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RESEARCH PAPER

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A Review on Recent Development of Fluorescent Chemosensor for Water (H₂O)

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ABSTRACT

Recently many advanced research in the field of sensing of trace amount of water in organic solvents by fluorogenic probes have made an interest area to the researchers. Fluorescence detection technique is highly attractive because of its high sensitivity and real-time approach almost in a non-destructive way. This review article covers the developments of different types of fluorogenic probes reported by different groups of scientists, their sensing mechanism, sensitivity, potential applications from 2005 to till date. Currently this area is in its early development stages and expected continuous improvements.

Keywords: Fluorogenic Probe, Sensing and Sensitivity.

INTRODUCTION

Qualitative detection and quantitative estimation of trace amount of water mainly in various organic solvents has been a promising area for the researcher during the past few decades because water is considered as the most common impurity in organic solvents which has vital significance in chemical reactions (Wang et al., 2005), many industrial applications (Nussbaum et al., 2009), environmental monitoring etc. In organometallic chemistry, the existence of small amount of water may lead to the quenching of the reactions, lowering the selectivity of a particular compound the reaction or lowering the yields of the products and sometime causes explosions in the reaction mixture. Further in industrial process, presence of trace amount of water may lead to failure of engine and damage it. At the beginning majority of the reports for the quantitative determination of water are based on electrochemical and electrophysical sensing mechanisms (Tsamis et al., 2005) but these methods suffers a lot in lack of portability and precision. Karl Fisher method of titration (Fischer, 1935) and gas chromatography (Liang, 1990) is the most popular methods for the quantitative determination of trace amount of water in organic solvents. However this method has the disadvantage in real time sample preparations, using toxic reagents (i.e., CH₃OH, I₂ and SO₂), long experiment time and requirements of special instruments. Recently developments of fluorescence based sensors for the detection of trace amount of water in organic solvents have gained immense interest because of their simple operation, high sensitivity and high detection limit. These fluorescence based water sensors are of two types viz. 'on-off' and 'off-on' type according to their switching mode: 'on-off' (Niu et al., 2006) and 'off-on' (Coyama et al., 2009) sensors. Between the two systems, the off-on system where fluorescence intensity increases with increasing water content in organic solvents is much more efficient system in determining water in organic solvents. Aggregation-induced emission (AIE), has become a hot research topic because of its unique optical properties and extensive applications (Hong et al., 2009). The first report of AIE-active sensor comes from Tang's

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Prediction of charge transfer transition energies of the molecular complexes of PMDA with a series of methylbenzenes by TDDFT

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The functionals M06, M06-L, M06-2X and B3LYP were used to establish molecular complex formation and to calculate CT transition energies of the molecular complexes of PMDA with benzene, toluene, *p*-xylene, mesitylene and durene in CCl_4 medium by a TDDFT calculation under the PCM formalism. Using the ground state optimized geometries as starting points, attempts were made to calculate the CT transition energies of the molecular complexes by TDDFT(M-31)+G(d,p). The calculated $h\nu_{\text{CT}}$ values obtained by the different functionals were compared among themselves and also with experimentally reported values. Agreement of the calculated CT transition energies with experimental values is reasonably good, M06 results being closest. The lowest energy CT absorption bands as calculated by TDDFT were found to abide by the theory of charge transfer complexes given by Mulliken (J. Am. Chem. Soc., 1952, 74, 811).

Keywords: TDDFT, charge transfer, PMDA complex, M06 functionals, Mulliken's theory.

Introduction

Transition energies and excited state properties of molecules are generally calculated by the time dependent density functional theory (TDDFT)¹⁻⁵. It is well known that some inherent deficiencies⁶⁻¹⁰ of the traditional functionals like B3LYP, MPW1PW91, PBE etc., make them unreliable for the prediction of electronic transition energies of charge transfer (CT) complexes (non-covalently bonded molecular adducts) by TDDFT. It has been found that the M06 family of functionals¹¹⁻¹⁴ developed by Truhlar et al. overcome these deficiencies to a great extent by reducing the self-interaction and self-correlation errors through inclusion of the kinetic energy density in the generalized gradient approximations (GGA) and also different percentages of Hartree-Fock exchange. Such functionals have been shown to work well in case of weak interactions¹⁵⁻¹⁸. Suitability of these functionals was tested for prediction of electronic excitation energies of some main group (benchmark) molecules and also of the $\text{C}_2\text{H}_4 \cdots \text{C}_2\text{F}_4$ CT complex. Performance of these functionals in predicting the CT transition energies of TCNE with two series of electron donor molecules have been tested fairly recently^{19,20} and have been found to be reasonably suitable.

According to Mulliken's theory²¹ the molecule of a charge transfer complex is a linear combination of a 'no-bond' and a

'dative' structure; the ground and excited states of such a complex formed between a donor (*D*) and an acceptor (*A*) is described by the wave functions

$$\begin{aligned}\Psi_{\text{ground}} &= a\psi(D \cdots A) + b\psi(D^+ \cdots A^-), \quad a \gg b \\ \Psi_{\text{excited}} &= a^*\psi(D \cdots A) + b^*\psi(D^+ \cdots A^-), \quad b^* \gg a^*\end{aligned}$$

where $D \cdots A$ means a 'no-bond' structure in which the molecules *D* and *A* are held together by van der Waals type of interactions and $D^+ \cdots A^-$ is a 'dative' structure formed by the transfer of an electron from *D* to *A*, the resulting ions being held by Coulombic interaction. The ground state is dominated by the 'no-bond' structure while in the excited state the 'dative' form predominates. The charge transfer transition energy corresponds to the transition



Using this model Mulliken²¹ arrived at the following expression for the charge transfer transition energy:

$$h\nu_{\text{CT}} = I_D^0 - C_1 + \frac{C_2}{I_D^0 - C_1} \quad (1)$$

$$C_1 = E_A^0 + G_1 + G_0 \quad (2)$$

Here E_A^0 = vertical electron affinity of the acceptor (PMDA),

NHC Catalyzed Dual Stetter Reaction: A Mild Cascade Annulation for the Syntheses of Naphthoquinones, Isoflavanones, and Sugar-Based Chiral Analogues

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Supporting Information

ABSTRACT: The *N*-heterocycle carbene (NHC)-catalyzed dual Stetter cascade reaction is discovered through coupling of β -nitrostyrene with phthalaldehyde under mild conditions to furnish valuable aryl-naphthoquinones. The generality of this new reaction is validated through the development of a C–C and O–C bond forming Stetter cascade reaction using salicylaldehydes to obtain functionalized dihydroisoflavanones. The mild NHC organocatalysis is successfully employed for the construction of optically pure sugar-based naphthoquinones and dihydroisoflavanones. Herein, NHC is found as a unique and powerful organocatalyst to construct homoatomic C–C cross-coupling, heteroatomic O–C bond formation, and cascade cyclization utilizing $\text{P}(\text{O})_3$ as a leaving group at ambient temperature. A mechanistic pathway of the new metal-free catalysis is predicted on the basis of our ESI-MS study of the ongoing reaction and literature.



INTRODUCTION

The *N*-heterocycle carbenes (NHCs) have gained enormous attention in the last couple of decades because of their remarkable physical, chemical, and selective properties, leading to find diverse applications as outstanding catalysts, useful ligands, radical stabilizers, substrate activators, oxidative and reductive reagents, upbulking, polymers, liquid crystals, MOFs, photoinactive and bioactive materials, and pharmaceuticals.¹ Moreover, organocatalysis of NHCs especially for activation of enal compounds leads to the development of a wide range of new reactions,² including lactone and lactam formations,³ cycloadditions,⁴ Michael additions,⁵ γ -amino alkylation of α,β -unsaturated esters,⁶ and self-redox catalysis.⁷ Notably, NHCs were frequently employed for fundamental organic transformations such as esterification, transesterification, arylation reaction, 1,2-addition reactions, *aza*-Morita–Boyls–Hillman reaction, activation of silylated nucleophiles, the transformation of ketenes, cross-coupling, isomerization, and asymmetric processes.^{1,8} The organocatalysis reactions were efficiently utilized for the umpolung of aldehydes to generate acyl anion intermediates and developed fundamental transformations such as benzoin condensation and Stetter reaction.⁹ The Stetter reactions with α,β -unsaturated carbonyls, α,β -unsaturated esters, α,β -unsaturated nitriles, and β -nitrostyrenes were studied to access 1,4-dicarbonyl compounds, 4-ketocarboxylates, nitriles, and nitroalkenes.^{10–11} Interestingly Cheng^{10d} and Hong^{12d} et al. in their separate reports described NHC-catalyzed aldehydes-nitrostyrene C–C coupling to produce β -nitroketones. NHC-catalyzed cascade reactions

employing the umpolung Stetter concept received growing attention among the scientific community because of its utility for easy construction of targeted core structures present in natural products.¹²

A cascade reaction is an attractive synthetic tool, in which more than one bond forming event is performed, avoiding cost-effective and time-consuming protection–deprotection, isolation of intermediates, waste handling, and poor selectivity through coupling of two or more substrates under the same reaction conditions with the same catalyst. The cascade NHC organocatalysis employing the umpolung concept is still limited. Kovis et al. reported a tandem NHC-catalyzed direct synthesis of cyclopentane derivatives through Michael addition followed by the Stetter reaction under the basic conditions.¹³ Gravel and co-workers established an NHC-catalyzed Stetter–Michael reaction using benzene-1,2-dienyl derivatives and aldehydes to achieve indane diastereomers.^{13a} A Stetter–aldol reaction between phthalaldehyde and alkene with NHC was performed by Ye and colleagues to furnish the diastereoselective synthesis of 4-hydroxytetralones.^{14b} Inspired by the NHC catalysis, we envisioned that a phthalaldehyde (**1**) may react with a metal-free NHC to form a “ Breslow intermediate”, which may couple with a suitable Michael acceptor (**2**), leading to the Stetter adduct (**3**, eq 1, Scheme 1). The domino second Stetter cascade (**3**) may trigger off the naphthoquinone derivative (**4**) through a real oxidative

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Strategies for Employee Retention and The Influencing Factors: A Study with Reference to the Selected IT Companies in West Bengal



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Abstract

Employee Retention is one of the key challenges faced by IT Organizations in India. Retaining the talented employee as high turnover is serious concern for organizations now days. Employees retaining is the most imperative target for the organization because hiring of qualified candidates is essential for organization but their retention is more important than hiring because a huge amount is spending on the orientation and training of the new employees. When employees leave the job, organization lost not only employees, but also lost the customers and clients who were loyal with the employees, knowledge of production. There are many factors that can make the employees to stay long back and perform well. The main aim of this study is to highlight the different factors that affect the retention of employees and formulate some strategies for retention of employees working in IT companies, West Bengal and also indicate some suggestions and recommendations for employees' retention in IT sector.

Keywords: Employee, Retention, Strategies, IT Companies.

Introduction

One of the most critical issues facing organizations today is to retain the employees especially in the Information Technology (IT) sector. Even though more and more IT companies are coming up, the turnover rate is considerably high compared to other industries. Gone are the days when organizations could hire the best talent and expect them to stay on board until retirement. When the organization looks for a replacement there is certain amount of intangible costs in addition to loss in productivity. The information technology industry is faced with a shrinking pool of skilled employees causing demand to increase for these employees. This places organisations under pressure to devise retention strategies to retain these employees. Retaining employees is very important in any organization. Employee retention can be termed as the process when an employee is encouraged and agreed to remain in the same organization for a long or maximum period of time. It becomes more pertinent in the information Technology industry to retain the key performers. Successful organizations recognize the worth of retaining their best employees and continuously look for innovative ways to do so. Employees leave for various reasons which include: ambiguous and unchallenging role, poor supervision, inadequate peer support, and limited career growth, lack of recognition, limited control over work, perceived pay inequity and perception of more favourable opportunities in other companies. Employee retention strategies should be taken into account so that an individual stays in an organization for the maximum period of time. The organization is completely at loss when these employees leave. Losing employees means losing knowledge, capital, skills, and experience. Loss of talented employees is loss of productivity and revenue. The Indian IT sector attracts foreign direct investment (FDI) but if employees are not retained by the organizations then it will affect the employment relationship with the foreign countries and it will affect the economic growth of the country.

Aim of the Study

The paper tried to make an attempt to investigate and analyze those factors which influenced directly or indirectly on the decision taken by the employees to stay long back in the present company and accordingly to perform well and also formulate and provide some strategies for the

Analyzing Profitability of Indian Pharmaceutical Sector: A Comparative Study of Select Domestic and Multinational Companies

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Pharmaceutical Industry, Financial Performance, Multinational, Domestic

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ABSTRACT

In mid-1991, the liberalization process that has been taken by the government of India, made a path to multinational companies (MNCs) to access the Indian markets resulting in tremendous competition in market. With the change in the economic scenario, a paradigm change in the Indian pharmaceutical industry has also become inevitable. International and national level mergers, acquisitions and takeovers have now become a common phenomenon in the pharmaceutical industry. In coming days, with the help of international financial companies the MNCs may capture and take control of Indian companies to exercise control over the Indian market. To match the situation created by international mergers and takeovers, Indian companies are adopting the same path, some of them have been able to adapt themselves to the new situation while the others are struggling. So, it is high time to measure the profitability of the industry. In this backdrop, the present study seeks to make a comparison, particularly in respect of performance of different financial aspects, between multinational and domestic companies in the Indian pharmaceutical industry during the fifteen year period from 2003-04 to 2017-18. The sample size of the study consists of twenty pharmaceutical companies by taking ten companies from each of the multinational and domestic sectors. The issue has been tackled using appropriate statistical measures.

1. Introduction

Presently the pharmaceutical industry is recognized as one of the most flourishing industries in India. Its contribution towards the growth, development and welfare of the liberalized economy as well as forming a strong base of human resource in a country cannot be ignored. In fact, Indian pharmaceutical industry has been contributing to the social well-being of the country by performing a diversified role of inventing, developing, manufacturing and also distributing quality medicines. Since 1991, the globalization and liberalization process of the Indian economy has made a way to multinational companies to access the Indian markets resulting in increased competition in market place. Liberalization of the Indian economy has also exposed the Indian pharmaceutical industry to such intensified competition from multinational corporations. The domestic companies have been forced to change their policies for managing difficulties arising out of tremendous competition in the post-liberalization era. Some of them have been able to adjust themselves to the new situation while others failed to do so. Besides this, Indian pharmaceutical industry has experienced significant changes due to India's signing of Trade Related Intellectual Property Rights System agreement. In fact, the advent of TRIPS (WTO since 1995) has induced a series of changes in this industry. To be noted that the permission granted by the Central Government to the multinational companies to come to India with 100 per cent equity has also added more challenge to the domestic ones and hence, they have tried to continue their traditional practices but forced to reorient their strategies for managing difficulties arising out of tremendous competition in the post-liberalization era. In this backdrop, the present study seeks to make a comparison, in respect of earning capability, between multinational and domestic companies in the Indian

pharmaceutical sector during the period 2003-04 to 2017-18. The sample size of the study consists of twenty pharmaceutical companies by taking ten companies from each of the multinational and domestic sectors. The issue has been tackled using appropriate statistical measures.

2. Objectives and scope of the study

1. To compare the profitability of the selected multinational companies with that of the selected domestic ones.
2. To identify the best performer among the selected pharmaceutical companies in respect of earning capability.

3. Research methodology

The study is based on twenty companies in Indian pharmaceutical industry by taking ten leading companies from each of the multinational and domestic sectors. While making this selection, net sales revenue was considered as the selection criterion. The list of the companies displayed in Appendix. In this study purposive sampling procedure was followed. The data of the ten selected multinational companies and ten selected domestic companies in the Indian pharmaceutical industry for the period 2003-04 to 2017-18, used in this study were collected from secondary source i.e. Capitaline Corporate Database of Capital Market Publishers (I) Ltd. Mumbai. The data used in this study pertains to the calendar year figures of each year under study. Other secondary sources used in this study were CMIC reports, books, magazines, journals and research reports. For analyzing the data used in this study, simple mathematical tools like percentages, averages, ratios were used. The ratios relating to

AN OVERVIEW OF FAIR VALUE ACCOUNTING

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ABSTRACT

Accounting standard-setters of the world have already emphasized on the concept of Fair Value Accounting (FVA) and also implemented this concept in the accounting standards. There is a prominent controversy between fair value-based financial statements and historical cost-based financial statements regarding their contribution towards giving better view of the financial performance and position of a business to its stakeholders. Against this backdrop, the present paper sketches an overview of the fair-value based accounting system and concludes that there is an urgent need for introduction of uniform model of fair value measurement by making a joint effort by the leading accounting standard-setting bodies of the world in order to minimize discrepancies in financial reporting.

KEYWORDS: Fair Value Accounting, Financial Reporting, Accounting Standard

I. Introduction:

Financial position should disclose firms' present and future ability to generate favorable cash flows which is the object of prime interest to stakeholders of financial statements. But the historical cost-based financial statements cannot satisfy the real objective of preparing financial statements. In fact, they fail to show 'true and fair' view of the financial statements. It is well accepted that most of the items depicted in the financial statements under the existing historical cost-based accounting practices are not properly measured. In order to overcome these inherent disadvantages, some steps have been taken from time to time by different accounting experts to

A Comparative Study of Dividend Policies of Selected Domestic and Multinational Companies in Indian Pharmaceutical Sector

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Abstract

During the post-liberalization period, reorientations in Indian economy have forced business firms to modernize their management practices. The domestic companies have failed to maintain their traditional practices as they have been highly exposed to the foreign competitors. Framing suitable dividend policy is one of the most crucial issues that the management of a company should consider with due importance in order to survive in today's competitive business environment. There is no strict rule or guideline to decide as to what portion of the profit should be distributed as dividend and what portion should be kept in the business. An inefficient dividend policy may put the company into financial distress. Both conservative and liberal dividend policies have some positive as well as negative impacts. Dividend policy that ensures shareholders' wealth maximization is treated as the ideal dividend policy. In fact, an ideal dividend policy which is influenced by a good number of internal as well as external factors is very crucial to improve the value of the company. In this backdrop, the present paper seeks to examine the dividend payout trends and the degree of influence of some major internal factors on dividend policy of both domestic and multinational pharmaceutical companies in Indian pharmaceutical industry during the period 1998-99 to 2012-13. The paper also makes a comparison, in respect of dividend payout trend and the degree of influence of some important internal factors on dividend policy, between multinational and domestic companies in the Indian pharmaceutical industry during the same period. In this study, ten multinational and ten domestic companies in the Indian pharmaceutical sector have been considered. The issues analyzed in this study have been tackled using relevant statistical tools and techniques.

Key words: Pharmaceutical Industry, Multinational, Domestic Companies, Dividend Payout

I. Introduction:

Dividend policy is one of the most crucial areas of financial management. An ideal dividend policy should fulfill the organizational objective of shareholders' wealth maximization. If the company retains a huge portion of earnings for possible expansion and modernization in future, shareholders may get deprived in short run due to insufficient dividend. On the other hand, if the company distributes a substantial portion / full of the profits by way of dividend, the company may earn the confidence of the shareholders in short run, but it may cause serious hindrance in long term growth of the company. In fact, an ideal dividend policy

Liquidity-Profitability Relationship of Indian IT Sector

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ABSTRACT

Implementation of efficient financial management in the organization is the prime challenge of every business. The efficiency of an organization is measured on the basis of certain parameters like liquidity, profitability etc. Liquidity management is one of the most important factors that influences the development, survival and growth of any business organization. In the backdrop, present study makes an attempt to assess the influence of liquidity management on profitability of the selected companies of Indian information technology sector.

1. Introduction

In the modern business world, prime challenge of every business organization is to maintain efficient financial management. The efficiency of an organization is measured in terms of certain parameters such as profitability, liquidity, efficiency of assets management etc. One of them is liquidity which is a pre-requisite for the development, survival and growth of any business organization. Success of any enterprise is to manage current assets and current liabilities in such a manner that an enterprise eliminates the risk of inability to meet the matured short term obligations on the one hand and avoid excessive investment in these assets on the other hand. In fact, liquidity management has a significant impact on profitability of any business. In the light of the above, in this study an attempt was made to assess the influence of liquidity management on profitability of selected companies in information technology (IT) sector in India. The data of the 101 selected Indian IT companies used in this study for the period from 2001 – 02 to 2015-16 were collected from the secondary source i.e. 'Capitaline Corporate Database' of Capital Market Publishers (P) Ltd., Mumbai.

2. Literature Survey

A brief review of the different efforts of research in the field of liquidity management of Indian IT companies was analysed in the following studies:

Jeethi (2016) in his study made an attempt to analyze and evaluate the liquidity position of the selected five Indian IT companies for the period from 2004-05 to 2013-14. He concluded that financial health of an enterprise depends on the profitability as well as liquidity position of the concern.

Sumathi and Narasimhaiah(2016) examined the effect of different components of working capital of the Infosys Ltd. on its profitability during the period from 2011 to 2015. One of the significant outcomes of the study was that overall working capital position of the company was satisfactory. They suggested that firm can increase the value to stock shareholders by decreasing the credit period allowed and also

quoted more returns for their shareholders by improving the inventory position.

Kumar and Agarwal (2015) carried out a study to analyze the efficiency of liquidity management of the three firms from Indian information technology industry for the period 2007 to 2013. The relationship between liquidity and profitability of the selected firms was examined through correlation coefficient. In their study, t-test was done to determine the impact of working capital management on profitability. They concluded that there was no significant impact of working capital on profitability of firms in information technology industry under study.

Kaur and Singh (2013) in their study made an empirical investigation regarding the relationship between liquidity and profitability and also examined the impact of working capital management on profitability of 14 companies in Indian IT sector for the period 2000 to 2010. The study was based on secondary database collected from CMIE database. Karl Pearson correlation and regression analysis were used to analyze data of the study. The study revealed that there was a strong significant relationship between the liquidity and profitability of the selected companies during the study period.

ChandamywardPilladia (2012) conducted a study to make a comparative analysis of cash management, as well as, working capital position of two major companies (i.e. Infosys Ltd. and Wipro Ltd.) in Indian IT sector for the period 2001-02 to 2009-09. The study was based on secondary database which was collected from various relevant websites and magazines. Simple mathematical and statistical tools and techniques were used to analyze the data under the study. The study revealed that quick ratio and cash ratio of Infosys Ltd. were higher than the Wipro Ltd. during the study period.

Kasisomayajula(2012) made a study on liquidity and the working capital management of the Indian Banking and IT industries for the period 2000-01 to 2009-10. In his study, liquidity and profitability aspects of selected companies were assessed through analysis and interpretation of selected liquidity ratios (i.e. demand deposit to total deposit, liquid

Rural Life as Depicted in Kauṭilya's *Arthaśāstra*

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Abstract:

India is a vast country with a majority of its total population living in the villages. The Indian society is predominantly divided into two divisions like the rural and the urban society. Villages have always been an integral part of society in India. No specific timeframe can be mentioned about the conception of villages in India. However, the concept of the village was not present there in the ancient period. The Indus Valley civilization is so far known to be the ancient civilization in India and it mainly comprised two cities of Harappa and Mohenjodaro. However, the concept of the village seems to be absent during this era. The history of Indian villages, in fact, goes back to the Vedic era when the villages were a cluster of houses and the surrounding land was cultivated by the villagers. The concept of villages in India flourished during the late Vedic era or during the reign of the Mauryas. The Maurya dynasty was founded by Chandragupta Maurya during 323 BC and the villages were a predominant part of the Indian social system at that time. The most reliable source to know about Mauryan era is Kauṭilya's *Arthaśāstra*. The *Arthaśāstra* is a text on political science and is not primarily concerned with society and its organization.

This paper will focus on the Rural Life as depicted by Kauṭilya in his *Arthaśāstra* after discussing the Kauṭilyan outlook of settlement and formation of the villages, the daily life of the people, particularly how they lived in the villages, what they ate and drink and how they spent their leisure.

Key Words: Rural life, Ancient India, Kauṭilya, *Arthaśāstra*.

