Structure, ferroelectric and magnetic behavior in Mn doped 0.75 BiFeO$_3$-0.25BaTiO$_3$ ceramics

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HIGHLIGHTS

- 0.75BiFe$_{1-x}$Mn$_x$O$_3$-0.25BaTiO$_3$ (where x-0.00, 0.01, 0.02, 0.03) ceramics was prepared by solid state sintering method.
- Single phase pure perovskite structure was observed for all the samples.
- Poor ferroelectric and poor leakage current behavior was observed for Mn-doped ceramics.
- Maximum Ms value~0.8emu/gm was recorded highest for maximum Mn-concentration attributed to John Teller distortion.

ARTICLE INFO

ABSTRACT

Lead-free polycrystalline 0.75 BiFe$_{1-x}$Mn$_x$O$_3$-0.25BaTiO$_3$ (x = 0.00, 0.01, 0.02 and 0.03 **hereby designated as BF-BT**) ceramics were synthesized by high temperature solid state reaction technique. This study dwells on the role of Mn doping on the structure, ferroelectric and magnetic behavior of **BF-BT** ceramics. Structural phase analysis of the samples carried out by X-ray diffraction and Raman scattering measurements revealed single phase distorted perovskite structure with rhombohedral symmetry. No alteration in crystal structure was observed with increasing Mn concentration. The average crystallite size of the compounds increases (12.9–27.8 nm) with increasing Mn concentration. The saturated value of ferroelectric polarization (P$_r$) was found to decrease with increasing Mn-concentration and a maximum remnant polarization (P$_r$) of 0.6 μC/cm^2 was recorded at an applied field of 25 kV/cm for x = 0.00 sample. Leakage current density was found to increase with increase in Mn concentration. Oxidation states of the cations probed by X-ray photoelectron spectroscopy (XPS) suggested that Fe/Mn were in mixed state (+3/+2), while Ti-ion demonstrated (+3/+4) state. Presence of multivalence states of Fe/Mn/Ti causing distortion in the lattice (attributed to Jahn Teller) with increasing Mn concentration significantly affects the magnetic behavior of the ceramics. A maximum value of saturation magnetization of Ms~0.80emu/gm was recorded for x = 0.03 composition.

1. Introduction

Multiferroic materials that offer flexibility and control of more than one ferroic orders have drawn the attention of scientific community for the past few decades. These materials exhibit compelling and intriguing physics which is accompanied by a wide range of applications such as storage media, radar technologies, spintronics, non-volatile memories and micro-electromechanical (MEMS) systems etc [1–5]. BiFeO$_3$ (BF) is a natural occurring single phase multiferroic system that displays magneto-electric (ME) effect at room temperature, and exhibits both ferroelectric and anti-ferroelectric behavior with high Curie temperature (Tc~810–890 °C), G Type antiferromagnetic ordering with Neel temperature (T$_{\bar{N}}$350–370 °C), large remnant polarization and large electrically induced strain [6–9].

However, BF being hygroscopic in nature, the biggest challenge lies in the synthesis of pure BF in bulk and thin film form as the formation of hetero-phases (Bi$_2$Fe$_4$O$_9$ and Bi$_{25}$FeO$_{39}$) occurs during the sintering process at elevated temperatures. This leads the system to deviate from stoichiometry, occurrence of Fe-multiple states at crystal interstitial sites, creation of vacancies and defects which compromises the functional properties of BF [9,10]. Also, the semi-conducting properties of BF restrict poling, leading to poor electrical resistivity, non-saturated

Pure and co-doped ZnO nano-sheets thin films as UV detectors

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ABSTRACT

Herein we report the formation of hexagonal nano-sheets of pure and Co-doped ZnO thin films. Both films were deposited using the aerosol-assisted chemical vapor deposition technique. The X-Ray diffraction results revealed that the film is a mixture of two ZnO phases; Wurtzite and Zinc blende. Scanning electron microscope images show hexagonal nano-sheets formation onto the substrate surface. The band gap of the deposited films has been determined using Beer's law. The performance of both films as Ultra-Violet detectors has been investigated. The response/decay time has been determined which shows large values. With doping response time decreases, whereas decay time increased. The response time was recorded a minimum value of 4s for Co-doped ZnO films at 5 V applied voltage. While the gain value of the doped film was found to be lower than the pure one.

1 Introduction

ZnO is one of the most studied semiconductor metal oxides (SMO) materials due to its multifunctional properties. Properties like high band gap value [1], high exciton binding energy [2], high dielectric constant [3], adjustable refractive index [4], and antibacterial activity [5] make ZnO a very attractive material for many applications. It has been used as photodetectors [6], gas sensors [7], optoelectronic devices [8], solar cells [9], and many other applications.

Zinc oxide is known to exist in three phases [10]. These structures are hexagonal Wurtzite (WU), Cubic rock salt (RS), and cubic Zinc blende (ZB). Among these three phases, the hexagonal WU-ZnO structure is the most common one since it is the most thermodynamically stable phase under ambient conditions, while the ZB-ZnO phase is thermodynamically metastable [11]. Also, the zinc blende phase is stable only when a film gets grown onto a cubic substrate and the rock salt structure is stable at high pressure [11]. It is also known that due to high mismatching between the film and substrate, a separated region of ZB phase

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Double-Absorber CZTS/Sb$_2$Se$_3$ Architecture for High-Efficiency Solar-Cell Devices

Atul Kumar,* M. Sujith, K. Valarmathi, Rajnish Kumar, Bandar Ali Al-Asbahi, and Abdullah Ahmed Ali Ahmed

The design and configuration of solar cells are critical for photovoltaic action and achieving high efficiency. Herein, the double-absorber solar-cell architecture of low-bandgap Sb$_2$Se$_3$ and high-bandgap Cu$_2$ZnSnS$_4$ (CZTS) absorbers for broader spectrum utilization leading to higher efficiency are comprehensively analyzed. The cost-effective chalcogenides CZTS and Sb$_2$Se$_3$ for high-efficiency dual-absorber configuration to show the possibility of high wattage at a lower cost are taken. The crucial parameters of bandgap pair and thickness are optimized for synergetic device performance and optimal utilization of the incident spectrum. By introducing an additional absorber–absorber interface, the interfacial defect at CZTS/Sb$_2$Se$_3$ is lowered by optimizing the band offset for the efficient functioning of a double–absorber device. The proposed device has straightforward NiO/CZTS/Sb$_2$Se$_3$/AZO architecture suitable for low-cost fabrication with high efficiency of 30.9%.

1. Introduction

Switching from conventional to renewable solar energy has colossal cost-parity challenges.[1] Cost parity in favor of photovoltaics (PV) could be made by maximizing wattage to cost ratio (W/\$)[2] for solar cells. High W/\$ matric could be achieved by using affordable material, fabrication process, mass scale production, and high-efficiency device configuration with better wattage output. In the current PV research landscape, the primary aim of all the research efforts is to maximize output efficiency or lower the overall input cost. Non-silicon alternatives such as Cu$_2$ZnSnS$_4$, Sb$_2$Se$_3$, and FeS$_2$ offer exciting cost reductions owing to low material utilization in thin films, lower cost, and faster throughput fabrication process due to state-of-the-art nanotechnology.[3]

Additionally, thin-film sulfide/selenide materials, such as Cu$_2$ZnSnS$_4$ (CZTS) and Sb$_2$S$_3$, are potentially cost-effective owing to the earth-abundant constituent elements.[4–9] Realizing high efficiency in low-cost systems is critical to substantiate PV as a future energy source. PV must simultaneously outperform on both the technological and economic fronts. Newer low-cost materials with high-efficiency yielding configuration and device design are required for achieving high W/\$ matric. The practical approach to competitive PV narrowed down to two-variable between input cost (material and fabrication) of thin-film solar cells and a high-efficiency technique.

In this line, cost-effective chalcogenide material (sulfides, selenides) with a high-efficiency configuration, such as a dual-absorber device design[10–20] for high-efficiency is pursued in this study. The double-absorber technique utilizes two distinct bandgap absorbers to cover a broader spectrum reducing spectrum losses (thermalization and non-absorption). We have taken CZTS and Sb$_2$Se$_3$ absorber pairs for double absorbers as they are earth-abundant, nontoxic, potentially low-cost alternative absorber materials for PV.[21] Among all upcoming cost-effective PV materials (like CZTS, Sb$_2$S$_3$, SnS, FeS$_2$, etc.), CZTS and Sb$_2$Se$_3$ are the only material which has shown practical efficiency beyond the 10% mark.[22] These have excellent absorption properties and optimal bandgap with wide tunability.[23,24] The substitution of selenium in place of sulfur could tune their bandgap in Cu$_2$ZnSn(S$_x$Se$_{1-x}$)$_4$[25] and Sb$_2$S$_x$Se$_{3-x}$.[26] Solution-processable, high-throughput, and energy-efficient fabrication techniques are inherently advantageous to these

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Physica Scripta

PAPER

Physical properties of Ni: Co_3O_4 thin films and their electrochemical performance

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Keywords: cobalt oxide, thin film, Ni-doping, electrochemical properties

Abstract

In this research work, we have deposited cobalt oxide as pure and Ni-doped thin films using spray pyrolysis. The concentration of Ni has been changed from 0 to 6 wt% in all films while other deposition parameters are fixed. The characterization of deposited films has been c using X-ray diffraction (XRD), energy dispersive x-ray spectroscopy (EDX), x-ray photoelectron microscope (XPS), scanning electron microscope (SEM), and optical spectroscopy. The XRD results confirm the formation of Co_3O_4 as the low-temperature stable phase of cobalt oxide and the successful doping with nickel. The XRD also shows the preferred orientation of growth of film is along the (111) plane and the crystallite size was found to decrease with increasing Ni content. The SEM micrograph of the deposited film surfaces revealed that the samples are porous and in some parts of the sample, the particles are agglomerated due to doping. The Ni doping was confirmed by both EDX and XPS. The Ni concentration was found to increase according to dopant concentration. The XPS data of the 4 wt% film has been recorded which confirms the existence of Ni^{+2} in the deposited films. Both optical transmission and reflection spectra have been recorded using a spectrophotometer. The band gap values have been found to decrease upon Ni-doping. The electrochemical properties of the pure and nickel-doped cobalt oxide films were measured by cyclic voltammetry (CV), galvanostatic charge-discharge (GCD), and electrochemical impedance spectroscopy (EIS) in 0.3 M KOH electrolyte. The specific capacitance of 4 wt% Ni doped Co3o4 was found to be 804 Fg-1 at a 2 mVs^{-1} scan rate which is 90% higher than pure films. The important property of this material is that it shows excellent retention of 96% and remains almost constant for 10000 cycles. The impedance analysis reveals that 4 wt% Ni doped cobalt oxide film has the lowest R_S value of 0.2 Ω cm^{-2} and lowest R_{CT} value of 0.05 Ω cm^{-2} in comparison to other films which have excellent super-capacitive nature. These outstanding electrochemical properties of 4 wt % Ni-doped Co3O4 thin film have made it a potential candidate for anode material in supercapacitor devices.

1. Introduction

With the increasing demand for energy due to the increase in world population, the sources of conventional energy will not be able to meet this in near future. So, interest in green technology is growing among every stack holder. But we cannot make it popularize until a low-cost non-conventional energy system is developed. The main challenge for this is its storage capacity. A renewable energy source with an excellent storage system can be a game changer once a decent storage material is fabricated [1, 2]. Batteries have led the sector for a few decades but batteries alone cannot provide a total solution to the limitation of energy storage systems. Nowadays, electrochemical supercapacitors are gaining interest among energy storage systems as a result of their different advantages including high power density, good energy density, longer cycle life, excellent reversibility, and rapid

REVIEW ARTICLE

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Synthesis, antibacterial and antifungal activities of Schiff base rare earth metal complexes: a review of recent work

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ABSTRACT
Schiff bases are useful pharmacophores and form stable complexes with various metal ions in different oxidation states. Schiff base metal complexes show various biological activities such as antioxidant, antimalarial, antimicrobial, antitumor and anti-inflammatory. Schiff base ligands easily form complexes with rare earth metals and show various biological activities; due to paramagnetic nature of complexes, they are primarily used in medicine as a contrast media for magnetic resonance imaging. This review summarizes the synthesis of Schiff base rare earth metal complexes as well as antimicrobial activities especially antibacterial and antifungal from the last two decades and comparison of the result with standard reference drugs.
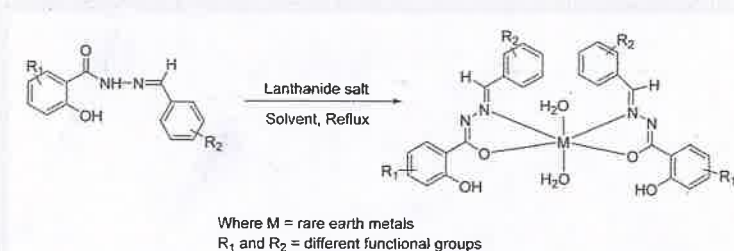
Where M = rare earth metals
R₁ and R₂ = different functional groups

Introduction

Transmittable diseases are spreading faster and emerging more rapidly than ever before; according to a WHO report, between 1940 and 2004 335 transmittable diseases have been identified with the majority being of rickettsial or bacterial infections.[1] Schiff base ligands are a very significant class of compounds with coordination

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Double-Absorber CZTS/Sb$_2$Se$_3$ Architecture for High-Efficiency Solar-Cell Devices

Atul Kumar,* M. Sujith, K. Valarmathi, Rajnish Kumar, Bandar Ali Al-Asbahi, and Abdullah Ahmed Ali Ahmed

The design and configuration of solar cells are critical for photovoltaic action and achieving high efficiency. Herein, the double-absorber solar-cell architecture of low-bandgap Sb$_2$Se$_3$ and high-bandgap Cu$_2$ZnSnS$_4$ (CZTS) absorbers for broader spectrum utilization leading to higher efficiency are comprehensively analyzed. The cost-effective chalcogenides CZTS and Sb$_2$Se$_3$ for high-efficiency dual-absorber configuration to show the possibility of high wattage at a lower cost are taken. The crucial parameters of bandgap pair and thickness are optimized for synergetic device performance and optimal utilization of the incident spectrum. By introducing an additional absorber–absorber interface, the interfacial defect at CZTS/Sb$_2$Se$_3$ is lowered by optimizing the band offset for the efficient functioning of a double–absorber device. The proposed device has straightforward NiO/CZTS/Sb$_2$Se$_3$/AZO architecture suitable for low-cost fabrication with high efficiency of 30.9%.

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1. Introduction

Switching from conventional to renewable solar energy has colossal cost-parity challenges.[1] Cost parity in favor of photovoltaics (PV) could be made by maximizing wattage to cost ratio (W/\$)[2] for solar cells. High W/\$ matric could be achieved by using affordable material, fabrication process, mass scale production, and high-efficiency device configuration with better wattage output. In the current PV research landscape, the primary aim of all the research efforts is to maximize output efficiency or lower the overall input cost. Non-silicon alternatives such as Cu$_2$ZnSnS$_4$, Sb$_2$Se$_3$, and FeS$_2$ offer exciting cost reductions owing to low material utilization in thin films, lower cost, and faster throughput fabrication process due to state-of-the-art nanotechnology.[3] Additionally, thin-film sulfide/selenide materials, such as Cu$_2$ZnSnS$_4$ (CZTS) and Sb$_2$S$_3$, are potentially cost-effective owing to the earth-abundant constituent elements.[4–9] Realizing high efficiency in low-cost systems is critical to substantiate PV as a future energy source. PV must simultaneously outperform on both the technological and economic fronts. Newer low-cost materials with high-efficiency yielding configuration and device design are required for achieving high W/\$ matric. The practical approach to competitive PV narrowed down to two-variable between input cost (material and fabrication) of thin-film solar cells and a high-efficiency technique.

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Impact of Grain Size and Grain Nature in Thin-Film Solar Cells

R. Thandaiah Prabu, S. R. Malathi, Rajnish Kumar, Huda S. Alkhalidi, and Atul Kumar*

Herein, a theoretical investigation is conducted on grain-size inhomogeneity's impact and grain boundaries' (GBs') electrical nature in thin-film solar cells. Using the Matthiessen rule, grain-size-dependent mobility is derived in polycrystalline material. The obtained grain-size-dependent mobility values are fed into the Poisson solver to calculate device performance. The severity of grain sizes in the lower region determines how grain size affects the photovoltaic performance by grain-size-dependent efficiency simulation. Low grain sizes become critical, especially for low-thickness absorbers. The second aspect of the study assesses potential variation at GBs to reveal the impact of the electrical properties of GBs. Evidence shows that the acceptor defects at GB are benign for device performance, causing upward band bending at the GB and acting as electron barriers. Device performance is adversely affected by donor defects at GBs due to downward band bending. As summarized in the findings, the polycrystallinity-induced cause–effect relationships of grains are likely to interest solar cell researchers.

1. Introduction

Solar cell devices are made of thin, typically polycrystalline thin films, i.e., composed of randomly arranged grains. By examining grain size and grain boundaries (GBs), it is possible to quantify the impact of grains. The grain size of polycrystalline granular ranges from nanometers to micrometers scale.[1–5] Small grain size will result in a substantial volumetric GB area. The grain size of high-efficiency solar cells (in Cu_2InGaS_4 (CIGS), Cu_2ZnSnS_4 (CZTS), or CdTe) is comparable to the absorber layer thickness (grain diameter and absorber thickness are approximately $1\,\mu m$). At GBs, small grain sizes increase the scattering probability, thus altering mobility and conductivity. Polycrystalline material inherently possesses GBs, which dominate the local composition and chemistry, leading to altered bulk device properties. The exact and comprehensive impact of GB is still under evaluation by various groups. Grains in polycrystalline material cast two-sided impact based on their a) size inhomogeneity (mobility limiting) and b) boundaries effect (causing charge accumulation). It is observed experimentally that the polycrystalline devices show efficiencies comparable to or even higher than many single-crystalline semiconductor solar cells owing to several intriguing optical and electrical properties. The microscopic GBs greatly influence the electro-optical properties of polycrystalline absorbers, which need to be explored.

Large grain size will have a low volumetric GB disruption compared to low grain size. In this way, grain size becomes a crucial factor that significantly impacts charge transport, and superior device performances are anticipated from larger grain sizes. There is ample experimental evidence suggesting GBs can be made beneficial for transport properties.[1] Recombination at GBs is constrained by diffusion, which decreases as the inverse of the grain area is raised to the power of 3/2. This implies that even in samples with a sizable average grain size, small grains are the dominant factor contributing to recombination losses, effectively making them focal points for recombination.[6] The local chemistry of GBs leads to band structure variation at the grain–grain interface. The downward bending of energy levels (conduction and valence band) is observed due to the accumulation of electrons at GB. In some instances, upward band bending at GB is observed due to hole accumulation at GBs owing to the

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The Influence of benzyl chloride on fermentative bioproduction of ethanol

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Abstract: The influence of benzyl chloride on bioproduction of ethanol by yeast *Saccharomyces cerevisiae* DK-18 has been assessed. It has been found that the mutagen, i.e., benzyl chloride under observation has stimulatory effect on bioproduction of ethanol by yeast *Saccharomyces cerevisiae* DK-18 and enhances the yield of ethanol to an extent of 22.827% higher in comparison to control fermentor flasks, i.e., 6.79 ml/100mL in 56 hrs of incubation period, 4.7 pH and 33°C temperature with 22% (w/v) molasses solution.

(Keywords: Molasses, ethanol, mutagens, benzyl chloride, *Saccharomyces cerevisiae* DK-18)

Introduction

Chemical mutagens are standard tools for mutagenesis in a variety of organisms, and they are a primary means of creating mutations in phenotype-based screens in most genetic systems. Since the 1960s, however, mutagens have defined a transdisciplinary problem of risk policy. Substances such as radioactive particles from fall-out and the nuclear industries, pharmaceuticals, chemical supplements in the foodstuffs industry or pesticides were silent, efficient and ubiquitous.[1-4] The precarious status between efficiency and (dangerous) autonomy formed the key characteristics of mutagens that nurtured the ambivalent career of mutants. Daily life became populated by horrifying, but also superhuman creatures.[5-18]

Literature survey reveals that a little work has been done on fermentative production of ethanol by *Saccharomyces cerevisiae* DK-18 exposed to benzyl chloride, therefore, the author has employed benzyl chloride on fermentative production of ethanol by *Saccharomyces cerevisiae* DK-18.

Experimental

The influence of benzyl chloride on fermentative bioproduction of ethanol from molasses by *Saccharomyces cerevisiae* DK-18 The constitution of production medium for the fermentative bioproduction of ethanol from molasses by *Saccharomyces cerevisiae* DK-18 is prepared as follows :

Molasses Solution : 22 % (w/v), Malt-Extract : 0.40%, Yeast-Extract : 0.40%, Peptone : 0.40% Distilled water : 100 ml, pH : 4.7, Distilled water was added to make up the volume up to '100 mL'.

The pH of the medium was adjusted to 4.7 by adding requisite amount of lactic acid. Now, the same production medium for fermentative bioproduction of ethanol from molasses by *Saccharomyces cerevisiae* DK-18 was prepared for ninety nine fermentor-flasks, i.e., each containing hundred mL of production medium.

WOMEN ENTREPRENEURS IN MICRO AND SMALL ENTERPRISES IN BIHAR: SUGGESTING THE NEED OF APPROPRIATE POLICY

Rashmi Akhouri*

Abstract

Creating space for self-assertive roles of women in economic and political domains is the prime pre-requisite for their genuine empowerment. No doubt governments, especially Bihar Government have launched several gender based welfare schemes and promoted Self-Help Groups (SHGs) as well as 'Bank Sakhi' for their economic wellbeing, yet it becomes an urgent imperative to make women enabled to compete in economic sphere with their male counterparts. Under influence of this dominant assumption, the present paper intends to analyse the administrative and legal problems, socio-economic conditions, as well as socio-cultural factors affecting women entrepreneurs in micro and small enterprises in Bihar milieu. For this Patna district has been selected for examination. The present study is based mainly on primary sources of data collection through survey method. The study finds that for reaping the demographic dividend, it is high time to introduce public policies with gender inclusive strategies on education, skill development, informal sector development, and entrepreneurship.

Keywords: MSMEs, MSEs, Women Entrepreneurs, Motivation, Administrative-Legal, Patna, Bihar

INTRODUCTION

Women in general must fulfil a lot of societal roles pressed upon them for ages. It is critical and unheard-of women who tend to break down all barriers and step beyond their roles. The norms of masculinity are at once hostile towards the new

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A Comprehensive Study of Social and Economic Dimensions of Rural-urban Migration in Bihar

| Author(s)	Rashmi Akhoury, Juhi Prasad
Country	India
Abstract	Bihar with about 92,000,000 rural population and 11,000,000 urban population has always been in limelight as the state with second highest out migration in India. How ever this fact has overshadowed inner migration within different districts of Bihar especially to its capital city Patna. The aim of this article is to study how socio- economic causes has led to heavy migration to capital city of Patna. It discusses the multifaceted problems which this migration has created. The article also tries to suggest multidimensional remedial measures(economic political social) to overcome this problem and improve the plight of capital city Patna.
Keywords	urban rural migration, Social economic causes of migration, social economic problems of migration, remedial measures political social and economic.
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A Comprehensive Study of Social and Economic Dimensions of Rural Urban Migration in Bihar

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Abstract

Bihar with about 92,000,000 rural population and 11,000,000 urban population has always been in limelight as the state with second highest out migration in India. How ever this fact has overshadowed inner migration within different districts of Bihar especially to its capital city Patna. The aim of this article is to study how socio- economic causes has led to heavy migration to capital city of Patna. It discusses the multifaceted problems which this migration has created. The article also tries to suggest multidimensional remedial measures(economic political social) to overcome this problem and improve the plight of capital city Patna.

Keywords- urban rural migration, Social economic causes of migration, social economic problems of migration, remedial measures political social and economic.

INTRODUCTION

Rural-urban migration is basically labour migration. It is thought to be the consequence of unequal development wherein people from 'backward' regions move to 'development' regions. These developed regions may either be prosperous rural areas or expanding urban areas where the people from the regions of less employment income opportunities flock.

Bihar is one of the state of India from where the out-migration from the rural areas has taken place. Apart from the out-migration from rural areas, Patna Town is a witness of heavy in-migration from the rural areas of other districts of Bihar which results in variety of problems and imbalances viz., problems of urbanization, slums, pollution, unemployment and many other institutional, social, cultural and educational problems. Hence, a multiform attack should be organized to check the rural-urban migration. In present paper, some remedial measures have also been suggested to make the migration process more systematic, organized and less cumbersome.

Migration is a very important subject of study and research in a backward economy. The subject of migration has attracted the attention of increasing number of social scientists. In a backward region, migration means migration of labour from less developed areas to more developed areas. "Rural to urban migration", the most important of the migration streams, is generally attributed to pull factors like the difference between average income opportunities in the urban and rural areas.

OBJECTIVES

1   To analyse the causes of socio-economic problems and social unrest in rural areas of undivided Bihar
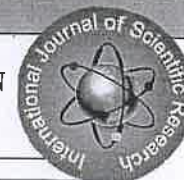
EFFECTS OF NYCTANTHES ARBOR-TRITIS (HARSINGAR) PLANT EXTRACTS ON PROMASTIGOTE FORM OF LEISHMANIA DONOVANI IN IN-VITRO CONDITION.

Biotechnology

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ABSTRACT

Leishmaniasis is a group of disease caused by the members of kinetoplast protozoa of the genus *leishmania* comprising a group of unicellular organisms which are intracellular parasites in macrophage and other phagocytic cells of the reticuloendothelial system. Visceral leishmaniasis (VL) or Kala-azar a vector-borne parasitic disease caused by protozoan parasite (Chang, KP.; et.al, 1985). In India the traditional methods of treatment are based on the principles of ayurveda and naturopathy. Considering the aforesaid facts this project has been selected to search the plants for the treatment of Kala-azar. The plant products or plant extracts will certainly be cheaper than the allopathic drugs. Therefore, aim is to search a plant which is locally available and if not available, it can be purchased from the local market to provide cheaper and without side effect treatment to Kala-azar (Mishra P. 2008; W.H.O. Tropical diseases 2008. Effects of *Nyctanthes arbor-tritis* plant extracts on promastigote form of *Leishmania donovani* in in-vitro condition. Phytochemical screening of the plant extract showed the presence of alkaloid, flavonoid, fixed oil and fats, saponin, tannin and phenolic compounds. The selected plant obtained from Gaya, Bihar region & their ethanolic extracts will be prepared in the laboratory by Soxhlet apparatus in Ethanol solvent to use during experiment. The effects of plant extracts on the parasite will be studied by providing variable doses to the parasite. The plant extracts at varied concentration will be added into media containing the parasite in the ratio between extract & media determined during experimentation in the laboratory. After incubation at different time intervals of 24, 48 and 72 hours the effect of extracts on the parasite will be studied. The sample of parasite (promastigote of *L. donovani*) used for experiment (in-vitro) will be routinely culture in laboratory at $25 \pm 2°$ with in different culture media after collecting parasites (sample) from the blood and bone marrow of patients of Kala-azar in the hospitals or research institutes. The plant extracts exhibit that with the increasing duration of time the efficacy of the plant extracts also increases significantly in NA_E taken into the consideration.

INTRODUCTION

Leishmaniasis are a group of multiorgan, vector-borne disease caused by intracellular protozoan parasite of genus *Leishmania* and transmitted by sandflies.

Visceral leishmaniasis [VL] also called as "Kala-azar" is featured by skin pigmentation, irregular fever, weight loss, lymphadenopathy, hepatosplenomegaly (both the spleen and liver are enlarged than normal), pancytopenia and anemia. The visceral leishmaniasis is most common in India, East Africa and in Brazil. According to WHO report more than 90% of the cases reported in 2019 were from India, Brazil, Iraq, Ethiopia, Kenya, Somalia, Nepal, and Sudan (Piscopo and Mallia, 2007; WHO 2021). India alone shares nearly 25 % of the global load of kala-azar. This is a serious public health issue in the eastern part of the country specially in the states of Bihar, eastern Uttar Pradesh, Jharkhand, West Bengal, and areas adjoining to Nepal. In term of districts, 54 districts in the four states., 33 districts of Bihar, 4 districts of Jharkhand, 6 districts of Uttar Pradesh and 11 districts of West Bengal are affected. Sporadic cases also appear from some other states like Uttaranchal, Assam, Himachal Pradesh, Gujarat, Jammu & Kashmir, Madhya Pradesh, Kerala, Haryana, Sikkim, Puducherry, and Tamil Nadu (Talniya, 2016; Bhunia *et al.*, 2013; Kumar *et al.*, 2020).

Bihar is one of the most severely affected state of India. More than 50 % of all the cases of leishmaniasis is reported from Bihar. VL is still common in the 458 blocks of Bihar. Some VL affected blocks have persistently remained extremely endemic for many years (Kumar *et al.*, 2020; WHO-NVBDCP, 2017).

The universally recommended drugs used for the treatment of *Visceral leishmaniasis* are pentavalent antimonial. Recently, Emergence of (MDR) multiple drug resistance to human pathogenic organisms particularly the hemoflagellates like *Leishmania* species along with severe side effects has compelled to search of new antimicrobial substances from other sources including plant. It has been established that plants are one of the vital sources and the phyto-chemicals derived from them acts suitably & potentially against the parasites. It has also been reported that over 100 plants act suitably against various form of Leishmanial parasites (Hamid Eqbal et.al.2012). Different parts of the medicinal plant extracts are being used as antileishmanial agents. Considering these facts, present study has been undertaken to evaluate the extracts of *Nyctanthes arbor-tritis* (Harsinghar) on promastigote form of *L.donovani* in in-vitro condition. *Nyctanthes arbor-tristis*, a medicinal plant belonging to family *Oleaceae* and commonly known as Night Jasmin (Vats et al., 2009; Meshram et al., 2012). The plant has some traditional as well as medicinal values. This plant also has some phytochemicals like flavonoids, glycosides, D-mannitol, nicotiflorin etc. (Bordoloi & Lahkar, 2018). The whole plant exhibits pharmacological effects and the leaves show anti-fungal, anti-inflammatory and antibacterial effects (Gulsan et al., 2015).

Therefore, this study addresses assessing the present information has also been co-related with those of the findings as antileishmanial drugs derived from the plant origin.

MATERIALS AND METHODS

Collection of Plant Materials

Plant samples *Nyctanthes arbor-tritis*, was taken for the experiment. *Nyctanthes arbor-tritis* leaves was taken from Post graduate department of Biotechnology, Magadh University, Bodh Gaya, Bihar, India and identified according to the relevant monographs of Indian Pharmacopoeia and kept in the sterile condition in the laboratory for further process. After collection, the desired plant parts (leaves) were first cleaned from extra weeds and washed with distilled water. After then, they dried at 40°C in hot air oven till completely dried and grind into fine powder in a mortar. The plant extracts were obtained by ethanolic treatment by using Soxhlet apparatus. The powder form of plant material weighed and kept in the thimble for at least 24 hours ethanolic treatment. After ethanolic treatment, the extracts were eluted from thimble and come back to ethanol. The extracts along with

Microbial Journey: Mount Everest to Mars

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Abstract A rigorous exploration of microbial diversity has revealed its presence on Earth, deep oceans, and vast space. The presence of microbial life in diverse environmental conditions, ranging from moderate to extreme temperature, pH, salinity, oxygen, radiations, and altitudes, has provided the necessary impetus to search for them by extending the limits of their habitats. Microbiology started as a distinct science in the mid-nineteenth century and has provided inputs for the betterment of mankind during the last 150 years. As beneficial microbes are assets and pathogens are detrimental, studying both have its own merits. Scientists are nowadays working on illustrating the microbial dynamics in Earth's subsurface, deep sea, and polar regions. In addition to studying the role of microbes in the environment, the microbe-host interactions in humans, animals and plants are also unearthing newer insights that can help us to improve the health of the host by modulating the microbiota. Microbes have the potential to remediate persistent organic pollutants. Antimicrobial resistance which is a serious concern can also be tackled only after monitoring the spread of resistant microbes using disciplines of genomics and metagenomics The cognizance of microbiology has reached the top of the world. Space Missions are now looking for signs of life on the planets (specifically Mars), the Moon and beyond them. Among the most potent pieces of evidence to support the existence of life is to look for microbial, plant, and animal fossils. There is also an urgent need to deliberate and communicate these findings to layman and policymakers that

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BMC Public Health

What causes loneliness among household heads: a study based in primary setting in Mumbai, India

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Abstract

Background: With the pace of urbanization, symptoms of loneliness emerge as one of the most devastating mental illnesses among city dwellers in the modern age. The present study has tried to identify the potential factors and correlates which affect loneliness vulnerability.

Methods: The data for this study were collected from three different areas of Mumbai (i.e., Dadar, Bandra, and Chembur).This study was conducted through a cross-sectional household survey of household heads in the five different housing typologies/ localities between January and June 2016.A total of 450 household data were collected using the quota sampling method. Loneliness was the main dependent variable. The bivariate analysis was used to see the percentage of loneliness among respondents. Bivariate analysis for categorical data was carried out using the chi-square (x^2) test. Logistic regression analysis was performed to explore the correlates of loneliness among household heads. The probability of significance was set at 5%.

Results: It was found that around 7 percent of respondents often feel lonely, and 21 percent of respondents sometimes feel lonely in the last seven days preceding the survey date. Household heads with two or more chronic diseases had higher odds (OR = 4.87, CI = 1.52–15.57) of loneliness than household heads without any chronic disease. The odds of loneliness were almost 3 times higher (OR = 3.05; CI = 1.11–8.38) among females as compared to males. Household heads living alone (single) had higher odds (OR = 19.99; CI = 4.14–96.59) to suffer from loneliness than those living in a joint family.

Conclusion: Finding reveals that level of loneliness symptomatology in urban dwellers may be attributed significantly by individual (i.e., morbidity status and sex of respondent), social (i.e., personal relation) and residing locality characteristics. Community psychological intervention along with enhanced civic engagement can reduce level of loneliness in existing slum rehabilitees.

Keywords: Loneliness, Urbanization, Civic engagement, India

Background

Urbanization is considered a new avenue of prosperity as it continuously attracts people to a better life. Nevertheless, gradually, it was realized that urbanization is like a two-edged sword [1]; on one side, it provides better opportunities for standard life and health care to the population through better urban services [2]. However, on the other side, the fruits of city life such as privacy and seclusion have led to many physical and psychological problems among people living in urban areas [2]. In this context, it has been anticipated that with the pace of urbanization, symptoms of loneliness emerge as one of

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Declarations

Ethics approval and consent to participate
This study is based on primary data collected by the first author herself. The ethical approval was granted by the Student Research Ethics Committee of International Institute for Population Sciences, Mumbai, India. Written informed consent was sought from each participant before undertaking the survey and the information was collected from those only who provided the written informed consent. All the participants were above 18 years old and therefore were eligible to provide their consent to participate in the study. Furthermore, all the procedures were performed in accordance with relevant guidelines.

Consent for publication
Consent for publication was taken from each of the individual respondent.

Competing interests
The authors declare that they have no competing interests.

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Intergenerational educational and occupational mobility among scheduled castes in rural Bihar

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Abstract

The socio-economic transition underway as part of India's development process has brought about convergence between social groups. However, intra-caste heterogeneities in accessing developmental opportunities may persist in the backdrop of widening economic inequality, specifically among the marginalised groups. This calls for an exploration of intergenerational mobility that has not been investigated adequately due to paucity of panel data. Contrary to studies that have treated Scheduled Castes (SCs) as a homogenous entity, this paper made an attempt to provide new evidence on intergenerational mobility among SCs through a primary survey conducted in rural Bihar. Education and occupation, two indicators of socio-economic status, were used as measures of intergenerational mobility. Transition

Social Media Engagement and Mental Health: An Empirical Study

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Social media is a digital phenomenon embraced by billions worldwide. It provides users with an easy way to engage and connect with others without meeting face- to-face. It has become an omnipresent part of everyday life. Use of social media platform has the potential to generate a number of benefits including the well-being from enhanced social connectedness and social capital accumulation, but is also associated with several negative behaviours and impacts on our life. This research explores social media use and its relationship with mental health. The sample comprised of 100 participants. To assess the social media engagement and mental health of the participants two questionnaires were distributed. Mean, SD, t- test and correlation coefficients were calculated. It was found that the social media engagement of both genders was positively correlated with significant mental health domains (i.e., anxiety and depression) which may lead to serious issues in the long run as the users tend to be young people who use social media sites more frequently on a daily basis.

Keywords: *Social media engagement, mental health, depression, and anxiety.*

Human beings are social creatures. they need the companionship of others to thrive in life, and the strength of their connections has a huge impact on their mental health and happiness. Being socially connected to others can ease stress, anxiety, and depression, boost self-worth, provide comfort and joy, prevent loneliness, and even add years to the life. On the other side, lacking strong social connections can pose a serious risk to peoples mental and emotional health.

In today's world, people rely on social media platforms such as Facebook, Twitter, Snapchat, YouTube, WhatsApp, and Instagram to find and connect with each other. Social media (SM) is a way to communicate and share content through these various technological platforms (Kaplan &Haenlein, 2010). It is an Internet based form of Communication.Social Media is broadly defined as "forms of electronic communication through which users create online communities to share information, ideas, personal messages, and other content" (Cambridge English Dictionary, 2016). In the past several years, the social media industry has boomed. In 2020, there are an estimated 3.8 billion social media users worldwide, representing half the global population (We Are Social, 2020). Statistics show that the extent of time people spend on social media sites amount to significantly high rates. On average, 28% of the time spent using the internet is for social media interaction (Huang, 2017).

There are many positive ways in which it can help to stay connected and support the wellbeing, such as, social media platforms allow users to have

The Mediating Role of Psychological Capital in the Relationship between Positive Emotions and Mental Health: A Cross Sectional Study

*Vandana Maurya
**Urmila Rani Srivastava

Abstract

Healthcare institutions render important services dealing with the health and life of people. However, research to date has found that the healthcare professionals are always surrounded with the elements of stressful, difficult situations, and the episodes of hardship. Since, if unhealthy and anxious personnel are damages to organizations, no phenomenon is more important for employees than the positive emotions and mental health. Positive emotions are often found to be associated with good outcomes and enhanced psychological well- being. However, despite these well-established facts the mechanism of the relationship between the two is less clear. This study explores whether psychological capital (PsyCap) may act as a personal resource mediating the relationship between positive emotions and mental health of healthcare professionals. 240 healthcare professionals completed the survey which includes the measures of positive emotions, PsyCap and mental health. The results indicated that positive emotions predicted increase in both mental health and PsyCap, while PsyCap was having important influence on mental health. PsyCap partially mediated the relationship between positive emotions and mental health of the employees in the healthcare sector. This study recommends that organizations could facilitate more positive emotions and provide PsyCap orientation to employees for improving their mental health and the overall organizational performance.

Keywords: Positive emotions, mental health, PsyCap, and healthcare professionals.

Introduction

Today's growing and fast paced work scenario has a robust impact on each kind of occupation and health, including the mental health, of the workforce. Problems related to mental health have deleterious effects, since, it largely influences the employees' performance. Healthcare is a distinctive profession offeringimportantfunctions in patient care (Estiri, Nargesian, Dastpish, & Sharifi, 2016).Healthcare professionals'responsibility in contributing towardspatients' health and the productivity of the organization isimperative.Hence, healthcare professionals are the key factor in providing better service to their patients, promoting their well- being and ultimately to improve the overall performance of the hospitals (Sampath, Kappagoda, Othman, & De Alwis, 2014).In order to maintain this, healthcare professionals encounter many challenges and issues regularly. The few most frequently occurring and most stressful issues in healthcare sector are the prevalence of new types of diseases,risingskill demands, overburdened emergency rooms, anxiety, fatigue and maintaining work- life balance. Healthcare professionalsin their early career may have greater chances of experiencing these issues in a greater extent, thus, reporting higher levels of stress and health related issues. Therefore, work-related stress and mental health problems are widely thought to be as

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COVID-19:
A Psychological Perspective

Dr. Vandana Maurya
Prof. Jai Mangal Deo

COVID-19 is an infectious disease which was unknown before its outbreak in December, 2019 and was declared as a global threat. Such widespread outbreaks are associated with many adverse consequences. It was estimated that the damage created by it, will take more than a decade to recover globally. Specially, the estimation about psychological health issues and their recovery are beyond the concerns of the majority. However, WHO has throughout been concerned about this crucial aspect. While the pandemic COVID-19 is targeting our psychological health as well the aim of the present discussion is to highlight the role of resilience to various domains of life during uncertainties and vulnerabilities so characteristic of COVID-19. Surrounded by the elements of negativity people can only escape from it if they can build courage and strength from it. It is a potential strength of the individuals that they have the ability to think, to plan, to reorganize, to decide and to response in difficult situations in better way, preparing their road to recovery.

"No matter how much falls on us, we keep plowing ahead. That's the only way to keep the roads clear."

—Greg Kincaid

The COVID-19 pandemic is a major health crisis influencing most of the countries throughout the globe. It is an acute viral

EFFICIENT RESOURCE USE & ENVIRONMENTAL PROTECTION

- Resource Use efficiency- Water, Energy, Chemicals and Natural Capital
- Global Warming and Climate Change
- Renewable Energy
- Waste Management
- Transition From Carbon Intensive to Clean Energy
- Sustainable Consumption and Sustainable Production
- Use of Alternative Fuel Vehicles
- Reducing the levels of Water, Air and Noise Pollution
- Conservation of Forest

CONTENTS

The Path Of Energy Transition For Global Economies

Anita Das

ABSTRACT

Global energy consumption in 2018 increased at nearly twice the average rate of its growth since 2010, this result is due to the world economies being highly carbon intensive. All over the world, demands for fuels have increased, and it's mostly led by natural gas, even though solar and wind energy resources have shown high growth. Most of growth in energy needs happened due to high rise in electricity demand throughout the world. Energy-related CO_2 emissions have risen to a historic high of 33.1 Gt CO_2 and are expected to rise in the years to come. The power sector accounted for nearly two-thirds of emissions growth, with carbon emission at an all-time high, mostly happening in China, India, United States and countries of the European Union. With Carbon Dioxide being emitted at a large scale, it is the most important cause of global warming. With such huge amounts of CO_2 emissions, it is very evident that mostly all the countries are in carbon intensive economy stage. Climate Change is at peak high, with its effects being witnessed by nearly all parts of the world. There has been increasing sea levels, global temperature rise, increase in the frequency of droughts, cyclones and much more. To understand the adversity effects happening due to climate change, it's very vital that the energy sector needs to change its ways of occurrence. Electricity generation, transmission, distribution and consumption, all these need to be revised and laid out with a new outlook. 'Decarbonization' of the global energy systems is the need of the hour, with all countries across the globe have to take responsible ways to tackle this challenge. With decarbonisation happening, countries need to look into energy transition and sustainable energy development. The International Renewable Energy Agency (IRA) defines 'Energy Transition' as "the pathway in the transformation of the global energy sector from fossil-dominated mix to zero-carbon by the second half of the 21st century". Sustainability and Energy are intertwined, with the development and growth in one automatically leads the growth in other. With all these happening simultaneously, it will result in the growth and development of a nation. Group of 20 (G20) being the rich, technologically advanced, independent, democratic economies should lead the way forward in energy transition and sustainable energy development. India is rising to be an economic superpower, with any country's progression, there's always been a significant rise in energy demands and that's happening in India as well. In this perspective, this paper analysed the different aspect of adversities it may cause into the economy due to climate change. This paper also tried to find the path for energy transition policy measures and the role of G20 economies for Sustainable Energy Development. In this process, the key role played by India in respect of climate change and clean energy transition were also discussed.

Keywords: Climate Change, Carbon dioxide (CO_2), Decarbonisation, Sustainable Energy, G20 Economies

Introduction

Carbon dioxide emissions, primarily from the combustion of fossil fuels, have risen drastically since the beginning of the industrial revolution. Most of the world's greenhouse gas emissions come from a relatively fewer number of countries such as United States, China, Russia, India, Japan, countries of European are some of the major emitters of carbon dioxide gases.

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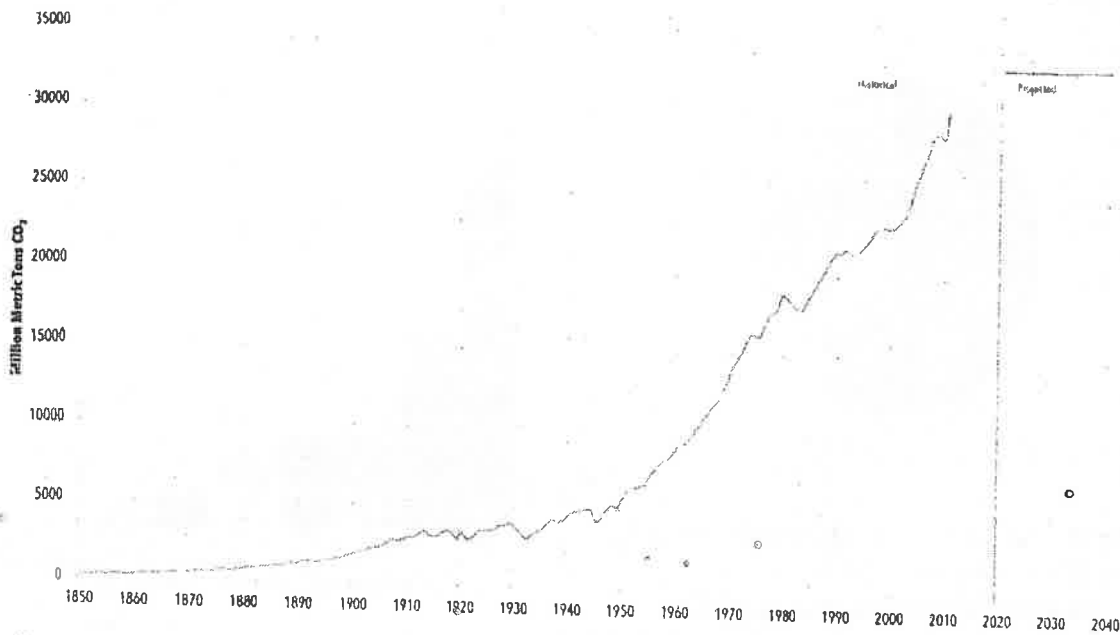
Figure 1 : Level of production of Carbon Dioxide (CO2) per decade
Source: International Energy Agency

The graph projected here (Source: International Energy Agency) depicts the level of production of Carbon Dioxide (CO2) per decade by all the nations. It can be very well noticed that over the past 50 years or so, the level of carbon dioxide emissions have increased exponentially. These production levels are projected to remain more or less similar as they are of now over the next few decades as well. Also, the other greenhouse gases such as methane, nitrogen based gases also are expected to have a rise over the next few decades owing to high intensive industrialization, machining & production processes with the countries across the world intensifying their growth and development.
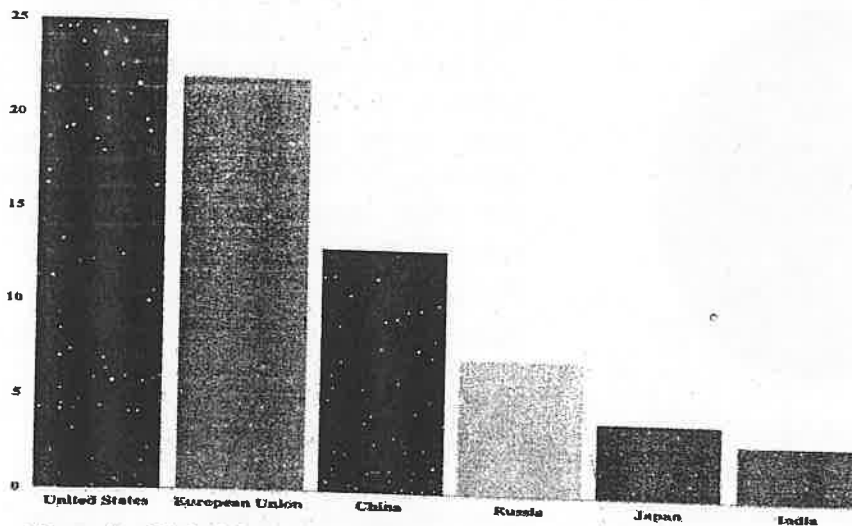
Figure 2 : Global Carbon Emission across (1751-2017) by different countries
Source: International Energy Agency

This chart (Source: International Energy Agency) depicts the Global Carbon Emission across (1751-2017) by different countries. It can be clearly understood that most of the carbon emission produced till date is from the most advanced and highly developed countries and from the recent developing nations. The reason being these countries focused highly on industrial processes, manufacturing, electricity production, automotive & transport etc. and different other sectors.

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(CO_2), Sulphur dioxide (SO_2), Nit... ous oxides (NOx). With Carbon dioxide dominating the role here, it is the main cause of global warmi... g, which is now felt and faced in every part of the world. With such huge amounts of CO_2 emissions ... ross the nations, throughout the world, it can be said that presently most of them are still in a carbo... intensive economy stage. The energy sector is vital in tackling the climate change since it accounts ... about two thirds of global carbon dioxide emissions. To realize the adversity of climate change, th... e is a dire need for a global transition in electricity generation, transmission, distribution as well... consumption. Decarbonization of the global energy systems is one of the greatest and most importa... challenges faced by humans in the 21st Century. It is very important right now to strike a balance ... tween developmental needs and environmental conservation and protection. The main challenge... acing renewable energy sources is resource availability, resource access, resource location, securi... of supply, sustainability, and affordability. With several steps and measures need to be set up and ... roduced by the governments of different countries, will it allow to transform their economies into c... n energy economies.

