]. It is highly important to be able to detect the molecules of

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https://doi.org/10.1016/j.jorganchem.2024.123196
Received 11 March 2024; Received in revised form 12 May 2024; Accepted 21 May 2024
Available online 22 May 2024

ORIENTAL JOURNAL OF CHEMISTRY
An International Open Access, Peer Reviewed Research Journal
www.orientjchem.org
ISSN: 0970-020 X
CODEN: OJCHEG
2024, Vol. 40, No.(1):
Pg. 28-39

Dioxomolybdenum (VI) Compounds of Macrocyclic Schiff base Ligands: Preparation, Characterization and Antibacterial activity

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http://dx.doi.org/10.13005/ojc/400104

(Received: December 09, 2023; Accepted: January 29, 2024)

ABSTRACT

Using di-2-furanylethanedione and 5-bromo-3-methylbenzene-1,2-diamine we prepared a monomeric [MoO_2(SL)] with a Schiff base, as well as 4 different compounds using the formulation [MoO_2(MSL). We investigate how [MoO_2(SL)] reacts with 1,3-diketones. Several characterizations are discussed in this article, including molar conductance measurement, elemental analysis, UV-Vis, IR, NMR, and thermal measurements. Molybdenum has a six-coordination number. All five MoO_2(VI) compounds have distorted octahedral arrangements. Molybdenum octahedra have four N-atoms and two oxidized O-atoms.Against *S. aureus* and *S. typhi*, all synthesized compounds showed moderate activity. The chelation hypothesis is used to define the progression of the antibacterial task.

Keywords: Dioxomolybdenum(VI), 5-bromo-3-methylbenzene-1,2-diamine, Schiff base, Di-2-furanylethanedione, β-diketones, Macrocyclic compounds, Antibacterial activity.

INTRODUCTION

At least nine atoms are required for a macrocyclic compound, including all heteroatoms. This type of compound contains at least three donor atoms. Over the past half century, macrocyclic compounds have undergone considerable development[1-5]. In coordination chemistry, N-atom-containing ligands and their compounds play an important role. There have been various research papers published that explore metal compounds from physicochemical and biochemical perspectives and drive extensive applications[6-11]. A transitional Schiff base formulation with vitamin B6 catalyzes transamination reactions using metal ions[15,16]. In addition to their antifungal and antiviral properties, Schiff base compounds are also anti-inflammatory and antitumor[12-20].

Biointerface Research in Applied Chemistry
Open-Access Journal (ISSN: 2069-5837)

Article
Volume 14, Issue 2, 2024, 38
https://doi.org/10.33263/BRIAC142.038

Physico-Chemical Analyses to Assess the Quality of Distillery Effluents at Unnao

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Scopus Author ID 35119371500
Received: 25.02.2023; Accepted: 25.03.2023; Published: 4.02.2024

Abstract: One of the distilleries in Unnao, India, was sampled for analysis in the laboratory to determine its physicochemical characteristics and pollution level. A fixed spot at the distillery was used for the collection of samples for a period of one year, from May 2021 to April 2022. Observations of high chemical loads in the effluent discharged from the above-stated distillery included carbonate, bicarbonate, iron, calcium, magnesium, chloride, and BOD and COD. Results showed that there are certain relationships between the physicochemical characteristics of positive and negative effluents every month.

Keywords: distillery, Pearson correlation, potassium permanganate, Regression equation, BOD.

1. Introduction

People had always lived near water sources, such as rivers, lakes, or groundwater springs when they first settled in one place and started growing crops [1-3]. In order to be able to drink, prepare food, bathe, clean, irrigate crops, and perform a variety of other tasks, it was essential to have easy access to water. However, a problem with the water sources used to supply water in the past and treating drinking water to make it better smelling, tasting, clearer, or eliminating disease-causing pathogens has occurred throughout recorded history in one form or another. Human well-being is directly linked to water quality, so its quality is a vital concern for humanity. Pollution occurs when water deviates from its natural condition, affecting its properties and functions [4]. Various biological, chemical, and physical interactions affect water quality and aquatic environment characteristics. With respect to their geological age and geochemical characteristics, estuaries, water bodies, lakes, and rivers are continuously changing. As a result of human activities disrupting this dynamic balance in the aquatic ecosystem, pollution manifests itself dramatically in fish kills offensive tastes, and odors. Industrial pollution is a type of pollution caused by effluents generated by industries [5].

Among the seventeen most polluting industries listed by the CPCB are distilleries. Distillery effluent is the liquid flow from the distilleries' wastewater treatment systems. India currently has 319 distilleries with a capacity of 3.29 billion liters of alcohol. Over 40% of the

JMEPEG
https://doi.org/10.1007/s11665-024-09175-2

1059-9495/$19.00

ORIGINAL RESEARCH ARTICLE

Aniline-Naphthylamine Copolymer Integrated with Aluminum Terephthalate-Based Metal Organic Framework for Efficient Hydrogen Evolution From Seawater

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Submitted: 24 August 2023 / Revised: 15 October 2023 / Accepted: 25 November 2023

A composite made of aniline-naphthylamine copolymer (αNPANI) integrated with an aluminum terephthalate-based metal organic framework (MIL53(Al)) was created by chemically oxidizing aniline monomer in the presence of various contents of naphthylamine and MOF for the hydrogen evolution reaction (HER). There were some nanorods and a microporous structure observed in the SEM images of the copolymer. In the case of the composite (αNPANI/MIL53(Al)), the MOF crystal structures were not visible, suggesting that MOF might be wrapped by the copolymer. The catalytic activities of the prepared electrodes were evaluated in artificial seawater using electrochemical impedance spectroscopy (EIS) and linear sweep voltammetry (LSV) techniques. The Tafel slope values of 98.4, 83.3, and 61.2 mV dec^{-1} were respectively obtained for the PANI, αNPANI, and αNPANI/MIL53(Al) electrodes. This indicated that the presence of both naphthylamine and MOF in the PANI structure dramatically increased the catalytic H_2 evolution. Chronopotentiometry was used to demonstrate the stability of αNPANI/MIL53(Al), and it was discovered that the produced electrode remained stable for at least 48 h after electrolysis.

Keywords hydrogen evolution reaction, metal organic framework, naphthylamine, polyaniline

1. Introduction

Fossil fuels are widely recognized as the primary energy sources despite their drawbacks, including scarce resources, global warming, and environmental degradation (Ref 1-3). Hydrogen generation has drawn a lot of interest as a potential solution to the energy resource crisis and a variety of other major environmental issues. A possible approach for hydrogen production is electrochemical water splitting, which has received much media attention for its advantages of sustainability, affordability, and environmental protection (Ref 4). The electrocatalyst is essential for the water splitting process, because a conventional water splitting needs a high voltage input. At platinum (Pt) and Pt-based materials, hydrogen evolution occurs at the lowest attainable overpotential. However, using Pt as an electrocatalyst to generate huge amounts of hydrogen is nearly impossible due to its extreme rarity and high price. On this basis, studying highly effective, stable, and cheap electrocatalysts capable of creating hydrogen gas by water splitting in the neutral electrolyte is urgently needed, but it is still a difficult task. In this content, conducting polymers, especially polyaniline (PANI), could be a hopeful candidate because of its easy synthesis, low cost, and high capacitive properties (Ref 5, 6). PANI can also provide protons to the reaction, which will aid in the promotion of both the hydrogen evolution reaction (HER) and oxygen evolution reaction (OER) (Ref 7, 8). More crucially, PANI possesses plenty of lone electrons on N atoms, which makes it possible for it to adsorb H^+ and create protonated amine groups (Ref 9, 10). Due to its strong conductivity, PANI may efficiently boost electroactivity

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Published online: 01 February 2024

Chemistry Africa (2024) 7:1817–1828
https://doi.org/10.1007/s42250-023-00868-0

ORIGINAL ARTICLE

Synthesis and Crystal Structure–Activity Studies and Possible Therapeutic Application of Diamine Conjugated Furil Schiff Base as Antibacterial Agent

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Received: 26 August 2023 / Accepted: 19 December 2023 / Published online: 31 January 2024

Abstract
A novel furil-based asymmetric Schiff base was prepared and characterized by analytical and spectroscopic methods. Schiff base could be produced by the amalgamation of furil with 1,2-diaminotoluene by employing conventional methods in variety of solvents. Synthesized compound was found to be asymmetric without possessing mirror plane and inversion center with all explained physical parameters possessed. Antibacterial activity was performed by in vitro test using an agar-well diffusion technique. This compound showed potent antibacterial activity compared to standard doxycycline drug. This compound could be a better drug candidate for antimicrobial infections though this area needs further persuasion and deliberation by the scientific community.

Keywords Furil · Diamine · Antibacterial activity · Symmetry · Doxycycline

1 Introduction

In 1864, a German chemist named Hugo Schiff developed Schiff base (SB) by condensing primary amines and aldehyde [1]. Since then researchers have employed them as chelating ligands in various capacities in coordination chemistry [2–4] as a catalyst [5–8] as a dye [9, 10] as an initiator in polymerization [11] and as luminescent compounds. One of the major research areas pertaining to Schiff base metal complexes is their biological activity. The main aim being the discovery of safe and effective therapeutic agents for the treatment of cancer and bacterial infections claiming millions of lives across the globe annually. A number of Schiff-based metal complexes have a diverse pool of biological and pharmaceutical activities.

Tetradentate Schiff base ligands with a N- donor atoms are facile for coordinating with different metal ions [12–14]. Schiff bases can be optimized for the production of novel drugs. A number of biological properties have been reported for Schiff base derivatives obtained from sulfa drugs [15, 16]. With its electrophilic carbon and nucleophilic nitrogen, the imine group exhibits a wide array of action to prevent targeted diseases, enzyme reactions, and DNA replication by binding to different nucleophiles and electrophiles. There is considerable interest in the development of antimicrobial

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Physica B 676 (2024) 415658

Contents lists available at ScienceDirect

Physica B: Condensed Matter

journal homepage: www.elsevier.com/locate/physb

Interaction of procarbazine drug and solvent effects on pristine and embedded-zinc oxide nanotube as a drug delivery vehicle: A DFT investigation

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ARTICLE INFO

Keywords:
ZnO nanotube
Procarbazine drug
Drug delivery
DFT

ABSTRACT

Numerous research studies have been carried out on nano-structures regarding their potential applications in drug delivery for treating cancers. Within the current work, the procarbazine (PB) drug delivery ability of a pure ZnO nanotube (PZnO-NT) and X-doped (X = Al, Ge, and In) ZnO-NT is inspected through DFT computations. The results demonstrates that PZnO-NT isn't suitable for the PB drug delivery. We showed that doping the Al, Ge, and In atoms into the ZnO-NT structure changes the adsorption energy (AdE) of PB from −6.9 to −26.4, −28.7, and −31.5 kcal/mol, respectively. Moreover, there is a substantial amount of charge transfer from PB to the doped ZnO-NT based on the natural bond orbital analysis. Using water solvent changes the AdE of the drug on the In-doped ZnO-NT from −31.5 to −29.8 kcal/mol. Hence, based on the computations undertaken within this work, the X-doped ZnO-NT can be utilized as a suitable PB carrier.

1. Introduction

One of the commonly used anti-cancer medications for the treatment of cancer is procarbazine (PB). Moreover, it is one of the cytotoxic chemotherapeutic drugs used for the treatment of Hodgkin's lymphoma and most brain-related cancers [1]. Being on the WHO list of essential medicines, PB was verified in 1969 for the first time [2–6]. PB is usually taken by mouth. Low blood cell counts, nausea, fatigue, and depression are the common side effects associated with PB [7,8]. It is possible to use drug delivery systems (DDSs) in order to overcome such drawbacks [9]. DDSs have enjoyed considerable attention owing to their significant in drug delivery to target cells [10]. However, low drug loading efficiency, high toxicity, and immunogenicity are some of the major drawbacks to many of these systems [11,12]. Researchers have investigated nano-carriers in order to correct the defects in anti-cancer drugs such as lack of selectivity, severe toxicity, low water solubility, and severe side effects [13–16].

Nowadays, nanotechnology is helping to significantly advance and revolutionize numerous technology and industry sectors, including information technology, food safety, environmental science [17–22], transportation, medicine, and energy [23–26]. Many research groups and scientists have found that one-dimensional (1D) nanostructures are encouraging DDSs for many drugs [27]. The most widely employed 1D nanostructures as DDSs are carbon nanotubes (CNTs) [28]. Nonetheless, many chemicals have a weak interaction with pure CNTs. This makes it almost impossible to employ CNTs as ideal DDSs [29,30]. So, methods

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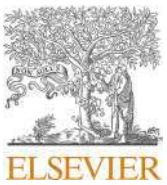
https://doi.org/10.1016/j.physb.2023.415658
Received 31 July 2023; Received in revised form 25 December 2023; Accepted 30 December 2023
Available online 1 January 2024

Inorganic Chemistry Communications 160 (2024) 111918



Contents lists available at ScienceDirect

Inorganic Chemistry Communications

journal homepage: www.elsevier.com/locate/inoche

Short communication

Evaluating ammonia sensors based on two-dimensional pure and silicon-decorated biphenylene using DFT calculations

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ARTICLE INFO

Keywords:
Biphenylene
Ammonia
Electronic attributes
Sensor
Adhesion energy

ABSTRACT

Within this piece of research, the performance of two-dimensional pure and silicon-decorated monolayers of biphenylene (PBPML and SBPML) in detecting ammonia (NH_3) was investigated though DFT calculations. In spite of the fact that PBPML adsorbed NH_3 better than other reported 2D materials, NH_3 had a physical adhesion on the surface of PBPML and the adhesion energy was −0.037 eV. After decorating the Si atom, the NH_3 adhesion capacity of PBPML changed significantly and there was a dramatic change in its electronic attributes. The SBPML can be considered as an encouraging sensor for NH_3 with a structural solidity at ambient temperatures, the recovery time of 0.84 s at 300 K, charge transport of 0.56 e and significant adhesion energy of −0.72 eV. The results demonstrated that the SBPML was suitable for sensing NH_3 and it was suitable for practical applications. This work can provide insights into the designing and development of biomolecule sensors with high efficiency.

1. Introduction

One of the highly corrosive and toxic compounds that is generated naturally during nitrification processes is ammonia (NH_3) [1]. Also, NH_3 is generated by chemical plants and combustion vehicles and different industries use NH_3 [2]. In cities with industrial plants, aerosols of NH_3 are seen as smog clouds [3]. Long exposure to NH_3 can be highly detrimental to the living organisms and the environment due to its corrosiveness and toxicity [4]. There are severe side effects associated with NH_3, including burns and blindness. At high temperatures (450–500 °C), NH_3 is dissociated into hydrogen and nitrogen, but it has stability and at ambient temperatures. Furthermore, one of the best sources of hydrogen is NH_3, which is conducive to developing the future economy though green fuels [5,6]. The hydrogen capacity of NH_3 in the liquid phase is 17%, which has been demonstrated to be higher compared to the capacity of methanol [7]. Thus, detecting and stroing NH_3 are of paramount significance.

Thanks to their outstanding chemical and physical attributes such as large surface are and optoelectronic properties, two-dimensional (2D) materials like MXenes, transition metal dichalcogenide, graphene (Gr) and its derivatives have attracted the attention of many researchers [8–14]. Interestingly, since different methods can be used to modify the electronic attributes of 2D materials, these materials can be used in the development of biomolecule and gas sensors [15–19]. The sensor technology has witnessed a dramatic improvement after the discovery of Gr because of its capability in detecting different gasses at ambient temperatures with superior sensing attributes. Researchers have made a lot of effort to produce different sensing devices by utilizing various sorts of 2D materials like borophene, phosphorene [20], transition metal oxides (e.g., WO_3, ZnO) [21,22], transition metal dichalcogenides (MoS_2, WSe_2, VSe_2, ZnO, SnS_2, TiO_2) [23–27], penta-graphene [28], holey graphyne [29] and graphyne [30]. These highly selective and sensitive

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https://doi.org/10.1016/j.inoche.2023.111918
Received 21 September 2023; Received in revised form 10 December 2023; Accepted 11 December 2023
Available online 14 December 2023

THERMOLYSIS AND THEIR KINETICS OF Cu(II) PERCHLORATE COMPLEX WITH ISOPROPYLAMINE AND WATER

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Abstract

Copper perchlorate complex containing isopropylamine (ipa) has been prepared with the molecular formula $[Cu(ipa)_3(H_2O)(ClO_4)]ClO_4$. It was characterised by elemental analysis, IR spectroscopy and thermogravimetric data. Response of the complex to heat has been studied by thermogravimetry (TG) in static air and simultaneous thermogravimetry-derivative thermogravimetry-differential thermal analysis (TG-DTG-DTA) in flowing nitrogen atmospheres. The complex decomposes in three steps, although the resolution between the steps is less. Possible decomposition pathways have been proposed for decomposition in static air and flowing nitrogen atmosphere. Thermolysis kinetics have also been investigated using isothermal TG data recorded at five different temperatures and applying model-fitting and isoconversional methods. An application of model-fitting methods has yielded a single activation energy value, whereas an isoconversional method has yielded a series of activation energy values for each extent of conversion, α. Differences in decomposition patterns under air and inert atmosphere have been also discussed.

Keywords: Isopropyl amine, perchlorate, complex, thermolysis, kinetics.

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DOI: - 10.53555/ecb/2023.12.Si13.206

Molecular Cancer

REVIEW

Open Access

Progressing nanotechnology to improve targeted cancer treatment: overcoming hurdles in its clinical implementation

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Abstract

The use of nanotechnology has the potential to revolutionize the detection and treatment of cancer. Developments in protein engineering and materials science have led to the emergence of new nanoscale targeting techniques, which offer renewed hope for cancer patients. While several nanocarriers for medicinal purposes have been approved for human trials, only a few have been authorized for clinical use in targeting cancer cells. In this review, we analyze some of the authorized formulations and discuss the challenges of translating findings from the lab to the clinic. This study highlights the various nanocarriers and compounds that can be used for selective tumor targeting and the inherent difficulties in cancer therapy. Nanotechnology provides a promising platform for improving cancer detection and treatment in the future, but further research is needed to overcome the current limitations in clinical translation.

Keywords Nanotechnology, Cancer detection, Cancer treatment, Nanoscale targeting techniques, Protein engineering, Materials science, Nanocarriers, Medicinal purposes, Human trials

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among multidisciplinary teams of scientists, clinicians, regulatory bodies, and industry partners to bridge this gap effectively. Regulatory agencies must continue to adapt to the unique complexities of nanotechnology, ensuring both patient safety and the timely availability of groundbreaking treatments. Moreover, this review has highlighted the diverse arsenal of nanocarriers and compounds available for selective tumor targeting. From liposomes to nanoparticles and beyond, the toolbox for oncologists is expanding. Nonetheless, as we navigate the vast landscape of nanomaterials and delivery systems, we must be vigilant in ensuring that these innovations do not introduce unforeseen toxicity or off-target effects. Rigorous preclinical evaluation and ongoing safety assessments are paramount. Furthermore, the inherent complexities of cancer therapy underscore the need for personalized approaches. Nanotechnology offers the potential for tailoring treatments to individual patients, taking into account the unique molecular characteristics of their tumors. This promises not only increased efficacy but also reduced side effects, thereby enhancing the quality of life for cancer patients. In closing, the review underscores that while nanotechnology holds immense promise, it is not a panacea for the challenges of cancer therapy. It requires ongoing commitment, collaboration, and innovation from the scientific and medical communities. The potential to improve cancer detection and treatment through nanotechnology is tantalizing, but the journey from the laboratory to the clinic is a road laden with obstacles. Nevertheless, with perseverance and sustained investment in research, we can unlock the full potential of nanotechnology in the fight against cancer. The future holds the promise of more effective, targeted, and less invasive treatments that will significantly improve the lives of cancer patients, and it is our collective responsibility to ensure that this promise becomes a reality.

Acknowledgements
We would like to thank from the Novin Genome (NG) Institute, Shahrekord branch, Research and Development Center for Biotechnology in Chaharmahal and Bakhtiari Province for their kindly cooperation.

Authors' contributions
M.CH., M.CH., O. A., R.C., N.J., D.R., T.T., M.V., P.V., N.L., M.J. S., A.A., M.A., R.C, AI, AA, and RA wrote the main manuscript text. All authors reviewed the manuscript.

Funding
The authors extend their appreciation to the Deputyship for Research & Innovation, Ministry of Education in Saudi Arabia for funding this research work through the project number : IFP22UQU4331100DSR020.

Availability of data and materials
Not applicable.

Declarations

Ethics approval and consent to participate
Not applicable.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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Received: 2 July 2023 Accepted: 21 September 2023
Published online: 09 October 2023

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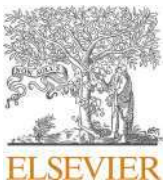
Inorganic Chemistry Communications 157 (2023) 111321



Contents lists available at ScienceDirect

Inorganic Chemistry Communications

journal homepage: www.elsevier.com/locate/inoche

Short communication

Design and evaluation of the chemical functionalized $B_xC_yN_z$ (x = z = 1, y = 2) nanotube as an anticancer drug delivery vehicle

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ARTICLE INFO

Keywords:
Anti-cancer drugs
functionalized BC_2NNTs
Ciclopirox
Adsorption energies

ABSTRACT

One of the most studied biomedical applications of nanomaterials is their use as drug delivery vehicles to mitigate the side effects of various anticancer agents. Side effects are usually caused by drug delivery. The performance of both pure BC_2N nanotube (BC_2NNT) and chemically functionalized BC_2NNTs as drug delivery vehicles for ciclopirox (CPX) is investigated by density functional theory (DFT) calculations. It has been found that the interaction of CPX with pure BC_2NNTs is weak (−11.27 kcal mol^{-1}). Therefore, the interaction of CPX with functionalized BC_2NNTs was investigated. Examination of the values related to the adsorption energies of CPX at the surface of pure and functionalized BC_2NNTs showed that the formation of a hydrogen bond between the active parts of CPX and the carboxyl group of functionalized BC_2NNTs has a significant effect on drug adsorption and its thermodynamic stability. In addition, the functionalized BC_2NNTs were stable in the water phase with negative solvation energies, which were conducive to CPX delivery applications. This study presents a new strategy for achieving high densities of CPX on BC_2NNTs.

1. Introduction

One of the primary causes of death in human beings worldwide, especially in industrialized countries, is cancer [1]. Cancer is not a single disease, rather it encompasses many different types, such as colorectal, stomach, prostate, and lung cancer. Cancer is a leading cause of death worldwide, and the number of people dying from it continues to rise every day. According to recent reports, cancer has caused the death of approximately 8.8 million people globally [2]. Oncologists have predicted that the number of cancer cases might rise up to 15 million by 2020 and the number of deaths might rise up to 12 million [2]. Thus far, different cancer treatment methods have been employed for minimizing the associated side effects, including surgery, radiation, immunotherapy and chemotherapy [3]. Nonetheless, these treatment methods suffer from some disadvantages. including biodegradation, poor biocompatibility, reappearance rate of cancer or tumor-cells, and high cytotoxicity to normal cells [3–9]. Cancer chemotherapy is an effective treatment method in which anticancer drugs are used to destroy cancer cells. However, these drugs have limited effects due to their toxic nature and negative side effects. Therefore, delivering anticancer drugs to targeted cancer cells is a popular yet challenging issue that needs to be addressed [10]. The development of novel and effective drug delivery vehicles (DDVs) is crucial to improving drug absorption levels and reducing negative side effects. The use of nanotechnology, particularly the design

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https://doi.org/10.1016/j.inoche.2023.111321
Received 20 May 2023; Received in revised form 23 August 2023; Accepted 25 August 2023
Available online 26 August 2023

Biochem. Cell. Arch. Vol. 24, No. 1, pp. 1021-1028, 2024
DocID: https://connectjournals.com/03896.2024.24.1021
DOI: https://doi.org/10.51470/bca.2024.24.1.1021
Crossref
ISSN 0972-5075
eISSN 0976-1772

REMOVAL OF FLUORIDE ION FROM WASTEWATER USING *PSYLLIUM* CROSSLINKED POLYACRYLIC ACID (Psy-cl-PAA)

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(Received 20 January 2024, Revised 7 March 2024, Accepted 14 March 2024)

ABSTRACT : The application of food grade polysaccharide namely *Plantago psyllium* (Isabgol) has been assessed for the removal of fluoride from wastewater. Flocculation studies were carried under varying experimental condition of contact time, fluoride concentration, flocculant dosage and pH. The maximum removal obtained was 71.32% after 45 minutes. The optimal mucilage dose was 10mg/L. The maximum removal was obtained at acidic pH (4) for fluoride. These food-grade polysaccharides are a great option for an adsorbent because they are plentiful, biodegradable and non-toxic.

Key words : *Plantago psyllium*, optimal mucilage dose, fluoride ion, biodegradable, non-toxic.

How to cite : Rahsmi Dubey, Ratna Shukla, Monika Agarwal and Rajeev Kumar (2024) Removal of fluoride ion from wastewater using *Psyllium* Crosslinked Polyacrylic Acid (Psy-cl-PAA). *Biochem. Cell. Arch.* **24**, 1021-1028. DOI: https://doi.org/10.51470/bca.2024.24.1.1021

INTRODUCTION

Pure water is scarce and is not easily available to all. Deprieved sections of the society consume contaminated water and take ill periodically, often resulting in epidemics. The water may be contaminated by natural sources or by industrial effluents. One such contaminant is fluoride. Fluorine is a salt of the element fluorine. Fluorine is the most highly reactive element of hydrogen family. Small amount of it are found in sea water, bone, teeth and in ground water mainly as fluoride ion. Most fluoride associated with monovalent cations such as NaF and KF is water soluble, while the other formed with divalent cations such as CaF and PbF is generally insoluble.

Fluoride is "more toxic than lead and less toxic than arsenic" and is an accumulative toxin. Fluoride has dual significance, if its content is less than 0.5ppm, it may result in problems like dental caries. World Health Organisation (WHO) recommends fluoride concentration in the range of 0.1-0.5ppm. The requirement of fluoride content varies among countries and depends on the geography and the age of people involved. An intake of fluorine per day results in fluorosis. Fluorine being cumulative, bone seeking mineral, the resultant skeletal changes are progressive. Fluoride increases the stability of crystal lattice in bone, but makes the bone more brittle. Drinking of fluoridated water will double the number of hip fractures.

The International Society for Fluoride Research (ISFR) has reported studies implicating fluoride in the rising rates of Down's syndrome, Chronic fatigue syndrome and sleep disorder.

The presence of fluoride ion in portable water has adverse effects on human health. According to the World Health Organization (WHO) the maximum acceptable concentration of fluoride in drinking water lies below 1.5mg/L (Ayoob and Gupta, 2006). Fluoride is attracted by positively charged calcium in teeth and bones due to its strong electronegativity, which results in dental, skeletal and non skeletal fluorosis, in children as well as adults (Ayoob and Gupta, 2006). Fluoride normally enters the environment and human body through water, food, industrial exposure, drugs, cosmetics etc; however, drinking water is the major source of daily intake (Sarala and Rao, 1993). Increasing fluoride concentration in water has already become a very serious issue in many countries (Ayoob and Gupta, 2006; Meenakshi and Maheshwari, 2006). Traditional treatment methods such as reverse osmosis, ion exchange (Mohapatra *et al*, 2009) and adsorption (Sundaram *et al*, 2009) have been attempted.

FERROELECTRICS
2023, VOL. 617, 93–100
https://doi.org/10.1080/00150193.2023.2271139

Taylor & Francis
Taylor & Francis Group

Structural and dielectric properties of Y^{3+} doped $SrTiO_3$: a novel anode materials for solid oxide fuel cell

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ABSTRACT

An ongoing and elusive task is to create single phase anode materials for solid oxide fuel cells (SOFC). Compared to the typical Ni-YSZ cermet anode, perovskite oxide based anode material has a number of benefits. Here, we present the structural and electrical characteristics of Y^{3+} doped $SrTiO_3$ ceramics that are used as the anode in solid oxide fuel cells. The samples with nominal composition $x = 0$ and 0.05 were synthesized by high energy ball milling. The powder X-ray diffraction pattern reveals that the synthesized samples crystallize into cubic crystal structure with space group Pm3m for both the compositions. The samples were sintered at a temperature of 1300 °C for 6h. The sintered density of the samples was found to be greater than 97%. The temperature dependent dielectric measurement studies reveal that dielectric constant increases with yttrium doping and shows relaxer behavior. A higher dielectric constant and electrical conductivity was observed for the Y-doped sample which fulfill the basic requirement for anode materials of solid oxide fuel cells.

ARTICLE HISTORY
Received 17 December 2022
Accepted 11 August 2023

KEYWORDS
Strontium titanate; perovskite anode; dielectric properties; solid oxide fuel cells

1. Introduction

Solid oxide fuel cell is a fourth-generation battery in which energy conversion from chemical to electrical occurs. A solid oxide electrolyte separates the cathode and anode in a Solid oxide fuel cell (SOFC) [1]. One of the most crucial parts of a SOFC is the anode, which exposes the catalyst to fuels directly. A common anode material, nickel/YSZ, has the drawback of resistance losses at high temperatures, suffers poisoning, and accumulates carbon. Because they are chemically robust at high working temperatures, ceramic anodes have benefits in achieving direct electrochemical oxidation of dry methane without carbon deposition [2]. A number of scientists have recently shown that anodes made of perovskite materials are promising options for upcoming fuel cell anodes [3, 4]. Since their development, perovskite-based oxide materials have found a wide range of uses, including super capacitors, SOFCs, photovoltaics, battery materials, and energy storage [5–9]. Strontium titanate, or $SrTiO_3$, is particularly attractive owing to its crucial thermo-chemical durability and semiconducting characteristics [10].