Introduction

The village has been from its inception, one of the primary units in which human activities are socially arranged. Throughout the Indian history, average people of ancient India were a countryman.¹ It is known to be a great antiquity, and came into existence when agriculture became the economic basis of subsistence of group life, which archaeological evidence shows, first began in the Neolithic age. The earliest archaeological evidence of a village in the Indian subcontinent is at Mehrgarh as early as 6th millennium BC.² The Indus Valley civilization is so far known to be the ancient civilization in India and it mainly comprised two cities of Harappa and Mohenjodaro. Many settlements have been brought to light in archaeological explorations and excavations. However, the concept of the village seems to be absent during this era. The history of Indian villages, in fact, goes back to the Vedic era when the kingdoms comprised a major city and several villages. The villages were a cluster of houses and the surrounding land was cultivated by the villagers. The *Rgvedic* people led a pastoral-cum-agricultural life. A Vedic village generally comprised a group of families of a single clan.³ Villages were situated close to each other and some far apart. Each family lived

श्रीमद्भागवते चतुर्विंशतिगुरुवः

प्रबन्धसारः-

"गुरोरेव परं ब्रह्म गुरोरेव परमं तपः। तत्त्वज्ञानात् परं नास्ति तस्मै श्रीगुरवे नमः"॥ तेन ज्ञानेन परमसाक्षात्कारो भवति पुरुषो जननमरणं चिह्नन्ति, बीदनं सार्वकं भवति तदेव गुरोः परब्रह्मणः। अदो धेनुगुरुः भवति नो जन्मदात्री जननी, ततः परं शिक्षागुरो दीक्षागुरुश्चेति। जगत्पस्मिन् ब्रह्मः स्थावराः जलमाद्य सन्ति। तेषां व्यवहारिकजीवनेभ्यः पुरोः शिक्षणीयमस्ति। सा शिक्षा पुरुषजीवने पवित्रयति। पुरुषस्य साधनं परेष्टुं करोति, पुरुषं बोधयति सन्निकटमाययति। अतस्तोऽपि पुरुषस्य गुरोः भवन्ति। किञ्च गुरोरेव सम्मानाहो भवन्ति। एवं चतुर्विंशतिः गुरोः दृश्यन्ते श्रीमद्भागवतपुराणे एकादशस्कन्धे अवधूतब्राह्मणचरिते। अवधूतब्राह्मणस्तस्य व्यवहारेकजीवने साधनजीवने चतुर्विंशतिगुरुन् प्राप्तवान्। तेषां यत् शिक्षणीयमस्ति तेन स्वजीवने सम्यक्त्वा पातितम्। किञ्च तान् गुरुरूपेण स्वीकृतवान्। तेषां तु दुर्गुणः, सुगुणश्चास्ति। किन्तु स दुर्गुणं विहाय केवलं सुगुणं स्वीकृत्वा स्वजीवने साधनं सम्पादितवान्। एतदेव प्रकृतशेषस्य तद्वत् शिष्यः केवलं गुरोः सुगुणं स्वीकरोति न तु दुर्गुणमिति। एवं चतुर्विंशतिगुरुभ्यः प्राप्या शिक्षया यथायथसाधनेन अवधूतब्राह्मण आत्मज्ञानं सम्पादितवान्। यद्ः अवधूतब्राह्मणं पृष्ठवान् यत् तेन केन प्रकारेणात्मज्ञानं सम्पादितम्। तस्योत्तरत्वेन अवधूतब्राह्मणः तस्य चतुर्विंशतिगुरुणां माहृत्यमवर्णयत्। कथं तेषां पञ्चाशत् किं शिक्षितवान्, तेषां को गुणः स्वजीवने साधनत्वेन स्वीकृतः। किञ्च तेषां गुणः कथं पुरुषस्य जीवने प्रयोगं साधयति तत् सर्वं पृष्ट्वा तस्य हृदये यत् प्रति अभोषत्। अवधूतब्राह्मणश्चतुर्विंशतिगुरुभ्यः किं शिक्षितवान् कथं ते तस्य गुरवोऽभवन् इत्येतत् सर्वं श्रीमद्भागवतविशा अवोचन्। कर्तुं प्रयते।

उपौद्घातः-

पुराणेषु यत्र वर्तते तत् पुराणमिति वक्ष्यते। पुराणं किन्तु सर्वदा नवीनमिव प्रतिभाति। एतेषां सर्वेषां मूलोद्गर्भो भवति वेदः। वेदस्यैव नाता कथा, आख्यायिका, इतिवृत्तः, रहस्यम्, आध्यात्मिकचिन्तनं तत्त्वमित्येतत् सर्वं जनसन्मुखे प्रत्यक्षेण अपूर्वरोमाञ्चकरकथया प्रतिपादनार्थं पुराणस्याविर्भावः। पुराणे सूततत्सर्गः, प्रतिसर्गो बंशो वंशानुचरितं, सन्वन्तरमित्येतत् सर्वं वर्णितोच्यते। तदेव पुराणस्य सत्रणमाह-

"सर्गश्च प्रतिसर्गश्च बंशो सन्वन्तराणि च।

वंशानुचरितं चैव पुराणं पञ्चलक्षणम्"॥

वेदस्यापौरुषेयत्वम्

सुजित-परामानिकः

पश्य देवस्य कार्यं न नमर न जीर्यते इति वेदवचनं वेदस्य नित्वत्वं प्रतिपादयति, किञ्च ऋषिर्दर्शनाद्, ऋषयो मन्त्रद्रष्टारो भवन्ति इति शास्त्रेषु दृश्यते, तस्माद् ऋषयो द्रष्टारः (साक्षात्कर्तारः) वेदस्य सन्ति, न तु कर्तारः । वेदः यदि नित्यः तर्हि अपौरुषेयस्तु भवत्येव परमिह खलु शास्त्राकाराणां शास्त्रभेदेन वेदस्य पौरुषेयत्वापौरुषेयत्वनिगमे मतैक्यं नस्ति। तत्रतावत् मीमांसकाः अलिखन्ते यत् वेदः अपौरुषेयः इति, परं नैयायिका एतन्नसहन्ते। ते आहुः शब्दस्य अनित्यत्वात् वेदः शब्दराशिः सोऽपि अनित्यः इति संगिरन्ते । एवं गते सति कतरत् मतं सत्यमिति निर्णेतुं शास्त्रीयपद्धत्या सम्भावितपूर्वपक्षान् समुत्थाप्य क्रमशः सप्रमाणं समाधानं विधानं कश्चन पयवो विहितोऽत्र लेखे ।

: सम्पादकः

प्रबन्धसारः-

भारतीयदर्शनसाहित्ये पञ्चास्तिकदर्शनानि त्रीणि नास्तिकदर्शनानि प्रसिद्धानि सन्ति। आस्तिकदर्शनेषु मीमांसादर्शनमन्यतमम्। भारतीयदर्शनसाहित्ये मीमांसादर्शनस्यातिप्रसभं स्थानमस्ति वेदवाक्यस्य तात्पर्यार्थनिर्णये दर्शनस्यास्य माहात्म्यपूर्णं स्थानमस्ति। दर्शनेऽस्मिन् बहवो वादाः सिद्धान्ताश्च प्रचलिताः सन्ति। बहुषु सिद्धान्तेषु वेदस्यापौरुषेयत्वं कश्चन तेषां निद्धान्तः। तेषां मते वेदस्य रचयिता नास्ति नाप्युपजभ्यते। ऋषयो, मुनयो वेदस्य रचयितारो न भवन्ति ते तु वेदमन्त्राणां द्रष्टारः। वेदस्तु नित्यः शाश्वतोऽनादिः। मीमांसकाः “यः कल्पः सः पूर्वकल्पः” इति न्यायेन वेदस्यापौरुषेयत्वं प्रतिपादयन्ति। किन्तु

रघुवंशमहाकाव्ये इन्द्रादिदेवकृतविष्णुस्तुतौ अद्वैतचिन्तनम् सुजितपरामानिकः*

उपोद्घातः

संस्कृतसाहित्यप्रपञ्चे पञ्चानां काव्यानां महाकाव्यत्वेन परिगणनमस्ति। तेषु पञ्चसु महाकाव्येषु द्वे काव्ये स्तः कविकुलगुरुशिरोमणिकालिदासस्य। स स्वप्रतिभया काव्यद्वयमिदं विरच्य संस्कृतसाहित्यस्य माहात्म्यम् इतोऽपि अवर्धयत्। येन कारणेन इदानीमपि संस्कृतसाहित्यस्य उज्ज्वलप्रदीपशिखा जाज्वल्यमाना दृश्यते। कविस्तु कान्तदर्शी, तस्य कर्म काव्यमित्युच्यते। संस्कृतसाहित्ये तु बहूनि काव्यानि सन्ति, किन्तु सर्वेषां काव्यानां महाकाव्याभिधेयत्वं नास्ति। महाकाव्यमिति अभिधानं श्रुत्वेव तत् काव्यं कियत् उत्कृष्टं, रमणीयम् आनन्ददायकमस्ति, किञ्च रसस्वादवमरितं तद् ज्ञायते। कालिदासस्य द्वयोः महाकाव्ययोः मध्ये एकं भवति “रघुवंशम्” अपरञ्च “कुमारसम्भवम्” इति। महाकाव्यद्वयमिदं कालिदासस्य विशिष्टप्रतिभायाः परिचायकम्। रघुवंशं महाकाव्यं तस्य अनवद्यकीर्तिः। यत्र सूर्यवंशीयानां राज्ञां कीर्तिः, किञ्च मर्यादापुरुषोत्तमस्य श्रीरामचन्द्रस्य उज्ज्वलजीवनचरित्रं, शौर्यं, वीर्यं, त्यागः, प्रशासनदक्षता इत्येतत् सर्वम् अत्र प्रामुख्येन वर्णितमस्ति। यस्य पठनेन पुरुषस्य मनसि नवीनचिन्तनं किञ्च प्रशान्तिश्चाविर्भवति। ग्रन्थोऽयं कविकुलगुरुणा रामायणम् आश्रित्य विरचितः। अतः स्वाभाविकतया ग्रन्थेऽस्मिन् भगवतो रामचन्द्रस्य जीवनगाथा तु भवेदेव। पुलस्त्यगोत्रात् उत्पन्नो राक्षसनृपो रावणः पितामहस्य बह्वर्णो वरेण अपराजेयः सन् सर्वान् प्रति अत्याचारं कुर्वन्नासीत्। स इन्द्रादिदेवान् अपि तस्य बलेन युद्धे पराजितवान्। पराजये प्राप्ते सति स्वर्गराज्यात् च्युताः विताडिता देवा रावणस्य विनाशाय वैकुण्ठलोकं विष्णुलोकं जग्मुः। ग्रीष्मकाले अतिसूर्यतापेन सन्तप्ता जनाः यथा शीतललायासंयुक्तवृक्षच्छायां ऋषन्ति। तद्वत् देवा अपि रावणस्यात्याचारेण ततः पराजयं प्राप्य तेषां दुःखं प्रशमयितुं वैकुण्ठलोकं क्षीरसमुद्रं जग्मुः।

तस्मिन्नवसरे देवाः पौलस्त्योपप्लुता हरिम्।

* सहायकाचार्यः, संस्कृतविभागे, आरामबागस्थिते नेताजिमहाविद्यालये

वेदान्ते पञ्चप्रमेयाणां विमर्शः

सुमित्र-वराणसिक

{प्रमाणपरं न्यायशास्त्रं, प्रमेयपरं वैशेषिकम् । न्यायशास्त्रे यथा प्रमाणानि प्रमेयानि च परिगणितानि न तथा वेदान्ते । न्यायवैशेषिकशास्त्रयोः प्रत्यक्षप्रमाणानां प्रामुख्येन विचार्यन्ते। न्यायतन्त्रं षोडशपदाश्च पौरोगायिताः ततः परं द्वादशप्रमेयपदाश्च। अतस्त्वेति प्रमाणानि च स्पष्टतया प्रतिपादितानि । लोकेऽस्मिन् यत्किञ्चित् अविरलं तत्सर्वं प्रमेयम् । वेदान्तशास्त्रे कति प्रमेयपदाश्च, सन्तीति उल्लेखो न विलोक्यते । तत्त्वबुधैस्तुभिः प्रमाणं प्रमेयञ्च ज्ञेयं येन यथाार्था प्रमितिः ज्ञेयः , एतन् मनसि कृत्य वेदान्ते निरीक्ष्य, परीक्ष्य कतिपयप्रमेयानि समासाद्य तानि निरूपयितुं लेखेऽस्मिन् विदुषा लेखकेन कश्चन यत्नोऽनुष्ठितः ब्रह्म, माया, ईश्वरः, हिरण्यगर्भः, प्राज्ञः, चैतन्यम् इति गद्यानि ध्रुवपूर्वाणि द्रष्टुं परं तत्ततः तेषां पारम्परिकं स्वरूपं किमिति विचारो विहितः । }

सम्पादकः

प्रबन्धसाराः

सर्वेस्मिन् शास्त्रे प्रमेया भवन्ति। तदेव शास्त्रस्य विवरणविषयो भवति। एवं वेदान्तशास्त्रेऽपि बहवः प्रमेयाः सन्ति। प्रबन्धेऽस्मिन् केवलं वेदान्तस्य पञ्चप्रमेयाणां संक्षिप्तरूपेण व्याख्यानं विहितमस्ति। ईश्वरः जगत्कर्ता, जगत्पालकः, सर्वज्ञः, अन्तर्बोधी इत्युच्यते। मायोपाधियुक्तं ब्रह्म ईश्वरोऽभिधीयते। ब्रह्म बीजशक्त्यनादिमायया जगदुत्पत्तिं प्रति कारणं भवति। विशुद्धसत्त्वप्रधाना भवति साया, किञ्च मत्तिनसत्त्वप्रधाना भवति अविद्या। एवं मायाविद्ययोर्वशीकर्ता भवति ईश्वरः। जगति सर्वत्र ब्रह्मणः सत्ता अभ्युपगम्यते। तस्यैव चित्स्वरूपं चैतन्यम् इत्युच्यते। चैतन्योपाधिरूपेण बहुविधा भवति। अयमद्रुपहितचैतन्यकारणामूढमन्थूलभेदेन ईश्वरो, हिरण्यगर्भो, विराट् सौम्यते। अयमद्रुपहितचैतन्यकारणामूढमन्थूलभेदेन प्राज्ञस्वैजसो विश्व सौम्यते। विद्यवचैतन्यं, उमावचैतन्यं, पद्मानुचैतन्यमिन्द्रुपाधेभेदेन पुनश्चैतन्यं विविधं भवति। माया तु दैवी विगुणान्तिका परमेश्वराधिशक्तिः। माया नापि सती नापि असती। अनिर्वचनीया कारणरूपा भवति इयं परमेश्वरीशक्तिः माया। यया विगुणात्मिकामायाशक्त्या जगत उत्पत्तिः वेचित्त्वञ्च भवति। ब्रह्म तु निर्गुणं निष्क्रियं, निरकारं भवति। मायोपाधिना ब्रह्म साया भवति। मायोपाधिना निर्गुणं ब्रह्म सद्रुपं ब्रह्म भवति तथा च ईश्वर इत्युच्यते।

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Growth of Generalize Iterated Entire Functions and Maximum Term

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Abstract— In this article, we consider comparative relative durations of entire functions and study comparative growth of the maximum term of generalize iterated entire functions with that of the maximum term of the related functions.

Keywords— Entire functions, maximum term, maximum modulus, iteration, order, lower order.

1. INTRODUCTION, DEFINITIONS AND NOTATIONS

Let $f(z) = \sum_{n=0}^{\infty} a_n z^n$ be an entire function defined in the open complex plane $\mathbb{C}$. Then $M(r, f) = \max_{|z|=r} |f(z)|$ and $\mu(r, f) = \max_n |a_n| r^n$ are respectively called the maximum modulus and maximum term of $f(z)$ on $|z| = r$. The following definitions are well known.

Definition 1.1 [9] The order ρ_f and lower order λ_f of a meromorphic function f are defined as

$$\rho_f = \limsup_{r \rightarrow \infty} \frac{\log \log M(r, f)}{\log r}$$

and

$$\lambda_f = \liminf_{r \rightarrow \infty} \frac{\log \log M(r, f)}{\log r}.$$

Notation 1.2 [7] Let $\log^{(m)} x = \log(\log^{(m-1)} x)$ and $\exp^{(m)} x = \exp(\exp^{(m-1)} x)$ for positive integer m where $\log^{(0)} x = x$ and $\exp^{(0)} x = x$.

A simple but useful relation between $M(r, f)$ and $\mu(r, f)$ is given in the following theorem.

Theorem 1.3 [8] Let f be a non-constant entire function defined in the open complex plane $\mathbb{C}$. Then for $0 < r < R$,

$$\mu(r, f) \leq M(r, f) \leq \frac{R}{R-r} \mu(R, f).$$

Taking $R = 2r$, for all sufficiently large values of r we have

$$\mu(r, f) \leq M(r, f) \leq 2\mu(2r, f) \quad (1)$$

Taking two times logarithms in (1) it is easy to verify that

$$\rho_f = \limsup_{r \rightarrow \infty} \frac{\log^{(2)} \mu(r, f)}{\log r}$$

and

$$\lambda_f = \liminf_{r \rightarrow \infty} \frac{\log^{(2)} \mu(r, f)}{\log r}.$$

Definition 1.4 [1] Let f and g be two entire functions defined in the open complex plane $\mathbb{C}$ and $d \in (0, 1)$. Now we define

$$f^{(n, d)}(z) = (1-d)g^{(n-1, d)}(z) + df(g^{(n-1, d)}(z))$$

and

$$g^{(n, d)}(z) = (1-d)f^{(n-1, d)}(z) + dg(f^{(n-1, d)}(z)),$$

for any positive integer $n \geq 2$ where $f^{(1, d)}(z) = (1-d)z + df(z)$ and $g^{(1, d)}(z) = (1-d)z + dg(z)$.

From the above definition clearly all $f^{(n, d)}$ and $g^{(n, d)}$ are entire functions.

Recently Banerjee and Dutta [2] Dutta [4], [5] study some results on comparative growth properties of the maximum term of iterated entire functions.

In this paper, we study growth properties of the maximum term of generalize iterated entire functions as compared to the growth of the maximum term of the related function to generalize some earlier results. Throughout the paper we denote by $f(z), g(z)$ etc. non-constant entire functions of order (lower order) $\rho_f, (\lambda_f), \rho_g, (\lambda_g)$ etc. We do not explain the standard notations and definitions of the theory of entire functions as those are available in [6], [9] and [10].

2. LEMMAS

The following lemmas will be needed in the sequel.

Lemma 2.1 [3] For any two non-constant entire functions f and g defined in the open complex plane $\mathbb{C}$,

On the Growth Properties of Generalized Iterated Entire Functions

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ABSTRACT

We study the generalized iteration of entire functions and investigate the growth properties of iterated entire functions of finite iterated order. Here we prove some results on the growth of iterated entire functions of finite iterated order. The results improve and generalize some earlier results.

AMS (2010) Subject Classification: 30D35.

Keywords: entire functions, growth, iteration.

1. INTRODUCTION, DEFINITIONS AND NOTATIONS

In order to study the growth properties of generalized iterated entire functions, it is very much necessary to mention some relevant notations and definitions. For standard notations and definitions we refer to¹.

Notation 1.1⁽²⁾ Let $\log^{[0]}r = r$, $\exp^{[0]}r = r$ and for positive integer p , $\log^{[p]}r = \log(\log^{[p-1]}r)$, $\exp^{[p]}r = \exp(\exp^{[p-1]}r)$.

Definition 1.2 The order $\rho_{[f]}$ and lower order $\lambda_{[f]}$ of a meromorphic function f is defined as

$$\rho_{[f]} = \limsup_{r \rightarrow \infty} \frac{\log T(r, f)}{\log r}$$

Growth and Generalized Iterated Functions

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Abstract. We study the growth properties of iterated entire functions. Considering entire functions of finite iterated order we prove some results on the growth properties of generalized iterations. The results improve and generalize some earlier results.

Keywords: Entire functions, growth, iteration.

1. INTRODUCTION, DEFINITIONS AND NOTATIONS

To study the growth properties of generalized iterated entire functions some relevant notations and definitions are needed. For standard definitions and notations we refer to [4].

Notation 1.1 [10] Let $\log^{(k)}t = t$, $\exp^{(k)}t = t$ and for positive integer k , $\log^{(k)}t = \log(\log^{(k-1)}t)$, $\exp^{(k)}t = \exp(\exp^{(k-1)}t)$.

Definition 1.2 The order $\rho_{(f)}$ and lower order $\lambda_{(f)}$ of a meromorphic function f is defined as

$$\rho_{(f)} = \limsup_{r \rightarrow \infty} \frac{\log T(r, f)}{\log r}$$

and

$$\lambda_{(f)} = \liminf_{r \rightarrow \infty} \frac{\log T(r, f)}{\log r}.$$

If f is an entire function, then one can easily verify that

$$\rho_{(f)} = \limsup_{r \rightarrow \infty} \frac{\log^{(2)} M(r, f)}{\log r}$$

and

$$\lambda_{(f)} = \liminf_{r \rightarrow \infty} \frac{\log^{(2)} M(r, f)}{\log r}.$$

Definition 1.3 A function $\lambda_{(f)}(r)$ is called a lower proximate order of a meromorphic function f if

- (i) $\lambda_{(f)}(r)$ is nonnegative and continuous for $r \geq r_0$, say;
- (ii) $\lambda_{(f)}(r)$ is differentiable for $r \geq r_0$ except possibly at isolated points at which $\lambda'_{(f)}(r-0)$ and $\lambda'_{(f)}(r+0)$ exist;
- (iii) $\lim_{r \rightarrow \infty} \lambda_{(f)}(r) = \lambda_{(f)} < \infty$;
- (iv) $\lim_{r \rightarrow \infty} r \lambda'_{(f)}(r) \log r = 0$

and

$$(v) \quad \liminf_{r \rightarrow \infty} \frac{T(r, f)}{r^{\lambda_{(f)}(r)}} = 1.$$

Definition 1.4 [1] Let f and g be two entire functions defined in the open complex plane and $c \in (0, 1]$. Then the generalized iterations of f with respect to g are defined as follows

$$\begin{aligned} f_{(1,g)}(x) &= (1-c)x + cf(x) \\ f_{(2,g)}(x) &= (1-c)g_{(1,g)}(x) + cf(g_{(1,g)}(x)) \\ f_{(3,g)}(x) &= (1-c)g_{(2,g)}(x) + cf(g_{(2,g)}(x)) \end{aligned}$$

$$f_{(n,g)}(x) = (1-c)g_{(n-1,g)}(x) + cf(g_{(n-1,g)}(x))$$

are so that

$$\begin{aligned} g_{(1,f)}(x) &= (1-c)x + cg(x) \\ g_{(2,f)}(x) &= (1-c)f_{(1,g)}(x) + cg(f_{(1,g)}(x)) \\ g_{(3,f)}(x) &= (1-c)f_{(2,g)}(x) + cg(f_{(2,g)}(x)) \end{aligned}$$

$$g_{(n,f)}(x) = (1-c)f_{(n-1,g)}(x) + cg(f_{(n-1,g)}(x)).$$

Clearly all $f_{(n,g)}(x)$ and $g_{(n,f)}(x)$ are entire functions.

For two non-constant entire functions $f(x)$ and $g(x)$, it is well known that

$$\log M(r, f(g)) \leq \log M(g(r, g), f). \quad (1)$$

Let $f(x)$ and $g(x)$ be any two transcendental entire functions defined in the open complex plane $\mathbb{C}$. J. Clunie [3] proved that $\lim_{r \rightarrow \infty} \frac{\log T(r, f \circ g)}{T(r, f)} = \infty$ and $\lim_{r \rightarrow \infty} \frac{\log T(r, f \circ g)}{T(r, g)} = 0$. In 1985, Singh [11] proved some comparative growth properties of $\log T(r, f \circ g)$ and $T(r, f)$. After this Lahiri [6] proved some results on the comparative growth of $\log T(r, f \circ g)$ and $T(r, g)$.

Recently Lahiri and Datta [7] made a close investigation on the comparative growth properties of $\log T(r, f \circ g)$ and $T(r, g)$. They also proved some results on the comparative growth properties of $\log \log T(r, f \circ g)$ and $T(r, f^{(k)})$. In 2011, Banerjee and Datta [2] proved some results on comparative growth of iterated entire functions which improve some earlier results.

বাংলার বাউল সাধনায় সুফি ও বৈষ্ণব সাধনার প্রভাব গনতা খাঁ

পল্লীর জীবনপ্রবাহের সঙ্গে বাউল বৈষ্ণবী ও ফকিরদের একটা যোগসূত্র আছে। সন্ধ্যাবেলায় কখনো হাতে 'একতারা', কখনো কোমরে 'ডুগি', কখনো 'গুবগুনি' আবার কখনো বা বগলে 'সরিষা' বা 'বেহালা' নিয়ে বাউলরা পল্লীর গৃহে গৃহে ভক্তিমূলক, দেহতত্ত্বের গান, রাধাকৃষ্ণের বা গৌরলীলার গান করে ভিক্ষাবৃত্তি করে বেড়ায়। কালের প্রবাহে বাংলার ইতিহাসের নানা দ্রব্য ও অপ্রত্যক্ষ গতিশ্রোতে সনাজের নানা রূপান্তরের ফলে বাউল সাধনার উদ্ভব হয়েছিল এবং তার বিস্তৃতিও ঘটেছিল। আবার সনাজের গতিশ্রোতধারা পথে তার বিলোপায়িত ঘটেছে সনাজের রূপান্তরের সঙ্গে সঙ্গে। বাউল সাধনার উদ্ভবের মূল যদি ধরা হয় গুপ্তযুগ পূর্ব মহলে সপ্তদশ শতাব্দী পর্যন্ত বাংলার ও বাঙালি জাতির ধর্ম ও সংস্কৃতিতে, ইতিহাসে, জাতির ধর্মের উপাদানে ও তার বৈশিষ্ট্যে বাউলদের সম্প্রদায় পাওয়া যাবে। বাউল সম্প্রদায়ের মৌলিক বৈষ্ণব সহজিয়া সম্প্রদায়, সুফি আউলিয়া সম্প্রদায় এবং শৈব নাপদর্ম, যোগতন্ত্র, হর্যোগ প্রভৃতি ধর্ম ও উপধর্মের 'কার্যসাধনা' তত্ত্ব অবলম্বনে হয়ে থাকে। বাউল সম্প্রদায়ের নব্য জাতপাতের ভেদাভেদ না থাকার ফলে সহজিয়া বৈষ্ণব সম্প্রদায়, সহজিয়া হিন্দু বাউল ও সুফি পন্থি মুসলমান ফকির বাউল সম্প্রদায়ের মধ্যে একটা আত্মীয়তার যোগ লক্ষ করা যায়। বাউল ধর্ম সাধারণ লোকধর্ম। তাই এর পশ্চাতে একটা বিশিষ্ট রাস্তা নৈতিক ও সামাজিক ঋতুনিষ্ঠারও ইঙ্গিত আছে। এই সনাতন যোগসূত্রের কথা চিন্তা করে বাংলার বাউল সাধনায় সুফি ও বৈষ্ণব সাধনার প্রভাব সম্পর্কিত ভাবনার প্রচেষ্টা রাখা হল সমীক্ষাটিতে। সমীক্ষার দ্বারা পরিনরে বিষয়ালোচনা দীর্ঘায়িত হবার সুযোগ নেই। তাই বিশেষ বিশেষ দিকগুলিকে মূলে ধরার প্রয়াস রইলো।

বাউল ধর্মের উদ্ভব সম্বন্ধে কোন নির্দিষ্ট সময় নির্ণয় করা যায় না। সপ্তদশ শতাব্দীর বাংলার ধর্ম ও সংস্কৃতির এবং সামাজিক ইতিহাসের উপকরণ দৈন্যতার জন্য তা পাওয়াও দুরূহ। তবুও অনুমানসিদ্ধভাবে ঐতিহাসিক তথ্যানুযায়ী একটা মত ধরা হয় তা হল 'সপ্তদশ শতাব্দীর প্রথম ইহাতেই বৈষ্ণব সহজিয়াধর্মের প্রবল বিস্তারের যুগ আরম্ভ। মূল সাধনাজ্ঞা এক হওয়ার সহজিয়া মুসলমান ফকিরদের মিলনে ১৪২৫ খ্রিস্টাব্দের মধ্যে বাউলধর্মের উদ্ভব। তদপরে আরো পঁচিশ বছরে সহজিয়া বৈষ্ণব ও ফকিরের মিলিত সাধনার মোটামুটি ভিত্তি স্থাপিত।' মুসলমান ফকিররাই বাউল সাধনার আদি প্রবর্তক বলে মনে করা হয়। আবার কীও ভাবা হয় বাউল সাধনার কয়েকটি বৈশিষ্ট্য খুব সম্ভবত ফকিরদের কাছ থেকেই এসেছে। আবার বিশেষত পশ্চিমবঙ্গের বাউল মহলে একটা জনশ্রুতি আছে যে—

Prospect Of Urbanisation In East Bardhaman District, West Bengal, India

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Abstract

Urbanisation of the new-born district East Bardhaman in West Bengal is facing a challenge after being separated from mining and industry-based West Bardhaman. In East Bardhaman there are only six municipal towns and 21 census towns in 2011. Among the four old towns of nineteenth century only Bardhaman is a class-I town, but in Kalna, Katwa and Dainhat towns urbanisation is almost stagnant as they have lost their past glory of trade and commerce. Basic urban amenities are poor in towns other than Bardhaman. All the towns and villages of the district therefore depend on Bardhaman to avail better educational, medical and marketing facilities and makes it overcongested. Agricultural prosperity on the one hand and urban shadow effect of Kolkata and Bardhaman hinder urbanisation in East Bardhaman district. Therefore to activate urbanisation process in the district improvement in transport system, basic urban amenities and socio-economic facilities as well as materializing the prospect of agro-based industry and tourism can be emphasised.

Key words: urbanisation, small towns, basic amenities, socio-economic facilities.

