Contents

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EFFECT OF TRANSPIRATION ON MHD FREE CONVECTIVE FLOW OF VISCOUS FLUID THROUGH A POROUS MEDIUM BOUNDED BY AN OSCILLATING POROUS PLATE IN SLIP FLOW REGIME WITH HEAT SOURCE/SINK

N. K. Varshney, R. K. Gupta and Rajesh Kumar Bhardwaj
Department of Mathematics, S. V. College, Aligarh (U. P.)

Abstract : An analysis of velocity, temperature, concentration and skin friction of a viscous incompressible fluid of small electrical conductivity in a porous medium near an oscillating infinite porous flat plate in slip flow regime under influence of a transverse magnetic field of uniform strength is carried out. In this study, velocity of fluid increase with the increase in G_m (Modified Grasholf Number), K (Porosity Parameter) and A (Thermal Diffusion Parameter), but it decreases with the increase in M (Hartmann Number) and S_c (Schimdt Number). Concentration of fluid increases with the increase in A, but decrease with the increase in S_c.

Introduction : Many papers have been published on the theory of laminar boundary layers in unsteady flow. The study of fluctuating flow is important in the paper industry and many other technological fields. Stokes[8] and Rayleigh[6] studied the flow of a viscous and incompressible fluid past an infinite flat wall which execute linear harmonic oscillation parallel to itself. Stuart[9] investigated the response of skin friction and temperature of an infinite plate thermometer to fluctuations in the stream with suction at the plate, Ong and Nicholls[5] extended the method to obtain the flow in magnetic field near an infinite flat wall which oscillates in its own plane. Ahmadi and Manvi[1] have derived a general equation of motion for viscous flow through a rigid porous medium and applied to some basic flow problems. Yamamoto and Iwamura[10] investigated the flow with convective acceleration through a porous medium. Gupta and Babu[3] studied the flow of a viscous incompressible fluid through a porous medium near an oscillating infinite porous flat plate in the slip flow regime. Devangana[2] studied MHD free convective flow of viscous fluid through a porous medium bounded by an oscillating porous plate in the slip flow regime. Singh and Gupta[7] studied MHD free convective flow of viscous fluid through a porous medium bounded by an oscillating porous plate in slip flow regime with mass transfer. Recently, Madhukar and Jha[4] studied MHD free convective

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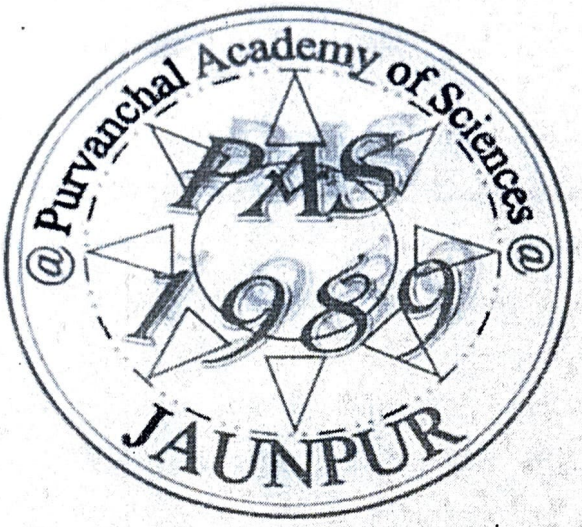
UNSTEADY EFFECT ON MHD FREE CONVECTION AND MASS TRANSFER FLOW OF OLDROYD FLUID THROUGH POROUS MEDIUM WITH CONSTANT SUCTION AND CONSTANT HEAT AND MASS FLUX

by
N. K. Varshney, R. K. Gupta and Rajesh Bharadwaj



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Topic: Education for Sustainability and Global Citizenship

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Abstract:

Education for Sustainability and Global Citizenship has become essential in the modern era to address global challenges such as climate change, social inequality, and economic instability. Guided by the goals of the United Nations, particularly Sustainable Development Goal focuses on quality education, this approach aims to empower learners with the knowledge, skills, values, and attitudes needed to build a sustainable and peaceful world. It integrates environmental awareness, social responsibility, and global cooperation into educational practices. In the context of the Sustainable Development Goals, education plays a transformative role in promoting responsible citizenship and sustainable lifestyles. By encouraging critical thinking, ethical decision-making, and intercultural understanding, it prepares students.