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J Mater Sci: Mater Electron **(2024) 35:433**

Development of low band gap layered $Bi_6FeNiTi_3O_{18}$ aurivillius phase ceramics for ferroelectric memory and cathode for lithium-oxygen batteries applications

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Received: 17 October 2023
Accepted: 19 February 2024
Published online: 27 February 2024

ABSTRACT

The layered multiferroic perovskite oxides are excellent functional materials for ferroelectric memory applications and also show application potential for cathode materials in lithium-oxygen battery due to high surface area, good stability, easy processing and low price. Synthesis of uniformly distributed layered perovskite oxides with low band gap, ionic-conducting and ferroelctric nature is still challenging. In this work, we have synthesized a new single-phase aurivillius phase $Bi_6FeNiTi_3O_{18}$ ceramics by high-energy ball mill mechano-chemical reaction. The Rietveld refinement of XRD data reveals that the compound $Bi_6FeNiTi_3O_{18}$ shows orthorhombic structure with space group P2/m and SEM images confirm the uniform layered morphology. $Bi_6FeNi\ Ti_3O_{18}$ ceramic have shown very high T_c of 450 °C and typical relaxor behaviour. Impedance analysis reveals the effect of grains, grain boundaries and electrode on conductivity. Ferroelectric nature is confirmed by obtained P-E loop at room temperature. We also report much lower band gap (E_g = 1.87 eV) as compared to $Bi_6Fe_2Ti_3O_{18}$ (E_g = 3.2 eV) ceramics which is due to Ni 3d state formation below Fe 3d state. The present work provide new path to engineer the functional properties of perovskite oxides for memory and energy storage applications.

1 Introduction

In the twenty-first century, identifying potential materials for effective energy generation and storage is a significant task. The globe has been struggling with serious issues of energy scarcity and environmental pollution. Because of its enormous potential for the degradation of pollutants and the conversion of different forms of energies directly driven by solar energy, semiconductor-based photocatalysis has long been seen to be one of the most promising methods to solve these problems [1]. Multiferroic photocatalysts with small band gaps, ferromagnetism (FM), and ferroelectricity (FE) are predicted to have potential in

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UGC Approved, Journal No. 48416 (IJCR)
Impact Factor : 6.0

ISSN : 2393-8358

Interdisciplinary Journal of Contemporary Research

An International Peer Reviewed Refereed Research Journal

Vol. 10, No. 12.1 December, 2023

PEER-REVIEWED JOURNAL

UGC Approved Journal No. 48416 (An International Peer Reviewed Refereed Research Journal)
Interdisciplinary Journal of Contemporary Research, Vol. 10, No. 12.1, December, 2023
Impact Fact
ISSN: 239

संस्कृत साहित्य में चित्रकला के प्राचीन साक्ष्य

सुनील यादव
असिस्टेंट प्रोफेसर (चित्रकला विभाग), डी.ए.वी. कॉलेज, कानपुर

UGC Approved, Journal No. 48416 (IJCR), Impact Factor 6.0 ISSN : 2393-8358

Interdisciplinary Journal of Contemporary Research
An International Peer Reviewed Refereed Research Journal

Vol. 10, No. 12.1 December, 2023

PEER REVIEWED JOURNAL

UGC Approved Journal No. 48416 (An International Peer Reviewed Refereed Research Journal) *Impact Factor : 6.0*
Interdisciplinary Journal of Contemporary Research, Vol. 10, No. 12.1, December, 2023 *ISSN : 2393-8358*

आलोचना

त्रैमासिक

अंक 65, भाग –1, 2024

आलोचना
त्रैमासिक

ISSN No. 2231-6329
(UGC-CARE Listed Group-I)

उद्यमवृत्ति और आर्थिक विकास : एक अवलोकन

डा पूजा सिन्हा
एसोसिएट प्रोफेसर, अर्थशास्त्र विभाग, डी०ए०वी० कालेज, कानपुर

प्रस्तावना :

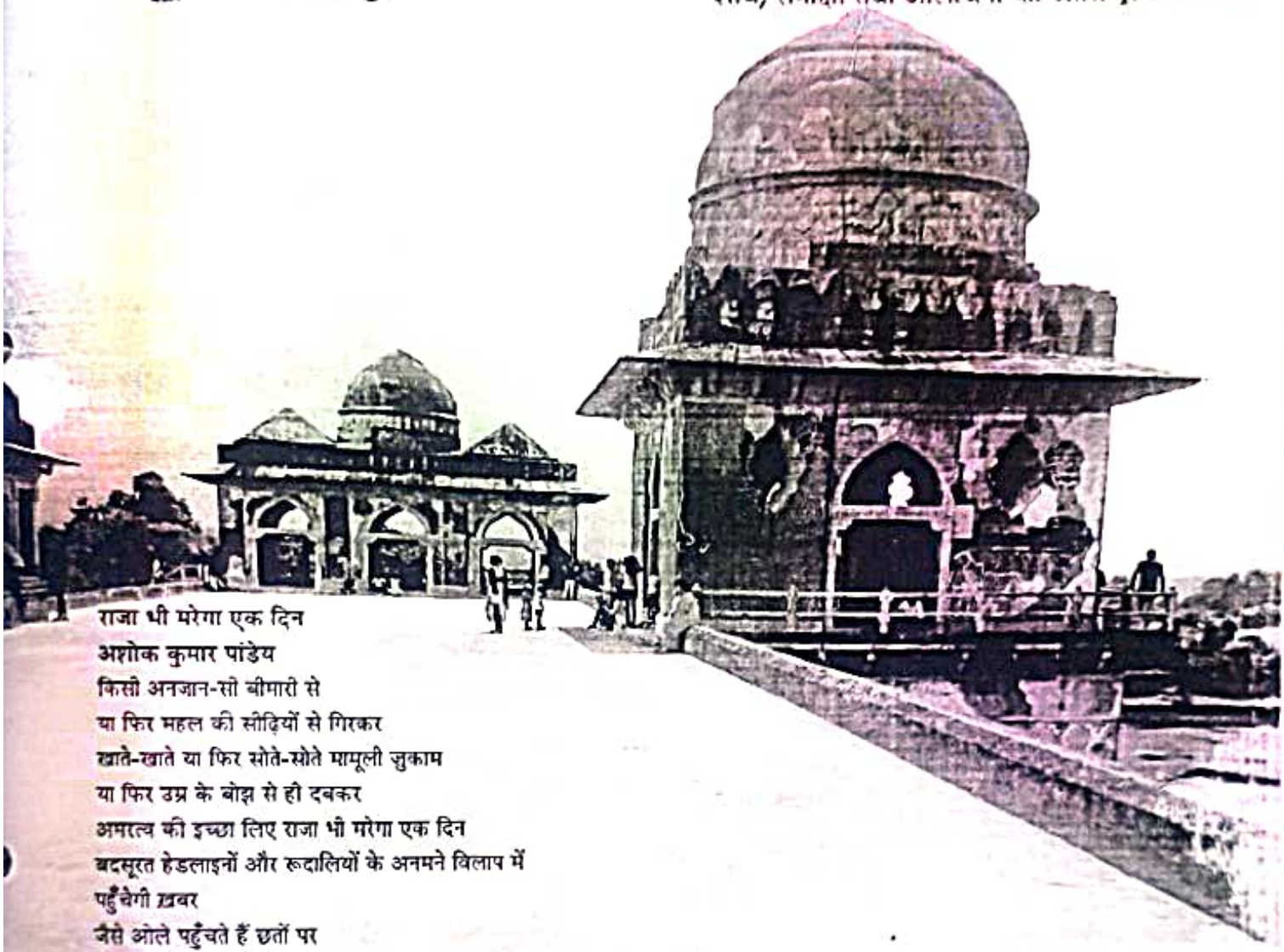
इसी अल्प विकसित देश में उद्यमवृत्ति द्वारा एक पथ प्रदर्शक की भूमिका निभायी जाती है। स्वतन्त्र विकास के दिन समाप्त हो गये जब सरकार केवल नियामक प्रकृति के कार्य करती थी जैसे कानून व्यवस्था को बनाये रखने का कार्य आदि। परन्तु, अब स्थिति पूर्णतया बदल गई है। कोई ही ऐसा देश होगा जहां सरकार लोगों के आर्थिक जीवन में सक्रियतापूर्वक भाग नहीं ले रही है। लार्ड केन्ज का प्रसिद्ध कार्य स्पष्ट प्रमाण है, जो प्रमाणित करता है कि प्रणाली स्वचालित रूप में कार्य नहीं कर सकती और राज्य को अर्थव्यवस्था के सुचारू ढंग से काम-काज अपना उत्तरदायित्व अवश्य निभाना चाहिये। वास्तव में, यह सार्वभौमिक रूप में स्वीकार किया गया है और लगभग सभी विकासशील देश इसे सामाजिक-आर्थिक स्थानान्तरण के मौलिक उपकरण के रूप में दृढ़ता से अपना रहे हैं। ऐसी अर्थव्यवस्थाओं में निजी उद्यमवृत्ति प्रायः संकोची होती है तथा नये कार्य आरम्भ करने का जोखिम उठाने से परहेज करती है। इसलिये सरकार स्वयं उद्यमी होती है और परिस्थितियों अनुसार उचित कार्य करती है, परन्तु उन्नत पूंजीवादी देशों में, निजी उद्यमियों ने आर्थिक विकास में युक्तियुक्त भूमिका निभायी है। इसलिये, देश की आर्थिक एवं राजनैतिक व्यवस्था की ओर ध्यान न देते हुये उद्यमवृति आर्थिक विकास का आवश्यक भाग है।

सरल शब्दों में, उद्यमी एक आर्थिक नेता है जिसमें नई तकनीकों, नई वस्तुओं, नये साजो-सामान को एकत्रित करने के लिये नये स्त्रोतों, संयंत्र, मशीनरी, प्रबन्ध तथा श्रम शक्ति को व्यवस्थित करने के सफल आरम्भ के लिये अवसरों को पहचानने की योग्यता होती है। पिछले कुछ वर्षों से उद्यमी के कार्य में परिवर्तन आया है। कई बार उसे जोखिम और अनिश्चितता सहन करनी पड़ती है तथा कई बार वह उत्पादक साधनों के तालमेल के लिये कार्य करता है। शुम्पीटर उसे नव प्रवर्तक कहते हैं क्योंकि वह नव प्रवर्तन लाने में सक्रिय भूमिका निभाता है। येल ब्रोजन (ल्संम ठतब्रमद) के शब्दों में, जो इसे किसी भी व्यवसाय संगठन का केन्द्रीय स्तम्भ मानता है का कहना है कि उद्यमी के बिना उद्योग का पहिया एक इंच भी आगे नहीं बढ़ सकता । उसके शब्दों में "दीर्घ काल में निजी उद्यमवृत्ति आर्थिक विकास का एक अभिन्न अंग है।"

एक ऐसी घटना जो नवीन विचारों को बढ़ावा देती है, प्रगति को आगे बढ़ाती है और हमारी अर्थव्यवस्था के ढांचे को आकार देती है। हेनरी फोर्ड की असेंबली लाइन क्रांति से लेकर मार्क जुकरबर्ग के फेसबुक के निर्माण तक, उद्यमी लंबे समय से परिवर्तन के अग्रदूत रहे हैं।

लेकिन उनके अथक प्रयासों का अर्थव्यवस्था पर वास्तविक प्रभाव क्या है? खैर, एक कप कहफी लें और मेरे साथ जुड़ें क्योंकि हम उद्यमिता की मंत्रमुग्ध कर देने वाली दुनिया में उतरेंगे और पता लगाएंगे कि कैसे ये बहादुर आत्माएं चांदनी रात में टूटते सितारों की तरह हमारे आर्थिक परिदृश्य को रोशन करती हैं।

विश्वविद्यालय अनुदान आयोग द्वारा अनुमोदित पत्रिका
ISSN NUMBER : 2455-9717
UGC Approved Journal - UGC Care Review
RNI NUMBER :- MPHIN/2016/67929
शिवना प्रकाशन
वर्ष : 8, अंक : 30
जुलाई-सितम्बर 2023
मूल्य 50 रुपये
शिवना साहित्यिकी
शोध, समीक्षा तथा आलोचना की अंतर्राष्ट्रीय पत्रिका



राजा भी मरेगा एक दिन

अशोक कुमार पांडेय

किसी अनजान-सी बीमारी से
या फिर महल की सीढ़ियों से गिरकर
खाते-खाते या फिर सोते-सोते मामूली जुकाम
या फिर उम्र के बोझ से ही दबकर
अमरत्व की इच्छा लिए राजा भी मरेगा एक दिन
बदसूरत हेडलाइनों और रूदालियों के अनमने विलाप में
पहुँचेगी ख़बर
जैसे ओले पहुँचते हैं छतों पर
कौतूहल में निकलेंगे लोग
बच्चे खेलना छोड़ देखेंगे इधर उधर अचरज में
औरतें चौके से बाहर निकल टी.वी. निहारेंगी थोड़ी देर
मर्द उत्तराधिकारी पर चर्चा करते हुए मनाएँगे छुट्टी
महल के वीरान कक्षों में चलेंगी तलवार-सी ज़बानें
उदासी का केंचुल उतार उम्मीदें करेंगी परवाज़
ठीक वैसे ही सड़ेगी राजा की लाश
जैसे मुझ-सी परजा की जलेगी आग
धुआँ हो जाएगी देह अस्थियाँ चटकेंगी
तस्वीरों में मुस्कुराता चेहरा सुतली बम की तरह फटेगा
मानव गंध से मचल उठेगा श्मशान का कुत्ता
दक्षिणा बटोरता पंडित घर लौटते ही उतार फेंकेगा गंभीरता का मुखौटा
हज़ार लाशों का बोझ लिए
राजा भी मरेगा एक दिन

6a

संपादकीय एवं व्यवस्थापकीय कार्यालय
पी. सी. लैब, शॉप नं. 2-7
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एक प्रति : 50 रुपये, (विदेशों हेतु 5 डॉलर $5)

सदस्यता शुल्क
3000 रुपये (पाँच वर्ष), 6000 रुपये (दस वर्ष)
11000 रुपये (आजीवन सदस्यता)
बैंक खाते का विवरण-
Name: Shivna Sahityiki
Bank Name: Bank Of Baroda,
Branch: Sehore (M.P.)
Account Number: 30010200000313
IFSC Code: BARB0SEHORE

शिवना प्रकाशन

शिवना साहित्यिकी

शोध, समीक्षा तथा आलोचना की अंतर्राष्ट्रीय पत्रिका
वर्ष : 8, अंक : 30, त्रैमासिक : जुलाई-सितम्बर 2023
विश्वविद्यालय अनुदान आयोग द्वारा अनुमोदित पत्रिका
(UGC Approved Journal - UGC Care Review)
RNI NUMBER :- MPHIN/2016/67929
ISSN : 2455-9717

आवरण कविता
अशोक कुमार पाण्डेय

आवरण चित्र
पंकज सुबीर

6b

इस अंक में

6c

शोध आलेख

(शोध आलेख)

कृषि विपणन की मण्डियों का समीक्षात्मक अध्ययन

(उ.प्र. के जनपद हरदोई के विशेष सन्दर्भ में)

शोध लेखक : दीपा वर्मा
शोधार्थी, डी.ए-वी. कॉलेज, कानपुर, (सीएसजेएम विश्वविद्यालय, कानपुर)
शोध निर्देशक : डॉ. पुन्ज भास्कर
सीनियर असिस्टेंट प्रोफेसर, अर्थशास्त्र विभाग, डी.ए-वी. कॉलेज, कानपुर

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सारांश- कृषि विपणन में मण्डियों की अहम भूमिका होती है जिसमें विभिन्न आयाम, मण्डियों में उपलब्ध संसाधनों, उत्पादों की क्रय-विक्रय व्यवस्था, परिवहन व अन्य सुविधाओं, योजनाओं, निर्धारित मूल्यों की जानकारी, भाव एवं मूल्यों का उतार-चढ़ाव, इत्यादि को शामिल किया जाता है ताकि कृषि उत्पादों का क्रय एवं विक्रय करते समय उत्पादकों तथा उपभोक्ताओं दोनों को आवश्यक शर्तों के साथ नियंत्रित करके आसानी से विपणन की क्रिया को सम्पन्न किया जाता रहे। मण्डियों की संरचना, व्यवस्थाओं, विपणन क्रियाओं, मूल्य निर्धारण, नीतियों, कार्यक्रमों, उत्पादों की गुणवत्ता, सर्वेक्षणों, शोधों आदि भिन्न-भिन्न पहलुओं का मूल्यांकन करके मण्डियों के मूल दायित्वों को स्पष्ट किया गया है जिसके परिणामस्वरूप कृषि विपणन में वृद्धि से मण्डियों की स्थापना में उन्नति होने के उपरान्त कृषकों की आर्थिक आय में बढ़ोतरी होती रहे। प्रस्तुत शोध पत्र में कृषि विपणन की मण्डियों का समीक्षात्मक अध्ययन करने के लिए शोध क्षेत्र जनपद हरदोई की पाँचों मण्डियों का सर्वेक्षण करके प्राप्त प्राथमिक एवं द्वितीयक आँकड़ों के लिखित अभिलेखों के आधार पर संक्षिप्त विवरण को तालिका के द्वारा दर्शाया गया है जिसके द्वारा कृषि विपणन में मण्डियों के मूलभूत उत्तरदायित्व को दृष्टिगत किया गया है।

मुख्य शब्द- कृषि, कृषि विपणन, मण्डियाँ

प्रस्तावना- कृषि मानव सभ्यता के उदय से ही शुरू हो गई थी, जब मनुष्य जंगलों में रह कर कृषि उपजों को उगाकर अपना जीवन-यापन करने लगा था, तब कृषि मात्र जीविकोपार्जन का साधन थी लेकिन आज, कृषि अनेक शोधों, वैज्ञानिक रीतियों, तकनीकों, उपकरणों इत्यादि के उपयोग से आधुनिक एवं व्यवस्थित होती जा रही है जिससे कृषकों की कृषि फसलों के उत्पादन में वृद्धि होने से कृषि एक व्यवसाय का रूप बन गई है। कृषि में भूमि, जल, प्रकाश, वायु, पशुओं, वनस्पतियों, जैविक तत्वों, आदि प्राकृतिक संसाधनों तथा मानव निर्मित साधनों का प्रयोग किया जाता है जिससे कृषि फसलों की पैदावार में दिन-प्रतिदिन बढ़ोत्तरी होती जा रही है। हरित क्रांति की उत्पत्ति से कृषि फसलों को उगाने के लिए नवीनतम बीजों, खादों, कीटनाशकों, नवीन पद्धतियों, के प्रयोग से कृषि उपजों की उत्पादन क्षमता में वृद्धि हुई है जिसके परिणामस्वरूप कृषकों के अतिरेक में संवृद्धि होने से कृषि विपणन में उन्नति होने के उपरान्त कृषकों की आर्थिक स्थिति में विकास हुआ है। जिस प्रकार माँ अपने बच्चे का पालन-पोषण करती है उसी प्रकार कृषक भी अपनी फसलों की देख-भाल करता है इसलिए कृषक को कृषि की रीढ़ की हड्डी कहा जाता है क्योंकि अगर कृषक निरोगी और आर्थिक मजबूत रहेगा, तो कृषि में स्वत: ही वृद्धि होती रहेगी। विपणन उत्पादक और उपभोक्ता दोनों के बीच मध्यस्थता की अहम भूमिका निभाता है जिसमे कृषि फसलों के विक्रय, प्रचार, प्रबंधन, योजनाएँ और वित्तीय लेन-देन को शामिल किया जाता है ताकि उत्पादकों एवं उपभोक्ताओं की आवश्कताओं को पूरा करते हुए सुविधाजनक व्यवहार को संभव बनाया जा सके। विपणन में कृषि उत्पादों को अन्तिम उपभोक्ता तक पहुँचाने की सभी गतिविधियों को समाविष्ट किया जाता है जिसमें उत्पादों की पहुँच, मूल्य निर्धाण, विपणन रणनीतियों का विकास, विपणन संचार, बिक्री और विपणन के अन्य पहलुओं को सम्मिलित किया जाता है। विपणन उत्पादों की माँग एवं आपूर्ति के मध्य समान वितरण को सुनिश्चित करने में महत्त्वपूर्ण स्थान रखता है ताकि उत्पादक व उपभोक्ता दोनों को लाभ प्राप्त हो सके।

कृषि विपणन की प्रक्रिया उत्पादक तथा उपभोक्ता के समायोजन से सम्पन्न होती है जिसमे कृषि विपणन के लक्ष्यों, नीतियों, विविध उत्पादों एवं सेवाओं की बाजारों में स्थिति, विज्ञापन, संचार, बिक्री प्रचार, विपणन अनुसंधान, विपणन योजनाएँ, मूल्य निर्धारण, वित्त व्यवस्थाएँ, समाचार पत्रों, वितरण, विपणन व्यवस्थाओं इत्यादि को शामिल किया जाता है। कृषि विपणन का उद्देश्य कृषि उत्पादन को बेचने के लिए अधिकतम क्रेताओं तक पहुँचाना, उत्पादों के बारे में ग्राहकों को जानकारी देना और कृषकों को कृषि फसलों का उचित मूल्य दिलाना है। कृषि विपणन में नमूना, भण्डारगृहों, नई उत्पादों की शृंखला, मण्डियों और बाजारों का उपयोग किया

विश्वविद्यालय अनुदान आयोग द्वारा अनुमोदित पत्रिका UGC Approved Journal - UGC Care Review
ISSN NUMBER : 2455-9717
RNI NUMBER :- MPHIN/2016/67929

सिवना प्रकाशन

वर्ष : 8
अंक : 32
जनवरी-मार्च 2024
मूल्य 50 रुपये

शिवना साहित्यिकी
शोध, समीक्षा तथा आलोचना की अंतर्राष्ट्रीय पत्रिका

नए साल की सुबह

दिनेश कुशवाह

अगर सिर्फ़ शुभकामनाओं से
मिल जाता मनचाहा
तो हर आदमी के पास होती
एक ख़ूबसूरत दुनिया।

आज नए साल की सुबह
मन नहीं किया कि शुभकामनाएँ दूँ
उन तमाम लोगों को
यानी कहूँ उनसे कि आप
इस साल और सफलतापूर्वक करें
वही सब वाहियात
जो करते रहे पिछले साल।

जबकि देश को तोड़ने की होड़
लगी है दरारों में
सिद्ध करने की जुगलबंदी
गा रहे हैं पक्ष-विपक्ष।

स्तब्ध हूँ मैं
इस बात से कि
अपनी बेचैनी की लाज
बचाने के लिए भी
मेरे पास रास्ता नहीं है।

शोध, समीक्षा तथा अनूदित की अंतर्राष्ट्रीय पत्रिका
वर्ष : 8, अंक : 32, जनवरी-मार्च 2024
विश्वविद्यालय अनुदान आयोग द्वारा अनुमोदित पत्रिका
(UGC Approved Journal - UGC Care Review)
RNI NUMBER :- MPBIN/2016/67929
ISSN : 2455-9717

दिनेश कुशवाह

पंकज सुबीर

Name: Shivna Sahityiki
Bank Name: Bank Of Baroda,
Branch: Sehore (M.P.)
Account Number: 30010200000313
IFSC Code: BARB0SEHORE

Sb

इस अंक में

त्रैमासिक, जनवरी-मार्च 2024

Sc

शोध आलेख

(शोध आलेख)

सतत विकास के लिए वित्तीय क्षेत्र के सुधार

शोध लेखक : डॉ पुन्जभाष्कर
एसोसिएट प्रोफेसर, अर्थशास्त्र विभाग, डी-ए.वी. कॉलेज, कानपुर

सारांश- वित्तीय क्षेत्र एक राष्ट्रीय अर्थव्यवस्था के लिए बहुत महत्त्वपूर्ण होता है, क्योंकि यह विभिन्न उद्योगों और व्यापारों को समर्थन प्रदान करता है और अर्थतंत्र के विकास में महत्त्वपूर्ण भूमिका निभाता है। सतत विकास की दिशा में, वित्तीय क्षेत्र के सुधार और विकास अत्यंत महत्त्वपूर्ण है, ताकि एक समृद्ध और सामर्थ्यपूर्ण अर्थव्यवस्था की ओर कदम बढ़ा सके। भारतीय अर्थव्यवस्था का विकास और सुधार तेजी से बढ़ रहा है, और इसमें वित्तीय क्षेत्र का महत्त्वपूर्ण योगदान है। वित्तीय क्षेत्र के सुधारों के माध्यम से, हम सतत विकास और प्राकृतिक संसाधनों का सुरक्षित और अनुकूल उपयोग करके सामाजिक और आर्थिक साकारात्मकता की दिशा में कदम बढ़ा सकते हैं। इस लेख में, हम वित्तीय क्षेत्र के सुधारों के महत्त्व और उनके प्राकृतिक संवेदनशील विकास के प्रति आकर्षित होने के साथ ही साथ, हम इस शोध में यह भी विश्लेषण करने का प्रयास किया गया है कि कैसे वित्तीय क्षेत्र के सुधार एक सतत विकास के लिए महत्त्वपूर्ण हैं और इसे कैसे समर्थन किया जा सकता है।

शब्दबिन्दु: सतत विकास, वित्तीय क्षेत्र, भारतीय अर्थव्यवस्था, आर्थिक विकास।

प्रस्तावना- वित्तीय क्षेत्र का महत्त्व एक राष्ट्र की आर्थिक स्थिति और सामाजिक विकास में महत्त्वपूर्ण है। यह एक ऐसा क्षेत्र है जो संचालन, निवेश, और धन वितरण के माध्यम से विकास और सामर्थ्यपूर्णता की दिशा में महत्त्वपूर्ण भूमिका निभाता है। भारतीय अर्थव्यवस्था के विकास में वित्तीय क्षेत्र का योगदान अत्यधिक महत्त्वपूर्ण है, और इसे सतत विकास की दिशा में प्राकृतिक साधनों के साथ मेल करने का सामर्थ्य दिखाना अत्यंत आवश्यक है। वित्तीय क्षेत्र के महत्त्व को समझने के लिए हमें पहले से ही उसके सुधार की आवश्यकता को समझना होगा। इसका मतलब है कि हमें वित्तीय संस्थानों की सुरक्षा और सुरक्षा के प्रति गंभीर ध्यान देना होगा। बिना वित्तीय संस्थाओं की सुरक्षा के, आर्थिक स्थिति को स्थिर और सुरक्षित नहीं बनाया जा सकता है। वित्तीय संस्थानों के सही तरीके से संचालन और निगरानी के बिना, वित्तीय सं... में संकटों का सामना करना मुश्किल हो सकता है, जिससे आर्थिक तंगी और सामाजिक असमानता बढ़ सकती है। डिजिटल युग के साथ, वित्तीय सेवाओं की पहुँच एक महत्त्वपूर्ण वित्तीय सुधार का हिस्सा बन गई है। डिजिटलीकरण के माध्यम से, गाँवों और छोटे शहरों में लोगों को वित्तीय समावेशन का मौका मिलता है, जिससे उनकी आर्थिक स्थिति में सुधार हो सकती है। इसके अलावा, डिजिटल भुगतान और वित्तीय सेवाओं के नए तरीके लोगों को और ज्यादा आसानी से वित्तीय समावेशन की ओर बढ़ा रहे हैं। वित्तीय शिक्षा भी इस विकास का महत्त्वपूर्ण हिस्सा है। लोगों को वित्तीय जागरूकता प्राप्त करने के लिए प्रशिक्षण और उपयोगी जानकारी की आवश्यकता है ताकि वे अपने वित्तीय निर्णयों को सही तरीके से ले सकें। इससे लोग उनके आर्थिक लक्ष्यों को प्राप्त करने के लिए सही और सुझाव दे सकते हैं, और इससे वित्तीय स्वाधीनता की दिशा में एक महत्त्वपूर्ण कदम बढ़ावा मिल सकता है।

वित्तीय संस्थानों को सामाजिक और पर्यावरणीय लक्ष्यों के साथ समर्थन करना महत्त्वपूर्ण है। वित्तीय संस्थानों का सामाजिक योगदान सामाजिक समर्थन के रूप में देखा जा सकता है, और इन्हें पर्यावरणीय संरक्षण के माध्यम से वित्तीय समावेशन को बढ़ावा देने के तरीकों में शामिल किया जा सकता है। इसके अलावा, वित्तीय संस्थानों को उनके प्रदूषण को कम करने के लिए प्रोत्साहित किया जा सकता है, जिससे हम पर्यावरण के साथ सहयोग करके सामाजिक और आर्थिक साकारात्मकता की दिशा में कदम बढ़ा सकते हैं। इस प्रकार, "सतत विकास के लिए वित्तीय क्षेत्र के सुधार" शोध पत्र वित्तीय क्षेत्र के महत्त्वपूर्ण पहलुओं को जानने और समझने का प्रयास करेगा, और सतत विकास की दिशा में भारतीय अर्थव्यवस्था को सुनिश्चित करने के तरीके पर विचार करेगा। इसके माध्यम से हम समृद्धि, सुरक्षा, और सामाजिक साकारात्मकता के दिशा में एक सुदृढ़ और सुरक्षित वित्तीय क्षेत्र को बढ़ावा देने में कदम बढ़ा सकते हैं।

वित्तीय संस्थानों की सुरक्षा और निगरानी- वित्तीय संस्थानों की सुरक्षा और निगरानी, वि...