1. Introduction

Urbanisation is a long continued process of development in the form of social transformation from traditional rural society to modern urban community. In India earlier urbanisation was based on administrative centres, commercial centres and centres of historical importance. Later industrialisation and better transport facilities gear up the process. But two vital characteristics of Indian urbanisation is overdependence on mega cities and rural character of small and medium towns. Therefore many primate cities coexist in India and small and medium towns get less importance. Similarly urbanisation in West Bengal has mainly taken place pivoting on Kolkata. The people of entire state largely depend on this single city for administrative needs as well as better socio-economic facilities and consequently, immigration to the city results into problems of over-population, urban congestion, atmospheric pollution etc. So a planned urban development with decentralisation of urban amenities in other class-I towns (>100000) outside Kolkata and provision of minimum urban infrastructure in small and medium towns (20000-99999) are necessary to minimise regional inequality in urban development in the state.

The urban scenario of new born district, East Bardhaman of West Bengal is also facing similar problem at local level. In spite of her historical importance and past glory of trade and commerce centres, East Bardhaman district has only a class -I town and few small and medium towns dotted over vast rural tract. Western part of erstwhile Bardhaman district was urbanized based on mining and industrial activities. But the eastern part was entirely rural agricultural tract except the district head quarter town. So it's a challenge in front of East Bardhaman to encourage urbanisation for the sake of economic development of this new born district (April, 2017).

2. Problem and Study Area

East Bardhaman comprises of four sub-divisions, Kalna, Katwa, Bardhaman Sadar North and Bardhaman Sadar South containing 23 blocks, Kalna-I,II, Purbasthali-I,II, Maneswar, Katwa-I,II, Ketugram-I,II, Mangolkote, Bhatar, Memari-I,II, Burdwan-I,II, Jamalpur, Rains-I,II, Khandaghor, Galsi-I, II and Ausgram-I,II. All these blocks are dominated by agriculture. East Bardhaman had four municipal towns in 1860s and after almost 150 years there are now only 6 municipal towns and 21 census towns (2011). Urban activities are mainly concentrated in the district head quarter, Bardhaman. To unfold the reason behind slow pace of urbanisation in East Bardhaman and to propose a projected urban growth there, this district has been selected for present study.

3. Objectives

The objectives of this research article are to find out:



INTELLIGENT DIGITAL RIGHTS MANAGEMENT SYSTEM FOR DISTANCE EDUCATION (DRMSDE) USING MULTI-AGENT SYSTEM

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ABSTRACT

Distance Education (DE) system are enlightening learners at their own time and space. E-learning, virtual learning and online learning have come under the umbrella of DE. Nowadays with the advancement of technology DE not only confined to its learners rather it touches to the students of traditional education system directly or indirectly. The education community is the larger producer of the digital repository of digital contents (DC). These DC are used and reused by learners during their courses. The major challenges of institutions are to know who, when, what and how DC is being used. Digital Rights Management (DRM) that manages rights over any digital creations is the solution to this problem. In this paper, we proposed an Intelligent Digital Rights Management System for Distance Education (DRMSDE) that manages the digital rights of users intelligently. For intelligent system we have identified that Multi-Agent System based technology is very much suitable so, here we use one of the most popular Multi-Agent based tool JADE (Java Agent Development Framework).

Key words: Distance Education, Digital Rights Management, Digital Content, Multi Agent System, JADE.

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1. INTRODUCTION

Distance Education (DE) System is a good option to increase gross enrollment ratio of a country like India[1]. In this system learner and teacher need not sit face to face rather they use some other medium like postal or electronic medium to meet their requirements. One of the main advantages of DE is that it has no spatiotemporal boundary. The main source of DE is Digital Content (DC) that includes course materials, e-journals, e-books, audio tutorial, video tutorial, assignments etc. Digital content may easily be copied and used by multiple

Centripetal Forces Of Urbanization In Bardhaman Municipality, West Bengal

Mahamaya Laha, Arambagh, Hooghly, West Bengal

Abstract

Bardhaman is one of the oldest town of erstwhile Bardhaman district in West Bengal. Bardhaman (Burdwan) became an urban centre in 1855 and a municipal town in 1865. In 1961 Burdwan became a Class -I town and after fifty years Bardhaman has now 314265 population (2011) over 26.3 sq km area. Initially Bardhaman town emerged as a market centre to her surrounding rural area as patronaged by Burdwan Rajas. But later urbanization of this town was geared by mainly service sector. The centripetal forces of urbanization of this town are educational, medical, transport and marketing facilities along with agro-based industry like rice mills since its inception. This assemblage of these socio-economic amenities has invited immigrants to this town from surrounding areas. Growing population density has enforced vertical expansion of the town and urban hazards as well. So a planned development and geographical expansion of the town is the hour of need.

Keywords: Bardhaman, urbanization, service sector.

1. Introduction

In the history of Indian urbanization historical places, state capitals, regional capitals and industrial centres have often been given the importance to become an urban centre. Since 1991 as a result of globalization and adoption of neo-Liberalization Policy in India metropolitan cities become the best area for investment. So a metro-biased urban development is the real scenario of Indian urbanization (Bhattacharya, 2006; Rao, 2013). Infrastructural development in other regional towns is neglected. Siphoning of resource to metros keeps large part of eastern and northern India rural. In Eleventh Plan it has been admitted that degree of urbanization in India is one of the lowest in the world. During 2001-2011 a decelerating

urban growth is found in Indian metro cities. So the creation of new growth centres in the form of small and medium towns is a major challenge of Indian urbanization (Kundu, 2011). Focus should also be given to the regional Class-I towns which can provide urban benefits to their surrounding rural and small urban centres. This will minimise the burden of metro cities. The existing resource and potentiality of the class- I towns should be capitalised to increase their urban density.

In West Bengal the capital city Kolkata has the agglomeration of all administrative and socio-economic facilities and therefore there is poor urban development in her surrounding area and overpopulation is causing deterioration of urban infrastructure and basic urban amenities in Kolkata.

ANALYSIS OF DIGITAL RIGHTS MANAGEMENT SYSTEM IN DISTANCE EDUCATION (DRMSDE) USING OBJECT ORIENTED METRICS

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Abstract: The education system in which space and time constraints are flexible is called Distance Education (DE) System. Distance Education Institutions allow Learner to choose their own time and space for study, but to maintain the quality of teaching in DE, rights of different users are needed to be properly maintained otherwise the significance of education is not full field. In this paper for the management of different rights of users in DE, we design and implement a Digital Rights Management System for Distance Education (DRMSDE) using Object-Oriented Tools and Techniques. For designing our system we are using UML Tools. To measure the quality of our design, we use two most popular Chidambra and Kemerer metric (C-K metric) and Metric for Object-Oriented Design metric (MOOD metric). We use their metrics on our class diagram and show results are within the interpretation guideline. For implementation, we are using the most popular and powerful Object-Oriented programming language JAVA and for storage purpose, we are using MySQL database.

Keyword: Distance Education, Digital Rights Management, Object Oriented Metric, Class Diagram, JAVA

1. INTRODUCTION

Digital Content can be copied with perfect quality and these copies can easily be transmitted to hundreds or thousands of others [1]. In the digital world, one can distribute huge digital content by just sitting at their desk. So, it is very essential for the digital content provider like Distance Education Institutions to prevent unauthorized use and distribution [1]. Digital Rights Management (DRM) is the only solution to this problem. DRM is the technological control and protection for any digital creation by restricting what actions an authorized recipient may take in regard to that content. For the sustainable development of DE proper rights management is very important.

Here we proposed a complete Distance Education System with rights management DRMSDE using Object Oriented Approach. We design our system by using Class Diagram and express dynamic nature using Activity Diagram. For measuring quality of our design we are using C-K and MOOD Metrics and implement our prototype by using NetBeans 8.0 IDE and MySQL Database. In our system DRMSDE, the Distance Education Organization instruct Administrative Manager to appoint Course Designer[2][3] for designing courses for Distance Education System. The Course Designer design courses structures, digitized the courses and stored into Digital Library [4]. For the protection of Digital Content, Digital Library imposed different Rights on it as specified by the Administrative Manager. A Learner registers him or her into the course and has access Digital Content according to their rights. Teachers communicate with the Digital Library for teaching and support to the learner.

We organized this paper into five sections: section two discusses Object-Oriented Design of our DRMSDE system. Section three describes the analysis of DRMSDE system based on different software metrics. Section four explains the implementation procedure of DRMSDE system and finally, section six concludes our work with some future plan.

2. OBJECT-ORIENTED DESIGN OF DRMSDE

A set of Object-Oriented Software engineering[5] tools is used for design purpose of the proposed system. A class diagram represents the existence of classes and associations among classes. The fig1. Shows class diagram of our system DRMSDE. The System has six classes which are Distance Education Organization, Administrative Manager, Course Designer, Digital Library, Learner, and Teacher. The solid line indicates association and dotted line shows uses among classes. Generalization is the association between the general and special class. Here Learner is a generalized form of Knowledge Seeker and students.

Distance Education Organization: It represents the authority of Distance Education System. Its attributes are organization id, name and place and methods registration(), affiliation() and degree() are used for registration, receiving affiliation and providing the degree to the learner.

Administrative Manager: A person responsible for the overall management of digital rights of digital content in the digital library of our system. Administrative Manager Class having attributes manager code, name, address, password represent the supreme power of our system. The methods supervision(), instructCourseDesigner(), assignRight() and modifyRight() are used for supervision, guiding Course Designer, assigning rights to different user and updating rights of user. In general, we may say that the entire system is maintained by the administrator

তুর্কি আক্রমণোত্তর পর্বে উদ্ভূত বিপ্রদাসের কুর মনসা : লাঞ্ছিত নারীর প্রতিমূর্তি



আভা দে

অধ্যাপিকা, বাংলা বিভাগ

নেতাজী মহাবিদ্যালয়, আরামবাগ, কুগলি

দ্বাদশ শতাব্দীর শেষভাগ, ত্রয়োদশ শতাব্দীর একেবারে শুরুতে তুর্কি আক্রমণের ঢেউ এসে পৌঁছায় বাংলায়। সুদূর উত্তরে আরও অনেক আগে তুর্কি আক্রমণ শুরু হলেও প্রত্যন্ত অঞ্চল বাংলায় এর প্রভাব এসেছে অনেক পরে। তার কারণ—বাংলা কেন্দ্রীয় ভারতবর্ষ থেকে দূরে অবস্থিত ছিল। তাই নিশ্চিত পল্লিবাসী বাঙালির কানে ‘তুর্কি আক্রমণ’ শব্দটি কণ্ঠগোচর হলেও ভীতি উৎপাদনকারী বিদেশি শক্তির বিধ্বংসী ব্যাপকতা এসে পৌঁছেছে অনেক পরে এবং অতর্কিতে। বাঙালির জীবনে আসা এই হঠাৎ উৎপাত অনভ্যস্ত, অপ্রস্তুত, বিমূঢ় বঙ্গরাজশক্তি এবং জনসাধারণ ঠেকাতে অসমর্থ ছিল। ফলে আকস্মিক আঘাতের পরিমাণ ও ক্ষয়ক্ষতি হয়েছিল ব্যাপক। দ্বাদশ শতাব্দী পর্যন্ত বাংলায় যাদের হাতে শিক্ষা-সংস্কৃতি ও সাহিত্য সৃষ্টি ন্যস্ত ছিল তাঁরা ছিলেন প্রধানত সংস্কৃতি শাস্ত্রশাসিত সংস্কৃতিমনস্ক ব্রাহ্মণ্যপন্থী কিংবা বৌদ্ধ মতাবলম্বী। অর্থাৎ গ্রন্থকার কবিশিল্পীরা ছিলেন এদেশের রাজআনুকূল্যপুষ্ট অথবা সমাজের উচ্চস্তরের ব্যক্তি অথবা ধর্মপ্রাণ সংঘাচার্য এবং সাহিত্য শিক্ষা সংস্কৃতির পীঠস্থানগুলি ছিল ধর্মকেন্দ্রিক মন্দির বা সংঘ। ত্রয়োদশ শতাব্দীতে বিধর্মী তুর্কির আক্রমণে সবচেয়ে আগে-বিধ্বস্ত হয়েছিল এই ধর্মীয়

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Seasonal variations of zooplankton diversity in fresh water reservoir of West Bengal, India

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Abstract

Background/Objective: Present study was carried out to identify zooplankton density at Baburpukur pond along with physicochemical properties. In India. Planktonic richness reflects the biodiversity stock. The present study assumes greater importance for biodiversity conservation/ pollution indicator and aquaculture of fish and prawns. **Methods/Statistical analysis:** Statistical analysis in this experiment was performed by Student's t-test. In this test, 0.05 probability, degree of freedom, critical t-value, and calculated t-values were recorded. Here zooplankton number along with physico-chemical parameters was recorded. From these t-values, significant seasonal variations were found in the respective water body. The zooplankton density and physiochemical parameters were recorded during the period of Jun 2018 to February 2020. Diversity of zooplankton has been counted using Sedgwick-Rafter counting chamber. **Findings:** Four different species of zooplankton were studied such as *Daphnia*, *Cyclops*, *Cypris* and *Brachionus*. Zooplankton community structure generally changes with temperature, pH of water, free CO₂ level, dissolved O₂. This study also reveals that zooplanktons have their own peak periods of density which is influenced by the above environmental conditions. **Application:** At present, this water reservoir is suitable for fish culturing. So several management practices are necessary to conserve this zooplankton density for proper healthy situation of water body. This study is also helpful in understanding the zooplankton diversity of Baburpukur Pond with proper maintaining of aquaculture.

Keywords: Zooplankton; biodiversity conservation; pollution indicator; aquaculture

1 Introduction

Presence of zooplankton in water body helps to increase economically important fish populations and they play a major role in energy transfer between phytoplankton and fish⁽¹⁾. The study of freshwater zooplankton fauna is wide



Nematode Extract-Induced Resistance in Cowpea against *M. Incognita*

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Abstract: Every plant in the world has a special defence mechanism to protect themselves from their enemies. In India, total crop losses annually 10-40% by plant-parasitic nematodes. These plant parasitic nematodes are roundworms, which are microscopic in nature. Although there are hundred different kinds of plant parasitic nematodes infect plants, root-knot nematode (*Meloidogyne incognita*) is one of the serious pest for cowpea plants. They manage to evolve sophisticated defence mechanism for their own protection and also creates interrelationship with the roots of their host plant to form giant cells. They also have the capacity to sense and respond to chemical signals of host plant and by this way they orient themselves within the roots and enhances own survival. Present investigation was carried out to establish the biocontrol potentiality of nematode extract (*Meloidogyne* sp.) on *Vigna unguiculata* (cowpea) L.walp variety infected with *Meloidogyne incognita* (Kofoid & White) Chitwood nematode. The result of in vitro laboratory bioassay showed that application of nematode extract safe for second-stage juveniles (J₂) of *M. incognita*. The result of in vivo test revealed that nematode extract increased growth of inoculated plants in terms of shoot length, shoot weight and root length as compared with inoculated untreated plants. Application of nematode extract showed reduction in root gall number and number of nematode eggs in inoculated roots. In nematode extract treated plants PAL (Phenylalanine ammonia lyase) activity generally increased in the roots which may interfere with infected juveniles at the time of root penetration. Although there are several current management practices have been identified for plant nematode control such as use of botanicals, cultural practices, physical methods, chemical nematicides etc but application of nematode extract is one of new method which ultimately reduces management cost and enhances crop production.

Keywords: Defence Mechanism, Nematode, PAL activity, Root gall, Management Practices

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Nematode extract-induced resistance in tomato against *Meloidogyne incognita*

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Abstract

Objective: Present study was carried out to establish the biocontrol potentiality of nematode extract on *Lycopersicon esculentum* (Tomato) Pusa Ruby variety infected with *Meloidogyne incognita* (Kofoid & White) Chitwood nematode.

Methods/Statistical analysis: We examine in vitro test, phytotoxicity test, in vivo test, in vivo glasshouse bioassay test, PAL (Phenylalanine ammonia lyase) extraction test to identify the effect of nematode extract on tomato plant. One way analysis of variance, ANOVA test is performed in this experiment. **Findings:** The result of in vitro laboratory bioassay showed that application of nematode extract safe for second-stage juveniles (J₂) of *M. incognita*. The result of in vivo test revealed that nematode extract increased growth of inoculated plants in terms of shoot length, shoot weight and root length as compared with inoculated untreated plants. Application of nematode extract showed reduction in root gall number and number of nematode eggs in inoculated roots. PAL (Phenylalanine ammonia lyase) activity increased in roots of nematode extract treated plants. Root protein content was greater in inoculated untreated plants compared to treated groups. **Application:** This is the first study to control plant parasitic nematode *M. incognita* with nematode extract. In the future it will minimize the global crop loss.

Keywords: Biocontrol; Nematode; PAL activity; Root gall

1 Introduction

Management of plant parasitic nematodes are more difficult than any other pests because they generally inhabit the 'O' horizon of soil, so several types of management practices have been developed yet, management with nematode extract is one of the new methods identified in our laboratory. Several years back, chemical nematicides were effectively applied but due to their toxic effect on human health and environment they were withdrawn from the market⁽¹⁾. About 2000 plant species are susceptible to plant nematode infection and they cause approximately 5% of global crop loss⁽²⁾. Tomato, *Lycopersicon esculentum* (Kofoid & White) Chitwood is an important vegetable crop and is infected by root-knot nematode, *Meloidogyne incognita* in tropical and subtropical countries



Impact of organizational culture on employee motivation and engagement: A study with special reference to IT industry

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Abstract

Organizations grow with human resources and become best with time, through effective functioning with positive culture and employee wellbeing. Organizational culture and organizational climate set a frame work and promote the effective beliefs and values influencing behaviour. The internal working environment of every organization has certain commonly perceived psychological characteristics or traits which are collectively called its climate or culture or. Organization's culture and Climate mainly focuses on the level of employee satisfaction and dissatisfaction, considering the performance of the employees, which results in major impact on motivation, engagement and job satisfaction of individual employees. Organizational climate, therefore affects productivity, motivation and employee behaviour. This paper tries to evaluate the influence of organizational culture and climate in employee motivation and their engagement.

Keywords: Employee motivation, organizational culture, IT industries

Introduction

The core identity of an organization is formed with a set of values, beliefs, and behaviour patterns which can be termed as Organizational culture. It is the specific collection of values and norms that are shared by the people and groups in an organization and that control the way the employees interact with each other and with stake holders outside the organization and is also essentially a learned set of responses of constituent individuals and groups to the organization environment, tasks and problems. It shapes attitudes and behaviors among people in wide-ranging and durable ways and when properly aligned with personal values, drives, and needs, it can unleash tremendous amounts of energy toward a shared purpose and foster an organization's capacity to thrive. Organizational climate on the other side is the recurring patterns of behavior, attitudes and a multidimensional construct that encompasses a wide range of individual evaluations of the work environment. Organizational cultures and Organizational climate has a potentially rich, but widely unrealized and invisible role in the development of an organization as well as to raise the motivation among employees and stimulate them. Brown and Brooks (2002, p. 330) describe climate as the "feeling in the air" and the "atmosphere that employees perceive is created in their organizations due to practices, procedures and rewards." Based on these clauses, obviously the individual view of employees in the organization affects the climate. Climate factors like recognition, competency, environment, team work, management effectiveness, involvement, reward and commitment all these lead to job satisfaction and motivation.

Thus culture and climate are held to influence attitudes in the workplace. Power-oriented culture emphasize upon competitive, responsive to personality rather than expertise. People-oriented culture put pressure on consensual and rejection of management control rejected. Task-oriented culture focus on competency, dynamism. Role-oriented

focus on legality, legitimacy and bureaucracy. Constructive cultures are characterized by organizational norms to achievement and motivation self-actualization and being humanistic and supportive. It helps the staff to meet their higher order satisfaction needs. Defensive cultures encourage or implicitly require interaction with people in ways that will not threaten personal security (Hellriegel *et al*, 1974; Meglino, 1976, Kays and Decotis and cooke and Srimal 2000) [4]. The attributes of organizational climate have been thought to promote job satisfaction and increase motivation at individual level and organizational levels.

Review of Literature

Organizational culture includes an organization's expectations, experiences, philosophy, as well as the values that guide member behavior, and is expressed in member self-image, inner workings, interactions with the outside world, and future expectations. Organizational culture affects the way people and groups interact with each other, with clients, and with stakeholders. Also, organizational culture may influence how much employees identify with their organization (Schrodt, 2002). Organization's norms and values have a great impact on those who are fully devoted to the organization. (Stewart, 2010) [14]. Organizational climate as a set of characteristics that describes an organisation, distinguishes it from other organizations, is relatively enduring over time and can influence the behaviour of people in it (Forehand and Gilmer, 1964) [4]. Both Organizational culture and organizational climate set a frame work within which an individual and group behavior takes place. The internal working environment of every organization has certain commonly perceived psychological characteristics or traits which are collectively called its climate, culture. Organizational climate can be seen as a descriptive concept that reflects the common view and agreement of all members regarding the various elements of the organization

Critical Evaluation on Liquidity-Profitability Relationship of Indian IT Sector

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ABSTRACT: In the present world economy India is the largest exporter of information technology (IT). The IT industry of India has increased its contribution towards India's GDP from 1.2 per cent in 1998 to 7.7 per cent in 2017. However it is a big challenge for the industry to be competitive with the growing IT companies all over the world. In order to survive, Indian IT companies have been changing their business policies to face the diverse challenges emanated from the changing global scenario of the industry. With the changing scenario in the business environment, the liquidity-management in the Indian IT industry has failed to maintain its conventional practices. Liquidity-management ensures financial stability of a business by financing properly the day-to-day operations of a business. It is claimed that skillful liquidity-management has a positive impact on the profitability of the business. In this backdrop, the present paper seeks to reexamine the relationship between the liquidity-management and profitability in the Indian IT sector during the period 2001-2002 to 2015-2016 and also to examine whether its findings conform to the theoretical arguments. While carrying out this study ten IT companies have been selected. These ten IT companies have been selected following purposive sampling procedure. The data of the selected companies relating to the period 2001-2002 to 2015-2016 collected from secondary sources have been used in the present study. The issues analyzed in this study have been tackled using relevant statistical tools and techniques.

Key words: Indian IT Sector, Liquidity, Profitability, Financial Performance

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I. INTRODUCTION:

During the last two decades IT sector of India has become globally competitive. In fact, the sector transformed India from an agriculture based economy to knowledge based economy and contributed significantly in almost all sectors of the Indian economy. IT sector increased its contribution to India's GDP from 1.2% in 1998 to 7.7% in 2017. The sector also provides job to about 3.9 million Indians in the financial year 2017.

In the modern business world, prime challenge of every business organisation is to maintain efficient financial management. The efficiency of an organization is measured in terms of certain parameters such as profitability, liquidity, efficiency of assets management etc. One of them is liquidity which is a pre-requisite for the development, survival and growth of any business organization. Success of any organisation largely depends on the management of current assets and current liabilities in such a manner so that an enterprise can eliminate the risk of inability to meet the matured short term obligations on the one hand and avoid excessive investment in these assets on the other hand. Liquidity-management ensures financial stability of a business by financing properly the day-to-day operations of a business. It is claimed that skillful liquidity-management has a positive impact on the profitability of the business. In this backdrop, the present paper seeks to reexamine the relationship between the liquidity-management and profitability in the Indian IT sector during the period 2001-2002 to 2015-2016 and also to examine whether its findings conform to the theoretical arguments.

II. LITERATURE REVIEW:

A brief review of the different efforts of research in the field of liquidity management of Indian IT companies was analysed in the following studies:

Joshi (2016) in his study made an attempt to analyse and evaluate the liquidity position of the selected five Indian IT companies for the period from 2004-05 to 2013-14. He concluded that financial health of an enterprise depends on the profitability as well as liquidity position of the concern.

Samathi and Narasimhaiah (2016) examined the effect of different components of working capital of the Infosys Ltd. on its profitability during the period from 2011 to 2015. One of the significant outcomes of the study was that overall working capital position of the company was satisfactory. They suggested that firm can increase the value for their shareholders by decreasing the credit period allowed and also created more returns for their shareholders by improving the inventory position.

Linkage between Managing Liquidity and Profitability in Indian Blue Chip Companies

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Abstract

Efficient management of liquidity of the firm can ensure a smooth running of its business wheel. The opening of the Indian economy has changed the market environment with private sector performing a significant role in shaping the industrial landscape. As a consequence, Indian industry is exposed to tremendous competition from domestic and multinational competitors. Some of them have been able to adjust themselves to the new situation while others could not do so. In this backdrop, the present study seeks to make a study in respect of the performance of liquidity management in the Indian industry during the ten year period from 2009-2010 to 2018-2019. The sample size of the study consists of ten top most companies (other than banking sector) on the basis of their market capitalization on 29th February, 2020. The issue has been tackled using appropriate statistical measures.

Key words: Liquidity management, Profitability, Company.

Introduction:

In the modern business world, prime challenge of every business organisation is to maintain efficient financial management. Liquidity is one of the most important parameters of efficient financial management. Liquidity is a pre-requisite for the development, survival and growth of any business organization. Liquidity-management ensures financial stability of a business by financing properly the day-to-day operations of a business. It is claimed that skilful liquidity-management has a positive impact on the profitability of the business. In this backdrop, the present paper seeks to reexamine the relationship between the liquidity-management and profitability in selected Indian blue chip companies during the ten years period from 2009-2010 to 2018-2019 and also to examine whether its findings conform to the theoretical arguments.

Literature review:

A brief review of the different efforts of research in the field of liquidity management of Indian companies was analysed in the following studies.

Banerjee (1982) conducted a study to examine the interrelationship between liquidity and profitability. More precisely, he investigated the relationship between liquidity and

Education System, -A Study of the Vedic & Buddhist era

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India has a reach tradition of education from the antiquity and the knowledge was handed down from generation to generation either in the form of oral tradition or in written document. Ancient Vedic education of India puts emphasis on simple living and high their king as self development. Aryan people has been bidden necessarily to gain both kind of knowledge material and spiritual consequently. Thus the knowledge were divided i.e spiritual wisdom and the lower knowledge i.e secular science. After a period of time Buddhist education also influenced by the ancient Hindu System.