This paper explores the role of educational institutions in promoting sustainability and citizenship through innovative teaching approaches, interdisciplinary learning, and value-based education. It also examines how curriculum design, experiential learning, and community engagement can help students develop critical thinking, ethical responsibility, and environmental awareness. Furthermore, the study highlights the importance of policy frameworks such as the National Education Policy 2020 in encouraging holistic and sustainable educational practices.

The findings suggest that integrating sustainability and citizenship education can empower students to become informed decision-makers and responsible global citizens. By fostering environmental consciousness, social responsibility, and participatory values, education can significantly contribute to achieving long-term sustainable development and a more equitable global society.

Keywords: Sustainability Education, Global Citizenship, Sustainable Development, Educational Innovation, Environmental Awareness, Higher Education

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Research Article

The GST Burden: How Compliance Affects Work-Life in Finance Roles

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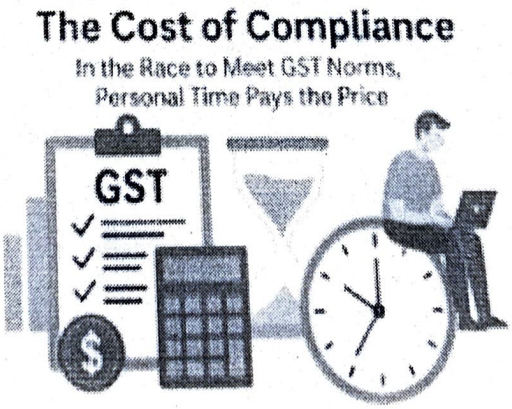
ABSTRACT

The Cost of Compliance: In the Race to Meet GST Norms, Personal Time Pays the Price. While India's Goods and Services Tax (GST) promises streamlined taxation and economic efficiency, it silently imposes a heavy toll on the professionals tasked with its compliance. This exploratory study investigates the lesser-known cost of GST—its impact on the work-life balance of finance and accounting employees. Drawing from empirical data gathered from 80 professionals across sectors in Moradabad, the findings reveal a stark reality: prolonged work hours, disrupted family life, stress-induced health issues, and diminishing personal time are common consequences of intense GST-related workloads. Statistical analyses confirm strong negative correlations between GST compliance and work-life balance (r = -0.78) and personal time availability (r = -0.72), alongside a moderate positive correlation with stress levels (r = +0.65). The paper not only exposes a critical gap in employee well-being within compliance-heavy roles but also proposes actionable HR interventions such as flexible schedules, mental wellness programs, automation of filing processes, and customized work-life balance policies. As the tax regime evolves, so must our support for the silent workforce behind it—lest we compromise both their wellness and organizational productivity

Keywords: - GST Compliane, Work-Life Balance, Accounting and Finance Professionals, Work-Related Stress, Tax Reforms in India



INTRODUCTION

WORK-LIFE BALANCE

Work-life balance in the Indian banking sector is significantly impacted by the contrasting operational models of private and public sector banks. Private Banks, driven by performance and profitability, foster a culture of high expectations, aggressive targets, and performance-linked incentives, leading to extended working hours, constant availability, and increased stress, potentially resulting in burnout. Conversely, public sector banks, known for stability and job security, operate within a structured, bureaucratic

WORK-LIFE BALANCE AND EMPLOYEE LONGEVITY: A STATISTICAL EXPLORATION USING ACTUARIAL MODELS

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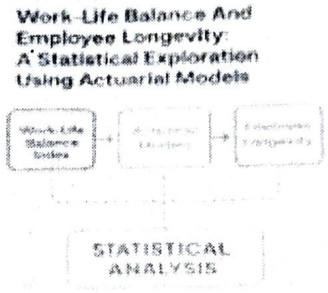
ABSTRACT