Objectives:

- To know the adversity of C... ate Change
- To realize the need for Glob... Energy Transition in Energy Sector
- To understand the process o... Decarbonisation of Global Energy Systems
- To understand the path of E... gy Transition in Global Energy Sector
  To understand the concept ... Sustainable Energy Development.

Methodology

This paper is conceptual and b... d on secondary data, referred and collected from various sources. Published articles, journals, nati... al newspapers, government websites and different network websites were used to substantiate and au... nticate the objectives of the study. Different graphical representation methods like pie chart, bar diag... , percentage methods were also used and taken as references.

The path for Energy Transition

Energy transition refers changes ... dertaken in fundamental processes in human societies evolution that are driven by technical, econom... and social changes. It is a new path for economic development and innovation that does not com... omise the environmental integrity and sustainability motivated by challenges faced around. It ca... for changes in existing policies, technology as well as supply and demand patterns for electricity ... d other energy resources. Till date the world has faced three energy transitions already, the first tra... ition involved replacement of wood with coal as the main energy source. In the second transition... l replaced coal as the main energy resource. In the third transition, it was asked to replace fossil fue... with renewable energy. The main objective of this fourth transition, that's being developed, is to f... t the global climate change through decarbonization of the energy supply and usage. Kabeyi, M... Al., talks about developing a sustainable energy transition system which is driven by the climat... hange agenda, technology developments and innovation, increased energy efficiency, enhanced en... y security, deployment of affordable energy solutions and measures and modernization of the energ... ctor from traditional energy systems.

Energy efficiency and Renewal... Energy are the two major components for energy transition. Together they can provide most of th... energy-related CO_2 emission reductions which is required, using technologies that are safe, relia... affordable and widely available. The total share of renewable energy should be raised for this path... y to succeed. With most of the world's population using renewable energy, it will automatically im... ve the energy efficiency.

- Th y should be readily accessible, available, and affordable.
- Th Energy sources should be diverse and easy to secure.
- Th Energy systems should be economically and financially viable.
- Th energy production should be associated with minimal environmental impacts.
- D ing the production of energy, there should be minimum resource wastage.
- E rgy produced using the sources should be of low carbon content . . The energy production should e done efficiently.
- E rgy development and usage should bring positive social impacts.
- T nsport and transfer of energy from source to users should be made easy and economical.

Goal f Sustainable Energy

- I roving Energy Efficiency – It is related with improvement in economic and the technical effici cy of energy systems in terms of energy generation, distribution and usage. This can be made possi through improvement of existing technologies, research and development and putting good energ management practices.
- I roving Energy Security – It is related to supply of energy resources. It is to be ensured that the energ at all times, in sufficient quantities and at fair prices is made available for the supply.

Som common problems of energy security includes: power distribution, price instability, supply insta ity, power blackout, theft of electricity etc.

- duce Environmental Impact – It can be achieved through reduction in the environmental impact of e gy systems of production or generation. Waste recycling, treatment, adoption of clean techn ogies, safe disposal of wastes, usage of low carbon technologies, decarbonisation of energy supp and integration of the whole electric system are all a part of energy system's relation with the envi iment.
- pand Access, Availability, and Affordability – Energy provided should be reliable in supply and acce and should made available at affordable price or cost and quality.

Dim sions of Energy Sustainability

Kab i, M. et. Al., defines the selection criteria for development sustainable energy transition should cons er the environmental, technical, social, institutional, and economic dimensions of sustainability.
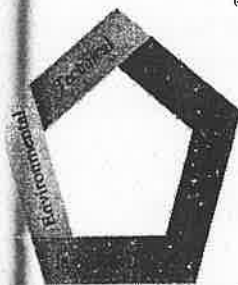
Figure 6 : Dimensions of Energy Sustainability

S ce: Kabeyi, M. et. Al., Frontiers in Energy Research

- echnical – It relates to the meeting of the current and future demands in a safe and efficient ma er with usage of clean sources of energy and technology.

- G20 democracies impose a tax on carbon-intensive imports to reduce the risk of use of such industries which have a higher carbon footprint. It would also induce other economies to reform their policies of carbon emission.

- Major democracies need to recycle the revenues earned through reforming fossil fuel markets to fund additional green innovation and development. Research & Development is needed in major democracies to fund for more innovative methods of energy transition.

Focus areas where policies need to be developed:

(i) Make a synergy between energy efficiency and renewable energy
(ii) Development of power sector based on renewable sources of energy
(iii) Decarbonisation of the transport, industrial, manufacturing sectors through electrification
(iv) Technological innovation for the development of renewable energy methods
(v) Aligning the socio-economic system with the transition requirements
(vi) Ensuring that the transition costs and benefits are fairly distributed amongst all

Constraints in global energy transformation

This global energy transformation as talked about won't be possible without spending a huge sum of money. Every country has a huge budget for its energy requirement purposes for different sectors, but with transitioning to a more cleaner and non-carbon based economy would require more of their allocated percentage of their budget in the development of the energy sector. Comparing with the current policies, there will be a lot of additional investments in low-carbon technologies for the development of the energy sector for the transition to take place since most countries policies on energy sector are based on using carbon intensive technologies. A report by the International Energy Agency says that the 'Cumulative investment in the energy system between 2015 and 2050 will need to increase around 30%, from USD 93 trillion according to current and planned policies, to USD 120 trillion to enable the energy transition. In total, throughout this period, the global economy would need to invest around 2% of the average global GDP per year in decarbonisation solutions, including renewable energy, energy efficiency, and other low carbon energy technologies.' The financial system of every country should be aligned with sustainability and energy transition requirements. Every country has its own financial constraints which will inhibit the capital required for the energy transition process. However the cost-savings from reduced air pollution, better health and lower environmental damage would far outweigh these costs. In addition to this, the energy transition would significantly improve the energy sector's socio-economic footprint, will help in increasing the Gross Domestic Product (GDP) of a country, will create a lot of jobs, thus increasing employment opportunities, will provide a cleaner and more healthier environment and also will aid in improving global welfare.
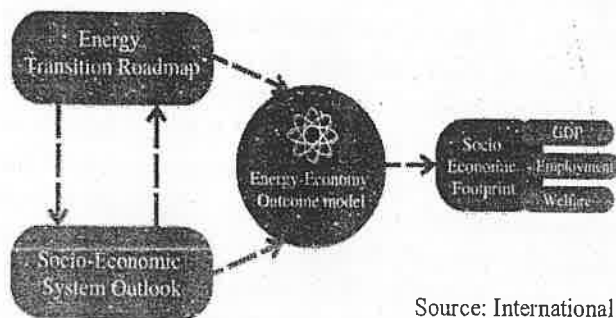
Source: International Renewable Energy Agency

Figure 7 : Socio-Economic Footprint

implementation of policies for energy transition is not further delayed. This will thus create a world that is both more prosperous and exposed to fewer longterm risks.

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matrices, correlation, and multivariate analysis were used to understand the pattern and correlates of mobility. The results of the transitional matrix show that children of illiterate parents are likely to remain illiterate or to attain, at best, primary education and that occupational diversification occurs mainly from agricultural to non-agricultural labour. The regression findings confirm that parental characteristics, feeling of alienation and state interventions play a critical role in educational and occupational changes. The evidence on intergenerational correlation, characterised by a gradual, incremental change at the lower rungs of the socio-economic ladder, reflects the persistence of socio-economic inequality. Though state interventions have been effective in promoting upward mobility, social discrimination still acts as a barrier to it. Therefore, it is important to direct policy attention to effective implementation of welfare programmes, prioritising the least advantaged among the SCs. A blanket approach to policy-making will not work as targeted measures are required for the least advantaged SCs.

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Supercapacitor: The future of energy system

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Abstract

The development of energy storage system essential for renewable energy can solve the energy crisis along with environmental issues. There are different types of energy storage devices like battery, capacitor, etc. Battery has high energy density whereas capacitor has high power density. Therefore, battery can store huge amount of charge but its required large time for charging and discharging. So, a new efficient device was designed, named supercapacitor, which have both the advantages of battery and capacitor. This paper discussed the mechanism of supercapacitor along with its advantages and disadvantages. Also, future scope of supercapacitor was depicted in this article.

Keywords: Battery, Capacitor, Supercapacitor, Hybrid energy storage system

An Editorial

Upgrading of energy storage is very much essential for the modernization of modern-day electronic gadgets like laptops, camera smart-phones, smart watches, etc. The size of devices is gradually decreasing day by day and therefore it is very much difficult to design them efficiently. The main driving force behind any state-of-art device is its power supply. Energy crisis and increased environmental issues have forced us to create more and moreclean renewable energy. [1] But commercialization of renewable energy is largely dependent on energy storage system. [2] Energy storage technology has great potential to compensate the intermittency problem of different renewable energy sources by storing the generated intermittent large energy and then making it available upon demand. So, we have to develop excellent energy storage system for our prosperous future development.

In electronic devices energy is stored mainly in two ways:

Accelerating Economic Growth : Trends and Way Forward

▶ Infrastructure Development

▶ Health Issues and Economic Growth

▶ Revival of Agriculture and Rural Area Development

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Reviving Indian Economy in the aftermath of COVID-19

Anita Das

ABSTRACT

The Coronavirus pandemic (COVID-19) has shaken the foundation of international order created much distortion to every sector of the economy as well as lives and livelihoods of human beings. The pandemic induced economic shock is felt globally and pushed economy into darkness. The challenges thrown by the Covid-19 also gives opportunities in turn. This pandemic led to two type of crisis – health & economic crisis. In this perspective this article focuses mainly on the governmental measures during the pandemic period to safeguard its own population and economy and after the second wave of pandemic that India is reviving or revival of India were discussed.

Keywords : COVID-19, Pandemic, Atmanirbhar Bharat , Reviving

Reviving Indian Economy in the aftermath of COVID-19

The coronavirus pandemic (Covid-19) has shaken the foundations of the international order. It has already taken a significant toll in advanced countries known for its advanced health care, infrastructure and accessibility. Covid-19 engulfed the whole world and has resulted into two concurrent global crises, a health crisis and an economic crisis. Millions of dollars are being spent nationally and globally to control the pandemic and to reduce causalities. Countries are spending large scale on medical and health care services, free ration to the poor, special economic packages for the downtrodden and job for the jobless people. The different welfare schemes put extra-burden on the financial health of the countries, as a result Covid-19 turned into an economic crisis.

India was in the middle of an economic slowdown before the pandemic. With the spread of this disease and the national lockdown imposed to curb it's spread has turned the economy into recession. The pandemic has induced the long term structural changes which affects up to 1.5 billion jobs resulting from the crisis. The Covid-19 pandemic has taught us several painful lessons.

That we can no longer continue with ruthless exploitation of nature, the climate crisis, land and ocean have pushed the country and the world to a dangerous brink. There is no doubt that the pandemic has forced the economy to press the reset button. Against this backdrop and situations, the objectives of this article have to examine:

(i)   The stimulus and financial packages allocated and distributed to the different sectors of economy.

(ii) How far the governmental and changing policy helping in reviving the Indian economy after Covid-19

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The Indian Economic Journal

National Education Policy 2020:
With Special Reference to Jharkhand

CONTENTS

NEP-2020 : Envisioning the Future of India

Anita Das* and Kamini Kumari**

The New Education Policy of 2020 (NEP-2020) approved by ministry of Human Resource Development (Now it's known as Ministry of Education). Under the chairmanship of former ISRO chairman Dr. K. Kasturirangan outlined the vision of India's new education system, it replaced the 34-year-old NEP which was last revised in 1986. NEP-2020, attempt to produce timely progressive and historical reformative educational policy, it makes a monumental milestone in the country's education system. While the systematic reformative agenda gaining ground in the recent years through the initiative steps, schemes, programs were taken by the NITI Aayog's School Foundation Quality Index (SFQI), SATH-E, the Aspiration District Program, encouragement of multilingualism etc. As NEP 2020 focuses on Accessibility, Quality, Equity, Affordability to ensure continual learning. This article tried to analyze the various schemes, missions are engaging to attain the goals of NEP 2020, their merits, implications on the society. How far NEP 2020 is compatible and could help to transform India a global knowledge superpower were also discussed.

Keywords: Kothari Commission 1966, NEP-1986, Samagra Shiksha, NIPUN Bharat

INTRODUCTION

The New Education Policy 2020 (NEP, 2020) replaced the NEP 1986 which was last revised 34 years ago. the NEP 2020 was approved by the Union Cabinet of India on 29th July 2020. The Ministry of Human Resource Development formed a committee under the chairmanship of Dr. K. Kasturirangan. former chairman of ISRO: who outlined vision of India's new education system.

It makes a monumental milestone in the country's education system. Education is a dynamic process that starts from birth. A child surrounded by parent, environment the social and physical activity of some information and respond. Education impart knowledge, enhance the self-identity, instill confidence, help to overcome the exploitation and to seize the social and political opportunities extending to an individual Recognizing the importance of education, Gandhiji raised his voice in favor of Universa

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Keywords: Climate Change, Carbon dioxide (CO_2), Decarbonisation, Sustainable Energy, G20 Economies

Introduction

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Sand Mining and its Effect, Causes of Concern for Zooplankton: A Case Study from Kishanganj, Bihar, India

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Abstract

The Mahanadi River and its tributaries namely Dhok and Chenga, as like other rivers, serve to be a lifeline for thousands of individuals in the Kishanganj district falling within the Purnea sub-division of Bihar. The rapid escalation in the development of infrastructure within the state has imposed an elevated demand of sand. To meet this demand, the activities pertaining to sand mining have also escalated throughout the country comparatively from the past couple of decades. The report presented herewith was centered on evaluating the effect of sand mining on the zooplankton at three mining sites namely Belwa Ghat (river Donk), Thakurganj Ghat (river Chenga) and Arrabari Ghat (river Mahananda) in the Kishanganj district from March 2019 to March 2021. The observations from the study reported herewith showed that there was substantial increase (p<0.01) in the turbidity of the water at Belwa and Thakurganj Ghat due to increased mining activities. However, the turbidity of water was comparatively low at the Arrabari Ghat. Statistical evaluation also confirmed that the amount of species and mean Shannon diversity index for zooplankton at the reference or control sites of Belwa Ghat were different considerably however except for Arrabari Ghat. Thus the present case report made it evident scientifically that the increased mining activities in the Kishanganj district has led to a decline in the distribution and reduction in the number of species of zooplanktons in the Mahananda, Dhok and Chenga rivers of Kishanganj district in Bihar.

Keywords: Bihar, Kishanganj District, Sand Mining, Shannon-Weiner Diversity Index Zooplankton

1. Introduction

Sand mining has been a long traditional method for exploiting the rivers across the world not just to sustain the livelihood but also for infrastructural requirements. In Indian perspective, the rapid growth in industrialization and infrastructural sector has given a massive boom to the sand mining industry. As per a report, increased urbanization with a plan to construct 60 million houses for individuals from low-economic background further enhances the consumption of sand in coming years[1]. Sand can geologically be defined as a granular material constituted by fine broken rocks and mineral particles. Although sand is also characterized on the basis of its constituent nevertheless the grain size of the particles till date remains an essential criterion. The size of grain smaller than gravel but bigger than slit demarks the grain size of sand. Earlier it was reported that unscientific sand mining has led

to increased incidences of illicit mining activities[2]. Mahananda River originates from the Himalayas in Nepal and travels through a course of 324 km in Indian state of Bihar having a cumulative drainage area of 11,530 sq km whereas Donk and Chenga are important tributaries of Mahananda within the state of Bihar. For constructional purposes coarse sand is preferred due to reduced processing, relatively is easily accessible and requires primitive extraction techniques[3]. Mining of sand using manual methods like country boats have been in use within India in different rivers and their tributaries from ancient times. However, the increasing need of coarse sand in previous decades had led to the augmented use of mechanized boats in sand mining industries in and around the state of Bihar and there is a lack of information on the impact of sand mining on overall ecology of Mahananda and other allied rivers within the Kishanganj district of Bihar.

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Bioethanol production by *S. cerevisiae* AK-22 exposed to 6-(4-hydroxy-3-methylbutyl) aminopurine

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Abstract : The influence of cytokinine, i.e., 6-(4-hydroxy-3-methylbutyl) aminopurine on bioethanol production by the yeast *Saccharomyces cerevisiae* AK-22 has been assessed. It has been found that the cytokinine, i.e., 6-(4-hydroxy-3-methylbutyl) aminopurine at its molar concentration of 6.0×10^{-5}M has stimulatory effect on bioproduction of ethyl alcohol and enhances the yield of bioethanol to an extent of 18.798% higher in comparison to control fermenter flask, i.e., 5.29mL/100 mL while molar concentration of 6-(4-hydroxy-3-methylbutyl) aminopurinep under trial at 7.0×10^{-5} M and onwards inhibits and retards the bioethanol production. The molar concentration of cytokinine, i.e., 6-(4-hydroxy-3-methyl-cis-2-butenyl) aminopurine has been employed in between 1.0×10^{-5}M to 10×10^{-5}M and has been found that at initial concentration, i.e., 1.0×10^{-5}M it is least effective and at higher concentrations it gives insignificant yield of ethyl alcohol. Experimental parameters has been optimized viz. : 32°C temperature, 4.6 pH, 50 hrs incubation period with 16.5% (w/v) molasses solution alongwith other nutritional ingredients required by the yeast *Saccharomyces cerevisiae* AK-22 .

(**Keywords :** Molasses, 6-(4-hydroxy-3-methyl-cis2-butenyl) aminopurine and *S. cerevisiae* AK-22)

Introduction

Cytokines are a large group of proteins, peptides or glycoproteins that are secreted by specific cells of immune system. Cytokines are a category of signaling molecules that mediate and regulate immunity, inflammation and hematopoiesis. Cytokines are produced throughout the body by cells of diverse embryological origin. Cytokine is a general name; other names are defined based on their presumed function, cell of secretion, or target of action.[1-5]

Cytokinin is a generic name for substances that promote cytokinesis in cultured plant cells and also surve other regulatory functions similar to those of kinetin, the first chemically defined cytokinin[6-10] Virtually all the known naturally-occurring cytokinins are substituted purine. A large number of compounds have been synthesized with substituents at different position on the purine nucleus and with alterations in the nucleus itself. Substituents at different positions on the purine nucleus generally result in lower biological activity. Alteration in the nucleus usually lead to compounds with much reduced activity and often result in complete loss of cytokinin activity. Although cytokinin research is not yet at a stage to be able to recognize physiologically active pools, knowledge of the biochemical mechanisms controlling cytokinin turnover can provide considerable insight into the way in which processes which modify growth and development may modulate pool sizes of cytokinins.[11-15]

Thus, from the above brief review it is evident that cytokinins are required for genetic manupulation and exploitation specially for alcoholic fermentation and in view of this the author has studied the influence of 6-(4-hydroxy3-methyl-cis-2-butenyl) aminopurine on alcoholic fermentation by *S. cerevisiae* AK-22

Editor
R.K. Verma

Indian Institute of Public Administration
Bihar Regional Branch, Patna

DEVELOPMENT OF CANINE RETINA AND ITS FUNCTIONAL ANNOTATION

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ABSTRACT

The optics of the eye create a focused two-dimensional image of the visual world on the retina, which then processes that image within the retina and sends nerve impulses along the optic nerve to the visual cortex to create visual perceptionIn the majority of cases, the mode of inheritance is autosomal recessive, although some autosomal dominant and X-linked RP existThe choriocapillaris, a network of capillary vessels located under the retinal pigmented epithelium, is the main source of oxygen for the outer retina, and retinal vessels are the main supply for the inner retina.

KEYWORDS: Retinal, Oxygen, autosomal, Inheritance, Optics, Capillary

INTRODUCTION

The retina (from Latin: rete "net") is the innermost, light-sensitive layer of tissue of the eye of most vertebrates and some molluscs. The optics of the eye create a focused two-dimensional image of the visual world on the retina, which then processes that image within the retina and sends nerve impulses along the optic nerve to the visual cortex to create visual perception. The retina serves a function which is in many ways analogous to that of the film or image sensor in a camera.The neural retina consists of several layers of neurons interconnected by synapses and is supported by an outer layer of pigmented epithelial cells. The primary light-sensing cells in the retina are the photoreceptor cells, which are of two types: rods and cones. Rods function mainly in dim light and provide monochromatic vision. Cones function in well-lit conditions and are responsible for the perception of colour through the use of a range of opsins, as well as high-acuity vision used for tasks such as reading. A third type of light-sensing cell, the photosensitive ganglion cell, is important for entrainment of circadian rhythms and reflexive responses such as the pupillary light reflex.

Retinitis pigmentosa (RP) is a heterogeneous group of inherited retinopathies with varying genetic background and highly variable clinical consequences. RP is the leading cause of irreversible blindness in man with a worldwide prevalence of one in 4,000 people [1]. The disease first manifests as impaired vision in dim light (nyctalopia) resulting from progressive loss of the rod photoreceptor cells. As the disease progresses, complete blindness is expected due

Research Article

Ameliorative effect of *Panax quinquefolius* on sodium arsenite induced toxicity in Charles Foster rats

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Abstract

An estimated 70 million population are exposed to arsenic poisoning in India in the 2020. The present study is aimed to develop the antidote for arsenic-induced toxicity in Charles Foster rats. A total of n=18 rats (12 weeks old) of an average weight of 160 ± 20 g were used for the study. The study group included three groups, n=6 control (Group I: Untreated) and n= 12 (group II) treated with sodium arsenite orally at the dose of 8mg/Kg b.w daily for 6 months. The n= 6 animals were dissected and the rest n=6 (Group III) was administered orally with *Panax quinquefolius* (Ginseng) root ethanolic extract at 300mg/Kg body weight per day for 8 weeks. All the animals were sacrificed after the completion of their respective doses and their blood samples were taken for haematological and biochemical evaluation, while the vital tissues such as liver and kidneys for the histopathological study. The study revealed significant fluctuation (p<0.0001/p<0.001/p<0.05) in the haematological parameters viz. leukocyte count, haemoglobin, red blood cell count, haematocrit percentage, MCV, MCH and MCHC and biochemical parameters such as SGPT, SGOT, ALP, bilirubin, urea, uric acid, creatinine and lipid peroxidation in arsenic-treated groups. There was a significant reduction (p<0.0001/p<0.001/p<0.05) in the levels of haematological and biochemical parameters after the administration of ginseng extract. Similarly, the histopathological study revealed a high magnitude of degeneration in the hepatocytes and nephrocytes after the treatment of arsenic, but after the administration of ginseng extract, there was significant restoration at the cellular level. Thus, the root extract of *P. quinquefolius* possessed significant ameliorative properties against arsenic-induced toxicity in rats.

Keywords: Arsenic treatment, Ameliorative effect, Charles Foster rats, *Panax quinquefolius*, Root extract

INTRODUCTION

Arsenic poisoning through the groundwater in recent times has become a major health related problem worldwide. An estimated 300 million population is exposed to groundwater arsenic poisoning worldwide with serious health problems. In Asia, an estimated 180 million population are exposed to arsenic poisoning (Shaji et al., 2021; Hassan, 2018). Moreover, in India about 70 million people are exposed to arsenic poisoning. The major chunk of population exposed to groundwater inhabit in the Ganga- Meghna- Brahmaputra plains. India and Bangladesh plains cater the maximum geographical area where arsenic poisoning has caused severe health hazards among the exposed population

(Kumar et al., 2019[a]; 2019[b]). This has caused disease such as skin manifestations – keratosis in sole and palm, melanosis on body, raindrop pigmentation, loss of appetite, constipation, breathlessness, recurrent cough, cardiovascular problems, hormonal imbalances, gastrointestinal disorders and cancer of skin, lungs, urinary bladder, colon, gallbladder, liver and kidney etc. (Kumar et al., 2020[a]; 2021[a]; 2021[b]; 2021[c]; 2021[d]).

Therefore, there is a need to discover novel drugs which can combat arsenic-induced toxicity in humans. Plethora of medicinal plants have been discovered for its medicinal properties such as immuno-boosters, anti-oxidants, antidotes, hepatoprotective, nephroprotective etc. Few medicinal plants have proven promising effect against arsenic induced toxicity in animal models

Research Article

Phytoremedial effect of *Asparagus racemosus* on sodium arsenite-induced toxicity in Charles Foster rats

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Abstract

Arsenic poisoning has recently resulted in significant health problems in the exposed population. In India, the Indo-Gangetic plains are the region where the arsenic threat has increased. In Bihar, it is estimated that 10 million people are exposed to arsenic poisoning. The present study aims to develop a novel drug as an antidote against arsenic-induced toxicity in rats. In the present study, arsenic in sodium arsenite at a dose of 8 mg/kg body weight per day was induced (Group-II) in Charles Foster rats at 2 or 6 months to observe chronic exposure. In the arsenic pretreated group (Group-III), *Asparagus racemosus* was administered at a dose of 400 mg/kg body weight per day for 8 weeks. Normal control group (Group I) was taken without any treatment. After completion of the entire experiment, the animals were sacrificed, and their blood samples were obtained for hematological and biochemical evaluation. At the same time, vital tissues, such as the liver and kidney, were fixed in preservatives for the histopathological study. The study showed that the hematological levels, such as RBC, WBC, platelet counts and hemoglobin percentage, were significantly restored by administering *A. racemosus* (Group-III), against the arsenic-exposed group. Furthermore, biochemical parameters such as SGPT, SGOT, ALP, bilirubin, urea, uric acid and creatinine were significantly recovered (p<0.05) against arsenic-induced toxicity. The histopathological study also showed remarkable restoration in hepatocytes and nephrocytes by *A. racemosus* against arsenic-induced toxicity. Therefore, it can be concluded from the entire study that *A. racemosus* has a significant antidote effect against arsenic-induced toxicity.

Keywords: Arsenic treatment, *A.racemosus*, Charles Foster rats, Drug development

INTRODUCTION

Arsenic poisoning in groundwater has caused serious health risks for the exposed population around the world. An estimated 300 million people around the world are exposed to arsenic, while approximately 70 million people are affected in India. In Bihar, approximately 18 districts out of 38 are affected by ground water arsenic poisoning, while an estimated 10 million people are exposed to arsenic poisoning in the state (Hassan, 2018; Kumar *et al.*, 2019[a]; 2019[b]; 2015; 2016; Singh and Geetanjali., 2014). After the intake of contaminated water, the arsenic reaches the bloodstream through the gastrointestinal tract in the toxic trivalent form, which is converted into pentavalent form and finally degraded to the low toxic compound DMA, which is still a carcinogen (Zheng *et al.*, 2017). According to

the WHO and EPA, the maximum limit of arsenic contamination in water is 10 μg/L. However, in the exposed population of Bihar, severe health risks were observed in the population as a result of chronic exposure (US NRC (National Research Council)), 2001; Kenneth and Gilbert, 2002). It has led to dysfunction of vital organs, such as the liver, kidney (Smith *et al.*, 1998; Kannan *et al.*, 2001), cardiovascular system (Vahidnia *et al.*, 2008), nervous system, endocrine system, etc., with inhibition of DNA repair capability (Hartwig *et al.*, 2002; Andrew *et al.*, 2006; Patlolla and Tchounwou 2005), leading to carcinogenesis in vital tissues such as the skin, lungs, urinary bladder, colon, gallbladder, liver and kidney (Martinez *et al.*, 2011; Minatel *et al.*,2018; Kumar *et al.*, 2021[a]).
Chronic exposure of the population to arsenic has resulted in serious health issues, such as skin manifesta-

National Education Policy 2020:
With Special Reference to Jharkhand

CONTENTS

NEP-2020 : Envisioning the Future of India

Anita Das* and Kamini Kumari**

The New Education Policy of 2020 (NEP-2020) approved by ministry of Human Resource Development (Now it's known as Ministry of Education). Under the chairmanship of former ISRO chairman Dr. K. Kasturirangan outlined the vision of India's new education system, it replaced the 34-year-old NEP which was last revised in 1986. NEP-2020, attempt to produce timely progressive and historical reformative educational policy, it makes a monumental milestone in the country's education system. While the systematic reformative agenda gaining ground in the recent years through the initiative steps, schemes, programs were taken by the NITI Aayog's School Foundation Quality Index (SFQI), SATH-E, the Aspiration District Program, encouragement of multilingualism etc. As NEP 2020 focuses on Accessibility, Quality, Equity, Affordability to ensure continual learning. This article tried to analyze the various schemes, missions are engaging to attain the goals of NEP 2020, their merits, implications on the society. How far NEP 2020 is compatible and could help to transform India a global knowledge superpower were also discussed.

Keywords: *Kothari Commission 1966, NEP-1986, Samagra Shiksha, NIPUN Bharat*

INTRODUCTION

The New Education Policy 2020 (NEP, 2020) replaced the NEP 1986 which was last revised 34 years ago. the NEP 2020 was approved by the Union Cabinet of India on 29th July 2020. The Ministry of Human Resource Development formed a committee under the chairmanship of Dr. K. Kasturirangan, former chairman of ISRO; who outlined vision of India's new education system.

It makes a monumental milestone in the country's education system.

Education is a dynamic process that starts from birth. A child surrounded by parent, environment the social and physical activity of some information and respond. Education impart knowledge, enhance the self-identity, instill confidence, help to overcome the exploitation and to seize the social and political opportunities extending to an individual. Recognizing the importance of education, Gandhiji raised his voice in favor of Universal

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established journals reputed newspapers, NEP websites, Ministry of HRD & education and research articles.

As the vision of NEP 2020 is very vast, comprehensive, futuristic for the all-round development of children, and to encourage holistic development, therefore in this policy stressed on creativity, scientific temper, communication, multilingualism, problem solving skills, type of textbooks, the curriculum pedagogy and assessment system are undergoing into transformative process. NEP 2020 has set 2040 as the deadline to fulfill the goals. It has been expected that the child who get entry school at 2020 under NEP system could after passing through process may become local and global knowledge centric people.

Now, it is imperative to discuss some recommendations of the NEP 2020:

1. In NEP-2020, the new curriculum and pedagogical structure divided into in four stages 5+3+3+4 i.e., Foundational, Preparatory, Middle and Secondary. Major thrust put on formative assessments, experimental learning at all stages, innovative, creativity and generate curiosity amongst the children and establish crucial role of foundation learning.

2. NEP 2020 put emphasis on universal acquisition of foundational skills by all children at the end of Grade 3. It means every child till grade 3 may acquire the ability to read and write, meaningfully comprehend and have basic knowledge of numeracy.

3. Till 2030 it has been fixed that for Sustainable Development Goals for education (SDG4) commits to provide inclusive and equitable quality education at all levels. To achieve this, it requires that at a minimum all learners develop Fundamental Literacy and Numeracy (FLN) skills so that it can act as laying stone for further learning.

4. There is paradigm shift in the teaching-learning process from traditional teacher-centered to learned centric approach, as to ensure holistic development of students.

5. Integration of Experimental learning, play based, sports integrated, art-integrated, toybased pedagogies all the stages of school education.

6. Integration of Pre-vocational education into the curriculum from upper primary level onwards.

7. Strengthening and universalization of early childhood care education (ECCE) and Foundational Literacy and Numeracy (FLN).

8. Development of National State Curriculum frameworks for ECCE, School Education, Teacher Education and Adult Education.

9. Reforms in Assessment and Examinations.

10. Tracking students' progress for achieving learning outcomes.

11. Provisions have been made to provide exposure to vocational education at Upper Primary level (Grade 6-8), with aim to provide opportunities to the students to focus on activitybased teaching-learning process.

12. At Secondary and Senior Secondary level National Skills Qualification Framework (NSQF) competency based vocational courses are offered to students

3 may have the desired competency of reading, writing, learning and knowledge of numeracy. The mission will cover the learning needs of children in the age group of 3 to 9 years. This mission will be executed across the nation through five-tier stages such as – National, State, District, Block and School level. Another important feature of NIPUN Bharat is setting targets for Foundational Literacy and Numeracy which has been developed to generate awareness among parents, community, volunteers and other stakeholders.

(ii) **'SamagraSiksha'**—The erstwhile schemes of SarvaSiksha Abhiyan (SSA), Rashtriya Madhyamik Siksha Abhiyan (RMSA) and strengthening of teacher training institutions have been merged to form the SamagraSiksha. The merger intends to give a holistic and integrated approach to school education in line with the NEP 2020. An important part of the vision is to provide skill education to millions of children in their school years in an integrated and holistic manner. Under SamagraSiksha 14,345 schools have been approved to impart vocational education. Currently more than 1.5 million students are engaged in vocational education under this scheme.

(iii) **DIKSHA**—Digital Infrastructure for Knowledge Sharing: This program was launched in 2017 by Government of India as a national platform for school education to address the challenge of remote learning especially in rural areas. It is available for all the learners of Grade 1 to 12. As per India report digital education 2020, DIKSHA provides access to large number of curriculums linked e-content through several use cases and solution for teacher, quizzes and others.

(iv) **e-pathshala**—It is a joint initiative of MHRD, Government of India and NCERT, New Delhi for the purpose of disseminating all educational e-sources to students, teachers, educators, parents ease of access to e-books, ICT intervention and many other digital and virtual resources.

(v) **Expansion of Digital Education**—Through the PM e-VIDYA initiative under the AatmaNirbhar Bharat Program. 'DIKSHA' is the One Nation, One Digital Education infrastructure for school education. Under this program majority of States and Union Territories have been benefited by on boarding on this single digital infrastructure.

(vi) **P.M. Poshan Shakti Nirman**—It is centrally sponsored program under National Food Security Act 2013, which cover all children from Balvatika to class 8 in Government and Government aided school.

To introduce and implement all these schemes NEP recommends that teachers be given continuous opportunities for self-improvement and to learn the latest innovations and advances in their profession. For this purpose, National Initiative for School Heads and Teachers' Holistic Advancement (NISHTHA) is a first of its kind teacher training program under SamagraSiksha through its academic bodies, NCERT and NIEPA are taking a lead role in changing the landscape of in-service teacher training.

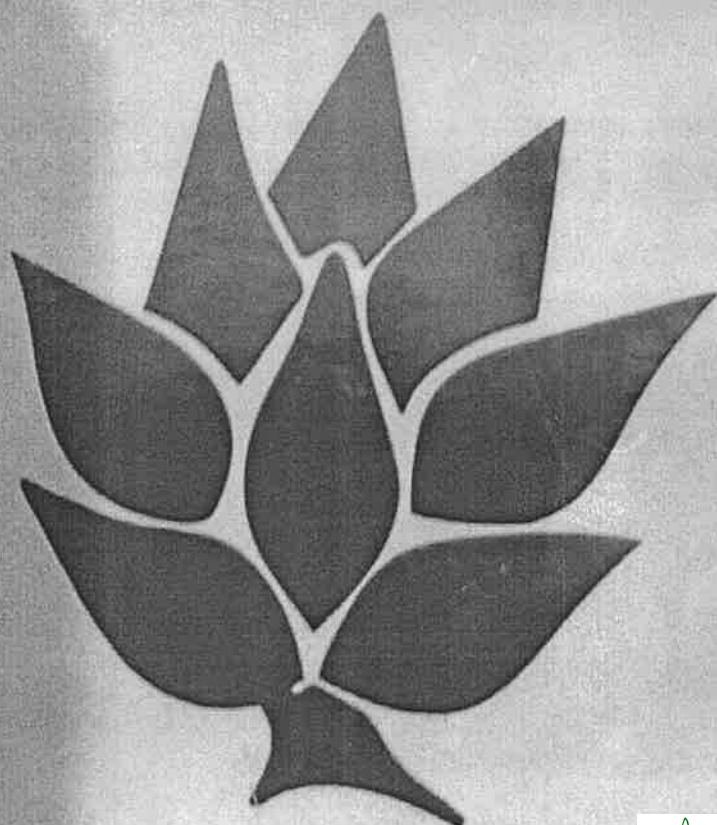# Literature and Science : A Corona's Eye-View

*Shiv Kumar Yadav

Abstract

The COVID-19 pandemic has caused a great havoc around the world at all levels of human affairs and impelled the global humanities to give rethinking of the concept of development and its importance in their life and living as well as their effects on the planet earth. Literature, which aims at helping the mankind to share this common property, earth, together with love, care and right attitude, and Science, which helps the humanity to have a comfortable living here, seem to fail in their respective goals satisfactorily due to having deviations and digression from their proper paths. Corona crises have presented an opportunity to evaluate the all anthropogenic activities going on the earth so that human conditions can be better than that exist today. In this article, an effort has been made to look into the crises from the perspective of a semi-life nano virus, Corona and the litterateurs and the scientists have been asked to revise their paths of progress by bridging the gap between knowledge and wisdom achieved by mankind and motivate them to create a "Lifestyle for Environment" (LIFE) so that the lurking crises as to food, energy, water and global political and economic order can be averted.

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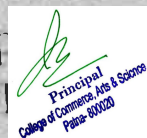
Homomorphism of Characteristic Fuzzy Subgroup and Abelian Fuzzy Subgroup

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Abstract: In this paper, we have established some independent proof of homomorphism on algebra of abelian and characteristic fuzzy subgroup. The characteristic of fuzzy subgroup [13] was first introduced by P. Bhattacharya and N. P. Mukharjee in 1986.
Keywords: Fuzzy subgroup, characteristic fuzzy subgroup, abelian fuzzy subgroup and normal fuzzy subgroup.

I. INTRODUCTION

The concept of fuzzy sets was introduced by L.A.Zadeh [15] in 1965.Study of algebraic structure was first introduced by A.Rosenfeld [1]. After that a series of researches have done in this direction P.Bhattacharya and N.P.Mukharjee[13] have defined fuzzy normal subgroup and characteristic fuzzy subgroup in 1986. In this paper we have tried to established some independent proof about the properties of fuzzy group homomorphism on algebra of characteristic fuzzy subgroup.

II. PRELIMINARIES

In this section, we recall and study some concepts associated with fuzzy sets and fuzzy group, which we need in the subsequent sections.

A. Fuzzy Set

Over the past three decades, a number of definitions of a fuzzy set and fuzzy group have appeared in the literature (cf., e.g., [15, 1, 3, 7, 10]). In [15], it has been shown that some of these are equivalent. We begin with the following basic concepts of fuzzy set, fuzzy point and fuzzy group.

Definition 2.1 [15] A fuzzy subset of D_1 be a function $f_1 : D_1 \to [0,1]$ the set of all fuzzy subset of D_1 is sad to be fuzzy power set of D_1 and designate by $P_1(D_1)$.

Definition 2.2 [15] **Support of fuzzy set.** Suppose $A_1 \in F_1 \, P_1(D_1)$ then the set $\{ A_1(d_1) : d_1 \in D_1 \}$ is said to be the image of A_1 is designate by $A_1(D_1)$. The set $\{d_1 : d_1 \in D_1 , A_1(d_1) > 0\}$ is said to be the support of A_1 is designate by $A_1{}^*$.

Definition 2.3 [15] Let $A_1, C_1 \in F_1 \, P_1(D_1)$ such that $A_1(d_1) \leq C_1(d_1), \forall \, d_1 \in D_1$ then A_1 is said to be contained in C_1 and it is designate by $A_1 \subseteq C_1$

Definition 2.4 [15] Let $B_1 \subseteq A_1$ and $d_1 \in [0,1]$ we defined $d_{1_{B_1}} \in F_1 \, P_1(D_1)$ as

$$d_{1_{C_1}}(a) = \begin{cases} d_1, for \; a_1 \in B_1 \\ 0, \; for \; a_1 \in A_1 \end{cases}$$

If B_1 is a singleton $\{b_1\}$ then $D_{(b_1)}$ is called a fuzzy point.

For any collection $\{A_{i_1}, i_1 \in I_1\}$ of fuzzy subset of D_1, where I_1 is an index set the least upper bound (L.U.B.) $U_{i_1 \in I_1} A_{i_1}$ and greatest lower bound (G.L.B) $\cap_{i_1 \in I_1} A_{i_1}$ of A_{i_1} are given by

$$(U_{i_1 \in I_1} A_{i_1})(d_1) = V_{i_1 \in I_1} A_{i_1}(d_1), \; \forall \, d_1 \in D_1.$$

$$(\cap_{i_1 \in I_1} A_{i_1})(d_1) = \wedge_{i_1 \in I_1} A_{i_1}(d_1), \; \forall d_1 \in D_1$$

Fuzzy subgroup

In this section, we discuss the concept of a fuzzy subgroup in details (c.f.,[1]).

LESSONS LEARNT FROM
THE PAST FOR PLANNING RAPID GROWTH

- Market Reforms
- Growth Trends and Economic Policy Changes
- Trends in Inequality, Poverty and Hunger
- Agriculture-Productivity and Employment
- Modern Services- Role of Information Technology
- Manufacturing Productivity- Public Vs. Private Sectors
- Workforce Participation and Labour Flexibility
- Infrastructure Development
- Foreign Trade and Foreign Investment
- Actions to Spur High-growth Track and Create Gainful Jobs
- Financial-sector Reforms and Streamlining Fiscal Resources
- Banking sector issues

Neglected Female Migrant Labour in Bihar- A Gender Perspective

Rashmi Akhouri

...ecome a trend of life in search of job opportunities. A large series of research work [has] ...gration from time to time, but still some aspects need to be investigated especially [regarding] their movement from state of Bihar (mainly because of androcentric biases in [the] ...). The present study on Female labour in Bihar mainly aims to find out whether the ...migration (i.e., migration with men) in Bihar or independent migration of women [in] ...m this area. Review of available literature points out that associate migration in [which] ...o women do not migrate independently. The present study based on primary data [of women who] ...o have migrated from their place of origin, aims to highlight the nature and magnitude ...on in the Shampatchak block of Patna district in Bihar. The primary data is collected ...red questionnaire and by making personal contact with the migrants. The data collected ...interpreted by applying various statistical, mathematical tools and techniques ...percentage analysis. Besides these tools, use of tables, charts graphs are also ...ght and better understanding. The study also aims to find out comparative stud[y] ...ion, relationship of female migration with literacy level and family occupation. ...of female migrants in this area. This study covers the socio-economic impact ...l at the same time throws light on type of occupation in which females are engaged ...c study also tries to understand female migrant perspective regarding enhancement ...being due to their migration. This study highlights that independent ...women from Bihar has increased considerably, which is supported by 2011 ...depth analysis of rural urban migration in the study area provides the scope ...l variations in causes, consequences and pattern of migration but ...analysis for gendered impact of Migration. The issues and challenges ...llighted and this paper concludes that gender dimensions should ...ining with the data system for effective policy interventions in the research.

Migration, Female, Gender, Employment, Socio-Economic Determinants

Neglected Female Migrant Labour in Bihar- A Gender Perspective

Introduction

The movement of people from one place to another for permanent or temporary ...the history of migration is very old, almost as old as the history of mankind, the ...history of migration is very old ...icance and therefore received high level of attention of academicians, the ...ers in the recent times. The variety of reasons which motivate the migration ...ure which it acquires and the wide-ranging impact it has on both the ...ind has made the issue highly significant. Many studies have taken ...om Raven stein's law of migration propounded in (1885) trying to explore ...sition, nature, destination, determinants and impacts of migration ...Female migration has mostly been ...

Condition in Bihar

Bihar is a major contributor to internal migration and around 15% contributor to outmigration. A large [population] of youth in Bihar are unemployed. Census of 2001 and 2011 shows that there is more than [an increase] in both male and female workforce in urban areas of Bihar. Observation showed that total [number] of persons and male workers decreased in rural areas, but female workers increased in rural and [urban areas] of Bihar in the last decade that is 2001 to 2011. The pace of industrialization has been slow ... It is said, India entered the service sector revolution without passing through the stage of [industrialization]. Same is the situation in Bihar. In Bihar there is a lack of industrial development. The [number] of industries is very few compared to the labour force available in Bihar. Only 8% of Labour [force is] engaged in industries according to (Mehrotra and Roy 2020) which is 15% less than the national ... which has further deteriorated in Bihar. About 56% of the Labour force is engaged in [agriculture] which is 12% higher than national average (Mehrotra and Roy 2020). High rate of [unemployment i.e.,] 46.6% in Bihar has further accelerated migration due to Lack of technical training ... of institutions.

[According] to a United Nations report there are 136 million migrants of which 66 million are women [migrant] workers. Out of this very large number of migrant workers are mostly engaged in low paid jobs. About 8.5 million women work as domestic helpers and are devoid of any social and [economic] insurance. This has led to several gender specific, economic, cultural, and social exploitation ...them to harsher physical, psychological and food problems but since women migration is ...but seen as employment driven but marriage driven so the gender dimension is largely ...

Review of literature

...the migration forms a significant portion of total migrants. But the conventional migration ...that capture the magnitude nor the nature of women's migration pattern. Schenk-Sandbergen ...ten (1978) found androcentric biases in migration studies. Women migration has been ...ntified to be marriage induced in exogamous, patrilocal, society or associated with or ...ompanying male migration.

...[Singh] (2011) in "Making of Female Breadwinners: Migration and Social Networking of Women ...In Delhi" studied migration of domestic service worker which is dominantly female centric. ...Migration happened through personal relationship and social network. So, the study revealed that ...In this way a male dominant phenomenon only, as considered by existing theories of ...migration. Here the above study draws attention to the fact that female migration has wrongly been ...studied and entirely dependent upon migration of male and emphasise that migration ...in gender specific terms. The study however does not discuss female migration and ...both literacy and occupation of the family of the migrants.

...[...] (1980) "Aspects of Female Migration in India" According to data collected in the ...NSS (June 1964) of the National Sample Survey it was found that the migration rate ...was 85 for males and 100 for females(that is the number of in migrants to rural areas for ...find no such segregated data are found for the study related to area of Bihar i.e. ...of migration in gender specific terms.

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Logistic Growth Model and its Extention with Verification in aspect of India's Population

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ABSTRACT

Population growth model tries to predict the population of an organism that reproduces according to fixed rules. Depending on how many times and how often it reproduces, how many new organisms it produces each time and how often it reproduces, the model can predict what the India's Population will be at a given time.

Populations do not usually grow in unlimited factors stop the population increase. Two limiting factors are lack of resources and mortality. Limiting factors have the greatest effect on large populations that have grown rapidly. As population is growing due to overcrowding and limitation of resources, the birth rate decreases and death rate increases with the population size. The present paper provides logistic growth model and its extension with verification in aspects of India's population.

Key words: Population, Ecology, Continuous growth, Logistic growth, Crowding effects.

INTRODUCTION

A fundamental problem in ecology is that of growth, whether it is the growth of a cell, an organ, a plant, a human or population etc. Single species models are relevance to laboratory studies in particular but, in the real world, can reflet a telescoping of effects which influence the population dynamics[2, 5]. Human population grow is much the same way as the population of any other organism. Therefore, the principle of population growth is applied to human. The population biology or mathematical ecology deals with the increase and fluctuation of populations. The fundamental study of the problem in ecology is not of recent origin. In fact, Lotka and Voltera were early pioneers developing foundation work in this field [11, 12]. The book by Nisbet and Gurney [9] is comprehensive account of mathematical modelling in population dynamics: a good elementary introduction is given in the book Edelstein-Keshet [3]. If can't find enough of the resources they need to grow and reproduce they will have fewer or no yo e rate of population
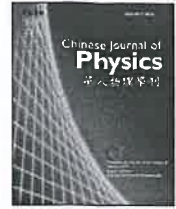
Spin-polarized room temperature ferromagnetism in co-doped ZnO synthesized by electrodeposition

Santosh Kumar [a,*], Deepika [a], Raju Kumar [a], Ritesh Kumar [a], Pratyush Vaibhav [b], Rajnish Kumar Singh [c], Nishant Kumar [d], Rakesh Kumar Singh [d], Seema Sharma [e]

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ARTICLE INFO

ABSTRACT

We have investigated the structural, optical and magnetic properties of $Zn_{0.90}Co_{0.10}O$, synthesized by the method of two electrode electrodeposition. X-ray diffraction measurement confirms the evolution of a single-phase polycrystalline hcp Wurtzite structure. Co-2p core-level XPS confirms that Co is present in mixed 2+ and 3+ states. The Fourier Transform Infrared (FTIR) spectrum findings substantiate the fact that a single-phase Hexagonal Wurtzite ZnO Crystal Structure has evolved. The SEM micrograph of the sample reveals smooth and dispersed morphology consisting of fine particles. The U-V visible NIR and PL spectroscopy measurements substantiate the fact that Co^{2+} has substituted Zn^{2+} in the matrix of ZnO which agrees with XRD findings. The sample shows good optical property and reveals a blue shift. It seems that the material is a potential candidate to be used as UV sensors. Room Temperature Intrinsic Ferromagnetism has been confirmed by VSM measurement.

1. Introduction

During the last few years, incalculable progress has been witnessed in the electronic industry. Legion of innovative and inventive ideas have been put in to obtain smarter, smaller and highly efficient electronic systems.

Presently, the electronic industry is mostly using the charge degree of freedom of carriers and the intrinsic property of spin of these carriers normally remains unexpressed in the equation of current flow.

During the past few years, efforts have been made to induce a coupling between the charge nature of the carriers and their spin property so that the spin degree of freedom may also start carrying information [1,2]. We can control the spin of the charge carriers by a magnetic field and the charge property of carriers can be controlled by an electric field. Hence, we can have a system usually known as spintronic devices which will possess the electrical as well as the magnetic functionalities simultaneously in the same system.

In pursuit of more storage capacity, non-volatile memory, spin logic devices, increased data processing speed, spin-polarized light sensors and to realize photovoltaic and magneto-optic devices [3,4,5], people have tried several inventive methods to engineer novel spintronic materials coalescing the spin and the charge nature of the carriers together to obtain desirable and tunable functionalities.