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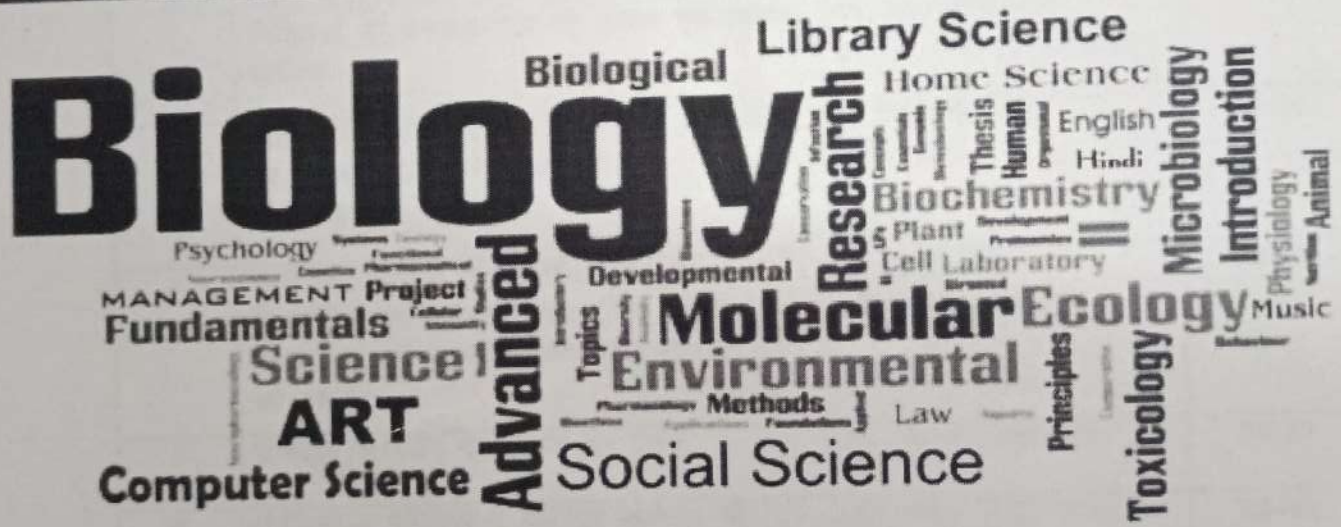
ISSN : 2581-8872

Vol. - 6, No. - 1, Feb. - 2024

Unnati International Journal of Multidisciplinary Scientific Research



Peer Reviewed - Refereed Journal
Impact Factor - 4.8, Open Access,
Double Blind, Monthly Journal

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Unnati International Journal of Multidisciplinary Scientific Research (U.I.J.M.S.R.)
Peer Reviewed - Refereed Journal & Impact Factor - 4.8, Open Access, Double Blind
Monthly Journal, ISSN : 2581-8872, Vol. : 6, No. : 1, February - 2024

2024

उत्तर प्रदेश की ग्रामीण आजीविका में मनरेगा का योगदान : जनपद कन्नौज का एक अध्ययन

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सार (Abstract) :- स्वतंत्रता के बाद से ही ग्रामीण विकास पर जोर दिया जा रहा है, जिसके लिए भारत सरकार द्वारा समय – समय पर अनेक रोजगारपरक तथा विकासजनित योजनाऐं ग्रामीण क्षेत्र में चलायी गयीं ताकि ग्रामीण लोगों की आजीविका में वृद्धि हो सके और ग्रामीण विकास सम्भव हो सके । चूंकि भारत एक ग्रामीण अर्थव्यवस्था वाला देश है इसलिए ग्रामीण क्षेत्र का विकास किए बिना देश का विकास नहीं किया जा सकता । भारत सरकार द्वारा चलायी गयी ग्रामीण विकास योजनाओं में से एक व्यापक योजना मनरेगा है, जिसे राष्ट्रीय ग्रामीण रोजगार गारंटी योजना के नाम से 2 फरवरी 2006 में प्रारम्भ किया गया था । इस योजना का मुख्य उद्देश्य सम्पूर्ण भारत के ग्रामीण क्षेत्र में लोगों को रोजगार उपलब्ध कराकर उनकी आय में वृद्धि करना है, जिससे उनके जीवन स्तर में सुधार हो सके और ग्रामीण क्षेत्र का विकास हो सके ।

मुख्य शब्द (Key Words) : आजीविका, ग्रामीण अर्थव्यवस्था, मनरेगा, रोजगार व आय ।

प्रस्तावना (Introduction) :- भारत की आबादी का एक बड़ा हिस्सा (लगभग 70 प्रतिशत) ग्रामीण क्षेत्र में निवास करता है, जिस कारण से भारत को ग्रामीण अर्थव्यवस्था वाला देश कहा जाता है । ग्रामीण क्षेत्र का विकास किए बिना भारत देश का विकास नहीं किया जा सकता । इसीलिए स्वतंत्रता प्राप्ति के बाद से ही ग्रामीण क्षेत्र का विकास भारत सरकार के लिए एक चुनौती बनी हुई है । अत: भारत सरकार द्वारा समय – समय पर अनेक विकासात्मक एवं रोजगारपरक योजनाऐं चलायी गयीं ताकि ग्रामीण क्षेत्र का विकास हो सके । इन योजनाओं का मुख्य उद्देश्य ग्रामीण लोगों को रोजगार प्रदान करना था जिससे ग्रामीण लोगों की आय में वृद्धि हो सके तथा उनका जीवन स्तर ऊँचा उठ सके ।

हालांकि भारत सरकार द्वारा समय – समय पर अनेक विकासजनित और रोजगारपरक कार्यक्रम ग्रामीण क्षेत्र में चलाए गए परंतु पूर्णरूप से पहला मजदूरी रोजगार कार्यक्रम 'काम के बदले भोजन कार्यक्रम' के रूप में 1977 में लागू किया गया। राष्ट्रीय ग्रामीण रोजगार कार्यक्रम (NREP) व जवाहर रोजगार योजना वर्ष 1980 में ग्रामीण रोजगार उपलब्ध कराने के उद्देश्य से प्रारम्भ किया गया तथा प्रधानमंत्री रोजगार योजना का प्रारम्भ 2 अक्टूबर 1993 को किया गया । इस योजना का उद्देश्य ग्रामीण क्षेत्रों और छोटे शहरों के शिक्षित बेरोजगारों को स्वरोजगार हेतु अवसर प्रदान करना था । स्वर्ण जयंती ग्रामीण स्वरोजगार योजना का प्रारम्भ । अप्रैल 1999 से किया गया। इस योजना में पूर्व में चल रही छ: योजनाओं - 1. स्वरोजगार के लिए ग्रामीण युवाओं का प्रशिक्षण (ट्राइसेम), 2. उन्नत टूल किट योजना, 3. समन्वित ग्रामीण विकास कार्यक्रम, 4. ग्रामीण महिला एवं बालोत्थान योजना, 5. गंगा कल्याण योजना तथा 6. दस लाख कूप योजना, का विलय कर दिया गया । इस कार्यक्रम का मुख्य उद्देश्य ग्रामीण गरीब जनसंख्या को गरीबी रेखा के स्तर से ऊपर उठाना है ।

भारत सरकार द्वारा अनेक रोजगारपरक तथा विकासजनित कार्यक्रम लागू करने के बावजूद उचित परिणाम प्राप्त न होने के कारण एक अलग तरह के रोजगार कार्यक्रम की आवश्यकता को महसूस किया गया । जिसको ध्यान में रखते हुए भारत सरकार ने 7 सितम्बर 2005 को राष्ट्रीय ग्रामीण रोजगार गारण्टी अधिनियम (नरेगा) पारित किया । 2 अक्टूबर 2009 को इस योजना का नाम बदलकर महात्मा गाँधी राष्ट्रीय ग्रामीण रोजगार गारण्टी अधिनियम (मनरेगा) कर दिया गया । इस योजना के अन्तर्गत प्रत्येक ग्रामीण परिवार के वयस्क सदस्यों को जो अकुशल श्रम कार्य करने का इच्छुक है को 100 दिन के मजदूरी रोजगार की गारण्टी

Feb - 2024

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ISSN : 2454-4655 VOLUME - 10 No. : 1, Feb. - 2024

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International Journal of Social Science & Management Studies (I.J.S.S.M.S.)
Peer Reviewed-Refereed Research Journal, Indexing & Impact Factor - 5.2, Ex - UGC S.N. 5351
ISSN : 2454 - 4655, Vol. - 10, No. - 1, February - 2024, Special Issue Hindi

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उत्तर–प्रदेश के ग्रामीण विकास में खाद्य–प्रसंस्करण उद्योग की भूमिका : एक अध्ययन

कल्पना आर्य
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डॉ. राम प्रकाश
एसोसिएट प्रोफेसर अर्थशास्त्र विभाग डी.ए.वी. कॉलेज कानपुर

सारांश :– वर्तमान समय में भारतीय अर्थव्यवस्था तेजी से बढ़ रही है साथ ही इस अर्थव्यवस्था में ग्रामीण विकास का महत्वपूर्ण सकारात्मक योगदान है। उत्तर–प्रदेश की अधिकांश जनसंख्या गाँवों में रहती है। ग्रामीण क्षेत्र में रहने वाले लोग अपना जीवन–यापन कृषि एवं गैर–कृषि कार्य करके पूरा करते हैं। ग्रामीण क्षेत्रों में कृषि कार्यों में खाद्य–प्रसंस्करण से सम्बन्धित फसलें फलों सब्जियों इत्यादि का उत्पादन किया जाता है जिनमें से कुछ कच्चे माल की प्राप्ति कराते हैं। कच्चे माल का उपयोग हेतु ग्रामीण उद्योगों में विद्यमान गैर–कृषि गतिविधियों द्वारा किया जाता है। अधिकांश खाद्य पदार्थों के लिए कच्चा माल ग्रामीण क्षेत्रों से ही प्राप्त होता है। वर्तमान में खाद्य–प्रसंस्करण उद्योग में कच्चे माल को भोजन के लिए एवं भोजन से सम्बन्धित अन्य रूपों में परिवर्तित किया जाता है।

प्रस्तुत शोध पत्र में उत्तर प्रदेश के ग्रामीण खाद्य–प्रसंस्करण उद्योग के महत्व एवं योगदान को दर्शाया गया है। यह शोध पत्र ग्रामीण विकास के लिए खाद्य–प्रसंस्करण उद्योग की आवश्यकता से सम्बन्धित है। खाद्य–प्रसंस्करण के द्वारा कच्चे माल को परिवर्तित करके उसकी आर्थिक उपयोगिता बढ़ायी जाती है जिससे ग्रामीण क्षेत्र में होती है।

इस पत्र में ग्रामीण विकास के लिए आधुनिक तकनीकों का प्रयोग करके खाद्य–प्रसंस्करण उद्योग अधिक विकसित करके ग्रामीण क्षेत्रों में पायी जाने वाली बेरोजगारी को कुछ हद तक कम किया जा सकता है। गैर–कृषि गतिविधियों को और अधिक विकसित किया जाना आवश्यक है जिसके लिए खाद्य–प्रसंस्करण उद्योग मन्त्रालय द्वारा बनाई नीतियों को पूर्णरूप से लागू करने कृषि एवं गैर–कृषि गतिविधियों में अधिक वृद्धि होगी और ग्रामीण क्षेत्र में प्रति व्यक्ति आय में वृद्धि होगी।

मुख्य शब्द :– ग्रामीण विकास, खाद्य प्रसंस्करण उद्योग, ग्रामीण बेरोजगारी, प्रति व्यक्ति आय, गैर–कृषि गतिविधियां।

प्रस्तावना :– ग्रामीण क्षेत्रों में आय एवं रोजगार में खाद्य–प्रसंस्करण उद्योग अपनी महत्वपूर्ण भूमिका निभाता है। खाद्य–प्रसंस्करण उद्योग का ग्रामीण क्षेत्रों के साथ घनिष्ठ सम्बन्ध है। कच्चा माल ग्रामीण लोगों द्वारा ही उत्पादित किया जाता है। खाद्य–प्रसंस्करण उद्योग विकसित होने से कृषि की उत्पादकता बढ़ती है सब्जियां, फल, फूल तथा अन्य खाद्य पदार्थों की मांग बढ़ जाती है जिससे कृषि क्षेत्रों में सुधार तो होता ही है साथ ही ग्रामीण क्षेत्रों का विकास होने लगता है। कृषि से उत्पादित कच्चे माल को पूर्ण रूप से आर्थिक प्रयोग हेतु करने का कार्य गैर–कृषि गतिविधियों द्वारा किया जाता है। खाद्य–प्रसंस्करण एवं अन्य गतिविधियों के विकास के लिए ग्रामीण विकास का होना अत्यन्त आवश्यक है। जब तक ग्रामीण विकास नहीं होगा तब तक खाद्य–प्रसंस्करण उद्योगों को विकसित नहीं किया जा सकता है। ग्रामीण क्षेत्रों में रहने वाले लोगों की सामाजिक, आर्थिक स्थिति में सुधार होने से उनके जीवन स्तर में सुधार करता है। जब ग्रामीण क्षेत्रों का बहुमुखी विकास होने लगता है तो उस क्षेत्र में रहने वाले लोगों को अच्छी शिक्षा, उत्तम स्वास्थ्य, स्वच्छ वातावरण से परिपूर्ण आवास एवं रोजगार के अनेक अवसर प्राप्त होते हैं। महात्मा गाँधी जी का स्वप्न ऐसे गावों की स्थापना का था, जहाँ स्वराज्य, सुराज्य में परिवर्तित होने लग जा।

ग्रामीण क्षेत्रों को विकसित करने में कृषि एवं गैर–कृषि दोनों प्रकार की गतिविधियां सहयोग करती है। कृषि क्षेत्र वह क्षेत्र है जिसमें फसल उत्पादन करने की प्रक्रिया से लेकर, पशुपालन, मत्स्यपालन एवं वानिकी को सम्मिलित किया जाता है इसीलिए कृषि को भारतीय अर्थव्यवस्था की रीढ़ कहा जाता है। उद्योगों के लिए कच्चा माल कृषि क्षेत्र से ही प्राप्त होता है। कृषि क्षेत्र से प्राप्त कच्चे माल को आर्थिक दृष्टिकोण से प्रयोग करना गैर–कृषि कहलाता है।

गैर–कृषि गतिविधियों से आशय :– वह क्षेत्र जो ग्रामीण क्षेत्रों में घरेलु, गैर–घरेलु, ग्रामीणहस्तशिल्प क्रियायें, निर्माण खनन, उत्खनन, परिवहन संचार एवं व्यक्तिगत सेवायें आदि गतिविधियों शामिल रहती है गैर–कृषि गतिविधियां कहलाती है। गैर–कृषि क्षेत्र के अन्तर्गत उन सभी ग्रामीण गैर–आर्थिक क्रिया–कलापों

ISSN 2394-4366

Vol. 10 , Issue-37, January-March, 2024

ABHINAV GAVESHNA

(Multi Disciplinary Quarterly International Refreed/Peer Reviewed Research Journal)

An International Refreed/Peer Reviewed Research Journal of Humanities
Arts, Literature, Culture, Commerce, Science & Social Science

Chief Editor :

Dr. Ranju Kushwaha

Editor :

Dr. Swati Purwar

अभिनव गवेषणा

(मल्टी डिसिप्लिनरी क्वार्टरली इण्टरनेशनल रेफ्रीड/पियर रिव्यूड रिसर्च जर्नल)

वर्ष- 10, अंक-37, जनवरी-मार्च, 2024

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ISSN : 2394-4366

Received: 23 August, 2023; **Accepted:** 28 August-2023, **Published:** January-March, 2024, Issue

जी.एस.टी. में पूर्ति शब्द का अर्थ, आशय व बाह्यपूर्ति एवं आन्तरिक पूर्ति पर कर दायित्व : एक अध्ययन

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जी.एस.टी. में कर योग्य घटना –

'कर योग्य घटना' का आशय ऐसी घटना से है, जिसके होने पर कराधान निश्चित किया जाता है। यह एक ऐसी घटना है, जिसके घटित होने पर ही करदायित्व सृजित होता है। ऐसा दायित्व के समय के उस बिन्दु से पूर्व या पश्चात् उदय नहीं होता है। यद्यपि कर योग्य घटना समय के विशेष बिन्दु पर उदय होती है, तथापि कर का उद्ग्रहण और संग्रहण प्रशासनिक सुविधा के लिए किसी पश्चात्वर्ती तिथि पर टाला जा सकता है। कर केवल तभी देय होता है जब कि कर योग्य घटना उदय हो जाती है, तथापि संविधान की सातवीं अनुसूची में सभी कर योग्य घटनाओं को विधायी प्रविष्टियों में शामिल नहीं किया गया है। जी.एस.टी. के अधीन 'माल या सेवाओं या दोनों की पूर्ति' कर योग्य घटना है– संविधान के अनुच्छेद 366 (12 ए) के अधीन 16 सितम्बर, 2016 से प्रभावी 'माल और सेवा कर का आशय' (मानवीय उपभोग हेतु मादक शराब को छोड़कर) माल और सेवा या दोनों की पूर्ति पर कर है।

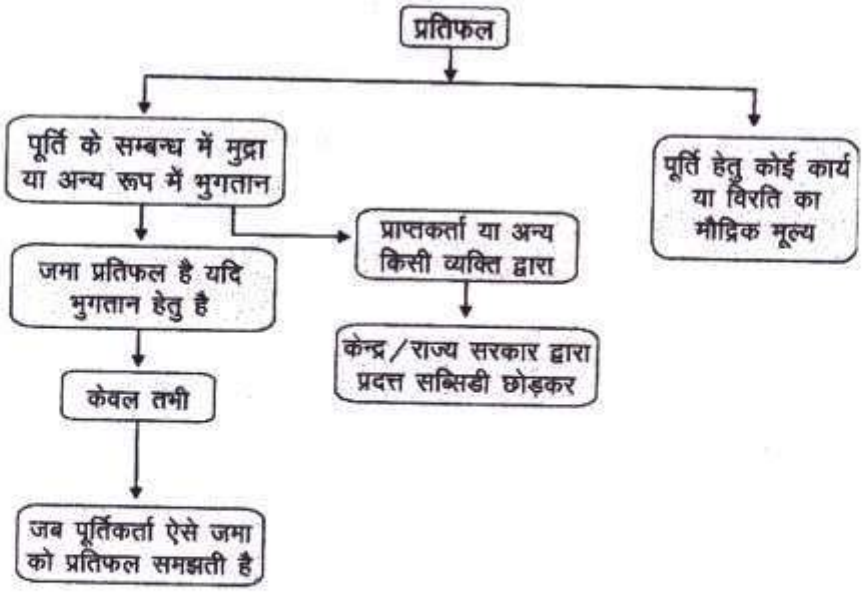
जी.एस.टी. के अधीन प्रभावी धारा –

सी.जी.एस.टी. एक्ट की धारा 9 (1) के अधीन माल या सेवाओं या दोनों की राज्य के अन्दर सभी पूर्तियों पर उद्ग्रहणीय कर है, जिसे सी. जी. एस. टी कहते हैं। आई. जी. एस. टी. एक्ट की धारा 5 (1) और 5 (2) में आई. जी. एस. टी. के सम्बन्ध में समरूपीय प्रावधान है, जिनके अधीन माल या सेवाओं या दोनों की अन्तर्राज्यीय पूर्तियों और भारत में माल के आयात पर आई.जी.एस.टी. उद्ग्रहणीय है। राज्य स्तरीय एस.जी. एस.टी. एक्ट के अधीन भी राज्यों में अपने–अपने अधिनियमों में समरूपी प्रावधान कर उद्ग्रहण के सम्बन्ध में परित किये हैं। अतः प्रभावी रूप में सी.जी.एस.टी., एस.जी.एस.टी. और आई.जी.एस.टी. में जी.एस.टी. के उद्ग्रहण के सम्बन्ध में समानार्थी प्रावधान हैं।

पूर्ति शब्द का अर्थ –

माल के विक्रय पर 'मूल स्थान आधारित' करारोपण के पूर्ववर्ती सिद्धान्त के विपरीत जी.एस.टी. में 'गन्तव्य आधारित सिद्धान्त' पर करारोपण किया जाता है। यह माल एवं सेवाओं की 'पूर्ति' पर लागू होता है–

- जी.एस.टी. का उद्ग्रहण 'पूर्ति' शब्द पर आधारित है। जी.एस. टी. के अधीन करारोपण माल एवं सेवाओं की पूर्ति पर निर्भर करता है।
- क्रय, विक्रय, क्रेता, विक्रेता, सेवाओं का प्रावधान, सेवाओं के प्रदाता, सेवा प्राप्तकर्ता, निर्माता एवं निर्माण जैसे शब्द जी.एस.टी. एक्ट के उद्देश्य के लिए अप्रासंगिक हैं।
- अतः सर्वप्रथम यह जानना आवश्यक है कि जो व्यक्ति व्यवसाय



में लिप्त है, उसे माल या सेवाओं की कोई पूर्ति की है या नहीं और ऐसी पूर्तियाँ जी.एस.टी. एक्ट के अधीन कर योग्य हैं, पूर्ति में शामिल हैं, पूर्ति के लिए सभी रूप (माल या सेवाएं) और पूर्ति के लिए सहमति भी शामिल है, यदि ऐसी पूर्ति प्रतिफल के लिए एवं व्यवसाय के दौरान या उसके अभ्युदय के लिए है।

पूर्ति के रूप हैं – (1) विक्रय, (2) अन्तरण, (3) विनिमय, (4) वस्तु–विनिमय, (5) अनुज्ञापन, (6) किराये पर देना, (7) पट्टा या (8) निस्तारण।

प्रतिफल –

'पूर्ति' में कर योग्य घटना मुख्यतः प्रतिफल पर निर्भर है। अतः प्रतिफल की परिभाषा समझना आवश्यक है। धारा 2 (28) के अनुसार– किसी व्यक्ति को माल/सेवाओं की पूर्ति के सम्बन्ध में 'प्रतिफल' में शामिल हैं–

(क) कोई प्राप्य या प्राप्त भुगतान चाहे मुद्रा में अथवा अन्यथा जो माल/सेवाओं की पूर्ति के सम्बन्ध में प्रापक द्वारा अथवा अन्य किसी व्यक्ति द्वारा किया गया है।

(ख) माल/सेवाओं की पूर्ति के सम्बन्ध में किसी कार्य को करने अथवा उससे विलग रहने के लिए ऐच्छिक रूप से अथवा नहीं, किये कार्य का मौद्रिक मूल्य चाहे प्रापक द्वारा अथवा अन्य किसी व्यक्ति के द्वारा। **(प्रतिफल टेबिल ऊपर देखें)**

जमा प्रतिफल –

धारा 2 (28) के अनुबन्धके अनुसार– 'जमा' चाहे वापसी योग्य हो अथवा नहीं, माल/सेवाओं की पूर्ति के सम्बन्ध में प्रदत्त है। उसको पूर्ति के लिए भुगतान समझा जायेगा, जब तक कि पूर्ति कर्ता ऐसे जमा को पूर्ति का प्रतिफल मानता है।

मानी गयी पूर्ति –

यदि कोई व्यक्ति किसी सहमत दलाली या कमीशन के लिए एजेन्ट के रूप में कार्य करते हुए किसी प्रधान के लिए माल/सेवाओं की पूर्ति या प्राप्ति करता है, प्रधान एवं एजेन्ट के मध्य ऐसा लेन–देन मानी गयी पूर्ति होगा।

पूर्ति के मूल घटक –

'पूर्ति' होने के लिए निम्नांकित शर्तों की संतुष्टि अपेक्षित है–

- माल/सेवाओं की पूर्ति।
- पूर्ति प्रतिफल के लिए है।
- पूर्ति व्यवसाय के अभ्युदय के दौरान की गयी है।
- पूर्ति करयोग्य क्षेत्र में प्रदान की गयी है।
- पूर्ति एक कर योग्य पूर्ति है।
- पूर्ति कर योग्य व्यक्ति को प्रदान की गयी है।

कुछ विशेष परिस्थितियों में जैसे कि माल/सेवाओं का आयात किया गया है अथवा पूर्ति बिना प्रतिफल के है, यदि एक या घटक संतुष्ट नहीं होते हैं, उसे पूर्ति ही समझा जायेगा। अन्तर्राष्ट्रीय स्वयं को पूर्ति जैसे कि 'स्टॉक अन्तरण' कर योग्य होगी, क्योंकि करदाता को प्रत्येक राज्यानुसार पंजीयन कराना होता है। ऐसे व्यवहार बिना प्रतिफल के भी कर योग्य होते हैं। माल की पूर्ति के सम्बन्ध में, स्वामित्व के साथ–साथ उसका भौतिक

अन्तरण भी ऐसे लेन–देन को पूर्ति मानने के लिए आवश्यक है। कुछ मामलों में भौतिक अन्तरण तुरन्त भी हो सकता है और कुछ मामलों में भविष्य में हो सकता है। ऐसे लेन–देनों को भी पूर्ति ही समझा जायेगा।

व्यवसाय के दौरान या उसके अभ्युदय के लिए की गयी पूर्तियाँ –

व्यवसाय में शामिल है कोई व्यापार, वाणिज्य, निर्माण, पेशा, रोजगार, साहस अथवा बाजी आदि, जिनका क्रियान्वयन चाहे आर्थिक हित के लिए हो अथवा नहीं। इसके अतिरिक्त व्यवसाय में ऐसी गतिविधि शामिल है जो पूर्तिकर्ता द्वारा की जा रही है। ऐसी गतिविधि जी.एस.टी. के अधीन होती है।

यदि पूर्तिकर्ता माल/सेवाओं की पूर्ति के व्यवसाय में संलिप्त नहीं है, जी.एस.टी. लागू नहीं होता है। दिनांक 13 जुलाई, 2017 की प्रेस विज्ञप्ति के अनुसार यह स्पष्ट किया गया है, जब कोई व्यक्ति (जिसका व्यवसाय आभूषण विक्रय नहीं है) प्रयुक्त आभूषण का विक्रय करता है, ऐसी स्थिति में प्रतिलोमी प्रभार के अधीन जी.एस.टी. लागू नहीं है। यह स्पष्टीकरण, समान रूप से ऐसी अन्य पूर्तियों के सम्बन्ध में भी लागू है (जो व्यवसाय के दौरान नहीं) जो किसी व्यक्ति के द्वारा की जाती है।

यदि कोई लेन–देन व्यवसाय के दौरान अथवा उसके अभ्युदय के लिए है, वही लेन–देन केवल जी.एस.टी. के अधीन कर योग्य होता है। चूंकि जी.एस.टी. का उद्देश्य केवल मूल्य संवर्धन को ही करारोपित करना है। अतः ऐसी कोई निर्विवाद परिभाषा या परीक्षण नहीं है, जिससे यह निश्चित किया जा सके कि कोई गतिविधि व्यवसाय के दौरान अथवा उसके अभ्युदय के लिए है अथवा नहीं। अन्तर्राष्ट्रीय रूप से व्यवसायिकता के परीक्षण का उदय न्यायालयों के निर्णयों से हुआ है। करदाता द्वारा की गयी कोई गतिविधि व्यवसाय है अथवा नहीं, इसका निर्धारण करदाता द्वारा की जा रही समस्त गतिविधियों के सन्दर्भ में ही किया जा सकता है कि विचाराधीन गतिविधि का सम्बन्ध मुख्यतः प्रतिफल के लिए करयोग्य पूर्ति करने से है। यद्यपि ऐसी कोई पूर्व मान्यता नहीं है कि करदाता द्वारा की गयी कोई गतिविधि लाभोपार्जन के लिए नहीं की गयी है, व्यवसाय नहीं होगा। जी.एस.टी. लाभ या आय पर कर नहीं है वरन् कर योग्य पूर्ति पर है। कोई गतिविधि व्यवसाय के दौरान है इसका निर्धारण निम्नांकित बिन्दुओं पर विचारोपरान्त ही किया जा सकता है–

(1) क्या गतिविधि उपक्रम द्वारा गंभीरता से निष्पादित किया है।

(2) क्या निष्पादित गतिविधि समुचित अथवा पहचान योग्य निरन्तरता से सम्पादित की गयी है।

(3) क्या निष्पादित गतिविधि सुदृढ़ एवं मान्य व्यावसायिक सिद्धान्तों पर आधारित है।

(4) क्या निष्पादित गतिविध का सम्बन्ध प्रतिफल अथवा लाभोपार्जन के उद्देश्य से मुख्यतः सम्बन्धित है।

उपरोक्त परीक्षणों के पश्चात् ही यह निश्चित हो सकेगा कि कोई गतिविधि व्यवसाय के दौरान अथवा उसके अभ्युदय के लिए है अथव नहीं।

करमुक्त पूर्ति –

धारा 2 (42) के अनुसार– माल/सेवाओं की ऐसी पूर्ति जो इस सी.जी.एस.टी. एक्ट, 2017 के अधीन कर योग्य नहीं है, इसमें माल/सेवाओं की ऐसी पूतियाँ भी शामिल हैं जो अधिनियम की धारा 10 के अधीन करमुक्त हैं अथवा अनुसूची–3 में उल्लिखित हैं।

शून्य दर पूर्ति –

धारा 2 (109) के अनुसार– शून्य दर पूर्ति का आशय माल/सेवाओं की ऐसी पूर्तियाँ जिन पर कोई कर देय नहीं है, परन्तु ऐसी पूर्ति के सम्बन्ध में इनपुट टैक्स क्रेडिट स्वीकृत है। निर्यातों को भी शून्य दर पूर्ति समझा जायेगा। आई.जी.एस.टी. एक्ट की धारा 16 (1) के अनुसार शून्य दर पूर्ति का आशय निम्नांकित कर योग्य माल/सेवाओं की पूर्ति से है। नियमतः (क) माल/सेवाओं का निर्यात, अथवा (ख) एस.ई.जेड. (सेज) विकासकर्ता/इकाई को माल/सेवाओं की पूर्ति, इसका आशय है केवल दो प्रकार की पूर्तियाँ– निर्यात एवं सेज (एस.ई.जेड.) को पूतियाँ ही शून्य दर पूर्तियाँ हैं।