Key Words: Gṛhyasūtra, Buddhist, education

Introduction

The materialistic education organize various aspects of knowledge. It is for the students to develop social structure exists. They are regarded as the axis of the society. So on their development lies the development of the society as a whole. After the completion of materialistic knowledge for the knowledge of great truth deep meditation in privacy is needed and therefore the pupil has been bidden to take recourse to serve penance once again. Thus the sages developed themselves as well as their students to the study of a supra-sensible world and spiritual powers and moulded their life accordingly. The ultimate aim of education was to control the mental activities connected with the concrete world. In India during the ancient time the students away from the haunts of din and distraction of material surroundings sitting at the feet of his teacher, comprehend all the problems of life through listening and meditation Buddhist education can be regarded as a continuation of the ancient Hindu System of education. Especially Buddhism in its ancient original form has been admitted deeply in pre existing Hindu education system of thought and life. In this paper I want to highlight the

मीमांसादर्शनस्य संक्षिप्तेतिहासः

- सुजित-परामानिकः

शोधसारः –

प्राचीनेतिवृत्तो यत्र वर्तते तदितिहास इत्युच्यते। जगति सर्वेषां इतिहासोऽस्ति। एवं संस्कृतसाहित्ये सर्वेषां शास्त्राणामितिहासो विद्यते। दर्शनेषु मीमांसादर्शनम् अन्यतमम्। प्रबन्धेऽस्मिन् मीमांसादर्शनस्य संक्षिप्तेतिहासो वर्णितोऽस्ति। इतिहासे मीमांसकाचार्याणां देशकालकृतिविषये विवरणं विद्यते। महर्षिजैमिनिना प्रवर्तितमिदं मीमांसादर्शनम्। तस्य देशकालकृतिविषये परिचयो यथामति प्रदत्तोऽस्ति। प्रबन्धेऽस्मिन् जैमिनिपूर्वकालिकाचार्याणां तथा जैमिन्युत्तरकालिकाचार्याणां संक्षिप्ततया परिचयो व्याख्यातोऽस्ति। जैमिनिपूर्वकालिकाचार्याणां मध्ये महर्षिः बादरायणः प्रसिद्धः। जैमिनिना तस्य मीमांसामूत्रे बादरायणस्य नाम स्मृतम्। अपि च बादरिः, महर्षिः आत्रेयः, काष्णजिनिः इत्येतेषां मीमांसाशास्त्रकाराणामपि नाम जैमिनिना स्मृतम्। एते विद्वांसः अपि जैमिनिपूर्वकालिकाः प्रसिद्धा मीमांसाशास्त्रकाराः। जैमिन्युत्तरकालिकाचार्याणां मध्ये सर्वाधिकाः प्रसिद्धाचार्याः भाट्टसम्प्रदायस्य प्रवर्तकः कुमारिलभट्टः किञ्च तस्यैव शिष्यः प्रभाकरमिश्रः। कुमारिलभट्टो नितान्तो मेधावी विद्वान् लोकविश्रुतशास्त्रार्थी चासीत्। कुमारिलः तस्य पाण्डित्येन स वैदिकधर्मं संरक्षितवान्। प्रभाकरमिश्रः महान् मीमांसाभाष्यव्याख्याकार आसीत्। एते आचार्या मीमांसाशास्त्रस्य परिधिं तथा माहात्म्यं वाधैतवन्तः। पार्थसारथीमिश्रः आचार्यः मीमांसाशास्त्रकारेषु अन्यतमः। तस्य सम्प्रदायो मिश्रसम्प्रदाय इति नाम्ना ख्यातः। मण्डनमिश्रः, वाचस्पतिमिश्रः, शालिकनाथमिश्रः इत्येते आचार्या मीमांसाशास्त्रस्य प्रख्याताचार्याः। एतेषामपि आचार्याणां परिचयः संक्षिप्ततया प्रदत्तोऽस्ति अस्मिन् प्रबन्धे। अपि च केषाञ्चित् मीमांसाचार्याणां सारणीमाध्यमेन तेषां देशः, कालः, कृतयः इत्येते विषया अतीव संक्षिप्तरूपेण प्रदत्ताः सन्ति।

कुक्षी-शब्दाः – जैमिनिः, बादरायणः, आत्रेयः, काष्णजिनिः, उपवर्षः, भवदासः, भर्तृमित्रः, कुमारिलभट्टः

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भूमिका -

चतुर्दशधर्मशास्त्रेषु मीमांसादर्शनम् अन्यतमं किञ्च षडास्तिकदर्शनेषु मीमांसादर्शनस्य परिगणनमस्ति

“पुराणन्यायमीमांसाधर्मशास्त्राङ्गमिथिताः।

वेदाः स्थानानि विद्यानां धर्मस्य च चतुर्दश”॥ इति।



ON THE COMPARATIVE GROWTH OF GENERALIZE ITERATED ENTIRE FUNCTIONS

RATAN KUMAR DUTTA, NINTU MANDAL¹, AND NIRMAL KUMAR DATTA

ABSTRACT. In this article, we study the properties of generalize iterated entire functions and prove some results on the comparative growth properties of the maximum term of generalize iterated entire functions which improve and generalize some earlier results.

1. INTRODUCTION, DEFINITIONS AND NOTATIONS

$M(r, f) = \max_{|z|=r} |f(z)|$ and $\mu(r, f) = \max_n |a_n| r^n$ are respectively called the maximum modulus and maximum term of the entire function $f(z) = \sum_{n=0}^{\infty} a_n z^n$ on $|z| = r$, $\rho_f = \limsup_{r \rightarrow \infty} \frac{\log \log M(r, f)}{\log r}$ and $\lambda_f = \liminf_{r \rightarrow \infty} \frac{\log \log M(r, f)}{\log r}$ are respectively called the order and lower order of the entire function f .

Definition 1.1. [8] We define $\log^{[0]}\theta = \theta$, $\exp^{[0]}\theta = \theta$ and for positive integer t , $\log^{[t]}\theta = \log(\log^{[t-1]}\theta)$, $\exp^{[t]}\theta = \exp(\exp^{[t-1]}\theta)$.

In 1989 A. P. Singh [9] proved the following very important relation between the maximum modulus and maximum term of an entire function.

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Key words and phrases. Entire functions, maximum term, maximum modulus, iteration, order, lower order.



Evaluation of gel time of TEOS using the idea of phononic band-gap for macro bi-mass system

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ABSTRACT

In this work, elastic wave propagation through a composite medium, consists of solid and colloidal liquid in a one-dimensional phononic crystal has been studied. The behavioural change in mechanical properties for sol to gel phase transformation is obtained in this experiment. When, a wave of certain range of frequency passes through such a medium, propagation is blocked for some frequency range due to the presence of specific periodic structural arrangement. This range of frequency is termed as forbidden band gap. Calculations for the structure of one dimensional N mass system are performed and are generalized for a bi-mass system (assuming $N = 2$). Considering different structural and mechanical parameter of the medium, the range of the forbidden gap is calculated and is verified with the experimental analysis. Along with this, the transition time for sol to gel phase transformation is obtained.

1. Introduction

The idea of phononic band gap [1–11] or acoustic band gap [12–16] in elastic wave propagation in periodic materials was the subject of interest since last few decades. The motivations of this type of work were grown after several studies during 1960s and 1970s with the discovery of composite materials and very much useful for non-destructive testing methods, based on the propagation of elastic waves through the sample under NDT observation. A theory has been proposed to describe the dynamics of sound wave when it passes through composite expressing the displacements of the matrix and reinforced materials. Periodic arrangement of highly mismatched materials, especially in mechanical properties, is still a point of research interest in the design of ‘Phononic Crystals’ [17–31] or ‘Sonic Crystal’ [32–36] or ‘Acoustic Meta-material’ [37–39]. The concept of ‘Phononic Crystals’, a periodic regular array of materials having different dielectric constants, gives the idea about ‘Phononic Crystals’.

When the elastic wave travels through periodically regular array of inhomogeneous elastic medium, suffers an in-phase reflection and almost total wave of certain frequency range is reflected back causes the formation of forbidden band gap [40–50]. Forbidden band gap means that there must be a frequency range within which almost no wave transmission is possible regardless about the direction of propagation.

This range depends upon the geometry, dimension, design and mechanical or elastic property such as elastic modulus, density etc. of the constituents of the medium. So, from this study one can obtain some useful information about the phononic crystal (PnC). PnC is constructed by varying the elastic property, density or states periodically over an infinite region in 1D, 2D and 3D space.

The sol-gel methods [50–63] involve a critical role and the chemistry of the sol (liquid) state is an important point to be studied. Liquid in which the colloidal particles of diameter 1–100 nm [58] is suspended, is called Sol, whereas, gel is an arbitrarily interconnected polymeric or covalent rigid network or chains with very small void space or pores. Gels are produced by linking condensed species and growing the interconnected network in three-dimensional space followed by simultaneous hydrolysis and poly-condensation of sol. The process involves the conversion of a solution of a precursor by a chemical reaction into a sol or a gel which transformed to non-crystalline materials upon drying, densification etc. Some in-situ studies have already been done to shed light on the process of nucleation and the nature of molecular spacing involve in sol-gel transformation. The required steps from sol to gel transition are 1) gelation of a colloidal solution, 2) hydrolysis and poly-condensation of alkoxide and 3) drying in under suitable environment. When the particles of sol grow and collide, condensation occurs and small particles nucleate to produce a micro particle to form gel.

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Implementation of Multi-Agent based Digital Rights Management System for Distance Education (DRMSDE) using JADE

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Abstract—The main objective of Distance Education (DE) is to spread quality education regardless of time and space. This objective is easily achieved with the help of technology. With the development of World Wide Web and high-speed internet the quality of DE is improved because now Digital Content (DC) can be easily and in no time distributed to many learners of different locations in text, audio and video formats. But, the main obstacle in digital publishing is the protection of Intellectual Property Rights (IPR) of DC. Digital Rights Management (DRM) that manages rights over any digital creation is the only solution to this problem. In this paper, we have made an attempt to implement a Digital Rights Management System for Distance Education known as DRMSDE. We have identified that Multi-Agent System (MAS) based technology is very popular for such type of implementations. Keeping that in mind, we have chosen one of the most popular Multi-Agent based tools, namely JAVA Agent Development Framework (JADE), for our system. This paper presents an overview and the system architecture for the proposed implementation.

Keywords—Distance Education (DE); Intellectual Property Rights (IPR); Digital Rights Management (DRM); Multi-Agent System (MAS); JADE

I. INTRODUCTION

The advancement of Information and Communication Technologies (ICT) touches every aspect of life [1], and knowingly or unknowingly we all are part of this technological revolution. The areas that are affected most are telecommunication, commerce, education, health and the media industry. Education with ICT reaches every corner of the globe within a fraction of a second under the domain of DE. DE is the most demanding and popular education system running in parallel to the traditional education system. The reason behind the popularity of DE is the flexibility of studying with respect to time and place. The main source of DE is DC that includes assignments and text tutorials along with advanced audio and video tutorials. DC may easily be copied and used by multiple users simultaneously. This advantage of DC sometimes becomes problematic because unauthorized users can also use and even modify DC, which is against the content-creators' IPR. Our main purpose is to protect IPR using the technology available with us, and thereby, preventing misuse of content.

Maintaining the rights of the different users in DE is a big challenge and it affects the quality of DE. DRM is the only

solution to this problem. DRM is a combination of hardware and software, collaborating to protect the rights of content creators. There are two generations of DRM [2]; in the first generation DRM, digital contents are locked and the users, who pay, then only use the content. Second Generation DRM includes identification, protection, monitoring, and tracking of all forms of rights, permissions etc.

In this study, we have designed and implemented a Distance Education System (DES) with DRM for protection of IPR for DC. Here we are using both approaches. For text tutorial, we are using second generation DRM and for advanced tutorial we are using first generation DRM. Our system is known as DRMSDE [3]. Here we are using MAS [4, 5] approach for the implementation of our system. An agent based approach is a new paradigm for software implementation. Agents are programs that take some input from systems as well as from some other agents, and perform actions for the system. In MAS at least two or more agents cooperate to achieve system goal. Real world problems can be successfully implemented using MAS. One of the major advantages of agent-based system is that we can easily upgrade the system by introducing a new agent. In case of DE, new experiments are done every time. MAS is good for domains like DE. There are so many tools to implement MAS but among all, JADE [6] is very popular. JADE, is a software framework that is used to build MAS. It is a middleware that includes a run-time environment, library and graphical tools. JADE is in compliance with FIPA specification, it has predefined programmable and extensible agent model that helps to develop MAS. JADE is the most popular agent development tool.

This paper is organized in six sections; Section 2 discusses some literature on agent-based DES. Section 3 describes the proposed DRMSDE system model in which we discuss the different components of our system. Section 4 presents the proposed system architecture, while Section 5 discusses implementation details. Finally, Section 6 concludes our work throwing some light on future applications and scope for improvement.

II. RELATED WORK

In the life cycle of DC we need to protect it from unauthorized users by DRM techniques [7]. DRM can be achieved in two ways [8]—using Right Expressions, and

A Survey on Digital Rights Management in Distance Education

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Abstract: The basic purpose of Distance Education (DE) is to provide quality education regardless of time and space for those who do not continue his/her education in traditional mode due to several reasons. In the digital era, DE uses Digital Rights Management (DRM) to promote quality teaching for all. DRM manages and protects any digital creation, in the education domain, it is used to protect and manage Intellectual Property Rights (IPR). There are many distance education system running around the globe and spreading the essence of quality teaching. In our survey we try to focus on DE, DRM, needs of DRM in DE and discuss some pioneer DE systems that use DRM worldwide and also propose a model DRMSDE for Distance Education system using DRM.

Keywords: Distance Education (DE), Digital Rights Management (DRM), Intellectual Property Rights (IPR)

1. INTRODUCTION

Distance Education (DE) is the most demanding and popular education system parallel to traditional education around the globe. The reason behind the popularity of DE is flexibility in time and place. In DE the learner can learn in different places at the same time (education through telecommunication) or can learn in different places at the different time (e-learning, virtual university) [1]. First correspondence course run by Eminent Historian Febrick Turner for the University of Wisconsin in the late 1800s. The University of Chicago, the University of Wisconsin and the University of Iowa was a pioneer in correspondence education in the later years of 19th and early in the 20th century [1]. In India, DE started in 1962 with the establishment of Correspondence Course in Delhi University [2].

Technological growth was also improving the mode of communication between experts and learners as well as the quality of DE. Thomas Edison predicted use of motion pictures for learning in 1922. In WWII US Army use videotape to train an employee [3]. In 1940s satellites are used in DE. US Army uses the internet for sharing of scientific and technological information. The table below represents milestones in DE.

Table 1. Milestones in Distance Education

Name of Country	Country	Year of Establishment
National Higher Distance Education Program	China	Late 1970 and early 1980
The National University of Distance Education	Spain	1972
Anadolu University*	Turkey	1981
Indira Gandhi National Open University	India	1985
Open University of Hong Kong	China	1989

*Largest University on Earth

Now it is clear that the demand for DE increases day by day, but the major obstacle towards the development of DE is maintaining Intellectual Property Rights (IPR) protection [2]. IPR are the rights given to people over the creations of their minds (WTO, 2003) [4]. For the protection of IPR copyrights act are introduced and violation of this is a punishable offense in many countries. But now in the digital era, it is very easy to violate copyrights act, so amendments in copyrights act towards digital creation are heavily required. Some of the major steps taken toward the betterment of copyrights for digital materials are [5,6,7]:

- World Intellectual Property Organization (WIPO) copyright treaty adopted in Geneva in 1996.
- WIPO is implemented in the US by the Digital Copyright Millennium Act (DCMA) in 1998.
- The European Union passed the EU Copyright Directive in 2001.



Recycling of municipal solid waste into valuable organic fertilizer towards rejuvenation of crop physiology, yield and soil health

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ABSTRACT

Though application of chemical fertilizers has contributed significantly to the huge increase in the world food production, the adverse impacts of it are well known. To develop an organic farming system an experiment was conducted on paddy, in old alluvial soil zone, with vermicompost prepared from screened municipality solid waste and different doses of bio-fertilizer and chemical fertilizer which is productive, profitable, enhances soil health and conserves the natural resource. We compared crop yields, crop morphological and morpho-physiological characters along with economical analysis obtained from three consecutive years experiment (2017 to 2019) along with long-term soil sustainability. It has been observed that 25% NPK fertilizer can safely be supplemented by low cost and natural resource-based vermicompost at 2.5 t ha⁻¹ to achieve long-term sustainability in paddy cultivation that is more productive and profitable.

ARTICLE HISTORY

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KEYWORDS

Vermicompost; bio-fertilizer; chemical fertilizer; soil health; economic analysis

Introduction

Waste is an unavoidable by-product of most human activity. Composting municipal solid waste is an attractive method of resource recovery and waste disposal. According to a conservative estimation, around 600 to 700 million tones (mt) of agricultural wastes (including 272 million tones of crop residues) were generated in India every year (Suthar 2009) but most of it remains unutilized. This huge quantity of wastes can be converted into nutrient rich bio-fertilizer (vermicompost) for sustainable land restoration practices. Nurhidayati et al. (2018) reported that the vermicompost had a lower C/N ratio and indicated that it is more suitable for use as a soil amendment. It is due to the high NH₄⁺ content released and converted into NO₃⁻ through the nitrification process during vermicomposting. On the other hand, rice (*Oryza sativa* L.) is the main food crop in many countries. Food security of these areas largely depends on the productivity of rice. Major thrust should be given to sustain and increase the productivity of rice to meet the increasing demand of huge population. Chemical fertilizers are the major source of nutrients for rice under intensive cultivation which potentially reduces the soil fertility (Biswas et al. 2017). Continuous use of inorganic NPK fertilizers results in a deficiency of micronutrients, an imbalance in soil physico-chemical properties and unsustainable crop production. Nutrient supply in crop system should be economically viable, environmental friendly and socially acceptable without affecting the gross plant production. An important soil restorative management practice is the use of organic manures for crop production. Vermicomposting among other alternatives has been considered as a way to transform these wastes into useful compost for plant and soil, while diminishing their negative environmental impact.



ORIGINAL ARTICLE



Toxicological and therapeutic effects of neem (*Azadirachta indica*) leaf powder in hole-in-the-head (HITH) disease of fish *Anabas testudineus*

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Abstract

Parasitic infection is a major problem of intensive fish farming in present-days. Hole in the head is a very common disease occurred in both freshwater and ornamental fish families, which is mainly caused by the infection of a flagellated protozoan of Hexamitidae family. The use of biologically active pharmaceuticals for the treatment of this disease is gradually decreased due to the major issue of bioaccumulation of these chemical compounds in the environment. Our current study shows an effective way to treat the disease by using leaf powder of medicinal plant neem (*Azadirachta indica*). To assess the therapeutic dose, 96 hr LC₅₀ value of neem leaf powder on *Anabas testudineus* was found 6.2 g/L. The treatment with neem leaf powder healed the wound region of infected fish and improved fish health efficiently. After treatment, the blood cell counts were significantly increased. Improvement in the liver histopathology was observed in the treated groups. We also found the reduced level of MDA, which is an oxidative stress biomarker after treatment. The hepatic activity of CAT, SOD and GPx was also increased in treated groups. Therefore, our study introduces a very effective way to treat hole-in-the-head disease in *Anabas testudineus* by nonhazardous neem leaf powder in fish culture.

KEYWORDS

Anabas testudineus, antioxidant, *Azadirachta* sp., blood cells, hole-in-the-head disease

1 | INTRODUCTION

Aquaculture is a very common practice and profitable business across the world. The fish industry has great potentialities of fulfilling the major demand of animal proteins in the market. Therefore, to improve fish production, intensive fish farming is increasing nowadays (Fere et al., 2018). Despite the increased production, the fish industry is facing many challenges. The infectious disease is one of the major issues which take the lion share of fish production by causing huge loss annually (Azzeff & Abunna, 2018). Fish infection can be caused by pathogenic organisms such as viruses, bacteria, fungi or parasites (Bondad-Reancho et al., 2005). Among them, the parasitic infection is very common and sometimes causes serious disease outbreak (Wootton, 2012). They are directly responsible for the

growth retardation and mortality of fish stock. Additionally, parasitic infections can also alter the fish behaviour and reduce reproductive fitness and the fish become susceptible to other infectious diseases (Williams & Jones, 1994).

Among different parasitic infections, hole in the head (HITH) is a very common disease in fish caused by the infection of a flagellate protozoan of the Hexamitidae family (Pauli & Matthews, 2001). This parasite can infect both freshwater fish and ornamental fish families. Among the freshwater fish, Anabantidae, Belontiidae and Cichlidae are mainly infected. The marine fish families Acanthuridae and Pomacentridae are also prone to this infection (Pauli & Matthews, 2001). The main characteristics of this disease are depigmented skin and eroding hole in the head of fish which can proceed through the lateral line (Amesberger-Frettag



A review on-Volatile-mediated tritrophic interaction

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Abstract

Volatile Organic Compounds (VOCs) are the most important parameter to establish the tritrophic interaction in between insect, plant and predator or parasitoid. Naturally, insect induced plant volatile attract the natural enemies of that insect. These mixtures of volatiles attract predator as well as parasitoid. In this review, objective is the role of VOCs in tritrophic interactions from an ecological as well as an implemented perspective. Several methods are applicable here. More popular technique is VOCs extraction by HS-SPME and headspace push- pull. Qualitative and quantitative volatiles are analyzed by GC-MS & GC-FID. Most important method is GC-EAD for identifying specific VOCs as well as two-choice arena. Most popular specific compounds are fatty acid derivative, aromatic compounds, aldehydes, alcohols, terpenes, amino acid derivative, sesquiterpenes and a ketone. These compounds play a crucial role for tritrophic interaction. Tritrophic interaction enhance the knowledge of predator and prey interaction also. This overview focuses on the how specific VOCs can interact with insect, plant and natural enemy and thus this specific knowledge can be implemented in pest control by biological control method.

Keywords: voes; tritrophic-interaction; predator; parasitoid; biological control

Introduction

Volatiles can intermediate with the interaction of plants with pollinators, herbivores and their natural enemies, other plants and micro-organisms. With full of knowledge about these interactions, the underlying mechanisms become increasingly complex. The increasing scientific knowledge can be used to draw a design and apply volatile-based agricultural strategies [1]. Price *et al.*, introduced this Tritrophic concept in a well manner. The author narrated details of this Tritrophic interaction. In present scenario terrestrial organism interact at least three interacting trophic levels: plants, herbivores, and natural enemies of herbivores [2]. Predatory soil nematodes hunt for root herbivores with the help of volatile cues from damaged or intact roots of 18 Alpine *Festuca* grass species & they found that adaptation into harsh, nutrient-limited alpine environments coincided with the production of specific blends of volatiles that is highly attractive for nematodes [3]. In this interaction middle part is plant which can be triggered by herbivore that may be positive effect or negative effect. All these interactions mediated by volatiles compounds [4]. Herbivore induced plant volatile (HIPV) play a crucial role for this insect-plant and natural enemy interaction.

Materials and methods

Several methods are applicable here. More popular technique is VOCs extraction by HS-SPME and headspace push- pull. Qualitative and quantitative volatiles are analyzed by GC-MS & GC-FID. Most important method is GC-EAD for identifying specific VOCs as well as two-choice arena.

Volatile Organic Compounds (VOCs)

Plants release volatile organic compounds that mediating plant-plant interactions aboveground, roots can detect the chemical signals originating from their neighbours, and

roots release VOCs involved in biotic interactions Belowground [5]. The certain volatile organic compounds (VOCs) can be considered as Damage-associated molecular patterns (DAMPs). Due to their chemical nature, VOCs are supposed to act not only locally and systemically in the same plant but also between plants. The possibility to use such airborne DAMPs as eco-friendly compounds which stimulate natural defense in agriculture in order to avoid pesticides [6]. Herbivore induced plant volatiles (HIPVs) are specific volatile organic compounds (VOC) that a plant produces in response to herbivory. Some HIPVs are only produced after damage, while others are also produced by intact plants, but in lower quantities. VOCs are low molecular weight compounds mostly belong to terpenoids, alcohol, aldehyde fatty acid and amino acid derivative. They are synthesized by different metabolic pathway [7].

Specific VOCs attractant for natural enemy like predator or parasitoid

After herbivore attack on plant, release volatile organic compounds (VOCs). With the help of this VOCs parasitoid and predator find out their host and prey [8]. Green leaf volatiles (GLVs) and terpenoids released from herbivore-damaged plants were found to be most important in the host identifying of parasitic wasps. Such as parasitic wasp *Opius dissitus* showed response to (Z)-3-hexenol [9]. Parasitoid (*Cotesia marginiventris*) responded to these compounds (E)-2-hexenal, (Z)-3-hexenyl acetate, linalool and geranyl acetate after herbivore damaged [10]. Mixture of specific five compounds (E) and (Z)- β -ocimene, (Z)-3-hexenyl acetate, DMNT, TMTT and methyl salicylate were attracted by mite *Phytoseiulus persimilis* [11]. Predators and parasitoids were attracted by two special compounds S-linalool and (E)- β -caryophyllene [12]. *Evarcha culicivora* jumping spider attracted to (E)- β -caryophyllene, α -humulene and 1,8 cineole and attack to their natural enemy [13].

Therapeutic Effects of Metronidazole Benzoate in Combination with Melatonin in Diplomonad Parasite Infection on *Anabas testudineus*

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ABSTRACT

The diplomonad fish parasite of the Hexamitidae family frequently infects the fish *Anabas testudineus* during the warm season, leading to economic loss in the fish farming industry. Parasitic infection causes the generation of a large number of free radicals that promote oxidative stress in the fish body. This oxidative stress may cause direct tissue damage and affects the natural health condition of the fish population. Metronidazole benzoate (MB) is a widely accepted anti-protozoan drug, used to treat the protozoan infection in fish farming. The neurohormone melatonin is a potent free radical scavenger that is well known for its antioxidant, anti-inflammatory, and wound healing properties which can decrease the free-radical damage in liver tissue and reduce oxidative stress in fish body. The use of melatonin alone or in combination with other drugs to treat parasitic infection in fish has not been reported previously. Our current study shows a strong therapeutic potentiality of MB in combination with melatonin to treat the parasitic infection. The combination therapy caused a significant reduction of the lesion marks and the formation of new skin over the scar area. Complete recovery of liver histopathology was observed in the treated groups. The combination therapy also significantly improved blood cell counts to maintain body homeostasis recovery after infection. MB in combination with melatonin treatment gradually decreased the level of oxidative stress biomarker in parasite-infected fish. The level of antioxidative enzymes like, CAT, SOD, and GPx was also significantly increased after treatment, which promotes the health recovery of infected fish. Thus, our study demonstrates that combination therapy of MB and melatonin effectively controls parasitic infection in *Anabas testudineus* which can be used to enhance the productivity in the fish farming industry.

KEY WORDS: AQUACULTURE, HEXAMITIDAE, MELATONIN, METRONIDAZOLE BENZOATE (MB), OXIDATIVE STRESS.

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INTRODUCTION

The spread of infectious diseases in intensive fish farming is of major concern because it causes huge loss annually for the fish culture industry. Protozoan parasites are among the most common cause of fish disease in the culture system than any other fish parasites (Lom and Dyková, 1992; Abowei, Briyai, and Bassey, 2011). The diplomonad flagellate protozoa of the Hexamitidae family are generally intestinal parasites of fish and have

1993



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Eco-friendly management of plant parasitic nematodes

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Abstract

Background/Objective: Root-knot nematodes and cyst nematodes are two important plant-parasitic nematodes that cause severe plant diseases in various plant species around the world. They act as obligate and biotrophic parasite within the plant body. The objective of the study is to review for suitable management to keep the nematode population density below the threshold level. **Methods:** In spite of several nematode control practices such as crop rotation, use of biopesticides or nematicides, each has some limitations of their use but biotechnological applications including RNAi or miRNA represent a potential breakthrough in the application of functional genomics for plant nematode control. Here, a comparison is made between some old and modern nematode management practices but recent data shows that application of RNAi or miRNA has a better option of nematode control in some crop plants. **Findings:** Efficacy and biotechnological success can be maintained by holistic grasping of several soil biological and ecological factors. Therefore, modern approaches those reviewed herein due to their usefulness in minimizing plant nematode populations and increasing crop yield should be incorporated into management systems. The scientific community has entered into a new era that shows the tools to actually unravel the underlying molecular mechanisms, making this an opportunity for a review of our current knowledge and better understanding. **Application:** These modern eco-friendly practices may not quickly perform as synthetic chemicals, but they are pest specific, non-toxic to humans or environment, and also serves as a sustainable tool for disease management. **Novelty:** The present communication identifies plant nematode control approaches with emphasis on modern research. This review article emphasized the importance of modern biotechnological approaches for better crop yield than the common older practices.