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ORIGINAL RESEARCH

Interval type-2 fuzzy automata and Interval type-2 fuzzy grammar

S. Sharan[1] · B. K. Sharma[2] · Kavikumar Jacob[3]

Abstract

The purpose of the present work is to introduce and study the concept of interval type-2 (IT2) fuzzy grammar which recognizes the given IT2 fuzzy languages. The relationship between IT2 fuzzy automata and IT2 fuzzy (weak) regular grammars is discussed. Specifically, the results we obtained here are (i) IT2 fuzzy weak regular grammar and IT2 fuzzy regular grammar generate the same classes of IT2 fuzzy languages (ii) for a given IT2 fuzzy regular grammars, there exists an IT2 fuzzy automata such that they accept the same IT2 fuzzy languages, and vice versa. In addition, we define some operations on IT2 fuzzy languages and it is shown that IT2 fuzzy languages recognized by IT2 fuzzy automata are closed under the operations of union, intersection, concatenation and Kleene closure, but are not closed under complement.

Keywords Interval type-2 fuzzy set · Interval type-2 fuzzy automata · Interval type-2 fuzzy grammar · Interval type-2 fuzzy languages

1 Introduction

It is well-known that the simplest and most important type of automata is finite-automata and it is closely related to formal language as finite-automata can be classified by the class of formal languages (cf., [5,6,25]). In finite automaton, the input alphabet consists of a finite number of discrete input symbols. Fuzzy automata proposed by

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Rheological studies of energetic binder-plasticizer blends

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ABSTRACT

Two azido ester plasticizers, bis(1,3-diazido prop-2-yl) malonate and bis(1,3-diazido prop-2-yl) gluta-rate, were mixed with three different binders, Glycidyl azido polymer (GAP), 3,3-bis-(azidomethyl) oxetane-tetrahydrofuran (BAMO-THF or BT) and 3- nitratomethyl-3-methyl oxetane or Poly NIMMO (PLN) in the ratio of 20:80 (w/w) to study their rheological properties. The addition of plasticizer has reduced the viscosity of three polymer blends, which improved the flow behaviour to an acceptable range. The change in activation energies of polymer blends is also calculated. For all the combination of blends, the rate of change in shear stress and linear range of strain with stress decreases after addition of plasticizers. Variation of viscosity with applied stress is unaffected initially and then increases significantly which limits the linear viscoelastic region (LVR) due to the dilution effect.

1. Introduction

The demand for high-performance explosives and propellants has led to intensive investigations towards improving their energetics, mechanical and storage properties. The research in this regard focused primarily on using superior energetic ingredients like energetic binders, energetic plasticizers etc [1–3]. Molecules containing ester and azido groups are useful as energetic plasticizers for gun and solid rocket propellants [4,5]. The use of plasticizers in polymeric binders is important to improve the mechanical properties, helps to achieve high solids loading (>80%) and also assist in processing of propellants by maintaining optimum viscosity [6–8]. Plasticizers as polymer additives serve to decrease the intermolecular forces between the polymer chains, resulting in a softened and flexible polymeric matrix. They increase polymer's elongation capacity and processability by lowering the glass transition temperature and viscosity of the blends [9,10]. Further the viscosity and flow behaviour of the composition strongly depends on the physical and chemical nature of the plasticizer used in the composition [11,12].

The rheological (flow) response of complex fluids can be linear or non-linear depending on the applied stress. Nonlinearity is usually a sign of structural rearrangement in the system, caused by the applied stress or deformation. Due to the non-Newtonian nature of polymers, characterisation must cover a wide range of shear rates which can be applied to polymer systems during their transformation. Rheological properties of polymers can be studied by measurement of various properties such as shear rate, complex viscosity, elastic (storage) modulus, viscous (loss) modulus, frequency, strain amplitude and phase angle by rheometer [13–20].

Present paper delineates rheological studies of two novel tetra-azido esters, bis (1,3-diazido prop-2-yl) malonate (MAL), and bis(1,3-diazido prop-2-yl) glutarate (GLU) (shown in Figure 1), for their suitability as energetic plasticizers with different energetic binders like Glycidyl azido polymer (GAP),

3,3-bis-(azidomethyl)oxetane-tetrahydrofuran (BAMO-THF or BT) and 3- nitratomethyl-3-methyl oxetane or Poly NIMMO (PLN) (shown in Figure 2) in propellant formulations. The experiments were conducted under steady state as well as oscillatory shear flow.

2. Experimental

2.1. Materials

Synthesis of both novel energetic plasticizers namely bis (1,3-diazido prop-2-yl)malonate (**I**), and bis(1,3-diazido prop-2-yl)glutarate (**II**) (shown in Figure 1) involves two steps: esterification and azidation. During esterification process, dicarboxylic acids, 1,3- dichloropropane-2-ol and p-toluene sulphonic acid, in catalytic amount, were dissolved in toluene and allowed to reflux for 6–10 h to obtain tetrachloro esters. In the second step, tetrachloro esters, obtained from first step, were dissolved in DMF, NaN_3 was added to that at ice bath temperature with stirring and then the reaction mixture was allowed to stirrer overnight at 70°C to obtain tetraazido esters (I and II). The full characterisation of both tetraazido esters by NMR, HRMS, FTIR with thermal, kinetic, computational and compatibility studies was reported by Kumari et al. [21]. Basic properties of both energetic plasticizers are shown in Table 1.

The energetic binders, GAP (Mn- $\approx$ 2,000), PLN (Mn- $\approx$ 2,500), and BAMO-THF copolymer (Mn- $\approx$ 4,800) were obtained from High Energy Materials Research Laboratory (HEMRL), Pune, India.

2.2. Equipment

A stress control rheometer (Stress Tech, Rheologica Instruments AB, Scheelevagen, Sweden) was used to measure the viscosity and other parameters at variable shear rate. The instrument was equipped with a 20 mm diameter parallel plate at a gap of 0.5 mm. For dynamic tests, the stress sweep was

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▌ Energy Technology & Environmental Science

Effect of Electrolyte Concentration on Electrochemical Performance of Bush Like α-Fe$_2$O$_3$ Nanostructures

Sk Yasnur,[a, b] Samik Saha,[a, c] Apurba Ray,[a] Mahimaranjan Das,[d] Ayan Mukherjee,[e] and Sachindranath Das*[a]

The nano-sized bush-like α-Fe$_2$O$_3$ particles were synthesized using sol-gel auto combustion route. The structural characterization of obtained α-Fe$_2$O$_3$ was performed by X-ray diffraction (XRD) method to confirm its phase and crystallinity. The Scanning Electron Microscopy (SEM) confirmed the formation of bush-like nanostructure which was further used for the electrochemical charge storage performance testing. The electrochemical performances of the synthesized electrode material were studied by using Cyclic Voltammetry (CV) and electrochemical impedance spectroscopy (EIS) analysis in a three electrode configuration. The variation of specific capacitance values with the different molar concentration of electrolyte has been discussed. An enhancement in the specific capacitance has been observed up to 3 M KOH electrolyte solution. The maximum value of specific capacitance is 202.2 F g^{-1} which is obtained at a scan rate of 2 mV s^{-1} for 3 M aqueous KOH solution as electrolyte.

Introduction

The ever increasing demand for energy along with dependency on fossil fuels has led to different problems including an increase in pollution levels and depletion of natural resources. To address these issues, much attention has been given to the efficient utilization of different renewable energy sources such as solar, wind, tidal etc. Although these renewable energy sources are capable of meeting the energy demand but because of their intermittent nature, they cannot replace existing fossil fuel based system.[1–7] In this respect, there is a need to develop a suitable energy storage device that can store the energy generated from these renewable energy sources and supply in need. Among the different energy storage devices, such as capacitors, batteries, and fuel cells, supercapacitors (SCs) are one of the most important and advanced energy storage systems because of their superior qualities, such as high power density, long cycling, good stability, excellent rate capability, and safety etc..[8–12] According to the charge storage mechanism, SCs can be classified into electric double-layer capacitors (EDLCs) and pseudocapacitors.[13–14] In EDLCs, electrical double layers are formed between the electrode and electrolyte interface which is responsible for charge storage via electrostatic forces. On the other hand, pseudocapacitors store charges with the help of ultra-fast reversible faradaic redox reactions between the electrolyte and the electrode materials.[15–17] The specific capacitance of pseudocapacitors is generally much greater than that of EDLCs which makes them superior for developing high-performance supercapacitors.[18–19] Different transition metal oxides and few conducting polymer based materials act as pseudocapacitive materials. Among metal oxides, RuO$_2$ has been extensively studied for its extraordinary specific capacitance, long life cycle and outstanding reversibility. However, its application in practical working devices is very limited owing to its rarity, high cost and toxicity.[20–23] Other redox active oxide materials generally exhibit high internal resistance as well as high charge transfer resistance which restrict the commercialization of such materials for supercapacitor electrode applications.[24–27] For example, Kolathodi et al. prepared NiO nanofibers through electrospinning but obtained a low specific capacitance owing to its high internal resistance.[28] Shivakumara et al. prepared porous hematite with a poor specific capacitance of 198 F g^{-1} due to high internal resistance.[29] In addition, Endut et al. have shown that due to low electrical conductivity, the specific capacitance of CuO at a current density of 2 mA cm^{-2} is 197 F g^{-1} in 1 M KOH electrolyte.[30] Furthermore, surface morphology is an effective parameter that

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Growing slums in Indian towns: Insights from Census data 2001-11

Vidya Yadav[*1], Rahul Rajak[2] and Arun Kumar Yadav[3]

Abstract: Urbanization is considered as a new source of prosperity for cities and towns, but it has also resulted in its fair share of 'by-products.' 'One of the most persistent is pockets of poverty, overcrowded residential areas, substandard housing, and inadequate basic services, which come in all shapes and sizes and have different names but all mean the same thing and are commonly referred to as "slums." The present paper tries to examine the trend and pattern of slum growth in towns, its correlation with urbanisation, and speculates on whether slum growth is inevitable with India's rapid urbanisation. Using data from the population Census of India 2001 and 2011, it discusses the spatial pattern of slums and the growth of slum populations in different size classes of towns and administrative categories. The study finding shows that over the decade 2001-11 slum population reduced by 0.8%. However, relationship between urbanisation and slum growth is still positive, strong and linear over the decade. Similarly, correlation coefficient (r) value is positive for both census period (Census 2001- r = 0.69, P-value = 0.001; and Census 2011- r = 0.71, P-value = 0.001). Additionally, it found that proportion of slum dwellers in urban areas is declining, although their number is increasing significantly. Over the decade 2001-11 number of town reporting about slums has increased 1725 to 2613 respectively. Among the states Tamil Nadu has added the highest number (266) of new slum town over the decade followed by Madhya Pradesh (161) and Chhattisgarh (60). The analysis shows that small and medium towns reported a higher proportion of slum population in both Census periods (2001-11) than larger towns/cities. Except for Municipalities and Notified Areas, all other administrative units have seen a significant increase in slum population growth over the decade particularly Cantonment board area. The findings of this study concludes that coordination requires within various authorities in charge of economic development and urban planning. To strengthen the affordable housing may be an important implication for India's efforts to eradicate slums.

Keywords: Administrative Unit, City, Informal Settlement, Population, Slum.

Introduction

The gradual and increasing concentration of population in the urban unit is referred to urbanisation (Davis, 1965). However, the rapid pace of urbanisation, combined with deteriorating infrastructure and inadequate facilities to accommodate the growing urban population, is leading to the formation of slums in many developing-world cities (UN-DESA, 2014). Today, the urban age is unfolding, with more than half (54.5 percent) of the world population lived in urban settlements. By 2030, it is projected that urban areas will house of 60 percent of the people globally, and we can say that every third person will live in cities having a population of at least half a million inhabitants. The world's cities are expanding in terms of both size and number. In 2016, there were approximately 512 cities in the world with a population of at least one million

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▌ Energy Technology & Environmental Science

Effect of Electrolyte Concentration on Electrochemical Performance of Bush Like α-Fe$_2$O$_3$ Nanostructures

Sk Yasnur,[a, b] Samik Saha,[a, c] Apurba Ray,[a] Mahimaranjan Das,[d] Ayan Mukherjee,[e] and Sachindranath Das*[a]

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Introduction

The ever increasing demand for energy along with dependency on fossil fuels has led to different problems including an increase in pollution levels and depletion of natural resources. To address these issues, much attention has been given to the efficient utilization of different renewable energy sources such as solar, wind, tidal etc. Although these renewable energy sources are capable of meeting the energy demand but because of their intermittent nature, they cannot replace existing fossil fuel based system.[1–7] In this respect, there is a need to develop a suitable energy storage device that can store the energy generated from these renewable energy sources and supply in need. Among the different energy storage devices, such as capacitors, batteries, and fuel cells, supercapacitors (SCs) are one of the most important and advanced energy storage systems because of their superior qualities, such as high power density, long cycling, good stability, excellent rate capability, and safety etc..[8–12] According to the charge storage mechanism, SCs can be classified into electric double-layer capacitors (EDLCs) and pseudocapacitors.[13–14] In EDLCs, electrical double layers are formed between the electrode and electrolyte interface which is responsible for charge storage via electrostatic forces. On the other hand, pseudocapacitors store charges with the help of reversible ultra-fast faradaic redox reactions between the electrolyte and the electrode materials.[15–17] The specific capacitance of pseudocapacitors is generally much greater than that of EDLCs which makes them superior for developing high-performance supercapacitors.[18–19] Different transition metal oxides and few conducting polymer based materials act as pseudocapacitive materials. RuO$_2$ has been extensively studied for its extraordinary specific capacitance, long life cycle and outstanding reversibility. However, its application in practical working devices is very limited owing to its rarity, high cost and toxicity.[20–23] Other redox active oxide materials generally exhibit high internal resistance as well as high charge transfer resistance which restrict the commercialization of such materials for supercapacitor electrode applications.[24–27] For example, Kolathodi et al. prepared NiO nanofibers through electrospinning but obtained a low specific capacitance owing to its high internal resistance.[28] Shivakumara et al. prepared porous hematite with a poor specific capacitance of 198 F g^{-1} due to high internal resistance.[29] In addition, Endut et al. have shown that due to low electrical conductivity, the specific capacitance of CuO in a 1 M KOH electrolyte at a current density of 2 mA cm^{-2} is 197 F g^{-1}.[30] Furthermore, surface morphology is an effective parameter that plays an important

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Dated :- 12/02/2021

To,

डॉ0 सुषमा कुमारी

सहायक प्राध्यापिका, दर्शनशास्त्र विभाग

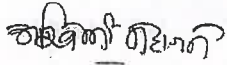कॉलेज ऑफ कॉमर्स एंड साइंस (पटना) पाटलिपुत्र विश्वविद्यालय, पटना

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Thankfully, wishing you all the best.

Yours truly,

Ashwani Mahajan
Managing Editor

Principal
College of Commerce, Arts & Science
Patna- 800020

In vitro biotic production of H₃Cit by *Aspergillus wentii* RS- 519 exposed to N-ethylideneethylenediamine

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Abstract: The efficacy of N-ethylideneethylene-diamine on biotic production of H₃Cit by fungal strains such as *Aspergillus fischeri* RS – 119, *Aspergillus foetidus* RS–215, *Aspergillus aculeatus* RS-313, *Aspergillus carbonarius* RS-418 and *Aspergillus wentii* RS- 519 has been assessed. It has been observed that the fungal strain *Aspergillus wentii* RS- 519 has been found most significant and effective for the citric acid fermentation process. It has been found that the compound, i.e., N-ethylideneethylenediamine has stimulatory effect on biotic production of H₃Cit by *Aspergillus wentii* RS- 519 and enhances the yield of citric acid to an extent of 22.852% higher in comparison to control fermenter flasks, i.e., 4.321g/100 ml under the optimized conditions.

(**Keywords:** Citric acid fermentation, N-ethylideneethyl enediamine and *Aspergillus wentii* RS-519)
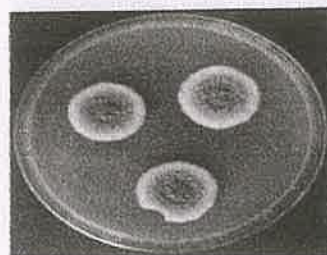
Introduction

A large variety of active compounds[1,2] such as peroxides, caffeine, gaseous butadiene, ethylene and thiourea causes mutation in different microbes. Peroxides and epoxides as mutagenic chemicals were also reported by a group of workers[3,4], as a very specific mutagens. Nisihi *et al*[5] and others[6-10] have worked on different mutagenic chemicals and some mutagens on different microorganisms on fermentation process such as N-methyl-N-nitroso urea, EMS, or x-rays to induce the microbial process and achieve the improved yields. Thus, from the above brief review it is evident that chemical mutagens are required for genetic manupulation and exploitation specially for citric acid fermentation and in view of this the authors have studied the influence of

N-methyl hydroxylamine on biotic production of citric acid.

Experimental

The influence of N-ethylideneethylene-diamine on biotic production of H₃Cit by *Aspergillus wentii* RS- 519.

Aspergillus wentii

The composition of the production medium for biotic production of H₃Cit by *Aspergillus wentii* RS- 519 has been prepared as follows: Molasses:22%(w/v), NH₄NO₃: 0.66% , KH₂PO₄: 0.66%, MgSO₄.7H₂O:0.66%, pH : 2.2 The pH of the production medium was adjusted to 2.2 by adding requisite amount of KCl-HCl buffer solution, and this pH was also ascertained by a pH meter. The above composition medium represents volume of a fermenter flask, i.e., "100ml" biotic production of citric acid by *Aspergillus wentii* RS- 519. Now, the same production medium for biotic production of H₃Cit by *Aspergillus wentii* RS- 519 was prepared for 99-fermenter flask, i. e; each contained '100ml'

Biotechnique for ethanol bioproduction by *Saccharomyces cerevisiae* DK-18 exposed to 2-Naphthylhydroxylamine

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Abstract: The efficacy of 2-Naphthylhydroxylamine on bioproduction of ethanol by yeast *Saccharomyces cerevisiae* DK-18 has been assessed. It has been found that the mutagen, i.e. 2-Naphthylhydroxylamine under observation has stimulatory effect on bioproduction of ethanol by yeast *Saccharomyces cerevisiae* DK-18 and enhances the yield of ethanol to an extent of 17.201% higher in comparison to control fermentor flasks, i.e., 6.86 ml/100mL in 56 hrs of incubation period, 4.7 pH and 33°C temperature with 22% (w/v) molasses solution.

(Keywords: Molasses, ethanol, mutagens, 2-Naphthylhydroxylamine, *Saccharomyces cerevisiae* DK-18)

Introduction

Chemical mutagens are standard tools for mutagenesis in a variety of organisms, and they are a primary means of creating mutations in phenotype-based screens in most genetic systems. Although varied in the experimental design, all whole animal screens involve the generation of lines harboring mutated chromosomes followed by the examination of the resulting phenotypes in the heterozygous or homozygous state. In contrast, gene-based screens rely on the identification of lines that carry.

Mutagens are simultaneously both required and avoided substances. They are "substances of transformation," but also "genetic poisons." Their transformative qualities destined mutagens to become unavoidable instruments within genetics and molecular biology. Since the 1960s, however, mutagens have defined a trans-disciplinary problem of risk policy. Substances such as radioactive particles from fall-out and the nuclear industries, pharmaceuticals, chemical supplements in the foodstuffs industry or pesticides (like DDT) were silent, efficient and ubiquitous.[1-4] The precarious status between efficiency and (dangerous) autonomy formed the key characteristics of mutagens that nurtured the ambivalent career of mutants. Daily life became populated by horrifying, but also superhuman creatures.[5-15]

Literature survey reveals that a little work has been done on SmF biotechnique for ethanol production by *Saccharomyces cerevisiae* DK-18 exposed to 2-Naphthylhydroxylamine, therefore, the authors have employed 2-Naphthylhydroxylamine on biotechnique for ethanol production by *Saccharomyces cerevisiae* DK-18.

Experimental

The influence of 2-Naphthylhydroxylamine on fermentative bioproduction of ethanol from molasses by *Saccharomyces cerevisiae* DK-18

The constitution of production medium for the fermentative bioproduction of ethanol from molasses by *Saccharomyces cerevisiae* DK-18 is prepared as follows :
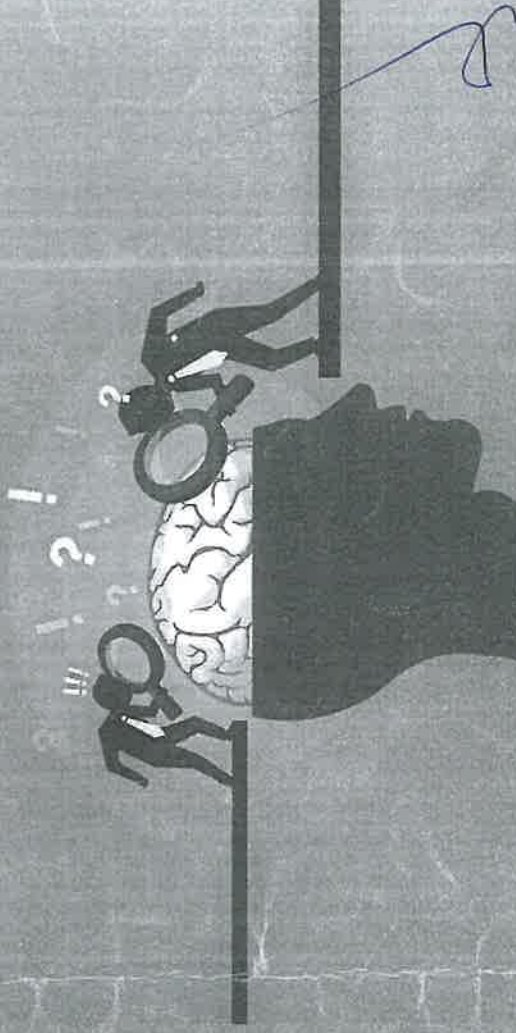
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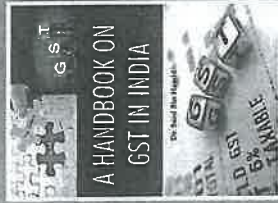
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INNOVATION AND ENTREPRENEURSHIP

भारतीय समाज और राजनीति में महिलाओं की स्थिति

डॉ० सुषमा कुमारी

सहायक प्राध्यापिका, दर्शनशास्त्र विभाग, कॉलेज ऑफ कॉमर्स, आर्ट एंड साइंस (पटना), पाटलिपुत्र विश्वविद्यालय, पटना

प्रारूप- इस शोध-पत्र के अंतर्गत भारतीय समाज और राजनीति में महिलाओं की जमीनी हकीकत से रु-ब-रु कराने का प्रयास किया गया है। आजादी के बाद से अभी तक के सामाजिक राजनीतिक सफर में आधी आवादी की दसा और दिशा में कितना बदलाव आया है। उन्हें समाज और राजनीति में अपनी जगह बनाने के लिए किन-किन समस्याओं को सामना करना पड़ रहा है। यह सब को भली भाति समझने के लिए इसके ऐतिहासिक परिप्रेक्ष्य को भी समझना बहुत जरूरी है।

आज भारत 21वीं सदी के दहलीज पर खड़ा होकर अपने को विश्वगुरु कहलाने के लिए हुंकार भर रहा है। लेकिन विचारणीय प्रश्न यह है कि इस हुंकार में कितनी सच्चाई है? आजादी के सत्तर साल के बाद भी भारत की जमीनी हकीकत में ज्यादा बदलाव नहीं दिख रहा है। आज भी कुछ बुनियादी समस्याएँ जस-की-तस बनी हुई हैं। लड़खड़ाती शिक्षा व्यवस्था, भुखमरी, बेरोजगारी या फिर महिलाओं की स्थिति हर जगह गुणात्मक सुधार की आवश्यकता महसूस की जा रही है। मेरे ख्याल से जब तक उपर्युक्त समस्याओं का समाधान नहीं हो जाता तब तक विश्व गुरु का दंभ भरना शोभा नहीं देता। 'महान दार्शनिक अरस्तू ने बहुत पहले कह गए थे- किसी भी राष्ट्र की स्त्रियों की उन्नति या अवनति पर ही उस राष्ट्र की उन्नति या अवनति निर्भर है।'

आधुनिकता तथा ज्ञान-विज्ञान के विस्तार के साथ-साथ देश में दिन-प्रतिदिन महिलाओं के प्रति बढ़ते अपराधों के आंकड़े चौंकाने वाले हैं। उन्हें आज भी लैंगिक भेद- भाव, अशिक्षा, दहेज-उत्पीड़न, घरेलू हिंसा, बलात्कार जैसी अनेक जघन्य अपराधों का शिकार हो रही हैं। हालाँकि पिछले कुछ दशकों में लगभग सभी सरकारी और गैर-सरकारी क्षेत्रों में महिलाओं की भागीदारी बढ़ी हैल्लेकिन यह सिर्फ शुरुआत है, जब तक समाज के सभी क्षेत्रों में महिलाओं को पुरुषों के बराबर भागीदारी सुनिश्चित नहीं हो जाती, वे हर प्रकार से शिक्षित, सुरक्षित और सशक्त नहीं हो जाती तब तक हमारा भारत आत्मनिर्भर नहीं बन सकता है। जोन स्टुअर्ट मिल ने अपनी पुस्तक 'स्त्रिओं की पराधीनता' में बहुत ही सरल और सुंदर शब्दों में लिखा है "समझदार नागरिकों की संख्या में निरंतर वृद्धि होने से ही इससे सारा समाज लाभान्वित होगा, यह किसी के भी स्वार्थ के अनुकूल नहीं होगा कि राष्ट्र के आधे नैतिक एवं बौधिक संसाधन को अविकसित रहने दिया जाये। स्त्री को पुरुष के समकक्ष समान अधिकार देने से आम मानसिक शक्ति एवं संकाय दुगनी होगी, मानवता के उच्चतर सेवाओं के लिए उन्हें उपलब्ध किया जा सकेगा। मनुष्य जातिकी नैतिक पुनर्स्थापना तभी आरम्भ होगी जब सामाजिक संबंधों में बुनियादी सामान न्याय के नियम पर रखी जाएगी और जब अधिकारों एवं उनके रोपण में मनुष्य अपने समान साथी के लिए गहरी सहानुभूति अनुभव करना सिख जायेगा"१। इससे यह स्पष्ट होता है कि जब तक समाज के प्रत्येक वर्ग में महिलाओं की पुरुषों के बराबर भागीदारी सुनिश्चित नहीं हो जाती हमारा देश उन्नति की राह में अग्रगण्य नहीं हो सकता।

यहाँ यह उल्लेखनीय है कि भारतीय समाज में स्त्रियों के प्रति उपेक्षा पूर्ण व्यवहार की समाप्ति तथा उनकी राजनीतिक स्थिति को सुधारने के लिए १२ सितम्बर १९९६ को पहली बार महिला आरक्षण विधेयक लोकसभा में प्रस्तुत किया गया था, जो आज तक लंबित पड़ा है। यह उदासीनता बहुत कुछ कह रही हैलपाजनीति में महिलाओं की स्थिति बेहतर करने के लिए जरूरी है कि राजनीति में महिला आरक्षण लागू किया जाये। क्योंकि, "आरक्षण का प्रावधान न तो तोफा है और न विशेषाधिकार। यह एक पहला कदम और अंतरिम प्रावधान है जिससे महिलाओं को एक ऐसी लोकतान्त्रिक व्यवस्था की राजनीतिक मुख्य धारा में शामिल किया जा सकेगा जिसका संविधान जाती, नस्ल, वर्ग और लिंग के भेदभावों से ऊपर उठकर अपने सभी नागरिकों के लिए समान सामाजिक आर्थिक व राजनीतिक अधिकारों और अवसरों की गारंटी देती है।"२ दुनिया के कई देशों में महिलाओं की सामाजिक और राजनीतिक स्थिति भारत से बहुत अच्छी है।

विचारनी प्रश्न यह है कि आजादी के ७४ वर्ष बाद भी भारतीय राजनीति में महिलाओं की भागीदारी इतनी कम क्यों है ? इसका प्रमुख वजह क्या है? इसका उत्तर है भारतीय समाज का पितृसत्तात्मक होना। यह न सिर्फ महिलाओं को राजनीति में आने से हतोत्साहित करता है, बल्कि समाज के प्रत्येक क्षेत्र में महिलाओं को आगे बढ़ने में अवरोध पैदा करता है। पितृसत्तात्मकव्यवस्था की वजह से केवल महिलाओं को स्वतंत्र निर्णय लेने नहीं दिया जाता बल्कि समाज में भी महिलाओं को स्वतंत्र रूप से अपनी बात को रखने का मौका बहुत कम ही दिया जाता है। हालाँकि कुछ महिलाओं ने इन सभी चुनौतियों से पार पाकर विभिन्न क्षेत्रों में देश के सम्माननीय ओहदे तक अपनी पहुंच बनाई है जिसमें सावित्री बाई फूले, श्रीमती इंदिरा गांधी, प्रतिभा देवी सिंहपाटिल, सुषमा स्वराज, निर्मलासीतारमण, महादेवी वर्मा, सुभद्राकुमारीचौहान, अमृता प्रीतम, महाश्वेता देवी, लता मंगेशकर, मेघा पाटकर, हिमा दास, गीता फोगाट, मैरीकौम आदि अनेक नाम उल्लेखनीय हैं।

महिला सुरक्षा और समता के लिए उठाया गया हमारा प्रतेक कदम किसी न किसी हद तक महिलाओं की दशा सुधारने में कारगर साबित हो रहा है, लेकिन सामाजिक सुधार की गति इतनी धीमी है की इसके यथोचित परिणाम स्पष्ट रूप से सामने नहीं आ पाते। हमें तेज गति से इस क्षेत्र में जन-जागृति और शिक्षा पहुँचाने का कार्य करने की आवश्यकता है। शिक्षा ही एक मात्र हथियार है जो महिलाओं को उसका हक दिला सकता हैल्एक शिक्षित महिला न केवल अपना

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Nanotechnology-based filtration membranes for removal of pollutants from drinking water

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1 Introduction

Covering 70% of Earth's surface, water is the one of our amplest resources. However, 97% of available water is saline, which is not suitable for human consumption, leaving only 3% freshwater that is safe for consumption (Grey et al., 2013). According to the World Health Organization (WHO), around 785 million people have an inadequate supply of basic drinking water, and around 2 billion people are suffering from scarcity of safe drinking water and are constrained to drink contaminated water (Briggs et al., 2016). It is estimated that half of the world's population will face water-stressed conditions by 2025. Drinking water across the globe arises from two important resources: groundwater and surface water. Groundwater includes underground water, springs, and aquifers located under the surface, whereas surface water includes rivers, lakes, and wells. However, these resources of drinking water continue to diminish due to rapid increases in global population, urbanization, and industrialization. As a result, a critical shortage of clean drinking water has been predicted for the coming years (Adeleye et al., 2016; Anand et al., 2018; Grey et al., 2013; Navarro-Ortega et al., 2015; Pendergast and Hoek, 2011; Ying et al., 2016, 2017). The rapid development of industries and human activities has led to the release of many harmful pollutants, such as organic and inorganic compounds, toxic metals, microbes, and viruses, into water bodies, which seriously endanger these freshwater resources (Houtman, 2010). Clean drinking water is essential for the continuation of life on Earth. Over the last decade, the raising demands for food and energy due to the growing population coupled with climate change have put tremendous pressure on sources of drinking water. As a result, the reduced supply of freshwater has become a

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COVID-19 Vaccination: Do Age and Educational Level Matter ?

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The utility of vaccine campaigns to control coronavirus 2019 disease (COVID-19) is not merely dependent on vaccine efficacy and safety. Vaccine acceptance among the general public or simply the negative attitudes towards vaccines is the major barriers in managing COVID-19 pandemic in the long-term. This study assessed the attitude towards COVID- 19 vaccination among the participants in relation to their age and educational level. The sample comprised of n= 100 participants. The attitude towards the COVID- 19 vaccination was rated on a 5 point rating scale. The results indicated that there was a significant difference among the participants on the basis of their educational level ($p<.001$). The findings were discussed and few recommendations were suggested to better understand the current backdrop in COVID-19 vaccination.

Keywords: COVID-19, attitude, vaccination, education

COVID-19 pandemic has inflicted almost unimaginable harm on the health, economy and life of almost every nation. The long-term success of the public health response to the coronavirus disease 2019 (COVID-19) pandemic will mostly depend on acquired immunity in a sufficient proportion of the population (herd immunity). Achieving population immunity through natural means or by allowing a large proportion of the population to become infected would cause unprecedented strain on healthcare resources and could result in up to millions of deaths worldwide (Randolph & Barreiro, 2020). Widespread vaccination is therefore essential for managing COVID-19 transmission, although questions remain about the degree and duration of protection that will be offered from COVID-19 vaccines (Altmann, Douek, & Boyton, 2020). However, the current pandemic is occurring amidst a backdrop of widespread mistrust in the safety and effectiveness of vaccines globally (de Figueiredo, Simas, Karafillakis, Paterson, & Larson, 2020). Thousands of people in western world have taken to the streets around the world to protest COVID-19 social distancing policies and the prospect of mass vaccinations. This is concerning as public attitudes towards vaccine safety, their importance, and effectiveness are consistently associated with vaccine uptake (de Figueiredo, Simas, Karafillakis, Paterson, & Larson, 2020).

Although general population data from most European countries indicate mostly positive attitudes towards vaccines however, research is suggesting there are still a substantial proportion of peoples who are unsure of or distrust the safety and effectiveness of any kind of vaccines (Larson, de Figueiredo, Karafillakis, & Rawal, 2018). India began its COVID-19

Fermentative bioproduction of ethanol from molasses exposed to dibenzamine

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Abstract: The effect of dibenzamine on bioproduction of ethanol by yeast *Saccharomyces cerevisiae* DK-18 has been assessed. It has been found that the mutagen, i.e., dibenzamine under observation has stimulatory effect on bioproduction of ethanol by yeast *Saccharomyces cerevisiae* DK-18 and enhances the yield of ethanol to an extent of 10.289% higher in comparison to control flat bottom fermentor flasks. i.e., 6.98 ml/100mL in 56 hrs of incubation period, 4.7 pH and 33°C temperature with 22% (w/v) molasses solution.

(Keywords: Molasses, ethanol, mutagens, dibenzamine, *Saccharomyces cerevisiae* DK-18)

Introduction

Mutagens can be classified into 3 types based on their origin. They are as follows: Physical mutagens: These include ionizing radiation, such as X-rays, gamma rays and alpha particles. Ultraviolet radiations can also behave as potential mutagens. Chemical mutagens: Elements such as arsenic, nickel and chromium are considered to be mutagens.[1-9]

Early studies by Ames showed around 90% of known carcinogens which can be identified in Ames test as mutagenic and 80% of the mutagens identified through Ames test may also be carcinogens. Mutagens are not necessarily carcinogens, and vice versa. Sodium Azide for example may be mutagenic (and highly toxic), but it has not been shown to be carcinogenic.[10-14]

Literature survey reveals that a very little work has been done on ethanol production by yeast *Saccharomyces cerevisiae* DK-18 exposed to chemical mutagens, therefore, the authors have employed dibenzamine on ethanol production by yeast *Saccharomyces cerevisiae* DK-18.

Experimental

The influence of dibenzamine on fermentative bioproduction of ethanol from molasses by *Saccharomyces cerevisiae* DK-18

The constitution of production medium for the fermentative bioproduction of ethanol from molasses by *Saccharomyces cerevisiae* DK-18 is prepared as follows :

MS Molasses Solution	:	22 % (w/v)
ME Malt-Extract	:	0.40%
YE Yeast-Extract	:	0.40%
PTN Peptone	:	0.40%
DW Distilled water	:	10ml
To make up 100 ml		
pH	:	4.7

Distilled water was added to make up the volume up to '100 ml'.

The pH of the medium was adjusted to 4.7 by adding requisite amount of lactic acid.

Now, the same production medium for fermentative bioproduction of ethanol from

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CYLINDRICALLY SYMMETRIC UNIVERSE IN PRESENCE OF ELECTROMAGNETIC FIELD

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Abstract: Taking cylindrically symmetric metric we have found a non static cylindrically symmetric cosmological model which is spatially homogenous non-degenerate Petrov type - I. The Energy momentum tensor has been assumed to be that of a perfect fluid with an electromagnetic field. Various physical & geometrical properties of the model have been discussed.

Introduction: In recent years there has been a lot of interest in cosmological models in the presence of electromagnetic fields in general relativity. Cosmological models in the presence of a magnetic field have been studied by Zeldovich and Novikov[14] and Thorne[11]. Ginzburg[2] has studied the gravitational collapse of the magnetic star. Galaxies and interstellar spaces exhibit the presence of strong magnetic fields Zeldovich and Novikov[14]. Monoghan[7] and Seymour[9] have discussed the magnetic field in stellar bodies. Del[1] and Jacobs[4] have studied the behavior of the general Bianchi type - I cosmological model in the presence of the spatially homogeneous magnetic field. This work has been further extended by Tupper[12] to include Einstein-Maxwell fields in which the electric field is non-zero. He has also interpreted certain type -VI cosmologies with electromagnetic field Tupper[13] Roy and Prakash[8] taking the cylindrically symmetric metric of Marder[6] have constructed a spatially homogeneous cosmological model in the presence of an incident magnetic field which is also anisotropic and non degenerate Petrov type- I. Later on Singh and Yadav[10] assuming the energy momentum tensor to be that of perfect fluid with an electromagnetic field constructed a spatially homogeneous cosmological model. Some other researchers in this field are Yadav et. al. [15, 16], Saha and Rikhvitsky [17] and Saha and Visinescu [18].

In this paper, we have also constructed a non-static cylindrically symmetric cosmological model which is spatially homogeneous non-degenerate Petrov type-I assuming the energy momentum tensor to be that of a perfect fluid with an electromagnetic field. Various physical and geometrical properties of the model have been found.

The Field Equation and their Solutions:

We consider the most general cylindrically symmetric space time in the form given by

$$ds^2 = A^2(dt^2 - dx^2) - B^2 dy^2 - C^2 dz^2 \qquad (1 \quad)$$

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DIABETOGENIC POTENTIAL OF STREPTOZOTOCIN IN THE GENERATION OF DIABETES MELLITUS IN ALBINO MICE

Biological Science

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ABSTRACT

BACKGROUND: Streptozotocin is toxic to beta cells and therefore used to produce animal model for diabetes mellitus. The Streptozotocin induces diabetes mellitus by the selective inhibition of glucose-stimulated insulin secretion and the formation of reactive oxygen species (ROS) which promotes death of beta cells. Both these effects result in a pathophysiological state of insulin-dependent diabetes mellitus in animals.
AIM: Generation of streptozotocin-induced mice diabetic models.
OBJECTIVES: To study the production of diabetes in albino mice.
METHODS: Diabetogenic albino mice were developed using intraperitoneal injection of different concentrations of streptozotocin (50-250 mg/KgBW) so that the hypoglycaemic efficacy of plant extracts can successfully be performed.
RESULTS: Streptozotocin induced a multiphasic plasma glucose response when injected intraperitoneally in albino mice. At 150 mg/kg BW of streptozotocin concentration the hyperglycaemic activity was noticed only after 35 hours of exposure (209.0 mg/dL of blood). At this concentration streptozotocin caused significant increase in plasma glucose level to 270 mg/dL after 50 hours of exposure.
CONCLUSIONS: It can be concluded that the streptozotocin is a diabetogenic agent when administered to albino mice.

INTRODUCTION

Streptozotocin (STZ) is a glucosamine-nitrosourea, alkylating antineoplastic agent. It is toxic to insulin-producing beta cells of pancreas and is used to treat certain cancers of pancreatic islets of Langerhans and also to produce animal model for diabetes mellitus. DNA damage caused by STZ induces the production of a transcription factor known as the peroxisome proliferator-activated receptor-γ (PPARγ). This transcription factor is involved in adipogenesis and in the regulation of adipocyte gene expression and glucose metabolism[1]. PPARγ is thus important for diabetes induction[2]. It enhances glucose transport to cells through glucose transporter protein (GLUT2) only, but not recognized by other glucose transporters. STZ thus shows relative toxicity to beta cells because these cells have high levels of GLUT2[3,4].

For induction of diabetes this drug can be administered to experimental animals through different routes viz. intraperitoneal, intravenous and subcutaneous with single or multiple doses. The genetic strains, route of administration and nutritional status of experimental animals play an important determining role for induction of diabetes[5].

Streptozotocin induces diabetes mellitus in experimental animals by partial degradation of the beta (β) cells of islet of Langerhans in pancreas and subsequent compromise in the quality and quantity of insulin produced by these cells. The Streptozotocin induces two distinct pathological effects. First, the selective inhibition of glucose-stimulated insulin secretion, and second the formation of reactive oxygen species (ROS) which promotes death of beta cells. Both these effects result in a pathophysiological state of insulin-dependent diabetes mellitus in animals[6]. The former is associated with specific inhibition of a pancreatic glucose sensor enzyme, glucokinase by streptozotocin whereas the latter is rather connected with the redox cycling ability of STZ which results in the generation of ROS.

Materials and Methods

Diabetogenic albino mice were developed using different concentrations of streptozotocin (50-250 mg/KgBW). Adult albino mice weighing around 250-300 gram with 7.5 ± 0.5 cm length were selected and mice were housed in shoe-box type cages under good hygienic conditions in animal house during experimental period. The mice were acclimatized for 15 days in an environmentally controlled room under standard conditions (21 ± 2°C, 55 ± 5% humidity, 12 hr Light: Dark cycle).

Streptozotocin solution in 0.05M sodium citrate at pH 4.5 at the dose of 35 mg/kg body weight was administered by multiple intra-peritoneal injections. The mice were then allowed to access the respective food and water ad libitum. Mice with fasting blood glucose level of 200 mg/dl (7.8 mmol/l) or higher were considered to be diabetic and were used in the study. A parallel set of control mice (non-diabetic) were injected with citrate buffer only.

The mice were fed on diet pellet consisted of wheat grains, choker wheat, maize grains, soybean grains, sun drop oil, milk powder and jaggery and water ad libitum to ensure proper growth. One pellet of feed per mice was given. Data were expressed as the mean ± S.E and analysed by ANOVA. The results obtained have been presented in Table-1 and Figure-1.

Table-1: Plasma Glucose Level In Mg/dl Of Albino Mice After Administration Of Different Concentration Of Streptozotocin At Different Time Intervals

Plasma glucose level in reference range (mg/dL)	Plasma glucose level in control mice (mg/dL)	Concentration of Streptozotocin administered (mg/kgBW)	Exposure time intervals in hours									
			5	10	15	20	25	30	35	40	45	50
70-110	72.15 ± 1.02											
		50	77.00 ±1.17	86.00 ±1.75	100.50 ±1.63	107.00 ±1.16	110.00 ±0.65	113.00 ±1.66	115.00 ±0.74	117.00 ±1.52	119.00 ±0.67	120.00 ±0.84
		100	78.00 ±1.12	88.00 ±1.75	97.20 ±1.15	105.50 ±1.25	110.35 ±1.26	113.00 ±1.37	117.00 ±1.25	120.00 ±1.12	121.00 ±0.71	122.00 ±1.15
		150	85.00 ±1.11*	99.00 ±1.65*	114.50 ±1.35*	142.20 ±1.17*	167.50 ±1.35*	188.20 ±1.35*	209.00 ±1.61*	220.00 ±1.64*	242.00 ±1.63*	270.00 ±1.35*

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Paradigm of intergenerational mobility among scheduled caste in rural Bihar

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Abstract

he concept of intergenerational mobility deals with the transformative values of development that successive generation of a fa achieves while scaling up their skill, preference and other socio-economic achievement. While Sanskritisation deals with the in social values of higher caste by the low caste, intergenerational mobility is about the acceptance of transformative values over generations of a family, irrespective of the social group and the incremental changes in the social values in the due course of development. Understanding intergenerational mobility among social groups who are at the bottom of the social hierarchy mer attention. This is because caste-based discrimination excluded them in attaining socio-economic opportunities and they contin remain outside the mainstream of society. In the due course of development, socio-economic and cultural transformation have taking place with increasing urbanisation, migration and innovation. Such changes are expected to bring convergence betwee social groups and lead to upward mobility among the low caste people. To understand upward mobility among the Scheduled (the extent to which the changing process of development has been able to integrate them into the mainstream society by over caste barriers needs to be explored. Given this context, this paper tries to locate the intergenerational mobility among Schedul Castes in rural Bihar, taking into consideration various changes viz. educational, occupational and cultural that has taken place due course of time. The findings of the study suggest that there is a gradual change in these indicators. This calls for an analys understand the welfare programmes and policies that were implemented for the socio-economic improvement of the Schedule

Keywords

Bihar, Caste, Intergenerational, Marginalised, Mobility.

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ANTIFUNGAL ACTIVITY OF ETHANOL AND AQUEOUS EXTRACTS OF SOME MEDICINAL PLANTS AGAINST YEASTS

Botany

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ABSTRACT

BACKGROUND: Many medicinal plants possess antifungal activity due to the presence of secondary metabolites like phenols, phenolic acids, quinones, flavones, flavonoids flavonols, tannins and coumarins, and hydrolytic enzymes which act on membranes of invading microorganisms and cause inhibitory activities against bacteria, fungi and yeasts.
AIM: Evaluation of anti-yeast activity of aqueous and ethanol extract of medicinal plants.
OBJECTIVE: To study the anti-yeast activity of ten important medicinal plants.
METHODS: Ten medicinal plants viz. *Citrus Sinensis* (L) (Orange), *Curcuma longa* L. (Turmeric), *Allium cepa* L. (Onion), *Coriander sativum* L. (Dhania), *Trigonella feonum-graceum* L (Fenugreek), *Bauhinia variegata* (Kachnar), *Oxalis corniculata* L. (Creeping wood sorrel), *Solanum nigrum* Linn (Black nightshade), *Moringa oleifera* L.(Drumstick) and *Azadirachta indica* L. (Neem) were assayed for their antifungal activities against yeasts viz. *Geotrichum candidum, Pichia membranifaciens* and *Yarrowia lipolytica*. Anti-yeast activity was assayed by determining the percentage inhibition of colonial growth by comparing the colony diameter (mm) of poisoned plate (with plant extract) and non poisoned plate.
RESULTS: The results revealed that aqueous and ethanol extract of selected medicinal plants could suppress mycelia growth of these three yeast isolates. In general ethanol extract caused slightly of higher growth inhibition of yeasts than aqueous extract.
CONCLUSIONS: The present findings can form the basis for further investigation to optimize the antifungal activity of herbal extract.

KEYWORDS

Geotrichum candidum, Pichia membranifaciens, Yarrowia lipolytica, Medicinal plants, Aqueous extract, Ethanol extract.

INTRODUCTION

Many herbs possess antimicrobial potential in combination and are considered as alternatives antimicrobial agents[1]. Plants synthesize aromatic secondary metabolites like phenols, phenolic acids, quinones, flavones, flavonoids flavonols, tannins and coumarins[2]. These secondary metabolites and hydrolytic enzymes viz. glucanases and chitinases act specifically on membranes of invading microorganisms[4,5] and cause inhibitory properties against bacteria, fungi and insects[3].

The antifungal activity of medicinal plants has been reported by several workers[6-20]. There is little evidence on the antifungal properties of the medicinal plants and hence present investigation was undertaken.

MATERIALS AND METHODS

Ten medicinal plants viz. *Citrus Sinensis* (L) (Orange), *Curcuma longa* L. (Turmeric), *Allium cepa* L. (Onion), *Coriander sativum* L. (Dhania), *Trigonella feonum-graceum* L (Fenugreek), *Bauhinia variegate* (Kachnar), *Oxalis corniculata* L.(Creeping wood sorrel), *Solanum nigrum* Linn (Black nightshade), *Moringa oleifera* L.(Drumstick) and *Azadirachta indica* (L..) (Neem), were assayed for their antifungal activities against yeasts. The different parts of these plants viz. fruits (peel and juice) of orange, rhizome of turmeric, bulb of onion, leaves of dhania, fenugreek and kachnar, drumstick and neem were used for the preparation of ethanol and aqueous extracts.

Preparation of Extracts

The plant samples were surface sterilization with 5% sodium hypochlorite solution and then dried in shade for 48 hours at ambient temperature. The plant parts were then crushed to fine powder in electric grinder. The aqueous and ethanol crude extracts were prepared from their dried powder. For this purpose twenty five grams (25g) of powder sample was mixed in 100 ml of distilled water and 70% ethanol separately and homogenized in a blender. The mixture was kept undisturbed at room temperature for 24 hrs in sterile flask covered by aluminum foil to avoid evaporation. The homogenates obtained were first squeezed out in a muslin fabric square and then filtered through Whatman filter paper (3 mm diameter). After filtration, the extract was evaporated in water bath until 25 ml extract was left in a container. Ethanol and aqueous extracts thus obtained were immediately evaluated for antifungal activities.

Isolation of Yeasts

Yeasts were isolated from spoiled chapatti in YES media consisted of

Yeast extract (5g/L), Dextrose (30g/L), Adenine (0.05g/L), Histidine (0.05g/L), Leucine (0.05g/L), Lysine (0.05g/L), Uracil (0.05g/L), Difco bacto agar (20.0 g/L) and Distilled water (1L), and incubated at ambient temperature $25 \pm 2°C$. Antibiotics viz. Chloramphenicol, Streptopenicillin (50 mg/l) were added to media to inhibit bacterial and fungal growth. Three species of yeast viz. *Geotrichum candidum, Pichia membranifaciens* and *Yarrowia lipolytica* were isolated spoiled chapatti.