सेवा का निर्यात –

धारा 2(44) के अनुसार किसी सेवा की पूर्ति को 'सेवा का निर्यत' समझा जायेगा, जब–

(क) सेवा का पूर्तिकर्ता भारत में स्थित है।

(ख) सेवा का प्राप्तकर्ता भारत के बाहर स्थित है।

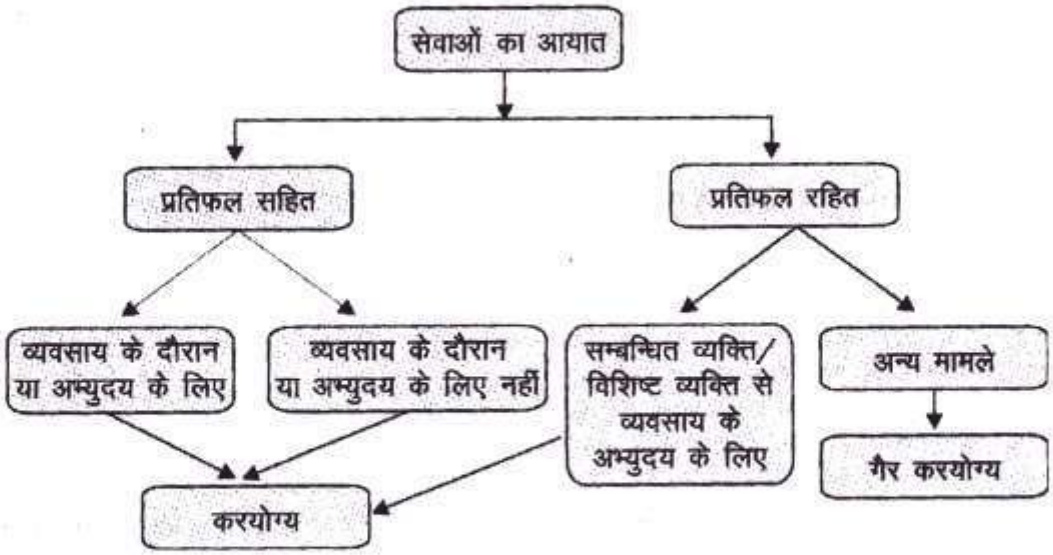
(ग) सेवा की पूर्ति का स्थान भारत के बाहर है।

(घ) सेवा के पूर्तिकर्ता को ऐसी सेवा के सम्बन्ध में भुगतान परिवर्तनीय विदेशी मुद्रा में प्राप्त हुआ है और

(ङ) सेवा का पूर्तिकर्ता एवं सेवा का प्राप्तकर्ता, विशिष्ट व्यक्ति के प्रतिष्ठान मात्र नहीं हैं।

इस धारा के स्पष्टीकरण में उल्लिखित है कि

सेवाओं के आयात पर करदेयता
(Taxability of Import of Services)



उपर्युक्त वाक्य (ङ) के उद्देश्य के लिए किसी व्यक्ति का भारत में कोई प्रतिष्ठान और भारत के बाहर उसका कोई अन्य प्रतिष्ठान, विशिष्ट व्यक्तियों के प्रतिष्ठान समझे जायेंगे। **(सेवाओं के आयात पर करदेयता टेबिल ऊपर देखें)**

सरकारी सार्वजनिक प्राधिकरण एवं पूर्ति –

केन्द्रीय सरकार, राज्य सरकार या कोई सीनीय निकाय जिसमें ये सरकारें जन प्राधिकारी के रूप में संलिप्त हैं, जैसा कि जी.एस.टी. परिषद की सिफारिशों पर सरकार द्वारा अधिसूचित हैं, इनके द्वारा किये गये लेन–देन या गतिविधियाँ न तो माल की पूर्ति और न ही सेवाओं की पूर्ति समझी जायेगी। केन्द्रीय/राज्य सरकार जी.एस.टी. परिषद की अनुशंसा पर अधिसूचना द्वारा ऐसे लेन–देनों को निर्दिष्ट कर सकती है, जिनको समझा जायेगा– (क) माल की पूर्ति, परन्तु सेवाओं की पूर्ति नहीं अथवा (ख) सेवाओं की पूर्ति, परन्तु माल की पूर्ति नहीं। अधिसूचना संख्या 14/2017 केन्द्रीय कर (दर) दिनांक 28 जून, 2017 के अधीन संविधान के अनुच्छेद 243 जी के अधीन किसी पंचायत को सुपुर्द कार्य से सम्बन्धित गतिविधि को सेवा की पूर्ति नहीं समझा जायेगा।

संयुक्त पूर्ति एवं मिश्रित पूर्ति –

संयुक्त पूर्ति	मिश्रित पूर्ति
1. दो या अधिक पूर्तियाँ निहित होती हैं।	1. दो या अधिक पूर्तियाँ निहित होती हैं।
2. स्वाभाविक रूप से संयोजन हो।	2. स्वाभाविक रूप से संयोजन नहीं होता।
3. एक–दूसरे से संसर्ग रूपी है, कोई एक प्रधान पूर्ति होती है।	3. स्वतंत्र पूर्ति संभव है, फिर भी मिश्रित पूर्ति।
4. प्रधान पूर्ति पर लागू दर प्रभावी होती है।	4. सर्वोच्च दर वाली पूर्ति की दर लागू होती है।
5. उदाहरण : चार्जर सहित मोबाइल की पूर्ति।	5. उदाहरण: चाकलेट्स मिठाइयों आदि सहित कोई उपहार पैकिंग।

संयुक्त पूर्ति का आशय –

किसी कर योग्य व्यक्ति द्वारा प्राप्तकर्ता को ऐसी पूर्ति जिसमें दो या अधिक माल या सेवाओं की अथवा उनके संयोजन की पूर्ति जो कि स्वाभाविक रूप में बण्डल हुए हैं और उनकी पूर्ति एक–दूसरे के साथ में व्यावसायिक क्रिया के दौरान किये गये हैं, जिसमें से एक प्रमुख पूर्ति है। उदाहरणार्थ– माल की पैकिंग उसकी परिवहन बीमा के साथ माल की पूर्ति, पैकिंग मैटेरियल्स, परिवहन एवं बीमा एक संयुक्त पूर्ति है और माल की पूर्ति एक प्रमुख पूर्ति है।

केन्द्र/राज्य सरकार जी.एस.टी. परिषदों की सिफारिशों पर अधिसूचना द्वारा निर्दिष्ट कर सकती है कि विशिष्ट लेन–देनों को निम्न रूपों में समझा जायेगा– (क) माल की पूर्ति, परन्तु सेवाओं की पूर्ति नहीं, अथवा (ख)

सेवाओं की पूर्ति परन्तु माल की पूर्ति नहीं।

प्रमुख पूर्ति का आशय –

माल या सेवाओं की ऐसी पूर्ति जो कि संयुक्त पूर्ति में प्रमुख तत्व हो और उसके सम्बन्ध में अन्य कोई पूर्ति जो कि संयुक्त पूर्ति का भाग है, सहायक पूर्ति कहलायेगी।

मिश्रित पूर्ति का आशय –

माल या सेवाओं की दो या अधिक व्यक्तिगत पूर्ति या उनका संयोजन जो एक दूसरे के साथ पूरित हो, किसी कर योग्य व्यक्ति द्वारा एक ही मूल्य पर हों, मिश्रित पूर्ति है। इसमें से प्रत्येक मद को पृथक रूप से पूरित किया जा सकता है और एक–दूसरे पर निर्भर नहीं हैं। उदाहरणार्थ– एक पैकेज में ऐसी पूर्ति जिसमें खाद्य, मिठाई, चॉकलेट, केक, सूखे मेवे, एरियेटेड ड्रिंक्स एवं फलों के रस जब एक मूल्य पर पूरित किये जायें, मिश्रित पूर्ति कहलायेगी। इसमें प्रत्येक वस्तु की प्रथक् भी पूर्ति की जा सकती है और एक–दूसरे पर निर्भर नहीं हैं।

संयुक्त एवं मिश्रित पूर्ति पर करदायित्व –

प्रथम संयुक्त पूर्ति में दो या अधिक पूतियाँ होती हैं, जिसमें एक प्रधान होती है। उस पर प्रधान पूर्ति की भांति सम्पूर्ण मूल्य पर करारोपण होगा। द्वितीय मिश्रित पूर्ति जिसमें दो या अधिक पूतियाँ शामिल होती हैं, उसमें से ऐसी पूर्ति जिस पर सर्वोच्च दर से करारोपण होता है, उसी दर से सम्पूर्ण मूल्य पर करारोपण होगा।

संयुक्त पूर्ति एवं मिश्रित पूर्ति में अन्तर –

(1) यदि दो या अधिक माल सेवाएं स्वाभाविक रूप से इकट्ठी होती हैं, तब इसे संयुक्त पूर्ति कहते हैं। यदि ये अस्वाभाविक रूप से बण्डल की जाती हैं, यह मिश्रित पूर्ति हैं। (2) मिश्रित पूर्ति को एक ही मूल्य पर पूरित किया जाना चाहिए। (3) संयुक्त पूर्ति की स्थिति में प्रधान पूर्ति पर लागू दर से कर योग्य होती है जब कि मिश्रित पूर्ति की स्थिति में करदेयता उसमें शामिल सर्वोच्च दर वाली पूर्ति के अनुसार सम्पूर्ण मूल्य पर होगी।

निरन्तर पूर्ति –

माल की निरन्तर पूर्ति– माल की पूर्ति जो निरन्तर की गयी है या की जानी सहमत है अथवा पुर्नआवर्त के आधार पर किसी समझौते के अधीन निष्पादित हो 'निरन्तर पूर्ति' कहलाती है। चाहे ऐसी पूर्ति किसी वायर, केबिल, पाइप लाइन व अन्य प्रवाहकों के माध्यम से हो अथव नहीं हो। ऐसी स्थिति में पूर्तिकर्ता द्वारा नियमित/सामयिक आधार पर प्रापक को बीजक निर्गमित किया जाता है। इसमें केन्द्र या राज्य सरकार द्वारा माल की ऐसी पूर्ति भी शामिल है जो किसी अधिसूचना के अधीन शर्तों के अन्तर्गत हो अथवा नहीं।

सेवाओं की निरन्तर पूर्ति – सेवाओं की ऐसी पूर्ति जो कि समझौते के अधीन निरन्तर या पुर्नआवर्त आधार पर की गयी है अथवा किये जाने को सहमत हो, जिसकी अवधि 3 माह से अधिक हो, जिसमें आवधिक भुगतान का दायित्व हो। इसमें ऐसी सेवायें शामिल हैं जिन्हें केन्द्र व राज्य सरकार द्वारा सशर्त या बिना शर्त अधिसूचित किया गया हो।

बाह्य पूर्ति एवं आन्तरिक पूर्ति –

किसी व्यक्ति के लिए 'आन्तरिक पूर्ति' का आशय माल/सेवाओं की प्राप्ति है, चाहे क्रय या अभिग्रहण या अन्य किसी रूप में हो, इसमें चाहे प्रतिफल हो अथवा नहीं। 'बाह्य पूर्ति' से आशय किसी व्यक्ति के सम्बन्ध में माल/सेवाओं की पूर्ति है, जो चाहे विक्रय, अन्तरण, विनिमय, वस्तु विनिमय, अनुज्ञापन किराये कर पट्टा या निस्तारण के रूप में हो, जो किसी व्यवसाय के दौरान या उसके अभ्युदय के लिए हो।

माल की पूर्ति–समय एवं करदेयता –

जी.एस.टी. के अधीन 'पूर्ति' कर योग्य घटना है और घटना के लिए किसी निश्चित समय का होना आवश्यक है, न कि अनुमानित समय। जब तक कि पूर्ति का समय नहीं आता जी.एस.टी. का आपोरण नहीं किया जा सकता।

सन्दर्भ ग्रन्थ सूची

1. माल और सेवा कर (Goods and Services Tax (G.S.T.) (राष्ट्र कर बाजार) – डॉ. एच. सी. मेहरोत्रा एवं प्रो. वी. पी. अग्रवाल, साहित्य भवन पब्लिकेशन्स, आगरा, चतुर्थ पूर्णतः संशोधित संस्करण : 2019, पृष्ठ संख्या – 67 – 70।
2. माल और सेवा कर (Goods and Services Tax (G.S.T.) (राष्ट्र कर बाजार) – डॉ. एच. सी. मेहरोत्रा एवं प्रो. वी. पी. अग्रवाल, साहित्य भवन पब्लिकेशन्स, आगरा, चतुर्थ पूर्णतः संशोधित संस्करण : 2019, पृष्ठ संख्या – 72 – 76।

ISSN 2349-9273

The Gunjan

Multi Displinary Quarterly International Refreed/Peer Reviewed Research Journal

Super Prakashan Present's Vol. 10, Issue 38
January-March, 2024

An International Refreed/Peer Reviewed Research Journal of
Humanities, Arts, Social Studies, Commerce and Science

Chief Editor :
Prof. Bindu Singh

Editor :
Dr. Seema Mishra

दि गुंजन

वर्ष 10 अंक 38

(मल्टी डिसिप्लिनरी क्वार्टरली इण्टरनेशनल रेफ्रीड/पियर रिव्यूड रिसर्च जर्नल)

वर्ष-10, अंक-38 जनवरी-मार्च, 2024

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ISSN : 2349-9273

Received: 21 October, 2023; **Accepted:** 28 November-2023, **Published:** January-March, 2024, Issue

Economic Reforms in India since 1991 : A Review

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India was a latecomer to economic reforms, embarking on the process in earnest only in 1991, in the wake of an exceptionally severe balance of payments crisis. The need for a policy shift had become evident much earlier, as many countries in east Asia achieved high growth and poverty reduction through policies which emphasized greater export orientation and encouragement of the private sector. India took some steps in this direction in the 1980s, but it was not until 1991 that the government signaled a systemic shift to a more open economy with greater reliance upon market forces, a larger role for the private sector including foreign investment, and a restructuring of the role of government.

India's economic performance in the post-reforms period has many positive features. The average growth rate in the ten year period from 1992-93 to 2001-02 was around 6.0 percent, as shown in Table 1, which puts India among the fastest growing developing countries in the 1990s. This growth record is only slightly better than the annual average of 5.7 percent in the 1980s, but it can be argued that the 1980s growth was unsustainable, fuelled by a buildup of external debt which culminated in the crisis of 1991. In sharp contrast, growth in the 1990s was accompanied by remarkable external stability despite the east Asian crisis. Poverty also declined significantly in the post-reform period, and at a faster rate than in the 1980s according to some studies (as Ravallion and Datt discuss in this issue).

However, the ten-year average growth performance hides the fact that while the economy grew at an impressive 6.7 percent in the first five years after the reforms, it slowed down to 5.4 percent in the next five years. India remained among the fastest growing developing countries in the second sub-period because other developing countries also slowed down after the east Asian crisis, but the annual growth of 5.4 percent was much below the target of 7.5 percent which the government had set for the period. Inevitably, this has led to some questioning about the effectiveness of the reforms.

Opinions on the causes of the growth deceleration vary. World economic growth was slower in the second half of the 1990s and that would have had some dampening effect, but India's dependence on the world economy is not large enough for this to account for the slowdown. Critics of liberalization have blamed the slowdown on the effect of trade policy reforms on domestic

industry (for example, Nambiar et al, 1999; Chaudhuri, 2002). However, the opposite view is that the slowdown is due not to the effects of reforms, but rather to the failure to implement the reforms effectively. This in turn is often attributed to India's gradualist approach to reform, which has meant a frustratingly slow pace of implementation. However, even a gradualist pace should be able to achieve significant policy changes over ten years. This paper examines India's experience with gradualist reforms from this perspective.

We review policy changes in five major areas covered by the reform program: fiscal deficit reduction, industrial and trade policy, agricultural policy, infrastructure development and social sector development. Based on this review, we consider the cumulative outcome of ten years of gradualism to assess whether the reforms have created an environment which can support 8 percent GDP growth, which is now the government target.

Savings, Investment and Fiscal Discipline-

Fiscal profligacy was seen to have caused the balance of payments crisis in 1991 and a reduction in the fiscal deficit was therefore an urgent priority at the start of the reforms. The combined fiscal deficit of the central and state governments was successfully reduced from 9.4 percent of GDP in 1990-91 to 7 percent in both 1991-92 and 1992-93 and the balance of payments crisis was over by 1993. However, the reforms also had a medium term fiscal objective of improving public savings so that essential public investment could be financed with a smaller fiscal deficit to avoid "crowding out" private investment. This part of the reform strategy was unfortunately never implemented.

As shown in Table 2, public savings deteriorated steadily from +1.7 percent of GDP in 1996-97 to –1.7 percent in 2000-01. This was reflected in a comparable deterioration in the fiscal deficit taking it to 9.6 percent of GDP in 2000-01. Not only is this among the highest in the developing world, it is particularly worrisome because India's public debt to GDP ratio is also very high at around 80%. Since the total financial savings of households amount to only 11 percent of GDP, the fiscal deficit effectively preempts about 90 percent of household financial savings for the government. What is worse, the rising fiscal deficit in the second half of the 1990s was not financing higher levels of public investment, which was more or less constant in this period.

These trends cast serious doubts on India's ability to achieve higher rates of growth in future. The growth rate of 6 percent per year in the post-reforms period was achieved with an average investment rate of around 23 percent of GDP. Accelerating to 8 percent growth will require a commensurate increase in investment. Growth rates of this magnitude in east Asia were associated with investment rates ranging from 36-38 percent. While it can be argued that there was overinvestment in East Asia, especially in recent years, it is unlikely that India can accelerate to 8 percent growth unless it can raise the rate of investment to around 29-30 percent of GDP. Part of the increase can be financed by increasing foreign direct investment, but even if foreign direct investment increases from the present level of 0.5 percent of GDP to 2.0 percent -- an optimistic but not impossible target -- domestic savings would still have to increase by at least 5 percentage points of GDP.

Can domestic savings be increased by this amount? As shown in Table 2, private savings have been buoyant in the post-reform period, but public savings have declined steadily. This trend needs to be reversed. Both the central government and the state governments would have to take a number of hard decisions to bring about improvements in their respective spheres.

The central government's effort must be directed primarily towards improving revenues, because performance in this area has deteriorated significantly in the post reform period. Total tax revenues of the center were 9.7 percent of GDP in 1990-91. They declined to only 8.8 percent in 2000-01, whereas they should have increased by at

least two percentage points. Tax reforms involving lowering of tax rates, broadening the tax base and reducing loopholes were expected to raise the tax ratio and they did succeed in the case of personal and corporate income taxation but indirect taxes have fallen as a percentage of GDP. This was expected in the case of customs duties, which were deliberately reduced as part of trade reforms, but this decline should have been offset by improving collections from domestic indirect taxes on goods and by extending indirect taxation to services. This part of the revenue strategy has not worked as expected. The Advisory Group on Tax Policy for the Tenth Plan recently made a number of proposals for modernizing tax administration, including especially computerization, reducing the degree of exemption for small scale units and integration of services taxation with taxation of goods (Planning Commission, 2001a). These recommendations need to be implemented urgently.

There is also room to reduce central government subsidies, which are known to be highly distortionary and poorly targeted (e.g. subsidies on food and fertilizers), and to introduce rational user charges for services such as passenger traffic on the railways, the postal system and university education. Overstaffing was recently estimated at 30 percent and downsizing would help reduce expenditure.

State governments also need to take corrective steps. Sales tax systems need to be modernized in most states. Agricultural income tax is constitutionally assigned to the states, but no state has attempted to tax agricultural income. Land revenue is a traditional tax based on landholding, but it has been generally neglected and abolished in many states. Urban property taxation could yield much larger resources for municipal governments if suitably modernized, but this tax base has also been generally neglected. State governments suffer from very large losses in state electricity boards (about 1 percent of GDP) and substantial losses in urban water supply, state road transport corporations and in managing irrigation systems. Overstaffing is greater in the states than in the center.

The fiscal failures of both the central and the state governments have squeezed the capacity of both the center and the states to undertake essential public investment. High levels of government borrowing have also crowded out private investment. Unless this problem is addressed, the potential benefits from reforms in other areas will be eroded and it may be difficult even to maintain the average growth rate of 6 percent experienced in the first ten years after the reforms, let alone accelerate to 8 percent.

Reforms in Industrial and Trade Policy -

Reforms in industrial and trade policy were a central focus of much of India's reform effort in the early stages. Industrial policy prior to the reforms was characterized by multiple controls over private investment which limited the areas in which private investors were allowed to operate, and often also determined the scale of operations, the location of new investment, and even the technology to be used. The industrial structure that evolved under this regime was highly inefficient and needed to be supported by a highly protective trade policy, often providing tailor-made protection to each sector of industry. The costs imposed by these policies had been extensively studied (for example, Bhagwati and Desai, 1965; Bhagwati and Srinivasan, 1971; Ahluwalia, 1985) and by 1991 a broad consensus had emerged on the need for greater liberalization and openness. A great deal has been achieved at the end of ten years of gradualist reforms.

Industrial Policy-

Industrial policy has seen the greatest change, with most central government industrial controls being dismantled. The list of industries reserved solely for the public sector -- which used to cover 18 industries, including iron and steel, heavy plant and machinery, telecommunications and telecom equipment, minerals, oil, mining, air transport services and electricity generation and distribution -- has been drastically reduced to three: defense aircrafts and warships, atomic energy

generation, and railway transport. Industrial licensing by the central government has been almost abolished except for a few hazardous and environmentally sensitive industries. The requirement that investments by large industrial houses needed a separate clearance under the Monopolies and Restrictive Trade Practices Act to discourage the concentration of economic power was abolished and the act itself is to be replaced by a new competition law which will attempt to regulate anticompetitive behavior in other ways.

The main area where action has been inadequate relates to the long standing policy of reserving production of certain items for the small-scale sector. About 800 items were covered by this policy since the late 1970s, which meant that investment in plant and machinery in any individual unit producing these items could not exceed $ 250,000. Many of the reserved items such as garments, shoes, and toys had high export potential and the failure to permit development of production units with more modern equipment and a larger scale of production severely restricted India's export competitiveness. The Report of the Committee on Small Scale Enterprises (1997) and the Report of the Prime Minister's Economic Advisory Council (2001) had both pointed to the remarkable success of China in penetrating world markets in these areas and stimulating rapid growth of employment in manufacturing. Both reports recommended that the policy of reservation should be abolished and other measures adopted to help small-scale industry. While such a radical change in policy was unacceptable, some policy changes have been made very recently: fourteen items were removed from the reserved list in 2001 and another 50 in 2002. The items include garments, shoes, toys and auto components, all of which are potentially important for exports. In addition, the investment ceiling for certain items was increased to $1 million. However, these changes are very recent and it will take some years before they are reflected in economic performance.

Industrial liberalization by the central government needs to be accompanied by supporting action by state governments. Private investors require many permissions from state governments to start operations, like connections to electricity and water supply and environmental clearances. They must also interact with the state bureaucracy in the course of day-to-day operations because of laws governing pollution, sanitation, workers' welfare and safety, and such. Complaints of delays, corruption and harassment arising from these interactions are common. Some states have taken initiatives to ease these interactions, but much more needs to be done.

A recently completed joint study by the World Bank and the Confederation of Indian Industry (Stern, 2001) found that the investment climate varies widely across states and these differences are reflected in a disproportional share of investment, especially foreign investment, being concentrated in what are seen as the more investor-friendly states (Maharashtra, Gujarat, Karnataka, Andhra Pradesh and Tamil Nadu) to the disadvantage of other states (like Uttar Pradesh, Bihar and West Bengal). Investors perceived a 30 percent cost advantage in some states over others, on account of the availability of infrastructure and the quality of governance. These differences across states have led to an increase in the variation in state growth rates, with some of the less favored states actually decelerating compared to the 1980s (Ahluwalia, 2002). Because liberalization has created a more competitive environment, the pay off from pursuing good policies has increased, thereby increasing the importance of state level action. Infrastructure deficiencies will take time and resources to remove but deficiencies in governance could be handled more quickly with sufficient political will.

Trade Policy -

Trade policy reform has also made progress, though the pace has been slower than in industrial liberalization. Before the reforms, trade policy was characterized by high tariffs and pervasive import restrictions. Imports of manufactured consumer goods were completely

banned. For capital goods, raw materials and intermediates, certain lists of goods were freely importable, but for most items where domestic substitutes were being produced, imports were only possible with import licenses. The criteria for issue of licenses were nontransparent, delays were endemic and corruption unavoidable. The economic reforms sought to phase out import licensing and also to reduce import duties.

Import licensing was abolished relatively early for capital goods and intermediates which became freely importable in 1993, simultaneously with the switch to a flexible exchange rate regime. Import licensing had been traditionally defended on the grounds that it was necessary to manage the balance of payments, but the shift to a flexible exchange rate enabled the government to argue that any balance of payments impact would be effectively dealt with through exchange rate flexibility. Removing quantitative restrictions on imports of capital goods and intermediates was relatively easy, because the number of domestic producers was small and Indian industry welcomed the move as making it more competitive. It was much more difficult in the case of final consumer goods because the number of domestic producers affected was very large (partly because much of the consumer goods industry had been reserved for small scale production). Quantitative restrictions on imports of manufactured consumer goods and agricultural products were finally removed on April 1, 2001, almost exactly ten years after the reforms began, and that in part because of a ruling by a World Trade Organization dispute panel on a complaint brought by the United States.

Progress in reducing tariff protection, the second element in the trade strategy, has been even slower and not always steady. As shown in Table 3, the weighted average import duty rate declined from the very high level of 72.5 percent in 1991-92 to 24.6 percent in 1996-97. However, the average tariff rate then increased by more than 10 percentage points in the next four years. In February 2002, the government signaled a return to reducing tariff protection. The peak duty rate was reduced to 30 percent, a number of duty rates at the higher end of the existing structure were lowered, while many low end duties were raised to 5 percent. The net result is that the weighted average duty rate is 29 percent in 2002-03.

Although India's tariff levels are significantly lower than in 1991, they remain among the highest in the developing world because most other developing countries have also reduced tariffs in this period. The weighted average import duty in China and southeast Asia is currently about half the Indian level. The government has announced that average tariffs will be reduced to around 15 percent by 2004, but even if this is implemented, tariffs in India will be much higher than in China which has committed to reduce weighted average duties to about 9 percent by 2005 as a condition for admission to the World Trade Organization.

Foreign Direct Investment-

Liberalizing foreign direct investment was another important part of India's reforms, driven by the belief that this would increase the total volume of investment in the economy, improve production technology, and increase access to world markets. The policy now allows 100 percent foreign ownership in a large number of industries and majority ownership in all except banks, insurance companies, telecommunications and airlines. Procedures for obtaining permission were greatly simplified by listing industries that are eligible for automatic approval up to specified levels of foreign equity (100 percent, 74 percent and 51 percent). Potential foreign investors investing within these limits only need to register with the Reserve Bank of India. For investments in other industries, or for a higher share of equity than is automatically permitted in listed industries, applications are considered by a Foreign Investment Promotion Board that has established a track record of speedy decisions. In 1993, foreign institutional investors were allowed to purchase shares of listed Indian companies in the stock market, opening a window for portfolio investment

in existing companies.

These reforms have created a very different competitive environment for India's industry than existed in 1991, which has led to significant changes. Indian companies have upgraded their technology and expanded to more efficient scales of production. They have also restructured through mergers and acquisitions and refocused their activities to concentrate on areas of competence. New dynamic firms have displaced older and less dynamic ones: of the top 100 companies ranked by market capitalization in 1991, about half are no longer in this group. Foreign investment inflows increased from virtually nothing in 1991 to about 0.5 percent of GDP. Although this figure remains much below the levels of foreign direct investment in many emerging market countries (not to mention 4 percent of GDP in China), the change from the pre-reform situation is impressive. The presence of foreign-owned firms and their products in the domestic market is evident and has added greatly to the pressure to improve quality.

These policy changes were expected to generate faster industrial growth and greater penetration of world markets in industrial products, but performance in this respect has been disappointing. As shown in Table 1, industrial growth increased sharply in the first five years after the reforms, but then slowed to an annual rate of 4.5 percent in the next five years. Export performance has improved, but modestly. The share of exports of goods in GDP increased from 5.7 percent in 1990-91 to 9.7 percent, but this reflects in part an exchange rate depreciation. India's share in world exports, which had declined steadily since 1960, increased slightly from around 0.5 percent in 1990-91 to 0.6 percent in 1999-2000, but much of the increase in world market share is due to agricultural exports. India's manufactured exports had a 0.5 percent share in world markets for those items in 1990 and this rose to only 0.55 percent by 1999. Unlike the case in China and southeast Asia, foreign direct investment in India did not play an important role in export penetration and was instead oriented mainly towards the domestic market.

One reason why export performance has been modest is the slow progress in lowering import duties that make India a high cost producer and therefore less attractive as a base for export production. Exporters have long been able to import inputs needed for exports at zero duty, but the complex procedure for obtaining the necessary duty-free import licenses typically involves high transactions cost and delays. High levels of protection compared with other countries also explains why foreign direct investment in India has been much more oriented to the protected domestic market, rather than using India as a base for exports. However, high tariffs are only part of the explanation for poor export performance. The reservation of many potentially exportable items for production in the small scale sector (which has only recently been relaxed) was also a relevant factor. The poor quality of India's infrastructure compared with infrastructure in east and southeast Asia, which is discussed later in this paper, is yet another.