Keywords: Root-Knot nematode; biotrophic Parasite; threshold level; nematicides; biopesticide; micro RNA

1 Introduction

Plant parasitic nematodes (PPNs) constitute serious threats on crop yield both in quantity and quality, globally. They are responsible for 10% global crop losses annually which estimates US \$173 billion per year⁽¹⁾. Many of the PPM acts as pests on a

Inhibitory Effects of Acaciasides Isolated from the Funicles of *Acacia auriculiformis* on the growth of *Escherichia coli*

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ABSTRACT

The present study was carried out to establish the effect of acaciaside on Gram positive and Gram negative bacterial community especially to *Escherichia coli*. The inhibitory effect of acaciaside on growth of typical intestinal gram negative pathogen *E.coli* was identified. The degree of inhibition was measured by well disc assay method. In recent days, antimicrobial resistance has become a great global threat to public health systems worldwide. Bacteria pose the greatest threat to human health because of its growing resistance to antibiotics are the members of the enterobacteriaceae family, mainly *E.coli*. *E.coli* is an important contaminant of drinking, agricultural, industrial and recreational water which is a major environmental and public health concern. Acaciaside A and acaciaside B were isolated individually from the funicles of *Acacia auriculiformis*. The mixture of these two acylated triterpenoid bisglycoside saponins are known to have antihelminthic and antimicrobial activity. Here antibacterial activity of the individual compound has been investigated.

Due to continuously increasing number of infections caused by multidrug-resistance *E.coli* as they are transmitted through fecal-oral route among humans and from other environmental sources, the better understanding of the epidemiology of this strain and their mechanism of resistance are key components to cure against their infections. Acaciaside A inhibited the growth of *Escherichia coli*, *Salmonella typhimurium* and *Bacillus megaterium* at 200, 400 and 600 µg/ml, respectively whereas acaciaside B inhibited the growth of *Pseudomonas aeruginosa* at 600 µg/ml. The present investigation reveals the inhibitory effect produced by acaciaside A or in combination with acaciaside B in *E.coli*, and in comparison with other bacterial strain. By this inhibitory effect of acaciaside which acts as a natural product we can minimize the growth of several species of harmful bacteria. In conclusion, *E.coli* revealed a great deal for its presence in the environment, its diversity as well as its main role in the human microbiome and disease. This findings also outcomes its biology and ecology for better understanding of its growth inhibition.

KEY WORDS: ACACIASIDE A AND B, ANTIHELMINTHIC, ANTIMICROBIAL, INHIBITORY EFFECT, SAPONINS.

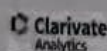
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A review on-Volatile-mediated tritrophic interaction

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Abstract

Volatile Organic Compounds (VOCs) are the most important parameter to establish the tritrophic interaction in between insect, plant and predator or parasitoid. Naturally, insect induced plant volatile attract the natural enemies of that insect. These mixtures of volatiles attract predator as well as parasitoid. In this review, objective is the role of VOCs in tritrophic interactions from an ecological as well as an implemented perspective. Several methods are applicable here. More popular technique is VOCs extraction by HS-SPME and headspace push- pull. Qualitative and quantitative volatiles are analyzed by GC-MS & GC-FID. Most important method is GC-EAD for identifying specific VOCs as well as two-choice arena. Most popular specific compounds are fatty acid derivative, aromatic compounds, aldehydes, alcohols, terpenes, amino acid derivative, sesquiterpenes and a ketone. These compounds play a crucial role for tritrophic interaction. Tritrophic interaction enhance the knowledge of predator and prey interaction also. This overview focuses on the how specific VOCs can interact with insect, plant and natural enemy and thus this specific knowledge can be implemented in pest control by biological control method.

Keywords: voes; tritrophic-interaction; predator; parasitoid; biological control

Introduction

Volatiles can intermediate with the interaction of plants with pollinators, herbivores and their natural enemies, other plants and micro-organisms. With full of knowledge about these interactions, the underlying mechanisms become increasingly complex. The increasing scientific knowledge can be used to draw a design and apply volatile-based agricultural strategies [1]. Price *et al.*, introduced this Tritrophic concept in a well manner. The author narrated details of this Tritrophic interaction. In present scenario terrestrial organism interact at least three interacting trophic levels: plants, herbivores, and natural enemies of herbivores [2]. Predatory soil nematodes hunt for root herbivores with the help of volatile cues from damaged or intact roots of 18 Alpine Festuca grass species & they found that adaptation into harsh, nutrient-limited alpine environments coincided with the production of specific blends of volatiles that is highly attractive for nematodes [3]. In this interaction middle part is plant which can be triggered by herbivore that may be positive effect or negative effect. All these interactions mediated by volatiles compounds [4]. Herbivore induced plant volatile (HIPV) play a crucial role for this insect-plant and natural enemy interaction.

Materials and methods

Several methods are applicable here. More popular technique is VOCs extraction by HS-SPME and headspace push- pull. Qualitative and quantitative volatiles are analyzed by GC-MS & GC-FID. Most important method is GC-EAD for identifying specific VOCs as well as two-choice arena.

Volatile Organic Compounds (VOCs)

Plants release volatile organic compounds that mediating plant-plant interactions aboveground, roots can detect the chemical signals originating from their neighbours, and

roots release VOCs involved in biotic interactions Belowground [5]. The certain volatile organic compounds (VOCs) can be considered as Damage-associated molecular patterns (DAMPs). Due to their chemical nature, VOCs are supposed to act not only locally and systemically in the same plant but also between plants. The possibility to use such airborne DAMPs as eco-friendly compounds which stimulate natural defense in agriculture in order to avoid pesticides [6]. Herbivore induced plant volatiles (HIPVs) are specific volatile organic compounds (VOC) that a plant produces in response to herbivory. Some HIPVs are only produced after damage, while others are also produced by intact plants, but in lower quantities. VOCs are low molecular weight compounds mostly belong to terpenoids, alcohol, aldehyde fatty acid and amino acid derivative. They are synthesized by different metabolic pathway [7].

Specific VOCs attractant for natural enemy like predator or parasitoid

After herbivore attack on plant, release volatile organic compounds (VOCs). With the help of this VOCs parasitoid and predator find out their host and prey [8]. Green leaf volatiles (GLVs) and terpenoids released from herbivore-damaged plants were found to be most important in the host identifying of parasitic wasps. Such as parasitic wasp *Opus dissitus* showed response to (Z)-3-hexenol [9]. Parasitoid (*Cotesia marginiventris*) responded to these compounds (E)-2-hexenal, (Z)-3-hexenyl acetate, linalool and geranyl acetate after herbivore damaged [10]. Mixture of specific five compounds (E) and (Z)- β -ocimene, (Z)-3-hexenyl acetate, DMNT, TMTT and methyl salicylate were attracted by mite *Phytoseiulus persimilis* [11]. Predators and parasitoids were attracted by two special compounds S-linalool and (E)- β -caryophyllene [12]. *Evarcha culicivora* jumping spider attracted to (E)- β -caryophyllene, α -humulene and 1,8 cinole and attack to their natural enemy [13].



Impact of organizational culture on employee motivation and engagement: A study with special reference to IT industry

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Abstract

Organizations grow with human resources and become best with time, through effective functioning with positive culture and employee wellbeing. Organizational culture and organizational climate set a frame work and promote the effective beliefs and values influencing behaviour. The internal working environment of every organization has certain commonly perceived psychological characteristics or traits which are collectively called its climate or culture or. Organization's culture and Climate mainly focuses on the level of employee satisfaction and dissatisfaction, considering the performance of the employees, which results in major impact on motivation, engagement and job satisfaction of individual employees. Organizational climate, therefore affects productivity, motivation and employee behaviour. This paper tries to evaluate the influence of organizational culture and climate in employee motivation and their engagement.

Keywords: Employee motivation, organizational culture, IT industries

Introduction

The core identity of an organization is formed with a set of values, beliefs, and behaviour patterns which can be termed as Organizational culture. It is the specific collection of values and norms that are shared by the people and groups in an organization and that control the way the employees interact with each other and with stake holders outside the organization and is also essentially a learned set of responses of constituent individuals and groups to the organization environment, tasks and problems. It shapes attitudes and behaviors among people in wide-ranging and durable ways and when properly aligned with personal values, drives, and needs, it can unleash tremendous amounts of energy toward a shared purpose and foster an organization's capacity to thrive. Organizational climate on the other side is the recurring patterns of behavior, attitudes and a multidimensional construct that encompasses a wide range of individual evaluations of the work environment. Organizational cultures and Organizational climate has a potentially rich, but widely unrealized and invisible role in the development of an organization as well as to raise the motivation among employees and stimulate them. Brown and Brooks (2002, p. 330) describe climate as the "feeling in the air" and the "atmosphere that employees perceive is created in their organizations due to practices, procedures and rewards." Based on these clauses, obviously the individual view of employees in the organization affects the climate. Climate factors like recognition, competency, environment, team work, management effectiveness, involvement, reward and commitment all these lead to job satisfaction and motivation.

Thus culture and climate are held to influence attitudes in the workplace. Power-oriented culture emphasize upon competitive, responsive to personality rather than expertise. People-oriented culture put pressure on consensual and rejection of management control rejected. Task-oriented culture focus on competency, dynamism. Role-oriented

focus on legality, legitimacy and bureaucracy. Constructive cultures are characterized by organizational norms to achievement and motivation self-actualization and being humanistic and supportive. It helps the staff to meet their higher order satisfaction needs. Defensive cultures encourage or implicitly require interaction with people in ways that will not threaten personal security (Hellriegel *et al.* 1974; Meglino, 1976, Koys and Decotis and cooke and Szumal 2000) [4]. The attributes of organizational climate have been thought to promote job satisfaction and increase motivation at individual level and organizational levels.

Review of Literature

Organizational culture includes an organization's expectations, experiences, philosophy, as well as the values that guide member behavior, and is expressed in member self-image, inner workings, interactions with the outside world, and future expectations. Organizational culture affects the way people and groups interact with each other, with clients, and with stakeholders. Also, organizational culture may influence how much employees identify with their organization (Schrodt, 2002). Organization's norms and values have a great impact on those who are fully devoted to the organization. (Stewart, 2010) [11]. Organizational climate as a set of characteristics that describes an organisation, distinguishes it from other organizations, is relatively enduring over time and can influence the behaviour of people in it (Forehand and Gilmer, 1964) [3]. Both Organizational culture and organizational climate set a frame work within which an individual and group behavior takes place. The internal working environment of every organization has certain commonly perceived psychological characteristics or traits which are collectively called its climate, culture. Organizational climate can be seen as a descriptive concept that reflects the common view and agreement of all members regarding the various elements of the organization

IMPACT OF ORGANIZATIONAL CULTURE ON EMPLOYEE PERFORMANCE AND BEHAVIOUR: AN ASSESSMENT

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Abstract

Today it becomes crucial to set the organizational strategic objectives due to the dynamic nature of organizational culture, its effectiveness and its relationship with employee performance as well as behaviour. This paper basically aimed to assess the impact of organizational culture on employee performance and behaviour. Review of several literatures and researches from libraries are taken as the basis to assess and evaluate the impacts of organizational culture on employees, processes and systems in an organization. Researches highlight that the organizational culture influences the effectiveness, performance, satisfaction and productivity of employees. Different dimensions of culture have been identified so far and the findings of research indicate that value and norms of an organization are based upon the relationship with employees. The objective of an organization is to improve and increase the overall performance level by formulating appropriate strategies.

Keywords: Organization, Culture, Employee, Behaviour, Performance

INTRODUCTION

The effectiveness of Organizational development improves the sustainability on the basis of its certain factors and boost the employee morale and feel them more empowered. The culture of an organization can be improved by its norms, values and

objectives which lead to the improvement of employee commitment as well as the productivity of the organization. The establishment of strong and sound culture in an organization improves the performance level of an employee. The performance of employees can be improve by establishment of a strong and



A SHORT REVIEW ON THE RECENT ADVANCEMENT OF FLUORESCENT PROBES FOR FORMALDEHYDE SENSING 2017 ONWARD

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ABSTRACT

Formaldehyde is not only a ubiquitous chemical pollutant in indoor environments but also a reactive carbonyl species in biological processes. Formaldehyde is endogenously produced through the essential biological processes, including mitochondrial one-carbon metabolism, metabolite oxidation, and nuclear epigenetic modifications. High electrophilic property allows it high reactivity with a wide variety of biological nucleophiles, which can be beneficial or detrimental to cellular function depending on the situation. Therefore, it is important to develop non-invasive sensing technique for monitoring the roles and functions of FA in biological processes. So, development of a rapid, sensitive and facile method to determine the concentration of FA becomes highly desirable. Fluorescence detection technique is highly attractive because of its high selectivity, sensitivity and real-time approach. This review article focuses on various design strategies of the fluorescent probes, their sensing mechanism for detecting formaldehyde in environment as well as in living cells based on different recognition groups from 2017 onward. This area still in prime focus because of the rapid development of the fluorescence probes from lab to indoor in near future.

Keywords: Fluorescent Probe, Sensitivity, Selectivity

1. INTRODUCTION

The simplest aldehyde, formaldehyde (FA), an endogenously produced reactive carbonyl species (RCS), has attracted significant attention in the field of science because of its potential applications in various fields such as cosmetics [1], plastics [2], drugs [3] and industrial chemicals [4]. In addition, FA has been recognised as the third largest indoor chemical pollutant and toxin which is released from plywood manufacturing and vehicle exhaust [5]. Because of its amphibolic nature FA easily enters into the cells as a carcinogen and causes DNA damage by reacting with nucleophilic material actively [6]. Exposure to FA may cause diseases by the combination with DNA. Short-term exposure of FA can cause headache [7], tingling sensation in the throat [8], dyspnoea and its long-term exposure may cause memory loss [9], cancer [10] even death [11]. Moreover the Alzheimer's disease is related to the intake of FA [12]. In 2004 International Agency for Research on Cancer (IARC) has categorized FA in Group I, carcinogenic [13] to humans whereas China has ranked it second in the control list of chemicals toxic to humans [14]. The United States Environmental Protection Agency suggested the limit of FA as 0.2 mg kg^{-1} of body weight in

daily life and WHO set it as 0.15 mg kg^{-1} . In spite of being hazardous product, FA exists in all cells and plays a vital role in the carbon cycle of metabolism. In living systems, endogenous FA may be generated in many biological processes such as one carbon metabolism [15], various demethylation events [16] or methylation metabolism of methylation of DNA [17]. In a normal physiological brain, the concentration of formaldehyde ranges from 0.2 mmol to 0.4 mmol . At this level, formaldehyde is essential to the memory formation via DNA demethylation cycles and cognitive ability [18]. However, the physiological function of FA is still not clear. Moreover, FA certainly performs as a key signalling molecule in the course of disease development and may be a target for drug release. Therefore, FA acts as a double role not only in public health but also in industrial development. Thus, it is very important to develop facile, selective and reliable methods to detect FA for environmental monitoring and biological study. At present several methods have been used for the detection of formaldehyde including piezoelectric sensors [19], electro-chemical biosensors [20], quartz crystal microbalance [21] Raman spectroscopy [22] colorimetric assay [23] gas chromatography [24] mass spectrometry



A Review on the Development of Spectroscopic Sensors for the Detection of Creatinine in Human Blood Serum

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Abstract: Creatinine measurement is the key parameter in detecting renal, muscular and thyroid dysfunction. The accurate detection of creatinine level may be informative regarding the functional processes of these systems and help in early detection of acute diseases. There are lots of techniques available for detecting creatinine in human blood serum, most of them are of mainly based on spectroscopic (spectrophotometry, colorimetry and fluorimetric). Other techniques are based on electrochemical, impedimetric, Ion Selective Field-Effect Transistor (ISFET) and chromatography techniques. Each method has its own advantages and few limitations (limitation would be better word) regarding selectivity, sensitivity, reproducibility, cost effective, point-of-care level detection etc. Few methods based on electrochemical techniques are recently promising in detecting creatinine at the point-of-care level with adequate sensitivity and selectivity. On the other hand some biosensors based on spectroscopic techniques are recognized as the most promising substitute in recent years. As creatinine levels in the blood serum offer better information about patient status, here in this review it is thoroughly discussed over other biological samples such as urine, saliva.

Keywords: Creatinine, Spectroscopic, Fluorescent, Sensors, Selectivity

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Recent Advancement in Fluorescent Probes for Sensing and Imaging Tyrosinase Activity in Living Cells

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Abstract: Tyrosinase, a multi-copper oxidase enzyme, is widely distributed in different organisms and plays a vital role in the melanogenesis and enzymatic browning in fruits and vegetables. An abnormal level of tyrosinase in the living system is often associated with different kinds of skin diseases including albinism, vitiligo, skin hyperpigmentation etc. Moreover, overexpressed tyrosinase has become a prognostic biomarker for melanoma. Therefore early detection of tyrosinase activity both in vivo and in vitro has a potential diagnostic and therapeutic application. Small-molecule fluorescent probes have become a powerful device over the traditional biochemical method for the detection and imaging of enzymatic activities in biological systems by virtue of their superior sensitivity, nondestructive fast analysis, spatiotemporal resolution and real-time detection abilities. Moreover, due to their structural tunability, several small-molecule fluorescent probes have been developed to meet various aspects such as enhancing sensitivity, selectivity, cell permeability, real-time monitoring and easy imaging in biological systems. This review article sums up the recent progress of small-molecules fluorescent probes for tyrosinase activity, including their synthesis strategies, mechanistic paths and potential applications based on reports mainly in the past five years. The rapid advancement in this field suggests that fluorescence detection and imaging is a promising technology and widen up new horizons for early diagnosis of melanoma.

Keywords: Tyrosinase, Melanoma, Fluorescent, Probe, Biomarker, Cell

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FINANCIAL PERFORMANCE OF INDIAN PHARMACEUTICAL INDUSTRY BEFORE OUTBREAK OF COVID 19: AN EMPIRICAL ANALYSIS

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ABSTRACT

Pharmaceutical industry is playing a vital role in development of the economy and social wellbeing of any country. With a huge population Indian economy depends on pharmaceutical industry heavily especially during the period of COVID 19. Some of Indian pharmaceutical companies have been able to adapt themselves to the new situation while the others are suffering. So, it is high time to measure the financial performance of the industry. Over this background, present study seeks to make a comparison, particularly in respect of performance of different financial aspects, between multinational and domestic companies in the Indian pharmaceutical industry during fifteen-year period from 2004-05 to 2018-19. The time-frame of the study is just before the world-wide outbreak of COVID 19. This is because, the study tries to know how well-off the industry was in the aspect of financial performance before outbreak of COVID 19. This will help us to know the financial background in terms of strengths and weaknesses of the industry to cope up with the adverse situation of COVID 19. The sample size of the study consists of twenty pharmaceutical companies by taking ten companies from each of the multinational and domestic sectors. The issue has been tackled using appropriate statistical measures.

Keywords: Pharmaceutical Industry, Financial Analysis, Multinational, Domestic, COVID 19

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1. INTRODUCTION

The pharmaceutical industry, which is a part of the healthcare industry, is an indispensable industry of any country. With a huge population Indian economy depends on pharmaceutical industry heavily especially during the period of COVID 19. Some of Indian pharmaceutical



GENERAL RELETIONSHIP BETWEEN INDIAN NYAYA PHILOSOPHY WITH SANSKRIT

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ABSTRACT

In the foregoing pages we have attempted a study of ' the influence of Nyaya philosophy on the various aspects of Sanskrit Poetics. In the course of our study we have examined various Nyaya concepts in relation with the Poetic concepts. We have had an opportunity of studying the poeticians who have been influenced by the Naiyayikas and also the conditions and times in which they composed their treatises. The evolution of the poetic concepts under the growing influence, of Nyaya logic is also observed and brought to light. We come to realise that the Sanskrit Poetics manifests its deep relation with the principle tenets of Nyayasastra of Gautama and his successors as well as Buddhist logicians. The important theoris of Kavysbastra such as Sabdavr̥tti, Ras Dhvani, Dosa and Alankara have been influenced to a great extent by the logical concepts of the schools of Nyayasystem. The Nyaya theory of Sabdavr̥tti and the means of Saktigbaha have influenced the poeticians like MahimsHbhatta, Mammata, Kesavamisra and Jagannatha etc. The Nyaya theories of tatparya and anvltabhldhana have influenced a rhetorician like Bhoja in treating tatparya (intension of the speaker) as a separate Sabdavr̥tti. He holds the view that words convey the sentence meaning by their cumulative effect (samhatyakarjta). In this regard he follows Jayantabhatta who in his KM advocates attributes of the cumulative effect (samhatyafeakti) to the tatparyafeakti of words.

KEYWORDS: Interpreting Of Nyaya, Philosophy, Sanskrit, Naiyayikas

INTRODUCTION

Much is being written about hermeneutics these days. Yet few books come out that deal with the specific questions of interpretation that confront the Indologist who studies philosophical Sanskrit texts. The two books under review, however, do deal with these questions, even though it is from altogether different points of view and with completely different results.¹ It will be interesting to study them side by side. A. P. Tuck's Comparative Philosophy and the Philosophy of Scholarship present a survey of modern Nāgārjuna studies. The titles of three of the four chapters of the book leave no doubt as to the point its author wants to make. They are: "Nineteenth-century German idealism and its effect on second-century Indian Buddhism"; "Analytic India"; "Buddhism after Wittgenstein". If these titles — as well as some of the contents of these chapters — sound somewhat ironic, they do draw attention to the prejudices and presuppositions that have always influenced scholars in their work and are likely to continue doing so in the future. Tuck speaks in this connection of isogesis, which he defines as "a 'reading into' the text that often reveals as much about the interpreter as it does about the text being interpreted". Isogesis, Tuck further explains, is an unconscious phenomenon that is to be distinguished from exegesis, which is conscious intent. All this is very interesting, not only for the philosopher

A STUDY ON THE GROWTH OF GENERALIST ITERATED ENTIRE FUNCTIONS

RATAN KUMAR DUTTA

ABSTRACT. In this paper we study growth properties of generalist iterated entire functions.

Key Words: Entire functions, Growth, Iteration.

2010 Mathematics Subject Classification: 30D35.

1. INTRODUCTION, DEFINITIONS AND NOTATIONS

For any two transcendental entire functions $f(z)$ and $g(z)$ defined in the open complex plane C , it is well known [3] that $\lim_{r \rightarrow \infty} \frac{\log T(r, f \circ g)}{T(r, f)} = \infty$ and $\lim_{r \rightarrow \infty} \frac{\log T(r, f \circ g)}{T(r, g)} = 0$. Later on Singh [12] investigated some comparative growth of $\log T(r, f \circ g)$ and $T(r, f)$. Farther in [] he raised the problem of investing the comparative growth of $\log T(r, f \circ g)$ and $T(r, g)$. However some results on the comparative growth of $\log T(r, f \circ g)$ and $T(r, g)$ are proved in [].

Recently Banerjee and Dutta [], and Dutta [], [], [] made close investigation on comparative growth properties of iterated entire functions to generalist some earlier results.

In this paper we consider three entire functions $f(z)$, $g(z)$ and $h(z)$ and following Banerjee and Mandal [] form the iterations of $f(z)$ with respect to $g(z)$ and $h(z)$ [defined below] and generalist the results of Banerjee and Dutta [] in this direction.