Screening of plant extracts for their anti-yeast activities

The anti-yeast activity of aqueous and ethanol extracts was assayed against three isolates viz. *Geotrichum candidum, Pichia membranifaciens* and *Yarrowia lipolytica*.

Five ml of plant extracts from their stock solution was dispensed into 15 ml of molten SDA medium (Sabouraud Dextrose Agar) and poured in 90 mm diameter sterile Petri plates, and swirled to achieve a uniform mixture and allowed them to solidify at room temperature.

Preparation of Inoculums

At least three well isolated colonies of the same type from a culture agar plate were selected. Sterile cork borer (6mm) were used to cut each isolate culture which were at least 5-7 days old. Mycelial disc of each isolate was inoculated into separate plate in three replicates .The plates were then incubated at $25 \pm 2°C$ for 10 days period .Two control sets were set up without extract and preservative (negative control) and other one with chemical preservative (positive control). Colony diameter was recorded by measuring the two opposite circumference of the colony growth. Percentage inhibition of colonial growth was evaluated by comparing the colony diameter of poisoned plate (with plant extract) and non poisoned plate and calculated using the formula given below:

$$GI (\%) = \frac{CGc - CGt}{CGc} \times 100$$

GI= Growth inhibition; CGc= colony growth in control; CGt= Colony growth in treatment

All the experiments were conducted in replicates of three and data was recorded as mean value ± SE and Critical difference at 5% level. The results obtained have been presented in Table-1.

Table-1: Antifungal activity of aqueous and ethanolic extract of ten medicinal plants on growth(mm) and per cent inhibition of *Geotrichum candidum, Pichia membranifaciens and Yarrowia lipolytica*

ANALYTICAL STUDY ON OXIDATIVE STRESS AND SPERM DYSFUNCTION USING MICRODELETION ANALYSIS

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ABSTRACT

Reactive oxygen species (ROS), which are unavoidable byproducts of oxygen metabolism, are harmful compounds with the potential to have positive impacts through controlling important cell signaling cascades. The most frequent cause of infertility is defective sperm function, which up until recently proved challenging to diagnose and treat. By producing peroxides and free radicals that harm all cell constituents, including proteins, lipids, and DNA, disturbances in the normal redox state of cells can have harmful effects. However, occasionally, a little portion of a chromosome is lost during this process, leading to a microdeletion. Due to the possible negative consequences of high levels of reactive oxygen species (ROS) on sperm quantity, motility, quality, and function, including damage to sperm nuclear DNA, oxidative stress (OS) in the reproductive tract is now a genuine phenomenon and cause for concern. The maturation of sperm depends on ROS.

KEYWORDS Oxidative Stress; Sperm; DNA; Male Infertility and Reactive Oxygen Species (Ros),

INTRODUCTION

Reactive oxygen species (ROS), which are unavoidable byproducts of oxygen metabolism, are harmful compounds with the potential to have positive impacts through controlling important cell signalingcascades. ROS control intracellular signaling cascades at normal physiological levels, controlling crucial physiological processes include sperm maturation, hyperactivation, capacitation, acrosome response, and fertilization. However, issues arise when the ROS concentration goes above the physiological limit. Carbohydrates, nucleic acids, proteins, and lipids are just a few of the cellular constituents that are adversely affected by this redox potential imbalance. The most frequent cause of infertility is defective sperm function, which up until recently proved challenging to diagnose and treat. This challenge was exacerbated in part by our limited knowledge of the elements influencing both normal and aberrant sperm function. Failure to conceive after at least 12 months of unprotected sexual activity is referred to as infertility. Although the reason and severity of infertility can vary depending on a person's geographic location and socio-economic position, it is a condition that affects people from all walks of life worldwide. Eight to ten percent of couples in the reproductive age range seek medical attention, usually after two years of unsuccessful attempts to conceive. According to the WHO between 60 and 80 million couples worldwide have infertility each year, of which 15 to 20 million possibly live in India alone.

Defect induced room-temperature ferromagnetism and enhanced photocatalytic activity in Ni-doped ZnO synthesized by electrodeposition*

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$Zn_{0.90}Ni_{0.10}O$ nanoparticles have been synthesized by single-bath two-electrode electrodeposition at constant voltage. X-ray diffraction, UV vis and photoluminescence studies reveal that a single-phase polycrystalline hcp wurtzite crystal structure of ZnO is evolved. The material consists of a large number of defects such as oxygen vacancy (O_V) and zinc interstitial (Zi). The magnetization study reveals that the sample exhibits room-temperature global ferromagnetism and the ferromagnetic ordering seems to be defect induced via bound magnetic polaron mechanism, and double exchange is also expected to have played role. Interesting optoelectronic properties have been found in the synthesized sample and the material seems to be a potential candidate to be used as a UV sensor. Such a transition metal doped ZnO based dilute magnetic semiconducting system exhibiting room-temperature ferromagnetism is likely to be first of its kind in the sense that such materials have not yet been reported to be synthesized by the simple method of electrodeposition to the best of our knowledge on the basis of ample literature review.

Keywords: dilute magnetic semiconductors (DMS), bound magnetic polaron, photoluminescence, ferromagnetism

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1. Introduction

Manipulating physical properties of a material by introducing a dopant in the matrix of a solid semiconducting host to realize a desired functionality has attracted a great deal of attention since the last few decades. Magnetic and optoelectronic properties have been tailored by controlled doping in semiconductors to obtain interesting useful functionalities. Significant researches are being performed to explore the possibilities of inducing ferromagnetism (FM) by controlling spin degree of freedom of electrons in otherwise nonmagnetic semiconductors by doping dilute concentrations of magnetic impurities therein.[1–5] This field of research is categorized as the field of dilute magnetic semiconductors (DMS).[6–19] Dilute Doping ensures that besides the original application specific non-magnetic set of properties of the undoped parent material remain widely unaffected, an FM can also be induced in the material enabling us the best uses of both the properties.[20]

Magnetic properties of Ni-doped ZnO thin films have been studied by Wakano et al.[21] They have reported that the solubility of Ni in ZnO is up to 25% without precipitation. Ferromagnetism was observed at 2 K for the film doped with 3–35% of Ni. Above 30 K, superparamagnetic behavior has been

observed. Schwartz et al.[22] have observed robust ferromagnetism with T_c of about 350 K in Ni-doped ZnO nano crystalline thin films prepared using high quality colloidal DMS quantum dots as solution precursors. Apart from ferromagnetism, a substantial superparamagnetism was also observed in zero-field-cooled and field-cooled magnetization studies.

Radonovic et al.[23] have reported ferromagnetism in Ni-doped ZnO DMS systems synthesized from solution with $T_c >$ 350 K. Colloidal Ni^{2+}: ZnO nano crystals have been reported to be paramagnetic but their aggregation has been found to be exhibiting ferromagnetism, which may be attributed to the increase in domain volumes and the generation of new lattice defects during aggregation.

Room-temperature ferromagnetism (RTFM) with low moment in Ni-doped ZnO nanoparticles (NPs) has been reported by Srinet et al., in which the material synthesis was carried out by a sol-gel route.[24] RTFM has also been reported by Liu et al. in Ni-doped ZnO films synthesized by pulsed laser deposition.[25] RTFM is reported in ZnO films for Ni concentrations of 2%, 4%, and 7% to be intrinsic and for 11% Ni concentration to be extrinsic in nature due to precipitation of Ni, and the origin of FM has been attributed to defects mediated.[26] Satyarthi et al. have also reported the

He⁺ Impact Double Ionization of Noble Gases

Santosh Kumar, Geetanjali, L.K. Jha*

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ABSTRACT

Theoretical calculations of He⁺ impact double ionization of Ne, Ar, Kr and Xe have been performed in the Modified Binary Encounter Approximation. Direct double ionization cross sections have been calculated in the modified binary encounter model. Accurate expression of $\sigma_{\Delta E}$ (cross section for energy transfer ΔE) and Hatree-Fock velocity distributions for the target electrons have been used throughout the calculations. The present results of double ionization cross sections are in excellent agreement with the experimental observations in the case of Ne, Ar and Kr throughout the energy range. The calculated cross sections differs from the experimental results in the low energy regions in case of Xe because the present approximation not exhibits better result in the low energy regions, while the over-estimations of experimental results in the high energy regions shows that more theoretical calculations is required to understand the dynamics of the system.

KEYWORDS Hartree-Fock, Double Ionization, Cross-sections, Vriens

PACS number 34.80d

INTRODUCTION

The understanding of interaction of heavy particles with atoms and ions are atomic processes of fundamental nature. H⁺ impact ionization plays a significant role not only in different fields of Physics, but also in other branches of science. Single ionization is usually the most important among various ionization processes, but multiple ionization (especially double ionization) is strongest in various environments with abundance of energetic electrons. When compared with different multiple ionization processes, double ionization (DI) has the largest impact on ionization state distribution. The theoretical and experimental studies of double ionization have been widely accepted [1-4]. Direct and Indirect processes are responsible for the formation of the charge state of the resulting ion with two removed electrons. Indirect process is determined by ionization and subsequent auto-ionization.

**Propellants,
Explosives,
Pyrotechnics**

1,2,3-Triazoles by Click Chemistry Using Azido Esters as a Precursor

Dimple Kumari*[a] and Shaibal Banerjee*[b]

Dedicated in loving memory of Dr. Haridwar Singh

Abstract: This paper describes synthesis and characterization of new di, tetra, and hexa-1,2,3-triazoles by Click chemistry using synthesized azido esters as one of the precursors. The synthesized triazoles were subjected to detailed characterizations by FTIR, ^{1}H NMR, ^{13}C-NMR, and HRMS. Thermal stability was also performed by using DSC and TGA.

1 Introduction

Azido ester plasticizers have been reported to have better stability and good compatibility with normal energetic binder component used in solid propellants, such as azido binder and nitric acid ester binder [1–8]. These have low vapour pressure, high boiling point, low viscosity, and good processability, and are thermally safe [9]. The most attractive feature of azido compounds is their high heats of formation. These contribute to the positive heat of formation of about 355 kJ/unit [10]. The main combustion product of the azido based plasticizers is nitrogen, which is an extremely stable molecule and shows little tendency to react even at high temperature that exists in gun tubes and rocket engines.

Additionally, nitrogen is completely transparent in infrared and does not interfere with infra-red based missile guidance systems. Azido esters can also be used to reduce the amount of flame in the exhaust gases generated during the operational phase of gun, missile, and rocket propellants [11,12]. Azido compounds have the advantage of delivering extra energy on combustion combined with minimum smoke.

One of the most interesting features of azido group is to undergo cycloaddition reaction with terminal alkynes to form 1,2,3-triazole rings which are a unique class of aromatic five membered nitrogen-containing heterocycles [13]. These are stable high nitrogen containing molecules which contribute high heats of formations, high densities, good thermal stabilities, and low sensitivities. Their low carbon and hydrogen content gives rise to a good oxygen balance. The decomposition of these compounds is predominantly through the generation of dinitrogen which makes them very promising candidates for highly energetic materials for industrial or military applications [14–17]. Triazoles are new binder cure systems in the initial stage of development for high-energy explosive and propellant formulations [18–21].

Click reaction, 1,3-dipolar cycloaddition reaction of azide with terminal alkyne is most widely used for the formation of 1,2,3-triazoles [22]. Click reactions have attracted the attention of researchers because the process requires simple reaction conditions (ideally, the process should be insensitive to oxygen and water), readily available starting materials and reagents, the use of no solvent or a solvent that is benign (such as water) or easily removed, and simple product isolation. It is also noteworthy that click reactions achieve their required characteristics by having a high thermodynamic driving force, usually greater than 84 kJ mol^{-1}. Click reactions proceed rapidly to completion and also tend to be highly selective for a single product [23–26].

In our present work, we have used Cu-catalyzed click reaction to synthesize di, tetra & hexa-1,2,3-triazoles using azido esters as one of the precursors (presented in Scheme 1). All compounds (shown in Figure 1) have been synthesized and characterized by FTIR, ^{1}H NMR, ^{13}C NMR, HRMS, DSC, and TGA.

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A Study of Fish Farming Development in Small Scale Pond in Bihar

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Abstract

The cultivation of fresh water fish in a variety of aquatic bodies, eastern India's state of Bihar provides an ideal sub-tropical environment. Aquaculture has a significant impact on the state's food supply and rural economy. The integration of locally accessible biological resources, a pilot experiment with a group of resource-poor farmers shown that tiny seasonal farmhouse ponds could produce roughly 1 800 kg/ha/yr. Developing small-scale fish farming businesses in rural areas might have a significant impact on the local economy. Bihar's inland small-scale fisheries will benefit from the findings of this research. This pilot project was only the beginning of aquaculture education for farmers in the area, since aquaculture is a relatively new technique in the region. Fishermen in the Darbhanga area of Bihar were surveyed for their views on the challenges they face.

Keywords: - Small-scale fisheries, Sustainability, Fisheries policy, Bihar, Aquaculture.

1. INTRODUCTION

In addition to small-scale coastal and small-scale inland fisheries, small-scale fisheries include (SSIF). Small-scale inland culture fisheries, small-scale inland capture fisheries, and small-scale inland culture-based capture fisheries are all examples of small-scale inland fishing (rarely observed). There has been greater focus on small-scale coastal fishing than small-scale inland fisheries, on the whole. There are a variety of types of inland fisheries, including freshwater, brackish water, estuary (both lotic and lentic) natural and man-made water bodies. Fishing and aquaculture that does not take place in coastal waters are the focus of inland fisheries. Fishing communities are frequently regarded to be small-scale in India, and they are made up of both poor and marginal fishermen. Most of their time is spent working in agriculture or other manual labor to make ends meet, therefore many of them are discovered to be part-time fishermen. This industry, unlike the marine one, is mostly used for internal consumption and does not contribute to the country's exports in any significant way.

There is no homogenization or comprehensive industrialization of Indian fishing. Fishermen and fish farmers come from all walks of life and all economic levels. The majority of them fall under the "small-scale fisheries industry" umbrella. Small-scale fisheries (SSF) are sometimes seen as being trapped in a vicious cycle of poverty because of these social and economic constraints, which makes external policymakers opaque or unintelligible. The eastern Indian state of Bihar is the 13th biggest state by land area. Rivers (Ganga, Gandak, Kosi, Bagmati), canals (3,000 km long), reservoirs (7,000 ha), floodplain wetlands (5,000 ha), oxbow lakes (48,000 ha), chairs (and ponds) are all part of the state's fisheries resources (65,000 ha). Small-scale fisheries development may be achieved through maximizing the use of these resources. Figure 1 depicts the study's location.

In vitro Antioxidant assay of *Ficus microcarpa* Linn. Leaf extract

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Abstract: *Ficus microcarpa* Linn. of Moraceae is a tall tree characterized by rust-colored aerial roots, lanceolate stipules, glabrous petiole, narrow elliptical leaf blade with entire margin and male gall and female flowers are arranged within same fig, the hypanthodium inflorescence.
The present investigation is aimed to evaluate the antioxidant activity of methanol extract of leaves of F. microcarpa in in vitro condition. The results indicated that the extracts possess some anti-oxidant constituents. The methanol extracts of leaves of F. microcarpa contained phenolics in the concentration range of 20.50 mg TAE/g to 36.75 mg TAE/g. The DPPH scavenging activity of the methanol extracts (0.5 -1.5 mg/ml) exhibited concentration-dependent free radical scavenging activity. The extracts (0.5-1.5 mg/ml) and the standard antioxidant n-propyl gallate (0.003-0.03 mg/ml) caused a concentration   dependent reduction of Fe^{3+} to Fe^{2+}. The extracts (0.5 – 1.5 mg/ml) and n-propyl gallate (0.003 - 0.03 mg/ml) caused a concentration-dependent inhibition of linoleic acid autoxidation. The per cent inhibition of lipid peroxidation by methanol extract increased with increase in concentration of methanol extract. At concentration of 1.5 mg/ml concentration the methanol extract caused maximum inhibition of lipid peroxidation (85.9±0.21%).
Key words: Ficus microcarpa, Methanol extract, Antioxidant, DPPH, TAE, n-Propyl gallate

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I.   Introduction

Oxidation process is one of the important routes for production of free radicals and these high energy molecules may abruptly interfere with the normal metabolic activities of the body causing immense damage to the normal tissues [1]. There is a close relationship between diabetes and oxidative stress and it has been observed that the free radicals are produced in the form of ROS (reactive oxygen species) which cause mitochondrial DNA mutation thus resulting in hypoglycemic memory [2]. Free radicals generated during diabetes interfere with vital organ tissues and may lead to cardiovascular complications, diabetic nephropathy, diabetic retinopathy, erectile dysfunction and diabetic neuropathy [3]. Several plants are known for their efficacy to overcome these complications by enhancing the *in vivo* anti oxidant defense and provide protection against oxidative tissue damage [4]. The SOD (Superoxide dismutase), CAT (Catalase), Vitamin E and C are some of the antioxidants which provide protection to the diabetic tissues [5] and their level of defense can be assessed by measuring the MDA concentration which is the end product of lipid peroxidation [6].

Metabolic processes in the body generate highly reactive species, known as free radicals, which injure cellular molecules. Free radicals are highly reactive atomic or molecular species that contain an unpaired electron [7] which contributes to their high reactivity. Free radicals react quickly with the nearest stable molecule to capture the electron they need to gain stability. The „injured" molecule loses its electron, becoming a free radical itself. They can damage vital cellular components like nucleic acids, cell membranes and mitochondria, resulting in subsequent cell death. As all aerobic organisms utilize oxygen during cellular respiration and normal metabolism, the generation of free radicals by biochemical cellular reactions and from the mitochondrial electron transport chain is inevitable [8]. The free radicals include reactive oxygen and nitrogen species such as superoxide ($O_2.^-$), hydroxyl (OH.)-, peroxyl (ROO-), peroxinitrite ($\cdot ONOO^-$) and nitric oxide ($NO\cdot$) radicals. All these are produced through oxidative processes within the mammalian body [9]. They may also be generated through environmental pollutants such as cigarette smoke, automobile exhaust fumes, radiation, air pollution and pesticides [10, 11]. To protect the cells and organ systems of the body against reactive oxygen and nitrogen species, humans have evolved a highly sophisticated and complex antioxidant protection system, that functions interactively and synergistically to neutralize free radicals. These antioxidants are capable of stabilizing or deactivating, free radicals before they attack cells. Antioxidant enzymes such as superoxide dismutase, catalase, and glutathione peroxidase destroy toxic peroxides. In addition to antioxidant enzymes, non-enzymatic molecules play important roles in antioxidant defence systems. These

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EFFECT OF METHANOLIC EXTRACT OF *NYCTANTHES ARBORTRITIS* ON PROMASTIGOTE FORM OF *LEISHMANIA DONOVANI* IN IN-VITRO CONDITION

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ABSTRACT

In the present study, in vitro anti- leishmanial activity of Ethyl acetate, Methanolic, Benzene and Chloroform extracts of Nyctanthes arbortristis have been evaluated. Among those extracts Methanolic extracts of Nyctanthes arbortristis shows effective antileishmanial activity against promastigote form of Leishmania donovani. Nycanthic acid,3-4,secotriterpene acid present in Nyctanthes arbortristis may be responsible for inhibiting the growth of parasite. It was found that LC50=150 µg/ml i.e. 50% inhibition at 100 µg/ml and LC90=200 µg/ml for complete inhibition is required to inhibit the growth of Leishmania donovani. The details have been discussed in the paper.

Key words: Visceral Leishmaniasis, Nyctanthes arbortristis, promastigote, inhibition.

INTRODUCTION

Leishmaniasis is a group of diseases caused by the members of kinetoplast protozoa of the genus *Leishmania* comprising a group of unicellular organisms which are intracellular parasites in macrophage and other phagocytic cells of the reticuloendothelial system. They are transmitted from one primary host to another by the bite of an insect that is female sand fly belonging to the genus *Phlebotomas*. *This disease may be fatal when left untreated.* Leishmaniasis is a complex vector-borne disease, with more than 20 causative species of *Leishmania* protozoa resulting in diverse disease manifestations, ranging from localized skin ulcers (cutaneous leishmaniasis) to systemic disease that can be fatal if untreated (visceral leishmaniasis [VL]) (WHO. 2010). Leishmaniasis has strong links with poverty, due to poor housing conditions and deteriorated environmental sanitation, and with low income, gender imbalance, wars and displacements, immunosuppression, and poor nutrition, among other determinants. (Alvar , et.al, 2006). Cutaneous leishmaniasis (CL) is the most common form of *Leishmania* infections with an estimated incidence range of 0.7 to 1.2 million cases each year (Alvar et al., 2012). Leishmaniasis has been recognized by the scientific community, concerned government and international agencies and placed it among the six most important tropical diseases viz., malaria, filariasis, trypanosomiasis, leprosy and schistosmiasis. Thus, it kept at 2nd after malaria among the human protozoan diseases (Chang et. al, 1985).

The medicinal plants are being used in the treatment of human disease since long time. In Africa up to 80% of the population depend on herbal medicine and in India about 60% of the populations have faith in herbal medicine. Herbal medicines are also used by people of developed countries like 50% in Canadians and 75% in French. In Japan 85% of doctor prescribe advance medicine and side by side herbal medicine (WHR, 2002). A large number of systematic plant extracts are currently underway world-wide for different disease treatment. More than 90% of the world's reported neglected diseases like *Visceral Leishmaniasis* cases are in India, Nepal, Bangladesh, Sudan and Brazil and it may be fatal if not treated. (WHO, 2002). Development of drug resistance to the parasites has been observed since last two decades.

An Anthelmintic assay of fruit extracts of Ficus glomerata

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Abstract

Ficus glomerata L (Family; Moraceae) is known as fig or Gular, a popular plant in India, which is commonly used in traditional medicine, in the treatment of many diseases such as diabetes, gastrointestinal tract, monorrhoid, and urinary incontinence. This plant is mentioned in all the ancient texts of Ayurveda, Siddha, Unani and Homeopathy. Parts of the plant such as bark, roots, leaves, fruits and latex are used as astringent, carminative, anti-helminthic and anti inflammatory. Fruits used for diabetes mellitus, leukoderma, chills, asthma, hepatoprotection, antioxidants antidepressants and menorrhagia. It is mainly used to relieve skin lesions, lymphadenitis, sprains and fibrositis Therefore, this study is an attempt to provide information on phytochemical and pharmacological entities. The research was done to check the Anthelmintic activity on earthworms with different concentration of methanol, ethanol and water as control. The number of earth worms live and death recorded based on the concentration and time.

Keywords: diabetes mellitus; phytochemical; asthma; Homeopathy

Introduction

The genus *Ficus* is an important group of trees there are some promising chemical components Medicinal effect. It is a Hindu sacred tree, Buddhist. Four species of this genus are a group "Narpa Malam", that is; F.*racemosa, F microcarpa, F. benghalensis* and F. *Religius (Athi, Ithi, Peral, Arayal* all one [1]. Medicinal plants are used from time to time in almost all cultures as a source of medicine. The widespread use of herbal remedies and health preparations as described in ancient texts such as the Vedas and the Bible, and derivatives of traditional herbs and plants that are often used, has been accompanied by the emergence of natural products with medicinal properties [2]. Traditional medicines and plants are also widely used mainly in developing countries with a legal framework to protect good

Economics of Healthcare and COVID-19 in India

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Abstract: The COVID-19 pandemic is straining health systems worldwide. The rapidly increasing demand on health facilities and health care workers threatens to leave some health systems overstretched and unable to operate effectively. COVID-19 is revealing how fragile many of the world's health systems and services are, forcing countries to make difficult choices on how to best meet the needs of their people. Thus, as we face this challenge and focus on sailing through with minimum damage to human lives, there are opportunities to be unravelled for improvement in the healthcare scenario in the country. COVID-19 pandemic has forced us to think about the sound healthcare in India most urgently. If the virus is unmanageable in developed countries with far superior healthcare, India is facing a tough time to meet the current challenge in the form of COVID-19.Indian government is trying to mitigate the challenges arising out of costly and more privatized healthcare system. It needs to ramp up the flow of essential supplies and formulate an exit strategy that includes a financial stimulus package to get the economy and its people going again. The best defence against any outbreak is a strong health system. Here is a chance to redesign the system keeping both affordability and quality in mind.

Keywords: Health, Healthcare, Model of Healthcare, Public Health Expenditure, Out of Pocket Expenditure, COVID-19.

INTRODUCTION

More costly private sector of India dominates Healthcare System by delivering 75% of health services and caters to both rural and urban areas. India spends less of its GDP in comparison to other countries on Public Healthcare. Due to different concern about cost, equity and quality of healthcare people started criticizing private sector because of its less regulated nature. Equitable access to healthcare is always denied because of socio economic disparities created by caste, class and gender as well as strong rural and urban divide. We can observe that more robust private healthcare system is more prepared to respond to COVID-19 in cities and urban areas across India in comparison to lower-funded public health facilities in rural areas — home to more than **60 percent** of the Indian population. **Many will not be able to afford private treatment and testing, while public facilities and some private facilities as well will likely be less prepared to acquire necessary equipment in the short run, which is the main issue for the spread of COVID-19.**

The India's healthcare system with poor and inadequate infrastructure and manpower cannot extend quality services to its citizens. These inequalities are compounded in response to COVID-19 when considering broader reports throughout India's medical sector on lacking access to basic medical equipment and facilities for those receiving and providing treatment. **Italy is known to have the world's second-best healthcare system while Indian healthcare system is not included even in the top 100 list.** India spends about 3.5% of its GDP on healthcare and Italy spends about 9% of its GDP on health services.

COVID-19 pandemic has forced us to think about the sound healthcare in India most urgently. If the virus is unmanageable in developed countries with far superior healthcare, India is facing a tough time to meet the current challenge

PROJECTED GROWTH PATH OF INDIAN ECONOMY AFTER LOCKDOWN

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Abstract: This pandemic is being compared with global depression of 1930 and global financial crisis of 2008.COVID-19 is leading to sudden economic slowdown with multiple shocks which is creating an uncertain global macro -economic scenario. Many companies and economists are trying to project the probable shape of growth path of India. Months of Social Distancing is disrupting capital formation, Labour participation and productivity as well. The lock-down is likely to have a sizeable impact on the economy, most significantly on consumption, which is the biggest component. As far as my view is concerned I think U-shaped growth path can be projected if the COVID is contained. This is pandemic not financial crisis. Here financial and real economy risks are interlinked, because financial crisis leads to credit squeeze which affects the real economy. The U shaped curve in terms of GDP growth rate in case of India shows that economy will revive but GDP will remain below the previous trend. Low growth potential of Indian economy can be shown with the help of U-shaped. The spread of virus has become imperative, with no foreseeable development of a vaccine. World economy is expected to contract by 3% in 2020 and all economies will be affected. Demand shocks recovery can be managed but demand and supply shocks cause structural change in the economy, which takes time to respond. Even U path recovery requires significant reforms. A looming economic crisis triggered by pandemic is a challenge for India to enact sweeping reforms to fix ailing sectors and attract more FDI. In fact we must consider the mechanism which is causing damage to supply and demand dimensions equally. What is the policy response to prevent such damage is the deciding factor shaping the projected growth path of India. We will have to bring balance between *Life* and *Livelihood. Macro economic impact* of COVID-19 is causing slow comeback that's is the reason it is indicating a path which is elongated U due to large and perpetual loss of present value of future output.

Key words: GDP, U-shaped, Covid-19, Lockdown, Demand & Supply Disruptions.

INTRODUCTION

This pandemic is being compared with global depression of 1930 and global financial crisis of 2008. COVID-19 is leading to sudden economic slowdown with multiple shocks which is creating an uncertain global macro -economic scenario. Many companies and economists are trying to project the probable shape of growth path of India. Months of Social Distancing is disrupting capital formation, Labour participation and productivity as well. The lock-down is likely to have a sizeable impact on the economy, most significantly on consumption, which is the biggest component.

As far as my view is concerned I think U-shaped growth path can be projected if the COVID is contained. This is pandemic not financial crisis. Here financial and real economy risks are interlinked, because financial crisis leads to credit squeeze which affects the real economy. The U shaped curve in terms of GDP growth rate in case of India shows that economy will revive but GDP will remain below the previous trend. Low growth potential of Indian economy can be shown with the help of U-shaped. The spread of virus has become imperative, with no foreseeable development of a vaccine. World economy is expected to contract by 3% in 2020 and all economies will be affected. Demand

Rhizosphere and Rhizoplane bacteria of Okra (*Abelmuscus esculentus Linn.Moench*) and Cauliflower (*Brassica oleracea Linn. Var. Botrytis*) and their characterization

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Abstract: *The present study is aimed to study the diversity of bacterial flora in the rhizosphere and rhizoplane of Abelmuscus esculentus (Okra) and Brassica oleracea var. Botrytis (Cauliflower) and their morphological and biochemical characterization.*

Rhizosphere is the narrow region of soil that is directly influenced by root secretions and associated soil microorganisms. The microbe- plant interaction in the rhizosphere can be beneficial, neutral, variable, or deleterious for plant growth. Rhizobacteria that exert beneficial effects on plant development are termed plant growth promoting rhizobacteria (PGPR).

The rhizobacteria from rhizosphere and rhizoplane were isolated by serial dilution techniques and plating onto Nutrient agar medium. The isolates were subjected to various biochemical test.

The results revealed that the population density of Rhizosphere (RS) and Rhizoplane (RP) bacteria in A. esculentus was maximum during August being 3.85 X 10^8CFU/g and 3.975X10^8 CFU/g respectively which declined to 1.95 X 10^8CFU/g and 2.35 X1 0^8CFU/g respectively in December. Similarly, the population density of rhizosphere and rhizoplane bacteria in B. oleracea var. Botrytis was maximum during August being 2.95 X 10^8 and 3.65 X 10^8 CFU/g which declined to 1.95 X 10^8 and 2.15 X 10^8 respectively in December. Twenty bacterial bacterial flora viz. Bacillus. Subtilis, B. megaterium, B. pumilus, B. polymyxa, B. mycoides, Lactobacillus acidophilus, L. plantarum, L. brevis, Micrococcus luteus, Azotobacter beijerinckii, A. chroococcum, Pseudomonas putida, P fluorescence,P. aeruginosa, Streptococcus salivaris, Staphylococcus saprophyticus, Klebsiella sp, Corynebacterium sp, Arthrobacter sp, Citrobacter sp, Rhodococcus erythropolis and Erwinia amylovora were isolated in the rhizosphere and rhizoplane of these vegetable crops.

The isolates viz. Bacillus subtilis, B. megaterium, B. pumilus, B. polymyxa, Lactobacillus acidophilus, L. plantarum, Pseudomonas putida and P. aeruginosa showed catalase negative reaction whereas Bacillus mycoides, Azotobacter chroococcum, A. beijerinckii, Micrococcus luteus, Streptococcus salivaris, Staphylococcus saprophyticus, Klebsiella sp. Corynebacterium sp. Arthrobacter sp. Citrobacter sp. Rhodococcus erythropolis and Erwinia amylovora showed catalase positive reaction. Bacillus mycoides, Micrococcus luteus Pseudomonas fluorescence, P. putida Corynebacterium sp. and Citrobacter sp. showed anaerobic (Hugh- Leifson's O- F) negative result. Other species were non-reactive with Hugh- Leifson's O- F reaction. Micrococcus luteus, Klebsiella sp. and Rhodococcus erythropolis were hemolytic whereas Lactobacillus acidophillus, Azotobacter chroococcum, Pseudomonas fluorescence, P. putida, P. aeruginosa, Corynebacteriumsp. and Citrobacter sp. were non hemolytic. Only Micrococcus luteus and Klebsiella sp. showed Voges Preskaur's negative reaction and others were non-reactive. All rhizobacteria showed non-reactive to methyl red test. All isolates exhibited siderophore production and maximum Phosphate-solubilizing activity and, therefore, can be exploited as bioinoculants/ biofertilizers for improvement of crops.

Key Words: *Rhizosphere, Rhizoplane, Siderophore, Population density, Phosphate solubilization, Abelmuscus esculentus, Brassica oleracea var. Botrytis*

I. Introduction

Rhizosphere is the narrow region of soil that is directly influenced by root secretions and is considered as a "hot spot" for microbial colonization and activity (Bolton *et al.*, 1993) [1]. Soil which is not part of the rhizosphere is known as bulk soil. The rhizosphere contains many bacteria that feed on sloughed-off plant cells,

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The Pharma Innovation

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Residual analysis of rice grain after treatment of paddy field with cypermethrin for the management of major insect pest of paddy in Patna District

Surendra Singh and Bindu Kumari Singh

Abstract

Rice (*Oryza sativa* L.) is a staple food for people of India and most parts of the world. Major insect pests reduce yield and quality of rice grain. Cypermethrin is a pesticide which was used in paddy field for the management of major insect pests of paddy plant. It was hypothetically assume that cypermethrin transmitted into paddy plant during the course of pesticide spray. Contamination of paddy harmful for humans beings and other animals because cypermethrin is a carcinogen. For this an experiment (residual analysis) was done to find out quantity of pesticide in rice grain. The aim of research work is find out percentage contamination of rice grain with pesticide which was compared with the other nutrients of rice grain. 5 gram of treated rice crushed as sample, after this passing through centrifugation at 5000 rpm which was further followed by gas chromatography (GC-MS). The Result of this work, there was no contamination of rice grain to cypermethrin. So, it is safe for human consumption and other animals.

Keywords: Rice, major insect pests, residual analysis, cypermethrin, chromatography, spray

Introduction

Rice (*Oryza sativa* L.) is a most important food for human being and other some animals. It stands first rank in India and second in world in terms of food. Naturally production of paddy is decreases by different kinds of climatic factors. Among them, insect pests is an important factor that was incident on paddy field at the different stages of paddy growth and development and destroy them. Results, reduction of productivity and yield of rice grain. This crop being grown in large area during kharif season in Indo-Gangetic plan region and its productivity satisfy the need of 1.25 billion populations in India. The crop play vital role in our national food security and its means of livelihood of millions of rural households. In India rice is grown of an area 43.76 million hectare with production of 104.5 M tones (2011-12). Rice cultivated in all 38 district of Bihar, out 38 district only one district come under high productivity level, remaining others come under medium and low productivity level. Bihar state has a total geographical area of about 93.60 lakh hectares on which people it houses a population of 82.9 million exist. Results generating a human population density of 880 persons per sq.km (Census 2001). About 90 percent of the total population of State living in rural areas, agriculture play a vital role in food security and primary feeder of rural economy, continues to operate not only on margins of land of State but also on the margins of human enterprise, productivity of rice being among the lowest in Bihar as compared other State. Without increasing returns to these margins of productivity, not much can be done realistically to develop the agricultural sector in Bihar. Thus, agriculture of Bihar State continues to define both the potentialities and constraints to development in economy of Bihar. Bihar occupies a prominent place in rice production map in India. It was estimated that Over 1400 insect pest species attack on standing and stored grain of rice in the world (Grist and Lever, 1969), while (kyode and pasalu 1986) reported that over 100 species of insect pests were attack at various stages of its vegetative growth . According to concept of Pathak and dhaliwal (1981) these pest account for loss of 24 percent while Cramer (1967) reported that it was 34 percent. However, about 25 insect pests have major significance in different rice growing regions of India. Among, them yellow stem borer (*Scirpophaga incertulas* (walker), Brown plant hopper (*Nilaparvata lugens)*, Green leaf hopper (*Nephotettix virescens*),White blacked plant hopper (*Sogetella furcifera*) Gall midge(*Orseolia oryza*e), leaf folder (cnaphalocrocis medinaliscuenee), Case worm (*Propayax staganalis* (Guenee), Gundhi bug (*Leptocorisa acuta* (thunb.) and Rice hispa (*Dicladispa armegera*) are found to cause substantial damage of crop

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Yield loss assessment due to infestation of *Scirpophaga incertulas* of BPT 5204 rice variety in Patna district of Bihar, India

Surendra Singh and Bindu Kumari Singh

Abstract
The present studies were done in the BPT-5204 paddy field of Phulwarisharif Block of Patna District of Bihar. A fresh nursery field prepare for the sowing paddy seed for germination of paddy seedling. There was eradicated all types of grass like host plant for insect pest near the experimental site which was used for nursery germination. In this research work, it was investigated that nursery of paddy field infected by eggs of *Scirpophaga incertulas*. It was find out that eggs were laid down on the blade side of nursery leaves. These eggs were carrying on in the paddy field during course of nursery plantation. It was find out that infected nursery show low strength during plantation in paddy field. Yield loss happen due to infestation in nursery field as well as in planted paddy field. A main symptom of this insect pest is dead heart of main shoot at vegetative growth and white ear or chaffy panicles at the ear head stage and reproductive stage of paddy.

Keywords: Yield, nursery, *Scirpophaga incertulas*, infestation, rice, plantation, symptoms

1. Introduction
Rice (*Oryza sativa* L.) is a second most very important food crop of India and most part of the world. Rice is use for making various types of food stuffs like Pulaw, Biryani, Rishofo and different kind of Biryani. Softness of rice grain depends upon the protein "Oryzinin". Insect pest of rice crop play negative role in the total growth and development of paddy plants. Yellow Stem Borer (*Scirpophaga incertulas*) is major types of insect pest of which produce higher yield loss during high infestation. This pest belongs to Order Lepidoptera and family *Pyralidae*. This pest common in all the Asian countries. In India it is widespread in all paddy growing areas like Bihar, West Bengal, Orissa, Uttar Pradesh, Punjab, and Andhra Pradesh. The adults have a wing expanse of 25-45 mm and yellowish white with orange yellow front wings. The female moths have a prominent tuft of brownish yellow in colour silken hair at the tip of their abdomen. The female moth bigger than the male moth and has a centrally situated black spot on each fore- wings. The caterpillar when full-grown, grown measure about 20 mm and are dirty white or greenish yellow, having brown head and pronotum. Incidence of yellow stem borer on paddy was reported throughout the country with varied level of severity and yield losses ranged from 3 to 65 percent (Ghose et al 1960) [5]. The extent of 5 to 25 percent (Edwin Binjhan, Copland 1924). Rai *et al.* (2000) [15] reported yield losses of 90 per cent in the scented cultivars, Pusa Basmati and Sugandha and 70 and 60 per cent in Kanaka and Mahsoori, respectively under natural condition in Bihar, during *kharif*, 1998. The rice stem borer, *Scirpophaga incertulas* (Walker) is one of the most important pests of rice. In India, the yield losses ranged from 3 to 65 per cent (Ghose *et al.*, 1960) [5]. Nigam and Verma (1985) recorded the loss caused by rice ear head bug in Uttar Pradesh. Higher incidence (15.0-16.0 %) of yellow stem borer (*Scirpophaga incertulas* Walker) was observed during 1995 and 1996 at Sirsi and Mundgod, respectively. Gall midge (*Orseolia oryzae*) (Wood Mason) incidence level ranged from 1.9 to 7 %, in the coastal taluk's of the district. Rice stem borer, *Scirpophaga incertulas* (Walker) is one of the most serious pests of rice that occur in all the rice growing tracts of the Asian mainland and Japan (Narayana, 1953).

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Right to the City: Issues and Concerns

The real challenge for the political system is how to spur economic growth and how to restore city to the people.

By Dr Simi Mehta & Vidya Yadav   On Sep 13, 2020

Cities by virtue of concentration of people, firms and economic activities produce agglomeration economies conducive for production and economic efficiency. This is the reason why investment accrues to cities compared to rural areas. Returns are not only higher in cities, but also increase with increasing size of the city. The agglomeration economies not only increase production efficiency, but also keep the production cost low. Matching, sharing and learning are other advantages in cities where demand meets supply and people and firms may share information and learn from each other. Availability of skilled manpower, transportation, trade opportunities, banking and credit facilities are easily accessible in cities. In a market-driven economy, cities seem to be indispensable for economic growth. As cities are spatial organisations, one can also look at them from the perspectives of density, distance and division. Density is associated with larger markets, distance relates to the transportation costs and division stands for barriers that inhibit production, consumption and economic growth. In all the three spheres, cities have distinct advantages and potential. Therefore, cities, economic growth, wealth and capital accumulation exist cheek by jowl.
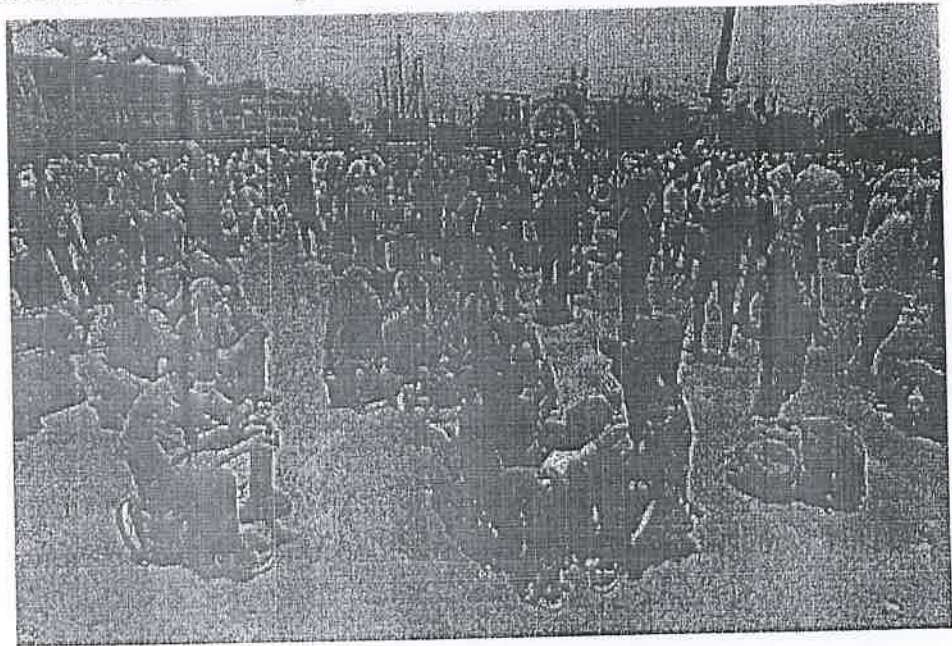
Recently, the Government has come up with a massive Micro, Small and Medium Enterprises (MSME) programme to boost economic activities. In order to have MSME start working in rural areas, we must have adequate and good rural infrastructure. So the integration of the Rurban Mission with development programmes like PURA, MGNREGA and MSME requires a good planning and strategy for planned urbanisation of rural areas. This integrated approach of development will help to restore migrants not only as formal citizens of the country, but also as substantive citizens, whose political, social and economic rights are protected. Hence, the Right to the City is a theoretical framework which enables us to examine development through the lens of space and place, which is epitomised in the form of urbanisation. It requires a collective action, mobilisation of people and a functional urban democracy as a prelude to inclusive, equitable and sustainable development.

*(**Note:** This is the second part of the excerpts of the Special Lecture delivered by Prof R.B. Bhagat at the Centre for Work and Welfare (CWW), Impact and Policy Research Institute (IMPRI), New Delhi).*

(City development) (Economic Growth) (Henry Lefebvre) (migration) (MSME) (Right to the City) (Urbanisation)

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Fuzzy Subgroup and Anti Fuzzy Subgroup

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Abstract
In this paper,using A.Rosenfeld [1] definition of fuzzy group,we have tried to establish some independent proof of fuzzy group homomorphism and anti fuzzy group homomorphism.
Keywords: Fuzzy subgroup,Fuzzy point,anti fuzzy subgroup.

I. Introduction

The concept of fuzzy sets was introduced by L.A.Zadeh in 1965.Study of algebraic structure was first introduced by A.Rosenfeld [1].After that a lot of researches have done in this direction.We have tried to establish some independent proof about the properties of fuzzy group homomorphism and anti fuzzy group homomorphism [2].

II. Preliminaries

In this section, we recall and study some concepts associated with fuzzy sets and fuzzy group,which we need in the subsequent sections.

2.1 Fuzzy Set

Over the past three decades, a number of definitions of a fuzzy set and fuzzy group have appeared in the literature (cf., e.g., [15, 1, 3, 7, 1']). In [15], it has been shown that some of these are equivalent. We begin with the following basic concepts of fuzzy set,fuzzy point and fuzzy group.

Definition 2.1 [15] *Fuzzy subset A fuzzy subset A,of X is a function $A : X \to [0,1]$.The set of all fuzzy subsets of X is called fuzzy power set of X and is denoted by F P(X).*

Definition 2.2 [15] *Support of fuzzy set. Let $A \in F P(X)$.Then the set $\{A(x) : x \in X\}$ is called the image of A and is denoted by A(X). The set $\{x \in X : A(x) > 0\}$ is called the support of A and is denoted by A'.*

Definition 2.3 [15] *Let $A \in F P(X)$ such that $A(x) \le B(x)$, forall $x \in X$. Then A is said to be contained in B we say that $A \subseteq B$.*

Definition 2.4 [15] *Let A, B, $\in F P(X)$. We denote $A \cup B$ and $A \cap B$ belongs to $F P(X)$, $\forall x \in X$,such that*

$$(A \cup B)(x) = A(x) \vee B(x) = max\{A(x), B(x)\}$$
$$(A \cap B)(x) = A(x) \wedge B(x) = min\{A(x), B(x)\}$$

For any collection of $\{A_i\}_{i \in I}$ of fuzzy subsets of X where I is an index set,the least upper bond $\cup_i A_i$ and greatest lower bond $\cap_i A_i$, are given by $\forall x \in X$

$$(\cup_i A_i)(x) = \vee_i A_i(x)$$
$$(\cap_i A_i)(x) = \wedge_i A_i (x)$$

2.2 Fuzzy subgroup

In this section, we discuss the concept of a fuzzy subgroup in details (c.f.,[1]).

Definition 2.5 *Fuzzy subgroup (or F(G)) Let G be any group, we de fine the binary operation o' and unary operation $^{-1}$ on F P(G) as follows, $\forall A, B \in F P(G)$ and $\forall x \in G$*

$(AoB)(x) = \vee\{A(y) \wedge B(z) : yz = x, \forall y, z \in G\}$
$A^{-1}(x) = A(x^{-1})$

Proposition 2.1[3] *Let A, B $\in F(G)$,and $A_i \in F P(G)$ for each $i \in I$,the following hold*

- $(AoB)(x) = \vee_{y \in G}\{A(y) \wedge B(y^{-1}x)\} = \vee_{y \in G}\{A(x.y^{-1}) \wedge B(y)\}$
- $(a_y o A)(x) = A(y^{-1}x)$, $\forall x, y \in G$, $(A o a_y) = A(xy^{-1}.)$
- $(A^{-1})^{-1} = A$
- $A \subseteq A^{-1} \Leftrightarrow A^{-1} \subseteq A \Leftrightarrow A = A^{-1}$
- $A \subseteq B \Leftrightarrow A^{-1} \subseteq B^{-1}$

Comparative Genomic Analysis of Rapidly Evolving SARS-CoV-2 Reveals Mosaic Pattern of Phylogeographical Distribution

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ABSTRACT The outbreak of coronavirus disease 2019 (COVID-19) that started in Wuhan, China, in December 2019 has spread worldwide, emerging as a global pandemic. The severe respiratory pneumonia caused by novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has so far claimed more than 0.38 million lives and has impacted human lives worldwide. However, as the novel SARS-CoV-2 virus displays high transmission rates, the underlying genomic severity is required to be fully understood. We studied the complete genomes of 95 SARS-CoV-2 strains from different geographical regions worldwide to uncover the pattern of the spread of the virus. We show that there is no direct transmission pattern of the virus among neighboring countries, suggesting that its spread is a result of travel of infected humans to different countries. We revealed unique single nucleotide polymorphisms (SNPs) in nonstructural protein 13 (nsp13), nsp14, nsp15, and nsp16 (ORF1b polyproteins) and in the S-protein within 10 viral isolates from the United States. These viral proteins are involved in RNA replication and binding with the human receptors, indicating that the viral variants that are circulating in the population of the United States are different from those circulating in the populations of other countries. In addition, we found an amino acid addition in nsp16 (mRNA cap-1 methyltransferase) of a U.S. isolate (GenBank accession no. MT188341.1) leading to a shift in the amino acid frame from position 2540 onward. Through comparative structural analysis of the wild-type and mutant proteins, we showed that this addition of a phenylalanine residue renders the protein in the mutant less stable, which might affect mRNA cap-1 methyltransferase function. We further analyzed the SARS-CoV-2–human interactome, which revealed that the interferon signaling pathway is targeted by orf1ab during infection and that it also interacts with NF-κB-repressing factor (NKRF), which is a potential regulator of interleukin-8 (IL-8). We propose that targeting this interaction may subsequently improve the health condition of COVID-19 patients. Our analysis also emphasized that SARS-CoV-2 manipulates spliceosome machinery during infection; hence, targeting splicing might affect viral replication. In conclusion, the replicative machinery of SARS-CoV-2 is targeting interferon and the notch signaling pathway along with spliceosome machinery to evade host challenges.

IMPORTANCE The COVID-19 pandemic continues to storm the world, with over 6.5 million cases worldwide. The severity of the disease varies with the territories and is

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Colchicine Induced Polyploidy in Cassia tora (L.) Rox.