Inflexibility of the labor market is a major factor reducing India's competitiveness in exports and also reducing industrial productivity generally (Planning Commission, 2001). Any firm wishing to close down a plant, or to retrench labor in any unit employing more than 100 workers, can only do so with the permission of the state government, and this permission is rarely granted. These provisions discourage employment and are especially onerous for labor-intensive sectors. The increased competition in the goods market has made labor more willing to take reasonable positions, because lack of flexibility only leads to firms losing market share. However, the legal provisions clearly remain much more onerous than in other countries. This is important area of reform that has yet to be addressed. The lack of any system of unemployment insurance makes it difficult to push for major changes in labor flexibility unless a suitable contributory system that is financially viable can be put in place. The government has

recently announced its intention to amend the law and raise the level of employment above which firms have to seek permission for retrenchment from 100 workers at present to 1000 while simultaneously increasing the scale of retrenchment compensation. However, the amendment has yet to be enacted.

These gaps in the reforms provide a possible explanation for the slowdown in industrial growth in the second half of the 1990s. It can be argued that the initial relaxation of controls led to an investment boom, but this could have been sustained only if industrial investment had been oriented to tapping export markets, as was the case in east Asia. As it happened, India's industrial and trade reforms were not strong enough, nor adequately supported by infrastructure and labor market reforms to generate such a thrust. The one area which has shown robust growth through the 1990s with a strong export orientation is software development and various new types of services enabled by information technology like medical transcription, backup accounting, and customer related services. Export earnings in this area have grown from $100 million in 1990-91 to over $6 billion in 2000-01 and are expected to continue to grow at 20 to 30 percent per year. India's success in this area is one of the most visible achievements of trade policy reforms which allow access to imports and technology at exceptionally low rates of duty, and also of the fact that exports in this area depend primarily on telecommunications infrastructure, which has improved considerably in the post-reforms period.

Reforms in Agriculture-

A common criticism of India's economic reforms is that they have been excessively focused on industrial and trade policy, neglecting agriculture which provides the livelihood of 60 percent of the population. Critics point to the deceleration in agricultural growth in the second half of the 1990s (shown in Table 2) as proof of this neglect. However, the notion that trade policy changes have not helped agriculture is clearly a misconception. The reduction of protection to industry, and the accompanying depreciation in the exchange rate, has tilted relative prices in favor of agriculture and helped agricultural exports. The index of agricultural prices relative to manufactured products has increased by almost 30 percent in the past ten years (Ministry of Finance, 2002, Chapter 5). The share of India's agricultural exports in world exports of the same commodities increased from 1.1 percent in 1990 to 1.9 percent in 1999, whereas it had declined in the ten years before the reforms.

But while agriculture has benefited from trade policy changes, it has suffered in other respects, most notably from the decline in public investment in areas critical for agricultural growth, such as irrigation and drainage, soil conservation and water management systems, and rural roads. As pointed out by Gulati and Bathla (2001), this decline began much before the reforms, and was actually sharper in the 1980s than in the 1990s. They also point out that while public investment declined, this was more than offset by a rise in private investment in agriculture which accelerated after the reforms. However, there is no doubt that investment in agriculture-related infrastructure is critical for achieving higher productivity and this investment is only likely to come from the public sector. Indeed, the rising trend in private investment could easily be dampened if public investment in these critical areas is not increased.

The main reason why public investment in rural infrastructure has declined is the deterioration in the fiscal position of the state governments and the tendency for politically popular but inefficient and even iniquitous subsidies to crowd out more productive investment. For example, the direct benefit of subsidizing fertilizer and underpricing water and power goes mainly to fertilizer producers and high income farmers while having negative effects on the environment and production, and even on income of small farmers. A phased increase in fertilizer prices and imposition of economically rational user charges for irrigation and electricity could raise resources to finance investment in rural infrastructure, benefiting both growth and equity.

Competitive populism makes it politically difficult to restructure subsidies in this way, but there is also no alternative solution in sight.

Some of the policies which were crucial in promoting food grain production in earlier years, when this was the prime objective, are now hindering agricultural diversification. Government price support levels for food grains such as wheat are supposed to be set on the basis of the recommendations of the Commission on Agricultural Costs and Prices, a technical body which is expected to calibrate price support to reasonable levels. In recent years, support prices have been fixed at much higher levels, encouraging overproduction. Indeed, public food grain stocks reached 58 million tons on January 1, 2002, against a norm of around 17 million tons! The support price system clearly needs to be better aligned to market demand if farmers are to be encouraged to shift from food grain production towards other products.

Agricultural diversification also calls for radical changes in some outdated laws. The Essential Commodities Act, which empowers state governments to impose restrictions on movement of agricultural products across state and sometimes even district boundaries and to limit the maximum stocks wholesalers and retailers can carry for certain commodities, was designed to prevent exploitive traders from diverting local supplies to other areas of scarcity or from hoarding supplies to raise prices. Its consequence is that farmers and consumers are denied the benefit of an integrated national market. It also prevents the development of modern trading companies, which have a key role to play in the next stage of agricultural diversification. The government has recognized the need for change and recently removed certain products -- including wheat, rice, coarse grains, edible oil, oilseeds and sugar -- from the purview of the act. However, this step may not suffice, since state governments may be able to take similar action. What is needed is a repeal of the existing act and central legislation that would make it illegal for government authorities at any level to restrict movement or stocking of agricultural products (Planning Commission, 2001).

The report of the Task Force on Employment has made comprehensive proposals for review of several other outdated agricultural law (Planning Commission, 2001b). For example, laws designed to protect land tenants, undoubtedly an important objective, end up discouraging marginal farmers from leasing out nonviable holdings to larger farmers for fear of being unable to reclaim the land from the tenant. The Agricultural Produce Marketing Acts in various states compel traders to buy agricultural produce only in regulated markets, making it difficult for commercial traders to enter into contractual relationships with farmers. Development of a modern food processing sector, which is essential to the next stage of agricultural development, is also hampered by outdated and often contradictory laws and regulations. These and other outdated laws need to be changed if the logic of liberalization is to be extended to agriculture.

Infrastructure Development-

Rapid growth in a globalized environment requires a well-functioning infrastructure including especially electric power, road and rail connectivity, telecommunications, air transport, and efficient ports. India lags behind east and southeast Asia in these areas. These services were traditionally provided by public sector monopolies but since the investment needed to expand capacity and improve quality could not be mobilized by the public sector, these sectors were opened to private investment, including foreign investment. However, the difficulty in creating an environment which would make it possible for private investors to enter on terms that would appear reasonable to consumers, while providing an adequate risk-return profile to investors, was greatly underestimated. Many false starts and disappointments have resulted.

The greatest disappointment has been in the electric power sector, which was the first area opened for private investment. Private investors

were expected to produce electricity for sale to the State Electricity Boards, which would control of transmission and distribution. However, the State Electricity Boards were financially very weak, partly because electricity tariffs for many categories of consumers were too low and also because very large amounts of power were lost in transmission and distribution. This loss, which should be between 10 to 15 percent on technical grounds (depending on the extent of the rural network), varies from 35 to 50 percent. The difference reflects theft of electricity, usually with the connivance of the distribution staff. Private investors, fearing nonpayment by the State Electricity Boards insisted on arrangements which guaranteed purchase of electricity by state governments backed by additional guarantees from the central government. These arrangements attracted criticism because of controversies about the reasonableness of the tariffs demanded by private sector power producers. Although a large number of proposals for private sector projects amounting to about 80 percent of existing generation capacity were initiated, very few reached financial closure and some of those which were implemented ran into trouble subsequently. Because of these difficulties, the expansion of generation capacity by the utilities in the 1990s has been only about half of what was targeted and the quality of power remained poor with large voltage fluctuations and frequent interruptions.

The flaws in the policy have now been recognized and a more comprehensive reform is being attempted by several state governments. Independent statutory regulators have been established to set tariffs in a manner that would be perceived to be fair to both consumers and producers. Several states are trying to privatize distribution in the hope that this will overcome the corruption which leads to the enormous distribution losses. However, these reforms are not easy to implement. Rationalization of power tariffs is likely to be resisted by consumers long used to subsidized power, even though the quality of the power provided in the pre-reform situation was very poor. The establishment of regulatory authorities that are competent and credible takes time. Private investors may not be able to enforce collection of amounts due or to disconnect supply for non-payment without adequate backing by the police. For all these reasons, private investors perceive high risks in the early stages and therefore demand terms that imply very high rates of return. Finally, labor unions are opposed to privatization of distribution.

These problems are formidable and many state governments now realize that a great deal of preliminary work is needed before privatization can be successfully implemented. Some of the initial steps, like tariff rationalization and enforcing penalties for non-payment of dues and for theft of power, are perhaps best implemented within the existing public sector framework so that these features, which are essential for viability of the power sector, are not attributed solely to privatization. If the efforts now being made in half a dozen states succeed, it could lead to a visible improvement within a few years.

The results in telecommunications have been much better and this is an important factor underlying India's success in information technology. There was a false start initially because private investors offered excessively high license fees in bidding for licenses which they could not sustain, which led to a protracted and controversial renegotiation of terms. Since then, the policy appears to be working satisfactorily. Several private sector service providers of both fixed line and cellular services, many in partnership with foreign investors, are now operating and competing with the pre-existing public sector supplier. Teledensity, which had doubled from 0.3 lines per 100 population in 1981 to 0.6 in 1991, increased sevenfold in the next ten years to reach 4.4 in 2002. Waiting periods for telephone connections have shrunk dramatically. Telephone rates were heavily distorted earlier with very high long distance charges cross-subsidizing local calls and covering inefficiencies in operation. They have now been rebalanced by the regulatory authority, leading to a

reduction of 30 percent in long distance charges. Interestingly, the erstwhile public sector monopoly supplier has aggressively reduced prices in a bid to retain market share.

Civil aviation and ports are two other areas where reforms appear to be succeeding, though much remains to be done. Two private sector domestic airlines, which began operations after the reforms, now have more than half the market for domestic air travel. However, proposals to attract private investment to upgrade the major airports at Mumbai and Delhi have yet to make visible progress. In the case of ports, 17 private sector projects involving port handling capacity of 60 million tons, about 20 percent of the total capacity at present, are being implemented. Some of the new private sector port facilities have set high standards of productivity.

India's road network is extensive, but most of it is low quality and this is a major constraint for interior locations. The major arterial routes have low capacity (commonly just two lanes in most stretches) and also suffer from poor maintenance. However, some promising initiatives have been taken recently. In 1998, a tax was imposed on gasoline (later extended to diesel) , the proceeds of which are earmarked for the development of the national highways, state roads and rural roads. This will help finance a major program of upgrading the national highways connecting Delhi, Mumbai, Chennai and Calcutta to four lanes or more, to be completed by the end of 2003. It is also planned to levy modest tolls on these highways to ensure a stream of revenue which could be used for maintenance. A few toll roads and bridges in areas of high traffic density have been awarded to the private sector for development.

The railways are a potentially important means of freight transportation but this area is untouched by reforms as yet. The sector suffers from severe financial constraints, partly due to a politically determined fare structure in which freight rates have been set excessively high to subsidize passenger fares, and partly because government ownership has led to wasteful operating practices. Excess staff is currently estimated at around 25 percent. Resources are typically spread thinly to respond to political demands for new passenger trains at the cost of investments that would strengthen the capacity of the railways as a freight carrier. The Expert Group on Indian Railways (2002) recently submitted a comprehensive program of reform converting the railways from a departmentally run government enterprise to a corporation, with a regulatory authority fixing the fares in a rational manner. No decisions have been announced as yet on these recommendations.

Financial Sector Reform-

India's reform program included wide-ranging reforms in the banking system and the capital markets relatively early in the process with reforms in insurance introduced at a later stage.

Banking sector reforms included: (a) measures for liberalization, like dismantling the complex system of interest rate controls, eliminating prior approval of the Reserve Bank of India for large loans, and reducing the statutory requirements to invest in government securities; (b) measures designed to increase financial soundness, like introducing capital adequacy requirements and other prudential norms for banks and strengthening banking supervision; (c) measures for increasing competition like more liberal licensing of private banks and freer expansion by foreign banks. These steps have produced some positive outcomes. There has been a sharp reduction in the share of non-performing assets in the portfolio and more than 90 percent of the banks now meet the new capital adequacy standards. However, these figures may overstate the improvement because domestic standards for classifying assets as non-performing are less stringent than international standards.

India's banking reforms differ from those in other developing countries in one important respect and that is the policy towards public sector banks which dominate the banking system. The government has announced its intention to reduce

its equity share to 33-1/3 percent, but this is to be done while retaining government control. Improvements in the efficiency of the banking system will therefore depend on the ability to increase the efficiency of public sector banks.

Skeptics doubt whether government control can be made consistent with efficient commercial banking because bank managers are bound to respond to political directions if their career advancement depends upon the government. Even if the government does not interfere directly in credit decisions, government ownership means managers of public sector banks are held to standards of accountability akin to civil servants, which tend to emphasize compliance with rules and procedures and therefore discourage innovative decision making. Regulatory control is also difficult to exercise. The unstated presumption that public sector banks cannot be shut down means that public sector banks that perform poorly are regularly recapitalized rather than weeded out. This obviously weakens market discipline, since more efficient banks are not able to expand market share.

If privatization is not politically feasible, it is at least necessary to consider intermediate steps which could increase efficiency within a public sector framework (see for example Ahluwalia 2002). These include shifting effective control from the government to the boards of the banks including especially the power to appoint the Chairman and Executive Directors which is at present with the government; removing civil servants and representatives of the Reserve Bank of India from these board; implementing a prompt corrective action framework which would automatically trigger regulatory action limiting a bank's expansion capability if certain trigger points of financial soundness are breeched; and finally acceptance of closure of insolvent public sector banks (with appropriate protection for small depositors). Unless some initiatives along these lines are taken, it is highly unlikely that public sector banks can rise to the levels of efficiency needed to support rapid growth.

Another major factor limiting the efficiency of banks is the legal framework, which makes it very difficult for creditors to enforce their claims. The government has recently introduced legislation to establish a bankruptcy law which will be much closer to accepted international standard. This would be an important improvement but it needs to be accompanied by reforms in court procedures to cut the delays which are a major weakness of the legal system at present.

Reforms in the stock market were accelerated by a stock market scam in 1992 that revealed serious weaknesses in the regulatory mechanism. Reforms implemented include establishment of a statutory regulator; promulgation of rules and regulations governing various types of participants in the capital market and also activities like insider trading and takeover bids; introduction of electronic trading to improve transparency in establishing prices; and dematerialization of shares to eliminate the need for physical movement and storage of paper securities. Effective regulation of stock markets requires the development of institutional expertise, which necessarily requires time, but a good start has been made and India's stock market is much better regulated today than in the past. This is to some extent reflected in the fact that foreign institutional investors have invested a cumulative $21 billion in Indian stocks since 1993, when this avenue for investment was opened.

An important recent reform is the withdrawal of the special privileges enjoyed by the Unit Trust of India, a public sector mutual fund which was the dominant mutual fund investment vehicle when the reforms began. Although the Unit Trust did not enjoy a government guarantee, it was widely perceived as having one because its top management was appointed by the government. The Trust had to be bailed out once in 1998, when its net asset value fell below the declared redemption price of the units, and again in 2001 when the problem recurred. It has now been decided that in future investors in the Unit Trust of

India will bear the full risk of any loss in capital value. This removes a major distortion in the capital market, in which one of the investment schemes was seen as having a preferred position.

The insurance sector (including pension schemes), was a public sector monopoly at the start of the reforms. The need to open the sector to private insurance companies was recommended by an expert committee (the Malhotra Committee) in 1994, but there was strong political resistance. It was only in 2000 that the law was finally amended to allow private sector insurance companies, with foreign equity allowed up to 26 percent, to enter the field. An independent Insurance Development and Regulatory Authority has now been established and ten new life insurance companies and six general insurance companies, many with well-known international insurance companies as partners, have started operations. The development of an active insurance and pensions industry offering attractive products tailored to different types of requirements could stimulate long term savings and add depth to the capital markets. However, these benefits will only become evident over time.

Privatization-

The public sector accounts for about 35 percent of industrial value added in India, but although privatization has been a prominent component of economic reforms in many countries, India has been ambivalent on the subject until very recently. Initially, the government adopted a limited approach of selling a minority stake in public sector enterprises while retaining management control with the government, a policy described as "disinvestment" to distinguish it from privatization. The principal motivation was to mobilize revenue for the budget, though there was some expectation that private shareholders would increase the commercial orientation of public sector enterprises. This policy had very limited success. Disinvestment receipts were consistently below budget expectations and the average realization in the first five years was less than 0.25 percent of GDP compared with an average of 1.7 percent in seventeen countries reported in a recent study (see Davis et.al. 2000). There was clearly limited appetite for purchasing shares in public sector companies in which government remained in control of management.

In 1998, the government announced its willingness to reduce its shareholding to 26 percent and to transfer management control to private stakeholders purchasing a substantial stake in all central public sector enterprises except in strategic areas. The first such privatization occurred in 1999, when 74 percent of the equity of Modern Foods India Ltd. (a public sector bread-making company with 2000 employees), was sold with full management control to Hindustan Lever, an Indian subsidiary of the Anglo-Dutch multinational Unilever. This was followed by several similar sales with transfer of management: BALCO, an aluminium company; Hindustan Zinc; Computer Maintenance Corporation; Lagan Jute Machinery Manufacturing Company; several hotels; VSNL, which was until recently the monopoly service supplier for international telecommunications; IPCL, a major petrochemicals unit and Maruti Udyog, India's largest automobile producer which was a joint venture with Suzuki Corporation which has now acquired full managerial controls.

The privatization of Modern Foods and BALCO generated some controversy, not so much on the principle of privatization, but on the transparency of the bidding process and the fairness of the price realized. Subsequent sales have been much less problematic and although the policy continues to be criticized by the unions, it appears to have been accepted by the public, especially for public sector enterprises that are making losses or not doing well. However, there is little public support for selling public sector enterprises that are making large profits such as those in the petroleum and domestic telecommunications sectors, although these are precisely the companies where privatization can generate large revenues. These companies are unlikely to be privatized in the near future, but even so, there are several companies in the pipeline for

privatization which are likely to be sold and this will reduce resistance to privatizing profit-making companies.

An important recent innovation, which may increase public acceptance of privatization, is the decision to earmark the proceeds of privatization to finance additional expenditure on social sector development and for retirement of public debt. Privatization is clearly not a permanent source of revenue, but it can help fill critical gaps in the next five to ten years while longer term solutions to the fiscal problem are attempted. Many states have also started privatizing state level public sector enterprises. These are mostly loss making enterprises and are unlikely to yield significant receipts but privatization will eliminate the recurring burden of financing losses.

Social Sector Development in Health and Education-

India's social indicators at the start of the reforms in 1991 lagged behind the levels achieved in southeast Asia 20 years earlier, when those countries started to grow rapidly (Dreze and Sen, 1995). For example, India's adult literacy rate in 1991 was 52 percent, compared with 57 percent in Indonesia and 79 percent in Thailand in 1971. The gap in social development needed to be closed, not only to improve the welfare of the poor and increase their income earning capacity, but also to create the preconditions for rapid economic growth. While the logic of economic reforms required a withdrawal of the state from areas in which the private sector could do the job just as well, if not better, it also required an expansion of public sector support for social sector development.

Much of the debate in this area has focused on what has happened to expenditure on social sector development in the post-reform period. Dev and Moolji (2002) find that central government expenditure on towards social services and rural development increased from 7.6 percent of total expenditure in 1990-91 to 10.2 percent in 2000-01, as shown in Table 4. As a percentage of GDP, these expenditures show a dip in the first two years of the reforms, when fiscal stabilization compulsions were dominant, but there is a modest increase thereafter. However, expenditure trends in the states, which account for 80 percent of total expenditures in this area, show a definite decline as a percentage of GDP in the post-reforms period. Taking central and state expenditures together, social sector expenditure has remained more or less constant as a percentage of GDP.

Closing the social sector gaps between India and other countries in southeast Asia will require additional expenditure, which in turn depends upon improvements in the fiscal position of both the central and state governments. However, it is also important to improve the efficiency of resource use in this area. Saxena (2001) has documented the many problems with existing delivery systems of most social sector services, especially in rural areas. Some of these problems are directly caused by lack of resources, as when the bulk of the budget is absorbed in paying salaries , leaving little available for medicines in clinics or essential teaching aids in schools. There are also governance problems such as nonattendance by teachers in rural schools and poor quality of teaching.

Part of the solution lies in greater participation by the beneficiaries in supervising education and health systems, which in turn requires decentralization to local levels and effective peoples' participation at these levels. Nongovernment organizations can play a critical role in this process. Different state governments are experimenting with alternative modalities but a great deal more needs to be done in this area.

While the challenges in this area are enormous, it is worth noting that social sector indicators have continued to improve during the reforms. The literacy rate increased from 52 percent in 1991 to 65 percent in 2001, a faster increase in the 1990s than in the previous decade, and the increase has been particularly high in the some of the low literacy states such as Bihar, Madhya Pradesh, Uttar Pradesh and Rajasthan.

Conclusions-

The impact of ten years of gradualist economic reforms in India on the policy environment presents a mixed picture. The industrial and trade policy reforms have gone far, though they need to be supplemented by labor market reforms which are a critical missing link. The logic of liberalization also needs to be extended to agriculture, where numerous restrictions remain in place. Reforms aimed at encouraging private investment in infrastructure have worked in some areas but not in others. The complexity of the problems in this area was underestimated, especially in the power sector. This has now been recognized and policies are being reshaped accordingly. Progress has been made in several areas of financial sector reforms, though some of the critical issues relating to government ownership of the banks remain to be addressed. However, the outcome in the fiscal area shows a worse situation at the end of ten years than at the start.

Critics often blame the delays in implementation and failure to act in certain areas to the choice of gradualism as a strategy. However, gradualism implies a clear definition of the goal and a deliberate choice of extending the time taken to reach it, in order to ease the pain of transition. This is not what happened in all areas. The goals were often indicated only as a broad direction, with the precise end point and the pace of transition left unstated to minimize opposition and possibly also to allow room to retreat if necessary. This reduced politically divisive controversy, and enabled a consensus of sorts to evolve, but it also meant that the consensus at each point represented a compromise, with many interested groups joining only because they believed that reforms would not go "too far". The result was a process of change that was not so much gradualist as fitful and opportunistic. Progress was made as and when politically feasible, but since the end point was not always clearly indicated, many participants were unclear about how much change would have to be accepted, and this may have led to less adjustment than was otherwise feasible.

The alternative would have been to have a more thorough debate with the objective of bringing about a clearer realization on the part of all concerned of the full extent of change needed, thereby permitting more purposeful implementation. However, it is difficult to say whether this approach would indeed have yielded better results, or whether it would have created gridlock in India's highly pluralist democracy. Instead, India witnessed a halting process of change in which political parties which opposed particular reforms when in opposition actually pushed them forward when in office. The process can be aptly described as creating a strong consensus for weak reforms!

Have the reforms laid the basis for India to grow at 8 percent per year? The main reason for being optimistic is that the cumulative change brought about is substantial. The slow pace of implementation has meant that many of the reform initiatives have been put in place recently and their beneficial effects are yet to be felt. The policy environment today is therefore potentially much more supportive, especially if the critical missing links are put in place. However, the failure on the fiscal front could undo much of what has been achieved. Both the central and state governments are under severe fiscal stress which seriously undermines their capacity to invest in certain types of infrastructure and in social development where the public sector is the only credible source of investment. If these trends are not reversed, it may be difficult even to maintain 6 percent annual growth in the future, let alone accelerate to 8 percent. However, if credible corrective steps are taken on the fiscal front, then the cumulative policy changes that have already taken place in many areas, combined with continued progress on the unfinished agenda, should make it possible for India to accelerate to well beyond 6 percent growth over the next few years.

Acknowledgements-

The views expressed in this article are those of the author and do not necessarily reflect the

views of either the International Monetary Fund or the Government of India. Thanks are due to Suman Bery, Ashok Gulati, Deena Khatkhate, Arvind Panagariya, Parthasarathi Shome, TN Srinivasan, Nicholas Stern and Timothy Taylor.

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A SOCIOLOGICAL ANALYSIS OF BADAL SIRCAR'S PLAYS *BHOMA* AND *STALE NEWS*

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ABSTRACT

A society is formed by the consciousness of identity of its inhabitants. After they became aware of their identity they constructed culture and a civilized society. In this process of civilization, they have become dehumanized and fragmented. Badal Sircar, through his plays, showed the true nature of Indian society, and also indicated the ways to resolve the social questions. In post-colonial India, society is polarized based on production, and the privileged group assumes the role of the former British rulers. The British colonizers considered colonized India as 'Other' than any civilized European country. Sircar's plays focus on how the concept of 'Other' is deeply rooted in Indian society. That sense of 'Other' has created a wide social gap. The play Bhoma constitutes a phenomenon on social reality. The play Stale News delves into the origins of colonialism and the anti-colonial struggle of Santhal tribal people against British colonial rule in 1855. The play also shows both colonial and post-colonial events simultaneously. The socio-economic condition of the Indian 'Other' has not shown any sign of improvement in post-colonial India.

Key Words: Society, Colonial, Post-Colonial, Us, Other, Exploitation, Superior, Inferior

In the ancient period, when there was no human civilization, man lived naturally with peace and liberty. In the course of civilization, human beings became conscious of their identity in a society, and they were alienated from Nature. After that, they became aware of their identity, they constructed culture and a civilized society. In this process of civilization, they have become dehumanized and fragmented. They grow up in a civilized society with various dichotomies like gender, economic and religious etc. Our society is still divided into the colonial dichotomy of 'Us' and 'Other'. An ideal Indian society, of post-independent period for which freedom fighters laid down their lives, an ideal society as prayed for by Tagore in his *Gitanjali*, is still beyond our reach:

Vol. 1 No. 12, July, 2023 ISSN:2583-6633

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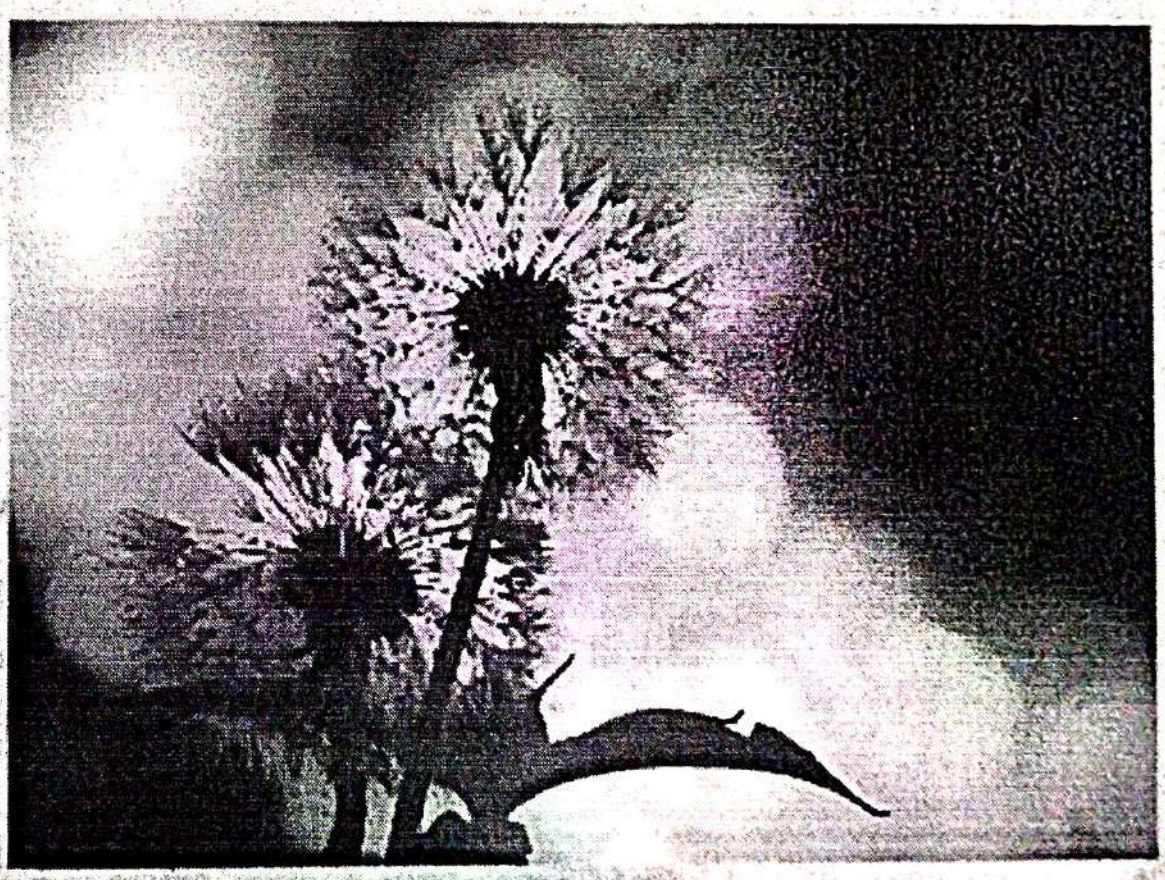

EDITOR
DR. RAMESH CHANDRA

Knowledgeable Research Vol. 1, No. 12, July 2023. ISSN 2583-6633

Knowledgeable Research
An International Open-access Peer-reviewed Journal

Vol-1, No-12, July 2023
Web: http://www.knowledgeableresearch.com/

Voicing The Woes of The Tribals in The Works of Mahasweta Devi

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Abstract: - Mahasweta Devi is a great name in the field of Tribals literature. She is the only writer among Indian writers in English who could prove her sympathy and kindness towards the tribals. Through, Devi was born and brought up in a family that produced scholars and sympathetic people. During her childhood and schooling days, she made wonders by proving herself a great scholar. After her marriage, she blossomed into a professional writer by writing on the topic of sorrows and sufferings by traveling to the areas of tribals and living with them to wipe their tears who were downtrodden and marginalized. These tribals whose stories Devi has taken into living record made Devi a famous and reputed writer of her time and among her contemporaries. She has been fully dedicated to the tribals who were voiceless or could not speak in their favor of them before the rich and zamindars. These people were so poor, if they took money on loan, could never recover, as the interest rate was so high and under such conditions, they were to work at the big forms of the money lenders and their wives were to work at the homes of the rich and landlords.