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নব্য মানবতাবাদের প্রতীক নজরুলের ‘মানুষ’ কবিতা মমতা খাঁ

রবীন্দ্রযুগে নজরুল ইসলাম সাম্যবাদের আলোকে কবিতাকে মানবতার দৃষ্টিকোণে প্রত্যক্ষ করেছিলেন। সাম্যবাদের অন্যতম কবিতা ‘মানুষ’ তাঁরই প্রতীক। কবিতায় নব্য মানবতাবাদের জয়গান ঘোষিত হয়েছে। তাই এই কবিতার প্রাসঙ্গিকতা যুগে যুগে প্রবহমান। সমাজজীবনের অবিচার শোষণের বিরুদ্ধে তাঁর প্রতিবাদ সাম্যবাদী কাব্যগ্রন্থে প্রকাশিত। ‘সাম্যবাদী’ কাব্যগ্রন্থের অন্তর্গত ‘মানুষ’ কবিতাটিতেও নজরুলের সেই প্রতিবাদী কণ্ঠস্বর শোনা যায় মানুষের প্রতি অত্যাচার উপেক্ষার বিরুদ্ধে। সর্বজীবে সমভাব প্রদর্শন করে সেই উপেক্ষিত মানুষেরই জয়গান করেছেন কবি এই কবিতায়।

মূল শব্দ : সাম্যবাদী কাব্য, মানুষ কবিতা, নব্য মানবতাবাদ, প্রতিবাদী কবি, বর্তমানে প্রাসঙ্গিকতা।

সমাজ জীবনে মানুষের প্রতি উপেক্ষা অত্যাচারের বিরুদ্ধে সোচ্চার হয়েছিলেন রবীন্দ্রযুগের অন্যতম প্রতিবাদী কবি কাজী নজরুল ইসলাম। তাঁর ‘সাম্যবাদী’ (১৯২৫) কাব্যগ্রন্থের অন্যতম কবিতা ‘মানুষ’ একাধারে প্রতিবাদ ও নব্য মানবতাবাদের মূর্ত প্রতীক। এই কবিতায় জাতি, ধর্ম, বর্ণ, সম্প্রদায় নির্বিশেষে মানুষের জয়গান ঘোষিত হয়েছে। ‘সবার উপরে মানুষ সত্য’— এই চিরন্তন সত্যকথাটি প্রকাশিত কবিতাটির মধ্যে। তাই কবিতাটির প্রাসঙ্গিকতা আজও প্রবহমান। কবিতাটির সমকালীন প্রেক্ষাপট, প্রকাশভঙ্গি, স্বাভাবিকতা, শিল্পগতভাবনা সমকাল প্রযোজ্য না হলেও কবির চিন্তাশক্তিতে নব্য মানবতাবাদের প্রসঙ্গটি চিরকালীন এবং সর্বসময়ে প্রাসঙ্গিক। আলোচ্য প্রবন্ধের স্বল্প পরিসরে সেই বিষয়টির বিশ্লেষণের প্রয়াস রইল।

কবি শৈশবকাল থেকেই জীবন অভিজ্ঞতায় মানুষের প্রতি নির্মম শোষণ, উপেক্ষা, বঞ্চিত প্রত্যক্ষ করে এসেছেন। নজরুলের কাব্যে হিন্দু-মুসলমান সমন্বয়ধর্মীতা প্রকাশ পেয়েছে। ইউরোপীয় নবজাগরণের আলোকে এই দুই সংস্কৃতি নব সংস্কৃতিতে পরিণত হয়েছে। এই দুই সংস্কৃতির মিলনসাধনায় কবি নজরুলের অবদানও কম নয়। ভারত ব্রিটিশ সাম্রাজ্যের অতর্ভূত হওয়ার কারণে এদেশের বাংলা সাহিত্যের মুসলমান সাহিত্যিকরা একটু নিরুৎসাহ হয়ে পড়েন। তাঁর পূর্বপুরুষেরা জীবনমুখী সাহিত্য রচনা করে উদার ও নবজাগরণের উত্তরাধিকারী রূপে নিজেদের পরিচিত করেছিলেন। কিন্তু ব্রিটিশ সাম্রাজ্যের প্রভাবে উত্তরাধিকারী

লোকায়ত সংস্কৃতি চর্চায় কালুরায়ের গাজন : একটি সমীক্ষা মমতা খাঁ

বাংলার লৌকিক দেবদেবীদের অবলম্বন করে মধ্যযুগে গড়ে উঠেছিল মঙ্গলকাব্য। মঙ্গলকাব্যগুলির মধ্যে উল্লেখযোগ্য হলো মনসামঙ্গল, চণ্ডীমঙ্গল এবং ধর্মমঙ্গল। এই মঙ্গলকাব্যের দেবদেবীদের মধ্যে বিগত ঊনবিংশ শতাব্দীর শেষদশক থেকে পশ্চিমবঙ্গের লৌকিক ধর্মানুষ্ঠান এদেশের গভীতমণ্ডলীর দৃষ্টি আকর্ষণ করে আসছে, তা হলো ধর্মদেবতার পূজা। এই ধর্মদেবতার মাহাত্ম্যসূচক নানা কাহিনি লোকগাথার মাধ্যমে ক্রমে ক্রমে বিভিন্ন স্থানে প্রচারিতও হয়েছে। এই ধর্মদেবতা এক এক জায়গায় এক এক নামে প্রচারিত। যথাক্রমে কালুরায়, বুড়ারায়, কৌতুকেরায়, যাত্রাসিদ্ধিরায়, বাঁকুড়ারায় ইত্যাদি। হুগলি জেলার অন্তর্গত আরামবাগ মহকুমার একটি প্রত্যন্ত গ্রাম বায়ড়া কানপুর। এই প্রত্যন্ত গ্রামেই ধর্মদেবতা কালুরায়ের অবস্থান। এই দেবতা সম্পর্কে পৌরাণিক ও অপৌরাণিক নানা ব্যাখ্যা মিললেও লৌকিক এই দেবতা গ্রামের সাধারণ মানুষের আশ্রয়স্থল। অনেকদিন ধরে তাই মানুষের আগ্রহ ও বিশ্বাসকে কেন্দ্র করে ধর্মের গাজন উৎসবে গ্রামে কালুরায়ের স্থান উল্লেখযোগ্য হয়ে উঠেছে লোকচক্ষুর অন্তরালে। এই লোকায়ত সংস্কৃতিচর্চা বাংলার সামাজিক ও সাংস্কৃতিক ইতিহাস রচনার ক্ষেত্রে এক অভিনব প্রয়াস বলা যায়। কিন্তু সবচেয়ে বড়ো কথা এই প্রত্যন্ত গ্রামটি স্বয়ংসম্পূর্ণ হয়ে ওঠে এই লৌকিক দেবতার উৎসবকে কেন্দ্র করে। জনপ্রিয়তার দিক থেকে শীর্ষস্থানে পৌঁছতে না পারলেও ধর্মদেবতা কালুরায়ের পূজাকে কেন্দ্র করে যে গাজন উৎসবটি পালন হয় তা আর পাঁচটা গ্রামের উৎসবের চেয়ে কিছু কম নয়। এই সমীক্ষায় সেই অখ্যাত গ্রামের লৌকিক ধর্মদেবতা কালুরায় ও তার গাজন উৎসবকে কেন্দ্র করে একটি লোকায়ত সংস্কৃতিচর্চা সম্পর্কে আলোচনার প্রয়াস রইল।

আলোচনার পূর্বে লৌকিক দেবতা ধর্মঠাকুর কালুরায় সম্পর্কিত পৌরাণিক ও লৌকিক ইতিহাস সম্পর্কে যে তথ্য প্রচলিত আছে তা জানা প্রয়োজন। বাংলার লৌকিক দেবতাকে অবলম্বন করে যে কাব্য প্রচলিত আছে সমাজে তা হলো মঙ্গলকাব্য। মধ্যযুগের সাহিত্যে মঙ্গল অভিধেয় কাব্যে কীর্তিত লৌকিক দেবদেবী নিয়ে রচিত মঙ্গলকাব্যগুলির মধ্যে ধর্মমঙ্গল উল্লেখযোগ্য। বাংলা মঙ্গলকাব্যের দেবদেবীদের কাহিনি বাংলার যে সামাজিক স্তর থেকেই উঠে আসুক না কেন কালক্রমে তা শিক্ষিত হিন্দু সমাজের বিষয়বস্তু হয়ে যাওয়ায় সেগুলির উপর পুরাণের প্রভাব পড়েছে। ফলে লোকায়ত আখ্যায়িকার সঙ্গে পৌরাণিক দেবদেবীদের ঐক্য স্থাপিত হলে তা 'দেবতার মাহাত্ম্য প্রচার মূলক রচনা' হয়ে গেছে। আশুতোষ ভট্টাচার্যের মতে—



Effect of Heavy Metals on Fishes: Toxicity and Bioaccumulation

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ABSTRACT

Heavy metal pollution is a serious problem for the environment due to their toxicity, persistency, bioaccumulation, and bio magnifications property. Heavy metal contamination in the environment can occur from different natural and anthropogenic sources. The natural sources of heavy metals are mainly volcanic eruption and weathering of metal-bearing rocks, while the anthropogenic sources of heavy metals include agricultural and industrial activities, combustion of fossil fuel and gasoline, waste incinerators, mining, etc. The mobilization of these heavy metals to the aquatic ecosystem alters the physicochemical property of water which is hazardous for aquatic organisms. Heavy metals mainly enter the fish body through gills, body surface and digestive tract during ingestion of metal accumulated food materials. Cadmium, chromium, nickel, arsenic, copper, mercury, lead and zinc are the most common heavy metal pollutants that cause severe toxicity in fishes. Development of oxidative stress is the fundamental molecular mechanism of metal toxicity. The stress weakens the immune system, causes tissue and organ damage, growth defect and reduces reproductive ability. The rich source of high-quality protein filled with vitamins and omega-3 fatty acids encourage the human being to uptake fish as a major food source. So, accumulated heavy metals in the fish tissues directly transfer to the human body and cause toxic effects to expedite various diseases. Therefore, it is necessary to discuss the sources of heavy metals and their toxic effect on fish health to enforce the law and legislations regarding their protection in the aquatic environment and also to save human life.

Keywords: Heavy metal; Aquatic ecosystem; Bioaccumulation; Toxicity; Oxidative stress

INTRODUCTION

Environmental pollution is one of the major challenges for human society nowadays [1]. Due to the fast-growing industries, increased energy demand and careless destruction of natural resources from the last few decades environmental pollution is increasing day by day [2]. Different organic and inorganic toxic materials are constantly releasing from various natural and anthropogenic sources in the soil and aquatic ecosystem. Among them, heavy metals are playing a major role in environmental pollution, not only for their toxic nature but also possessing the potentiality of bioaccumulation in the food chain [3]. Heavy metals are mostly releasing from domestic and agricultural waste products, industrial waste materials, combustion of fossil fuels, mining, waste water treatment plants to the natural ecosystem [4].

Since heavy metals are persistent in the natural ecosystem, once enter into the living organism, it can accumulate inside. The heavy metals that contaminate the soil are easily taken up by the plants and lead to different adversity e.g. chlorosis, growth inhibition, defect in water balance and photosynthesis, senescence, and finally death [5]. The soil contamination of heavy metals also affects

the microbiological balance and reduced soil fertility [6]. The heavy metals can easily dissolved in the aquatic environment and subsequently enter into the body of aquatic organisms [7]. In the course of the food chain, those metals then enter into the body of higher animals. Bioaccumulation of toxic heavy metals in the different tissues may harm animal health and causes damage to their normal physiological processes [8]. Heavy metal toxicity drastically affects the rate of survivability and reproductive capacity of the organisms. Some of these have been reported to be highly carcinogenic, mutagenic and teratogenic depending on the species, dose and exposure time [9].

Aquatic biota directly exposed to the heavy metals that dissolved in water or present as sediment in the water body [10]. Being the top consumers of the aquatic ecosystem fishes are affected most [11]. Heavy metal toxicity sometimes damages the nervous system of fish that affects the interaction of fish with its environment [12]. Humans are omnivorous and exposed to toxic heavy metals by different food items such as fish, vegetables and cereals. Therefore, the heavy metal contamination in the body of aquatic organisms or plants can biomagnified and persist in the food chain, results in

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RESEARCH ARTICLE

Organizational culture and Employee engagement: A Review of selected studies

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ABSTRACT:

The study attempts to examine the effect of organizational culture on employee engagement and performance and its evaluation has been identified by certain selected researcher's research. The main aim of research article is to identify and determine strong relationship between organizational culture and employee engagement as well as performance. Employee engagement and effectiveness could prove to be an excellent parameter to assess the health of the organization as such with regards to satisfaction, innovation, commitment, retention and productivity. Literature review is adopted as methodology to review the culture of an organization upon employee engagement and performance. The owners and top management of an organization generally tends to have a large impact on establishing a culture. Organizational culture plays a vital role in engaging the employees and enhancing their performance. Organizational culture must be united all members and employees of the organization as this will encourage uniformity among members of the organization and this enhance commitment, group efficiency and overall performance of employees. In this study it was tried to look at the effect of organizational culture on employee's engagement and performance with evidence of selected related literatures.

KEYWORDS: Organizational Culture, Employee Engagement, Performance, Satisfaction.

INTRODUCTION:

Organizational culture defines the way of employees' complete tasks and interacts with each other within the organization. The cultural pattern comprises various beliefs, values, rituals and symbols that govern the operating style of the people within a company. Organization culture binds the employees together and provides a direction for the growth of company. Organizational culture is the element that drives organizations and therefore developing an organizational culture which stimulates innovation and creativity, is a key and strategic option for strengthening the organization and making it more competitive (S.M. Hazem, 2019).

The progress of an organization or industry depends upon the engagement of its workforce, and organizational culture is one of the factors that drive employee engagement (Mc Bain 2007; Lockwood 2007). Different cultural background operating in one company can also impact employee performance. Organizational culture impacts on commitment and satisfaction of the employees, performance and employee engagement (Uddin et al., 2012). Efficient work culture helps employees feel empowered and satisfied with the work environment, thereby making them feel engaged in their work. Organizations with a positive and strong culture can lead to a highly motivated and committed employee whereas a negative and weak culture may demotivate an outstanding employee to perform and end up with no achievement. The engagement is achieved when people consider that their organization respects their work, their work contributes to the organizational goals and more importantly their personal aspirations of growth are met.

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Treatment of copper nanoparticles (CuNPs) for two spermatogenic cycles impairs testicular activity via down-regulating steroid receptors and inhibition of germ cell proliferation in a mice model

Vanrohlu Nicy, Milirani Das, Guruswami Gurusubramanian, Pradip Mondal & Vikas Kumar Roy

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RESEARCH ARTICLE

Organizational culture and Employee engagement: A Review of selected studies

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ABSTRACT:

The study attempts to examine the effect of organizational culture on employee engagement and performance and its evaluation has been identified by certain selected researcher's research. The main aim of research article is to identify and determine strong relationship between organizational culture and employee engagement as well as performance. Employee engagement and effectiveness could prove to be an excellent parameter to assess the health of the organization as such with regards to satisfaction, innovation, commitment, retention and productivity. Literature review is adopted as methodology to review the culture of an organization upon employee engagement and performance. The owners and top management of an organization generally tends to have a large impact on establishing a culture. Organizational culture plays a vital role in engaging the employees and enhancing their performance. Organizational culture must be united all members and employees of the organization as this will encourage uniformity among members of the organization and this enhance commitment, group efficiency and overall performance of employees. In this study it was tried to look at the effect of organizational culture on employee's engagement and performance with evidence of selected related literatures.

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POLYNUCLEAR GOLD (III) COMPOUNDS AS ANTICANCER AGENTS

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ABSTRACT

From extensive *in vitro* (cell-based) and *in vivo* (animal based) studies it is observed that different gold complexes reveal unique biological and medicinal properties. Particularly, gold(III) compounds have attracted special interest as efficient cytotoxic and antitumor agents because of their structural similarity with the most extensively used anti-cancer drug, cisplatin. Recently, new classes of polynuclear gold(III) compounds were synthesized and characterized that showed improved stability profiles with significant anti-cancer activities and majority of them are also capable to overcome cisplatin resistance. The implementation of appropriate ligand selection strategies plays the vital role in this connection as metal-ligand coordination improves the efficiency of these compounds against the selective cancer cell lines with reduction of unwanted side effects. The primary aim of this review is to sum up the chemistry and biological activities of some novel representative polynuclear anticancer gold(III) compounds that making themselves efficient for further pharmacological evaluation. The correlation of their stability and cytotoxicity with the nature of the corresponding ligands is outlined here. The importance of multinuclearity in modulating and enhancing the biological actions of anticancer gold(III) drugs compare to their mononuclear analogue is also discussed.

Keywords: Polynuclear Gold(III) Compound, Ligand Effects, Chemistry, Antitumor Activity.

1. INTRODUCTION

Cancer is a disease which is originated from the mutation of genes. It causes a sequence of alterations in cellular activity with persistent or uncontrolled inflammation in the tumour micro location that leads to the spread of cancer [1, 2]. In the 1960s, a new period of metal-based drugs started by the discovery of cisplatin which is still effectively used as anti-cancer chemotherapeutic drugs by inhibiting cancer cell activities through the formation of DNA-platinum adducts [3]. This non-selective DNA-targeted mechanism creates numerous toxic side effects like cardiotoxicity, nephrotoxicity and neurotoxicity [4, 5]. The clinical success of anticancer platinum(II) compounds suggests that other metal-based compounds may similarly serve as antitumor drugs hopefully by displaying different patterns of selectivities and activities.

Since ancient times, gold compounds have been used effectively to treat inflammation, infection and tuberculosis in traditional Chinese, Egyptian and Indian medicines [6, 7]. From 1980's, a few investigations have been done on different gold compounds in +3 or +1

oxidation states. It is reported that gold compounds perform their bioactivities through a "DNA-independent mechanism" [8] and hence they were considered soon as possible antiproliferative agents after the discovery of cisplatin. Though gold(I) compounds are found to be quite active *in vitro* [9-11] but almost ineffective *in vivo* due to their extensive binding to serum proteins and inactivation. On the other hand, gold(III) compounds attract special interest in cancer treatment as gold(III) ions are isoelectronic and isostructural to platinum(II) complexes and adopt square planar geometry like cisplatin. Hence they may exhibit similar biological actions like cisplatin. Consequently, a major effort has been dedicated to use gold(III) species in the treatment of cancer and many other diseases [12]. In spite of showing high *in vitro* cytotoxicity, the use of gold(III) compounds as experimental anticancer agents is limited due to its poor chemical stability under physiological conditions with possible quickly reduction to the more labile gold(I) and rather pronounced systemic toxicity [13] in animal models. In order to inhibit reduction and stabilize the apparently more active Au(III) oxidation state, a number of organic ligands containing different



Anticancer activities of polynuclear gold(I) complexes: A critical survey

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ABSTRACT

The development of transition metal based anticancer drugs is currently a very active field in Medicinal Inorganic Chemistry. The most remarkable success in this field is the effective use of platinum(II) based complexes against cancer. Several scientists make efforts to discover new inorganic agents for use in chemotherapy with improved specificity and decreased toxic side effects than the most common anticancer drug cisplatin. Nowadays, gold(I) compounds are potentially attractive as anticancer agents due to the unique chemical properties of the gold(I) center. Recently, a number of gold(I) compounds reveal outstanding antiproliferative properties without undesirable side effects and are also able to overcome cisplatin resistance. Polynuclear anticancer gold(I) compounds are a comparatively new and successful approach in respect. Extensive effort has been put to elucidate their mechanisms of action and to optimize their bioactivity through structural modification. In this review, the development of some novel polynuclear gold(I) anticancer drugs are discussed on the basis of the available experimental evidences.

Keywords: Polynuclear Gold(I) Compounds, Anticancer Activities.

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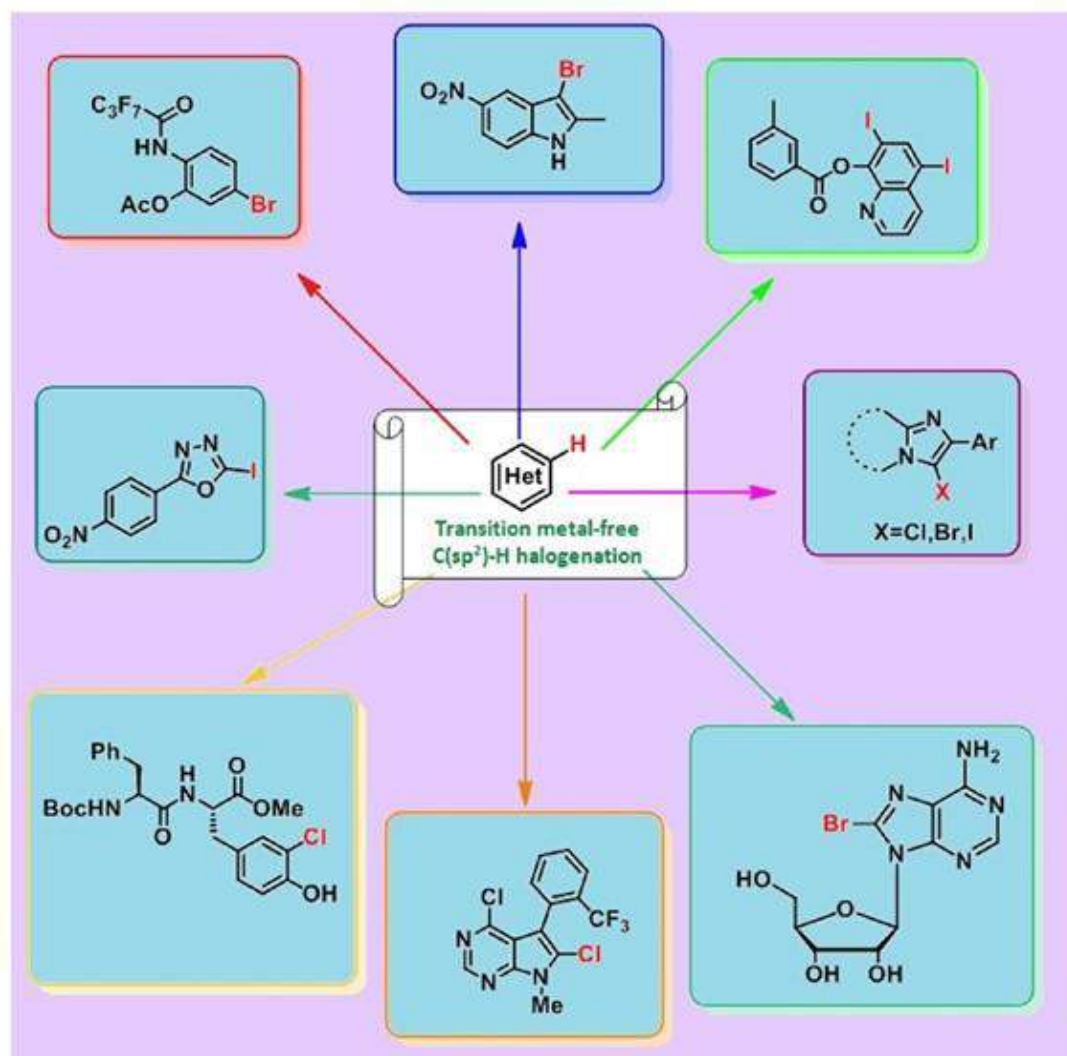
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INTRODUCTION

After cardiovascular diseases, cancer is considered as the second most fatal disease [1] that originates from the mutation of genes. The spread of cancer occurs through a sequence of alterations in cellular activity with continual or uncontrolled inflammation in the tumor micro location [2]. A new period of metal-based drugs initiated by the discovery of one of the leading platinum-based drugs 'Cisplatin' which is still successfully used in chemotherapy by inhibiting cancer cell activities through DNA-platinum adducts formation [3]. In spite of having powerful anticancer activity, cisplatin causes some undesirable side effects like cardiotoxicity, nephrotoxicity and neurotoxicity due to its non-selective DNA-targeted mechanism [4]. Moreover, it is effective against only a few kinds of cancers. Therefore, research in this field has been extended to include new non-platinum based antitumor drugs with an improved spectrum of efficiency and lower toxicity. Complexes of coinage metals (copper, silver and gold) are prospective candidates to fulfill this requirement. In this regard, gold(I) compounds acquire special attention because of their long and traditional uses in medicine [5] as antiarthritic agent. Extensive research on gold(I)-based antitumor agents was initiated when commercially used anti-arthritis gold(I) drugs showed potent cell growth inhibiting effects *in vitro* and some experimental *in vivo* models [6-9]. Moreover, a large number of anticancer gold(I) complexes have better activity than cisplatin and they effectively overcome the cisplatin resistance [10] tumor cell probably through different mechanisms from cisplatin. Consequently, they may be selected as effective antiproliferative agents after the discovery of cisplatin. Gold(I) compounds are quite active *in vitro*, but not so effective *in vivo* due to their extensive binding to serum proteins [7]. In addition, some of the gold(I) create distinct systemic toxicity in animal models. In order to minimize the systemic toxicity and to enhance the anti-cancer activities, a number of stable coordination compounds of gold(I) are prepared using suitable organic ligands with different substituents. Some of these complexes with modified ligands show promising anti-cancer activities targeting to mitochondria as well as reduce relevant systemic toxicity by affecting just the cell cycle of tested cells [11].

Generally, polynuclear anticancer gold compounds are obtained by the "fusion" of two or more mononuclear units. Here, the activity of each gold center is controlled by the molecular framework as well as its interactions with the nearby gold center(s). Notably, addition of two or more metal centers in an extended molecular frame work may considerably influence its specific biological activity compare to its

Organic & Supramolecular Chemistry

Recent Update on Transition Metal-Free C(sp²)-H Bond Halogenation in (Hetero) ArenesSourav Mal, Manoranjan Jana,* and Satinath Sarkar^[a]



INDIAN PHILOSOPHICAL SYSTEM ON SANSKRIT POETICS

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Abstract – Poetics, the science of poetry (kavya) known by numerous names such as liavyasastra Alankarasastra, Sahityasastra in Sanskrit literature is a fully developed discipline which deals with the nature of kavya and its important aspects, viz., Rasa, Alankara, Guna, Dosa and many others in a comprehensive and critical manner. The continuous literary activities of the Sanskrit poetics over a period extending from the hoary antiquity upto the eighteenth century A.D, resulting in the form of original works, commentaries and sub-commentaries have made this important Sastra detailed in its nature and varied in its scope. But the exact time of the origin of this science is not known. Bharata's Natyasastra (NS) is considered as the earliest available work dealing with the poetic theories in the field of Sanskrit literary criticism. But the origin of the Sanskrit Poetics is definitely prior to the NS of Bharata. For, in various works we find references to some authors like Nandikesvara, Kasyapa etc., who have probably preceded Bharata and whose works are not available to us. They seem to have significantly contributed to this science. Bhamaha tells us that he had predecessors whose works apparently he had utilized. While referring to these predecessors generally as anye, spare; and kecit Bhamaha cites -twice by name one Medhavin, probably a Buddhist Poetician.

Key Words – Nyaya Philosophy, Bharata's Natyasastra, Sanskrit Literary Criticism

INTRODUCTION

Sanskrit Poetics has a very long history of uninterrupted development which witnessed various changes in contents and outlook. In the field of poetics we find much by way of growth as a result of dialectical examination and refutation of views which resulted in a gradual rise, formation and development of five schools, viz., I. Rasa-school of Bharata II. Alankara-school of Bhamaha III. Riti- school of Vamana IV. Dhvani-school of Anandavardhana and V. Vakrokti-school of Kuntaka. These schools are not in conflict with one another as they all recognise the indispensability of Rasa in any literature worth the name. But they attach relatively more importance to some one element of these than to the rest.

Bharata is considered to be the earliest exponent of RASA School. The greatest and most far-reaching contribution of Bharata to poetics is his formulation of the Rasasutra to explain the genesis of Rasa on this Rasasutra many, of the later rhetoricians built their own theories of Rasanispatti. (Even those others who did not do so, have, from Bhamaha onwards, at least incorporated the element of Rasa in their scheme of poetics). But the original work of Bharata, Sahkuka and Nayaka are yet not found and we have relied upon the summaries of their views furnished by their critics such as Abhinavagupta and

Mammata. There are also several other works dealing with Rasa like Sarasvatikanthabharana, Srhgaraprakasa Basarupaka, Srhgaratilaka, Bhavaprakasana, Rasatarahgini etc.

IOT SECURITY ISSUES & ITS REQUIREMENTS IN REFERENCE TO E-COMMERCE

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Abstract

IoT (Internet of Things) is a new rising technology of interrelated physical devices and everyday objects that are remotely monitored and controlled via internet. Nowadays, IoT is becoming a popular mainstream in E-Commerce sector due to its endless capabilities with efficient numerous applications. In brief, IoT can provide more real benefits everywhere in our daily life by transforming retail and E-Commerce applications. However, all benefits may come across of many risks of privacy and security issues. To minimize the security issues of such IoT applications which are imposed in the area of E-Commerce sector to provide the best end user services in effective and efficient manner, many security mechanisms have been introduced to eliminate those issues, or at least minimize their effects on the security management. However, this paper represents IoT architectural security issues and classification of IoT security requirements with the communication protocol stack and the possible countermeasures against the IoT architectural layered security issues in respect of E-Commerce paradigm.

Keywords: Internet-of-Things (IoT) architecture, protocol stack, privacy, challenges, security issues & security requirements.

1. Introduction

The term, Internet of Things, a system of interconnected devices, was first proposed by Kevin Ashton in 1999 [1]. A 'thing' in IoT can be a person with a heart monitor or an automobile that has built-in-sensors to alert the driver i.e. objects that can be assigned an IP address and have the ability to collect and transfer data over a network without requiring human-to-human or human-to-computer interaction. Nowadays, traditional E-Governance is turned into smart Governance to serve the newer demands of smart living using IoT infrastructure. With smart governance as well as E-Commerce, countries around the world are tried to improve their education, security, retail management and economic infrastructure, business opportunities, etc.