Bihari Singh, Rajesh Kumar, Arvind Kumar Nag, Anil Kumar Singh, Prashant Chandra, Vishal Patel

Abstract

An Induction of artificial polyploidy by 0.4% aqueous solution of Colchicine has been successfully made in *Cassia tora*. The data obtained from the experimentally treated materials have been further analysed for all the implications to understand the effect of Colchicine on the Chromosome structure, and function. The tetraploids showed n = 26 bivalents and different combinations of univalent and multivalent, the percentage of quadrivalents being the highest Chromosome irregularities in PMCs of polyploids has been detected more frequently than normal diploid. The polyploids thus, raised did show autopolyploidy in nature. The chemical

Keywords

Acanthaceae Allelopathy Andhra Pradesh Antimicrobial activity Antioxidants Diversity combinations of univalent and multivalent, the percentage of quadrivalents being the highest Chromosome irregularities Diversity index Freshwater India Kerala Maharashtra

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environment within the cell can change the meiotic behaviour of a species. The tetraploid plants showed a slower rate of growth, delayed flowering, thicker, darker and wider leaflet, and decreased stomatal frequency per unit area. This also showed larger stomata, increase in height, increase in number of lateral branching, bigger fruit, seed size and increase in the number of pollen grains with absence of exine. The pollen sterility increases as compared to diploid. It is thus clear that experimental induction by Chemical means (Colchicine) holds a clue for understanding the adaptability of the species in different environmental conditions.

Keywords

Colchicine treatment; Cassia tora; polyploidy

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Scenario of bottom fauna of Gaya pond, Bihar, India

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Abstract: This research paper represents the concept of bottom fauna of Gaya pond Bihar. Bottom fauna were collected with the help of mushroom shaped scooping bottom samples. The bottom contents will be identified in living condition and quantitative estimation has been done by using of sample of constant volume of bottom. The total volume of organisms has been determined by standard displacement method. Zoo plankton, macro invertebrate and fishes were studied. It is seen that zooplankton community showed its peak during February and December. There was variation in the dominance of Rotifers and Copepods. Its population declined during May and represented by copepods during January and represented by various species. Altogether many species of zooplanktons have been reported from pond out of which Protozoa, Rotifer, Copepoda, Ostracoda are important. However, the information gathered from two years studies may provide insight into the ways and means of conservation and propagation of certain commercially important fishes and other organisms from pond to augment regular supply of raw materials for food and other commercial purposes so that cottage industries may run properly contributing sustainable economic wealth and giving employment to thousands of people Gaya region. Besides this, exploitation of pond resources through scientific methods on sustainable basis may provide an idea about the biology of pond ecosystem.

Key words: Freshwater organisms, bottom fauna, Arthropoda, Mollusca, Protozoa, Rotifera, Gaya.

INTRODUCTION

Bottom fauna is a group of mutually adjusted living organisms in habiting in a particular area. Odum (1963)[1] has described it is an assemblage of population living in a prescribed area, habitat and it is an organized unit to the extent that it has characteristics additional to it individual and population components and functions as unit through coupled metabolic transformation. Thus, benthic community has specific trophic structure and energy flow

pattern with functional and compositional unity. Benthic organisms provided valuable indication of past and present water quality conditions because of their long life history and central position in the food chain Cairns (1997) claims that diversity is the numerical expression that can be used to make comparison between communities and it is the best single means, for assessing biological integrity in fresh water streams. The communities of organisms living on the bottom of a water body form an important link in the food web of fishes apart from their biological role in the mud water exchange of nutrients. A number of studies have

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Development of Tourism in Bihar: A New Approach

Anuradha Sahay and Rashmi Ranjana

Abstract

Tourism today has emerged as the fastest growing industry and the world's largest ...ized sector. This highly competitive industry requires good and innovative marketing to ...re ...ence of a place and makes people aware of the local tourism that is offered to them. ...sm around the world continues to flourish for the sake of business or pleasure. Tourism ...oys largest number of people. The World Travel and Tourism Council calculated that tourism ...ate ...RS 16.91 lakh crore or 9.2% of India's GDP in 2018 and supported 42.673 million jobs, ...rcent of its total employment. As far as Bihar is concerned approximately 6 million tourists visit ...state every year. Global recognition is evident from the flow of people every year. Mass tourism ...becomes a trend for quick economic benefits ignoring the exploration of resources, natural ...ronment. Diverse approaches have emerged to attain sustainability. Today there is wide scope ...velopment of different aspects of tourism as an alternative tourism; for e.g. Medical tourism, ...a tourism, religious tourism, rural tourism, thermal tourism, bird watching, eco- tourism and ...... If tourism is to be a sustainable product, then it needs to turn part-time jobs into ...ers ... pricing itself out of the market. This paper has been written with the objective to ...e ... aspects of tourism in Bihar. Second objective is to assess the problems associated with ...development of tourism industry in modern times and infer a plan or design for development of ...sm ... having sustainability and social responsibility for preserving the environment.

... words: sustainability, thermal tourism, eco-tourism, sport tourism and rural tourism.

... is the temporary short-term movement of people to places away from their home to ...d the ...pursuit of recreation, relaxation and pleasure without any employment for less than ...con... ... year. (https://www.britannica.com/topic/tourism)Today, journeys for health, leisure ... ...become very common and popular among the middle classes due to their increased ... ...need to acquire the array of knowledge, experience and polish so that they can mix ... ... It also enhances one's education by social exchange with the local inhabitants ... ...ronment which encourages governments to preserve historical sites and monuments ... ...digenous groups to preserve their heritage. Modern tourism is an increasingly ... ...commercially organized, people oriented, seasonal, dynamic and business-

...ofesser and, Head Department of Geography, Patna University, Patna and Dr Rashmi Ranjana, Dept. of Geography, College of Commerce, Arts and Science, Patna (Patliputra University)
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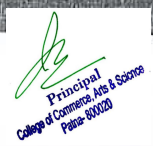
Qualitative and Quantitative analysis of Phytotochemicals in leaf extracts of *Centella asiatica* L.

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Abstract: *Centella asiatica* is one of the chief medicinal herbs used for treating skin problems, wound, nervous disorders etc. and is found throughout tropical and sub tropical regions of India up to an altitude of 600m. *Centella asiatica* contains asiatic acid, asiaticoside and madecassoside as major phytochemical constituents that are responsible for pharmacological value apart from being rich in flavonoids and terpenoids.

The present study was carried out on six solvent extracts of *Centella asiatica* to investigate the presence of medicinally important phytochemicals in their leaves. All the six extracts revealed the presence of various phytochemicals such as tannins, phlobatannins, saponins, terpinoids, diterpinoids, emodins, flavonoids, cardiac glycosides, anthraquinones, carotenoids, reducing sugars, alkaloids, anthocyanin, coumarins, steroids, phytosterols, phenol, fatty acids, proteins and amino acids. The leaves of *Centella asiatica* contained a significant amount of alkaloid, flavonoids, phenolic, saponins and tannin content. The amount of flavonoids was maximum (45.75mg/gm) followed by phenols (25.85mg/gm), alkaloids (17.75mg/gm), saponins (16.75mg/gm) and tannins (14.45mg/gm). The concentration of total alkaloids was maximum in distilled water extract (35.85mg/gm), followed by methanol extract (17.65mg/gm), ethanol extract (15.75mg/gm), petroleum ether extract (14.75mg/gm), acetone extract (12.45mg/gm) and benzene extract (11.75mg/gm). The concentration of total flavonoids was maximum in ethanol and methanol extracts (42.45mg/gm and 42.65mg/gm respectively), followed by distilled water extract (27.87mg/gm), benzene extract (13.35mg/gm), petroleum ether extract (14.65mg/gm) and acetone extract (13.55mg/gm). The amount of total phenol was maximum in ethanol and methanol extracts (15.35 and 15.45mg/gm respectively), followed by distilled water extract (12.33mg/gm), benzene and petroleum ether extracts (9.85 and 11.67mg/gm respectively) and acetone extracts (10.65mg/gm). Saponin concentration was maximum in ethanol (16.75mg/gm), benzene extract (15.25mg/gm) and distilled water extract (15.35mg/gm). Acetone and petroleum ether extracts contained relatively least amount of saponins (10.55 and 11.45mg/gm respectively). The total tannin concentration was maximum in ethanol extract (12.25mg/gm), followed by petroleum ether, acetone and benzene extracts (11.55, 10.35 and 10.35 mg/gm respectively. Methanol and distilled water extracts contained relatively low amount of total tannins, 9.25 mg/gm and 9.45 mg/gm respectively.

The data obtained in the present study is expected to serve as valuable tool for identification, authentication and detection of adulterants, standardization and quality control of the drugs. Hence it can be concluded that the results of the present study have given qualitative and quantitative information about the purity standards of the leaves of *Centella asiatica*.

Key words: *Centella asiatica*, Phytochemicals, Acetone, Petroleum ether, Ethanol, Methanol, Benzene, Distilled water

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I. Introduction

Centella asiatica L. (Syn Hydrocotyle asiatica Linn.) belonging to family Umbelliferae/Apiaceae of dicotyledonous angiosperm is a medicinal herb in India, China, Srilanka, Nepal and Madagascar. *Centella asiatica* is one of the chief herbs for treating skin problems, to heal wounds, for revitalizing the nerves and brain cells, and hence it is known as a "Brain food" in India. This herb is also known as Indian Pennywort, Gotu Kola, Asiatic pennywort, Spade leaf and Brahmi.

In Southeast Asia, it is traditionally used for the treatment of a wide variety of disorders such as skin diseases, rheumatism, inflammation, syphilis, mental illness, epilepsy, hysteria, dehydration, and diarrhea (Shanghai, 1977; Yu *et al.*, 2006) [1, 2]. In Indian systems this plant is used as medicine for enhancing memory

Biochemical profile of *Vinca rosea* Linn (*Catharanthus roseus* G. Don)

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Abstract: *Vinca rosea* Linn. (Syn *Catharanthus roseus* G. Don) is commonly known as periwinkle, Nayantara and Sadavahar plant. It is native to the Indian Ocean Island of Madagascar. It is an evergreen herbaceous plant growing to about 1 miter in height. *Catharanthus roseus* is an important medicinal which synthesizes two terpene indole alkaloids viz. vinblastine and vincristine. These alkaloids are used to treat cancer. The phytochemicals of *Catharanthus roseus* has been also used to treat diabetes, microbial infection, high blood pressure, hyperlipidemia, wound healing, CNS disorders etc.

Phytochemical analysis conducted on the leaves and flowers extracts of *Catharanthus roseus* revealed the presence of constituents which are known to exhibit medicinal as well as physiological activities. The phytochemical screening of the leaves and flowers of *Catharanthus roseus* was done with chloroform, petroleum ether, ethanol, methanol, hexane and distilled water. Among the six solvent extracts studied the carbohydrate was present in aqueous extract of flowers as evidenced by positive Fehling's test. All the six solvent extracts of flowers showed positive Benedict's test for carbohydrate. Only the chloroform and hexane extracts of flowers showed positive Iodine test for carbohydrate. The phenols and tannins were detected only in chloroform, ethanol, methanol and hexane extracts but not in petroleum ether and aqueous extracts. All the six solvent extracts of flowers showed negative alkaline reagent test which indicated the absence of flavonoids. Saponin was detected in four solvent extracts of flowers viz. ethanol, methanol, hexane and distilled water as evidenced by positive froth foam test. Glycosides were not detected in any of the six solvent extracts of flowers in Libermann's test, but in Salkowski and Killer- Kilani tests all the six solvent extracts showed the presence of glycosides. Phenolic compounds were detected in all extracts except petroleum ether. The steroids were recorded in all the six solvent extracts of flowers. Among other phytochemicals phlobatannin, terpenoid, diterpinoid, anthraquinones, carotenoids, anthocyanin, coumarin, fatty acids, proteins and amino acids were detected in all the six solvent extracts. Emodins were detected in all except petroleum ether extract of flowers. Similarly the phytosterols were present in all extracts except ethanol and methanol extracts of flowers of *Catharanthus roseus*.

In the solvent extracts of leaves of *Catharanthus roseus* carbohydrates were detected in all the six solvent extracts. Fehling's test was positive in chloroform, petroleum ether, ethanol and methanol extract but negative in hexane and aqueous extracts. Benedict's test was positive in all except petroleum ether extract. Similarly, Iodine test for carbohydrates was positive in all except chloroform extract. Phenols and tannins were detected in all except chloroform and aqueous extracts. Flavonoid was detected in all except chloroform, and saponins in all except chloroform and petroleum ether extracts. Petroleum ether extract showed negative results for the presence of glycosides with all the three tests viz. Libermann's, Salkowski and Killer- Kilani. In petroleum ether and hexane extract of leaves glycosides were not detected. Similarly, glycosides were also not detected in chloroform and petroleum ether extracts as Salkowski test was found to be negative. Killer- Kilani test for glycosides was positive with chloroform, ethanol and methanol extracts but negative with petroleum ether, hexane and distilled water extracts. Phenolic compounds and steroids were detected in all the solvent extracts of leaves except hexane and distilled water extracts. Among other phytochemicals phlobatannin, terpenoid, diterpinoid, anthraquinones, carotenoids, anthocyanin, coumarin, fatty acids, proteins and amino acids were detected in all the six solvent extracts. Emodins were detected in all except petroleum ether extract of leaves. Similarly the phytosterols were present in all extracts except ethanol and methanol extracts of leaves of *Catharanthus roseus*.

The leaves and flowers of *Catharanthus roseus* contain a significant amount of phytochemicals viz. alkaloid, flavonoids, phenolic, saponins and tannin. The leaves of *Catharanthus roseus* contained relativelely higher amounts of alkaloids, flavonoids and phenols than flowers. The amount of flavonoids in leaves was maximum

DEVELOPMENT OF HORTICULTURE IN PATNA DISTRICT : A CHANGING SCENARIO OF AGRO -BIODIVERSITY

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Abstract

Agriculture in Bihar is rich and diverse due to the availability of fertile alluvial soil with abundant water resources and rural areas with man power. Bihar is the largest producer of vegetables and litchis and major producer of pineapple, mango, banana, guava, sugarcane and jute apart from rice, wheat and maize. About 79% of its population is engaged in agricultural directly or indirectly. Bihar has the opportunity to have varied types of agro-climatic conditions, ideal for growing almost all the horticultural crops. Due to the high value of horticulture produces, horticulture is gaining more popularity than the agriculture crops. Therefore, farmers of Patna district are searching various possibilities in the field of horticulture to increase their income.

Patna district is a part of Patna division and its total population is 58.38 lakh (2011) and area 3,202 km2. The district has a population density of 1823 person per km2, growth rate 22.34 percent and literacy rate 72.47 percent. In Patna district, farmers are switching to horticulture in many areas due to less agricultural land, growing population, more profit and availability of large market, transport system, etc. The main fruit crops grown in Patna district are banana, guava, mango, muskmelon, papaya, watermelon, etc. Main vegetables are various types of beans, bitter gourd, bottle gourd, brinjal, cabbage, cauliflower, green chili, pumpkin, ladies finger, onion, parwal, potato, radish, tomato, etc. Plantation crops like coconut and spices like garlic, ginger, red chili, turmeric, coriander are also grown in the district. Therefore, the objectives of this paper are (i) to find the area and production of horticulture plants in the district and (ii) to find problems related to horticulture and giving some suggestions to improve the livelihood of farmers with focus on integrated farming system. This paper can help farmers in improving their income, quality of life, productivity and livelihood security in a sustainable manner. This also needs active participation of all weaker sections including women to promote awareness for the development of horticulture. This paper is based on secondary data obtained from Bihar government offices and websites.

Introduction

Biodiversity, the basis of agriculture, is the origin of all species of crops and domesticated livestock and the foundation of ecosystem services essential to sustain agriculture and

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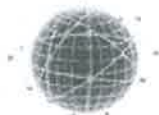
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Anthropogenic Air Pollutants in Patna :
A Rising Concern

RASHMI RANJANA

ABSTRACT

Environmental chemistry comprises the study of the chemical species existing in the various segments of the environment, their sources, pathways, reactions and their consequences on the activities of human beings and other life forms. It may be considered as a multi-disciplinary study, involving physical and life-sciences, meteorology, agriculture, public health, engineering, etc. The tremendous increase in industrial activity during the last few decades and the release of obnoxious industrial wastes into the environment, have been of considerable concern in recent years from the point of view of Environmental pollution. The magnitude of the problem of air pollution has increased alarmingly due to population explosion, industrialization, urbanization, automobiles and other human proclivities for greater comfort. Excessive release of air pollutants in the atmosphere by anthropogenic activities disturb the dynamic equilibrium in the atmosphere and thereby affect man and his environment. Anthropogenic pollutants have surpassed the pollutants contributed by nature thousand-fold. So, the main objectives of this paper are to study the (i) the various types of air pollutants and their effects on human-being, (ii) the methods to control anthropogenic air-pollutants.

Keywords: Environmental chemistry, pollutants, anthropenic, health hazard, industrialization, species.

INTRODUCTION

Environmental pollution is defined as the undesirable change in physical, chemical and biological characteristics of air, land and water that may or will harmfully affect the human life or that of other species, living or non-living things (India, ME&F, "Bihar Envis"). Earth became loaded with diverse pollutants that were released as by-products as a result of over-population, rapid

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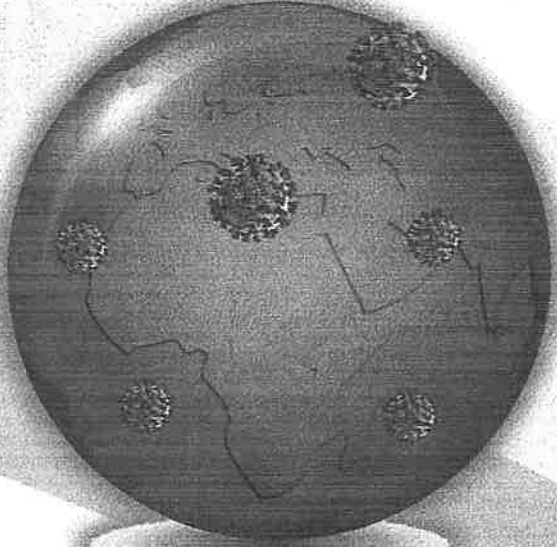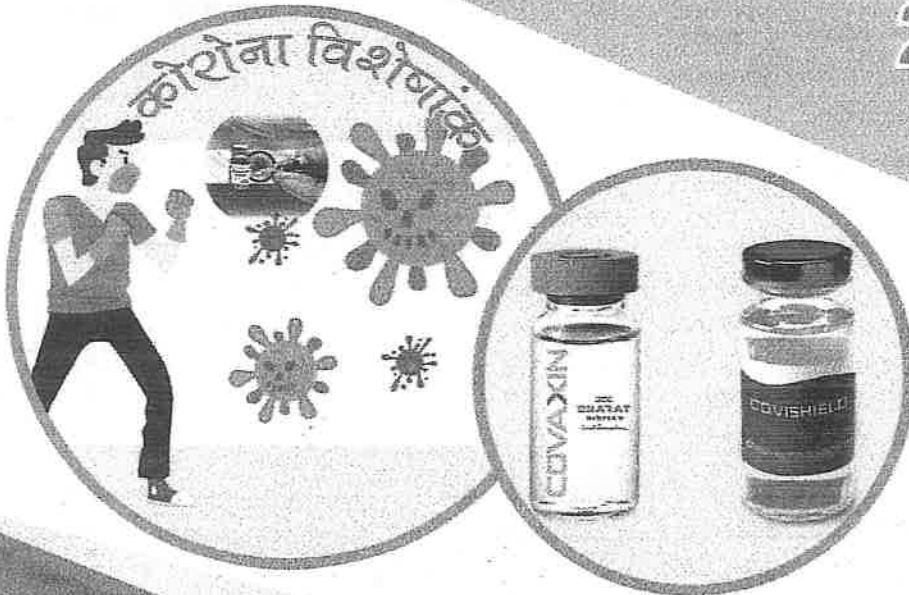
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Coronavirus : A Lesson for Lifetime

Prof. (Dr.) Umesh Prasad
Professor & Ex-Head
Department of Economics

There is no rainbow without rain

If we give it a thought-what is it that will come out of all this? Equality! This situation has shown us that we are all the same regardless of our religion, culture, customs, whether we are poor or rich. The virus simply does not choose. It connected us in a way, it showed us that we should all stick together. During this chaos, while many of us were in a panic, it showed us the might of humanity. It reminded us who we are. Maybe the world will finally change.

We humans are adaptive, and life is more flexible than we think

The pandemic has been a time of extraordinary change, and we have had to rapidly change and adapt to the evolving situation. Many individuals have lost jobs and have been forced to find creative ways to pay the bills. Many others began working from home. Schools and colleges turned online with virtual learning. Many physicians started offering telemedicine. This pandemic has been a testament to just how resilient we are as humans and our ability to be flexible and creative in the face of uncertainty.

Life is precious. Be grateful for what we have

This pandemic has made us rethink our values and remember how precious life is. It has been a reminder to appreciate the smaller things in life – the things we often take for granted. This pandemic has made us re-evaluate life and assess our priorities and served as a reminder of how precious life is and appreciate all things in life.

We should be grateful for what we have and adore the good things in life. And we should try to get a positive outcome from a negative situation. It also includes not comparing ourselves to others. So let's try to pull through this pandemic and help others do the same.

Gratitude is the healthiest of all the human emotions, Enjoy the little things, for one day you may look back and realise they were the big things.

Apologise and forgive

This grim time can also help us think about the mistakes we have made. We can apologise to those whom we might have hurt. We need to let go of our anger and hatred crammed inside us.

Learning to let go and focus on the positive is an art that we learnt in these tough times. There may be anger, tears or disappointment, but it will all be worth it in the end.

Turn your frown upside down

Keep smiling even if the situation is unpleasant. Sometimes, your smile can light someone else's day. An easier way to smile is by thinking about all the great people in your life and all the good in the world. Staying indoors most of the time can be very depressing, especially if people's plans for all the things that they wanted to do had to be cancelled due to this pandemic. So everyone is in need of some cheer and we can try to bring some smile on others faces. This can be done by doing things that lift up the mood and talking about all the positive things in life.

Learn about yourself

Ever since we have all been social distancing, we have been more involved with family and friends. More importantly, we have

Restricted cascade and wreath products of fuzzy finite switchboard state machines

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Abstract

A finite switchboard state machine is a specialized finite state machine. It is built by binding the concepts of switching state machines and commutative state machines. The main purpose of this paper is to give a specific algorithm for fuzzy finite switchboard state machine and also, investigates the concepts of switching relation, covering, restricted cascade products and wreath products of fuzzy finite switchboard state machines. More precisely, we study that the direct products/Cartesian compositions of two such fuzzy finite switchboard state machines is again a fuzzy finite switchboard state machine. In addition, we introduce the perfect switchboard machine and establish its Cartesian composition. The relations among the products also been examined. Finally, we introduce asynchronous fuzzy finite switchboard state machine and study the switching homomorphic image of asynchronous fuzzy finite switchboard state machine. We illustrate the definition of a restricted product of fuzzy finite switchboard state machine with the single pattern example.

Keywords: Fuzzy finite state machine, Switchboard, Direct product, Cascade product, Wreath product, Asynchronous.

1 Introduction

Automata theory is one of the topics from the general system theory which provides mechanisms for the formulation and solution of general problems which can be applied to real-world problems in the future. A different class of switching mechanisms has been used for controlling more complex systems. It is necessary to understand the significance of the modeling of switching mechanisms as a control device for any electronic system. In 2002, according to Inagaki [10], Genetic algorithms (GAs), an evolutionary computation method, was used for generating more complex deterministic finite automata (DFA) through the use of a switching device to make correct predictions on the next input symbol. Within the context of a Design Pattern, Ramnath and Dathan [33] studied the switchboard behavior which is similar to a mediator in a finite state machine (FSM) and also highlighted that FSM events allow anyone to design and modify the two subsystems independently. An FSM model exhibits a behavior where responses to future events depend on previous events. A classical problem of the finite state machine is to navigate or to predict the flow of the next input information into a designated output when it receives a given input information from a sequence of integers. The purpose of the switchboard in a finite state machine is that a direct flow of information from one state to another is able to be controlled and any sudden failure will not cause the information to be entirely lost. However, the switchboard

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FLAIR AND FLAWS IN THE ACTS
OF TRANSLATION

Aditi

ABSTRACT

Translation continues to be a potent source of dissemination of ideas and information cutting across the geographical boundaries and cultural barriers. Its recognition as an important academic exercise derives its sustenance from the monolithic universal characteristics manifested by mankind. This undercurrent of homogeneity constantly engenders an exploratory attitude among us that prompts to seek novel experiences in life brought through translated texts. But translating a text has its own share of challenges as any lapse on the part of a translator may cause misinterpretation leading to a chaotic and unpalatable situation in public domain. Keeping it in view, this paper attempts to explore different shades of challenges ranging from cultural to linguistic that a translator encounters while translating a text. A pragmatic approach has been adopted here to look into the nuances of translation and highlight certain measures that may help us overcome these challenges.

Keywords: dissemination, universal characteristics, homogeneity, cultural barriers.

1. An Overview

Historically, the emergence of translation as an intellectual exercise began with cross-cultural dynamism practiced by mankind as one of its primordial attributes. The rapid pace of advancement of different civilizations in the annals of history went on inducing interest among people to know about other homo-sapiens inhabiting distant lands, using different languages and practicing unfamiliar cultures. The expansion of

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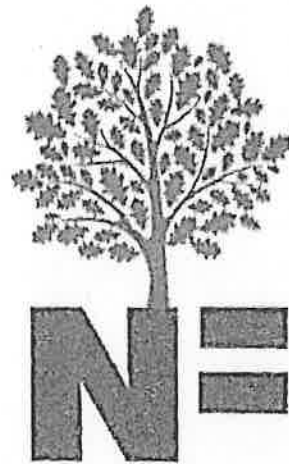
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Translation

Bridging the Gap

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RAINWATER HARVESTING IN FLOURIDE AFFECTED AREA NAWADA, BIHAR

SANJAY KHANNA* & DR. ARVIND KUMAR NAG

Research scholar, Dept. of Environmental Science, M.U Bodh Gaya*

ABSTRACT

KEYWORDS- Groundwater. Fluoride, human health rainwater harvesting.

Under Ground water is the major source for various purposes in most parts of the world. Presence of low or high concentration of certain ions is a major issue as they make the ground water unsuitable for various purposes. Fluoride is one such ion that causes health problem create in human being in more than twenty country in the world. Fluoride concentration of at least 0.6 mg/l is required for human consumption as it will help to have stronger teeth and bones. Consumption of water with fluoride concentration above 1.5 mg/l results in acute to chronic dental fluorosis where the tooth become coloured from yellow to brown. Skeletal fluorosis which causes weakness and bending of the bones also results due to long term consumption of water containing high fluoride. Presence of low or high concentration of fluoride in ground water is because of natural or anthropogenic causes or a combination of both. Natural sources are associated to the geological conditions of an area. Several rocks have fluoride bearing minerals like apatite, fluorite, biotite and hornblende. The weathering of these rocks and infiltration of rainfall through it increases fluoride concentration in ground water. The improper disposal of fly ash on ground surface contributes to fluoride in ground water. Since ingestion of high fluoride has a long term Affect on human health it is essential to monitor its concentration in ground water used for drinking periodically and take steps to bring them within the permissible range of 0.6 to 1.5 mg/l. There are several methods available for the removal of fluoride from ground water. Dilute the groundwater contaminated with fluoride, artificial recharging structures can be built in suitable places which will decrease its concentration. Rainwater harvesting through existing wells also will prove effective to reduce the ground water fluoride concentration. Fluoride contamination being a prominent and widespread problem in several parts of the world and as causes for this are mostly natural and unpreventable, educating the people and de-fluorinating the groundwater before consumption are essential for a healthy world.

INTRODUCTION

It is well known that about 70% of the earth's surface is covered with water. Most of the water is in the oceans (96.5%) in the unusable form while some of them are frozen (1.74%). Lakes, swamp water and rivers hold 0.014% and soil moisture accounts for 0.001%. Water also exists in the form of vapour in the air (0.001%) and as groundwater beneath the sub surface in the aquifers (1.7%) (Gleick, 1996). World's water needs are met from surface and groundwater resources. However, use of groundwater is advantageous as it is comparatively fresh and widely distributed unlike the surface water. Threats to ground water have been increasing everyday due to raise in population and their needs. Thus with increasing demand of groundwater for domestic, industrial and agricultural needs, the pressure on this resource has become enormous. Overexploitation and improper management has also lead to contamination of this resource. The degradation of groundwater may be due to natural or anthropogenic processes. Natural causes are inherent geological conditions while anthropogenic causes include wastewater from sewage treatment plants, discharge from industries, improper solid waste disposal, agrochemicals, runoff from agricultural fields, leakage from underground storage tanks etc. When the chemical composition of groundwater is not within the prescribed standards for drinking or irrigation or industrial water, they become unsuitable. Arsenic, fluoride, nitrate, iron, manganese, boron, most heavy metals and radionuclides are few contaminants that are of great concern if not present within permissible limits.

Rainwater harvesting is a simple low-cost technique that requires minimum specific expertise or knowledge and offers many benefits. For drinking water purposes in rural areas, the most common technique is small-scale rooftop rainwater harvesting: rainwater is collected on the roof and transported with gutters to a storage reservoir, where it provides water at the point of consumption. Rainwater harvesting for agricultural use see also bunds, field trenches, planting pits, micro-basins, retention basins, sand dams, conjunctive use, gully plug, controlled drainage or fog drip. Collected rainwater can supplement oth[er so]urces when they become scarce or are of low quality like brackish groundwater or polluted surfa[ce in] the rainy season. It also

STUDY ON RAINWATER HARVESTING FOR FLOURIDE FREE FRESH WATER AT DOMESTIC LEVEL IN FLUORIDE AFFECTED AREA IN NAWADA DISTRICT OF BIHAR

SANJAY KHANNA* & DR. ARVIND KUMAR NAG**

*Research Scholar, Dept. of Environmental Science, M.U Bodh Gaya

** Professor & Head, Department of Chemistry, College of Commerce (Art and Science), Patna.

ABSTRACT

KEYWORDS- Population, water, Groundwater. Fluoride, human health rainwater harvesting

Water is one of the essential commodities for survival of human beings. It is required for domestic purpose, irrigation, industrial and other uses, which are very relevant for survival and progress of society. That is important civilisations of the world have grown and prospered around perennial rivers. With rapid growth of population and development of modern technologies in various fields, the requirement of water has substantially increased. The perception that water is available with us in abundance no longer holds true now. Water availability is neither adequate nor equitable to all human beings and in all regions of the country as well as in the world. The global fresh water consumption has risen six folds between 1900 and 1995, which is more than twice the rate of population growth. However, one-third of the world's population is already living in countries with moderate to high water stress. About 20 percent of the world's population, lack access to safe drinking water. The problem is more acute in Africa and West Asia and in many other developing countries including our country India. In addition to the problems of limited availability of water, there is problem of water quality leading to various biological and chemical contamination. Even developed countries like United States are also affected by water quality degradation. India has more than 20 states and millions of people affected with Fluorosis, but Bihar is not one of the states that is recognized widely as highly affected with Fluoride in drinking water and affected with Fluorosis. Fluoride is often associated with scarcity of water and the perception of Bihar is often that of water plentiness. But what we often forget is the diversity that is there within this state.

INTRODUCTION

Rainwater harvesting is a technology used to collect rain water and store or lastly recharge ground water. for later use from relatively clean surfaces such as a roof, land surface or rock catchment. Rain water harvesting is the technique of collecting water from roof, Filtering and storing for further uses. Rainwater Harvesting is a simple technique of catching and holding rainwater where its falls. Either, we can store it in tanks for further use or we can use it to recharge groundwater depending upon the situation. Rain water harvesting system provides sources of soft, high quality water reduces dependence on well and other sources and in many contexts are cost effective. Rain water harvesting system is economically cheaper in construction.

Fluoride contamination in groundwater is a major geo-environmental issue. In India, groundwater sources contribute more than 85 percent of the drinking water requirement in rural areas, 76 percent of irrigation requirements and more than 50 percent of the urban and industrial water supplies. Many studies have reported fluoride-related health problems such as dental and skeletal fluorosis in humans due to drinking of fluoride-rich water which has severe socio-economic implications. The permissible limit of fluoride in drinking water is 1.5 mg/l according to the World Health Organisation (WHO, 2004) and the Bureau of Indian Standards (BIS, 2012). India has more than 21 states and millions of people aff[...] Fluorosis, but Bihar is not one of the states that is recognized widely as highly affected with Fl[...] [d]rinking water and affected

Rainwater Harvesting in Flouride Affected Area in Jamui, Bihar

Sanjay Khanna, Dr. Arvind Kumar Nag

Research Scholar, Department of Environmental Sciences, M.U Bodh Gaya, Bihar, India

ABSTRACT

Many people use to drink rainwater, even in areas where clean municipal water is available. Domestic rainwater is defined here as any water collected from building roof tops subsequent to rainfall events and stored by households for later use. Rain water may easily become contaminated on storage unless correct procedures for collection and storage are made. Rainwater may provide the best source of domestic water in areas affected by salinity, high fluoride or areas affected by pollution from various sources. Fluorides are widely distributed in nature and it is estimated to constitute about 0.32% of the earth's crust. Water forms the most important component of eco-system therefore any imbalance either in term of its amount or presence of added impurities to it can harm the whole eco-system (Ranjana, 2009) Nearly 12 million tons of fluoride deposits on the earth's crust are found in India. These fluoride deposits are the reason for fluorosis in 17 states of India (UNICEF, 1999). Rainwater has been found in some cases to contain bacteria, or trace metals, or both. the public to limit rainwater use to outdoor purposes, and to laundry and toilet flushing. In our study, over 12 months, rainwater samples were collected around tested for E. coli and total coliforms. Of many samples tested, more than 50% contained E. coli. The health guideline for E. coli is 0/100 mL for drinking water. A survey on household drinking water choice was undertaken across the metropolitan area. The aim was to determine drinking water choices and to understand the driving forces behind drinking potentially contaminated rainwater in a city where clean municipal water is supplied. The investigation concluded that a higher proportion of households use rainwater as their primary source of drinking water. It was found that a higher proportion of households are using domestic filtration systems to improve municipal water quality. Opposition to municipal water fluoridation was reported, drinking water preferences.

KEYWORDS: Rainwater, Storage tank, Drinking water, Household, Ground water recharge, Fluoride, Chlorination

INTRODUCTION

Fluorides are widely distributed in nature and it is estimated to constitute about 0.32% of the earth's crust (fluorine in the form of fluoride) (WHO environmental health , Geneva. (1984). Fluoride could be found in a number of minerals, of which fluorspar, cryolyte and fluorapatite are the most common (WHO,1993). Human health is threatened by most of the agricultural development activities particularly in relation to excessive application of fertilizers and unsanitary conditions.

Bihar is the 12th largest state in the country and is abundant in natural resources, rivers and fertile land. However, water in most habitations is contaminated by chemicals like arsenic, fluoride, iron and nitrate. This contamination has resulted in water borne problems like arsenic poisoning, melanosis and fluorosis, which make it necessary for the Government of Bihar to provide safe drinking water to its people. While hand pumps are the main source of water for a majority of the rural population in Bihar, some also depend on mini piped-water supply schemes. To monitor the quality of water supplied to the habitations via hand pumps, piped schemes and other sources, Fluoride contamination in the groundwater has got great attention in last few decades due to their toxicity, persistent capacity and accumulation in human body. There are several sources of fluoride in the environment and different pathways to enter in the drinking water resources, which is responsible for potential effect on human health. Presence of high concentration of fluoride ion in groundwater is a major issue and it makes the water unsuitable for drinking purpose. Availability of fluoride in groundwater indicates various geochemical processes and subsurface contamination of a particular area in nawada and jamui. Rainwater may easily become contaminated on storage unless correct procedures for collection and storage are made. Rainwater may provide the best source of domestic water in areas affected by salinity, high fluoride or areas affected by pollution from various sources. The chemical and isotopic composition of the rain may be used as a tracer to identify the recharge pathways, it may be possible to quantify recharge efficiencies.

Rainwater harvesting most common technique is small-scale rooftop rainwater harvesting: rainwater is collected on the roof and transported with gutters to a storage reservoir, where it provides water at the point of consumption. Rainwater harvesting for agricultural use see also bunds, field trenches, planting pits, micro-basins, retention basins, sand dams, conjur... ...lly plug, controlled drainage or fog drip. High ... ...ters have traditionally been treated by a rang... ...es including precipitation or

Study on Rainwater Harvesting at Domestic Level in Some Fluoride Affected Areas of Bihar

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[1]Research Scholar, [2]Professor
[1]Dept. of Environmental Sciences, Magadh University Bodh Gaya,
[2]College of Commerce, Art and Science, Patna

Abstract - Ground water source is the major source for various purposes in most parts of the world. Presence of low or high concentration of certain ions is a major issue as they make the groundwater unsuitable for various purposes. Fluoride is one such ion that causes health problems in people living in more than twenty five country around the world. Fluoride concentration of at least 0.6 mg/l is required for human consumption as it will help to have stronger teeth and bones. Consumption of water with fluoride concentration above 1.5 mg/l results in acute to chronic dental fluorosis where the tooth become coloured from yellow to brown. Skeletal fluorosis which causes weakness and bending of the bones also results due to long term consumption of water containing high fluoride. Presence of low or high concentration of fluoride in groundwater is because of natural or anthropogenic causes or a combination of both. Natural sources are associated to the geological conditions of an area. Several rocks have fluoride bearing minerals like apatite, fluorite, biotite and hornblende. The weathering of these rocks and infiltration of rainfall through it increases fluoride concentration in groundwater. Fluoride which is present in high concentration in volcanic ash is readily soluble in water and forms another natural source. Anthropogenic sources of fluoride include agricultural fertilisers and combustion of coal. Phosphate fertilisers contribute to fluoride in irrigation lands. Coal which is a potential source of fluoride is used for combustion in various industries and in brick kilns. The aerial emission of fluoride in gaseous form during these activities reaches the surface by fall out of particulate fluorides and during rainfall they percolate with the rainwater thus reaching the groundwater table. Also the improper disposal of fly ash on ground surface contributes to fluoride in groundwater. Since ingestion of high fluoride has a long term effect on human health it is essential to monitor its concentration in groundwater used for drinking periodically and take steps to bring them within the permissible range of 0.6 to 1.5 mg/l. There are several methods available for the removal of fluoride from groundwater which is insitu or exsitu. To dilute the groundwater contaminated with fluoride, artificial recharging structures can be built in suitable places which will decrease its concentration. Rainwater harvesting through existing wells also will prove effective to reduce the groundwater fluoride concentration. Exsitu methods which are conventional treatment methods like adsorption, ion exchange, reverse osmosis, electrodialysis, coagulation and precipitation etc. can be practiced at community level or at households to reduce fluoride concentration before ingestion. Each method depends on the local conditions of the region such as the quality of groundwater and the source of contamination whether it is natural or anthropogenic. Fluoride contamination being a prominent and widespread problem in several parts of the world and as causes for this are mostly natural and unpreventable, educating the people and defluorinating the groundwater before consumption are essential for a healthy world.

keywords - Storage tank, Drinking water, Household, Rainwater, Ground water recharge, Fluoride.

INTRODUCTION

It is well known that about 70 % of the earth's surface is covered with water. Most of the water is in the oceans (96.5%) in the unusable form while some of them are frozen (1.74%). Lakes, swamp water and rivers hold 0.014% and soil moisture accounts for 0.001%. Water also exists in the form of vapour in the air (0.001%) and as groundwater beneath the sub surface in the aquifers (1.7%). World's water needs are met from surface and groundwater resources. However, use of groundwater is advantageous as it is comparatively fresh and widely distributed unlike the surface water. Threats to groundwater have been increasing everyday due to raise in population and their needs. Thus with increasing demand of groundwater for domestic, industrial and agricultural needs, The pressure on this resource has become enormous. Overexploitation and improper management has also lead to contamination of this resource. The degradation of groundwater may be due to natural or anthropogenic processes. Natural causes are inherent geological conditions while anthropogenic causes include wastewater from sewage treatment plants, discharge from industries, improper solid waste disposal, agrochemicals, runoff from agricultural fields, leakage from underground storage tanks etc.

Rainwater is relatively free from impurities except those picked up by rain from the Atmosphere, but the quality of rainwater may deteriorate during harvesting, storage and household use. Wind-blown dirt, leaves, faecal droppings from birds and animals, insects and contaminated litter on the catchment areas can be sources of contamination of rainwater, leading to health risks from the consumption of contaminated water from storage tanks. Poor hygiene in storing water in and abstracting water from tanks or at the point of use can also represent a health concern. However, risks from these hazards can be minimized by good design and practice. Well designed rainwater harvesting systems with clean catchments and storage tanks supported by good hygiene at point of use can offer drinking-water with very low health risk, whereas a poorly d ʼ ʼ ʼ ʼ nanaged system can pose high

Volumetric Studies of Copper Sulphate in Aqueous L - Valine System at Different Temperatures.

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ABSTRACT

Densities (ρ) of copper sulphate in water and in binary aqueous mixtures of L-Valine for different molar concentration (0.05mol.kg^{-1} & 0.1mol.kg^{-1}) have been measured at different temperatures (305K, 315K, 325K and 335K). These data have been used to calculate apparent molar volume (φ$_v$), limiting apparent molar volume (φ$_v$°), slopes (S$_v$) and partial molar volumes of transfer (V$_{2,tr}$°). The data have been analysed using the *Masson equation*. Graphical plot of apparent molar volumes(φ$_v$) verus √c at different temperatures gave the values of limiting apparent molar volume (φ$_v$°) slopes and these results were utilised for the calculation of partial molar volume of transfer (V$_{2,tr}$°.The negative or positive values of obtained parameters have been used to discuss in terms of ion-ion and ion-solvent interactions occurring in solutions. The trends of transfer volumes have been interpreted in terms of **solute-co solute interactions** on the basis of **a co-sphere overlap model**. The negative partial molar volumes of transfer (V$_{2,tr}$°) values in L-Valine solutions indicate **hydrophobic-hydrophobic** and **ionic-hydrophobic** interaction is more pronounced in L-Valine system.

INTRODUCTION

Volumetric studies of biomolecules in mixed solvents play a crucial role in understanding the interactions of electrolyte with bio molecules at different temperature. Mixed solvent have received great attention in recent years in the study of molecular interaction of bio molecules because it helps in understanding the complex phenomena

Protein is an important bio-molecule in living system[1]. In many bio-chemical processes there are various types of interactions involved between the water molecules, micronutrients ions like Cu, Zn, Co, Fe etc. and also between these complex proteins. But ionic-biomolecular interactions are not easy to comprehend directly in biological system. Therefore, the useful approach is to study simpler model compounds such as amino acid, which is fundamental structural unit of proteins.

Thermodynamic studies[2-6] of amino acid systems are useful to understand several biochemical processes such as protein

Volumetric studies of biomolecules in mixed solutions have always been a matter of interest mainly because amino acids are among other compounds, the basic structural building unit of biomolecules.[8]

Several workers[9-17] have studied the behaviour of amino acid and bio -molecules in aqous as well as in mixed electrolyte solutions in the presence of metal ions . Biologically significant metal ions which play an important role in various metabolic activities interact with other bio molecules. Therefore molecular interaction studies of biomolecules in the presence of such metal ions can provide the further insight and important in many areas of applied chemistry and are essential for understanding the chemistry of biological system.

In continuation of our earlier work[3-6], therefore we planned to carry out the volumetric studies of CuSO$_4$ in water and in aqueous L-Valine solutions to understand the solute-solvent and solute- solute interactions in these solutions.

hydration, denaturation, aggregation etc[7].The properties and behaviour of amino acids in solvents play a crucial role in understanding the interactions of electrolyte with bio molecules at different temperature.

Phytochemical Analysis of Desmostachya bipinnata (Linn.) collected from different habitats

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ABSTRACT

Preliminary phytochemical analysis of Desmostachya bipinnataduring this study various types of chemical compounds which provide the base for the occurrence medicinally active constituents like Alkaloids, Carbohydrates, Tannins, Flavonoids, Protein and Free amino acids as shown by our results. Therefore compounds generated from these experiments have provided the chemical basis for the wide use of this plant as therapeutic agent for treating various diseases.Aerial and underground parts shows medicinal properties but underground part remained much effective than aerial parts of this plant.River bank samples found to be richest in presence of phytoconstituents than samples collected from other sites.

INTRODUCTION

Desmostachya bipinnata (Linn.) Stapf is an official drug of ayurvedic pharmacopoeia. (Sivaralan and Balachandran, 1994). It is distributed throughout India and various parts of this plant were used extensively in traditional and folklore medicine to cure various human ailments and used as astringent, aphrodisiac, galactogouge, analgesic, antipyretic, wounds, anti-inflammatory, anti-asthma, diuretic, sedative to pregnant uterus and also useful in dysentery, diarrhea, jaundice, vomiting, dysuria, diabetes, menorrhagia, skin eruptions, urinary calculi and other diseases of bladder and skin (Joshi, 2003; Alikhan and Khanun, 2004).

It is reported that in different regions of India Desmostachya bipinnata (L.) Stapf (syn: Eragrostis cynosuroides), is known as sacrificial grass, kusha (Khare, 2007), drabh (Qureshi et al., 2010), and dab (Praveen et al., 2007). According to Katewa & Jain (2006) D. bipinnata leaf paste is used to cure cuts and wounds. D. bipinnata roots are also used to treat rheumatism (Ahmad et al., 2010), carbuncles, piles, cholera alongwith dysentery, leucorrhea, and wounds (Praveen et al., 2007).

Flavonoids, viz.,kaempferol, quercetin, quercetin-3-glucoside, trycin, and trycin-7- glucoside, have been isolated from D. bipinnataby Awaad et al., (2008). Trycin and trycin-7-glucoside showed promising antiulcerogenic activity. Kumar et al., (2010) observed that D. bipinnata oil contains camphene (16.79%), isobornyl acetate (9.92%), tricyclene (4.30%), (±) trans-2,6-γ-irone (2.21 %), caryophyllene

Global Warming and Climate Change: Challenge Ahead

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INTRODUCTION

Climate change refers to the Variation in the earth's global climate or in regional climate over time. The term describes changes in the variability or average state of the atmosphere over time scales ranging from decades to millions of years. The average faced temperature of the globe has augmented more than 1 degree Fahrenheit since 1900 and the speed of warming has been almost three-folds the century long average since 1970. This increase in earth's average temperature is called Global warming.

Generally natural or human created increase in the average global temperature of the atmosphere near the surface temperature of the earth and related changes in the geographical distribution and chemical quality of rainfall perceived to have been caused by the trapped heat in the atmosphere consequent upon the rising concentration and accumulation of so-called green house gases from global warming. In other words, global warming is the phenomenon wherein the green house gases act as a shield and trap the solar heat from escaping in to outer space thereby increasing the earth's mean surface temperature.

CLIMATE CHANGE AND GLOBAL WARMING

In fact, several scientists estimate that between 15,000 and 30,000 years ago the Earth was covered by large sheets of ice. This period of time was known as the ice age. As the temperature of the Earth began to rise 7,000 years ago, the ice age came to an end. From the date the 14th century to the end of the 19th century, the Earth experienced a "Little Ice Age." Extreme cold and harsh conditions caused several famines and the expansion of glaciers, most notably in the Alps, Scandinavia, Iceland and Alaska. However, by 1850 the temperature of the Earth had warmed considerably and scientists were looking for an answer.

CAUSES OF GLOBAL WARMING

"Global Warming in increasing the earth is average temperature. The Green house gases are the main culprits of the global warming. The green house gases like carbon dioxide, methane, and nitrous oxide are playing hazards in the present times. These green houses gases trap heat in earth's atmosphere and thus result in increasing the temperature of earth. The excessive emission of these gases is the major cause of global warming.

"The major sources of carbon dioxide is the power plants. These power plants emit large amounts of carbon dioxide produced from burning of fossil fuels for the

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Chief Editor

Plant Growth-Promoting Bacteria and Their Importance in Vegetable Production

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Abstract – A large number of soil bacteria may colonize and promote plant growth and health on the surface/inside of the root system. This community of bacteria, commonly known as PGPR, increases the growth of plants, including crops, in traditional and stressed soils. Moreover, several PGPRs indirectly promote crop processing by inhibiting various phytopathogens. Conclusively, PGPR has an effect on plant growth by nitrogen fixation, phosphate solubilization, mineral absorption, development of siderophora, antibiotics and hydrolytic enzymes. The PGPRs that are known for helping to develop a wide variety of plants including potatoes, carrots, onions, etc. belong to the Azotobacter, Azospirillum, Pseudomonas and Bacillus genera. Plants play an important part in supplying vital minerals, vitamins and fibers, which in staple starchy foods are not available in significant amounts. Therefore, the use of PGPR in vegetable cultivation is advised to maximize vegetable output without chemical inputs. Here the importance of PGPR in vegetable production in both common and abandoned soils is underlined.

- X -

INTRODUCTION

The demand for big grains, such as wheat, is projected to increase by 70% by 2050 (1), primarily as a result of rising crop intensity. In recent decades, farming activities aimed at optimizing yields, mostly by increased fertilization, without regard to the socio-economic and ecological repercussions. Food processing utilizing sustainable technology that mitigate environmental effects, including habitat depletion and high greenhouse gas emissions, will also be of interest (2, 3). Sustainable intensification was described as "maximizing primary output per region without sacrificing the system's ability to maintain its production capability." The question of the sustainability of primary production is acute for wheat, a major cereal crop in many areas of the world used for human consumption, supplies 50 per cent of human dietary energy with maize and rice (4, 5). Hard weed (Triticum turgidum L. subsp durum), an agricultural plant well suited to the Mediterranean basin, is also a staple food used mostly in pasta processing for a part of the world population (6).

Growing and use of vegetables is a potential never properly explored in developed countries including Ethiopia to reduce hunger and improve food insecurity (4). Food and nutrition safety is progressively recognized as important for vegetables

The energy sources, body-building proteins, vitamins and minerals are plentiful and cheap[5]. Horticultural

crops, including berries, vegetables and root crops in Ethiopia contribute one quarter to crop output, which represents a significant economic operation spanning from smallholder to major commercial farms (3, 6).