In today's fast-paced banking sector, the equilibrium between professional responsibilities and personal well-being has emerged as a critical determinant of employee retention and longevity. This study explores the intricate relationship between work-life balance and employee longevity in private sector banks of Western Uttar Pradesh, applying statistical tools grounded in actuarial models and survival analysis. Utilizing primary data collected through structured questionnaires and analyzed via SPSS, the research employs the Kaplan–Meier estimator and Cox Proportional Hazards model to assess how factors such as job stress, overtime, flexible work arrangements, and family time impact employee tenure. The findings reveal that poor work-life balance significantly accelerates employee attrition, while supportive policies positively correlate with prolonged service duration. This study not only offers valuable insights for HR policy formulation in banking institutions but also contributes to the growing body of literature emphasizing the actuarial dimensions of workforce sustainability.



Keywords: Work-Life Balance, Employee Longevity, Actuarial Models, Survival Analysis, Banking Sector

1. INTRODUCTION

1.1. WORK LIFE BALANCE

In today's fast-paced and highly competitive professional environment, achieving a healthy work-life balance has become a growing concern for employees and employers alike. **Work-life balance (WLB)** refers to an individual's ability to effectively manage the demands of both their professional and personal lives. It is a dynamic and ongoing process that requires consistent effort and organizational support to prevent the overlapping of work responsibilities with personal well-being, family time, and leisure activities.

ANALYSIS OF TOXIC EFFECT OF INDUSTRIAL EFFLUENT ON LABEO ROHITA IN THE RIVER RAM GANGA AT MORADABAD

Bhupander Kumar[1], Vikas Gupta[2]

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Abstract

The industrial waste effluents generally contain heavy metals like Pb, Cr and Cu etc., dumped into rivers. In present study, the toxicity of industrial effluent was investigated using fish "Labeo Rohita" and found that fish was unable to survive even in 15% concentration of the effluent. An interesting feature of the study was that when the pH of the effluent decreased the toxicity of the effluent increased several times. It also found by the study that among three metals Pb, Cr and Cu Chromium is more toxic than other two metals. The results also shows that the Cr toxicity in enhanced at lower pH- 5.5. This result is in agreement with the already established toxicity which reported that high Cr accumulation occurred at lower pH- 6.5 that of high pH- 7.8. It also established by the present investigation that as the pH decreases, the toxicity of the metal increases.

Keywords: *Industrial Effluents, Heavy Metals, Labeo Rohita Fish, Aquatic Life.*

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1. INTRODUCTION

Water is abundantly available on the earth, three fourth to earth's surface is covered by water. Water is essential to all forms of life and makes up 50- 97% of the weight of all plats and animals [1]. In urban areas, the careless disposal of industrial effluents and other wastes in rivers & lacks may contribute greatly to the poor quality of river water [2-5]. Most of the rivers in the urban areas of the developing countries are the ends of effluents discharged from the industries. Asian countries experiencing rapid industrial growth during last few decade and this is making environmental conservation a difficult task [6]

Moradabad is a B-class city of Uttar Pradesh, having urban population more than 10 lakh. The city is full of brass, steel & glass cottage industries. A paper industry, some electroplating plants & other small-scale industries situated in Moradabad.. All these industries are in unorganized sector and thus have unplanned growth leaving to high degree of air, water and soil pollution. The most of the industries are dumping their effluents in two major rivers of the city- Ramganga River & Gagan River. The effluent containing heavy metals is largely the waste by product of industrial process. MATERIALS & METHODS

The samples collected at two different sites.

Site-1: Untreated Cu, Pb, & Cr effluents were colleted from the small scale industry situated near the bank of Ram Ganga river which continuously discharging effluents into the river. The samples of effluents collected before mixing in the river.

Site- 2: Effluents sample carrying mixed discharge of industries & nearby locality after mixing with river water were collected at site II that is almost 1 kilometer far from the site-1.