According to the McKinsey Global Institute estimates that the IoT will have a potential economic impact of \$3.9tn-\$11.1tn per year by 2025 across nine objects – homes, offices, factories, retail environments, worksites, human health, outside environments, cities and vehicles [2]. Internet of things is a collection of physical objects which has three basic characteristics such as [3]

- **Comprehensive awareness:** Comprehensive awareness is achieved by using Wireless Sensor Networks (WSN), Machine-to-Machine (M2M) communications and technologies such as Radio-Frequency Identification (RFID). These are used to get information from the different objects.
- **Reliable Communication:** The reliable communication provides real time objects with high accuracy transmission.
- **Intellectual processing:** The intellectual processing fulfills the user expectation by analyzing and collecting the useful information from the objects.

Based on the tendency, many IoT applications such as inventory management, supply chain management, etc. are positively used in E-Commerce sector to improve the business capabilities in efficiently. But, security and privacy remain vital issues for IoT applications, which introduce an ideal new online privacy concerns about consumers. Because such applications depend on the smart IoT sensor devices in making more productive, therefore, these devices not only gather personal information like users' names and mobile numbers, but can also monitor user's each activities. Therefore consumers are worry about placing too much personal data in public or private clouds, with good reason. However IoT definitely has a huge potential capability for its flexibility and easy accessibility features that provides a bright future for new generation.

The paper is organized as follows. Section 2 describes the IoT architecture & related security issues. Section 3 describes the classification of IoT security requirements with related works and possible countermeasures against the IoT layered security issues in respect of E-Commerce and finally Section 4 concludes the paper.

মহামারি ও তারাক্ষরের ধাত্রীদেবতা

গমতা খাঁ

সারসংক্ষেপ :

মহামারি এক বিশাল জনগোষ্ঠীকে সংক্রামিত করে। বাংলা সাহিত্যে মহামারি কথ্য নানারূপে প্রকাশ পেয়েছে। বিশেষত বাংলা উপন্যাসে মানবজীবনের নানা টানাপোড়েনের কাহিনিও গড়ে উঠেছে মহামারির ভয়াবহ প্রভাবে। ঔপন্যাসিক তারাক্ষরের 'ধাত্রীদেবতা' উপন্যাসে মহামারির প্রভাবে গড়ে ওঠা মানবজীবনের ভয়াবহতা ও টানাপোড়েনের কল্প কাহিনি লিখেছেন। তবে তাঁর উপন্যাসে মহামারি মুখ্য নয়, প্রেক্ষিত হিসাবে উপস্থাপিত। বরফ বলা যায় লেখক উপন্যাসে মহামারির প্রেক্ষিতে দেশসেবা ও দেশমাতৃকার স্বপ্ন বুঝতে চেয়েছেন। মহামারির স্মৃতি হারিয়ে যায় না। তাই বর্তমান সময়ের প্রেক্ষিতেও তারাক্ষরের ধাত্রীদেবতা উপন্যাসের প্রাসঙ্গিকতা থেকে যায়।

মূলশব্দ :

মহামারি, সাহিত্যে প্রকাশ, মানবজীবনে প্রভাব, ধাত্রীদেবতায় প্রেক্ষিত, দেশসেবার স্বপ্ন, বর্তমানের প্রাসঙ্গিকতা।

প্রতিপাদ্য বিষয় :

কোন সংক্রামক রোগ যখন বিশাল একটি জনগোষ্ঠীকে সংক্রামিত করে তখন তাকে মহামারি আখ্যা দেওয়া হয়। বাঙালির কাছে যুগে যুগে মহামারি এসেছে নানারূপে। কখনো শ্লেগ রূপে, কখনো ফু রূপে, কখনো কলেরার রূপে। বাঙালি কত গ্রাম, গঞ্জ, নগর ছারখার হয়ে যেতে দেখেছে এই মহামারিতে। বাঙালি পূর্বপুরুষরা এই মহামারিতে মড়ক বলতেন। মহামারির কথা উঠে এসেছে বাংলা সাহিত্যেও। বিশেষত বাংলা উপন্যাসে বিখ্যাত ঔপন্যাসিকদের রচনায় মহামারির ভয়াবহতা এবং তার প্রভাবে মানবজীবনের টানাপোড়েনের বিষয়টি কবিত হইয়েছে। ঔপন্যাসিক তারাক্ষরের বন্দ্যোপাধ্যায়ের উপন্যাসেও এ বিষয়টি লক্ষ করা যায়। তাঁর অনেকগুলি উপন্যাসে মহামারি প্রেক্ষিত হিসাবে উপস্থাপিত। তবে তাঁর লেখায় মহামারি মুখ্য বিষয় নয়। তাঁর রচিত ধাত্রীদেবতা ও গঙ্গাদেবতা উপন্যাসেও মহামারি প্রেক্ষিত হিসাবে উপস্থাপিত হয়েছে। এই মহামারির ফলে উপন্যাসে মানবজীবনের মধ্যে যে ভয়াবহতা ও মানসিক টানাপোড়েন সৃষ্টি হয়েছে তা বর্তমান সময়ের পাঠকবর্গের কাছে সমান গুরুত্বপূর্ণ। এছাড়া এর সঙ্গে সঙ্গে বহু বছর ধরে চলে আসা মহামারির প্রকোপকে পাঠক বর্তমান মহামারির প্রকোপের সঙ্গে মিলিয়ে অনুধাবন করতে পেরেছে। আলোচ্য 'মহামারি ও তারাক্ষরের ধাত্রীদেবতা' এই

উনিশ শতকে ত্রয়ী কাব্যে মহাভারতের নতুন ব্যাখ্যা মমতা গা

বাংলা সাহিত্যে মহাকাব্য রচনায় নতুন ঐতিহ্য সৃষ্টি করেছিলেন অনেক কবি। সেট ভাষাধারার উত্তরসূরী কবি নবীনচন্দ্র সেন। উনিশ শতকে নবীনচন্দ্র সেন তাঁর উল্লেখযোগ্য ত্রয়ী কাব্য রৈবতক, কুরুক্ষেত্র ও প্রভাসে মহাভারতের নতুন ব্যাখ্যা দিয়ে কাব্যটিতে তাঁর মৌলিক চিন্তাশক্তির প্রকাশ ঘটিয়েছেন। এই ত্রয়ী কাব্যে কবি জীবনের ও ক্রমবিকাশ লক্ষ্য করে যান। এই ক্রমবিকাশের একদিকে আছে উনিশ শতকের বাঙালি জীবনের সামাজিক ইতিহাস আর অন্যদিকে স্বয়ং কবির জীবন জিজ্ঞাসা। এই কাব্যে নবীনচন্দ্র সেন মহাভারতের ঘটনাবলীর মধ্য থেকে নতুন তাৎপর্যের সন্ধান পেয়েছিলেন। বলা যায় কবি ত্রয়ী কাব্যের মধ্য দিয়ে মহাভারতের নতুন ব্যাখ্যা করেছেন। এই প্রবন্ধে সেই বিবরণ উপস্থাপনের প্রয়াস রইল।

উনিশ শতকে মহাভারতকে লোকনমাজে সহজ ভাবে প্রকাশ করার প্রচেষ্টা দেখা যায়। জাতীয় জীবন ও সমতার অনুসন্ধান করতে গিয়ে বাঙালিরা মহাভারত চর্চা শুরু করেছিলেন এই যুগে নতুনভাবে। আধুনিক বাঙালি পাশ্চাত্য শিক্ষানীতি, সমাজ, রাজনীতির প্রভাবে প্রভাবিত হয়ে তাঁদের বিচিত্র সাধনার মধ্য দিয়ে এক বৃহত্তর জীবনের প্রত্যয়ে উপনীত হতে চেয়েছিলেন। এর মধ্যে প্রকাশ পেয়েছিল “মানবতার আদর্শ, পার্থিব জীবনরসের বিবিস্তৃতপূর্ণ ফেনোমেনা।”^১ তাই প্রাচীন পৌরাণিক ঐতিহ্যকে জ্ঞান-বিজ্ঞানের মানদণ্ডে বিচার করে নবযুগে জিজ্ঞাসার মাধ্যমে উপস্থাপিত করার একটা প্রয়াস দেখা গিয়েছিল নব্য শিক্ষিত সমাজে। এই যুগে কাব্য প্রচেষ্টার মূল উদ্দেশ্য ছিল জাতীয় ঐতিহ্যের সঙ্গে যোগসাদন করা। নবীনচন্দ্র সেন এই যুগের ভাবরসে লালিত হয়ে কাব্যসাধনায় মনোনিবেশ করেছিলেন। তাই তাঁর কাব্য সৃষ্টিতে নবযুগের প্রভাবে ব্যক্তিগত চেতনার অনুপ্রেরণা ও দেশকাল মানুষ নুই ই প্রকাশ লাভ করেছিল।

নবীনচন্দ্র সেনের ‘ত্রয়ী কাব্য’ রচনার মূল উদ্দেশ্য হলো কৃষ্ণ জীবনকে কেন্দ্র করে বিগট মহাকাব্য রচনা করা। নবীনচন্দ্র সেনের ‘ত্রয়ী কাব্য’ যথাক্রমে ‘রৈবতক’ (১৮৮৭) ‘কুরুক্ষেত্র’ (১৮৯৩) এবং ‘প্রভাস’ (১৮৯৬)। কবির কাব্য চতুষ্টয় রচনার পরেগরেই ১৮৮৭ খ্রিস্টাব্দের ফেব্রুয়ারি মাসে ত্রয়ী কাব্যের প্রথম খন্ড রৈবতক প্রকাশিত হয়। প্রথম বইবনে কবি রমায়াণ, মহাভারত, পৌরাণিক ঐতিহ্যের প্রতি সশ্রদ্ধ মনোভাব প্রদর্শন করেননি। কলে কৃষ্ণ চরিত্র সম্পর্কে তাঁর হৃদয়ে আকর্ষণ ছিলনা বা সে নিয়ে কোন ভক্তি নিষ্ঠাও জাগ্রত হয়নি। কিন্তু



**GEOGRAPHICAL STUDY ON DIVERSIFICATION OF CROP IN MALDA DISTRICT, WEST
BENGAL**

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ABSTRACT:

This paper aims to implement different measures of crop diversification for a uniform data set of Malda district. At the same time it focuses on status and changing pattern of crop diversification in different blocks of Malda district with a comparative outlook of District and State level status. Herfindahl index and Simpson index are widely used measures of crop diversification but as per the output scale of resolution, Gini's Coefficient and Entropy Measures are to be considered as better. As per the way of calculation Entropy index, modified Entropy index and Ogive index are more effective. District level status is far ahead the state level and blocks level status good. Monotonization in crop diversification is going on which is reflected through forward and backward shifting crop diversification into a single class in between 2001 to 2008. Peasants are still addicted with cereals instead of high value crops.

Key Words : Methods of Diversifications, Problems and Justification, Horizontal Diversification, Vertical Diversification

INTRODUCTION:

Crop diversification in the Third World Countries like India is a pungent applied concept to remove the plight of subsistence agricultural economy and to ensure diversified nutrition status of the poor countrymen. Crop diversification means raising of a variety of crops involving intensity of competition amongst field crops for arable or cultivable land. "The keener the competition, the higher the magnitude of the crop diversification and lesser the competition the greater will the trend toward specialization or monoculture farming where emphasis is on one or two crops" (Jasbir Singh 1976). The main advantage of the study of diversification in a region lies in the fact that it enables us to understand the impact of physical and socio-economic conditions on the agriculture. Moreover, it helps us in knowing the contemporary competition among crop for area, for rotation and effect on double cropping, total production and per hectare productivity (Bhalsing, 2009). Indian agriculture is predominantly a small peasant based economy with approximately 80% of the operational holdings being below two hectares, and 34% of the agricultural land are cultivated by them (GOI, 1997). Because of small operational holdings, it is indeed very difficult for the small farmers to improve their earnings only by raising the yields of the existing crops, mainly cereals. Attention on high value crops with available modern farm inputs may provide a stable economic base of the poor peasants (De and Chattopadhyay, 2010). The incidence of crop diversification in India, however, was very uncommon particularly before the introduction of new agricultural technology in the mid-sixties. With the advent of new agricultural technology

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Gender Gap in Literacy in Patna District

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Abstract:

The present paper aims to analyse the spatial pattern of gender gap in literacy in Patna District of Bihar. It is based on block-wise data derived from the census of India, 1991 to 2011. Generally, it is accepted that the male literacy is higher than the female literacy and the rural literacy is lower than the urban literacy. Likewise, the male-female literacy gap of differences is wider in rural than urban population in the study area and the state of Bihar. Regarding differences/gap of literacy, percentage literacy is found to be low as compare to rural-urban literacy. To fulfill the objectives, suitable statistical methods have been applied choropleth maps have been used to show the geographical pattern of male-female literacy gap in the entire district.

Keywords: Literacy, Female Literacy, Gender Gap.

Introduction

Gender gap denotes percentage variations among male and female literacy in a particular area. It may be presented as aggregate difference in number of male and female literates. Usually percentage variation has been utilized to describe/analyse the gap between male and female literates. Literacy is one of the most important characteristics of population which promotes quality to be a good human resource. It provides knowledge and skill to perform economic activities for subsistence and develop-

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An insight analysis of online classes in higher education institutions during COVID-19: A case study of West Bengal

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Abstract---The education system all over the world has faced an unprecedented change from offline mode to online mode due to the outbreak of COVID-19. West Bengal, a state of India, is not an exception. Since March 2020 the educational institutions of West Bengal are trying to shift entire educational activities from offline to online mode. Initially the acceptability of online learning was very low, but with the passage of time it has been improved. Still there are many areas which need up gradation. Our aim is to review the current status of online learning in higher education institutes of West Bengal. This paper is based on a survey among the students (post-graduate & under graduate) and the faculty members from higher education institutes all over West Bengal. We are trying to identify major bottlenecks of online education which are persistent after one year. The data have been analysed considering the demographic features of the respondent. Finally, proposals are made which may be considered, while policy making for online education. The technological improvement areas have also been pointed out. Although the survey was confined to the geographical boundaries of West Bengal, but the findings may be applicable to greater areas of higher education system improvement, exceeding the geographical boundaries.

Keywords---COVID-19, higher education, online learning, survey, west Bengal.



RESEARCH PAPER



Nitrate-Induced Toxicity and Potential Attenuation of Behavioural and Stress Biomarkers in *Tubifex tubifex*

Pramita Garai¹ · Priyajit Banerjee¹ · Pramita Sharma¹ · Pradip Mondal² · Nimai Chandra Saha¹ · Caterina Faggio³

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Abstract

Nitrogen is one of the major components of all biological systems. In the aquatic ecosystem, it is available in the inorganic forms of ammonia, nitrite, and nitrate. Climate change due to global warming and anthropogenic misconduct increases the amount of nitrogen in rivers and other aquatic ecosystems. That revolve nitrate pollution is a serious global concern. The benthic macroinvertebrates, which are necessary for maintaining the structure and functioning of the aquatic ecosystem, are the primary victims of this pollution. The determination of nitrate toxicity on the benthic oligochaete worm *Tubifex tubifex* is primarily detailed in this article along with enzymatic, toxicokinetic and statistical evidences. The acute toxicity of nitrate for 96 h of exposure on the worm is reported to be 664.38 mg/l. The nitrate-treated worms during acute exposure displayed certain behavioural abnormalities such as erratic movements, wrinkling tendency, profuse mucus secretion, and lower clumping tendency. The effect of sublethal concentration (10% and 20% of 96 h LC₅₀) of nitrate on differential expression of oxidative stress enzymes was also investigated over a period of 14 days exposure. The nitrate exposed worms showed an increased level of MDA that signifies lipid deterioration. The integrated biomarker response (IBR) assessment revealed that the combined effect of stress biomarkers increased gradually with increasing exposure time and nitrate concentration. The maximum integrated biomarker response was observed at 14th day of T2 concentration (20% of 96 h LC₅₀ value) of nitrate. Species sensitivity distributions (SSD) illustrated the toxic impact of nitrate on *T. tubifex* in the aquatic ecosystem with respect to other aquatic invertebrate species. The toxicokinetic-toxicodynamic studies through GUTS modelling applied to predict the LC₅₀ value for a longer period of nitrate exposure on the worm are reported to be 403.6 mg/l. It is concluded that nitrate exposure detrimentally affects the survival rate and alter oxidative stress biomarkers in *T. tubifex*. Evaluation of nitrate toxicity in *T. tubifex* will be useful to determine the acceptable concentration of nitrate for aquatic organisms.

Pramita Garai, Priyajit Banerjee and Pramita Sharma authors have contributed equally to this work.

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Biodegradation of p-nitrophenol by a member of the genus *Brachybacterium*, isolated from the river Ganges

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Abstract

A p-nitrophenol (PNP) degrading halotolerant, Gram-variable bacterial strain designated as DNPG3, was isolated from a water sample collected from the river Ganges in Hooghly, West Bengal (WB), India, by enrichment culture technique. Based on 16S rRNA gene sequence analysis (carried out at EzTaxon server and Ribosomal data base project site), the strain DNPG3 was identified as *Brachybacterium* sp., with *B. zhongshanense* strain JB^T (97.08% identity) as its nearest phylogenetic relative. The strain could tolerate up to 3 mM of PNP, while the optimal growth for the strain was recorded as 0.25 mM. The strain could carry out biodegradation of PNP with concomitant release of nitrite and p-benzoquinone (PBQ) was detected as a hydrolysis product. Under the catabolic condition, it could carry out 36% biodegradation of PNP within 144 h, while, under co-metabolic condition (with glucose), 100% biodegradation was achieved within 48 h at 30 °C. Calcium alginate bead-based cell immobilization studies (of the strain DNPG3) indicated complete biodegradation of PNP (under catabolic condition) within 26 h. This is the first report of PNP biodegradation by any representative strain of the genus *Brachybacterium*. The study definitely indicated that *Brachybacterium* sp. strain DNPG3 has biotechnological potential and the strain may be a suitable candidate for developing clean, green, eco-friendly, cost-effective bioremediation processes towards effective removal of PNP from the contaminated sites.

Keywords Biodegradation · *Brachybacterium* · Ca-alginate beads · Cell immobilization · p-nitrophenol · 16S rRNA gene

Introduction

PNP is one of the well-documented priority pollutants (USEPA 1980) which is extensively used in petrochemical, pharmaceutical, dye, explosives, pesticides, agrochemical, and leather industries (Spain 1995). In agro-ecosystems, it is also produced by hydrolysis of agrochemicals (mainly organophosphates) and its persistent presence has been documented from soil and water ecosystems (Kuang et al. 2020). Due to its water solubility and stability, it is considered as highly mobile and contaminates the drinking water sources (rivers, lakes, ponds, etc.), and causes water pollution (Samuel et al. 2014; Kuang et al. 2020). It is highly toxic and is known to have carcinogenic as well as mutagenic effects on living organisms like a human and several animal models (Vikram et al. 2013; Samuel et al. 2014). It

is reported to have a deleterious effect on the environment (Samuel et al. 2014) and its maximum permissible limit is documented to be 10 ng/ml (Kulkarni and Chaudhari 2006a; 2006b).

River Ganges is one of the major rivers of India which not only provides fresh water for consumption but is also a source of livelihood for the human population living along its bank (Ghirardelli et al. 2021). Over the past few decades, several industries (petrochemical, fertilizers, pharmaceuticals, paints, tannery, etc.) have come up along the Gangetic Plain (Roy and Shamim 2020). Major wastes from these industries are also disposed off in the river Ganges (Ghirardelli et al. 2021). Although no report regarding residue level of PNP in Ganges water was documented in literature, the same for several pesticides, phenolics, heavy metals, etc. was reported from time to time by various authors (Sarker et al. 2021; Paul 2017). Contamination of river water by PNP has been reported from El Harrach river near Algeria (Löser et al. 1998); river sediment in Buenos Aires, Argentina (Gemini et al. 2005); River Dene, Warwickshire, England (Kowalczyk

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Microbial biodegradation of nitrophenols and their derivatives: A Review

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KEYWORDS

Biodegradation

Bioremediation

Nitrophenol

Recalcitrant

Xenobiotic

ABSTRACT

Today, nitrophenols (NPs) represent chemicals highly in demand not only due to their function in synthetic chemistry but also due to their huge applications in several industries. Such diverse requirements and applications has resulted in a widespread abundance of these chemicals. Improper application and waste disposal practice results in the continuous discharge of these compounds into the environment and causes pollution threat to soil, groundwater, river water, etc. These xenobiotic chemicals are hazardous, toxic, carcinogenic, and mutagenic which results in serious health problems. The Nitro group present in the phenol makes them recalcitrant which causes the persistence of these chemicals in the environment. Although several chemicals, electrochemical, physical, and physicochemical methods have been proposed, bioremediation approaches mainly involving bacteria are considered best. To date, very few successful attempts (related to microbe-assisted bioremediation) have been carried out with environmental habitats for the removal of NPs (both *in-situ* and *ex-situ* attempts). So, as far as the effectiveness of the bioremediation process for NP decontamination is concerned, we are far away. More explorative studies using efficient aerobic-anaerobic NP degrading bacterial consortium (or combination of microbes- plant systems) and advanced techniques including omics approaches and nanotechnologies may help towards developing better practicable bioremediation approaches, in the future. This review article focuses on the list of nitrophenol degrading microorganisms, biodegradation pathways of NPs, bioremediation by immobilized cell technique, and the advantages and disadvantages of bioremediation. This article will increase our knowledge of the biodegradation of NPs.

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Evidence of *p*-nitrophenol Biodegradation and Study of Genomic Attributes from a Newly Isolated Aquatic Bacterium *Pseudomonas Asiatica* Strain PNP3

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ABSTRACT

A *p*-nitrophenol (PNP) degrading aquatic bacterial strain PNP3 was isolated from the Ganges water and was identified as *Pseudomonas asiatica* based on genome sequence analyses. The optimum catabolic growths for the strain was recorded with 0.5 mM PNP and it could tolerate up to 6 mM PNP. It could carry out biodegradation of PNP through *p*-benzoquinone (PBQ) and 1, 2, 4-benzenetriol (BT) with concomitant release of nitrite. Genome sequence analysis predicted the presence of all the genes (*pdcABC1C2DEFG*) responsible for providing the PNP biodegradation phenotype for this strain. Based on homology search, the functional attributes encoded by this gene cluster were predicted to include *p*-nitrophenol 4-monooxygenase (PdcA), benzoquinone reductase (PdcB), hydroxyquinol 1, 2-dioxygenase (PdcC1), hydroxyquinol 1, 2-dioxygenase large subunit (PdcC2), 4-hydroxymuconic semialdehyde dehydrogenase (PdcD), maleylacetate reductase (PdcE), hydroquinone dioxygenase alpha subunit (PdcF) and putative regulator (PdcG). This is the first report of any representative aquatic strain under *Pseudomonas asiatica*, having the highest known catabolic PNP utilizing capability from the Ganges water of India to the best of the author's knowledge, and may find application toward cost-effective bioremediation of PNP-contaminated waterbodies.

KEYWORDS

Bioremediation;
p-nitrophenol; *pseudomonas asiatica*; *p*-nitrophenol 4-monooxygenase; ganges water

Introduction

P - nitrophenol (PNP) is considered one of the priority pollutants by the United States Environmental protection agency (US Environmental Protection Agency (US-EPA) 1980) mainly due to its recalcitrant nature and toxicity (Wang et al. 2018). PNP is one of the extensively and widely used chemicals in synthetic chemistry with its application in pesticide, pharmaceutical, petrochemical, dye, explosive, and leather industries (Spain 1995). It is also produced as a hydrolysis product by several industries as well as from organophosphate agrochemicals (Prakash, Chauhan, and Jain 1996). A survey of the literature indicated a wide occurrence of PNP in almost all ecosystems around the World, including freshwater rivers (Kuang et al. 2020; Samuel, Sivaramakrishna, and Mehta 2014). The half-life of PNP varies in different ecosystems, for example- in the atmosphere, 3–18 days; freshwater, 1–8 days; sea water, 13 to 21 days; topsoil, 1–12 days; subsoil, 40 or

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Functional, and phylogenetic analysis of maleylacetate reductase of *Pseudomonas* sp strain PNPG3: An in-silico approach

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KEYWORDS

Maleylacetate reductase

Pseudomonas

PNP biodegradation

Homology modeling

STRING database

ABSTRACT

Shrinking freshwater ecosystems are under tremendous pollution threat due to anthropocentric activities. Para nitrophenol (PNP), a well-documented priority pollutant extensively used in dyes, petrochemical, pharmaceutical, explosives, pesticides, leather industries, and agrochemicals, is responsible for contaminating aquatic ecosystems globally. It is highly toxic and has carcinogenic and mutagenic effects on living organisms like humans and several animal models. Bioremediation approaches mainly involving bacteria are considered the best, most eco-friendly, cost-effective, green, and clean method for effective removal PNP from its contaminated sites. This manuscript highlights the structural and functional analysis of a lower pathway enzyme involved in PNP degradation, maleylacetate reductase (MR), from *Pseudomonas* sp strain PNPG3, which was recently isolated from a freshwater ecosystem. This enzyme plays a role in converting maleylacetate to 3-oxoadipate. Despite its crucial functional role, no model is available for this protein in the protein database (PDB). Therefore, attempts were made for the computational investigation of physicochemical, functional, and structural properties, including secondary, and tertiary structure prediction, model quality analysis, and phylogenetic assessment using several standard bioinformatics tools. This enzyme has a molecular weight of about ~37.6 kDa, is acidic and thermostable, belonging to a member of iron-containing alcohol dehydrogenase. Moreover, this study will benefit the scientific community in deciphering the prediction of the function of similar proteins of interest.

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Original Research

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Decolorization of p-nitrophenol and draft genome sequence of *Pseudomonas* sp. strain PNP3: A preliminary report

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Abstract

Aim: To study decolorization (with concomitant depletion) of p-nitrophenol by a bacterial strain designated as PNP3 and determination of draft genome sequence of the strain to understand its potential.

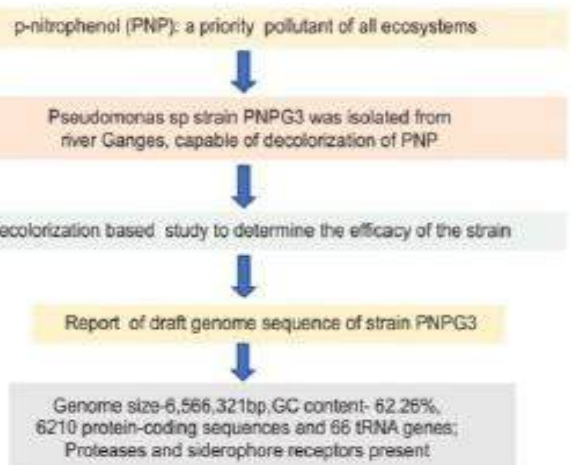
Methodology: A comparative study of PNP's decolorization (with concomitant removal) in three different test conditions was undertaken. The experiment was carried out in one-liter volume Schott Duran bottles. Genomic DNA was extracted and draft genome sequence was determined using Illumina HiSeqX platform. Raw reads were assembled and subjected to subsystem classification using several bioinformatics tools (RAST, PATRIC, and NCBI's PGAP pipelines). The genome sequence was deposited at the NCBI Genome database and the strain PNP3 was also deposited at MTCC, IMTECH, Chandigarh.