Plant Growth-Promoting Bacteria (PGPB)

Soil is understood for some time that a great many bacteria exist in the soil (offen about 108 to 109 cells per gram of soil) and the amount of cultured bacterial cells in the soil is usually only approximately 1% of the total cell numbers current (7, 8). Time, humidity and prevalence of salt and other pollutants, as well as amount and varieties of plants present in these soils are influenced by both the number and the nature of bacteria found in various soils (9). Moreover, bacteria are not usually spread uniformly in the soil. In other words, the concentration of bacteria present near the plant roots (i.e. in the rhizosphere) is usually far higher than the rest of the soil. This is due to the availability of carbohydrates, including sugars, amino acids, organic acids and other small molecules, which can account for up to one third of the carbon fixed by a plant in plants (10-13).

Regardless of the amount of bacteria in a certain soil sample, in one of three forms, bacteria may influence plants. The relationship between soil bacteria and plants is beneficial, negative or neutral (from the plan   ive) (14). However, when

Antimicrobial activity of *Streblus asper* (Moraceae) against bacteria causing dental caries

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Abstract: *Streblus asper* Lour (Family: Moraceae) is a small tree which is indigenous to tropical countries. The plant is a rich source of cardiac glycosides which are pharmacologically very important because of its antimicrobial, antifilarial, anticancer, anti-allergic and insecticidal activities. *S. aspera* is much useful in oral hygiene because its leaf extract is active against Streptococcus mutans and some other bacteria causing dental caries.

In the present investigation the antibacterial activity of four solvent extracts of leaves of *S. asper* was used against bacteria causing dental caries. The results revealed that the four solvent extract fractions were not equally antimicrobial against Gram positive and Gram negative bacteria. The different fractions are found to be more inhibitory to Gram negative bacteria in comparison to Gram positive bacteria. Among four solvent fractions Dichloromethane (DCM) and ethyl acetate (EAE) did not cause any growth inhibition to Streptococcus mutans and Streptococcus salivarus. The n-hexane (NHE) and Methanol (MEL) caused 17.50 mm and 12.25 mm growth inhibition in S. mutans respectively and 18.50 mm and 13.35 mm growth inhibition in S. salivarus respectively. The n-hexane fraction was not inhibitory to Actinomyces odontolyticus, but dichloromethane (DCM), ethyl acetate (EAE) and methanol (MEL) fractions were less inhibitory to A. odontolyticus. DCM, EAE and MEL fractions of S. asper caused 11.35 mm, 9.7 mm and 10.25 mm inhibition in this Gram positive bacterium. The growth of Bifidobacterium dentium was inhibited by EAE and NHE fractions, but ineffective to DCM and MEL fractions. Similarly, the growth of Staphylococcus aureus was inhibited by EAE and MEL fractions in the order of 14.95 mm and 19.5 mm respectively.

It can be concluded that the mouthrinse containing S. asper leaf extract can reduce the microbial count to safe level without changing an oral ecology.

Key Words: Streblus asper, dental caries, Streptococcus mutans, Streptococcus salivarus, Actinomyces odontolyticus, Bifidobacterium dentium, Escherichia coli, Enterobacter aerogens.

I. Introduction

Streblus asper Lour (Family: Moraceae) is a small tree which is indigenous to tropical countries such as India, Sri Lanka, Malaysia, the Philippines and Thailand. It is known by various names. e.g. Bar-inka, Berrikka, Rudi, Sheora, Koi, Siamese rough bush and Tooth brush tree [1] (Glasby, 1991). In India it is known by its several vernacular names, the most commonly used ones being Shakhotaka (Sanskrit), Siora (Hindi), Sheora (Bengali) and Piray (Tamil) [2] (Chopra *et al.*, 1956). It is used traditionally in leprosy, piles, diarrhea, dysentery, elephantiasis [3] (Kirtikar and Basu, 1933) and cancer [4] (Bhakuni *et al.*, 1969). It is a rigid shrub or gnarled tree; branchlets tomentose or pubescent. Leaves are 2–4 inch, rigid, elliptic, rhomboid, ovate or obovate, irregularly toothed; petiole 1/12 inch. Male heads globose, solitary or 2-nate, sometimes androgynous; peduncle short scabrid, flowers minute. Female flowers longer peduncled. Fruit pisiform; perianth yellow. It is found in the drier parts of India, from Rohilkund, eastward and southwards to Travancore, Penang and the Andaman Islands [5] (Hooker, 1886).

The pharmacognostical studies of its stem bark as well as its root bark have been carried out [6, 7] (Iyengar and Pandey, 1963; Chaudhari, 1968). It finds place in the Ayurvedic Pharmacopoeia of India (2001) [8] and has also been described in some monographs [9] (Gupta *et al.*, 2005), but none have described the complete chemistry and pharmacology of this important ethnomedicinal plant. Therefore, we aimed to compile an up-to-date and comprehensive review of S. asper that covers its traditional and folk medicinal uses, phytochemistry and pharmacology.

Natural Disasters, Psychological Well- Being and Resilience: Concerns related to Marginalized Groups

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Abstract : Natural disasters influence millions of people every year. Besides their severe effects on the life and infrastructure of country, natural disasters create immense collective stress over and above the capability of the affected population to cope with the emotional, physical, and financial burden. The consideration of the mental health and psychosocial well being of individuals, families and communities have recently been acknowledged in the context of natural disasters. But still there is lack of studies related to the impact of these catastrophic events on the marginalized groups of the country. The purpose of this article is to discuss the effect of these devastating events on the psychological well- being of the people of marginalized groups having poor resilience strategies. It is believed that resilience is the ability of people or communities in complex socio- economic settings to learn, adapt, transform and cope in the face of shattering and stressful life events. Thus, it is logical to hypothesize that having resilient attitude may help better to overcome of these devastating experiences. Moreover, the ability to "bounce back" from natural disasters seems very relevant and promising. Hence, although much has been documented about resilience but the disaster milieu offers a foremost opportunity to reframe, reorganize and construct new meaning to it. Finally, this article concludes with a discussion on the inclusion of marginalized sections in building preparedness and community resilience for the future calamities.

Keywords - Natural disasters, psychological well- being, resilience, community resilience and marginalized groups.

I. INTRODUCTION

Every year, natural catastrophic events, such as, earthquakes, floods, storms, heatwaves and droughts cause huge humanitarian and economic damage around the world. These Disaster episodes affect millions of people and exert a collective social suffering that requires a monumental effort by individuals, communities, societies, and the world community to overcome. While we can prepare for natural disasters and predict them to some extent, nothing can completely stop them from happening. In the past decade, disasters from natural events of all types have on average affected approximately 200 million people every year (Done, 2012), or about 3% of the world's population, while killing an additional 78,000 a year (Done, 2012), based on a 10-year average. More than 370,000 people alone died in the period 2001–10 as a result of extreme weather and climate conditions (WMO, 2013), such as extreme cold, heat, storms, floods and drought. Hence, deaths are the most obviously negative aspect of such disasters, but the statistics on the number of people killed or affected is not the whole human story.

Disasters that occur in the last few years have impose the necessity of focus on special needs of marginalized groups. Statistics tend to count up the lives lost and economic devastation of these events, but it is less easy to quantify the psychological impact of a disaster on marginalized groups. Poor living conditions, inadequate infrastructure, a lack of income diversification and limited access to basic services, especially education and information, ensure that the poorest and most marginalized people are disproportionately affected by disasters. Therefore, undoubtedly disasters hit the weakest the hardest. These underprivileged people are not only more vulnerable to climate-related shocks, but they also have fewer resources to prevent, cope with, and adapt to disasters. They tend to receive less support from family, community and financial systems, and even have less access to social safety nets (World Bank report, 2016). So, yes, disasters can discriminate on the same lines that societies discriminate against people.

Committing to address the root causes of disasters will help to address peoples' underlying vulnerabilities, increase their capacities to-cope with the effects of natural hazards and facilitate empowerment processes. This can be achieved by the equal participation of all segments of society in disaster risk reduction decisions.

II. NATURAL DISASTERS AND MARGINALIZED GROUPS

A disaster is the tragedy of a natural or human made hazard (a hazard is a situation which poses a level of threat to life, health, property, or environment) that negatively affects society or environment (Reissman, Schreiber, Shultz & Ursano, 2010). Natural disasters are far from rare events, killing a million people a decade and leaving many more homeless, with costs reaching into the billions. Such extreme natural events leave a trail of deaths, destroyed homes, shattered communities and far-reaching damage to national economies and overall well being of the people of the country. No need to mention that the most devastating effect is experienced by the most vulnerable groups.

People who are marginalized have relatively little control over their lives, and the resources available to them. This results in making them handicapped in delving contribution to society. A vicious circle is set up whereby their lack of positive and supportive relationships means that they are prevented from participating in local life, which in turn leads to further isolation. Moreover, disaster

GENDER EQUALITY IN INDIA-ISSUES AND CHALLENGES

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ABSTRACT: It is well known and established fact that gender equality and women's empowerment are fundamental prescriptions for achieving development goals. Gender equality is a human right which provides opportunities and environment to all the persons irrespective of their gender to live with dignity and with freedom. Gender equality is a precondition for all diversified development and poverty eradication. Millennium Development goal puts emphasis on empowerment of women through gender equality. When men and women enjoy same opportunities, rights and obligations in all spheres of their life, gender equality is achieved. By empowering women we can make invaluable contribution to the improvement of health, educational status and productivity of families and society which will eventually improve the prospects of the next generation resulting in healthy and educated society.

Gender equality means sharing equally power and influence, and having equal opportunities in social and economic life. Equal opportunities in sphere of education and career prospects will help women in understanding their personal ambitions and their own worth. Women Empowerment will have a Multiplier effect on future generation. It demands the empowerment of women with a focus on redressal of power imbalances and giving more independence and autonomy to manage and live their own lives.

Women can be powerful change agents. Empowering poor rural women involves three critical and interrelated dimensions: expanding access to assets such as capital, land, knowledge and technologies; strengthening decision-making and their representation in community affairs; and improving women's well-being and lessening their workloads.

Promotion of gender equality and the empowerment of women eliminate all forms of gender-based discrimination in labour markets which is essential to defeating poverty and fostering sustainable development. Policies aimed at eradicating the gender gap in education are crucial to allow women to develop the skills and competencies they need to better participate in the labour market and make their contribution to the global economy. Their increased role in turn will boost women's economic security that ultimately helps families out of poverty and hunger and leads to the improved health and education of their children that is fundamental for sustainable development. The theory that mothers have an asymmetrically large influence on a child's intelligent is not a new one. Even more so, the special bond between a mother and child provides motivation for them to explore the world. So, women play a much larger part in child's intellectual development and they have larger influence on their cognitive capacity.

Gender Equality is a critical element in achieving social and institutional change that leads to sustainable development with equity and growth. Education, Participation in the economy through employment measured by the percentage of women and men in paid jobs excluding agriculture, by the income ratio of men to women, Empowerment measured by the number of women working in different jobs and by the number of seats women occupy in parliament and in decision making ministerial post are some of the indicators of gender equality.

Despite rapid strides made by India on the front of economic growth, gender inequalities still persist This presents a serious challenge for the policy makers and decision makers to devise ways to reduce these gaps in

The Relationship between Psychological Capital & Psychological Hardiness: The Occupational Life Balance

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Human psychological resources have an important impact on their overall well-being and work-life balance. And a healthy OLB ensures the quality of life which creates a healthy society and a productive population with the overall well-being of humankind. This research aimed to investigate the relationship between Psychological Capital (PsyCap) and Psychological Hardiness (PH) on Occupational Life Balance (OLB) and to examine the moderating role of demographic variables. The study used a quantitative descriptive research methodology with a sample of 200 employees from various organizations. The findings showed a significant positive relationship between PsyCap, PH, and OLB. Additionally, work experience was found to moderate this relationship. The results indicate that interventions aimed at enhancing employees' psychological resources can improve OLB, and organizations can benefit from providing work experiences that promote the development of psychological resources. This research provides valuable insights into the relationship between psychological resources and OLB and can inform organizational policies and practices aimed at promoting employee well-being

: Psychological capital, psychological hardiness and occupational life balance

The dynamic changing work environment demands a healthy workforce for efficient productivity and creativity. However, a healthy workforce is created when a work-life balance could be created between the professional and personal realms of life. Hence psychological well-being is an important factor to create an occupational life balance for individuals. Furthermore, psychological well-being is referred to as a quality experienced life which is reflected through various life events of psychological performance and experience. Humans create an evaluation of their life as good or bad based on their personal psychology which establishes psychological well-being as a strong means for healthy life.

Psychological well-being (PWB) is mainly influenced by personal factors like psychological capital (PsyCap) and psychological hardiness (PH). Psychological capital could be defined as a positive state of personal growth with a positivist psychological index. The main sub-component of PsyCap includes self-efficacy, optimism, hope, resiliency and aptitude to achieve success. Psychological capital is a medium durable emotion with a more lasting time than mood while comparatively more dynamic than personality characteristics. The earlier studies have established a positive relationship between psychological well-being and psychological capital. Furthermore, people with high PsyCap create a better occupational life balance and show more resistance to stress and other negative factors.

The second important factor for psychological well-being is psychological hardiness (PH). The concept of PH has been

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ANTI-DIABETIC HERBS IN TREATMENT OF DRUG-INDUCED MICE DIABETIC MODELS

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Abstract: Diabetes mellitus is a syndrome with disordered metabolism and inappropriate hyperglycemia due to either a deficiency of insulin secretion or to a combination of insulin resistance and inadequate insulin secretion to compensate. This syndrome causes greater morbidity and mortality, in both young and old people. Diabetes is regarded as a third leading disease affecting almost every organ in the human body. sedentary life style and obesity are two major epidemiological determinants of diabetes mellitus.

In the present investigation hypoglycemic efficacy of ethanol extract of Adhatodavasica (Vasaka) and Withaniasomnifera (Ashvagandha) was studied on STZ induced mice diabetic models. The results clearly indicated that the diabetic control (DC) mice presented a significant lowering of body weight ($p<0.001$) when compared with the normal control (NC) mice. The DC mice showed a significantly ($p<0.001$) higher level of glucose (+279%), when compared with their normal control counterparts. Diabetic mice of both of the groups (DT_{150} and DT_{250}) showed a reduction in glucose levels, when compared to the DC ones. The DT_{150} and DT_{250} group showed an increase of 30% and 40% in body weight respectively after 15 days of treatment. Contrary to this, DT_{RGZ} group mice showed an increase of 50% in body weight after 15 days of treatment. The results clearly indicated that the ethanol extract of Adhatodavasica and Withaniasomnifera is antidiabetic in nature. The hypoglycemic activity of these two herbs is due to the presence of different types of active phytochemicals whose identification needs further investigation at scientific level.

Keywords: Diabetes mellitus, Adhatodavasica, Withaniasomnifera, ethanol extract, Streptozotocin, Mice

Introduction: Diabetes mellitus (DM) is the third leading disease affecting almost every organ in the human body and is also called silent killer. This is a metabolic disorder of multiple etiologies characterized by absolute or relative deficiency of insulin secretion with or without varying degree of insulin resistance. Diabetes mellitus is characterized by recurrent or persistent hyperoglycemia with an elevated fasting (>110mg/dL of blood) and post prandial (> 130mg/dL of blood) plasma glucose level. A fasting plasma sugar of >126mg/dL and post prandial plasma sugar value of > 200mg/dL is considered as diabetes mellitus. There are two major forms of diabetes mellitus namely Type-1, characterized by diminished production of insulin due to degeneration of pancreatic B-cells, and Type-2, the multifactorial syndrome characterized by either hypo secretion of insulin or insulin insensitivity or sometimes both.

Sedentary life style and obesity are two major epidemiological determinants of diabetes mellitus. The current therapy of this disorder includes exogenous insulin administration (particularly in case of Type-1 diabetes mellitus), and oral hypoglycemic agents (for Type-2DM) which includes Metformin, Pioglitazone, Sulphonylurea etc. which may have adverse effects in diabetic subjects.

Materials and Methods

Ethanol extract of Adhatodavasica and Withaniasomnifera was used for assaying hypoglycemic activities in Streptozotocin induced mice diabetic models. These two plant species were collected from botanical garden in the campus of College of Commerce, Patna. Freshly harvested plant materials (root, stem, leaves and flowers) were washed under running tap water, blotted with filter paper and was dried in the shade at room temperature. The dried plant

The Importance of Financial Literacy among Public in India

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Abstract—Financial literacy is a conjecture of financial debit/credit management and the knowledge that is necessary to make important financially decisions. Financial decisions should be made with utmost care and consideration as they are an integral part of our everyday lives. Financial literacy impacts the daily issues an average family makes when trying to balance a budget, buy a home, fund the children's education, meet medical expenses, and ensure an income at retirement. Ranging from pending credit card bills to payment of utility and essential items, more often than not, there's a money crunch that almost everyone faces that leaves us feeling depleted. We live in a time where it is crucially important for the public to have a sense of financial responsibility. This brings forth the need for financial literacy. Financial education is a life skill. It is a skill set required not only to earn money but also to retain, increase and delve out new opportunities for it. Any improvement in financial literacy will have a profound impact on consumers and their ability to provide for their future. There are numerous reasons as to why financial education is important. Making thoughtful and informed decisions about ones finances is more important than ever. Several trends are converging that demonstrate the importance of financial literacy. Learning how to read financially is not easy, but once mastered, it can ease life's burdens tremendously. This paper mainly focuses on several aspects which make financial literacy among public imperative.

Keywords—Financial Literacy, Decision Making, Payment of Utility, Financial Education and Budget Balance and National Strategy for Financial Education.

I. INTRODUCTION

FINANCE is the key to major decisions in any economic system. Financial literacy is the ability to understand how money works- how a person makes, manages, saves, invests and expends it. It is the thorough understanding of a person as to how money works and how it works for him, while he is awake or is asleep. To understand the term financial literacy in its true sense, one needs an understanding of various financial principles such as financial goals, investments, budgeting, retirement / superannuation planning, time value for money, financial contracts, concept of interest rates, credit cycle, management of investment risk vs return etc. The concept of financial literacy is as important to individuals as it is to an organization. Unlike in the case of Individuals, in the case of Organizations, there are persons with professed knowledge in this area managing it. Hence the relevance of having professional literacy is all the more high and relevant in the case of Individuals to help them make prudent personal finance decisions regarding investments, real estate, loans, insurance, superannuation funds etc.

Put simplistically, financial ability is the ability to use skills and knowledge to take effective and informed money-management decisions in business or in personal life. Meanwhile, financial literacy is considered as a means to expedite financial well-being, hence, possessing financial literacy would help the households with day to day financial tasks, deal with financial emergency and even pull them out of the clutches of poverty (Pg Md Salleh, 2015). In a literal sense, it is considered as a mix of one's acquired skills and attitude towards financial or money matters.

It's a popular myth that financial literacy applies to only adults. Financial education benefits all ages and income levels. It can help a teen-ager in better management of his monthly allowance, a young adult who has just started his career and earnings with budgeting of finances and savings to keep their expenses and debt in check, an older person in providing them means to save and invest wisely for the family needs, and to plan for a debt free retirement with financial independence. For low income persons, it gives them the ability to save what best can be saved and insulates them from a high charge debt which they are very highly prone to get into. It helps a person plan his finances to meet his life stage goals and also at the macro level meets the nation's capital requirements.

Lack of financial skills is understood as a scenario where an individual lacks the basic skills to reconcile their bank account and cash balances, defaults on payment of bills on time, piles up debt without an understanding of risks of compounding of the debt, and invests his savings in high risk — low return avenues. Lack of financial literacy amongst public may lead to piling and compounding of the debt, become victims to predatory lending at a very high interest rate, poor savings, bad retirement planning, and bankruptcy and poor quality of life. Public may frequently fall prey to several financial frauds. Financial crisis of 2009 is a classic example which highlights the need for increased financial literacy to the world's attention. In today's market which is being bombarded with products, financial and otherwise, the need for financial literacy becomes all the more imperative. Especially in the last couple of decades we have witnessed several financial transformations that makes

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Demonetisation and Cashless Transaction in India with Special Reference to The Behaviour of Retail Traders

Umesh Prasad and Binod Choudhary

Introduction

It is obvious that the overarching consideration in the discussions and policy measures on digitalization after demonetization was announced has been to wean the economy away from cash so that the scope for transactions outside the gaze of the tax authorities can be reduced. This is derived from the belief that the larger part of black money transactions takes place in cash. But as explained in the earlier chapters, such transactions take place both in cash and through the financial system, and both within India and across borders.

Cashless economy is a situation in which the flow of cash within an economy is non-existent and all transactions are done through electronic channels such as direct debit, credit and debit cards, electronic clearing and payment systems such as Immediate Payment Service (IMPS), National Electronic Funds Transfer (NEFT) and Real Time Gross Settlement (RTGS). Today, credit cards and online payment services are becoming increasingly popular in urban India, paper currency notes are still an essential part of daily life. One saying is revenue is vanity, cash flow is sanity but cash is king. Cash may be defined as any legal medium of exchange that is immediately negotiable and free of restrictions.

The Indian payment system is rapidly transiting to more and more IT based systems. In the retail sector we have very high volumes of money transactions. Other than cash, one of the growing payment methods adopted by merchants in the sector is payment cards. However, the whole isometrics of moving from cash-driven economy to cashless economy has somehow been asserted with demonetization that was aimed to extract liquidity from the system to unearth black money. With increasing adoption of electronic payments, particularly those driving e-commerce and m-commerce, there is a growing demand for faster payment services which, in turn, facilitate ease in doing financial transactions.

"A cashless economy is one in which all the transactions are done using cards or digital means. The circulation of physical currency is minimal." A Cashless Society describes an economic state whereby financial transactions are not conducted with money in the form of physical banknotes or coins, rather through the transfer of digital information (usually an electronic representation of money) between the transacting parties.

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Ethnobotanical study of *Phyllanthus amarus* used in treating diabetes mellitus in Patna district of Bihar, India

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Abstract: Phyllanthus amarus is a important medicinal plant which have many medicinal properties and found as a weed in cultivated land, road side, railway track side in the tropical and sub tropical region. Patna district is a located in the subtropical region and climate of the Patna district is suitable for growth of *Phyllanthus amarus*. Local people of Patna district uses this plant for treatment of some diseases. Local peoples is uses leaves juice for the treatment of diabetes mellitus. The whole plant parts of *Phyllanthus amarus* have antidiabetic properties.

Key Words: *Phyllanthus amarus*, Euphorbiaceae, Ethnobotanical, medicinal plant, diabetes mellitus.

1. Introduction

Phyllanthus amarus plant is a small herb and well known for its medicinal properties in Indian Ayurvedic system. In India, around 20,000 medicinal plants have been recorded which is used for treatment of many diseases[1]. Plant belong to genus *Phyllanthus* is use as a raw herbal drug in India[2]. *Phyllanthus amarus* is used as an important traditional medicinal plant[3]. *Phyllanthus amarus* plant is used for a several health problems and plant have many medicinal important[4]. Ethnobotanical survey about the plant and inquiries from practising Unani doctors and Ayurvdea experts reveal that different parts of the plant and especially whole plants are used in different diseases. Though many workers have attempted clinical trials which only led to controversies. One definite report of the biological activity of stem and root extracts against diabetes. It is a doubtless established fact that people have been using different plant parts in various types of diseases.

The disease diabetes mellitus was known to the Indian Physician long ago. Indian physicians called it *madhumeha* (honey urine) because it attracted ants. In the ancient period of India history physician Charak (200 A.D.) mentioned most of the clinical features of this disease in "Charak Samhitas"[5]. Susruta (500 A.D.) gave the description of this disease as "madhu meha" or "Ikhumeha" or "honey urine" as the urine of these patients taste sweet[6]. Diabetes is the consequence of the malfunctioning of the metabolism. If the levels of glucose becomes very high then it will become a toxic. Insulin is a hormone produced by the Pancreas. When insulin is deficient the body is diseased. There are many causes of diabetets mellitus i.e. bad diet, fatty food and sugary food, old age, stress, obesity, anxiety, lake of insulin, family history etc[7]. *Phyllanthus amarus* plant belong to Euphorbiaceae (Phyllanthaceae). *Phyllanthus amarus* plant is worldwide distributed in tropical and sub tropical area. In the country India this plant is widely distributed as a weed in a cultivated and waste land[8]. In Patna district of Bihar *Phyllanthus amarus* is widely distributed in the waste land as a weed in cultivated land, road side, railway track side etc.

2. Materials and Methods

In this study, the study area taken the Patna district. Patna district is located in the Bihar and south bank of the river Ganga. Approx 57% population lives in rural area of this district[9]. Area of Patna district belong to the sub tropical region of temperate zone. Subtropical climate is suitable for the *Phyllanthus amarus* plant growth. For Ethnobotanical study of *Phyllanthus amarus* plant used in treating diabetes mellitus direct interview with the peoples of the rural area of the Patna district and a structural questionnaire were asked. Most of questionnaires asked to old age peoples, females and local knowledgeable peoples which have knowledge about herbal medicine. Asked questions about the local name of plants used for treatment of diabetes mellitus.

Plant Identification: After interview, preliminary identification of the plants was done in the field during the research. After that, plant specimen collected and photographs were taken to the confirmation for the plant

Structural and Magnetic Properties of Second Row Transition Metal Doped Iron Oxide Nanoparticles

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ABSTRACT

Magnetic Nanoparticles of Fe_3O_4 doped by different amounts of Y^{3+} (0, 0.1, 1 and 10%) have been synthesized by chemical route. Single phase formation has been confirmed by X-Ray diffraction measurement. An improved magnetisation has been observed in SQUID-VSM measurement for the Fe_3O_4 sample with1% Y^{3+} doping.The surface morphology and particle size distribution have been confirmed by SEM and TEM measurements. The results obtained are suggestive of the suitability of Y^{3+} doped Fe_3O_4 Nanoparticles for biomedical applications specially for hyperthermia treatment.

Keywords : Spinel Ferrite, Ferromagnetism, Double Exchange Interaction,

Research Article

In silico route towards development of DNA barcodes of Indian medicinal plants in trade

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ABSTRACT

Herbal drugs are generally traded in many processed forms, thus making their identification by traditional morphology based methods strenuous. Hence, development of effective methods for their accurate identification to control problems of adulteration, substitution and biopiracy becomes necessary. DNA barcoding, a molecular diagnostic method, capable of identifying the species with a minute amount of tissue based on the sequence variation in the selected locus/loci, could be an effective tool for this purpose. A single locus that can be used as a universal barcode for land plants has not been identified. The consensus is that the barcode for plants could be a multi-locus one. As per National Medicinal Plant Board of India, 960 medicinal plant species, belonging to 169 families and 575 genera, are traded. Developing DNA barcodes for all these species from among the loci suggested/used for barcoding of plants by wet research would be a gigantic task. Therefore, to get an initial insight in the possible combination of loci that could provide barcodes to these plants, an *in silico* approach was followed. Barcode quality sequences of four loci, nrITS (nuclear ribosomal internal transcribed Spacer), ITS2 (internal transcribed spacer 2), *matK* (maturase K) and *rbcL* (rubisco large subunit), of these 960 medicinal plants, available on NCBI GenBank were downloaded and checked for their species specificity by BLAST1 method. Barcode quality ITS, ITS2, *matK* and *rbcL* sequences of 217, 292, 263 and 360 medicinal plant species, respectively were available. Individually, ITS, 83.8% of which were species-specific, was found to be the best among the four loci, followed by *matK*, ITS2 and *rbcL*, which provided species specific barcodes to 79.8%, 77.7% and 76.3% species, respectively. At the genus level, all the four loci provided specificity above 90% with the highest of 96.3% being of ITS, followed by 95.8% of *matK*. Various multi-locus combinations were checked for their species or generic specificity for 144 species, sequences of all the four loci of which were available. Two-locus combinations of ITS+*matK* and ITS+*rbcL* correctly identified 95.8% and 95.1% of the species, respectively, whereas, this value for combinations of ITS2+*matK* and ITS2+*rbcL* was 93.7% and 93%, respectively. Among two locus combinations, the lowest percent species specificity was exhibited by *matK*+*rbcL* (87.5%). Use of three loci, ITS+*matK*+*rbcL* raised the species identification capability to 97.2%. All the combinations of loci, whether two- or three-locus, provided 100% or near 100% genus specificity. Thus, the present study amply demonstrates the utility of an *in silico* approach as an initial and important step towards development of DNA barcodes for medicinal plants.

Keywords: ITS, *matK*, *rbcL*

INTRODUCTION

Medicinal plants are valuable sources of herbal products (Chen *et al.,* 2016). Herbal medicines and other natural plant products, with minimal side effects on human health, are in high demand in international markets (Calixto, 2000; Ekor, 2014; Kong *et al.,* 2003; Pal and Shukla, 2003; Anonymous, 2004; Dubey, 2004). According to World Health

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शोध-पत्रिका

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विश्वविद्यालय मैथिली विभाग

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सम्पादक

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2018

ECONOMIC IMPLICATIONS OF CHAMPARAN SATYAGARAHA

IMPACT OF GOODS AND SERVICE TAX (GST) ON INDIAN TAX SYSTEM

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IMPACT OF GOODS AND SERVICE TAX (GST) ON INDIAN TAX SYSTEM

CONTINUOUS FUZZY MAPPINGS IN FUZZY METRIC SPACE

By

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ABSTRACT

In this paper, we studied the fuzzy metric space as defined by Z.Q.Xia, and F.F.Guo. Defined in different way in the sense of fuzzy scalars instead of fuzzy numbers or real numbers are used to define fuzzy metric. We further define open and closed fuzzy sets in the sense of open sphere and established the basic properties of open and closed fuzzy sets. We also define continuous fuzzy mapping and established the properties of continuous mappings, as per new definition, which is more similar to classic metric space.

KEY WORDS: Fuzzy metric space, open fuzzy sphere, open fuzzy set, closed fuzzy sets, continuous fuzzy mapping.

1. INTRODUCTION

There are so many approaches to define fuzzy metric spaces. The researcher like Kaleva (1980),George (1994),Gregory (2000),etc. They are using real numbers to measure the distance between fuzzy sets. The problem is that they are using different measure in different problems in fuzzy environment. There does not exist a uniform measure that can be used in all kinds of fuzzy environment. In this paper, an attempt has been made to using fuzzy scalars (Fuzzy points defined on real valued space R) to measure the distance between fuzzy points which is consistent with the theory of fuzzy linear spaces in the sense of Xia and Guo (2003). We further define open fuzzy set and closed fuzzy sets, in the sense of open sphere. We also define continuous fuzzy mapping more similar to classic metric space and established the properties of continuous mapping according to this new definition.

2. PRELIMINARIES

FUZZY POINTS 2.1: A fuzzy set in X is called a fuzzy points iff it takes the value '0' for $y \in X$, except one say $x \in X$. If its value at x is λ ($0 < \lambda \leq 1$). We denote this fuzzy point by x_λ, where the point x is called its support.

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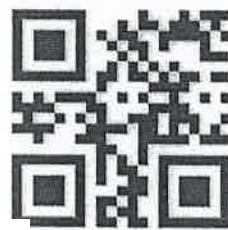
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TOPIC-DEMONETISATION AND INFORMAL ECONOMY IN INDIA

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Abstract: The failure of providing meaningful employment is the catastrophic development failure of a country. India is a diverse economy encompasses of agriculture, handicraft, wide range of modern industries and multitude services sectors, but unfortunate for the nation neither the public nor the private sector is able to provide enough employment for the widening labor force. The formal sector affords to manage only marginal cult of the unemployed population although it is an informal/ unorganized sector is increasingly recognized as an alternative source of employment in today's world. However, the informal/unorganized sector have prominent problems like job security, social security, the stability of living, migration, child labour, and exploitation of working women. Demonetisation has adversely affected significant amount of employment in the unorganised sector without giving a thrust on creation of employment opportunities in the formal sector. In this paper, we use both quantitative and qualitative data for the appropriate investigation and some serious issue like migration, issues of working women in an informal sector and the child labour are considered for analysis. It shows initial impact of Demonetisation on the informal sector of the economy.

If we evaluate economically it may be concluded that Demonetisation disrupted the functioning of informal sector of the economy where all transactions is done in cash in India and which contributes 45% of gross domestic product (GDP) and provides 80% of employment, resulted in very costly affair both in terms of growth and employment generation. Formal firms are dependent on informal firms as they are an important supplier of inputs .With a greater presence of unorganized suppliers of inputs in states more output and employment opportunities can be created. The Industrial growth is expected to slow down to 4% if the informal sector is unable to supply inputs to the organized sector, if Moreover, some of this cash is held by millions of the poor as savings and for meeting contingencies for which they are essentially dependent on cash. Since about 14.5 crore people in India are mostly working on a daily wage for non-contractual employment, their livelihood is being hurt. There are many reports about manufacturing establishments and construction sites temporarily shutting down due to shortage of cash for daily disbursal. Further, rural economy is badly hurt due to non availability of cash for sowing and other purchases. The insufficient labour laws in India encourage the problems of workers particularly the problems like no social security, no guaranteed minimum wages, and bonded labour are the outcomes of poor labour laws.

Against this backdrop, this paper attempts to spell out some of the key issues of informal economy in India and the pathways through which the economic shock transmits to the millions engaged and surviving in the informal.

Keywords: Demonetisation, Informal Economy, Migration, Working Women, Child Labour.

ANTIMICROBIAL ACTIVITY OF BIS-4,6-SULFONAMIDATED 5,7- DINITROBENZOFUROXANS

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Abstract

A new series of bis-4,6-sulfonamidated 5,7-dinitrbenzofuroxans **7–11** had been synthesized and tested for antimicrobial activity. The structures of new sulfanilamide derivatives were characterized by elemental analysis, IR spectroscopy, and mass spectrometry (MALDITOF). The synthesized compounds were tested for their in vitro antimicrobial activity using the disk diffusion method against Gram-positive bacteria Staphylococcus aureus; the Gram-negative bacteria Escherichia coli, Pseudomonas aeruginosa, and Proteus mirabilis; the fungal strain Aspergillus niger; and the yeast-like pathogenic fungus Candida albicans. Our results indicate that the compounds **7–11** exhibit potent antimicrobial activity. The stability of the compounds was evaluated by TG and DSC methods.

1. Introduction

A need for new antimicrobial agents is justified as more microorganisms develop resistance to the present drugs available in the market. Resistance of pathogenic bacteria to antibiotics is quickly becoming a major problem in the community and hospital-based healthcare settings. The search for novel agents to combat resistant bacteria has become one of the most important areas of antibacterial research today [1]. Some microorganisms are resistant to all approved antibiotics and can only be treated with potentially toxic drugs. Pharmaceutical and organic chemists are trying to synthesize new drugs with better pharmacokinetic and dynamic properties.

Since the discovery of antibacterial properties of the synthetic dye Prontosil over 70 years ago, sulfa drugs have been widely used to treat a broad spectrum of microbial diseases [2–5]. Sulfa drugs kill bacteria and fungi by interfering with cell metabolism. They exert their effect by targeting the synthase dihydropteroate (DHPS) enzyme, which catalyzes folic acid pathway in bacteria and some eukaryotic cells [6] but is not present in human cells [4].

This is the basis for the selective effect of sulfonamides on bacteria and for their broad spectrum of antibacterial activity. A free amino group (only in the para-position) is required for antibacterial activity. The sulfonamide family includes sulfadiazine, sulfamethizole (brand name Thiosulfil Forte), sulfaethylthiadiazole, sulfamethoxazole (Gantanol), sulfathiazole, sulfasalazine (Azulfidine), sulfametopyrazine, sulfisoxazole (Gantrisin), sulfadimethoxine, and various high-strength combinations of three sulfonamides. Before penicillin G, these antimicrobials were standard therapies and are still in use today [7].

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Impact of Demonetisation:
An Analysis of Online Shopping
Industry in India

Rashmi Akhoury

INTRODUCTION

India is one of the key growth countries when it comes to e-commerce but it is still at a nascent stage and has a huge potential for growth. The Indian Government's sudden and unprecedented move on November 8, 2016 to take high-value currency notes out of circulation influenced various aspect of Indian Economy. Demonetization is known as an act of stripping a currency unit of its status as legal tender. It is also known as withdrawing of a particular form of currency from circulation One year on, the after-effects of the exercise are still being felt in the economy. But the real question is, did the exercise achieve the objectives for which it was undertaken? Demonetization is a radical monetary step in which a currency unit's status as a legal tender is declared invalid. This is usually done whenever there is a change of national currency, replacing the old unit with a new one. Demonetization meant that Rs 500 and Rs 1,000 are now no longer legal tender, eliminating nearly 86 per cent of the currency in circulation, creating a huge cash crunch in the economy

While the debate on the impact of demonetization on the black economy and growth rates will continue and will be subject to interpretations, there are some impacts which will take time to show up or may even be invisible. And in this case, even the goods and services tax (GST) is as much responsible as demonetisation. The outcome is unintended but it needs to be highlighted. One of these is the impact on inequality.

The effects of this move have been seen at an individual as well as at an industry level. For online shopping in India as well, the impact has been major. While the unprecedented action taken by the Prime Minister Narendra Modi has impacted e-commerce and at the sometimes it has an impact on the consumers and their shopping behaviour through online shopping. Thus it becomes necessary to study the impact of demonetization on e- commerce industry. The main aim of the study is to understand and analyze the effect of demonetization on consumer's frequency of buying product and consumer's mode of payment mode through online shopping post demonetization.

India had an internet user base of about 365 million as of June 2016 and is expected to cross 500 million by the end of 2016. Despite being the second-largest user base in world, only behind China (650 million, 48% of population), the penetration of e-commerce is

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EFFECT OF NITROGEN SOURCE, VITAMINS AND LIGHT PERIOD ON THE GROWTH OF MARINE DIATOM PHAEODACTYLUM TRICORNUTUM BOHLIN UNDER INDIAN CONDITIONS.

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ABSTRACT

The earth is considered a huge repository of microbes with immense diversities, both in terms of quantity and qualitative characteristics of microorganisms. Diatoms are considered among the highest contributors of primary productivity in the ocean by virtue of their photosynthetic efficiency and accumulation of photosynthates, mainly in the form of lipids. Laboratory scale cultivation of diatoms has long been considered as challenging under Indian conditions due to various factors like temperature , nutrition, photoperiod and specificity of genera chosen for the studies. In temperate regions, P.tricornutum normally flourishes under marine conditions. Successful cultivation of P.tricornutum has been reported with the help of G/f2 medium. But greater insights into the nature of growth of P.tricornutum, biomass accumulation etc was lacking. Standard nutritional requirements along with optimized photoperiod studies could only be the technological imperatives needed for the development of mass cultivation techniques. The present study

Pharmacological evaluation of *Streblus asper* Lour. (Shakhotaka) extract with special reference to Antioxidant and Hypoglycemic activities

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Abstract: *Diabetes mellitus (DM) is a metabolic disorder of multiple etiologies characterized by absolute or relative deficiency of insulin secretion with or without varying degree of insulin resistance. Sedentary life style and obesity are two major epidemiological determinants of diabetes mellitus. In the present investigation hypoglycemic and antioxidant efficacy of methanol extract of Streblus asper of family Moraceae was tested on STZ induced mice diabetic models. The results clearly indicated that the diabetic control (DC) mice presented a significant lowering of body weight (p<0.001) when compared with the normal control (NC) mice. The DC mice showed a significantly (p<0.001) higher level of glucose (+279%), when compared with their normal control counterparts. Diabetic mice of all the three groups (DT150, DT250 and DT500) showed a reduction in glucose levels when compared to the DC ones. The results clearly indicated that the methanol extract of Streblus asper is antidiabetic in nature due to the presence of different types of active phytochemicals.*

The role of oxidative stress in the patho-physiology of diabetes and its associated complications are well known. The antioxidant system plays an important role in defending the cells against oxidants generated during metabolic processes and thus prevents the tissues from toxic response of the oxidants. The methanol extract of Streblus asper exhibited anti diabetic property as well as increased the levels of enzymatic and non enzymatic anti oxidant entities along with reduced MDA levels. The methanol extract of this plant did not exhibit any toxicity in the present study and thus it was concluded that the extract possesses antidiabetic as well as antioxidant properties without any adverse effect.

***Key Words:** Antioxidant activities, Diabetes mellitus, Streblus asper, Streptozotocin, Mice*

I. Introduction

Diabetes mellitus (DM) is the third leading disease, after heart attack and cancer affecting almost every organ in the human body [1] and is also called silent killer. This is a metabolic disorder of multiple etiologies [2] characterized by absolute or relative deficiency of insulin secretion with or without varying degree of insulin resistance [3, 1].

Diabetes mellitus is characterized by recurrent or persistent hyperoglycemia with an elevated fasting (>110mg/dL of blood) and post prandial (> 130mg/dL of blood) plasma glucose level. According to WHO (2006) diagnosis a fasting plasma sugar of >126mg/dL and post prandial plasma sugar value of > 200mg/dL is considered as diabetes mellitus. There are two major forms of diabetes mellitus namely Type-1, characterized by diminished production of insulin due to degeneration of pancreatic B- cells, and Type-2, the multifactorial syndrome characterized by either hypo secretion of insulin or insulin insensitivity or sometimes both. Sedentary life style and obesity are two major epidemiological determinants of diabetes mellitus. The current therapy of this disorder includes exogenous insulin administration (particularly in case of Type-1 diabetes mellitus), and oral hypoglycemic agents (for Type-2DM) which includes Metformin, Pioglitazone, Sulphonylurea etc. which may have adverse effects in diabetic subjects. Multiple risk factors for diabetes have been identified [4] (WHO, 2006). The greatest risk is impaired glucose tolerance, a precursor of diabetes. Thus, a number of type 2 diabetes prevention trials have included subjects with impaired glucose tolerance. These trials compared intensive lifestyle modifications (e.g., diet, exercise and weight loss), OHAs and placebo controls [5, 6]. Ayurvedic treatment known as *Apatarpana* (balanced diet with restricted calories) and *Santarpana* (highly nutritious, high-

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Biodiversity of Bacteria in the Rhizosphere of *Solanum melongena* L. (Brinjal) and their Characterization

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A B S T R A C T

Rhizosphere is the narrow region of soil that is directly influenced by root secretions and associated soil microorganisms. The microbe- plant interaction in the rhizosphere can be beneficial, neutral, variable, or deleterious for plant growth. Rhizobacteria that exert beneficial effects on plant development are termed plant growth promoting rhizobacteria (PGPR). In the present investigation the biodiversity of bacteria in rhizosphere and rhizoplane of *Solanum melongena* and their physiochemical characteristics was studied. The results revealed that the population density of Rhizosphere (RS) and Rhizoplane (RP) bacteria was maximum during September being 2.85×10^8 CFU/g and 2.95×10^8 CFU/g respectively which declined to 1.95×10^8 CFU/g and 2.15×10^8 CFU/g respectively in January. Sixteen bacterial flora viz. *Bacillus polymyxa*, *B. mycoides*, *Azotobacter chroococcum*, *Pseudomonas fluorescence*, *Trichoderma harzianum*, *Staphylococcus sp*, *Streptococcus sp*, *Klebsiella sp*, *Micrococcus sp*, *Corynebacterium sp*, *Arthrobacter sp*, *Lactobacillus sp*, *Clostridium sp*, *Enterococcus sp*, *Escherichia coli* and *Citrobacter sp* were recorded in the rhizosphere and rhizoplane of *Solanum melongena*. Among these only three isolates viz. *Bacillus polymyxa*, *Pseudomonas fluorescence*, and *Lactobacillus* showed catalase negative reaction. *Bacillus mycoides*, *Pseudomonas fluorescence*, *Corynebacterium*, and *Citrobacter* showed anaerobic (Hugh- Leifson's O- F) negative result. *Azotobacter chroococcum*, *Pseudomonas fluorescence*, *Corynebacterium* and *Lactobacillus* were non hemolytic whereas *Trichoderma*, *Staphylococcus*, *Klebsiella* and *Micrococcus* were recorded as hemolytic microbes. *Trichoderma*, *Klebsiella* and *Micrococcus* showed Voges Preskaur negative reaction. All isolates recovered from rhizoplane exhibited siderophore production. All the rhizospheric bacteria showed maximum Phosphate-solubilizing ability and, therefore, can be exploited as bioinoculants/ biofertilizers for improvement of crops.

1

An Analysis of the Role of Rhizobacteria that Promote Plant Growth in Agricultural Sustainability

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Abstract – Sustainable agriculture involves the effective use of agricultural capital to meet evolving human needs while preserving or improving environmental sustainability and preserving natural resources. Plant Growth Use The promotion of rhizobacteria will play an impotent function in achieving the sustainable agriculture objectives. Rhizobacteria are known as Rhizosphere-resident bacteria. The goal is to research the function of Rhizobacteria and promote plant growth in farming sustainable development.

Keywords – Plant Growth, Rhizobacteria, Sustainable Agriculture

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INTRODUCTION

Agriculture is one of the practices of human beings that contributes most through over-use of synthetic chemical fertilizers and pesticides, causing more harm to the ecosystem and possible health threats. Nitrous oxide (N_2O) is an example of chemicals produced by excessive nitrogen fertilizer use, and is a major source of global warming greenhouse gases. In addition, agricultural soil management, the largest single source, represented 74% of total US N_2O emissions in 2013. (1). Nitrogen fertilizers also reduce the biological fixation of nitrogen in the soil. Farmers use a high level of nitrogen fertilizers in ammonium nitrate to fertilize their soils to cultivate crops. The influx of ammonium means that plants no longer have symbiotic microbes to supply ammonium, which leads to a decrease in the degree of symbiosis. In addition, nitrifying bacteria also use this excess ammonium to produce nitrate. This high nitrate level is then used to manufacture N_2O and excess nitrate leaches by denitrifying bacteria (2). Increased processes of microbial nitrification and denitrification therefore increase the supply of natural N_2O. Denitrification is the stage during which microorganisms release nitrogen oxides into the environment in gas commodity, and nitrification is a two-stage ammonium phase (NH_4) (3).

Plant growth promoters (PGPs) are substances that improve overall plant health growth and development. These substances can also be produced in synthesis or from biological derivatives. Plant growth promoters (PGP) are effective in significantly increasing crops, quality and productivity. PGPs are simpler and safer, especially biological derivatives. They're going to be advised for all crops.

Among PGPs, Amino acids, organic derivatives obtaining biological resources such as fish waste, animal waste, plant macromolecules such as soya, maize, groundnut, etc. Amino acids currently play a substantial market share among completely different categories of PGPs, thanks to their properties which facilitate plant growth and development such as flowering, mature and overall yield increase. It is clear from the top of the table that there is a high demand for Amino acids for its plant growth properties. There is therefore considerable potential for amino acids on the market of PGPs.

Rhizobacteria are root-associated bacteria with a sort of dependence on several plants. The name derives from the Greek rhiza, which means root. There are parasite rhizobacteria, the term sometimes refers to bacteria which have a relation useful to each parasite (mutualism). They are a crucial cluster of biofertilizer microorganisms. Biofertilization accounts for approximately 65 percent of the world's crop gas supplied. Required citation] Rhizobacteria are typically referred to as rhizobacteria that promote plant growth or as PGPRs.

Promoting plant growth Rhizobacteria have {different|totally different} relationships

A BRIEF REVIEW ON THE BOTANICAL ASPECTS OF PHYLLANTHUS AMARUS COLLECTED FROM PATNA, BIHAR, INDIA

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ABSTRACT
Phyllanthus amarus is a wild plant and found in tropical and sub tropical region of the world. It is also found in Patna district as a weed in cultivated land and also other places as weed. It is approax 50 cm in hight. It is herb and also found in road side, railway track side. Phyllanthus amarus have many important phytochemicals and traditionally used in medicinal systems of India. Phytochemicals found in Phyllanthus amarus responsible for several pharmacological activities. In this study noted the Phyllanthus amarus distribution, habit, growth, morphological characters etc.

Keywords: Phyllanthus amarus, habit, climate, phytochemical, therapeutic.

INTRODUCTION
Phyllanthus amarus is a wild plant belong to family Euphorbiaceae (Phyllantheceae). The genus *Phyllanthus* is a consists approximately 1000 species, large and widely distributed in the tropical and subtropical zone [1,2]. In the India plant is widely distributed as wild plant. The climate of tropical and subtropical zones are suitable for growth of *Phyllanthus amarus*. The climate of Patna is also suitable for the growth of *Phyllanthus amarus*. The ethnic tribes of India used the herbs of *Phyllanthus* species as traditional home remedies. *Phyllanthus amarus* is used for the treatment of jaundice, gastropathy, diarrhea, dysentery, fevers, menorrhagia, scabies, genital infections, ulcers, and wounds[3]. Phyllanthus means "Leaf and flower" and named so because of its appearance where flower, fruit and leaf appears fused[4]. *Phyllanthus amarus* plant is 30-60cm high and branching annual glabrous herb. *Phyllanthus amarus* leaf bearing branchlets, subseseile elliptic-oblong obtuse and rounded base. The flowers of *Phyllanthus amarus* are yellowish, whitish or greenish aweillary, males flowers in groups of 1-3 where as females are solitary. Fruits of *Phyllanthus amarus* are depressed globose like smooth capsules present under neath the branches and seeds are trigonous pale brown with longitudinal parallel ribs on the back.

Botanical classification of *Phyllanthus amarus* Schum. & Thonn.