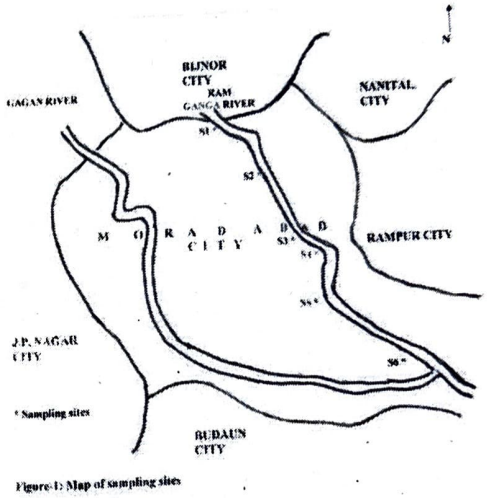

Figure-1: Map of sampling sites

Fig.1: Map of sampling sit

All the samples collected following standard procedure of sampling [8]. The toxicity test were conducted using "Labeo Rohita" (Hamilton) was acclimatized to the laboratory conditions for two weeks using diluents water prepared in the laboratory [9]. The fishes fed daily with a commercial food at a rate of 3% body wt. per day. The D.O. of the diluents water kept between 4.0-5.0 mg/lit [10]. The pH, hardness, alkalinity, Conductivity, COD of the diluents water kept almost same as that of fresh river water.

Different solution of effluents were prepared with diluents water (100%, 50%, 25%, 10%) and were taken separately in 5 lit capacity glass Jars and acclimatized fish (6 each) were put in all beakers. Before conducting the tests, the fish kept hungry for 24 hrs.

The acclimatized fish also kept in diluents water as control. The test conducted continuously for 96 hrs. The metal (Pb,

Dr. Mukta Rathore.

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Chromatographic analysis of food dyes using environmentally preferable solvents

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ABSTRACT

A schematic representation showing different interactions of the dyes with s.lica gel and aqueous methanol which arise during the separation of curcumin, erythrosine and amaranth from their mixture has been proposed. Effect of foreign substances on the achieved separation has been examined and the limits of detection of the separated dyes have also been calculated. The proposed method is applicable for the identification of these dyes in food samples and separation in spiked sample. Densitographic representation of achieved separation has also been included.

Keywords: Dyes; Separation; Densitometry; Food samples.

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LETTER OF APPRECIATION

Esteemed Author (s)

Please accept my heartiest felicitations on very kindly sending your valuable article/research paper titled '**A STUDY ON CONSUMER AWARENESS, USAGE PENETRATION AND ADOPTION OF 3G MOBILE SERVICES IN INDIA**' for publication in **Volume No. 2 (2012), Issue No. 05 (May)**.

Our editorial board has highly appreciated your invaluable piece of research. The researchers and the academics have conveyed their views and its worth have been appreciated by one and all.

With sincerest regards and profuse thanks for your contribution.

Sincerely Yours

Authorised Signatory

I. J. R C. M.

Success has two roots merit & aggressiveness. In theory, merit suffices, but not in practice ... Neither merit nor aggressiveness alone avail. They must be mixed in the right proportion. The Secret of success in life is for a man to be ready for his opportunity when it comes.

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Synthesis, Spectral Studies, Antifungal Activity and Biological Study of Bis (2 Hydroxy Benzylidene) Benzidine Titanium (III) Chloride with Schiff Bases Derived from Aromatic Amines

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Abstract- ***A series of transition metal complexes of Cu(II), Ru(II), Fe(II), Mo(II) with a tetradentate ligand, bis (2-hydroxy benzylidene) benzidine prepared by the condensation of 2-hydroxy benzaldehyde and benzidine. Metal complexes are reported and characterized based on elemental analysis IR, HNMR, Magnetic moment, molar conductance and thermal analysis. The synthesized ligands in comparison to their metal complexes were also screened for their antibacterial activity against bacterial species. The activity data show the metal complexes to be more potent antibacterial than the parent Schiff base ligand against one or more bacterial species.***

Keywords: *2-Hydroxy benzaldehyde, Benzidine, Magnetic moment, Transition metal complexes, Molar Conductance, Biological activity, Thermal analysis.*

1. INTRODUCTION

Schiff bases complexes with transition metal have played central role in development of co-ordination chemistry. Because Schiff base ligands are potentially capable of forming stable complexes with metal ions. Metal complexes play an important role in agriculture pharmaceutical and industrial chemistry.