Results: The bacterial strain PNP3 could carry out decolorization with concomitant removal of PNP in all three sets of experiments, including one set, where only distilled water was used. The best decolorization (with concomitant PNP removal) capacity was recorded for set D (with Minimal Medium, MM; PNP, and free cells) followed by set E (MM, PNP, and immobilized cells) and set B (distilled water, PNP and free cells) conditions. The size of the draft genome sequence of the strain PNP3 was 6,566,321 bp, with 62.26% GC contents. The genome had 6210 protein-coding sequences and 66 tRNA genes. The predictive presence of different types of proteases and siderophore receptors indicated its possible potential for industrial applications and plant growth-promoting activities.

Interpretation: The bacterium *Pseudomonas* sp. strain PNP3 has the capacity to decolorize p-nitrophenol even in presence of distilled water and it remains viable for up to twelve days. The genome sequence revealed that the strain harbored genes responsible for the metabolism of aromatic compounds, chemotaxis, protease, and siderophore receptors indicating the versatile nature of the strain.

Key words: Decolorization, P-nitrophenol, *Pseudomonas* sp., RAST, Xenobiotic

p-nitrophenol (PNP): a priority pollutant of all ecosystems



Pseudomonas sp strain PNP3 was isolated from river Ganges, capable of decolorization of PNP

Decolorization based study to determine the efficacy of the strain

Report of draft genome sequence of strain PNP3

Genome size-6,566,321bp, GC content- 62.26%,
6210 protein-coding sequences and 66 tRNA genes;
Proteases and siderophore receptors present

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Mechanistic study of copper nanoparticle (CuNP) toxicity on the mouse uterus via apelin signaling

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Abstract

Copper nanoparticles (CuNPs) have been widely utilized in various applications. Due to its wider application, humans are at risk of its exposure. It has been reported that the exposure of CuNPs can lead to organ accumulation and affect organ toxicity. Recent study suggested that CuNPs can translocate into the uterus and affect uterine injury in rat, whereas uterine toxicity still remains unclear. The uterus is an important female organ which is required to sustain pregnancy. Thus, uterine structure and physiology are important. Therefore, this study hypothesized that CuNPs might have a toxic effect on the uterine features of mice. In this study, we have investigated the potential effects of CuNPs on the uterus of mice both in vivo and in vitro. In in vivo study, two groups of female mice were exposed to 5 and 50 mg/kg/day via oral exposure. In vivo results showed that CuNP treatment decreases the body weight and uterus weight and changes in antioxidant status with low estrogen and progesterone levels. Furthermore, CuNPs up-regulated the expression of caspase3 and down-regulated the expression of apelin receptor (APJ). Immunolocalization of apelin showed low abundance in the CuNP-treated uterus. These results suggest a poor apelin signaling in the uterus after CuNP treatment. The in vivo findings were further supported by the in vitro studies. Firstly, the uterus was cultured with 5 and 40 µg of CuNPs, and in the second in vitro experiment, the uterus was divided into 4 groups: control, 40 µg of CuNPs, 40 µg of CuNPs with apelin, and 40 µg of CuNPs with apelin receptor antagonist (ML221). In vitro study showed that CuNPs could directly induce the oxidative stress and apoptosis as well as changing antioxidant status in the uterus. The in vitro apelin 13 (APLN 13) treatments alleviated the expression of BCL2 and improved the antioxidant markers in CuNP-treated uterus. These results also provided an evidence of apelin-mediated signaling in the CuNP-treated uterus. In summary, our results present evidence that CuNPs can stimulate apoptotic pathways which may lead to uterine impairment due to weak apelin signaling.

Keywords Copper nanoparticles · Uterus · Apelin · Oxidative stress

Introduction

Copper nanoparticles (CuNPs) are copper-derived particle sizes from 1 to 100 nm, and it can be synthesized biologically and chemically with unique chemical and physical properties (Curtis et al. 2006; El Bialy 2020). CuNPs received great interest due to their different structural properties and

plausible biological effects such as catalytic, antibacterial, antioxidant, and antifungal activities along with anti-cancerous and cytotoxic activity (Din et al. 2017). The large-scale production of engineered CuNPs provides tremendous potential human exposure (El Bialy 2020; Hu et al. 2019). In the last decades, the emergence use of CuNPs in industries leads to serious safety concerns and has elicited immense interest in evaluating the toxic activity on human (Hu et al. 2019). Previous study showed that engineered nanoparticles can expose to human by four major routes including the inhalation, dermal penetration, ocular exposure, and ingestion (Thomas et al. 2006). Due to several crucial advantages such as eco-friendly, cheap and easily synthesizable, biocompatible, high effectiveness, antimicrobial properties, CuNPs have many applications including skin product, metal coatings, inks, and plastic for food packaging. Most importantly,

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MONONUCLEAR ORGANOMETALLIC COMPOUNDS OF GOLD(III) AS ANTICANCER AGENTS: A CRITICAL SURVEY

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ABSTRACT

Recently gold based metallodrugs with +1 and +3 oxidation states show the significant role in the progress of medicinal chemistry, especially in the treatment of cancer, HIV virus, SARS-CoV-2 virus and other diseases. Particularly, gold(III) compounds are of the extreme attention because of their structural similarity with cisplatin, one of the first metallodrugs to be widely used for cancer treatment. A large variety of anticancer gold(III) organometallics of various families are reported in literature that have significant antiproliferative properties *in vitro* against selected human tumor cell lines and majority of them are also capable to overcome cisplatin resistance. The nature of inert and labile ligands plays a vital role in the anticancer activity of these compounds. The primary goal of this review is to summarize the chemistry and activity of some novel mononuclear anticancer gold(III) organometallic compounds that making themselves promising candidates for further pharmacological evaluation. The general outlooks on the progress of these compounds as clinically efficient anticancer drugs are discussed here on the basis of the available experimental evidence.

**Keywords: Gold(III) ion; Variety of ligands; Mononuclear organometallic compounds;
Chemistry; and Anticancer activity**



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A REVIEW ON MONONUCLEAR GOLD(III) PORPHYRIN COMPOUNDS AS ANTICANCER AGENTS

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ABSTRACT

In the last decade gold based metallodrugs show the significant role in the progress of medicinal chemistry for therapeutic and diagnostic purpose especially in the treatment of cancer, chrysotherapy, SARS-CoV-2 virus, HIV and other diseases. Though gold compounds with +1 and +3 oxidation states are dominant in medicinal chemistry, predominantly gold(III) compounds have attracted special attention for their structural similarity with the most extensively used anticancer metallodrug cisplatin. Several mononuclear anticancer gold(III) porphyrin compounds show significant antiproliferative properties *in vitro* against certain human tumor cell lines and can overcome cisplatin resistance where the macrocyclic ligand plays a vital role in their anticancer activity. The aim of this review is to sum up the chemistry and anticancer activity of some novel mononuclear anticancer gold(III) porphyrin compounds that making themselves excellent candidates for future pharmacological evaluation. The general viewpoint on the development of these compounds as clinically effective anticancer drugs is deliberated here on the source of the existing experimental evidence.

Keywords: Gold(III) ion; porphyrin ligand; Mononuclear compounds; Chemistry and
Anticancer activity



Metal-free C(sp³)-H Bromination: Synthesis of Phenacyl bromide and Benzyl bromide derivatives

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Abstract. A metal-free C(sp³)-H bromination methodology has been developed for aromatic ketones and some substituted toluenes under ambient conditions. The reaction for the toluenes is mediated by PhI(OAc)₂ (iodobenzene diacetate) in presence of KBr, while the bromination in aromatic ketones requires additional assistance of *p*-TsOH.H₂O and BF₃.Et₂O.

Keywords. Bromination; Hypervalent iodine; Ketones; Metal-free; Toluenes.

1. Introduction

C-C and C-heteroatom (C-X) bond formation is widely used by chemists with great interest nowadays.¹ However, some challenges remain in this area in terms of chemoselectivity, regioselectivity, and choice of catalyst and additives. In recent years, some noteworthy novel strategies have been developed for C(sp³)-H functionalization.² Therefore, selective C-H brominations are of considerable interest, and only a few approaches have been developed.³ The report by Nama *et al.*,⁴ shows a methodology where ammonium bromide has been used as bromine source in the presence of oxone as an oxidant to effect C(sp³)-H bromination. Another report by Itoh *et al.*,⁵ shows the synthesis of Phenacyl halides using I₂ aqueous HBr for iodides and bromides as halogen sources respectively, under aerobic photo-oxidative conditions. Guo *et al.*, also described a synthesis of Phenacyl bromides from styrenes with KBr as the bromine source and K₂S₂O₈ as an oxidant in water.⁶ An α -bromination of acetophenone derivatives has been achieved by Huang *et al.*, by using NBS as a bromine source under microwave irradiation.⁷ Development of new approaches for C(sp³)-H bromination is always in demand and quite challenging. Halogen-incorporated aromatic and heteroaromatic compounds are precursors for various synthetic protocols and are frequently used to

introduce a variety of functionalities. Especially, bromides, being a good leaving group, are often chosen as intermediate for useful transformations. On the other hand, chlorines are usually less reactive, and the use of iodine causes a greater loss after substitution in terms of molecular weight. Many such transformations include traditional cross-coupling reactions, substitution, elimination, and the introduction of boron-, silicon-, nitrogen-, and oxygen-based groups for accessing valuable synthesis.⁸ Hence, inserting a halogen atom into organic scaffolds still remains a burning topic for chemists. However, keeping environmental concerns in mind, metal-free protocols are more relevant in recent times.⁹ A well-known metal-free versatile reagent is hypervalent iodine. The first report of α -arylation of carbonyl compounds was done by Beringer and co-workers using diaryliodonium salts in 1960,¹⁰ and even today hypervalency of iodine continues to offer exciting outcomes in metal-free synthesis. In terms of effecting activation at the α -position of a carbonyl group, hypervalent iodine reagents are continuously being explored, and various methodologies are being designed for fruitful utility. Insertion of tosylates, halogens, hydroxyl, acetate groups has been achieved by using different types of hypervalent reagents under different conditions.^{11,12} And, the α -functionalization of carbonyl groups and various other useful synthetic applications have also been reported.^{11,12}

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PERFORMANCE EVALUATION OF SELECTED PUBLIC SECTOR OIL AND GAS COMPANIES IN INDIA

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Abstract:

Performance evaluation can be done through applying various performance indicators namely profitability, liquidity, ROI, internal resource generation, contribution to central exchequer, value addition, employment generation, and foreign exchange earnings, etc. In this paper an attempt has been made to appraise and evaluate the performance of selected public sector oil and gas companies in India through internal resource generation, contribution to central exchequer and value addition with the help of relevant data collected from published annual reports. The article concludes that ONGC has the greater amounts of value addition in the forms of remuneration paid to employees, remuneration paid to capital providers, govt. taxes and amounts retained for its maintenance and growth and OIL has lesser amounts of those as compared to others in the industry.

Key Words: Performance Evaluation, Internal Resource Generation, Contribution to central exchequer and Value Addition.

Introduction:

It has been the long standing practice to analyze the performance of business enterprises based on financial measures. But a change has emerged where the researchers and social scientists have vehemently opposed the practice of concentrating on financial parameters only for performance evaluation and they have recommended for the use of other relevant aspects side by side. This new evaluation ideology is appropriate for enterprises like Public Sector Enterprises (PSEs) which have not been established for profit motive. Therefore, in order to examine the performance of an enterprise especially in case of PSEs in India, both financial and social performance measures have been considered because the PSEs in India have been set up primarily with the public money for the noble mission to alleviate poverty, to reduce inequality of income and wealth distribution, to lessen the regional disparities and backwardness as well as to accelerate the pace of industrial development of India. In this paper an attempt has been made to evaluate the performance of the selected public sector oil and gas companies in India through different performance measuring parameters

like internal resources generation, contribution to central exchequer and value addition.

Literature Review:

There are so many studies have been conducted throughout the globe regarding the evaluation of financial performance of PSEs in India and especially the Public Sector Oil and Gas Companies in India, some important and valuable research studies are shown in the following paragraphs:

Chakraborty (2006) made a comparative study on the financial performance of selected public sector petroleum companies in India during the post liberalization period. The selected four companies were Bharat Petroleum Corporation Ltd. (BPCL), Hindustan Petroleum Corporation Ltd. (HPCL), Indian Oil Corporation Ltd. (IOCL) and Oil India Ltd. (OIL). For making a comparative study of financial performances of four selected companies, he had mainly used the technique of ratio analysis, which is regarded as the time tested method of appraising the financial performance of corporate enterprises. The study has been able to bring out some path-breaking findings which can go a long way in improving the performance of public sector

SIGNIFICANCE OF SANSKRIT IN THE MODERN WORLD

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संस्कृत = सम् + कृ + क्त , कर्मणि, “सम्परिभ्यां करोतौ भुषणे” इति सूत्रेण ‘स’ कारस्य आगमनाः संस्कृत इति शब्द उत्पद्यते । It means prefix सम् and verb कृ and suffix क्त jointly create this word. It means परिशोधितम्, refined, pure and thus adorned. In Sanskrit- पाणिनि प्रभृति व्याकरणैर्भूषितं परिशोधितं च यः तदेव संस्कृतम् अन्यः तु प्राकृतमित्यादिकम् । It means purified refined from others language by the law of grammarians like Panini and others. In our Indian culture, in our society some of human behaviour called ‘Sanskrit’ is related to word संस्कृतः It means the good thought, good idea in human nature.

But we mostly Indian think that Sanskrit means irrelevant, ancient, and dead, even so many people are stated as a statement that probably we all know about, “Sanskrit is a dead language”.

In my opinion this statement is incorrect, inappropriate because Sanskrit is not a language, it's a culture, which have so many things on its own, full of life, full of event, full of knowledge and so on. The culture we have in our heritage, the culture we got from our previous generation, the culture that influence so many countries back then when it appears and now a days the modern society.

Today in our day-to-day life we have so many things that we practice were come from Sanskrit directly or indirectly. we can discuss some of these aspect of Sanskrit in our modern society-

Linguistic:

“Sanskrit is the mother of all language” this is the statement we found about Sanskrit and this is true statement. if we deeply read and understand linguistic, we can see the steps how Sanskrit become a mother language and produce so many languages, and we can have more knowledge about it. Almost all modern Indian language are produced by Sanskrit like Hindi, Marathi, Gujarati, Rajasthani, Oriya, Asamiya, Bihari, Bengali and so many others. Not only Indian language some others languages are also influenced and enrich by Sanskrit like Greek, Latin, German, French, Japan, China etc. According to Sir William Jones “Sanskrit is perfect than Greek more copious than Latin and more exquisitely refined than either.”

We can see the path of creation Indian language from Sanskrit In chart-

बौद्धानां चत्वार्यार्यसत्यानि

सुजितपरामर्शकः

शोधसारः

दुःखमयमिदं जगत् “सर्वं दुःखं दुःखमिति”। सर्वे पुरुषाः दुःखेन सन्तप्ताः सन्ति। जगत् जीवनञ्च सर्वं दुःखमयम्। जन्मनः आरभ्य मृत्युपर्यन्तं सर्वं दुःखमयम्। कारणं विना कार्यं नोत्पद्यते। अतो दुःखस्यापि कारणमस्ति। दुःखस्य कारणं भवति अविद्या, तज्जन्यमासक्तिः तृष्णा। अविद्याजन्या तृष्णा काम वा सर्वानिष्टस्य कारणम्। इयं तृष्णा पुरुषस्य मनस्यनवरतमुत्पद्यते। दुःखस्य अन्तो नाशोऽस्ति। अविद्याघस्ता तृष्णा पुरुषस्य अन्तःकरणात् अपगच्छति चेत् दुःखं नोत्पद्यते। पुरुषः मनसः तृष्णात्यागेन दुःखनिरोधः कर्तव्यः। दुःखनिरोध एव बौद्धानां मते निर्वाणमिति। तदेव पुरुषस्य स्वरूपं भवति। दुःखनिरोधाय भगवता बुद्धेन साधनरूपाः अष्टाङ्गिकमार्गा उपदिष्टाः सन्ति। बुद्धोक्ताष्टाङ्गिकमार्गाः सम्यक्तया पालनेन पुरुषः परमशान्तिं निर्वाणं स्वतः प्राप्तुं शक्नोतीति एते विषयाः “बुद्धस्य चत्वार्यार्यसत्यानि” इति शीर्षकप्रबन्धे प्रतिपादिताः सन्ति।

कुञ्जीशब्दाः – आर्यसत्यम्, दुःखम्, दर्शनम्, दुःखसमुदयः, दुःखनिरोधः, अष्टाङ्गिकमार्गः, निर्वाणम्।

भारतीयसंस्कृते षड्नास्तिकदर्शनानि षड् नास्तिकदर्शनानि च प्रसिद्धानि सन्ति। वेदस्य अस्तित्वानास्तित्वे आस्तिक-नास्तिक इति विभागः। सांख्यो, योगो, न्यायो, वैशेषिकः, पूर्वमीमांसा, उत्तरमीमांसा इत्यादीनि आस्तिक-दर्शनानि, चार्वाकः, बौद्धः, जैन इति त्रीणि च नास्तिकदर्शनानि। नास्तिकदर्शनेषु बौद्धदर्शनमन्यतमं, यस्य प्रवर्तकः स्वयं भगवान् गौतमबुद्धः। भगवतः बुद्धदेवस्य महानिर्वाणस्यानन्तरं तस्य शिष्याः तस्य उपदेशाः त्रिपिटक इत्यस्मिन् बौद्धग्रन्थे पालिभाषायां लिपिबद्धमकुर्वन्। विनयपिटकः, सूत्रपिटकः, अभिधर्मपिटक इत्येषां त्रयाणां संज्ञा त्रिपिटक इति। विनयपिटके बौद्धभिक्षुकाणां आचाराजीवनं, सूत्रपिटके उपदेशात्मकसंक्षिप्तकथा, किञ्च अभिधर्मपिटके दार्शनिक-तत्त्वानामालोचना च विद्यन्ते। सर्वेषां दर्शनानां चरमं लक्ष्यं भवति मोक्षः निर्वाणं, कैवल्यं वा। दर्शनमित्युक्ते यत्र सृष्टि-संहारप्रक्रिया, ईश्वरतत्त्वं, संसारे जीवस्य गतिः, शरीरेन्द्रियैः साकं तस्य सम्बन्धः, तस्य कारणं किं, मुक्त्युपायः, इहलोक-परलोकगति इत्यादयः सर्वे विचाराः आलोच्यन्ते। यतो हि जन्म प्राणिनां दुःखकारणम्। तद्दुःखं जिहासितुं सर्वानि शास्त्राणि प्रवृत्तानि, तदेव अध्यासभाष्ये उद्धिखति यत् - तमेतमविद्याख्यमात्मानात्मनोरितरेतराध्यासं पुरस्कृत्य सर्वे प्रमाणप्रमेयव्यवहारा लौकिका वैदिकाश्च प्रवृत्ताः, सर्वाणि च शास्त्राणि विधिप्रतिषेधमोक्षपराणि।¹ सांख्यशास्त्रेऽपि प्रोच्यते-

दुःखत्रयाभिघाताजिज्ञासा तदपघातके हेतौ।

दृष्टे साऽपार्था चेन्नैकान्ताऽत्यन्ततोऽभावात्॥²

¹ शाङ्कराचार्येण रचितं ब्रह्मसूत्रस्य शारीरकाध्यासभाष्यम्।

² सांख्यकारिका १।

Rees matrix seminearring

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As a continuation of the work done in (R. Mukherjee (Pal), P. Pal and S. K. Sardar, On additively completely regular seminearrings, *Commun. Algebra* **45**(12) (2017) 5111–5122), in this paper, our objective is to characterize left (right) completely simple seminearrings in terms of Rees Construction by generalizing the concept of Rees matrix semigroup (J. M. Howie, *Fundamentals of Semigroup Theory* (Clarendon Press, Oxford, 1995); M. Petrich and N. R. Reilly, *Completely Regular Semigroups* (Wiley, New York, 1999)) and that of Rees matrix semiring (M. K. Sen, S. K. Maity and H. J. Weinert, Completely simple semirings, *Bull. Calcutta Math. Soc.* **97** (2005) 163–172). In Rees theorem, a completely simple semigroup is coordinatized in such a way that each element can be seen to be a triplet which gives this abstract structure a much more simpler look. In this paper, we have been able to construct a similar kind of coordinate structure of a restricted class of left (right) completely simple seminearrings taking impetus from (M. P. Grillet, Semirings with a completely simple additive semigroup, *J. Austral. Math. Soc.* **20**(Ser. A) (1975) 257–267, Theorem 4) and (M. K. Sen, S. K. Maity and H. J. Weinert, Completely simple semirings, *Bull. Calcutta Math. Soc.* **97** (2005) 163–172, Theorem 3.1).

Keywords: Rees matrix seminearring; left completely simple seminearring; right completely simple seminearring.

AMS Subject Classification: 16Y30, 16Y60, 16Y99

1. Introduction

A *near-ring* is a non-empty set N together with two binary operations “+” and “ $\cdot$ ” such that (i) $(N, +)$ is a group (not necessarily abelian), (ii) $(N, \cdot)$ is a semigroup (not necessarily commutative), and (iii) for all $n_1, n_2, n_3 \in N$, $(n_1 + n_2) \cdot n_3 = n_1 \cdot n_3 + n_2 \cdot n_3$, i.e., “ $\cdot$ ” distributes over “+” from the right side (“right distributive law”) [21]. It is well known that the set $M(G)$ of all self-maps of an additive group G

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DARK PATCHES OF COALTOPIA: DEGRADATION OF PHYSICAL LANDSCAPE BY MINING IN THE RANIGANJ COALFIELD

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Abstract

Raniganj Coal Field (RCF), the first coal mining region of India, has faced massive defacement of the physical and cultural landscape due to extensive coal excavation for approximately 250 years. Initially, open cast mining in Raniganj Coal Field (RCF) was started with rudimentary technology during 1774-1830. However, considering the slope of the coal belt underground coal mining has been established for more than two centuries. At present, unauthorized mining has grown up stupendously since the middle of the 1980s through the depillaring of underground peats and rapid extension of bore-hole/rat-hole mining at the peripheral areas of authorized mining sites, mainly in the agricultural tracts. Thus, almost the entire region is transformed into derelict land depicting widespread degradation of topography, and groundwater, dried-up of soil, destruction of primary succession, and modification of relief. Thus, defaced topography is termed 'coal-topia', studied through narrative analysis, word cloud, and Principal Component analysis (PCA).

Index Terms: Ranigang Coal Field, Authorized mining, Unauthorized mining,

Degradation, Physical landscape, EIA

1. INTRODUCTION

Every physical and cultural landscape has a distinct characteristic image and it is also true for the mining landscape. The mining regions of both the developed and developing world depict a different scenario than other resource regions commonly associated with the degraded environment and society (Bell & York, 2012; Goswami, 2015; Gupta & Paul, 2015; Rocha-Nicoleite, Overbeck & Müller, 2017). The coinage of the words 'Dark patches of Coaltopia,' is, therefore, self-reflexive in focusing on the core idea of this paper, i.e., the degradation of the physical landscape of the Raniganj Coal Field in the context of the coal mining landscape of the developing world.



Treatment of copper nanoparticles (CuNPs) for two spermatogenic cycles impairs testicular activity via down-regulating steroid receptors and inhibition of germ cell proliferation in a mice model

Vanrohl Nicy, Milirani Das, Guruswami Gurusubramanian, Pradip Mondal & Vikas Kumar Roy

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Abstract: One of the major goals of education system is to make a student completely competent for his future occupation so that they live a life which will be satisfactory for them, but finding the best fitting carrier which suits particular student's ability, skills and capabilities is the most challenging part, since choosing a wrong career can be devastating for a person. This paper is mainly comparative study of the articles about machine learning based career guidance system for students. The purpose of the study is to find out the positive and negative aspects of the existing recommendation system for guiding the students towards the right career. Our aim for future is to prepare superior automated career guidance based on recommendation system without any human intervention, which will have high accuracy and minimal error in which students of multi-disciplinary subject streams can rely on.

Keywords: Education, Machine Learning, Career Guidance System, Recommendation System, Multi-Disciplinary

1. Introduction

Choosing right career for a student plays a very important role for the rest of his/her life, since a wrong career can ruin one's life. According to an article published in The Guardian on 25th November 2018(16), huge number of mismatched graduates in UK face poorer prospects and lower earnings than their peers who enter on careers, that are a better fit for the knowledge and skills, that they have acquired through three or four years of study. It suggests that traditional careers advice is not working. A study in Indonesia (20) had shown that a significant percentage of university students cannot finally pursue their degree or end up with securing a very poor percentage just because of not choosing proper subject according to their interest and capability. In India, revelation came during nine-month survey conducted by CSIR (Council of Scientific and Industrial Research) and NML (National Metallurgical Laboratory) (17) that about 40% of the school students are clueless about their career choice, 30% want to go for engineering, 20% say that they are preparing for medical stream and 10% go for MBA. According to a survey report published on 19th May, 2022 in Financial Express '59% of the Indian workforce is not happy at work' and another report published in The Economic Times on 18th January 2022 points to the fact that '71% of employees rethinking their careers'(19). Now this is the scenario of 2022 which compels us to think what is going wrong? The tendency of prospective students to enroll in wrong stream, due to follow trends or coercion of parents that have a negative impact on students' academic performance (20) and their self-esteem too, and that definitely affects their career goals in future. Students have different capabilities and efficiencies; everyone should have the facilities to the right opportunity. They are young enough to decide what the best suitable career is for them. Often, they look for guidance from elders or teachers but that is not enough always, because in India the teacher student ratio is very poor (18), often it is not possible for the educators to take care of individual one, as a result a significant number of students end up choosing wrong career path due to lack of proper guidance.

Artificial Intelligence helps us to solve such burning issue by developing Recommendation System (RS). The first RS was created by Goldberg, Nichols and Oki & Terry in 1992 (21). RS are software tools and techniques that use Machine Learning Algorithms, data mining techniques to answer a particular

**Role of trade fairs in empowering womenpreneurs of West Bengal: A case study of Sabala
Mela of Kolkata**

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Abstract:

Trade fairs happen to be one of the most effective platforms for businesses to showcase their products. Such events are organised by various agencies to help the entrepreneurs to directly reach out to their prospective customers (both B2B as-well-as B2C) by providing the opportunity to display their wares. According to the theory of marketing mix (4Ps of marketing), these are crucial components of the third P i.e. Promotional mix. Sabala Mela is one such of trade fair organised under the patronage of Government of West Bengal organised specifically for the women entrepreneurs specialising in traditional handicrafts such as pattachitra i.e. scroll painting, bamboo products, handicraft jewellerys, and related items.