Keywords: - Equality, mainstream, suppression, marginalization, woeful tale, hunting, bond labor, etc.

Introduction: - The tribals, whose voice Devi has become, were the voiceless tribals who never stood against their suppression, oppression, and injustice. These people were to work as bonded laborers at the farms of moneylenders and upper-caste people. These people were born to be tortured, oppressed, and suppressed. Devi, the real voice of these voiceless persons, saw all these things happening with her own eyes and noticed that the people are

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THE PERPETRATION OF GENDER DISCRIMINATION: A STUDY OF GIRISH KARNAD'S *NAGA-MANDALA*

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ABSTRACT:

This paper analyses Girish Karnad's Naga-Mandala from the perspective of the perpetration of gender discrimination where the protagonist Rani becomes the victim of male operated society in which females are treated as the secondary gender or as the 'other' and are dominated by the primary gender, that is, male. Karnad has written this play that provides the readers various aspects to analyze it, be it a study of mythology, power of sexuality or gender based discrimination, it adds newly discovered perceptions provided by the readers to social construct where the powerless people suffer at the hands of those who have power and who are in the mainstream. Gender discrimination is a pervasive issue that persists across various societies, cultures and organizations, perpetuating inequality and hindering progress towards gender equality. The perpetration of gender discrimination is often rooted in deeply ingrained societal norms, stereotypes, and biases that shape attitudes and behaviours. Such discrimination can be manifested in various forms, including unequal pay, limited opportunities for career advancement, gender-based violence, and unequal access to education. All this is going on in our society, so where do we stand in such scenario? Are we working in this field to empower the underprivileged and the oppressed? Yes, we are doing great job seeing the resources provided and the situations prevalent. The efforts to combat gender discrimination require a comprehensive approach, involving legislative reforms, educational initiatives, workplace policies, and cultural shifts. Progress has been made but challenges persist. Addressing the issue of perpetration of gender discrimination is crucial for achieving a more equitable and inclusive world, where individuals of all genders can thrive and contribute to the fullest extent of their abilities.

Keywords: Gender Discrimination, Perpetration, Patriarchy, Male-Dominance, Inequality, Oppression.

UGC Approved Journal No. 49321 Impact Factor : 6.125 ISSN : 0976-6650

Shodh Drishti

An International Peer Reviewed Refereed Research Journal

Vol. 14, No. 8.1 Year - 14 August, 2023

PEER REVIEWED JOURNAL

Published by
SRIJAN SAMITI PUBLICATION
VARANASI
E-mail : shodhdrishtivns@gmail.com, Website : shodhdrishti.com, Mob. 9415388337

UGC Approved Journal No. 49321
Shodh Drishti (An International Peer Reviewed Refereed Research Journal), Vol. 14, No. 8.1, August 2023
Impact Factor : 6.125
ISSN : 0976-6650

Daphne Du Maurier's Rebecca : A Thematic and Psychoanalytic Study

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Dr. Nisha Gupta
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Abstract

This research paper examines the novel Rebecca by Daphne du Maurier through the lens of thematic psychoanalytic analysis. This study examines the complicated psychological dynamics between the characters and the underlying themes of the work from the perspective of psychoanalytic theory, specifically drawing on the concepts of repression, the unconscious mind, and the Oedipus complex. The principal heroine, whose identity is never revealed, is visited by Rebecca's ghost, the deceased first wife of her husband, Maxim de Winter. This investigation dives into the protagonist's emotional and psychological anguish, revealing indications of her suppressed impulses, worries, and anxieties. It delves into the protagonist's struggle with her identity and self-esteem, which is constantly influenced by Rebecca's idealized image. Furthermore, the study delves into Maxim de Winter's character, delving into his own psychological issues as well as the impact of his unresolved love for Rebecca. The Oedipus complex is investigated as a major psychological framework for comprehending the protagonist's connection with Maxim and her search for love and acceptance. Besides character analysis, this study delves into the larger themes of secrecy, power dynamics, and the interplay of fantasy and reality. It analyzes how these themes represent the characters' unconscious wants and struggles, as well as their psychological reasons. Overall, this thematic psychoanalytic examination of Rebecca gives insight into the characters' complex psychological qualities as well as the novel's underlying themes. It provides a deeper insight into the characters' motivations, internal battles, and the psychological complexity that drives the plot by utilizing psychoanalytic theory.

Keywords : Rebecca, Psychological analysis, Oedipus Complex, Repression, Unconscious mind.

Introduction:

Literature has traditionally been a canvas on which the complexities of the human psyche are clearly depicted, allowing readers to delve into the minds, emotions, and motivations of characters. *Rebecca*, Daphne du Maurier's timeless masterpiece, is a classic example of a narrative that not only captivates with its captivating mystery but also provides fertile ground for the investigation of psychological intricacies. This research paper conducts a thematic psychoanalytic examination of *Rebecca,* with the goal of uncovering the latent psychological underpinnings that drive its characters' behaviors and define the narrative's enigmatic allure.

Rebecca, published in 1938, introduces us to an unidentified narrator who finds herself caught up in a maze of emotions and secrets following her rapid marriage to the intriguing Maxim de Winter. The novel unfolds a tale of psychological suspense, obsession, and identity crisis against the backdrop of Manderley, a large estate cloaked in the ghostly presence of Maxim's murdered first wife, Rebecca. **"Last night I dreamt I went to Manderley again. It seemed to me I stood by the iron gate leading to the drive, and for a while I could not enter, for the way was barred to me" (*Rebecca*, Intro 6).**

The latent potential for psychoanalytic study derives from the subtle interplay of characters and their intricate relationships. Psychoanalytic theory, founded on the pioneering works of Sigmund Freud and developed by succeeding theorists such as Jacques Lacan, provides a conceptual framework for revealing characters 'unconscious drives, wants, and fears.

ISSN : 0974-0066

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Vol-85 No. 10
January–June: 2024

मध्य भारती

मानविकी एवं समाजविज्ञान की द्विभाषी शोध-पत्रिका

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LITERATURE UNDER THE SHADE OF TREES: A SELECT STUDY OF FROST, THOREAU AND KIPLING;

Dr. Shruti Srivastava Associate Professor Department of English, D. A-V .College, Kanpur
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Abstract- Nature is the soul essence of the very birth of human race in the world. This is not just a mere statement but also the factual grip which we as human have lost in in the hope to get a better world to dwell in; one is running after capital accumulation without even being thankful to these abiotic elements. On an economic note one can proclaim that the capital is the sheer investment of these raw materials which is being gifted to us by Mother Nature. 'Literature' has always been related to the very core of transcendentalism or we can also term these writers as Nature's poet or transcendentalist. Since ages they have tried to trigger the inner self; which is inter connected to the unseen chain of the nature either by showing love towards mountain, trees , serene landscapes and majorly forests. These forests were not only close to the Indian writers but even American poets found a solace while portraying their love for the woods. This research paper will be dealing with the notion of how literature has always been embracing the conservation of these forest cites. Rudyard Kipling to Robert Frost manifested their love for the wilderness. In actual; if we can comprise it in few lines this could be a divine manifestation of entering into a solace life and clasp to ones bosom with the very touch of abiotic sightedness.

Keywords - Mother Nature, Glorious Forests, Nature's poets, Solace, Wilderness and renunciation, harmony ,self-realization etc.

Introduction - Forest had been of utmost importance to promote harmony in the ecosystem. These writers who have embraced transcendentalism to their thoughts have focused majorly on abiotic goals. The roots to which we humans are connected are these environmental elements but due to certain furious progression run we have lost this connection. Robert Frost proclaimed in his one of the famous poems that is *Stopping by Woods on a Snowy Evening*; how the poet wants to escape away from the toilsome world for a while to visualize the nature. The same could be sensed in the poem *`Birches`;* which again portrays the same state of mind that is solace and inner harmony while embracing nature.

Everything is silent, apart from the soft wind and the slight sound of snowfall that could be heard by the poet. The sketch of this serene beauty had been remarkably narrated well. The panorama of the nature's scenic beauty could be visualized even by the readers. The sensual pleasure is evident. The poet has described the solace of the forest beautifully. He has actually engulfed us with the idea that the real alienation and peace lies within when we cuddle the abiotic elements; from which we are surrounded with. Poem *Birches* deals with the same notion of minute escapism where he wants to leave the world full of hustle for a short break and get indulged into the truth of the world. The real truth lies in *accepting the nature which we have blotted out. When we get grounded to our roots* we are mesmerized by this feel.

"When I see birches bend to left and right
Across the lines of straighter darker trees,
I like to think some boy's been swinging them."
(Robert Frost, *Birches* line-1-3)

These beautiful lines describe the coniferous forest areas which surely sweeps the mind away of a reader towards a pile of beauty, where nothing lies untouched except the venture towards spiritualistic transcendentalism. Both his poems *Stopping by Woods on a Snowy Evening* and *Birches* are the biggest mark in the literary world tending us towards these vast wood areas and deep solace. Being an American poet he uses Nature to a great extent. This description about earthly constituent is like a boy describing his best friend's attributes.

International Journal of Advance Studies and Growth Evaluation

Double-blind peer-reviewed, Multidisciplinary, Refereed, Open access and Indexed Journal

Publication Certificate

E-ISSN: 2583-6528
Impact Factor (SJIF): 5.231

Ref no: IJASGE-3-1-29.1

This is to certify that "**Dr. Upendra Kumar Dwivedi**" Has published Manuscript entitled "**The Impact of Urbanization on Dalit Lives in "Datta Bhagat's Whirlpool**"

Volume: 3 **Issue:** 1 **Year:** 2024

Date: 30-January-2024

IJASGE Director

Manish Kumar (Publisher)

International Journal of Research in Academic World

Double Blind Peer-reviewed, Refereed, Indexed, Open-access, Multidisciplinary Journal

E-ISSN: 2583-1615 | **Impact Factor (SJIF):** 6.092

Publication Certificate

This is to certify that **"Dr. Upendra Kumar Dwivedi"** has published manuscript entitled **"Intergenerational Conflict and Reconciliation in Uma Parmeshwaran's "Sons Must Die".**

Certificate No.: **3-6-37**

Date: **30/June/2024**

Volume: **3** Issue: **6** Year: **2024**

Kamal (Publisher)

Email: editor.academicworld@gmail.com

Website: academicjournal.ijraw.com

VOLUME 2 ● ISSUE 4

ISSN: 2583-973X (ONLINE)

THE ACADEMIC

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

(A Peer-Reviewed Refereed Online Journal)

EDITOR-IN-CHIEF:

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website: https://theacademic.in/

The Academic
International Journal of Multidisciplinary Research

An Online Peer Reviewed / Refereed Journal
Volume 2 | Issue 4 | April 2024
ISSN: 2583-973X (Online)
Website: www.theacademic.in

New Trends of ELT in Engineering Colleges of Bharat

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ARTICLE DETAILS

Research Paper

Keywords :
English, Technical, Communication, Professional, Engineering, Public Sector, Global, International, Language, Skill, Practical, Fundamental, Course, Syllabus

ABSTRACT

At this level, the main goal of English instruction should be to emphasize the four main components of language proficiency: speaking, listening, reading, and writing. Above all, the instructor needs to understand the needs and preferences of the technical college pupils. It is imperative that more focus be placed on the functional side of language—that is, language that speaks to learners' everyday needs rather than language from bygone eras. These days, the most important thing for English language learners is to acquire a language that will help them deal with everyday situations and speak confidently and easily. It is crucial that the teacher understands his role and the goals he hopes to accomplish in the classroom. They do not know how to put the syllabus into practice in their classes, even if it is in front of them. The instructor is in charge of determining when and how to give a detailed lesson plan. Without even the tiniest understanding of the course's goals and objectives, their only concern is finishing the entire thing in the allotted short amount of time. The goal of teaching English in engineering colleges should be to enable students to communicate well in the language so they may use it to their advantage in both social and professional contexts.

Asian Journal of Medicine and Health

Volume 21, Issue 10, Page 269-275, 2023; Article no.AJMAH.104818
ISSN: 2456-8414

Geriatric Population Dependency in India: An Analytical Review

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJMAH/2023/v21i10902

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/104818

Review Article

Received: 09/06/2023
Accepted: 14/08/2023
Published: 25/08/2023

ABSTRACT

The present study examines the dependency among the elderly population of India, the distribution of dependency in the elderly population across states in India and the causes that are responsible for the dependency among elderly population in India. The study analyses the various data points present on the elderly population enumerated in the Population Census 2011 and the report "Elderly in India" [1] published by the Ministry of Statistics and Programme Implementation, Government of India [2]. The focus of the paper is on analyzing the status, distribution and the causes of old age dependency in India. A few government measures that have been taken in recent times to reduce the old age dependency in the country have also been included as a part of the research. In the end some suggestions how to improve the situation of the elderly population and therefore reduce dependency and promote a better quality of life to them have been provided.

Keywords: Elderly; dependency; dependency ratio; illiteracy; disability; illness.

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Journal of Geography, Environment and Earth Science International

Volume 27, Issue 10, Page 45-51, 2023; Article no.JGEESI.106482
ISSN: 2454-7352

Population Dynamics of Village Danshanichara (Azamgarh District), Uttar Pradesh, India

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

Article Information

DOI:10.9734/JGEESI/2023/v27i10715

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/106482

Original Research Article

Received: 07/09/2023
Accepted: 19/09/2023
Published: 22/09/2023

ABSTRACT

Population is influenced by many factors that fall into the broad realms of demographic characteristics, socio-economic conditions across space and time. This paper adopts an approach to investigate the spatial and temporal variations of these factors effects on population change. Specifically, we conduct the analysis at the micro level Village Danshanichara in Azamgarh District In Uttar Pradesh. The results suggest that the factors have varying effects on population change over time and across rural, suburban, and urban areas. Their effects depend upon the general trend of population redistribution processes, local dynamics, and areal characteristics. Overall, a systematic examination of population dynamics should consider a variety of factors, temporal and spatial variation of their effects [1]. The examination should have the flexibility to identify and incorporate influential factors at a given point in time and space, not to adhere to a single set of drivers in all circumstances. The findings have important implications for population predictions used for local and regional planning.

Keywords: Population dynamics; micro level; spatio-temporal; age-sex structure.

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UGC Care Listed Geography Journal

R.N.I. No. UPBIL/1996/7631
I.S.S.N. - 0975-4903

UTTAR PRADESH GEOGRAPHICAL JOURNAL

Volume 28 2023

Chief Editor :
Dr. J. P. Gupta

THE BRAHMAVARTA GEOGRAPHICAL SOCIETY OF INDIA
124 C-1, Indira Nagar, Kanpur - 208 026 (India)

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Uttar Pradesh Geographical Journal
Vol. 28, 2023
R.N.I. No. UPBIL/1996/7631
I.S.S.N. - 0975-4903

TRENDS OF URBANIZATION IN KRISHNANAGAR MUNICIPALITY, NADIA DISTRICT, WEST BENGAL

Soumitra Gaine and Kumar Amit

ABSTRACT

There has been a unique trend of urbanization observed in the nineteenth century. It is projected that more than half or two-third of the global population will be residing in urban areas by 2050. The per capita income of average people has seen a major hike in recent days propelling them to flock towards urban areas to uplift their standard of living. India is no exception when it comes to the trend of rapid urbanization that the world is witnessing now a days. Although urbanization in India is sometimes metropolitan city oriented, the other small and medium size cities have also increased in association of globalization recorded by Census, 2011. Many small census towns (CTs), Notified Areas (NAs) are connected or associated with the Municipalities(M). Krishnanagar Municipality is also experienced with rapid growth of urbanization since Independence (1947).

Key Words: *Urbanization, Globalization, Metropolitan City, Census Towns (CTs), Notified Area (NA).*

Introduction

The word 'Urbanization' is a comprehensive term usually demonstrates with urban areas by geographically and demographically sense within changes time. In India, statutory body, e.g. Municipal corporation, municipality, cantonment, notified areas, etc. are considered as urban area (Chatterjee, 2014). Whereas, 2011 census recognized that places which have a minimum population of 5,000, male main working population more than seventy five per cent engaged in non-agricultural activity and population density is equal or more than 400 persons per square kilometre (Chandramouli, 2014). United Nations (UN) considered population in localities having 2,000 and more may be considered as urban population (Durand, et al., 1965).

City and Urbanization

Due to the lack of a fixed and unanimous definition it's difficult to figure out the precise and scholarly definition of the term 'Urban' (Carter, 1981). In many countries, an urban area can be recognized by the number of people living there, the economic activities of the citizen and its administrative nature. Ramchandran stated that the urban area may fall into five categories like 1. demographic, 2. economic, 3. social, 4. morphological, and 5. functional (Ramchandran, 2012). Caves defined city as a place of permanent and densely settled place with definite, administrative boundaries where vast number of population engaged in non-agricultural activities (Caves, 2004). Census of India has been modified the definition of urban areas time to time before and after Independence. The general report of the census of India, 1901 defines Municipalities, civil lines within municipal limits and permanently inhabited area having a population more than 5,000 as Urban areas (Bose, 1973).

Before 1951, all those settlements as urban which municipalities, civil lines or any other

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आदिवासी समाज में प्रचलित लोक विश्वास

*अखिलेश कुमार यादव**
*प्रो. राजेश कुमार तिवारी***

लोक विश्वास लोकतत्व का एक प्रमुख अंग है। संसार की सभी आदिम और असभ्य जातियों ने विभिन्न प्रकार के अंध विश्वासों और मूढ़ा ग्रहों को अपने वैयक्तिक एवं सामूहिक जीवन का आधार बनाया था। अर्द्ध शिक्षित समुदायों में ऐसे सैकड़ों विश्वास आज भी प्रचलित हैं, जिनका बीसवीं या वर्तमान सदी में कोई अर्थ नहीं, फिर भी परम्परा द्वारा पोषित एवं मान्य होने के कारण इनके प्रति किसी प्रकार की अनास्था नहीं प्रकट की जाती । लोक में प्रचलित अंधविश्वासों और मूढ़ाग्रहों के विषय अनेक हैं। तन्त्र-मंत्र टोना-टोटका, दुआ ताबीज, झाड़-फूंक, भूत-प्रेत, देवी-देवता और इन सबकी तथाकथित शक्तियाँ अंधविश्वासों की परिधि में आती हैं । इनके अतिरिक्त ज्योतिष से सम्बन्धित शकुन-अपशकुन, दिशा शूल, स्वप्न विचार, विभिन्न वस्तुओं के शुभाशुभ लक्षण, प्राकृतिक उत्पाद चिह्न आदि लोक विश्वासों की सीमा में ही आते हैं।

आदिवासी समाज अज्ञानी, अनपढ़ और आधुनिक सभ्यता सेदूर जंगलों में रहने के कारण इनमें लोक विश्वास का प्रचलन दृष्टिगत होता है। लोक विश्वास को आदिवासी तथा पिछड़े समाज में बहुत ही महत्व दिया जाता है। ' जंगल जहां शुरू होता है' उपन्यास में थारू जनजाति का विश्वास है कि गाय का दूध पीने से लेरू की आत्मा कलपती है। इस कारण थारू लोग गाय का दूध नहीं पीते। थारुओं का विश्वास है कि हिरण का मांस खाने से हैजा फैलता है। इसी कारण वे हिरण का मांस नहीं खाते हैं। थारू जनजाति का काली डाकू कुमार से कहता है कि ' थारू गाय का दूध नहीं पीते, थारू हिरण का मांस नहीं खा सकते।' [1]

धाँगड़ जनजाति में लोक विश्वास है कि मुगल काल में मुसलमानों का डिमांड था कि कोई भी दुल्हन हो पहली रात उनके साथ बितानी पड़ेगी। सभी जातियाँ इस शर्त को मान गयी लेकिन धाँगड़ नहीं माने और जंगलों में भाग गये। जंगलों में रहने लगे जब मुगलों की फौज आई तो धाँगड़ो ने सुअर का हाड़ फेंककर उनको भागने पर मजबूर कर दिया क्योंकि सुअर बादशाह को हराम था सोधाँगड़ों को छोड़ दिया गया। इसलिए धाँगड़ सुअर को गाय से भी श्रेष्ठ मानते

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हैं। एक धाँगड़ आदिवासी युवक इस बारे में कहता है- ' सो, सुअर तो हमारा गाय-भैंस से बढ़कर है। दुलहिन आती है। बाप के घर से तो अंचरा में छपैना देकर विदा करते हैं। दुलहिन का ताग-पाट उसी हाड़ का होता है।' [2]

' धार' उपन्यास में संथाल जनजाति के लोक विश्वास को लेखक ने अनेक स्थलों पर चित्रित किया है। संथाल जनजाति में अद्‌भुत लोकाचार है कि भ्रष्ट होते ही आदमी का श्राद्ध कर देना चाहिए। संथालों में पुरुष की मौत हो जाने पर श्राद्ध भोज दिया जाता है मैना के पति की मृत्यु पर लेखक कहता है- ' कुल बीस गाँवों में मंगर के श्राद्ध भोज का न्योता बँटा। बीस गाँव के लोग बाँसगड़ा आये – स्त्री पुरुष, जवान, बूढ़े, बच्चे सब। यह एक अजब भोज था जिसमें सभी आने वालों की लायी सामग्री को एक ही जगह रखा गया। भोज के पहले मैना ने अपनी सूनी माँग, सूनी कलाईं और सफेद साड़ी में बिरादरी को हाथ जोड़कर अरज किया।' [3]

बस्तर निवासी आदिवासी गोंड भूत-प्रेत व चुडैलों के अनेक रूपों से परिचित है। जंगल के फूल उपन्यास में भूत-प्रेत का चित्रण हुआ है। यहाँ के निवासियों का विश्वास है कि सिरिया मरने के बाद चुडैल बन गई है। वह आज भी अपने प्रेमी को खोजती फिरती है। वह कभी रोती है, कभी ' ये हो हो हो रे रे ऽऽरे लोऽऽरे' गाना गाती और नाचती है यही नहीं गांव वालों से वह बहुत चिढ़ी हुई है क्योंकि उनके ही कारण वह अपने प्रेमी से नहीं मिल सकी। वह अनेक वेष बनाकर गाँव में चक्कर लगाती है और जो भी उसके सामने पड़ जाए उसका सर्वनाश करती है। गायता ने कहा दो साल पहले मेरी पत्नी ने एक लड़की को जन्म दिया जिसकी खबर बताने मेरी बड़ी लड़की बाहर आई तो छानी पर उसने उल्लू बैठा देखा। कन्या का जन्म और उल्लू की सिर पर सवारी बहुत बड़ा अशुभ था। बड़ी लड़की ने उल्लू को एक पत्थर मारा जिसे उठाकर वह भाग गया। उल्लू ने पत्थर भिगोकर उँची टेकरी पर रख दिया, ज्यों ज्यों पत्थर का पानी सूखता गया वह नवजात कन्या धुलती गई और गुनिया भी उसको चुडैल से न बचा सका।' [4] यह सब कुछ सुनने पर भी गोरा नाच गाना देख व सुनकर उसी राज महल में सोया। आधी रात को सिरिया काली नंगी औरत के वेष में आई और गोरे अफसर को पछाड़ कर चली गई।' [5] जमीन पर गिरते ही उसके मुँह से चीख निकली और बेहोश हो गया जिसे सुनकर काला अफसर दौड़कर आया।

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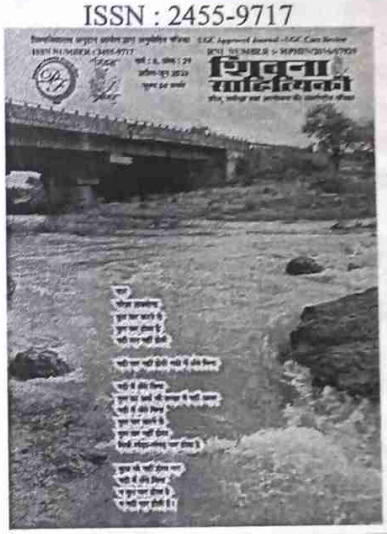
शोध, समीक्षा तथा आलोचना की अंतर्राष्ट्रीय पत्रिका
वर्ष : 8, अंक : 29, त्रैमासिक : अप्रैल-जून 2023
विश्वविद्यालय अनुदान आयोग द्वारा अनुमोदित पत्रिका
(UGC Approved Journal - UGC Care Review)
RNI NUMBER :- MPHIN/2016/67929
ISSN : 2455-9717



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नरेश सक्सेना

आवरण चित्र
पंकज सुबीर

इस अंक में

शोध आलेख

(शोध आलेख)

आदिवासी हिन्दी उपन्यासों में सांस्कृतिक जीवन

शोध लेखक : अखिलेश कुमार यादव, शोध-छात्र, हिन्दी विभाग
शोध निर्देशक : प्रो. राजेश कुमार तिवारी, हिन्दी विभाग, डी.ए-वी. कॉलेज, कानपुर, (उ.प्र.)

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भारतीय संस्कृति एवं सभ्यता का संसार में महत्वपूर्ण स्थान है। समस्त संसार की सभी संस्कृतियों का जन्म इतिहास में वर्णित आदिवासी समाज से माना जाता है। सांस्कृतिक दृष्टि से आदिवासी समाज समृद्ध एवं परिपूर्ण है। संस्कृति का जन्म एवं विकास मानव समाज के अभ्युदय के साथ ही आरम्भ हुआ। जनजातीय समाज मानव इतिहास में संस्कृति के उन आरम्भिक चरणों की ओर संकेत करते हैं, जहाँ से वे विकास की वर्तमान अवस्था तक पहुँची हैं, 'प्रत्येक मानव समूह की संस्कृति में विशिष्टता का यह रूप पाया जाता है कालान्तर में जब सरल समाज धीरे-धीरे जटिलता की ओर उन्मुख होते हैं तो यह विशिष्टता मात्र एक अतीत की वस्तु बनकर रह जाती है। जनजातीय समाजों के बारे में जब पूर्ण जानकारी हो सकती है, वह उसे विभिन्न सांस्कृतिक पक्षों के बारे में समझा जाये।1 आदिवासी संस्कृति का मूल और विस्तार उनके रीति-रिवाजों, प्रथाओं में दिखाई देता है। ऊपर से देखने पर आदिवासियों की प्रथाएँ विचित्र कौतूहलपूर्ण और आश्चर्यजनक लग सकती हैं, लेकिन नजदीक से देखने पर ये प्रथायें उनके जीवन के अनेक मिथकों, संस्कारों, परम्पराओं और व्यवहारों को खोलती हैं। धार्मिक विश्वासों, मान्यताओं, अदृश्य शक्तियों के रहस्यों और परास्वप्न स्मृतियों की खोज तक पहुँचती हैं। आदिवासियों की संस्कृति में ऐतिहासिक, सामाजिक, आर्थिक परम्पराओं का उल्लेख ही नहीं मिलता बल्कि उनके चरित्र के निर्माण और जातीय सीमाओं में बोध रखने का कार्य भी संस्कृति करती है।

आदिवासी समाज में लोक संस्कृति के विविध उपादान अत्यन्त विकसित अवस्था में देखे जा सकते हैं इनकी परम्परा में लोक नृत्य, लोक गीत एवं लोक वार्ताओं का बड़ा महत्त्व है आदिवासियों के लोक गीत व लोक नृत्य की समृद्धता भारत के सर्वाधिक विकसित आधुनिक कलाकारों को भी प्रेरणा एवं वैभव प्रदान कर सकती है। इनमें अज्ञान, अन्धश्रद्धा के कारण रूढ़ि प्रथा है। अग्नि प्रथा, जात पंचायत, नशापान, भोज देना, बलि प्रथा, बहु विवाह आदि परम्पराएँ व प्रथाएँ शोषण का आयाम हैं, हिन्दी आदिवासी कहानियों में इनके सांस्कृतिक जीवन की यथार्थ झलक दिखाई देती है। वे अपने इस सांस्कृतिक जीवन को पीढ़ी-दर-पीढ़ी सुरक्षित रखने की भरसक कोशिश भी कर रहे हैं परन्तु वैश्वीकरण तथा भूमण्डलीकरण के दौर में अब आदिवासी लोक या सांस्कृतिक जीवन बिखरता जा रहा है।

जैसे–जैसे आदिवासी समाज सभ्य और संस्कृतनिष्ठ समाज के सम्पर्क में आने लगा है। वैसे-वैसे उसके आभूषण, खान-पान, रहन-सहन में भी बदलाव होने लगा है आभूषण के अतिरिक्त शरीर को अलंकृत करने के लिए उस पर कलात्मक चित्र बनवाए जाते हैं। राउतों में शरीर को गोदने का व्यवसाय प्रमुखत: स्त्रियों द्वारा किया जाता है गूँदना स्थायी आभूषण के रूप में विद्यामन होता है। अपने पति को प्रसन्न करने के लिए चित्र गुदवाना अनिवार्य माना जाता है। राउतों में गूँदना गुँदवाने की परम्परा को लेकर वीरेन्द्र जी कहते हैं – 'लेकिन जब–जब कोई गूँदना गुँदवाने आती है उसके पास, मौढ़ी नहीं जनी तब अपनी दशा पर फूली नहीं समाती फुलिया, तसल्ली पाती है। तब सोचती है कि भली रही जो मैं राग से निबटी। नहीं तो मोए भी अपने जन को रिझाने, तपाने की खातिर नित नये गूँदना गुँदवाने होते अंग-अंग पर।'2

आर्थिक दरिद्रता के कारण आदिवासी महिलाएँ कम आभूषण पहन पाती हैं। आदिवासी महिलाओं का मुख्य आभूषण मालाएँ ही होती हैं। 'उसके गले में डगर पोल द्वि गुरियों की माला, जो चेलिक को उसकी प्रेमिका मोटिभारी भेंट करती है।'3 हमारे देश में एक तरफ गरीब उपेक्षित एवं दलितों की अर्थहीन वैराग्य संस्कृति है वहीं दूसरी ओर पूँजीपतियों एवं प्रभवर्ग की भोगवादी संस्कृति है। जनसंस्कृति की रक्षा का दायित्व हमारे बुद्धिजीवी साहित्यकारों पर है। बस्तर के गोंड़ आदिवासियों के नर्तक सम्बन्धी पोषाक अत्यन्त आकर्षक होते हैं। ये लोग अपने सिर पर गौर पशु के सींगों तथा मोरपंख को धारण करते हैं। 'जंगल के फूल' उपन्यास में गोरे अधिकारी

ISSN 2349-137X
UGC CARE-Listed Peer Reviewed

अनहद लोक

(प्रतिध्वनि कला एवं संस्कृति की)

वर्ष-9, अंक-18, 2023
(जुलाई - दिसम्बर)
(अर्धवार्षिक शोध पत्रिका)

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शरणागति, आकर्षण, उपादेयता, अखण्ड, आत्मिक।

परिचय :

'कवितावली' गोस्वामी तुलसीदास जी द्वारा रचित भक्तिकाल की प्रसिद्ध रचना है। डॉ॰ उदय भानु सिंह के अनुसार गोस्वामी तुलसीदास जी ने सं0 1631-80 के बीच कवितावली की रचना की है। जिसकी भाषा ब्रजभाषा है। 'कवितावली' का उत्तरकाण्ड सबसे अधिक व्यापक एवं उनकी गहन आत्मीयता से सम्बद्ध है। इस कृति की रचना का मन्तव्य आत्मबोध एवं यथार्थ की अभिव्यक्ति के साथ-साथ माया की गहन संसक्ति से जकड़े जीव (लोक) की जागृति की समस्या से सम्बद्ध है। तुलसीदास आत्मबोध एवं लोक दोनों के यथार्थ संकट, व्यधा तथा उन सबसे मुक्ति की चर्चा निरन्तर कवितावली के 'शंकर-स्तवन' खण्ड में किया है, जिसका अखण्ड आरम्भ वह उनके स्वरूप निरूपण से करते हैं। शिव का स्वरूप कैसा है?