By the study of available literatures, it appears that bis (2-hydroxy benzylidene) benzidine and its related compounds have been extensively used as biological screening agents and analytical agents. Considering the above facts, this paper describes the behaviour of the tetradentate aromatic Schiff base ligand with various transition metal ions [1].

The Schiff bases bis (2-hydroxy benzylidene) benzidine were prepared by standard methods and characterized by the determination of melting point and elemental analysis. The complexes of these ligand were prepared with Titanium (III) by standard method and synthesized & characterized by elemental analysis, molar conductance, magnetic susceptibility, IR, Electronic spectral measurement and TGA [].

1. MATERIALS AND METHODS:

All reagents were used without purification and supplied by Merck. The IR Spectra of the complexes were recorded with Perkin Elmer spectrophotometer model 651 in KBr or nujol phase at RSIC, CDRI Lucknow. The Visible spectra were recorded with Beckmann DU-2 spectrophotometer in the range of 750cm^{-1} to 300 cm^{-1} at Department of Chemistry, Bareilly College, Bareilly U.P. (India). The Elemental analyses were carried out at RSIC, CDRI Lucknow, conductivity measurements were carried out at Philips conductivity Bridge model PR 9500 type conductivity cell at department of chemistry, Bareilly College, Bareilly. The conductivity of complexes was measured in methanol, DMF, DMSO, nitrobenzene and acetonitrile. Magnetic Susceptibility of the complexes was determined by department by Gouy method at the Department of Chemistry, Bareilly College, Bareilly With $CuSO_4.5H_2O$ as Calibrate, the diamagnetic corrections were made for the ligand [3].

1.1 Synthesis of Schiff Base:

Methanol solution of N, N'-Bis (2-Hydroxy benzylidene) with methanol solution of benzidine (.01mol) in 2:1 molar ratio is taken. The ligand so formed was filtered and dried. It was purified by recrystalization from methanol. Chamical reaction is represented in Fig. 1 for same.

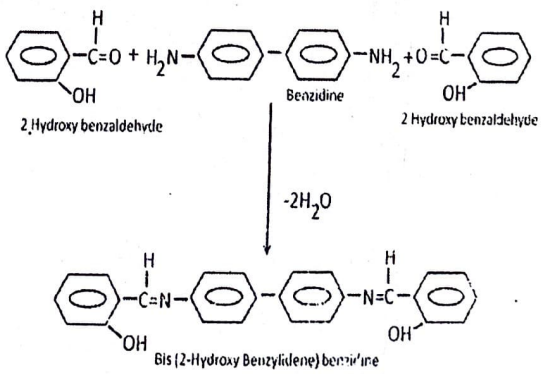

Figure 1: Prepration of Bis (2- Hydroxy Benzylidene) benzidine

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A Case Study of Electrification with PV Generation in MIT Block C

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ABSTRACT

MIT, Moradabad established in 1996, is marching strength to strength on the glorious ladder of academic excellence. Electricity supply is one of the main factors to increase the efficiency of each and every individual for fast growth of MIT. There used to be frequent power cuts in Moradabad. Increasing load shedding by electricity board has forced their consumers look for other reliable energy alternatives. Solar PV stands out to be the preferred choice because of its inherent advantages. A successful implementation of the solar photovoltaic roof top system provides a green and sustainable alternative energy supply to the premises. It allowsthe reliable use of lights, fans and appliances without the economic and environmental costs associated with the current diesel based generator sets. Here we present a case study through this paper which deals with the study for alternate electrification in institute buildings with PV generation.

Keywords: SPV, payback time, demand calculation.