Kingdom	- Plantae
Subkingdom	- Viridiplantae
Infrakingdom	- Streptophyta
Superdivison	- Embryophyta
Division	- Tracheophyta
Subdivision	- Spermatophytina
Class	- Magnoliopsida
Superorder	- Rosanae
Order	- Malpighiales
Family	- Phyllanthaceae
Genus	- *Phyllanthus*
Species	- *amarus*

MATERIALS AND METHODS
In this study, the study area was selected the Patna district. Patna is located at southern bank of Ganga River and its confluence of other three rivers in its vicinity-Sone, Gandak and Punpun in Middle Ganga Plain[5]. The climate of Patna is favorable for growth of *Phyllanthus amarus*. Plant samples were collected by extensive field trips in various parts of Patna district. Plant samples collected from road side, bank of river and waste land. All the observations and field data were noted out. With the help of book, Indian Medicinal Plants by Kiritkar and Basu[6], the identification was conformed. Voucher specimen of each plant sample was dry-mounted, photo graphed and preserved for future reference.

Understanding the Role of *aflS* Gene Expression in *Aspergillus flavus* and *Aspergillus oryzae* Regarding the Aflatoxin Production

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Abstract: The fungus *Aspergillus flavus* and *Aspergillus oryzae* are morphologically similar to each other and both belong to Aspergillus Section Flavi. Genetic study and genome sequencing of *A. flavus* and *A. oryzae* also revealed that both are closely related species. But, *A. flavus* is harmful for both human and animal due to its aflatoxins production, while *A. oryzae* is safe for both human and animal because it does not produce aflatoxins. Hence, *A. flavus* is known as the evil twin of *A. oryzae*. Aflatoxins are carcinogenic secondary metabolites. They cause liver cancer and Aspergillosis in both human and animal. In this study, genomic DNA of *A. flavus* and *A. oryzae* were extracted. Conventional PCR was used to amplify the aflS gene and for more conformation, Real-Time PCR was also used to detect the expression of *aflS* gene in both mold. Expression of *aflS* gene was detected in the genome of *A.flavus*, but not detected in the genome of *A. oryzae*. The *aflS* gene is responsible for the formation of many compounds such as NOR, AVN, DMST and OMST, and these are the main precursor compound for the synthesis of aflatoxins. So, based on obtained result, it can be concluded that lack of *aflS* gene in *A. oryzae* might be responsible for its non-aflatoxigenic property, and production of aflatoxins from *A. flavus* might be blocked by inhibiting the expression of *aflS* gene.

Keywords: *Aspergillus flavus, Aspergillus oryzae,* Aflatoxins, *aflS* gene, NOR, AVN, DMST and OMST.

Introduction:

The most serious problem of *Aspergillus flavus* infection is the production of aflatoxin. Aflatoxin was first recognised as carcinogenic, just after the outbreak of the "Turkey X" disease in England in 1960. Aflatoxin is also known as toxigenic, mutagenic, and teratogenic in nature (Kumar, Topno *et al.* 2018). It causes mutation (transversion) at 249th codon of P53 gene ((Kurtzman, Horn *et al.* 1987, Richard 2007). It was named "Class 1 Human Carcinogen" by the International Agency for Research on Cancer (IARC)

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Synthesis and Biological Activity of Some Schiff Bases from Phthalimides

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Abstract An innovative protocol to the synthesis of this material emerged on exploring the potential of the various form of N-aminophthalimides on its reaction with a number of aromatic aldehydes. New series of biologically active substituted Schiff bases with general formula, R1N=CHR2 where R1 = 3-nitro-N-aminophthalimide, 3-bromo-N-aminophthalimide, 4-nitro-N-aminophthalimide, 4-bromo-N-aminophthalimide, R2 =2, 6-dichlorobenzaldehyde, o-anisaldehyde and o-vanillin were synthesized by the reaction of substituted N-aminophthalimides and substituted aldehydes in ethanol. Moreover N-aminophthalimides (50-70% yield) were synthesized by reactions of corresponding phthalimides and hydrazine hydrate. Such compounds were characterized by different physico-chemical techniques like, melting point, elemental analysis, multinuclear NMR (1H, 13C).The synthesized compounds were screened for antibacterial and antifungal activities. The explorations of the biological properties of the compounds are mentioned in this paper.

Keywords N-aminophthalimide, Schiff Bases, Antimicrobial Activity, Aromatic Aldehydes, Azomethine

1. Introduction

Recent years have witnessed a great deal of interest in the synthesis and characterisation of Schiff bases [1]. They have a wide variety of applications in various fields, *e.g.*, biological, inorganic and analytical chemistry [2-6]. They are used in optical and electrochemical sensors as well as in various chromatographic methods, to enable detection of enhance selectivity and sensitivity [7-9]. They possess excellent characteristics structural similarities with natural biological substances. Relatively easy preparation procedures and the synthetic flexibility enables design of suitable structural properties [10-16]. Schiff bases are also effective corrosion inhibitor because of ability of forming monolayer on the surface to be protected due to interaction with C=N by electron transfer, chemisorptions [17-19]. In addition to this the atoms of the benzene rings create multiple adsorption sites for the inhibitor in forming stable monolayer formation. Imine linkage formed between the aldehyde derived from vitamin A and the protein opsin present in the retina of the eye plays a vital role in the chemistry of vision. Vitamin B_6 serves as a coenzyme and is capable to form an imine with amino acid of protein. This is helpful in the transfer of the amino group from one amino acid to another, the transamination reactions, which is important in the metabolism and the biosynthesis of amino acids. Reports have shown that the presence of a lone pair of electrons in sp^2 hybridized orbital of nitrogen atom present on the azomethine group has a vital role in exhibiting chemical and biological importance [20]. Schiff bases have been reported in their biological properties, such as, antibacterial, antifungal activities [21-24]. They are active against a wide range of organisms for example; *Candida albicans, Escherichia coli, Staphylococcus aureus, Bacillus polymyxa, Trichophyton gypseum, Mycobacteria, Erysiphe graminis* and *Plasmopara viticola* [25-28]. Ortho-phenylenediamine Schiff bases show clinical properties [29]. Isatin Schiff bases were reported to possess antiviral, anti-HIV, antiprotozoal and anthelmintic activities [30]. They also exhibit significant anticonvulsant activity, apart from other pharmacological properties [31]. Certain cobalt Schiff base complexes are potent antiviral agents [32]. Schiff bases derived from 4-dimethylamine benzaldehyde shows antibacterial activity, in medicines used as antibodies and anti-inflammatory agents [33-38]. All these facts prompted us to extend such works and we focused to synthesise Schiff bases with heterocyclic moieties such as phthalimides [39]. We also planned to screen such newly synthesized Schiff bases against microbial activities.

Following is the schematic diagram for preparation of Schiff bases which we followed:

Organizational and Individual Level Antecedents of Psychological Capital and its Associated Outcomes: Development of a Conceptual Framework

Urmila Rani Srivastava[1]
Vandana Maurya[2]

Abstract

The importance of positivity in life has been recognized long time back with the pioneering works of Seligman. Positive psychology as a field was founded on the belief that people want to lead meaningful and fulfilling lives, to cultivate what is best within them, and enhance their experiences of love, work and play. However, the potential need to incorporate the principles of positive psychology to enhance the lives of employees at workplace has been identified very lately. This review article starts with the journey from positive psychology to positive organizational behaviour (POB) followed by the elaborated conceptual development of psychological capital (PsyCap) and its uniqueness in relation to other positive constructs. Next section of the article presents evidence of major theoretical contributions in developing the field of POB and PsyCap along with distinction between states versus trait paradigm in Psychology. The purpose of this article is to provide an overview of recently introduced concept of PsyCap and reveal its antecedents and consequences. We have synthesized and integrated recent empirical research examining the nature of the construct of PsyCap and develop a conceptual framework regarding its individual and organizational antecedents and consequences for further understanding of the relevant issues in the area of PsyCap and POB. The organizational level antecedents of PsyCap included in this article are work engagement, organizational justice, workplace social support and authentic leadership. Likewise, individual level antecedents of PsyCap covered in this article are sense of humour and positive emotions. The major potential outcomes of PsyCap in the present article included both desirable (mental health, organizational citizenship behaviour (OCB), creative performance and ethical performance) and undesirable (incivility) work-related organizational outcomes. Several preliminary propositions have been offered to guide future research and the role of PsyCap within a broad theoretical and empirical context is discussed.

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INDEX

Research Article

Isolation and identification of endophytic fungi from two medicinally important orchids, *Satyrium nepalense* D. Don and *Herminium lanceum* (Thunb. ex sw.) Vuijk

Deepak K. Singh, Akanksha Priya, Saloni Malik, Rupam Kapoor and Shashi B. Babbar*
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ABSTRACT

Endophytic fungi isolated from medicinal plants can be good sources of medicine. *Satyrium nepalense* and *Herminium lanceum* are two medicinally important orchids. Decoction of stems, roots and tubers of *Satyrium nepalense*, locally known as 'Salam mishri', is prescribed in various ailments and also as dietary supplement since ancient times. *H. lanceum*, locally known as 'Jalya', is used for the treatment of urinary problems, diabetes, fever and haemorrhagia. A total of 12 fungal species, eight and four, respectively, were isolated from the root cultures of *S. nepalense* and *H. lanceum*. For the identification of these isolates, nuclear internal transcribed spacer (ITS) from each of these was amplified and sequenced. The amplification and sequencing of ITS was successful from 11 of the 12 fungi. All the amplicons yielded barcode quality sequences, which have been submitted to the GenBank, NCBI. The fungi were identified by BLAST method on NCBI as well as BOLD. Five fungal species, *Ilyonectria estremocensis*, *Cryptosporiopsis ericae*, *Thanatephorus cucumeris*, *Phialophora mustea*, *Aspergillus species* from *S. nepalense*, and two from *H. lanceum*, *Fusarium falciforme* and *Aspergillus flavus*, were identified. Most of these fungi have been shown to be antibacterial and/or anti-cancerous, and a few are the known to be sources of bioactive molecules.

Keywords: Orchids, endophytic fungi, therapeutics, ITS, BLAST

INTRODUCTION

The term 'endophyte' was coined by Bary (1866). It is commonly defined as an endosymbiont, often bacteria (Kobayashi and Palmbo, 2000), fungi (Stone *et al.*, 2000), algae (Peters, 1991) or insects (Feller, 1995) that live within a plant for at least a part of their life cycle without causing symptoms of disease. Endophytic fungi are ubiquitous (Davey and Currah, 2006) and predominantly belong to Ascomycota, Basidiomycota and Zygomycota (Zheng and Jiang, 1995; Sinclair and Cerkauskas, 1996; Guo, 2001). Endophytes profoundly influence growth and nutrient status of plants and increase the tolerance of plants to various abiotic and biotic stresses, which could be habitat-specific (Brundrett, 2006; Gouda *et al.*, 2016). They produce phytohormones, enzymes and bioactive compounds of pharmaceutical interest and therefore, have been aptly described as the treasure houses of bioactive compounds of medicinal importance (Gouda *et al.*, 2016). The bioactive chemicals produced by endophytes are alkaloids, phenolic acids, quinones, steroids, saponins, tannins, and terpenoids that serve as potential candidates for antimicrobial, anti-insect, anticancer and many more properties (Shukla *et al.*, 2014). While plant sources are being extensively explored for new chemicals for therapeutic purposes, endophytic microbes also constitute an important source for drug discovery (Gouda *et al.*, 2016). Endophytic fungi isolated from medicinal plants can be a good source of medicine.

Satyrium nepalense is a medicinal herb locally known as 'Salam mishri' (Jalal *et al.*, 2008). The genus is found in

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RESEARCH ARTICLE

EFFECT OF ACETONE EXTRACT OF *ZEA MAYS* L. LEAVES ON THE GROWTH OF *ASPERGILLUS FLAVUS* AND AFLATOXINS PRODUCTION.

Harish Kumar[1], Maneesh Kumar[1], Byas Kumar[1], Soniya Bharti[1], Pramod Kumar[1], Manoj Kumar[2] and *Jainendra Kumar[1,2].

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Manuscript Info	Abstract
Manuscript History Received: 20 June 2017 Final Accepted: 22 July 2017 Published: August 2017 *Key words:-* *Aspergillus flavus*, phytoconstituents, Aflatoxins, *Zea mays* L., TLC, anti-aflatoxigenic.	Present study outlines the antifungal and anti-aflatoxigenic effect of the acetone extract of *Zea mays* L. leaves, cultivar Pioneer- 30V92. As contamination of *Aspergillus flavus* is a major challenge in agriculture and food industry, we tried to inhibit the growth of *A. flavus* along with its aflatoxins production. Acetone extract of *Zea mays* L. leaves of strain Pioneer-30V92 was investigated for its antifungal and anti-aflatoxigenic activities against the aflatoxigenic strain of *A. flavus*. Phytochemical study revealed the presence of proteins, carbohydrates, flavonoids and terpenes in the extract. The antifungal activity of this extract against the growth of *A. flavus* was investigated by agar plate diffusion method, and anti-aflatoxigenic activity was determined by using Czapek Dox Broth (CDB) medium. TLC was employed for qualitative and quantitative study of the aflatoxins. Overall experimental results indicated that acetone extract of *Zea mays* L. leaves (Pioneer-30V92) has good inhibitory effect on aflatoxins production and growth of the *A. flavus*

Introduction:-

Aspergillus flavus is a pathogenic fungus and approximately 25-40% of raw world agricultural products are susceptible to infection by this mold (Sharma and Sharma, 2012). It destroys foodstuffs and grains such as corn, peanuts, cottonseeds, tree nuts, etc. (Mishra and Dubey, 1994). *A. flavus* produces aflatoxins, which are a class of mycotoxin and considered as toxigenic, carcinogenic, mutagenic, and teratogenic in nature (Patten, 1981). Aflatoxins are named "Class 1 Human Carcinogen" by the International Agency for Research on Cancer (IARC) (Williams *et al.*, 2004). Aflatoxins inhibit seedling growth, root elongation, carotenoid synthesis, chlorophyll synthesis, seed germination and production of some enzymes in plants (Jones *et al.*, 1980) Tropical and subtropical countries are facing the problem of aflatoxins contamination at large scale due to their hot and humid climatic conditions, which are favorable for mold growth and mycotoxin production. During prolonged storage, food items are damaged by oxidative stress due to free radical generation that leads to the damage of important cellular molecules such as proteins, nucleic acid and lipids (B. Prakash *et al.*, 2015). There is direct relation between aflatoxins production, oxidative stress and free radical generation (Jayashree and Subramanyam, 2000). Aflatoxins contamination of foodstuffs and other items have imposed a challenging scenario across the world and there is an urgent need to get rid of the problem.

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STUDY OF EFFECT OF ETHANOLIC EXTRACTS OF *Phyllanthus amarus* ON THE ROOT OF *Allium cepa* (L.) AND *Allium sativum* (L.)

Jitendra Kumar[1] and Manoj Kumar[2]

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Abstract: *Cytological studies of the effects of ethanolic extract of Phyllanthus amarus is the plant has served as lead for several experimental investigators that explored its phytochemical constituents uses the roots of Allium cepa L. and Allium sativum L. treated with ethanolic extract of Phyllanthus amarus on different concentration of ethanol (20% to 80%). A degree of chromosomal aberrations and physiological disturbances during mitotic divisions were observed after the treatments. The observations showed on exponential relationship between the % of abnormalities and the concentrations of ethanol applied.*
Keyword: *Allium cepa Allium sativum, Ethanol, Leaf extract of Phyllanthus amaru, cytological effects.*

Introduction: *Phyllanthus amarus* is a plant of the family euphorbiaceae and has about approximately 800 species which are found in tropical and subtropical countries. The genus allium being a member of family liliaceae is an important crop plant. It is used an vegetables and also has medicinal values. It is rich in vitamin, minerals and trace elements. It helps in digestion, stimulates kidney function and blood purifier. *Allium* is antiseptic, ethanol extract of *Phyllanthus amarus* used in this study is shown to be a potent phytochemical mutogen in both higher and lower organisms [1]. The present work perfomed in order to investigate potential effects of *Phyllanthu amarus* leaf extacts on both the species of *Allium* and its elimination through M1 and M2 generation.

The *Phyllanthus amarus* has been found in Philippines, Cuba, Nigeria and among others. In India, *Phyllanthus amarus* is widely distributed as a weed in cultivated and waste lands. *Phyllanthus amarus* have numerous phytocompounds such as alkaloids, flavonoids, tannins, lignins polyphenolic compounds and tetracyclic triterpenoids, several phytoconstituents isolated from this plant. Antimicrobial activity of ethanol extracts of *Phyllanthus amarus* were evaluated against the test organisms *Salmonella typhi*. Ethanolic extract of *Phyllanthus amarus* were employed for antimicrobial evalution by agar cup diffusion method which are compared against standard antibiotics that were evaluated by disk diffusion method. Ethanolic extract isolated phyllanthin from *Phyllanthus amarus* leaf due to phyllathin effect of cytology of *Allium* sps.

Effect of *Phyllanthus amarus* is evident from the study in which ethanol extract of *Phyllanthus amarus* leaves caused a significant doses dependent decrease in the levels of total cholesterol, urea, total protein, uricacid and prostotic, alkaline and acid phosphatases, as partate transminase and alanine transaminase. Since increase in enzyme in these enzymes is related to hepatic and heart disorders therefore their reduction shows that the leaves *Phyllanthus amarus* have hepatic and heart disorders therefore their reduction shows that leaves have hepato protective, nephroprotective and cardioprotective proproteine. Histopathalogical study confirmed the beneficial effect of *Phyllanthus amarus* with its potential antioxidant activity [2].

Materials and Methods

Preperation of Ethanolic extracts of *Phyllanthus amarus*: *Phyllanthus amarus* leaves (100g) were cleaned with water following which the leaves were ground into solution using an electric blender and successfully extracted with 200ml of ethanol (80%).The solution was kept at room temperature for

ETHNOBOTANY

ETHNOBOTANICAL STUDIES IN Desmostachya bipinnata (Linn.) STAPF. : A REVIEW

Syed Irfanur Rahman* and Manoj Kumar**

Key words : Ethnobotanical, Desmostachya bipinnata (L.), Bioconstituents.

Desmostachya bipinnata (L.) Stapf. (Poaceae), or Kusha in Sanskrit, is a sacred grass used extensively in Indian Vedic practices. It is well known for its medicinal value and is used in traditional Indian medicine to treat microbial infections in combination with other herbs. Thus a literature review was conducted to elaborate the ethnobotanical as well as clinical importance of this sacred grass.

INTRODUCTION

At present, herbal medicine represents one of the most important fields of traditional medicine all over the world. To promote the proper use of herbal medicines and to determine their potential as sources for new drugs, it is essential to study medicinal plants having folklore reputation in a more intensified way. Medicinal plants have been used for centuries by a vast human population of the world as remedies for human diseases.

Desmostachya bipinnata (L.) Stapf., Poaceae, is considered as a highly sacred grass among Vedic scholars in India. It is known as 'Kusha' in Sanskrit and constitutes a vital ingredient for almost all Vedic rituals and sacrifices. Its miraculous healing powers and medicinal value have been well documented in various Ayurvedic texts and preparations such as Tripanchamool, Kusablecha, and Kusadya-ghrita (Shrestha et al. 2000). Its chief medicinal properties include its uses as an astringent, galactagogue, analgesic, antipyretic, aphrodisiac, anti-inflammatory, wound-healing, anti-asthmatic, anti-diuretic and as a sedative to pregnant women. It is used along with other herbs to treat dysentery, diarrhoea, jaundice, dysuria, nausea, menorrhagia and skin infections (Kirtikar and Basu, 1918; Joshi, 2003; Alikhan and Khanun, 2004).

The scarcity of fresh and novel therapeutic agents or compounds and the severe unrelenting global clinical problem of antibiotics 'resistance' have also put on the spotlight the generous use of already commercialized antibiotics. This scenario thus signals a critical need for innovation, which is further exacerbated due to a global retreat on the development of new API (Active Pharmaceutical Ingredient) by the pharmacological sector. Under the realization of this situation, the present literature review related to ethnobotanical importance of Desmostachya bipinnata (Linn.) was conducted.

DISCUSSION

Desmostachya bipinnata (Linn.) belongs to the family, Poaceae (Graminae). It is known as Sacrificial Grass or Saved Gram in English (API, 2001). It is used for medicinal as well as holy purposes. It is known as Tharuppai and its kudineer is

prescribed for any type of disorder, fevers, itching and diuretic problems in Siddha literatures. It is useful for curing urinary tract diseases and excessive vaginal discharges (Pillai & Villakkam, 1967). Many secondary metabolites have been isolated from this plant, such as scopoletine, umbelliferone, sugars, amino acids, carbohydrates, kaempferol, quercetin, quercetin-3-O-glucoside, trycin, trycin-7-O-glucoside from the aerial part; 4-methoxy quercetin-7-O-glucoside from the whole plant; 2, 6-dihydroxy-7-methoxy-3H-xanthen-3 - 1 from leafly culms and eseroiline, camphene, caryophyllene diepoxide from the aerial parts (Hifnawy, 1999; Awaad et al. 2008; Ramadan and Safwat, 2009; Shrestha, 2011; Kumar et al. 2010).

Medicinal plants constitute an important component of human need and are widely distributed in India. The pharmacological evaluation of substances from plants is an established method for the identification of lead compounds which can help the development of novel and safe medicinal agents. Traditional systems of medicine continue to be widely practised in rural Bihar. Population rise, inadequate supply of drugs, prohibitive cost of treatments, side effects of several allopathic drugs and development of resistance to currently used drugs for infectious diseases have led to increased emphasis on the use of plant materials as a source of medicines for a wide variety of human ailments (Joshi, 2003).

The herbal plant Desmostachya bipinnata is used in yagnas and religious rites (Prajapati et al. 2003). It has several synonyms like Briza bipinnata L., Eragrostis bipinnata L., Eragrostis cynosuriodes (Retz.), commonly known in English by names Halfa grass, an old perennial grass. Desmostachya bipinnata is native to north east, west tropical, Northern Africa and countries in the Middle East, temperate and tropical Asia including India. According to religious books Desmostachya bipinnata has long been used in various traditions as a sacred plant. The plant was mentioned in the Rig veda for use in sacred ceremonies and also seat for priests. In arid regions Desmostachya bipinnata has been used as a fodder for domesticated livestock.

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Habitat and distribution of *Phyllanthus amarus* in Patna district of Bihar, India

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Abstract: Phyllanthus amarus is worldwide distributed plant and it is found in tropical and subtropical region of planet. The plant is non woody in habit and approx 50 cm in hight. *Phyllanthus amarus* found as a wild plant and also found as a weed in cultivated land,road side, railway track side, in a garden etc. The climate of Patna district is suitable for the growing of *Phyllanthus amarus*.In this study, observed the *Phyllanthus amarus* plant found in Patna district as a weed in cultivated land, National Highway side, Railway track side and other rural area of Patna district. *Phyllanthus amarus* plant have many medicinal properties so it is very important plant for this study.

Key Words: Phyllanthus amarus, Euphorbiaceae, habitat, distribution, climate.

1. Introduction

Phyllanthus amarus is widely distributed in all tropical and subtropical region of planet. *Phyllanthus amarus* is a wild plant of the family Euphorbiaceae (Phyllantheceae). *Phyllanthus amarus* plant has been widely distributed as a weed in cultivated and waste land in India.Distribution of plant in worldwide specially in Philiphines, Cuba, Nigeria and other country..The map shows countries where the species has been found. It not grows in Australia plants, grows in agriculture land, waste land coastal area, river banks in rainy season. *Phyllanthus amarus* is an herb and seen in moist deciduous forest plantations and in plains[1]. *Phyllanthus* genus consists of approx 1000 species and spread worldwide [2,3]. In India *Phyllanthus amarus* is found in as a weed in cultivated and waste lands[4].*Phyllanthus amarus* plant may be indigenous to the tropical Americas[5] and the Philippines or India[5,6].

2. Materials and Methods

Study area: In this study Patna district is selected for the habitat of *Phyllanthus amarus*. Patna is located at southern bank of Ganga river and its confluence of other three rivers in its vicinity- Sone,Gandak and Punpun in Middle Ganga Plain[7]. *Phyllanthus amarus* is a common pantropical weed that grows well in moist, shady and sunny places[5]. The climate of Patna district is of moderate type characterised by quite hot in summers to mild cold in winters. Rainfall is moderate and erratic during Kharif season. Patna is suitable for well growing of *Phyllanthus amarus*.

In Patna, *Phyllanthus amarus* found in as a weed in cultivated land, road side, Railway track side, Diyara land.The plant samples were collected and observed by extensive field trips in different location of Patna. All the observations and field data were noted out. With the help of important reference, Indian Medicinal Plants by Kiritkar and Basu[8], the identification was conformed. Voucher specimen of each plant sample was dry-mounted, photo graphed and preserved for future reference. Habitat and distribution of the plant samples were observed.

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Survey and fortnightly observation to find out major insect pests of rice crop (*Oryza sativa*) in Patna district of Bihar

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Abstract
Survey was conducted on major insect pests incidence on BPT-5204 rice ecosystem which covered 70 % cultivated rice growing area in Phulwarisharif Block of Patna District of Bihar State, India. The present studies were done in kharif season (2013–14) of Phulwarisharif Block of Patna District. Major insect pests of rice were inducing major problem in rice production in Patna District. The survey was conducted at both vegetative and reproductive stages of paddy. Fortnightly observations of major insect pests were done in relation to population dynamics and percentage damage extents in different Plots at vegetative and reproductive phase of paddy. Fortnightly observation provides information about pest population in relation to metrological changes. The crop is infested by major insect pests which play a significant role in limiting BPT-5204 rice production .

Keywords: Survey, fortnightly observation, Phulwarisharif, kharif, extent, vegetative

1. Introduction
Rice (*Oryza sativa*) is staple crop of Bihar, India and some part of the world. Rice is a major cereal crop of Patna district of Bihar State. It is a rich source of Carbohydrates (75 %) and Proteins (7 %). Rice contains gluten protein, which is responsible for softness of rice after cooking. It is also known as "Oryzinin". Besides, carbohydrate and proteins rice contains lipids, vitamins and minerals. The paddy crop is highly sensitive and potential host for several insect pests (Prasad *et al.*, 2005). Two major factors are responsible for low yield of BPT-5204 i.e. major insect pests attack and adverse conditions of environment. Insect-pests attack the rice crop from the time of nursery bed is prepared until harvest. Rice field is an artificial managed ecosystem for small duration of time in which a large diversity of flora, fauna and microbial species provides a wide range of services for human well-being (MEA 2005) [2]. A number of insect pests were recorded from the paddy field of Patna district but some of them were highly destructive. Those insect pests were considering as major insect pest that damage either 10% or more than 10%. Fortnightly observation is necessary for study of damaging nature major insect pests in relation to their population dynamics. Fortnightly observation provide as clear cut information about population dynamics of insect pest in paddy field, which provide support for making decision for management of major pests. Fortnightly observation of insects and their destructive phase, reveal that they are either major pests or minor pests.

Scirpophaga incertulas (Walker) is a monophagous pest of paddy that belongs to order Lepidoptera and family *Pyralidae*. This pest is most destructive pest and found almost all region of world. Symptoms of this pest is characterised by "dead heart" in hill at vegetative stage and "white ear" in panicle at reproductive stage. The last instar of larvae created an out let hole and pupate in silken cocoon inside the larval tunnel in the base of plant (Sarwar 2012a; 2012b) [3]. When infestation occur at flowering stage, the ear head become chaffy (Jadho and Khurad 2012) [4]. The population of *N. virescens* dominant in Tropic area including Sri Lanka (Fernado, 1967) [5], Philippines (Nasu, 1967) [6] and India, Burma, China, Taiwan, Malaysia (Ghauri, 1971) [7]. *Nephotettix virescens* and *Nilaparvata lugens* are sucking pest of rice that belong to order Hemiptera and family *Ciccadellidae* and *Delphacidae* respectively, damage symptoms of *Nephotettix virescens* characterized by " yellow/ brown leaves" while *Nilaparvata lugens* characterized by "Hopper burn". Higher population of leaf folder (*Cnaphalocrocis medinalis*) was found higher in kharif season during 1995-1997 by Prasad Kumar (2003) [1].

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Structural and Magnetisation Studies of Alloy of Immiscible Metals Prepared by Electrochemical Method

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Abstract:
Metastable $Fe_x Cu_{100-x}$ with x= 10,15, 29 and 45, alloys in powder form have been synthesized by a single bath two electrode electrodeposition method . The alloys are thermally stable up to 300^0C after which a gradual phase segregation takes place. Mossbauer spectra of the as-prepared samples show a quadrupole doublet with a large line broadening which decreases as the Fe concentration in the alloy is increased. The line broadening further increases with the annealing of the samples, passes through a maximum and sharply falls to very small values as the annealing temperature reaches 600^0C.

Keywords: Iron-based alloys; Mossbauer spectroscopy; X-ray fluorescence; Electrodeposition'
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1. Introduction
Synthesizing metastable alloys from insoluble binary metallic systems have always been a matter of fascination for researchers. These alloys offer a multitude of new properties and applications [1,2]. Usually, Iron and Copper are supposed to be insoluble and numerous efforts have been undertaken to synthesize Fe–Cu alloy. Iron and Copper have negligible mutual solid solubility at room temperature despite the fact that iron (Z = 26) and copper (Z = 29) are very near in the periodic table [3]. Nonequilibrium techniques such as ball milling [4–7], co-vapor deposition [8], rapid quenching [9], RF sputtering [10], ion-beam mixing [11], etc. have been used to prepare Fe_xCu_{100-x} metastable alloys at almost all compositions. High iron concentration leads to a BCC phase and a low iron concentration to an FCC phase. Mixed BCC and FCC phases occur for intermediate concentrations . The range of compositions forming BCC or FCC metastable alloy is found to be highly dependent on the preparation method. For ball-milled Fe–Cu alloys, a BCC structure evolves for iron concentration between 75% and 100%, whereas it is FCC for 0–60% iron. Mixed BCC and FCC phases evolve for iron concentration between 60–75%. Alloys made by rapid thermal quenching [9] show mixed phase for 19–85% iron concentration. Mixed BCC and FCC phases occur at 40–55% iron for films made by sputtering [10], at 35–60% for thermally evaporated films and at 27–30% for the electrodeposited films [12]. In the FCC phase, the alloy is found to be paramagnetic, whereas in the BCC phase it shows magnetization smaller than what can be expected from a simple dilution law.

Synthesis of Transition Metal Doped ZnO Nanoparticles for Its use as an Adsorbent for Waste Water Treatment

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ABSTRACT

Cr-doped ZnO nanoparticles (NPs) having different contents of Cr^{3+} have been synthesized by solvothermal method. The as-prepared products have been characterized by transmission electron microscopy (TEM), scanning electron microscopy (SEM), X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS) and Fourier transform infrared spectroscopy (FT-IR). In accordance with the adsorption capacity of the products, the obtained optimal Cr/Zn molar ratio is 6%. The adsorption process of Methyl Orange (MO) on Cr-doped ZnO was investigated by kinetics, thermodynamics, and isotherm technologies, which, respectively, indicated that the adsorption was fast. The adsorption reached equilibrium in 2 h and it agreed well with the Langmuir isotherm with a maximum adsorption capacity of 310.56 mg g−1. Moreover, a reasonable mechanism was proposed to elucidate the reasons for their adsorption behavior. In addition, a simple and low-cost chemical method was developed to separate and recycle ZnO and MO from the used adsorbent, effectively avoiding the secondary pollution. This work can not only describe efficient experimental approaches for obtaining novel adsorbents and recycling them but also offer valuable clues for the preparation and property study of other semiconductor adsorbents.

KEYWORDS: Cr-doped ZnO, adsorption, methyl orange, kinetics, isotherm

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MATHEMATICAL MODELING ON GROWTH OF POPULATION WITH HARVESTING: SOME ASPECTS

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ABSTRACT

The growing human need for more energy and more food has been leading to increase exploitation of biological resources. On the other hand, the present global demand is to protect ecology and environment. In the face of these two opposing approaches, we are looking for a sustainable development policy in every sphere of our life. The present paper provides mathematical modeling on growth of population with harvesting: some aspects. In this paper we have discuss about Logistic Model with Constant Harvesting Rate, Growth of Population, Harvesting Rate Being Proportional to Population Size, Growth of Predator-prey Populations with Harvesting and Growth of Populations in Competition under Harvesting.

Introduction

The ability to predict the population size of a group of individuals is extremely useful to the study of ecology. It allows for the estimation of the various effects imposed upon a group by internal and external forces [1]. We note that the word force has a different meaning in population modeling than in physics. You can think of these forces as factors that impact the population – for example, availability of food, spread of disease, interactions with other species. Among the most important concerns in population ecology is the effect of harvesting a natural population [7]. Harvesting can represent reduction of the population due to hunting or capturing individuals, which in effect removes individuals from the population \[6]. A deliberate decision to cut back expenditure of all kinds on a particular product (usually in the decline stage of its life cycle) in order to maximize profit from it, even if in doing so it continues to lose market share[2,3].

This outlook has necessitated scientific management of exploitation of biological resources like fisheries and forests, and in order to achieve this goal, bio-economic modeling is being increasingly used now-a-day [9]. The basic issues related to this field were presented by Colin Clark in his first book [4]. The technique and issues associated with bio-economic modeling were further developed by Clark in his book [5]. An interested reader may find contributions of the author the articles [8, 10].

(A) Logistic-Model with Constant Harvesting Rate

Let x (t) be the population size at time t, and let F(x) be the natural biological growth rate in the absence of harvesting. Also, let h (t) is the harvesting rate. Then we get

$$dx/dt = F(x) - h(t) \tag{1.1}$$

Let us consider the particular case when

$$F(x) = ax - bx^2, \ h(t) = h = constant$$

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Static Charged Fluid Spheres with Conformal Flatness In Einstein-Maxwell Theory

Authored By

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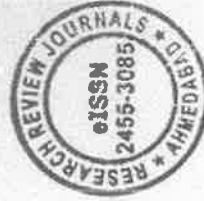
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Static Charged Fluid Spheres with Conformal Flatness In Einstein-Maxwell Theory

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ARTICLE DETAILS

ABSTRACT

The present paper provides some solutions of Einstein-Maxwell field equations for static conformally flat charged perfect fluid sphere by considering uniform mass density. Pressure and density have been calculated for the distribution.

1. Introduction

Much attention has been shown in finding exact solutions of coupled Eintein-Maxwell equations for static spherical distribution of charged matter [1(a), 5, 6, 79, 13, 16, 15, 22, 22(a), 23, 24]. These distributions constitute possible sources for the Reissner-Nordstrom metric which uniquely describes the exterior field of a spherically symmetric charged distribution of matter. As the field equations do not completely determine the system, different solutions were obtained by many authors by using different conditions to supplement the field equations. The supplementary conditions were used partly specify the physical model and partly to simplify the mathematical work.

Kyori and Barua [13] found some solutions for charged fluid distributions with spherical symmetry which are very regular. Chakraverti and De [7] studied the problem of static charged fluid distributions in the form of a spherical ball and presented some new solutions which are regular where and of course, the solutions could be matched with outside Reissner-Nordstrom metric. In all their solutions, the charge to mass ratio of the spherical ball was as expected, less than unity. Singh and Yadav [22] have also fond some exact solutions of charged fluid sphere in general relativity.

Bonnor [2], Effinger [10], Kyle and Martin [14] have considered the interior solution for a static charged sphere. As the field equations do not completely determine the system, different solutions were obtained by Effinger [10] and Kyle and Martin [14] by using different conditions to supplement the field equations. A conformally flat spherically sysmmetric non-static internal solution was obtained by Singh and Abdussattar [21]. Latter on Roy and Raj Bali [19] found a general solution representing conformally flat perfect fluid distribution of spherical symmetry. They have also discussed various physical properties of the model.

Gurses [12] has shown that the only static distribution of the fluid with positive density and pressure which would generate a conformally flat metric through the Einstein's equations without cosmological term is that described by the Schwarzschild inferior solution. Burman [4] discussed the motion of the particles in Conformally flat space-time. Singh and Abdussattar [21] has obtained a non static generalization of the Schwarzchild interior solution which is conformal to flat space time. They have also shown that the model admits of distribution of discret particles and disordered radiation. Zaleev [25] and Stakin [20] have obtained conformally flat non static solution in general relativity theory and scalar-tensor theories of gravitation. Collinson [8] has shown that every conformally flat axisymmetric stationary space-time is static. He has also proved that if the source is a perfect fluid the space-time is the interior Schwarzschild field. Gupta [11] has observed that if a conformally flat space-time describes a perfect fluid distribution of matter $p \neq 0$, then it is necessarily of embedding class one.

Rao and Reddy [17] have shown that there are no spherically symmetric static conformally flat solution of Nordvedt-Brakar field equations for perfect fluid distribution with disordered radiation obeying the equation of state $\rho = 3p$, except for the trivial empty flat space-time of Einstein's theory. Zhu-shi-chang [5, 6] has obtained some conformal flat interior solution of the Einstein-Maxwell equations for a charged stable static sphere which satisfy physical conditions inside the sphere. The metries of the spheres of charged dust have been investigated by Bonner and Wichremasuriya [3] and Raychaudhuri [18].

In this paper we have presented some solutions of Einstein-Maxwell field equations for static conformally flat charged perfect fluid sphere by considering uniform mass density. Pressure and density have been calculated for the distribution.

2. The Field Equations

We use here the static spherically symmetric line element in the form.

$$(2.1) \qquad ds^2 = e^\beta dt^2 - e^\alpha dr^2 - r^2(d\theta^2 + \sin^2\theta \phi^2)$$

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Age Structured Population Model and its Application for Perion Expension in the Presence of Chaperone

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ARTICLE DETAILS	ABSTRACT
Article History Published Online: 25 May 2019 **Keywords** Model,dynamics, structure, population, Stability.	This part is committed to the fundamental properties of the models old enough ward populace elements without dissemination. The primary spotlight is on the presence, uniqueness and energy of arrangements of the straight model and of the nonlinear model. Some correlation results, which will be utilized later in the investigation of the ideal control of populace elements, are expressed. The asymptotic conduct of the arrangements is additionally explored. At long last we set up some essential properties of the arrangement of direct intermittent age-subordinate populace elements.

1. Introduction

Numerical modeling is an interdisciplinary field of scholarly examination which targets modeling normal, organic procedures utilizing applied scientific methods and instruments. It has both pragmatic and hypothetical applications in natural exploration. Nature, which is a part of numerical science is an investigation of the entomb connection among species and their condition such zones as predator-prey and rivalry collaborations, sustainable asset the executives, development of pesticide safe strains, biological and hereditarily built control of irritations, multi species social orders, plant-herbivore frameworks, etc. is currently a colossal field[3,5]. The persistently extending rundown of utilization is broad on different parts of the field.

2. Population Dynamics

Population dynamics has customarily been the predominant part of nature, which has a past filled with over 210 years, albeit all the more as of late, its degree has significantly extended. Population dynamics is the investigation of minor and long-haul changes in the numbers, singular loads and age organization of people in one or a few populations, and natural and ecological procedures impacting those changes. Work in population dynamics goes back to the nineteenth century and the Lotka-Volterra predator-prey equations are a renowned model[1,2].

The expanding investigation of sensible and essentially valuable scientific models in population dynamics, regardless of whether we are managing a human population with or without its age appropriation, population of a jeopardized species, bacterial or viral development, etc, is an impression of their utilization in assisting with understanding the dynamic procedures included and in making useful forecasts. The investigation of population change has a long history. In the year 1202, an activity in a number juggling book composed by Leonardo of Pisa included structure a numerical model for a developing hare population. Scientific and computational methodologies give useful assets in the investigation of issues in population science and environments science. The subject has a rich history entwined with the advancement of measurements and dynamical frameworks hypothesis [7, 8]. These scientific and computational methodologies are currently considered as probably the most useful assets in finding out about nature. Such methodologies have prompted broad work and have given a structure to combination and investigation of such organic models. Since the mid nineteenth century, there has been developing enthusiasm for the investigation of scientific environment. Biology examines the states of presence and the connection of living creatures with one another and with their condition. Population dynamics, which considers population development, mortality, rivalry and predator-prey relations, is maybe the most scientifically evolved zone of environment.

A lot of examination has been done in refined models in population biology, for instance, models in both discrete and consistent time with and without delays alongside stochastic models with the impacts of spatially non-uniform conditions and with diffusive spread of populations [11, 12]. The expanding investigation of reasonable numerical models in environment is an impression of their utilization in assisting with understanding the dynamic procedures engaged with so much regions as predator-prey and rivalry connections, sustainable asset the executives, advancement of pesticide safe strains, biological control of nuisances, multi-species social orders, plant-herbivore frameworks, etc. The persistently growing rundown of utilizations is broad. There are additionally intriguing and valuable applications in the bio-clinical sciences and in physiology.

Scientific models give a significant commitment to natural investigations. They propose amounts that can be estimated, characterize ideas empowering to evaluate natural collaborations, and even propose diverse modeling methodologies with various suppositions to depict specific highlights of the populations. In population dynamics, from the scientific perspective, there are basically two primary modeling methods:

1. The consistent time approach utilizing conventional and fractional differential equations and

2. The discrete time approach which is all the more firmly related with the structure of the statistics of a population.

The two methodologies broadly utilize the techniques for the subjective hypothesis of dynamical frameworks. In the consistent time approach, the quantity of people of a population changes constantly in time and the most well-known modeling system applies to the depiction of the kinds of biotic

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Mathematical Modeling on Prey- Predator Interaction

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ABSTRACT: -

In the existence of hundreds of different animals on the island, the modeling of the interaction among these animals is not an easy task. However, the interaction between two species is possible taking one asa prey and the other asa predator.
Here in this paper we discuss about the study of interaction between the territorial animals like foxes and the rabbits. The territories for the foxes are considered to be the simple cells. The interaction between predator and its prey are represented by the chemical reactions which obey the mass of action law. In this sense, we apply the mass action law for predator prey models and the quasi chemical approach is applied for the interactions between the predator and its prey to develop the modeled equation for different possible situations of the predator and prey interaction.

KEY WARDS: -
Mathematical modeling, predator-prey interactions, reaction diffusion system, fox, rabbit.

1.1 INTRODUCTION: -

An important problem in ecology, the science which studies the interrelationships of organisms and their environment is to investigate the equation of co-existence of two species and to decide what mankind should to do to preserve this ecology balance of nature [1].

In nature there is many instances where one species of animals feeds on other species of animals, which is in turn feeds on the other things. For examples, wolves in Alaska feed on carbon which in turn feed on vegetation. Sharks in the ocean feed on small fish which in turn feed on plants. The first species (Wolves, Sharks) is known as the predator and the second species as the prey [6].

The Lotka-Voltera equations are a pair of first order nonlinear differential equations, and these are also known as the predator prey equations, i.e. when growth rate of one population is decreased and the other increased then these populations are said to be in a predator-prey situation. The Lotka-Voltera equations are frequently used to describe the dynamics of biological system in which two species interact, one as a predator and other as a prey [6,7].

The Lotka-Voltera predator-prey models were originally introduced by Alfred J. Lotka[5] in the theory of autocatalytic chemical reactions. In 1920, the model of "Organic systems", he made an extension while using plant species and an herbivorous animal species. In 1925, he utilized these equations for the possible analysis of predator-prey interactions and arrived at the equations situations which are well-known now a day.

In 1926, Vito Volterra [8] made a statistical analysis of fish catches in the Adriatic independently investigated in equations. V. Voltera applied these equations to predator-

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Some Charged Fluid Spheres in General Relativity

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Abstract - The present paper provides some solutions of Einstein Maxwell field equations for Some Charged Fluid Spheres by using a judicious choice of metric potential g_{11} and g_{44}. The central and boundary conditions have been also discussed,

Keywords - Metric, Potential, Boundary Conditions, Charged Fluid Spheres.

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INTRODUCTION

A various authors have already studied the charged fluid distribution in equilibrium. Bonner [4], Effinger [6] and Kyle and Martin [11] have considered the interior solution for a static charged sphere. As the field equations do not completely determine the system different solutions were obtained by Effinger [6], Wilson [16] and Kyle and Martin [11] by using different conditions. Some exact static solutions of Einstein-Maxwell equations representing a charged fluid sphere were obtained by Singh and Yadav [14]. Shi-Chang [15] found some conformal flat interior solutions of the Einstein-Maxwell equations for a charged stable static sphere. These solutions satisfy physical conditions inside the sphere. Xingxiang [18] obtained an exact solution by specifying matter distribution and charge distribution. The metric is regular and can be matched to the Reissner-Nordstrom metric and pressure is finite. In the limit of vanishing charge, the solution reduces to the interior solution of an uncharged sphere. Buchdahl [5] has also considered some regular general relativistic charged fluid spheres. Some other cases of the interior solutions for charged fluid sphere have been presented by Bekenstein[3], Bailyn[2], Whiman and Burch [17], Kramer and Neugebauer [9], Krori and Barua [10], Junevicous[8], Florides [7], Noluka[12, 13] and Yadav et. al. [19, 20]. Some other researchers in this field are Pradhan [21], Yilmaz (22) and Saha & Visinescu [23].

In this paper, we have solved Einstein-Maxwell field equations for static changed fluid spheres by using different assumptions. These solutions satisfy physical conditions. The central and boundary conditions have been also discussed. The pressure and density have been found for the distribution.

THE FIELD EQUATIONS

We take the metric in the form

$$ds^2 = e^\nu dt^2 - e^\lambda dr^2 - r^2(d\theta^2 + \sin^2\theta d\phi^2) \qquad (2.1)$$

where λ and ν are function of r only.

Thus the Einstein-Maxwell field equations are (Adler et. al. [1]).

$$e^{-\lambda}\left(\frac{1}{r^2} - \frac{\lambda'}{r}\right) - \frac{1}{r^2} = -8\pi p - E \qquad (2.2)$$

$$\frac{1}{r^2} - e^{-\lambda}\left(\frac{1}{r^2} + \frac{\nu'}{r}\right) = -8\pi p + E, \qquad (2.3)$$

$$e^{-\lambda}\left[\frac{1}{4}\nu'\lambda' - \frac{1}{4}\nu'^2 - \frac{1}{2}\nu'' - \frac{1}{2}\left(\frac{\nu' - \lambda'}{r}\right)\right] = -8\pi p - E \qquad (2.4)$$

where

$$E = -F^{41}F_{41} \qquad (2.5)$$

and

$$4\pi\sigma = \left(\frac{dF^{41}}{dr} + \frac{2}{r}F^{41} + \frac{\lambda' + \nu'}{2}F^{41}\right)e^{\nu/2} \qquad (2.6)$$

By the use of equations (2.2) – (2.4), we get the expressions for p, ρ and E as

$$8\pi p = \frac{e^{-\lambda}}{2}\left(\frac{3\nu'}{2r} + \frac{\nu'^2}{2} - \frac{\lambda'\nu'}{4} + \frac{\nu'^2}{4} - \frac{\lambda'}{2r} + \frac{1}{r^2}\right) - \frac{1}{2r^2} \qquad (2.7)$$

$$8\pi\rho = e^{-\lambda}\left(\frac{5\lambda'}{4r} - \frac{\nu''}{4} - \frac{\lambda'\nu'}{8} + \frac{\nu'^2}{8} + \frac{\nu'}{4r} - \frac{1}{2r^2}\right) + \frac{1}{2r^2} \qquad (2.8)$$

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SOME SPHERICALLY SYMMETRIC NON-STATIC MODELS IN GENERAL RELATIVITY

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Abstract:

The present paper provides some solutions of Einstein's field equations of non-static spherically symmetric metric. Pressure and density for the model have been found. These solutions are of special interest as they afford suitable models of a universe which is assumed to consist of isotropic and homogeneous matter.

Key Words: Pressure, density, isotropic, homogeneous, non-static models, energy-momentum tensor.

1. INTRODUCTION:

As a matter of fact Solutions of Einstein's field equations in general relativity is much discussed & interesting problem. Solutions giving an isotropic and homogeneous distribution of matter in space have since long been known in differential geometry. Such solutions have special interest in general relativity as they afford suitable models of a universe which is assumed to consist of isotropic and homogeneous matter. Such a model was considered by Friedmann and Lemaitre in their solutions for the expanding universe. The field of a static fluid sphere of constant density ε_0 was obtained by Schwarzachild [10] in the form

$$(1.1) \quad ds^2 = -\frac{dr^2}{\left(1-\frac{r^2}{R^2}\right)} - r^2(d\theta^2 + \sin^2\theta \, d\phi^2) + \left\{A - B/(1-\frac{r^2}{R^2})\right\}^2 dt^2$$

Where A and B are constants and $R^2 = \dfrac{3}{8\pi\varepsilon_0}$. Narlikar [4] gave a generalization of it in the form

$$(1.2) \quad ds^2 = -R^2\left\{dX^2 + \sin^2 X\left(d\theta^2 + \sin^2\theta \, d\phi^2\right)\right\} + s^2 dt^2$$

Where R = R (t) and S = S (X). The interesting conclusion is that relativity permits non-static spherical distribution of matter with a static gravitational potential, the only restriction being that either the time rate of change of the radius must be small or that it must be constant. A method for treating Einstein's field equation applied to static sphere of fluid to provide solutions in terms of known analytic functions was developed by Tolman [11]. Leibovitz ([2], [3]) has extensively discussed the static and non-static solutions of Einstein's field equations for the spherically symmetric distributions. The   :e of the Weyl conformed

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ANTIFUNGAL ACTIVITY OF ETHANOL AND AQUEOUS EXTRACTS OF SOME MEDICINAL PLANTS AGAINST YEASTS

Botany

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ABSTRACT

BACKGROUND: Many medicinal plants possess antifungal activity due to the presence of secondary metabolites like phenols, phenolic acids, quinones, flavones, flavonoids flavonols, tannins and coumarins, and hydrolytic enzymes which act on membranes of invading microorganisms and cause inhibitory activities against bacteria, fungi and yeasts.
AIM: Evaluation of anti-yeast activity of aqueous and ethanol extract of medicinal plants.
OBJECTIVE: To study the anti-yeast activity of ten important medicinal plants.
METHODS: Ten medicinal plants viz. *Citrus Sinensis* (L) (Orange), *Curcuma longa* L. (Turmeric), *Allium cepa* L. (Onion), *Coriander sativum* L. (Dhania), *Trigonella feonum-graceum* L (Fenugreek), *Bauhinia variegata* (Kachnar), *Oxalis corniculata* L. (Creeping wood sorrel), *Solanum nigrum* Linn (Black nightshade), *Moringa oleifera* L.(Drumstick) and *Azadirachta indica* L. (Neem) were assayed for their antifungal activities against yeasts viz. *Geotrichum candidum, Pichia membranifaciens* and *Yarrowia lipolytica*. Anti-yeast activity was assayed by determining the percentage inhibition of colonial growth by comparing the colony diameter (mm) of poisoned plate (with plant extract) and non poisoned plate.
RESULTS: The results revealed that aqueous and ethanol extract of selected medicinal plants could suppress mycelia growth of these three yeast isolates. In general ethanol extract caused slightly of higher growth inhibition of yeasts than aqueous extract.
CONCLUSIONS: The present findings can form the basis for further investigation to optimize the antifungal activity of herbal extract.