भस्म अंग, मर्दन अनंग, संतत असंग हर।
सीस गंग, गिरिजा अर्धंग, भूषन भुजंगबर॥
मुंडमाल, बिधु बाल भाल, डमरू कपालु कर।
बिबुधबृंद-नवकुमुद-चंद सुखकंद सूलधर॥
त्रिपुरारि, त्रिलोचन, दिगबसन बिषभोजन, भवभयहरन।
कह तुलसिदासु सेवत सुलभ सिव सिव सिव संकर सरन॥[1]

शंकर अर्थात् 'शुभ'। शंकर की शरणागति का भाव है- 'शुभता का विस्तार' क्योंकि जहाँ शंकर हैं वहाँ मंगल है, मानवता का मंगल। शंकर अपने शरीर पर भस्म रमाते हैं, वस्त्र के समान भस्म को धारण करते हैं एवं संसार को यह संदेश देते हैं कि राख या भस्म ही इस जगत् का अंतिम सत्य है। सभी तरह के शारीरिक आकर्षण से ऊपर उठकर ही मनुष्य जीवन की मंगल कामना की जा सकती हैं। शंकर कमदेव का मर्दन करने वाले हैं, जीवन में जब तक कामवासना रहेगी तब तक उसका मंगल होगा ही नहीं। वासना अपूर्णता का प्रतीक है, इसकी उपस्थिति में मनुष्य संतुष्टि को नहीं प्राप्त कर पाता, उसकी इच्छापूर्ति कभी होगी ही नहीं। इसका एक प्रमुख कारण संग भी है। शिव सर्वदा असंग हैं। संग सभी समस्याओं की जड़ हैं। असंग रहने में आत्मउत्थान का भाव निहित हैं। शंकर जी ने अपने मस्तक पर गंगा को धारण किया है। गंगा अर्थात् शीतलता को धारण किया है अतः भाव यह है कि जो शीतलता को

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M.A. PREVIOUS (HINDI) SEMESTER VII-VIII

2022-2023

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Physica Scripta

PAPER

Cross-shaped nanoaperture nanoantennas inside plasmonic nanorings for large SERS enhancement and multiple hotspots

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Keywords: SERS, nanoaperture, nanoantennas, hotspots, nanorings, SERS enhancement factor, plasmonics

RECEIVED
12 December 2023

REVISED
20 February 2024

ACCEPTED FOR PUBLICATION
29 February 2024

PUBLISHED
26 March 2024

Abstract

We have designed a novel nanostructure consisting of a cross-shaped nanoaperture nanoantenna inside plasmonic nanorings for achieving very large values of electric field enhancement, as well as large theoretical surface-enhanced Raman scattering (SERS) enhancement factor, towards the center of the nanostructure. In this work, we employed Finite-difference-time-domain (FDTD) numerical modeling to simulate the plasmonic (gold) nanostructures present on silica substrates. We found that the nanostructures being proposed by us show very high localized electric field enhancements as well as multiple hotspots in which the electric field is enhanced and localized. We observed that these hotspots have large electric field enhancements (and therefore large theoretical SERS enhancement factors) at more than one wavelength. Thus, the proposed nanostructure can be used to achieve a multiple wavelength SERS response. The electric field enhancements and the resonance wavelengths of nanostructures can be tuned in the visible and the NIR region by modifying the nanostructure dimensions like the gap between the tips in the central nanoaperture structure, height of nanostructure, and tip angle variation. It is observed that as the number of gold nanorings increase, the electric field enhancement (as well as the theoretical SERS enhancement factor) also increase due to the focusing of light towards the center of nanostructure, and after the addition of a few rings, the electric field enhancement becomes almost constant. We also studied the polarization dependence of the nanostructure by varying the angle of polarization of the incident light to check the variation of the electric field of the nanostructure, and observed that the proposed nanostructures did not have much polarization dependence. Moreover, due to the symmetric nature of the plasmonic nanostructure, the position of the hotspot region shifts to the adjacent corner on rotating the incident field polarization. We optimized all the dimensional parameters to get the best possible theoretical SERS enhancement factor of $\sim 10^{10}$. Moreover, we simulated a periodic array of these plasmonic nanostructures on the silica substrates, having equal periodicity in X and Y directions, and achieved a theoretical SERS enhancement factor of $\sim 10^{11}$.

1. Introduction

Raman spectroscopy is an extremely important and powerful analytical technique that is extensively employed for the detection and unique identification of molecules of interest. However, as the Raman cross-section of molecules is typically very low (10^{-30}–10^{-25} cm^2 per molecule) [1–4], a technique is required to amplify the Raman signals so that Raman spectroscopy could be employed for trace detection of molecules. Surface Enhanced Raman Scattering (SERS) is a powerful and sensitive technique to enhance the Raman signal of molecules in the vicinity of nano-scale structures or thin films of plasmonics-active metals such as silver, gold, or aluminum. There are two mechanisms for SERS enhancement — the electromagnetic (EM) enhancement and the chemical enhancement [5–7]. It is well established that the EM enhancement arises either due to the excitation of localized surface plasmon resonances in metal nanoparticles or nanostructures or due to the

Eur. Phys. J. Plus (2023) 138:982
https://doi.org/10.1140/epjp/s13360-023-04636-4

THE EUROPEAN PHYSICAL JOURNAL PLUS

Regular Article

Optical and structural changes in intermediate phase $Ge_{22}Se_{78}$ thin film under 100 MeV Ag swift-heavy ion irradiation

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Received: 8 August 2023 / Accepted: 27 October 2023

Abstract The current study examines the effects of six various fluences (3×10^{10}, 1×10^{11}, 3×10^{11}, 1×10^{12}, 3×10^{12}, and 1×10^{13} ions/cm^2) of 100 MeV Ag swift heavy ion irradiation on the optical characteristics of amorphous $Ge_{22}Se_{78}$ thin films. To analyse the structure and composition of materials, X-Ray Diffraction (XRD) and Energy-dispersive X-ray analysis (EDAX) measurements are utilised. The Swanepoel method, which is based on measurements of optical transmission, is used for linear optical analysis. When there are 1×10^{12} ions per cm^2 of fluence, the optical bandgap widens.Semi-empirical relations are used to calculate nonlinear optical parameters (n_2, $\chi^{(3)}$, β and FOM) from linear optical parameters (E_g and n_0). The single-oscillator Wemple-DiDomenico (WDD) model can be used to describe the dispersions of both pristine and irradiated films. The linear/ nonlinear refractive index, third order susceptibility, non linear optical absorption and figure of merit (FOM) reduces up to fluence 1×10^{12} ions/cm^2. These parameters increase as fluence is increased more. Raman spectroscopy is used to understand how bonding rearrangement affects linear and nonlinear characteristics when heavy ions are irradiated quickly. In the context of photonic applications, the use of this study is discussed.

1 Introduction

Covalent network glasses known as amorphous chalcogenides contain one or more chalcogen elements, such as sulphur, selenium, and tellurium [1]. In particular, in the IR-NIR region, network glasses made with chalcogen components are very beneficial in active and passive optical systems. The NIR-IR transparency, low phonon energy, high refractive index, high third-order nonlinearity, and broad range of photo/ion sensitivity of these glasses are what make them useful [2]. Through external processes like thermal annealing, photo-exposure, and ion irradiation, the optical characteristics of these glasses can be customised to meet the requirements of a particular application. Systematic experiments that have been published in the past have helped to better understand the changes in optical characteristics caused by photo-exposure and thermal annealing [3–5]. The findings from ion irradiations are different from those from photo exposure, therefore additional research is needed to build a clear perception and identify when its applicability is more advantageous than that of other methods. When the performance of the optical components is very desirable, ion irradiation is an approach that can be used since, in accordance with some earlier studies, it can optimise optical parameters up to a large limit [6–10].

Energetic ions deposit their energy into the medium, modifying its properties through elastic impact (nuclear energy loss) and inelastic impact (electronic energy loss). High-energetic ions, known as swift-heavy ions, range in energy from tens of MeV to GeV. Due to the energy that these ions largely deposit in the materials through inelastic collisions, rapid changes in material characteristics take place. A maximum dose limit must be established because high-energy ions may destroy thin film samples after a certain dose. [11].The amorphous $Ge_xSe_{(1-x)}$ system has a large glass formation zone and is non-toxic, non-hazardous, and environmentally acceptable [12]. As a result, this system has a substantial selection of amorphous compositions to suit the requirements of any given application. Due to the wide range of photo/ion sensitivity, photo/ion exposure can also be utilised to tailor the optical and structural characteristics of the amorphous $Ge_xSe_{(1-x)}$ system [6]. In terms of glass network connectivity, these alterations brought on by photo-exposure and low-energy ion irradiation are predictable. The valency and atomic proportion of a constituent element is multiplied to create the Mean Coordination Number (MCN) [13, 14]. The ternary and higher-order Ge-Se amorphous alloys continue to exhibit this behaviour of the amorphous $Ge_xSe_{(1-x)}$ system, which is useful in predicting the compositions' optical and structural

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Published online: 04 November 2023

JOURNAL of
THE ASIATIC SOCIETY OF MUMBAI

CERTIFICATE OF PUBLICATION

This is to certify that the article entitled

महिला सशक्तिकरण के लिए सरकारी योजनाओं की भूमिका

Authored By

ज्ञान-विज्ञान विमुक्तये

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University Grants Commission

Published in Vol. 97, No. 08, August 2023

JOURNAL OF THE ASIATIC SOCIETY OF MUMBAI with ISSN : 0972-0766

UGC-CARE List Group I

Impact Factor: 5.29

ज्ञान-विज्ञान विमुक्तये
UGC
University Grants Commission

Editor in chief

R.N.I. 23508/70
Volume 54 (1 & 2)

UGC Listed : 41032

ISSN 0378-1003
January-July, 2023

IJPE

Indian Journal OF PSYCHOMETRY AND EDUCATION

A Biannual Interdisciplinary Peer Reviewed, Refereed Research Journal

RNI. 23508/1970 ISSN : 0378-1003

Indian Journal of Psychometry and Education

Vol. 54 (1 & 2) U. G. C. Listed 41032 Jan. & July 2023

(A PEER REVIWED AND REFEREED JOURNAL)

Editor

Dr. Rajshree Bhargava

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Official Publication of :

Indian Psychometric and Educational Research Association

Subscriber Order to :

Bhargava Periodicals

12A, 4th Floor, Raman Tower, Sanjay Place, AGRA-282 002

E-mail : rakhiprakashan@yahoo.com *Phone : (0562) 2857458*

Vol. 54 (1 & 2) U. G. C. Listed 41032 January & July, 2023

INDIAN JOURNAL OF PSYCHOMETRY AND EDUCATION (IJPE)

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IJPE, Patna (ISSN : 0378–1003)
2023, 54 (1 & 2) : 58–62
© Indian Journal of Psychometry and Education

EXPLORING WOMEN'S PSYCHOLOGY : A COMPREHENSIVE REVIEW

Smriti Punwar

An extensive summary of women's psychology is what this research paper tries to deliver. In the history of psychology, women have been historically underrepresented, and their experiences are frequently disregarded or ignored. Recent studies have, however, illuminated the distinct psychological experiences of women and the ways in which these experiences are influenced by societal and cultural influences. Women's psychology will be examined from a variety of angles in this study, including sexuality, mental health, gender identity, and socialization. Additionally, it will look at the difficulties that women have while seeking psychological care as well as the ways in which gender prejudices and preconceptions can negatively affect women's psychological well being.

Keywords : socialization, gender bias, women psychology, assets, gender disparities, discrimination, masculine perspective, gender identity, stereotypes, challenges in treatment, gender equality, empowerment.

INTRODUCTION

For a long time, women have been the focus of psychological research, but frequently, theexperiencesof womenhave been grouped along with those of men. Due to this, the distinctive psychological experiences of women and the ways in which gender affects their lives have received little attention. Yet, there has been a rising understanding of the significance of researching women's psychology as a separate profession in recent years.

A subset of psychology focused on social structures and gender is called feminist psychology. Historical psychological study is criticised by feminist psychology as being conducted from a masculine perspective and with the assumption that men are the norm. The values and principles of feminism serve as the foundation of feminist psychology.

There are many various categories that gender issues might fall under, and they can be quite contentious. The way people identify their gender (for example, male, female, genderqueer, transgender or cisgender) and how they have been impacted by gender-related social structures (gender hierarchy), the place gender plays in a person's life (such as stereotypical gender roles), and any other gender-related issues are examples of what may can cover.

This subject of study's fundamental goal is to comprehend the person within the larger

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ourselves primarily in terms of their appearance which can contribute to low self-esteem and body dissatisfaction.

Socialization can also impact women's experiences of power and agency. Women are often socialized to be deferential and to prioritize the needs and desires of others over their own. This can make it difficult for women to assert themselves and to advocate for their own needs and goals, which can lead to feelings of powerlessness and frustration.

Overall, socialization can have a profound impact on women's psychology, shaping their self-concept, attitudes, and behaviours in ways that can both enable and constrain their lives. By understanding the ways in which socialization affects women, we can help us to create more equitable and empowering environments for women to thrive.

Gender Bias

Women face gender bias and stereotypes that can impact their psychological well-being. This section will explore the ways in which gender bias manifests in psychology and how it can be addressed.

Gender bias in women psychology refers to the tendency for research in psychology to reflect biases and assumptions about gender that favour men over women. Historically, women have been underrepresented in psychological research, and when they have been studied, their experiences have often been interpreted through a male lens.

One example of gender bias in women psychology is the overreliance on male subjects in research. This can result in findings that do not generalize to women or that overlook important gender differences. Another example is the use of male-based norms and standards to assess and diagnose women's mental health, which can lead to misdiagnosis and inappropriate treatment.

Gender bias can also be reflected in the language used in psychological research, where terms such as hysteria or neurotic have been used to describe women's behaviour and emotions. These terms have negative connotations and perpetuate harmful stereotypes about women's mental health.

To address gender bias in women psychology, researchers can use more diverse and representative samples, incorporate gender-sensitive language and measures, and acknowledge and examine gender differences in their findings. It is important to consider the unique experiences and challenges faced by women in psychology research and practice.

Challenges in Treatment

Women face unique challenges in seeking psychological treatment, including stigma, lack of access to care, and gender bias among mental health professionals. This section will explore these challenges and offer strategies for addressing them.

The therapy of women's psychology presents a number of difficulties. The underrepresentation of women in clinical trials and research studies is one of the major obstacles, which might lead to treatment methods that are not adapted to the unique needs of women.

The effect of societal and cultural norms on women's mental health is another obstacle. For instance, violence, discrimination based on gender, and unequal access to resources can all contribute to the emergence of mental health problems in women. Because they can make it difficult for people to get care and change how women react to it, these factors can also have

an impact on how well treatment approaches work.

Moreover, gender disparities in how mental health problems present themselves may result in incorrect diagnoses and the wrong kind of treatment. Men are more likely to engage in externalising behaviours like substance misuse and aggressiveness, whereas women are more likely to feel symptoms of anxiety and sadness.

Furthermore, there might be issues with stigma and cultural perspectives on mental health in some cultures. Women from different cultural origins could experience special difficulties getting care, and they might need treatments that are sympathetic to their cultural backgrounds.

It is crucial for mental health professionals to be aware of the effects of gender and cultural factors on women's mental health in order to address these issues and to create treatment plans that are specifically designed to meet the requirements of women. This may entail employing language and practises that are gender-sensitive as well as the creation of culturally sensitive treatment philosophies that take intoaccountthe special difficulties and experiences that women from various backgrounds confront.

Conclusion

Women's psychologyisa complexand multifaceted fieldthat isshapedby arange of biological, cultural, and social factors. By understanding these factors, psychologist scan better address the unique needs and challenges faced by women and work towards creating a more equitable and just society.

In conclusion, biological, psychological, and social elements interact in a complicated way to influence women's psychology. Socialization is a crucial aspect that cannot be ignored, even while biological and psychological factors undoubtedly shape women's experiences and behaviours. Women's ideas, attitudes, andbehaviourscanbe greatlyinfluencedby the processof socialization, which can also have an impact on how they perceive themselves, other people, and their own sense of power and agency. Creating more equal and enabling conditions for women to thrive requires a deep understanding of the ways in which socialization affects them. In order to advance gender equality and assist women in realising their full potential, we must first acknowledge the particular difficulties and assets that women bring to the table.

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Received January, 12, 2023
Revision received March, 02, 2023
Accepted June, 02, 2023

Delineating a trajectory for progressive SMEs towards a sustainable future: a cluster-based approach

Priyanka Kapoor, Shobhit Goel and Nidhi Nagar

Published Online: November 13, 2023 • pp 340-363 • https://doi.org/10.1504/IJPQM.2023.134814

Abstract

Small and medium enterprises (SMEs) are critical for the well-being and robustness of any economy. They account for more than 90% of firms and 50% of employment generated worldwide. Thus, they need to imbed sustainability in their operational construct to remain globally competitive and environmentally responsible. This work presents an 'enterprise success' framework comprising variables - entrepreneurial orientation, enterprise competitiveness and external environment. The commonality of attributes amongst the SMEs is examined to develop clusters exhibiting similar traits; thereby locating development strategies based on this cluster approach that positively impacts their performance. Cluster analysis is completed using the K-means clustering technique, identifying the homogeneous SME clusters based on various firm attributes. The cluster formation helps locate pertinent factors that impact the enterprise's long-term competitiveness, enabling the development of an innovative and strategic foresightedness for a sustainable future. The proposed framework offers managerial exhortations, highlighting the optimum solution transit strategy towards sustainability.

Keywords

small and medium enterprises, SMEs, sustainability, interlocking circles model, entrepreneurial orientation, enterprise competitiveness, digital adoption, firm performance, cluster analysis, K-means clustering technique

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BOOK	**01**	Research Methodology	
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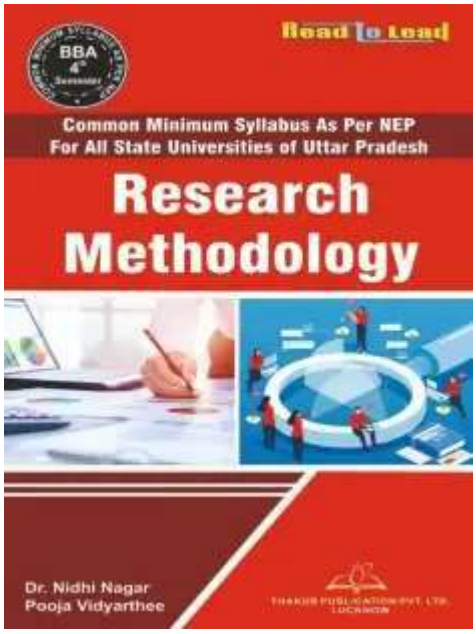

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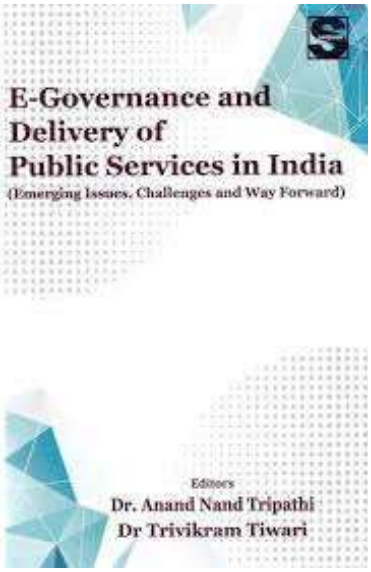

E-Governance and Delivery of Public Services in India

(Emerging Issues, Challenges and Way Forward)

Editors
Dr Anand Nand Tripathi
&
Dr Trivikram Tiwari

Satyam Publishing House
New Delhi-110059 (India)

BOOK CHAPTER: ANALYSING EASE OF DOING BUSINESS VIA ONLINE PORTAL FOR ENTREPRENEURS: NIVESH MITRA

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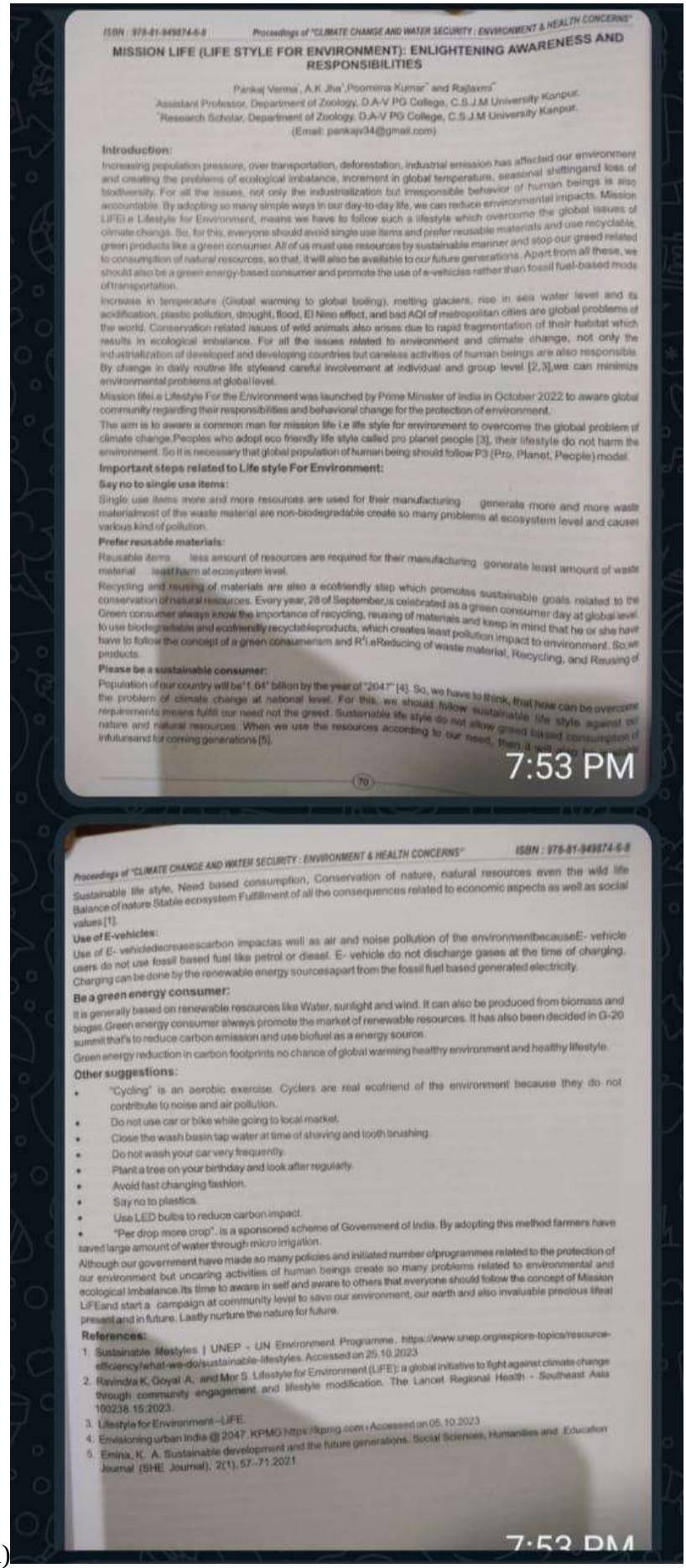

MISSION LIFE (LIFE STYLE FOR ENVIRONMENT): ENLIGHTENING AWARENESS AND RESPONSIBILITIES

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Introduction:

Increasing population pressure, over transportation, deforestation, industrial emission has affected our environment and creating the problems of ecological imbalance, increment in global temperature, seasonal shiftingand loss of biodiversity. For all the issues, not only the industrialization but irresponsible behavior of human beings is also accountable. By adopting so many simple ways in our day-to-day life, we can reduce environmental impacts. Mission LIFE i.e Lifestyle for Environment, means we have to follow such a lifestyle which overcome the global issues of climate change. So, for this, everyone should avoid single use items and prefer reusable materials and use recyclable, green products like a green consumer. All of us must use resources by sustainable manner and stop our greed related to consumption of natural resources, so that, it will also be available to our future generations. Apart from all these, we should also be a green energy-based consumer and promote the use of e-vehicles rather than fossil fuel-based mode of transportation.

Increase in temperature (Global warming to global boiling), melting glaciers, rise in sea water level and its acidification, plastic pollution, drought, flood, El Nino effect, and bad AQI of metropolitan cities are global problems of the world. Conservation related issues of wild animals also arises due to rapid fragmentation of their habitat which results in ecological imbalance. For all the issues related to environment and climate change, not only the industrialization of developed and developing countries but careless activities of human beings are also responsible. By change in daily routine life styleand careful involvement at individual and group level [2,3],we can minimize environmental problems at global level.

Mission lifei.e Lifestyle For the Environment was launched by Prime Minister of India in October 2022 to aware global community regarding their responsibilities and behavioral change for the protection of environment.

The aim is to aware a common man for mission life i.e life style for environment to overcome the global problem of climate change.Peoples who adopt eco friendly life style called pro planet people [3], their lifestyle do not harm the environment. So it is necessary that global population of human being should follow P3 (Pro, Planet, People) model.

Important steps related to Life style For Environment:

Say no to single use items:

Single use items more and more resources are used for their manufacturing generate more and more waste materialmost of the waste material are non-biodegradable create so many problems at ecosystem level and causes various kind of pollution.

Prefer reusable materials:

Reusable items less amount of resources are required for their manufacturing generate least amount of waste material least harm at ecosystem level.

Recycling and reusing of materials are also a ecofriendly step which promotes sustainable goals related to the conservation of natural resources. Every year, 28 of September,is celebrated as a green consumer day at global level. Green consumer always know the importance of recycling, reusing of materials and keep in mind that he or she have to use biodegradable and ecofriendly recyclableproducts, which creates least pollution impact to environment. So,we have to follow the concept of a green consumerism and R^3i.eReducing of waste material, Recycling, and Reusing of products.

Please be a sustainable consumer:

Population of our country will be"1.64" billion by the year of "2047" [4]. So, we have to think, that how can be overcome the problem of climate change at national level. For this, we should follow sustainable life style against our requirements means fulfill our need not the greed. Sustainable life style do not allow greed based consumption of nature and natural resources. When we use the resources according to our need, then it will [illegible] of infuturesand for coming generations [5].

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Sustainable life style, Need based consumption, Conservation of nature, natural resources even the wild life Balance of nature Stable ecosystem Fulfillment of all the consequences related to economic aspects as well as social values [1].

Use of E-vehicles:

Use of E- vehicledecreasescarbon impactas well as air and noise pollution of the environmentbecauseE- vehicle users do not use fossil based fuel like petrol or diesel. E- vehicle do not discharge gases at the time of charging. Charging can be done by the renewable energy sourcesapart from the fossil fuel based generated electricity.

Be a green energy consumer:

It is generally based on renewable resources like Water, sunlight and wind. It can also be produced from biomass and biogas.Green energy consumer always promote the market of renewable resources. It has also been decided in G-20 summit that's to reduce carbon emission and use biofuel as a energy source.

Green energy reduction in carbon footprints no chance of global warming healthy environment and healthy lifestyle.