I. INTRODUCTION

Here we demonstrate the actual cost of installing SPV power generation and its payback time as there are misconceptions regarding its expensive costs.The solar cells receive the solar energy directly from sun. The solar cells operate on the photo-electric energy by using solar cells principle. After the calculation of loads of C- block of MIT, we found that the building load is nearly 20 KW.The institute is really fed up with high electricity bill which is vary from Rs. 6500/month (approx) during winter season to Rs. 18000/month(approx) during summer season for block c alone. Block C for has four floors having total of 35 rooms which includes CFL's, fans, tube lights, water coolers, exhaust fans, AC & PC, etc. The loads considered here are for operating during 9 AM to 5 PM i.e. during college hours out of which maximum load found are during period of 9 AM to 1 PM. The proposed roof top Solar Photovoltaic Power Plant at MIT, Electrical & Electronics would utilize vacant area of about 980.10 m^2 available on the terrace of the concerned block of the institute. The SPV power plant with proposed load capacity of about 20 kW will cost approx of Rs 26,01,390 (Rupees Twenty six lakh one thousand three hundred ninety). Solar PV Plant 75 kWp installed at roof top includes Solar PV Panels, Schneider make Inverters & Charge Controllers, Control Panel, Lightning Arresters, DC cable, Mounting Structure at roof-top including fabrication and erection.

II. SYSTEM ANALYSIS

As the performance of solar panel depends directly on the sun's intensity, so the highest system performance is recorded during summer season i.e. during month of March to September and the winter season is the worst period characterized by short and cloudy days. The load demand during summer season goes up to 19 KW and downs to 7 KW during winter seasons. So while keeping in mind these load demands, we decided to design our SPV power plant for 20 KW load. The installed SPV power plant consists of many PV modules connected with each other to meet the demand. Each PV module has dimensions of 1680 × 1010 × 58 mm and weight of 21 kg and has power output of 230 watt. The arrangement of cell matrix in this module is 60 cells in form of 10 × 6 and is of multi or mono crystalline of dimensions 156 × 156 mm. Total number of module which are to be used for our load, is 96 with 2 set of 8 × 6 each. (i.e. 8 module in series with 6 parallel combination) i.e. array of total 8 × 12 size but due to lack of space to install the whole array we may install it in two parts each of 8 × 6 size [2]. The each set will occupy area of approx. 15 m × 7 m and the two set of array will be installed on both side of free space on the roof top.Other specification of this module is listed below:

Power at STC, (Pmax): 230 Watt

Number of Cells: 60 Cells

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Library

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Metal complexes of Schiff bases: Preparation, characterization and synthesis of Schiff base derived from salicyladehydeand triazole and its transition metal complexes

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ABSTRACT

The schiff bases and a series of transition metal complexes of Ti(III), V(III), Mn(III), Ru(III), CO(II), Ni(II), Zn(II), Cd(II) and Cu(II) with a tridentate ligand is derived from the inserted condensation of salicyaldehyde with 4-amino 5-mercapto 1,2,3 triazole in a 1:1 molar ratio. The synthesized complexes were characterized by several techniques using molar conductance, elemental and spectral analyses, magnetic measurements, Infra-red spectroscopy, NMR, electronic spectra. Mass spectra particle data. Based on these studies octahedral structures have been assigned to these complexes.

Keywords: Salicyaldehyde, Mercapto, Triazole and Octahedral.

INTRODUCTION

Schiff bases have a huge amount of synthetic uses in organic chemistry. Especially in ligand a metal surrounded by a cluster of ion or molecule, is used for preparation of complex compound named as Schiff bases[1]. Schiff bases are the compounds containing azimethine group($-C = N -$). A Schiff base is a nitrogen analog of an aldehyde or ketone in which the $> C = O$ group is replaced by ($> C = N - R$) group between the (O) and (N) atoms which play an important role in the formation of metal complexes and that schiff base compound show photochromism and thermochromism in the solid state by proton transfer from the hydroxyl (O) to the amine (N) atom [2].They are condensation products of ketones or aldehydes with primary amine according to the following scheme.

$$R - NH_2 + R - C - R \rightarrow {}^{R}_{R}> C = N - R + H_2O$$

Where R may be an alkyl or an aryl group.

The formation of a Schiff bases from an aldehydes or ketones is a reversible reaction and generally takes place under acid or base catalysis or upon heating. The common Schiff bases are generally solids, which are lacking physical strength but at least some form insoluble salts with strong acids. Polydentate ligands, such as Schiff bases assisted by metal ions, provide highly organized supramolecular metal complexes. Such complexes possess binding sites and cavities for various cations, anion and organic molecules [3-4].