INTRODUCTION

Many herbs possess antimicrobial potential in combination and are considered as alternatives antimicrobial agents[1]. Plants synthesize aromatic secondary metabolites like phenols, phenolic acids, quinones, flavones, flavonoids flavonols, tannins and coumarins[2]. These secondary metabolites and hydrolytic enzymes viz. glucanases and chitinases act specifically on membranes of invading microorganisms[3,4]and cause inhibitory properties against bacteria, fungi and insects[5].

The antifungal activity of medicinal plants has been reported by several workers[6-9]. There is little evidence on the antifungal properties of the medicinal plants and hence present investigation was undertaken.

MATERIALS AND METHODS

Ten medicinal plants viz. *Citrus Sinensis* (L) (Orange), *Curcuma longa* L. (Turmeric), *Allium cepa* L. (Onion), *Coriander sativum* L. (Dhania), *Trigonella feonum-graceum* L (Fenugreek), *Bauhinia variegate* (Kachnar), *Oxalis corniculata* L.(Creeping wood sorrel), *Solanum nigrum* Linn (Black nightshade), *Moringa oleifera* L.(Drumstick) and *Azadirachta indica* (L.) (Neem), were assayed for their antifungal activities against yeasts. The different parts of these plants viz. fruits (peel and juice) of orange, rhizome of turmeric, bulb of onion, leaves of dhania, fenugreek and kachnar, drumstick and neem were used for the preparation of ethanol and aqueous extracts.

Preparation of Extracts

The plant samples were surface sterilization with 5% sodium hypochlorite solution and then dried in shade for 48 hours at ambient temperature. The plant parts were then crushed to fine powder in electric grinder. The aqueous and ethanol crude extracts were prepared from their dried powder. For this purpose twenty five grams (25g) of powder sample was mixed in 100 ml of distilled water and 70% ethanol separately and homogenized in a blender. The mixture was kept undisturbed at room temperature for 24 hrs in sterile flask covered by aluminum foil to avoid 'evaporation. The homogenates obtained were first squeezed out in a muslin fabric square and then filtered through Whatman filter paper (3 mm diameter). After filtration, the extract was evaporated in water bath until 25 ml extract was left in a container. Ethanol and aqueous extracts thus obtained were immediately evaluated for antifungal activities.

Isolation of Yeasts

Yeasts were isolated from spoiled chapatti in YES media consisted of

Yeast extract (5g/L), Dextrose (30g/L), Adenine (0.05g/L), Histidine (0.05g/L), Leucine (0.05g/L), Lysine (0.05g/L), Uracil (0.05g/L), Difco bacto agar (20.0 g/L) and Distilled water (1L), and incubated at ambient temperature $25 \pm 2°C$. Antibiotics viz. Chloramphenicol, Streptopenicillin (50 mg/l) were added to media to inhibit bacterial and fungal growth. Three species of yeast viz. *Geotrichum candidum, Pichia membranifaciens* and *Yarrowia lipolytica* were isolated spoiled chapatti.

Screening of plant extracts for their anti-yeast activities

The anti-yeast activity of aqueous and ethanol extracts was assayed against three isolates viz. *Geotrichum candidum, Pichia membranifaciens* and *Yarrowia lipolytica*.

Five ml of plant extracts from their stock solution was dispensed into 15 ml of molten SDA medium (Sabouraud Dextrose Agar) and poured in 90 mm diameter sterile Petri plates, and swirled to achieve a uniform mixture and allowed them to solidify at room temperature.

Preparation of Inoculums

At least three well isolated colonies of the same type from a culture agar plate were selected. Sterile cork borer (6mm) were used to cut each isolate culture which were at least 5-7 days old. Mycelial disc of each isolate was inoculated into separate plate in three replicates .The plates were then incubated at $25 \pm 2°C$ for 10 days period .Two control sets were set up without extract and preservative (negative control) and other one with chemical preservative (positive control). Colony diameter was recorded by measuring the two opposite circumference of the colony growth. Percentage inhibition of colonial growth was evaluated by comparing the colony diameter of poisoned plate (with plant extract) and non poisoned plate and calculated using the formula given below:

$$GI\ (\%) = \frac{CGc - CGt}{CGc} \times 100$$

GI= Growth inhibition; CGc= colony growth in control; CGt= Colony growth in treatment

All the experiments were conducted in replicates of three and data was recorded as mean value ± SE and Critical difference at 5% level. The results obtained have been presented in Table-1.

Table-1: Antifungal activity of aqueous and ethanolic extract of ten medicinal plants on growth(mm) and per cent inhibition of *Geotrichum candidum, Pichia membranifaciens* and *Yarrowia lipolytica*

History Behind Co-perative Movement

*Prof.(Dr.)Pravin Kumar * & Rupesh Kumar ***

The Indian cooperative movement was initiated by the government. It spread and diversified with the encouragement and support of the government. Its present condition is also to a great extent because of the intrusive involvement of, and interference by the government. This chapter provides a brief review of the various phases of the evolution of cooperatives in general, and of credit cooperatives in particular, over the past century in India and Bihar.

The First Phase: 1900-1930

By the beginning of the 20th Century, officials of the colonial government perceived the Indian farmers' dependence on usurious moneylenders to be a major cause of their indebtedness and poverty. At that time the cooperative movement had become well established in Europe and achieved remarkable success there. Convinced that the cooperative movement offered the best means of liberating Indian farmers from the crushing burden of debt and the tyranny of moneylenders, Indian officials began to take active interest in promoting credit cooperatives in the country. Societies were organized for the first time in the closing years of the 19th Century.

The passage of the Cooperative Credit Societies Act in 1904, and the enactment of a more comprehensive Cooperative Societies Act in 1912 marked the beginning of a government policy of active encouragement and promotion of cooperatives. This thinking gained wide acceptance and was adopted as a policy by provincial governments and thereafter, "cooperation" became a provincial subject in 1919. The persistence of government interest in cooperatives and 11 the importance attached to them was reflected in the appointment of three different Committees to review their growth and functioning.

The classic study by Frederic Nicholson, followed by the Edward Law Committee on Cooperative Legislation, confirmed and reiterated the need for the State to actively promote cooperatives. A decade later, the Maclagan Committee (1915) advocated that "there should be one cooperative for every village and every village should be covered by a cooperative". The Royal Commission on Agriculture in India, which submitted its report in 1928, suggested among other things, that the cooperative movement should continue to focus on expanding rural credit and that the State should patronise cooperatives and protect the sector.

It was the Royal Commission which made the observation "if cooperation fails, there will fail the best hope of rural India". By this time, the State was already deeply involved in promoting agricultural credit cooperatives. The number of societies reached impressive proportions and diversified their activities well beyond agricultural credit. Debates centred on whether or not each village should have a cooperative and whether there should be a single purpose or a multipurpose cooperative at the village level.

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Implications of GST on Urban Local Bodies in India

*Sanjay Kumar Pandey**

Abstract : India's Goods and Services Tax (GST) is levied on domestic goods and services single uniform tax across India. Through the 101ST Constitutional Amendment Act, 2016, states enabled to levy tax on services and goods, and the Union Government could tax supply of goods services. The GST subsumed all indirect taxes imposed by the centre, states and local bodies. The a provision of compensation from centre to state, for losses incurred by its exchequer, due to implementation of GST, but ULBs were left in a lurch. GST Amendment Bill does not compens local bodies, for their revenue loss due to implementation of GST. But Maharashtrahas taken in to ensure that its urban local bodies (ULBs) do not operate in the red under the "one-nation, one regime.Ironically 'one nation one tax' regime, a move towards better transparency and accountabi has not been well thought-out for ULBs. It has replaced a buoyant tax octroi that provided flexibility cash spending. Following the implementation of the GST, ULBS have lost their autonomy and become increasingly dependent on states for financing, thus defeating the intent of the 74th Amen which sought to give ULBs greater autonomy.

This paper is a reflection on lost revenues of ULBs and how they could be recovered and compens through new sources and revenue sharing instead of lingered unpredictable state compens considering the scope of their services, that goesbeyond Constitutional definition. Since G implementation has just started, the government still has opportunity to reconsider the finer natur municipal finance and examine how urban bodies can function more independently from the state

Key Words:GST, Financial Autonomy,Urban Local Bodies, Panchayati Raj Instituitions, S Services, Octroi, Entry Tax, Revenue Sharing, Property Tax,Municipal Tax to GDP Ratio, Co Amendment.

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ACCELERATING AGRICULTURAL GROWTH

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Capital Formation and Growth in Indian Agriculture

Baikunth Roy

INTRODUCTION AND MOTIVATION

Agriculture is the backbone of the Indian economy, employing 60% of the population and their ultimate source of livelihood. However, contributes to less than 15% of overall GDP, and accelerating at a slow growth pace of 3%. This shows neglect of agriculture, despite being an agrarian economy. In this context, Gulati and Bathla (2001) argued that neglect of public sector investments in agriculture over long periods indicates putting future rates of growth in agriculture in jeopardy. Further, Bathla (2014) examined that capital formation in Indian agriculture increased significantly in the post-reform era, particularly from 2000 onwards but this increase in skewed in favour of private capital formation. Raghbendra (2007) viewed that one of the important elements of economic reforms initiated in 1991 was to reduce fiscal deficit, which was mounting. This was achieved largely by reducing transfers to state governments. As a result, the budget of state governments deteriorated hugely. Agriculture is a subject to state government and because of unfavourable conditions, agriculture was denied public investment. Hereafter the phase of stagnation of agricultural output growth continued. Fan, Gulati and Thorat (2007) have examined that the fall in gross public capital formation has led to fall in agricultural growth.

Undoubtedly, Indian agriculture has witnessed stagnancy and slowdown in the rate of growth of capital formation from 1980s onwards, which in turn has led to decline in the rate of agricultural growth. There has been debate among academic and policy-making circles that what constitutes capital formation? How decline in capital formation has affected agricultural growth? These issues sparked off in the late 1980s. As we know, gross capital formation consists of both public as well as private capital formation. More importantly, public investment in agriculture depends upon farm subsidy and funds available. Over the years, there has been rise in subsidies and fall in funds available, which have led to decline in public investment along with political reasons. As far as private investment is concerned, we see that capital formation in private sector primarily depends upon lagged terms of trade and public investment in this sector. There has been rise in private investment but public investment has fallen considerably. Widening of this investment gap has led to decline in agricultural growth.

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Temporal and Spatial Variations in Institutional Credit and Its Impact on Agricultural Production in India

Baikunth Roy*

Abstract

Institutional credit to agriculture has played a pivotal role in supporting farm production in India. The study analyses trends in rural credit and finds that direct institutional credit has been rising in the post-2000 period. The paper also examines regional variations by calculating Coefficient of Variation (CV), which suggests that spatial heterogeneity in the credit disbursement across states has fallen during the post reform period, and has shown declining trend. Further, the study attempts to assess the impact of institutional credit on agricultural production (at all India level) by estimating Cobb Douglas production function, the result suggests positive and significant impact. However, agriculture is typically a localized economic activity and its aggregation over country level may hide the spatial heterogeneity. Therefore, the study examines further by drilling down the model to state level by carrying out panel-regression analysis. The findings of the model validate the hypothesis that direct institutional credit to agriculture has positive and statistically significant impact on agricultural output and its effect is immediate. Random Effect Model (REM) is used to estimate regional variation across states, with slope dummy for credit. However, the result is statistically insignificant. It means that credit has uniform pattern in affecting output and does not affect agricultural production differently across regions of India.

To conclude, the study suggests that concerted effort is needed to augment the flow of rural institutional credit, alongside exploring innovations in product design, targeted delivery, enhanced use of technology and simplification of the cumbersome procedure for improved access to agricultural credit of small land-holders and less-educated or illiterate farmers. Finally, the study also urges to enhance investment credit in the total credit for holistic rural development.

Keywords: Agricultural Output, Dummy Variables, Economic Reforms, GDP, Hausman-Specification Test, Institutional Credit, Regression Analysis

Introduction and Motivation

The Indian economy has been experiencing high growth rate especially after the various reforms measures adopted by the successive governments. The sustainability of the growth momentum however critically depends on the performance of the agriculture sector. Because a large proportion of the population in India is rural based and depends on agriculture for a living. Agriculture sector in India still provides livelihood to more than half of of the country's population.

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Growth and Instability of Agricultural Exports of India: An Empirical Analysis

Baikunth Roy*

Abstract

The study examines trends in the exports of agricultural commodities from India. The major agricultural exports chosen in the study are rice, wheat, tea, coffee, fruits and vegetables, cashew nuts shelled spices, sugar, cotton lint and tobacco unmanufactured. Further, compound annual growth rate (CAGR) is calculated and a comparison between pre-WTO and post-WTO export growth scenario is made. An export instability index is constructed for pre-WTO and post-WTO period to measure instability in agricultural exports from India. The findings of the study suggest that agricultural exports have increased in the era of economic liberalization, however, there are wide fluctuations across commodities, validating the first hypothesis of this study that favourable policies have resulted in increase in agricultural exports and an increase in the value of agricultural exports is associated with high instability at the commodity level. Nevertheless, the paper shows that aggregate agricultural exports do not reveal much instability, validating second hypothesis of the study that variations are perceptible at the commodity level. In other words, variability in agricultural exports varies across commodities.

Keywords: Agricultural Growth, Export Instability, Regression Analysis, Trade Liberalisation, WTO

Introduction

Over the last seven decades of Indian planning and trade policies, the perception about the importance of external trade in economic development has gone through several changes. There has been a substantial increase in agricultural exports in the era of economic liberalization. Today India is a major supplier of several agricultural commodities like tea, coffee, rice, spices, cashew, oil meals, fresh fruits, fresh vegetables, meat and its preparations and marine products to the international market. Indian agricultural export basket has also become diversified. India is observed to have exported at least 27 principal agricultural commodities. India has emerged as a leading producer of agricultural commodities, endowed with rich natural resources and favourable soil and climatic conditions. India has huge potentiality in agricultural exports but overall potentiality has not been exploited. However, in the era of trade liberalization, agricultural export has been increasing but share of agricultural exports in total exports has steadily declined over the years. In addition, agricultural export is quite volatile and there are large year to year fluctuations in export growth. This has damaged India's image as a stable exporter (Bhalla, 2004).

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RURAL DEVELOPMENT: AGRICULTURE AND RURAL NON-FARM

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Agricultural Trade Policy and Export Performance: An Appraisal During Five-Year Plans of India

Baikunth Roy

SETTING THE CONTEXT

There exist several theories of international trade. The mercantilists viewed trade as a zero-sum game and hence any gain by a country is a loss to another. Adam Smith and David Ricardo demonstrated that trade is a positive sum-game, and nations should trade based on absolute or comparative advantage. For a long time the neo-classical Heckscher-Ohlin (H-O) model has been the dominant paradigm in explaining international trade among commodities. In H-O model of international trade, the importance of factors of production other than labour was recognised. The relative availability of these factors was the ultimate reason of trade taking place. The model states that the pattern of trade is determined by factor endowments and factor intensity. According to this theory (assuming the technology to be the same across countries), comparative advantage is the result of the resource endowment structure of different economies. The H-O proposition is that differences in factor proportions are the most important single cause of differences in price structure from country to country.

In modern times, an important aspect of international trade is the intra-industry trade or trade in the differentiated products (quoted in Trebilcock and Howse, 1996). Further, based on other studies the authors pointed out that leadership in technology and product development lead to international trade. Krugman termed economies of scale, the possibility of product differentiation and imperfect competition as new theories of trade. The new theories of international trade showed that scale economies played a crucial role in explaining post-war growth in world trade among the industrial countries - perhaps more important than differences in factor endowments (quoted in Sachdev, 2000).

Each of these theories on international trade supports that trade plays an important role in the development of a country. Many studies have supported this view and have found positive impacts of outward-oriented trade policies on overall growth of an economy. Nayyar (1976) has examined that international trade leads to development of a country. Balassa (1982) has revealed that countries applying outward oriented development strategies had a better performance in terms of exports, economic growth and employment whereas countries with continued inward orientation lead to increasing economic difficulties. The importance of international trade deals with the proper allocation and efficient use of

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ARTICLES

DISABILITY DIVIDES AND EMPLOYMENT CONDITIONS: A COMPARATIVE ANALYSIS OF INDIA AND BIHAR

Baikunth Roy*

ABSTRACT

This paper makes an effort to quantify and compare various dimensions of disability in India and Bihar using Census data. The findings of the paper suggest that there is socio-economic and regional divide in the prevalence of disability. The decadal growth and incidence of disability are higher among the vulnerable sections of the society. The outcomes of the linear regression model suggest that prevalence of disability is affected by a number of socio-economic and demographic factors. Further, the paper highlights that the proportion of employment for persons with disabilities (PWDs) in Bihar is more than that of India and of general employment in Bihar. However, there is much lower work participation rate among the disabled women in Bihar. There is evidence of increasing informalisation in the disability sector as well. The paper recommends that providing access to basic capabilities to persons with disabilities may be strategically important for reducing the challenges for the disabled communities.

Keywords: Disability, Employment Status, District Level Analysis OLS Regression

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Determinants of Agricultural Exports of India: A Commodity Level Analysis

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Abstract

The export opportunity allows the agricultural sector to expand productive capacity to the full extent. An attempt is made in the present study to specify and estimate the factors affecting agricultural exports of India at the commodity level. The major exportable crops used in the study are rice, wheat, tea, coffee, sugar, cotton lint and tobacco. The literature surveyed clearly shows that Indian exports are influenced by a number of factors. A double log-linear regression analysis has been carried out to understand the role of different factors in affecting agricultural exports across commodities from 1980-2010. Examining determinants of agricultural exports at commodity level is critical for proper allocation and effective utilisation of resources.

The findings of the study validate the hypothesis that the impact of various factors on agricultural exports may not be the same for all commodities. The export determination models suggest that agricultural exports of India are affected by a number of demand and supply side factors. In a nutshell, the empirical findings reveal the predominance of factors like lagged export, production and world income in determining agricultural exports of India. For rice and wheat rather than production, stock with the government influences export to a large extent. Because of semi government interventions in cereal market, actively for mandatory PDS, exports are not allowed on regular basis for many tradable commodities like wheat, therefore, much depends on demand and supply. The findings of the study are relevant to design public policies in the external sector.

Keywords: Agricultural Exports, OLS Regression, Determinants, Trade Liberalisation, WTO.

Contribution/Originality: This research paper is one of only few studies that have investigated the determinants of agricultural exports of India at a commodity level. The empirical findings of the study may be used as important inputs for designing agricultural export policies in India. There is fundamental evidence of originality in the work; therefore, its authenticity, credibility and novelty are not in doubt.

Nature and Extent of Employment among Persons with Disabilities and Factors Associated with their Employment in India

Baikunth Roy*

The paper carried out a systematic analysis of employment experiences of different types of persons with disabilities (PWDs) in diverse age cohorts and across gender, regions and social groups. A comparative study is also undertaken between the two time periods using 2001 and 2011 Census data. In the last section of the study, the factors affecting work participation rates (WPR) for persons with disabilities is estimated, separately for rural and urban regions. The findings of the study suggest that there are lower employment outcomes for the PWDs. The WPR has significantly increased in 2011 but it is attributed to an increase in the number of marginal workers. Thus, it can be inferred that there is growing informalisation in the disability sector as well. The Scheduled Castes (SCs) have the lowest employment rates and Scheduled Tribes (STs) recorded the highest values of WPR. The female work force participation rates are far lower, however female WPR has slightly increased in 2011. Further, the regression analysis of factors affecting the WPR for people with disabilities suggests that the rural and urban areas have different factors contributing to their employment. The findings reveal that individuals with disabilities have different employment outcomes depending on their disability types, gender and social compositions, levels of literacy, and whether they live in rural or urban regions. Understanding the economic experiences of PWDs is critical for designing specific public policies and leverage welfare measures in the disability sector. The state and society should be sensitive to the rights and needs of the PWDs to amalgamate them in mainstream society. The problems faced by persons with disabilities are multifaceted and require coordinated efforts to tackle them.

Keywords : Disability, Employment Determinants, Social Groups, WPR, Regions, Genders, Human Development.

1. Introduction

Disability is no longer seen as the biological condition of an individual body, it is being perceived as a complex product of political, social, environmental and biological discourses. According to Mehrotra (2013), this categorization lies within the ambit of social, cultural,

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ASSESSMENT AND MAPPING OF HOMELESSNESS

--A Comparative Study between India and Bihar

MR. BAIKUNTH ROY
MS. VIDYA YADAV

The study found that the highest share of homelessness is observed in the state of Uttar Pradesh, followed by Maharashtra, Rajasthan, Madhya Pradesh, and Andhra Pradesh. The primary prevention from homelessness could be affordable housing, social housing, creating employment opportunities and demolishing discrimination.

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Access to food, clothes and shelter are the fundamental human needs. While the government aims to ensure every citizen has a home by 2022, the number of families that live on the streets of urban India has grown. The findings of the present Study suggest that only about 11.86% urban homeless in India have access to a shelter house. The Study also compares and quantifies homelessness in India and Bihar. It found that the decadal growth among the homeless household of Bihar is much higher than the national average. Interestingly, the maximum increase among both homeless households and the population is in the rural areas of Bihar; however, the findings are opposite in the context of India. Further, the average household size of the homeless population has fallen. Also, gender composition shows that homelessness is more among men than women. The state-level analysis shows that the five states of India, namely, Uttar Pradesh, Maharashtra, Rajasthan, Madhya Pradesh, and Andhra Pradesh are home to more than half of the homeless population of the country. Further, the employment outcomes of homeless people are higher than that of the total population of the country, which reflects distress participation. Moreover, due to the lack of reliable numbers of the homeless and abdication of accountability towards them, the homeless appear to be neglected in public policies. Thus, primary prevention from homelessness could be facilitating shelters with necessary amenities, affordable housing, community housing, creating employment opportunities (more at the village level) and abolishing discrimination.

INTRODUCTION

Everyone has the right to a standard of living, adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services; and the right to security in the event of unemployment, sickness, disability, widowhood, old age, lack of livelihood or other circumstances beyond his control.

-Universal Declaration of Human Rights, article 25, para 1.

The shelter is an essential human requirement. Homelessness perhaps is the most visible violation of the right to adequate housing. A home provides roots, identity, and a sense of belonging and a place of emotional wellbeing. Homelessness is about the loss of all of these (Sattar 2014). Homeless individuals are considered to be an 'invisible burden' to society. Although widely considered to be a 'social evil', homelessness is more prevalent and neglected

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in low and middle- income countries like India. Besides, homeless, being the people of the street, they lack access to all civic services. Homelessness is estimated to affect 100 million people globally, comprising 20 to 40 million in the urban areas and about 60 million in the rural areas (UN Commission on Human Rights, 2005). The recent estimates show that around 150 million people are homeless globally (UN Habitat, 2019).

Discussions of homelessness tend to be shaped by several discourses concerning causation, definition, counting the homeless and appropriate responses (Robinson, 2003). Homelessness is one of the most persisting problems in India. Many times, it considered as one of the by-products of the rapid urbanization, it is a growing urban issue (Ballal, 2011). Homelessness is a strong and evocative social issue that has become emblematic of social inequality and injustice in otherwise affluent societies (Barker, 2012). Homeless people are found in both urban and rural areas, but 'the rural dimension of homelessness has been almost absent in policy debates' (UNCHS 2000). Rural homelessness in India (as in many developed and developing countries) is a relatively hidden and unknown phenomenon.

Historically, the rural poor come to the city in search of better job opportunities and for the betterment of their living conditions (Srinivas, 2005). Paradoxically, however, they end up being more pauperized. Cities attract poor people with the prospect of improving their life condition (Glaeser, 2011). However, the majority of these people are absorbed in the low-end informal jobs. Therefore, it is highly challenging for them to find shelter in formal housing. In India, about 32 per cent of the population lives in urban areas of which 26 percent live below the official poverty line, and 40 per cent do not have proper housing (Banerjee- Guha, n.d.).

Given this backdrop, the present Study uses the census of India 2001 and 2011 data to comprehend the size and magnitude of homelessness in the country. Geographic Information System (GIS) mapping method is used to gain insights into the distribution of homeless population across districts of India, separately for rural and urban areas. Also, the Study compares and quantifies homelessness in Bihar vis-a-vis India. Further, it makes use of Deen Dayal Antyodaya Yojna- National Urban Livelihoods Mission (DAY-NULM) data to estimate the shortage of urban shelters across states/UTs of India. Additionally, the paper briefly examines the government schemes and policies for the homeless in India.

WHO ARE THE HOMELESS?

In the developing world, the term 'homeless' refers to those who live in open spaces without having any basic shelter for their possessions, such as 'kuccha' (unfinished), slum or shanty house (Ghosh, 2020). According to the United Nations, homeless households that are without shelter that would fall within this scope. They carry their few possessions with them, sleeping in the streets, in doorways or on piers or in another space, on a more or less random basis (United Nations, 2005). The state of homelessness does not merely indicate the absence of a home, but it manifests the outermost states of marginalization and advanced levels of destitution and denial of basic rights (Tipple and Speak, 2009).

However, Census enumeration also poses the problems related to coverage of the homeless population. The most common questions about the homeless concern numbers, composition, and geographic distribution (Lee et al., 2010). Sattar (2014) pointed out that "according to the Census of India definition, the word houseless does not consider people who live in makeshift arrangements or in deplorable housing conditions. So, sections of the population who are vulnerable of becoming homeless are not considered. Besides, the government's official surveys are conducted during the day time, when it is difficult to trace the homeless"

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AILING DISABILITY EMPLOYMENT IN INDIA: EVIDENCE FROM CENSUS AND NSS

Baikunth Roy*

Abstract

The paper carries out a systematic analysis of employment experiences of persons with disabilities (PWDs) in India. It analyses the reasons behind lower employment outcomes of the disabled and discusses disability-inclusive legislations. Further, a comparative study is undertaken between 2001 and 2011 Census data. Also, nature and extent of employment are quantified and compared using the National Sample Survey (NSS) and the Periodic Labour Force Survey (PLFS). The major findings of the study suggest that disability employment is not only considerably lower but also has fallen over time. The work-participation rate (WPR) has significantly increased in 2011, but it is mainly attributed to an increase in the number of marginal workers. Thus, it can be inferred that there is growing informalisation in the disability sector as well. The female WPR is far lower, however, it has slightly increased in 2011. A comparative analysis between NSS (2018) and PLFS (2018) data also validate the hypothesis of the study that PWDs experience much lower economic participation than the "normal" population. Besides, the Labour Force Participation Rate (LFPR) has considerably declined in 2018, relative to 2002, as suggested by the NSS data. Also, the worker population ratio is much lower in NSS 2018 relative to Census 2011. Therefore, the proper understanding of the economic experiences of PWDs is critical. It brings about improvement to their quality of life socially and economically, largely absorbs them into the mainstream and also ensures dignity and recognition in the family and society.

Keywords: Disability, Employment, Inclusive Legislations, Gender, Locations.

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providing valuable inputs and guidance.

1. The Context

Amartya Sen in a keynote address at the World Bank in 2004 on "Disability and Justice" opined that people with disabilities are among the most deprived and neglected sections of society. He explained the issue of disability under capability and justice approach and argued that it is harder for the PWDs to find a job and retain it. Also, they may receive lower compensation for their work as compared to the general folk. A disabled person is severely deprived in terms of capabilities with the same level of income. Therefore, the disabled population face huge difficulty in earning income and it is harder to convert income into freedom to live well.

Employment is a critical element of independent living. Elwan (1999) reviewed vast literature on the subject and summarises that there is a higher incidence of disability rates in developing countries which is associated with a higher burden of unemployment. Disabled people in India have considerably lower employment rates than the average population. Besides, this gap is growing over a period of time (World Bank 2009). OECD (2010) noted that PWDs are more likely to be economically inactive, less likely to be in full-time employment, and more likely to be unemployed as compared to non-disabled persons. ILO (2013) examined that persons with disabilities in employment are more likely to be in jobs for which they are overqualified.

WHO and World Bank (2011) in a joint study found that working-age persons with disabilities when in employment, are more likely to be counted among the working poor because they are in low-paid jobs with poor career prospects and working conditions. In addition, they are also likely to work in poor quality, informal and subsistence jobs. With regard to employer's perspective to hire PWDs, this report cited many studies to prove that unlike some employers' fear that persons with disabilities are unqualified and unproductive, rather they often have appropriate skills, strong loyalty and low rates of absenteeism and growing numbers of companies find it efficient and profitable to hire people with disabilities. In this context, the World Bank (2009) suggested that the majority of the PWDs in India are capable of doing productive work. Despite this fact, the rate of employment is much lower for individuals with impairment.

ILO (2019) showed that exclusion of disabled persons from the labour market leads to an annual loss of approximately 3-7% of the GDP, based

Assessment and Mapping of Disability Prevalence in India: A District-Level Analysis

Baikunth Roy[1]

Abstract: The paper carries out a comprehensive analysis of temporal and spatial variations in the disability prevalence of India at the district level. However, the prime focus is the mapping of prevalence of each type of disability at the district level. The findings of the study suggest that about two-third of persons with disabilities (PWDs) reside in rural areas. However, the growth rate of disabled population is more in urban areas and among urban females. Besides, the absolute number of male with disabilities is greater than the absolute number of female with disabilities. Further, the maximum proportion of disability is observed among the persons with movement disability, however, considerably higher numbers of the PWDs under "any-other" category raise concern about the enumeration process in 2011 Census. The study further shows that there are geographical disparities in the prevalence of disability across India. In addition, burden of disability is disproportionately concentrated in certain disadvantaged regions and districts. Further, a cursory glance across the district level distribution of persons with disabilities suggests that they are scattered across every nook and corner in India with significant temporal and spatial variations. It is also evident that majority of the southern states reported higher number of persons with disabilities than the northern counterparts despite better performance on socio-economic indicators. The study suggests balanced regional development taking cognizance of specific rights and needs of each type of disability. Active support from the state, civil societies and disability advocate groups is extremely crucial along with mass sensitisation and awareness among the masses about the disabled communities. Also, the paper recommends for enhanced social securities and inclusive disability development policies.

Keywords: Disability, Demography, Gender, Regions, Census of India, GIS Mapping.

Introduction

According to the World Report on Disability (2011), prepared by the World Health Organisation and World Bank "Disability is part of the human condition. Almost everyone will be temporarily or permanently impaired at some point in life, and those who survive to old age will experience increasing difficulties in functioning" (p. 3). The report highlights that over a billion people, about 15% of the world's population, have some form of disability. Disability cuts across class, caste, gender, race, religion, ethnicity, and nationality, but mostly a differently abled person's first identity among their other identities is their disability (Jha, 2016). In India, there are primarily two data sources (Census and NSS) which follow their own definitions to define disability. The NSS (2002) considered disability as "any restriction or lack of abilities to perform an activity in the manner or within the range considered normal for human being". It excludes illness /injury of recent origin (morbidity) resulting into temporary loss of ability to see, hear, speak or move. On the other hand, population Census does not define disability; it identifies the disabled which is self-explanatory. The Census 2001 asks the respondents whether any-one in the household suffers from a disability, without first comprehensively defining disability. Official estimates of disability prevalence in India are low at 2.1% in the Census (2001). It is 1.8% in the National Sample Survey (2002). However, the disability questions in both sources have been reported to have major limitations (Mitra and

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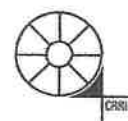
DISABILITY DEMOGRAPHY OF INDIA: EVIDENCE FROM CENSUS AND NSS

Baikunth Roy[1]

Abstract: The paper briefly analyses the global incidence of disability estimates. Further, it attempts to situate Census and NSS data in disability discourse at all India level. Besides, it compares and quantifies disability estimates in India across gender, regions and social groups using several rounds of Census and NSS data. An international comparison demonstrates that India reported significantly lower rates of disability prevalence. Disability prevalence is more among males than females in India. However, the gender gap in the incidence of disability narrows down as they grow older. Regional analysis shows that the rate of decadal growth of disability is higher in the urban areas. Further, the severity of the disability is observed more among scheduled castes (SCs). Age-cohort analysis suggests that there is a substantial increase in disability among the elderly population. Interestingly, both Census (2011) and NSS (2018) produced broadly similar estimates on overall disability prevalence (about 2.2%). Although there is a significant improvement in data collection in 2011 Census, concerns have been raised in the present study about the enumeration process and data sensitisation in the country due to perceived lacunae in the disability estimates. The study also finds that there is underreporting of incidence of disability due to deep-seated stigma among women and inadequate coverage of mental health issues in the country. As the burden of disability falls disproportionately across geographic regions and socioeconomic groups, public health policies in India should take this variation into account. It is recommended that social intervention against disability need to include prevention as well as management and alleviation.

Keywords: Disability, Demography, Social Groups, Gender, Regions, Age-Cohorts, Public Health.

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Socioeconomic and Demographic Correlates of Disability Prevalence in India: A Cross-Sectional Study

Baikunth Roy*

Abstract

This paper examines nature and extent of disability prevalence across gender, regions and social groups in India at the district level using 2001 and 2011 Census data. Further, Cross-sectional regression technique was performed to investigate the association between disability prevalence and the selected socioeconomic and demographic contextual characteristics across the districts of India. Spatial analysis with the help of Geographic Information System (GIS Mapping) shows that disability is well distributed across every nook and corner of India. However, the burden of disability is more concentrated in the southern regions of India. The paper reveals that disability prevalence had slightly increased in 2011. Also, it is more among males than females. The decadal growth of disability is higher among vulnerable sections. Further, the severity of the disability is observed more among scheduled castes.

Based on the estimates of the regression models, the findings of the study suggest that improvement in educational standards among women, creating employment opportunities and improving average living conditions can significantly reduce the burden of disability. However, it is a matter of grave concern that there is a growing elderly population and increasing age is highly associated with a rising level of disability. Thus, there is a close association between ageing and disability. It is also found that an increase in the proportion of children is positively and significantly linked to the higher burden of hearing disability. As the burden of disability falls disproportionately across geographic regions and socioeconomic groups, public health policies in India should take this variation into account. Therefore, providing accessible services and enhancing capabilities to the disabled under the broader social protection policies of the state are crucial at this juncture. Thus, the findings of this study may be relevant for designing public health policies in India.

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Disability employment in India: A regional analysis

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Abstract

The study makes an attempt to examine employment experiences of persons with disabilities (PWDs) across gender, regions and social groups. It carries out a comparative analysis using 2001 and 2011 Census data. The research paper examines extensively disability employment characteristics at the state level. The findings suggest that individuals with disabilities have different employment outcomes depending on their disability types, gender and social compositions and whether they live in rural or urban regions. The work participation rate (WPR) has significantly increased in 2011. The SCs (scheduled castes) recorded the lowest employment rates, whereas STs (scheduled tribes) observed the highest values of WPR. The female WPR was much lower, but slightly improved in 2011. The analysis at state level suggests that most of the north-eastern states, southern states excluding Kerala and the states of the central regions have higher WPR. On the other hand, most of the union territories and north-western states have lower employment outcomes. More or less, the states of the eastern regions scored WPR values in the middle range. The problems faced the persons with disabilities is multifaceted and require coordinated efforts to tackle them, at all the levels, social, economic and political. The affirmative steps taken by the state and the involvement of concerned stakeholders are expected to yield positive results in the times to come. Therefore, understanding the economic experiences of PWDs is extremely important to design public policies in the disability sector. The results provided in the present study may act as important inputs in the policy formulation.

Keywords: Disability employment, WPR, PWDs, states of India, social groups, human development

Introduction

Employment prospects of persons with disabilities are dependent on a host of factors; their functional capacity is one of the most important factors. However, there are other factors that affect their employment potential like education (general, special and vocational), providing them ample employment

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Reverse Migration: A Case of Rural Bihar

Sangita Kumari [*]

Introduction

The Theories of migration tell about unlimited supply of labour and the transfer of the surplus man power in tandem for industrial development to begin. Development is characterized by an ongoing move of labour and resources from a "traditional sector" in rural area to a "modern sector" in urban area. Ongoing capital accumulation in the modern sector facilitates the fuel for sustained transfer to the families in rural areas. The traditional sector is able to survive because of the remittances sent by those who are working in urban as well as rural areas in the sectors such as manufacturing, construction, agriculture etc. The mechanism of migration involves twin flow of resources: move of labour and a parallel move of money from destination to source. The epidemic has interrupted the twin flow of resources and underlying mechanism. The epidemic has completely made the economy of town and villages defunct as a result of nationwide lockdown which began on March 24 to check the spread of Covid-19.

The paper focuses on striking the balance between the codes of preventive health for the sake of life and the need of survival of the daily wage earners particularly, at the backdrop of fast spreading corona virus disease and the subsequent decision of government to lockdown entire nation.[1]

How the livelihood can co-exist with life?

By taking the decision to lockdown, to check the spread of deadly virus, the government has stopped public transport, airlines and construction work as a result most of the economic activities have been brought to a halt which has left millions of workers in the informal sector without livelihood. How will the migrant worker in an informal sector with no social security be resilient to lead a life without food and shelter is the pertinent question. The nationwide lockdown has badly affected the working class all over the world particularly the migrant labours who are sustaining their lives out of their meagre savings and seem to be hopeless in the near future which lies under the condition of uncertainty and confusion. The lockdown has led to sudden job loss for more than 12 crore persons.

Out of these more than 4 crore are estimated to be migrant labourers. The idea of quarantine by health experts gets defeated when the migrant labourers wish to go back home. One may call the situation as humanitarian crisis when government is insisting to follow the laid down medical protocol or to understand their voice of urgency in going back home from different parts of country. The mass movement of migrants from their work place to their native place has thrown up economic challenges before the rural economy. Migrants didn't know that where they always sent remittances to support their family in villages, have to rely on village economy for his survival. The disturbance in the twin flow of money and labour, nobody expected. They feel, village ecosystem provide them emotional security, and to a large extent, food security.

Moreover, the reverse migration will have multiplier effect in infecting the persons and the repercussions will be so wide and deep that the outbreak may siege the entire nation. What will happen in the future is beyond estimation particularly in our country where the health infrastructure of the nation does not even have the adequate availability of test kits. When economy is in standstill how will life work, as the very existence of life minus economics, questions one's sustenance as we know by definition given by Alfred Marshall that economics is the study of humans, in relation to the ordinary business of life. However, life with preventive measures doesn't allow economics to go hand in hand.

Soaring Unemployment:

Total employment in the country didn't increase even in absolute number since 2012, rather decreased by 9.1 million in the report of PLFS published in June, 2019.

Situation becomes worse when already 45 year high unemployment rate is rising at the rate of 6.1 percent and

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NATURE OF INFORMALIZATION IN EDUCATION & HEALTH SECTOR : CASE OF FEMALES IN RURAL BIHAR

☐ Dr. Sangita Kumari*

ABSTRACT

Of female workers in Bihar, 75.84 per cent are busy in agriculture, forestry and fishing and rest 24.16 per cent females are engaged in sectors other than agriculture as per PLFS, 2018-19. Finding is based on secondary and primary survey. There is no written mutual agreement between them, only oral words matter. There is not laid out a contract with respect to person-days of work generated, regular revision in the mode of payment, regulatory framework, working condition. Absorption of a new entrant to the labour market and at the same time good quality job is the twin requirement for augmenting the participation of educated females in rural areas of Bihar.

Keywords : Labour market, Informal, quality job.

Introduction

Jobs under formal sector are of high quality in terms of employment/social benefits, and on the other hand, there are jobs of low quality without any protection against arbitrary dismissal, no protection against accidents at the workplace and lacking social security like maternity and health care benefits (NCEUS, 2009).

The transition from "job" towards "good job" in India could be realized when the share of a daily wage earner in employment does not grow in comparison to regular jobs.

Jobs in the formal sector is not coming up because of rising outsourcing and contractualization within the secondary and tertiary sector.

Jayan Jose Thomas (2014) argued that the working-age population of India is growing in size, the labour force is shifting away from agriculture and with higher education, and workers are also seeking better quality non-agriculture jobs.

More than half the female workers are dependent on agriculture and allied sector.

In India, out of the total 129 million female workers, 124 million were informal workers (95.5 per cent).

As they do not have social security benefits like maternity leave and child care benefits, they get discouraged from joining the workforce.

Due to wage disparity between rural and urban areas, agriculture female labour from rural areas starts migrating to urban areas due to rural-urban wage gap.

The basic reason behind the movement of labour from agriculture sector to the urban sector is to get quality jobs with all social security benefits (Harris- Todaro Model, 1970).

Percentage of Regular job/Salaried employees in usual status (ps+ss) in non- agriculture sector (05-99) without written job contract, not eligible for paid leave without any social security benefit for females in Bihar and India.

Sangita
25/04/2023

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NATURE AND PATTERN OF OCCUPATIONAL SHIFTING OF FEMALES IN RURAL BIHAR

☐ Dr. Sangita Kumari*

ABSTRACT

Agriculture is still a mainstay of rural economy and most of the rural female workers are busy in this sector in India and Bihar. The percentage distribution of female workers in rural India is such that 71.06 percent are busy in the primary sector, 15.31 percent in the secondary sector and 13.62 percent in the tertiary sector. Whereas the corresponding figure in rural Bihar is such that their share in the primary sector is 75.84 percent and in secondary and tertiary sectors are 4.72 percent and 19.44 percent respectively. As per PLFS, 2018-19 less than a quarter of rural female workers of Bihar are in non-agriculture activities (24.16 percent). Against this background, the present paper analyses the nature and scope of non- farm opportunities for females in village economy at the backdrop of shrinking and unsuitable options of jobs within agriculture over the last twenty years (during 2000-2020) based on secondary survey. The series of sub-division and fragmentation of landholding over the years is pushing newly educated young rural females from agriculture to other non- farm options.

Keywords : Rural Females, Agriculture, Non-farm options.

1. INTRODUCTION

Most economies witness the path of development trajectory from a predominantly agrarian economy (extremely informal) to industrial or formal economy. The economy of every nation, state or village has its path of development. According to the Central Statistical Organization, in India, over the period 1950-90, the share of agriculture in GDP declined by about 25 percentage points, while the secondary and tertiary sector gained equally. Since 1990, the share of secondary sector stabilized and the entire subsequent fall in the share of agriculture has been counterbalanced by the services. The economy started witnessing the focus towards industrial development after the 1950s and started growing to a service-oriented economy in the mid -the 1980s.

Kuznets and Chenery (1967) argued that development would be associated with the sharp decline in the share of the agriculture sector to GDP and which is compensated by a significant increase in industry, and as an economy matures, the share of services both in terms of its share in GDP and employment both grow commensurate with the decline in agriculture. The pattern of diversification from agriculture to industry and subsequently to service sector ensures the normal path of development. Neither Bihar nor India followed the very type of development trajectory. The varying growth rate of various sectors of the economy has resulted in restructuring the composition of GSDP in the economy of the state.

1.1 Conceptualization of Shifting from Agriculture to Non-agriculture Sector :

Arthur Lewis in his famous paper "Economic Development with Unlimited Supplies of Labour" (Lewis, 1954) that divides the economy of an underdeveloped country in two sectors namely the subsistence or traditional sector and the capitalist or

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CO-OPERATIVE MOVEMENT IN BIHAR: SINCE 1991

DR. PRAVIN KUMAR*
RUPESH KUMAR**

Co-operatives are the main supportive body for agriculture and rural development in various forms such as disbursement of credit, supply of agricultural inputs, storage, processing and many other important activities. Co-operatives are also functioning as the main institutional agencies under public distribution system. Indian co-operative Movement over the years has grown in size and has multiplied their business manifold, encompassing major economic activities. By and large, co-operative movement in the country has a three tier structure, i.e., primaries at grass-root level which have been federated to their district level co-operatives for guidance and support. Likewise, there are 21 National Level sectoral co-operative union of India, the apex promotional organization, 361 State level federations and 2,741 district level federations having their links from national to village level. Thus, the movement has covered cent per cent village network and about 67 per cent of the rural households are within its fold.

Co-operative sector in India has been the part and parcel of the institutional arrangements for ushering in growth with social justice largely under government umbrella. Though co-operatives are presently provided with state assistance in the form of participation in share capital, subsidy and loans at concessional rates of interest from NABARD, they no longer enjoy the same status and privilege as in the past due to changes in economic environment. Thus, in the past due to changes in economic environment. Thus in the changed scenario the relationship between State and co-operatives is marked by what Prof. Khusro calls 'a curious mix of overregulation and sheer neglect". If Economic reforms are pursued to its logical end, the state may cease to extend financial assistance and patronize co-operatives as in the past.

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PEACE AND PATTERN
OF DEVELOPMENT

Agriculture: Area, Production and Yield

Om Prakash Ram and Praveen Kumar

Introduction

In India's growth story, there are reasons to focus attention on agriculture and allied sector, which will continue to play a significant role in providing employment and sustainable livelihoods for the growing population in India.

Overview of Agriculture and allied sectors

In the recent past, growth rates of agriculture have been fluctuating at 1.5 per cent in 2012-13, 5.6 per cent in 2013-14, (-) 0.2 per cent in 2014-15, 0.7 per cent in 2015-16 and 4.9 per cent in 2016-17 (PE). The uncertainties in growth of agriculture are explained by the fact that shocks emanate mainly from deficiency in rainfall since 55 per cent of agriculture in India is rainfall dependent and there have been two consecutive years of less than normal rainfall in 2014-15 and 2015-16.

Area, Production and Yield

As a result of good monsoon during 2016-17, area sown under most crops increased in 2016-17. The largest increase was recorded under pulses which is around 43.66 lakh hectares (around 17.5 percent) more over 2015-16. The area coverage under tur, gram, urad and moong increased by around 36 per cent, 14 per cent, 24 per cent and 12 per cent respectively, over 2015-16. The area coverage under wheat and coarse cereals also increased by 2.97 lakh hectares to 307.15 lakh hectares and by 2.94 lakh hectares to 246.83 lakh hectares in 2016-17 compared to 2015-16 respectively. However, there was a decline in the area under rice by 5.77 lakh hectares in 2016-17 as compared to the previous year.

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ECONOMIC
IMPLICATIONS OF
CHAMPARAN SATYAGARAHA

IMPACT OF GOODS
AND SERVICE TAX (GST)
ON INDIAN TAX SYSTEM

iej

GST at A Glance in India

Pravin Kumar

The introduction of Goods and Services Tax (GST) would be a very significant step in the field of indirect tax reforms in India. By amalgamating a large number of Central and State taxes into a single tax, it would mitigate cascading or double taxation in a major way and pave the way for a common national market. From the consumer point of view, the biggest advantage would be in terms of a reduction in the overall tax burden on goods, which is currently estimated to be around 25%-30%. Introduction of GST would also make Indian products competitive in the domestic and international markets.

Tax Structure before GST in India

- Before the implementation of GST, taxation laws between the Centre and states were clearly demarcated. There were no overlaps between the fiscal powers, whatsoever. The Centre would levy tax on goods manufacture, except alcohol for consumption, narcotics, opium, etc.
- The states had the power to charge tax on the sale of goods.
- The Centre would levy the Central Sales Tax that was collected by the originating states.
- The Centre was also levying service tax on all types of services.
- Additionally, the Centre was charging and collecting additional duties of customs on goods that were imported into or exported from India. This tax was levied in addition to the Basic Customs Duty. This additional duty of customs is referred to as Countervailing Duty (CVD) and Special Additional Duty (SAD) and it counter balances excise duties, state VAT, sales tax, and other such taxes.

History of GST in Some developed Countries:

A number of countries around the globe have already implemented GST. For instance, Australia saw the introduction of the tax in 2000, replacing the Federal Wholesale Tax. Canada witnessed the replacement of the Manufacturer's Sales Tax with GST in 1991. New Zealand saw the implementation of the reform in 1986, while Singapore did so in 1994. GST in Malaysia was introduced in 2015, and India has jumped on the bandwagon to provide benefits to the consumers, the industry, and the government.

History of GST in India

2000: In India, the idea of adopting GST was first suggested by the Atal Bihari Vajpayee

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VAAK SUDHA

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विशेष सूचना :
विचार की प्रतिबद्धता में राष्ट्रहित सर्वोपरि है।

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अनुक्रमणिका