Other suggestions:

- "Cycling" is an aerobic exercise. Cyclers are real ecofriend of the environment because they do not contribute to noise and air pollution.
- Do not use car or bike while going to local market.
- Close the wash basin tap water at time of shaving and tooth brushing.
- Do not wash your car very frequently.
- Plant a tree on your birthday and look after regularly.
- Avoid fast changing fashion.
- Say no to plastics.
- Use LED bulbs to reduce carbon impact.
- "Per drop more crop", is a sponsored scheme of Government of India. By adopting this method farmers have saved large amount of water through micro irrigation.

Although our government have made so many policies and initiated number ofprogrammes related to the protection of our environment but uncaring activities of human beings create so many problems related to environmental and ecological imbalance.Its time to aware in self and aware to others that everyone should follow the concept of Mission LIFEand start a campaign at community level to save our environment, our earth and also invaluable precious lifeat present and in future. Lastly nurture the nature for future.

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Encl.no. 3(a)

ZOOL.RES PAPER [42]

International Journal of Global Science Research
Vol. 10, Issue. 1, April 2023, pp. 1954-1958
Available Online at www.ijgsr.com

ISSN: 2348-8344 (Online)
DOI: 10.26540/ijgsr.v10.i1.2023.228

IJGSR
International journal of global Science Research

Research paper

Impact of Coronavirus on Mental Stress and its Side Effects

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Received: 03/03/2023
Revised: 13/03/2023
Accepted: 19/03/2023

Abstract: Coronavirus is a well-known virus that has affected human health all over the world, causing a great impact in India. It has been observed that throughout the world, the affected population is made aware of the physical effects of the SARS-COV-2 infection. Therefore, various steps have been taken to prevent exposure to coronavirus, which has in turn helped to prevent the rise of COVID-19. The coronavirus pandemic has created a very critical situation all over the world and has caused great damage to the population of India. Nowadays, the outbreak of COVID-19 has disturbed the routine of people and has resulted in many unanticipated changes, leading to severe psychological responses, mental health issues, and various physiological disorders. In such a crisis, the response of the citizens may greatly affect the pandemic's dynamic by altering the severity, transmission, disease flow, and repercussions. This research paper aims to understand the impact of coronavirus and its effect on the mental health of people. Moreover, it will investigate various physiological changes due to increased mental stress. Therefore, this research will also provide pragmatic implications for many psychological disorders at both macro and micro levels during such an epidemiological crisis, along with a detailed overview of the effects of coronavirus on the mental health of people around the world.

Keywords: Coronavirus, Covid19, Disease Flow, SARS COV2, Pandemic Dynamics, Mental Health

Introduction:

Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-COV-2 virus. Most people infected with the virus experience mild to moderate respiratory illness and recover without requiring special treatment; however, some become seriously ill and require specific medical attention.

It is a well known fact that novel coronavirus was identified in 2019 at Wuhan in China. On 11th February 2020, the WHO gave the name of COVID-19 and SARS COV-2 on the basis of infectious symptoms. The COVID-19 pandemic has affected the population all over the world and has given signals and precautions for the prevention against the

IMPACTS OF DIGITAL CLASSROOMS AND ONLINE LEARNING PLATFORMS ON EDUCATION

BHAWANA SRIVASTAVA, *REDDY. P.B

Abstract: This research delves into the transformative influence of technology on education, specifically focusing on the proliferation of digital classrooms and online learning platforms. Digital classrooms introduce novel dynamics to traditional learning environments, employing interactive whiteboards, tablets, and virtual reality tools to cultivate deeper student engagement and comprehension. These platforms enable students to explore simulations, visualize intricate concepts, and access a vast pool of information beyond conventional textbooks, thereby fostering personalized learning experiences tailored to individual needs and learning styles. Conversely, online learning platforms offer unparalleled flexibility and accessibility, allowing students to learn at their own pace regardless of geographical or temporal constraints. Massive Open Online Courses (MOOCs) and personalized learning platforms democratize education, offering lifelong learning opportunities to a diverse array of learners. Nevertheless, the integration of technology in education presents both opportunities and challenges. Effective implementation necessitates ongoing teacher training and infrastructure development while ensuring equitable access to technology remains a crucial hurdle. Furthermore, concerns persist regarding potential distractions, the digital divide, and the cultivation of essential social and interpersonal skills traditionally nurtured in classrooms. A balanced future likely entails a blended learning model that amalgamates the strengths of traditional and digital approaches, capitalizing on technology's ability to enhance instruction while preserving the irreplaceable benefits of face-to-face interaction. This research contributes to a deeper understanding of technology's potential to reshape education, advocating for the creation of future-proof learning environments that foster engagement, accessibility, and a passion for lifelong learning.

Keywords: Digital classrooms, Online learning platforms, MOOCs, Accessibility in education, Teacher training (technology integration)

Introduction: The educational landscape is undergoing a metamorphosis, driven by the persistent flow of technology (Aada, K., 2024, George, A.S., 2024). Traditional classrooms, once confined by the confines of textbooks and blackboards, are morphing into dynamic learning hubs buzzing with interactive whiteboards, tablets, and virtual reality (VR) tools (Brown, M.D., 2023). Simultaneously, the rise of online learning platforms is dismantling geographical and temporal barriers, offering unprecedented access to education. This research investigates into the multifaceted impact of technology on education, with a specific focus on digital classrooms and online learning platforms. Understanding the impacts of technology on education is not merely an academic pursuit; it is a critical exploration with profound implications for the future of learning (https://www.oecd.org/education).

Here's why studying this topic is essential:

1. **Fostering Deeper Engagement and Understanding:** Traditional education models often relied on rote memorization and passive learning (Kumari, R et al 2023). Technology, however, has the potential to revolutionize this dynamic. Digital classrooms, with their interactive tools and immersive experiences, can transform abstract concepts into engaging simulations (Malik, et al 2024). Students can explore the inner workings of the human body through VR anatomy lessons, travel to ancient civilizations through virtual reality field trips, and visualize complex

ISBN 978-93-90146-37-6

Spirulina-Mediated Mitigation Of Sub-Acute Mercuric Chloride Toxicity In Poecilia Reticulata: Insights From Serum Biochemical And Histopathological Studies

Experiment Findings · September 2023

DOI: 10.13140/RG.2.2.36108.49285

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Spirulina-Mediated Mitigation Of Sub-Acute Mercuric Chloride Toxicity In *Poecilia Reticulata*: Insights From Serum Biochemical And Histopathological Studies

[1]Rajendra Singh Jamod, [2]Bhawna Srivastava and [3]Reddy. P.B
[1] Asst. Professor [2] Assoc. Professor,[3]Professor
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Abstract: Spirulina platensis (SP), a microalga known for its potent antioxidant and anti-inflammatory properties, serves as a valuable food supplement for humans and various animal species. The global issue of mercury pollution, with its detrimental impacts on aquatic ecosystems and resident organisms, underscores the urgency of research in this field. *Poecilia reticulata*, commonly referred to as guppies, is a frequently utilized model organism in ecotoxicological studies due to its heightened sensitivity to environmental contaminants. Exposure to mercury chloride (HgCl2) induces hepatotoxic, nephrotoxic, and neurotoxic effects in numerous species, including humans, birds, and fish. This study investigates the potential hepatoprotective effects of *Spirulina platensis* (SP) against sub-acute mercury toxicity in male *Poecilia reticulata*. Histologically, the livers of $HgCl_2$-intoxicated fish displayed disrupted hepatic architecture, with hepatocytes dissociated from one another. Multifocal hepatocytes exhibited vacuolar degeneration, characterized by multiple clear rounded vacuoles within the cytoplasm, accompanied by moderate congestion and focal inflammatory infiltrate. Administering $HgCl_2$ for 28 days at various exposure levels (1/10, 1/20, and 1/30 of LC_{50} values) significantly elevated liver marker enzymes in fish serum ($P > 0.05$). Transaminases (AST and ALT) were particularly affected, increasing by over threefold (296% and 356%, respectively). However, co-administration of SP with $HgCl_2$ in Group IV significantly reduced ($P > 0.05$) the elevated liver biochemical marker enzymes compared to groups exposed solely to $HgCl_2$. SP treatment restored all tested serum enzymes and biomarkers to within normal limits. In summary, Spirulina supplementation effectively mitigated mercuric chloride-induced hepatotoxicity, ameliorating oxidative tissue injuries.

Keywords: *Spirulina platensis, Poecilia reticulata,* mercury toxicity, hepatoprotection, serum biomarkers, hepatic histopathology.

I. INTRODUCTION

Mercury (Hg) stands as a formidable and multifaceted environmental pollutant, characterized by its ability to manifest in a variety of forms, each carrying distinct and potent toxicity profiles (Driscoll, et al. 2013, Streets et al. 2019, Joy, A. and Qureshi, A., 2023). In the intricate tapestry of aquatic ecosystems, mercury undergoes a series of complex and often perplexing transformations. It exhibits an insidious capacity to accumulate within the organisms inhabiting these fragile ecosystems, thereby casting a pervasive and ominous shadow over aquatic life (Olsvik et al. 2021, Qu et al. 2022, Kumar et al. 2023). Moreover, this environmental menace extends its malevolent reach to encompass potential health risks for humans, effectively infiltrating the food chain (Kumar et al 2023).

Within the intricate web of this ecological narrative, the liver emerges as a central and multifaceted protagonist, equipped with a repertoire of critical roles that are pivotal in safeguarding the organism against the pernicious effects of heavy metal exposures, with mercuric chloride taking a particularly notorious role in

Socio-Economic Consequences of Climate Change in Rural Madhya Pradesh: A Comprehensive Analysis

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(A Biannual Journal of M.P. Institute of Social Science Research, Ujjain)
ISSN: 0973-855X (Vol. 28, No. 2, December 2023, pp. 98-107)
UGC-CARE (Group-I)

Socio-Economic Consequences of Climate Change in Rural Madhya Pradesh: A Comprehensive Analysis

Bhawna Srivastava* and Reddy P.B.†

The changing climate patterns, including shifts in temperature, rainfall, and the frequency of extreme weather events, pose significant challenges to agricultural productivity in rural Madhya Pradesh. The present paper examines the potential socio-economic consequences of climate change in rural areas of Madhya Pradesh, focusing on key sectors such as agriculture, water resources, livelihoods, health, and infrastructure. Water resources, essential for agricultural activities and rural livelihoods, are also at risk due to climate change. Changes in precipitation patterns can lead to water scarcity, affecting irrigation systems and access to clean drinking water. Moreover, increased frequency and intensity of floods and droughts can further exacerbate water-related challenges, impacting agriculture and rural communities. The socio-economic consequences of climate change extend beyond agriculture and water resources. Rural livelihoods, particularly those dependent on forests, natural resources, and traditional practices, are susceptible to disruptions. Changes in ecosystems and biodiversity loss can affect indigenous communities and local populations reliant on forest products and ecosystem services. Additionally, climate change can have implications for public health in rural Madhya Pradesh. Rising temperatures can contribute to the spread of vector-borne diseases, such as malaria and dengue, while changes in rainfall patterns can increase the incidence of waterborne diseases. The resulting health burdens can strain rural healthcare systems and impact the overall well-being of communities. Furthermore, climate change can pose challenges to rural

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© March 2023| IJIRT | Volume 9 Issue 10 | ISSN: 2349-6002

Comparative Study of B.P. Among People According to Age Group 1 Year To 60+Year

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Abstract-Hypertension is major problem a now days. The magnitude of this disorder is huge. According to the latest survey 8-10 crores of people in India from all age groups are suffering from hypertension. However the disease remain easily diagnosable, potentially preventable & completely manageable with many of complication being reversible nevertheless the lifestyle modification are recommended to the prevention as well as for the management of the disorder.
In this we have studied a comparative study of BP person having age group 1 to60+ & we have seen that there are many variations in age 45 & 60 yr

Keyword – Hypertension, age, diagnosis, disease

INTRODUCTION

In India, the incidence of hypertension is arising & becoming the most important public health problem. It is a common, asymptomatic, readily detectable and as usually easily treatable if untreatable

The Joint Nutritional committee (JNC) published in 1997. The committee experts felts the need for new recommendation due to following are spouse to-

To avoid of the result of new clinical trials and observations.

To provide a simple classification of BP.

To provide clear and consume guidelines.

To create awareness the (JNC) guidelines.

Have not been utilized to the max.

In the seventh JNC (JNC express report in Dec. 2002 and report was submitted to the journal of the American medical association in Apr. 2013. it was published in an electronic format on 14may 2003 and print on may 21, 2003) The use of tobacco, obesity and the under treatment of hypertension is the reason of more than 70% of premature mobility in the general population. Also we can trace down a lot of adulthood diseases origin back in early stage of childhood [1]

It has been proven that high blood pressure in adulthood is a result of its negligence in childhood [2-4]

That was on prevention, retraction, evaluation and treatment of BP provides the latest for the management of hypertension. It emphasis several key message such as risk assignment and therapeutic management of patients with or with risk factors for hypertension.

Blood percentiles were first published in a report in 1977[5]

The first message concerned cardiovascular risk associated with hypertensive disease and the significance of hypertension in general population

The risk of cardiovascular disease (CVD) beginning at 110/76 mmhg. Doubles with each increment of 20/10 mmhg.

Persons who normotensive at age 55have a 90 % lifetime risk for developing hypertensive.

In person older than 50 systolic BP greater than 140 mmhg is a much more important CVD risk Factor than diastolic BP

The second message relates to the restructuring for the diagnostic classification of hypertension. Individual with a systolic BP of 120-139 mmhg. Or diastolic BP of 80-89 mmhg should consider.

This led to subsequent task force reports, in which incorporated new data [6].Moreover; it was found that BP was strongly under the influence of height in addition to age and sex. Among these 3 effective factors height is more applicable and a quite suitable primary reference metric even in comparison with age ,it is a precise measure of body size and maturation which are the primary determinants of the natural rise of BP throughout childhood[7,8].Therefore height percentiles have been included in the determination of BP percentiles.

A STUDY ON THE IMPACT OF INDUSTRIALIZATION AND AIR POLLUTION ON BUTTERFLIES IN KANPUR, U.P.(INDIA).

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ABSTRACT

Kanpur city is well known for its industrial value as well as historic and cultivation/biodiversity conservation values. Butterflies dominantly flourish in the natural environment having nectar, flowering, or cropping plants. Butterflies are attractive, beautiful, efficient pollinators and work as a bio-indicator species of various environmental health status. Their high diversity and abundance represent good quality of environment and a healthy ecosystem for wildlife survival. They are the as indicators of ecosystem health because they are very sensitive to changes in microclimate, habitat, and pollution. There are dominantly season changes found as Winter, Summer, and Rainy, and butterflies were found good enough with rich densities as well as species diversities in July, August, September, October, mid-November, February, March, and April. In December, January, May, and June, Butterfly occurrence is negligible qualitatively as well as quantitatively. Air quality parameters depend on whether so they are highly influenced by changes in climatic conditions (Jacob, D.J., Winner D.A. 2009, Greg A. Breed 2013).

The present study is based on the impact assessment of various butterfly species regarding the climatic change of various sites of Kanpur. The current investigation demonstrated the richness of several butterfly species that encompass a wide range of types. There were 21 different kinds of butterflies, grouped into 5 families. Hesperiidae (1), Papilionidae (2), Lycaenidae (4), Pieridae (6), and Nymphalidae (8). Their abundance depends upon the various parameters of Air Quality as well as floral diversity which enhances their growth.
It was found that due to high dust particles and various pollutants released due to the establishment of industries. Automobile extraction is also responsible for Air Pollution. Greenhouse, global warming, acid rain, and oxygen depletion also negatively affect butterfly's survival and growth. Apart from this various physical environmental factors were also responsible for butterfly abundance regarding pollution.

Keywords- butterfly, bio-indicator, industrialization, pollutant, Limiting Factor

https://doi.org/10.33451/florafauna.v29i2pp321-326
FLORA AND FAUNA ISSN 2456 - 9364 (Online)
2023 Vol. 29 No.2 PP 321-326 ISSN 0971 - 6920 (Print)

The Effect of Physico-Chemical Stress on the Population of *Chlamydomonas* Species in a permanent pond of Kanpur, (U.P.) India

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Received **:** 15.08.2023; ***Revised*** **:** 25.08.2023; ***Accepted*** : 10.09.2023

ABSTRACT

In permanent lentic water bodies, the chemical picture completely depends on the surroundings from where these bodies receive effluents. Planktons play an important role as primary producers of the system**.** The limnological study is important for water quality monitoring by which correlation has been established among different physical, chemical, and biological parameters. This statistical analysis easily represented the presence /absence of Planktons on the basis of seasonal variations. Regarding the seasonal variations, the values of pH, magnesium & calcium (Mg, Ca), dissolved oxygen & dissolved oxygen matter (DO, DOM) indicate variation in water quality which directly or indirectly influence the population of *Chlamydomonas elliptica*, *Chlamydomonas globosa*, *Chlamydomonas intermedia*, and *Chlamydomonas orbicularis*. On the basis of chemical analysis in terms of DO & DOM, the shallow water system was moderately polluted. *Chlamydomonas intermedia* showed dominant species which occurred most of the months in a year. The fluctuation in the population densities of *Chlamydomonas elliptica, Chlamydomonas globosa,* and *Chlamydomonas orbicularis* was observed greatly as they occurred in a few months in a year. *Chlamydomonas intermedia* showed positive co-relation with DO and significant negative co-relation with DOM. Mg and pH showed significant negative values. Apart from this, biological populations also showed various co-relation among other known species.

Figure : 00 References : 12 Tables : 04
KEY WORDS : Density, Limnological study, Plankton, Waste-water system

Introduction

Kanpur is an eminent city for various industries. In most of the locations of the Kanpur city, small shallow ponds and puddles are found which are filled to the brim during the rainy season. Generally, these water bodies persist throughout the year. But the water level may vary due to seasonal variation. It has been observed that in drier months their water levels were maintained by the inflow of domestic discharges and industrial effluents were frequent. Excessive usage of natural resources and an ever-increasing population have been responsible for many undesirable changes in this lentic aquatic system. Most of the freshwater systems were under the stress of urbanization and industrialization. The development of new environmental problems as a result of this has given rise to new ideas in the field of monitoring and assessment of aquatic ecosystems. Such water body has unique physico - chemical characteristics which highly influences the biological spectrum[12]. Seasonal water samples collection and their experimental studies provided information for an understanding of environmental changes which was necessary to allow for the protection and remediation of ecosystems. Ecological assessment considering all components of the ecosystem helped in giving information in plankton densities regarding with physico – chemical parameters (pH, Ca, Mg, DO & DOM). In other words, we can say that Biomonitoring is used to assess environmental quality by observations on changes in the biological responses and vice–versa[8].

Material and Methods

This permanent pond was a hypertrophic system that is situated in the Dabauli(south) towards Gujaini in Kanpur. It is a natural aquatic system as no defined built boundaries are there. It is surrounded by natural vegetation as well as an urban area near NH19. It received rainwater, solid waste dumping, and domestic wastewater discharges regularly. This is a pond in which Sunlight reached all the way to the pond, so

IMPACT OF DO IN PRE AND POST LOCKDOWN IN RIVER GANGA AND YAMUNA RIVER

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ABSTRCT

A number of the vital important parameters for assessing the water great like DO (Dissolved Oxygen), were monitored at exceptional locations in a few foremost Indian rivers. The results received from the take a look at well-known shows that the vital parameters had growing values in some monitoring locations, decreasing values, and no variant in values at some other locations. It's far endorsed to have better values of DO. There was no discharge of industrial wastes, motels/restaurants wastes, immersing of idols in the course of spiritual festivals, and so forth, to the rivers in the course of the COVID-19 lockdown. Therefore, enforcement of strict policies via the government of India for disposal of wastes constituted of industrial & homeactivities can extensively reduce the water pollution levels within the Indian River Ganga and Yamuna

KEYWORDS; DO,COVID,Ganga,Yamuna

INTRODUTION

COVID-19 stands for Corona Virus Infectious disease, whose 12 months of occurrence is 2019. it's miles due to the pathogen intense Acute respiratory Syndrome Corona Virus-2 (SARSCOV-2) belonging to the β-subgroup of the Corona virus own family. The sickness became first identified in Wuhan town, Hubei province of China, which later spread its tentacles to over 220 nations and territories round the sector. The government of India imposed a national lockdown in view that middle of the night of 24th March to restrict the unfold of the deadly Corona virus disease Covid-19. The arena fitness company (WHO) declared it a worldwide pandemic of worldwide concern on 30th Jan 2020. it's far determined that human-to-human transmission is specially with the aid of near contact with an inflamed man or woman thru coughing, sneezing, breathing droplets but, there are instances suggested of transmission through viral dropping via feces [1,2]. Some of the commonplace signs of COVID-19 infection are fever, headache, fatigue, dry

ISSN 0304-9892 (Print) ISSN 2455-7463 (Online)
www.vijnanaparishadofindia.org/jnanabha
Jñānābha, **Vol. 54(1) (2024), 141-149**

TWO CLASSES OF TWO DIMENSIONAL MIXED GEGENBAUER-LEGENDRE POLYNOMIALS TO APPLY IN COMPUTATION OF THE REGION OF CONVERGENCE OF ARBITRARY FUNCTION CONTAINING THEM

By

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(Received: January 03, 2024*; In format: March* 24, 2024*; Revised: April* 11, 2024*;*
Accepted: April 12, 2024*)*

DOI: https://doi.org/10.58250/jnanabha.2024.54118

Abstract

In this article we introduce interesting two dimensional formulae of Legendre and Gegenbauer polynomials and then study their analytic and algebraic properties to derive some known and unknown results. Again we define two classes of two dimensional Gegenbauer-Legendre polynomials to obtain their series formulae. Finally, we use these results in the computation of the region of convergence of arbitrary function consisting of Gegenbauer-Legendre mixed polynomials.

2020 Mathematical Sciences Classification: 33C45; 33C47; 11B39; 33C90.

Keywords and Phrases: Analytic and algebraic properties; Legendre and Gegenbauer polynomials; Gegenbauer-Legendre mixed polynomials; Computation of the region of convergence of any function consisting Gegenbauer-Legendre mixed polynomials.

1 Introduction

The Legendre polynomials are used in various scientific and potential problems for example in ([4, p. 157, Sec. 86, Eqn. (1)], [7, p. 83, Eqn. (8)]) and presented by following generating function

$$\frac{1}{(1-2xt+t^2)^{1/2}} = \sum_{n=0}^{\infty} P_n(x)t^n = H_{1/2}(x,t) \text{ (let)}, \ |t|<1, \forall x \in [-1,1]. \tag{1.1}$$

From (1.1), first few Legendre polynomials are found as [4, p. 160]

$$P_0(x)=1, P_1(x)=x, P_2(x)=\frac{1}{2}\left(3x^2-1\right), P_3(x)=\frac{1}{2}\left(5x^3-3x\right). \tag{1.2}$$

A generating function of Gegenbauer polynomials studied in ([4, p. 276, Sec. 143, Eqn. (1)], [7, p.83, Eqn. (7)]), is given by

$$\frac{1}{(1-2xt+t^2)^{\alpha}} = \sum_{n=0}^{\infty} C_n^{\alpha}(x)t^n = H_{\alpha}(x,t) \text{ (let)}, \ |t|<1, \forall x \in [-1,1], \alpha \in \left(-\frac{1}{2},\infty\right)\backslash\{0\}, \tag{1.3}$$

Here in (1.3), we have

$$C_n^{\alpha}(x) = \sum_{k=0}^{\left[\frac{n}{2}\right]} \frac{(-1)^k(\alpha)_{n-k}(2x)^{n-2k}}{k!(n-2k)!}. \tag{1.4}$$

By (1.4) first few Gegenbauer polynomials are found as

$$C_0^{\alpha}(x)=1, C_1^{\alpha}(x)=2\alpha x, C_2^{\alpha}(x)=2\alpha(\alpha+1)x^2-\alpha. \tag{1.5}$$

Now in the field of polynomials to explore new interesting ideas in two and more dimensions, we introduce a two dimensional generating function as

ISSN 0304-9892 (Print) ISSN 2455-7463 (Online)
www.vijnanaparishadofindia.org/jnanabha
Jñānābha, **Vol. 54(1) (2024), 169-179**

A THEORY OF MULTIDIMENSIONAL FREDHOLM INTEGRAL EQUATIONS HAVING SEPARABLE KERNELS: SOLVABLE IN A REGION SURROUNDING BY THE HYPERPLANES

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(Received: February 23, 2024*; In format: March* 03, 2024*; Revised: March* 31, 2024*;*
Accepted: April 05, 2024*)*

DOI: https://doi.org/10.58250/jnanabha.2024.54121

Abstract

In this article, we present a theory of multidimensional Fredholm integral equations, having separable kernels, are solvable in a region surrounded by hyperplanes. In derivation of their solutions, we employ the generalized Hilbert-Schmidt theory involving eigenvalues and corresponding normalized eigen functions obtained by separable kernels in a region surrounded by the hyperplanes. Finally, we apply two variables Gegenbauer polynomials and derive a result on the inequality of the solution for the double symmetric Fredholm integral equation.
2020 Mathematical Sciences Classification: 45B05, 45C05, 33C99.
Keywords and Phrases: Multidimensional symmetric Fredholm integral equations, hyperplanes, symmetric kernels, normalized eigen functions, two variables Gegenbauer polynomials, inequality.

1 Introduction, definitions and preliminary theory

The aim of this article is to present and apply a theory of generalized multidimensional Hilbert-Schmidt theory due to [9] which is an extension of the Hilbert-Schmidt theory cited in for example ([6, p. 251], [10, p. 44]). This generalized theory generates an operator theory occurring in the physical sciences [10]. In 2011, on applying the homotopy analysis methods, Bazrafshan *et al.* [2] found the analytic solutions of integral equations in two-dimensions. Further in the same year, Alipanaha and Esmaeili [1] obtained a numerical solution for the two-dimensional Fredholm integral equations with the aid of Gaussian radial basis function.

Thus to explore new ideas in the field of multidimensional non-homogeneous Fedholm integral equations in the finite region $\forall\,(x_1,\ldots,x_n)\in\mathbb{D}^n$, we present a non-homogeneous multidimensional Fredholm integral equation having separable kernels in following form

$$U(x_1,\ldots,x_n) = F(x_1,\ldots,x_n) + \lambda\int\ldots\int_{\mathbb{D}^n} K_1(x_1,\ldots,x_n)\,K_2(t_1,\ldots,t_n)\,U(t_1,\ldots,t_n)\,dt_1\ldots dt_n. \tag{1.1}$$

We solve this multidimensional non-homogeneous Fredholm integral equation (1.1) on considering of the normalized eigen functions in respect of the real eigenvalues and using of following definitions:

Definition 1.1. *Hyperplane*
In $\mathbb{R}^n$, the hyperplane [5] *is a set of single scalar product equality and written by*

$$H=\left\{x: c^Tx=b\right\}, c^Tx=b\Rightarrow\begin{bmatrix} c_1 & \cdots & c_n\end{bmatrix}\begin{bmatrix} x_1\\ \vdots\\ x_n\end{bmatrix}=b\Rightarrow c_1x_1+\cdots+c_nx_n=b, \tag{1.2}$$

where , $c\in\mathbb{R}^n, c\neq 0$ and $b\in\mathbb{R}$ are known. Again when $b=0$, it is simply the set of points that are orthogonal to c; when $c\neq 0$. Also it is a translation, along direction c, of that set.

J. Mountain Res. P-ISSN: 0974-3030, E-ISSN: 2582-5011 DOI: https://doi.org/10.51220/jmr.v19i1.53
Vol. 19(1), (2024), 537-547

The Coefficients of Bell Polynomials and Arithmetic Functions: Applicable in Fourier series and Fourier Transforms

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Received: 07.12.2023; Revised: 21.01.2024; Accepted: 29.06.2024

Abstract: In this article, we consider the polynomials consisting of the coefficients of complete and the partial Bell polynomials and the polynomial expressions for the arithmetic functions $t_k(n)$ and $r_k(n)$, the number of representations of n as a sum of k triangular numbers and k squares, respectively, and also the color partitions $p_k(n)$. Then making an appeal to the Fourier series consisting of the coefficients of Bell polynomials and arithmetic functions we obtain various results concerning approximations and Fourier transformation identities.

2020 Mathematics Subject Classification: 11A25, 11A41, 11B73, 11B83, 42A16.
Keywords: Arithmetic functions • complete and partial exponential Bell polynomials • fourier series.

1. Introduction and preliminaries

If two analytic functions $F(q)$ and $G(q)$ of q, where $|q|<1$, are followed the equations

$$q\frac{d}{dq}\log F(q) = G(q),$$
$$(F(q))^k = \sum_{n=0}^{\infty} f_k(n)\, q^n,$$
$$G(q) = \sum_{n=1}^{\infty} g_n\, q^n, \qquad (1)$$

with the values $F(0)=1$, $G(0)=0$.

Then, due to Eqn. (1) there exists following recurrence relations [1]

$$f_k(n) = \frac{k}{n}\sum_{j=1}^{n} g_j\, f_k(n-j), \qquad (2)$$

$$g_n = -\,n\sum_{k=1}^{n}\frac{(-1)^k}{k}\binom{n}{k} f_k(n). \qquad (3)$$

The relation (3) is the inversion of (2) with respect to the sequence $\{g_n\}$.

From the hypotheses $f_k(0)=1$, $k\geq 0$, $f_0(n)=\delta_{0n}$, $g_0=0$, $f_k(n)$ be a polynomial in k of degree

$$f_k(n) = a(n,n)\,k^n + a(n,n-1)\,k^{n-1} + \cdots + a(n,2)\,k^2 + a(n,1)\,k, \qquad n\geq 1, \qquad (4)$$

where in (4) the coefficients $a(n,m)$ are determined in terms of the quantities g_j, given by