Dr. LAJMEET KAUR was born in UP, India. She holds a master's degree in History & Education as well as a Ph.D. degree in both. Education from Mahatma Jyotiba Phule Rohilkhand University, Bareilly, U.P., India. She has published several research papers in different National & International journals. She is working as Assistant Professor in PG Department of Education, RBTTI, Bareilly. Her area of interest is educational psychology.

Dr. RAVI KANT is working as Assistant Professor in Education in Maulana Azad National Urdu University, Hyderabad. He possesses a master's degree in Economics, English & Education and a Ph.D. in education. He accounts for several research papers in journals of National & International reputation. His areas of interest are educational psychology & educational technology.

Dr. ATUL KUMAR VERMA is working as research fellow under C.O.E. Project in the Department of Applied & Regional Economics, Mahatma Jyotiba Phule Rohilkhand University, Bareilly. After getting a master's degree in Economics and Education, he received his Ph.D. in Applied & Regional Economics from the same university. He has been engaged in teaching and research for over ten years.

Statistics in Education and Psychology

This book provides an essential introduction to statistical methods as applied in the fields of education and psychology. It covers descriptive and inferential statistics, offering tools to collect, analyze, and interpret data in educational research and psychological studies. Emphasizing clarity and relevance, the content explores topics such as measures of central tendency, variability, hypothesis testing, correlation, and regression. It also discusses the ethical use of data and the role of statistics in decision-making and policy development. Designed for students, educators, and researchers, the book bridges theoretical concepts with real-world applications. It fosters critical thinking and analytical reasoning, enabling readers to understand and conduct meaningful research. By combining statistical theory with practical examples from education and psychology, the book supports the development of evidence-based insights and interventions.

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TRANS STELLAR
• Journal Publications • Research Consultancy

INFLUENCE OF SALINE WATER IRRIGATION ON CRUDE PROTEIN AND AMINO ACIDS IN TWO GENOTYPES OF FINGER MILLET (*ELEUSINE CORACANA* GAERTN)

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ABSTRACT

The field experiment was conducted to study the effect of salt stress on protein and amino acid content in two varieties of finger millet viz. VL-315 and Local Hills. The experimental fields were irrigated with different saline waters (3, 4, 7.2, 10, 12 and 14 dSm-1). Tube-well water was used in control sets. Leaf protein content was determined at 90th day stage while grain protein was examined at the final harvest (130 DAS) while amino acids were examined at 60, 90 and 130 DAS. The leaf and grain protein content declined significantly in both cultivars at 3 to 14 dSm-1. The higher protein content in leaves and grains may be due to higher photosynthetic rate of plants due to higher total leaf area in VL-315. Ten amino acids were identified in different samples. Statistical analysis indicates that amino acids in both cultivars, exhibited a differential response under varying salinity levels. It was also noted that amino acid contents except thrionine were higher in cv. VL-315 than Local Hills under different salinity regimes at all three stages. Amino acid accumulation (e.g. arginine and proline) may be considered as a detoxification mechanism of the ammonium produced in plants subjected to stress. Thus, it is apparent that cv. VL-315 has performed better in terms of protein and amino acids over Local Hills under saline water irrigation.

KEYWORDS: Salinity, Protein, Grains, Millet, Irrigation

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Original Article

INTRODUCTION

Soil salinity is one of the most important abiotic stresses **(De bez *et al.*, 2006 and Koyro, 2006)** for worldwide plant production especially in arid and semi-arid regions. Soil salinity has caused heavy loss of national wealth in India. Uttar Pradesh alone has about 1.37 million hectares of sodic and saline soils. In U.P., the salts affected districts are Allahabad, Aligarh, Etah, Etawah, Hardoi, Mainpuri, Pratapgarh, Raebareli, Sultanpur, Jaunpur, Azamgarh and Bulandsahar etc. The agricultural areas affected by salts need amendment and determination of the most suitable plant species able to grow in these areas. Plants need to have special mechanisms for internal osmotic adjustments and changing of osmotic pressure in the root environment. Stressed plants diminish osmotic potential by accumulating free amino acids, ions and other dissolvable substances. Protein content and composition is an important determinant of cereal grain quality and it is sensitive to drought and heat stress as well as atmospheric CO2 concentration **(Wardlaw *et al.*, 2002; Gooding *et al.*, 2003).**

RESEARCH ARTICLE
Indian Journal of Agricultural Research, Volume 60 Issue 5: 723-727 (May 2026)

Ameliorative Effects of Nitrogen Application on Vegetative Growth and Productivity in Genotypes of Ragi (*Eleusine coracana* Gaertn.) under Saline Conditions

Sanjay Agarwal[1], Ashok Kumar[2]

10.18805/IJARe.A-5814

ABSTRACT

Background: Salinity and low soil nitrogen availability are important growth limiting factors for most crops. The proper use of N fertilizer is not only important for growth but it may also alter the salinity tolerance of plants depending on the level of salinity.

Methods: The present study was undertaken to determine the interactive effects of N nutrition and saline irrigations (3, 6, 7.2, 10, 12 and 14 dSm^{-1}) on growth and grain productivity in two varieties of finger millet *viz.* VL-315 and Local Hills. Different growth and productivity parameters (like plant height, dry weight of shoot, root and leaves, dry weight of panicle/plant, no. of grains, grain yield/plant *etc.*) adversely affected by saline irrigations, however, nitrogen nutrition minimized at different levels of salinity.

Result: The positive response of nitrogen was comparatively higher at lower salinity levels (3-7.2 dSm^{-1}) as well as at control than higher salinity (10-14 dSm^{-1}). The effect of salinity was lower in cv. VL- 315 than Local Hills, but the interactive effects of N nutrition and salinity also enhanced the dry weight of shoot, root, leaves, dry weight of panicles and grains/plant. It is probable that N nutrition had enhanced assimilation of NO_3^{-1}-N, through the activity of NRA which further increased total nitrogen and protein content in leaves, hence, enhanced growth, biological and grain yield in both cultivars.

Key words: Assimilation, Finger millet, Nitrogen nutrition, Productivity, Salinity.

INTRODUCTION

Soil salinity is one of the major stresses which severely limit plant growth and productivity (Koca *et al.*, 2007 and Nguyen *et al.*, 2020). In India around 13.3 million hectares of land is affected by salinity. Uttar Pradesh alone has about 1.37 million hectares of saline and sodic soils whereas Rajasthan has 3.75, Punjab 1.5 lakh and Haryana 2.32 hectares of land affected by salt accumulation. Salinity decreases the ability of plants to take up water andthis rapidly causes reductions in the rate of growth, along with a metabolic change same as caused by water stress.

The proper use of N fertilizer in all soils is important, but particularly so in saline soils where N might reduce the adverse effects of salinity on plant growth and yield (Albassam, 2001 and Flores *et al.*, 2001). On the other hand, over fertilization with N may contribute to soil salinization and increase the negative effects of soil salinity on plant performance. Studies of plant growth responses to N and soil salinity during the whole plant life cycle are important to reveal whether the amount of N applied alleviates or aggravates the detrimental effects of salinity during specific growth stages.

Finger millet (*Eleusine coracana* Gaertn.), commonly known as ragi and African millet, is grown under varied agro-climatic conditions, mostly in countries in Africa and Asia. It is important staple millet and cultivated mostly as a rain fed crop in India under diverse production environments. In India the crop is grown in an area of 1.6 million ha with a production of 2.1 million t and productivity of 1.3 t ha^{-1} (Krishnappa *et al.*, 2009). In finger millet grain, total fiber (22.0%) is comparatively higher than other cereal grains (*e.g.* 12.6%, 4.6%, 12.8% and 13.4% in wheat, rice, sorghum and maize, respectively). Excellent grain storage quality attributable to polyphenol content makes finger millet an ideal cereal for famine reserves. The aim of present study to compare the ameliorative effects of nitrogen application on vegetative growth and productivity of *Eleusine coracana* under saline conditions.

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MATERIALS AND METHODS

The effect of nitrogen application were observed in two varieties of finger millet *viz.* VL-315 (salt promising) and Local Hills (salt sensitive) under saline water irrigation. The Pure line seeds of both varieties were procured from Govind