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Why, Initiatives for E-Waste Management and Recycling Programs are Important!

Dr Reema Srivastava* and Saloni Sharma**

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Abstract

E-waste is produced when an electronic product is rejected after the end of its useful life. Mumbai is the top e-waste producer followed by Delhi, Bengaluru, Chennai and Kolkata. The presence of many toxic elements like lead, mercury, arsenic, cadmium, chromium and flame retardants beyond threshold limits make E-waste harmful for human health and environment.

Keywords: E-waste, hazardous, metal, poisonous, policies, e-waste sources, recycle

Introduction

In India, the quantity of "e-waste" or electronic waste has now become a major problem. Disposal of e-waste is an emerging global environmental and public health issue, as this waste has become the most rapidly growing segment of the formal municipal waste stream in the world (Dahl, 2002). The discarded and end-of-life electronics products ranging from computers, equipment used in Information and Communication Technology (ICT), home appliances, audio and video products and all of their peripherals are popularly known as Electronic waste (E-waste). In India most of the waste electronic items are stored at households as people do not know how to discard them. This ever increasing waste is very complex in nature and is also a rich source of metals such as gold, silver and copper, which can be recovered and brought back into the production cycle. So e-waste trade and recycling alliances provide employment to many groups of people in India (CPCB, 2008; Baud *et al*., 2001; Monika and Kishore, 2010).

The term waste is held in reserve for residue or material which is discarded by the consumer rather than reused, including residue from reuse and recycling processes. E-waste is produced when an electronic product is rejected after the end of its useful life. Technically, E-waste is only a subclass of Waste Electrical and Electronic Equipment (WEEE). According to the Organization for Economic Cooperation and Development (OECD), any machine or any device which uses the electric power supply, when approaches to end of its useful life would come under WEEE (EU, 2002). Thus E- waste is a term used for the electronic or electric goods that have become undesirable, non-functioning or obsolete and have basically reached the finish line of their useful life. E-waste is not just a waste but it also contains some very poisonous substances such as mercury, lead, cadmium, arsenic etc. These lethal substances can cause cancer, reproductive ailments and many other health harms, if not appropriately managed. Several public policy advocates the term E-waste approximately to all electronics waste.

Informal handling of E-waste in developing countries can cause adverse effects on human wellbeing and environment. Electronic scrap machines, such as a computer comprises potentially detrimental chemicals such as lead, cadmium, beryllium or brominated flame retardants etc. The rapid growth of technology leads to a very large amount of E-waste which is created every minute (Lavamobiles, 2017). Reuse and disposal of e-waste may include substantial danger to health of workers and communities in developed countries (Saker, 2023) and excessive attention must be taken to avoid insecure contact in recycling operations and leaking of things such as heavy metals from landfills and incinerator remains (Sthiannopkao and Wong, 2012).

Organic Farming: Sustainable Agriculture.

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Abstract

Organic agriculture is a unique production management system which promotes and enhances agroecosystem health including biodiversity, biological cycles and soil biological activities, this accomplished by using on-farm agronomic, biological and mechanical methods in exclusion of all synthetic off-form inputs.

Keywords: Organic farming, compost, green manure, agriculture

Introduction

Organic agriculture is developing rapidly and today at least 170 countries produces organic food commercially. There were 43.1 million hectares of organic agricultural land in India including in conversion areas and with 2 million producers. The world's biggest organic producers are in Asia (36%), followed by Africa (29%) and Europe (17%) (Santoshkumar *et al.*, 2017). The organic movement in India has its origin in the work of Howard, who formulated and conceptualized most of the views which were later accepted by those people who became active in this movement (Howard, 1940). As per the definition of the USDA study team on organic farming "organic farming is a system which avoids or largely excludes the use of synthetic inputs (such as fertilizers, pesticides, hormones, feed additives etc) and to the maximum extent feasible rely upon crop rotations, crop residues, animal manures, off farm organic waste, mineral grade rock additives and biological system of nutrient mobilization and plant protection". In another definition FAO suggested that "Organic agriculture is a unique production management system which promotes and enhances agroecosystem health, including biodiversity, biological cycles and soil biological activity and this is accomplished by using on-farm agronomic, biological and mechanical methods in exclusion of all synthetic off-farm inputs". The objectives of environmental, social and economic sustainability are the basic of organic farming (Stockdale *et al.*, 2001). A great emphasis is placed to maintain the soil fertility by returning all the wastes to it chiefly through compost to minimize the gap between NPK addition and removal from soil (Chhonker, 2002). Organic farming is an alternative to regular farming. It makes use of compost, manure, green manure, bone meal rather than using fertilizers and pesticides (AmadouBinta and Barbier, 2015). This system makes use of organic wastes and crops are raised in such a manner that it keeps the soil healthy and alive. Microbes are used as bio-fertilizers to increase production without polluting the environment (Kundu and Gaur, 1984; Kumar *et al.*, 1999; Pagnanelli *et al.*, 2010; Bagchi *et al.*, 2015). Organic farming promotes eco-friendly agricultural practices without making use of synthetic inputs and majorly relies upon the use of organic wastes to raise crops. Organic agriculture is an ecologically intensive production system expanding worldwide as demand for sustainability increases (Eyhorn *et al.*, 2019; Willer *et al.*, 2019). Although organic farms produce lower yields than comparable conventional farms (Seufert *et al.*, 2012; Ponisio *et al.*, 2015), they are more profitable, more friendly to pollinators and the environment, and deliver equally or more nutritious foods with fewer pesticide residues (Kennedy *et al.*, 2013; Tuck *et al.*, 2014; Reganold and Wachter, 2016; Kovács-Hostyánszki *et al.*, 2017; Seufert and Ramankutty, 2017).

Organic Agriculture in India

Since January 1994 "Sevagram Declaration" for promotion of organic agriculture in India.

Plant derived natural compounds and their anticancer properties

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Abstract:

In recent years, great interest has been focused on using natural extracts of plant origin with diverse biological activities including anti-cancer activities. This article provides an overview of various phytochemicals which are used chemotherapeutic agents in cancer treatment.

Keywords: Cancer, phytochemicals, anti-tumor activity

Introduction

Traditionally, plant derived extracts have been used for their therapeutic value to treat diseases such as inflammation, liver disease, diabetes, hypertension and abscesses (AbdulWahab *et al.*, 2018). Different parts of plants viz. leaves, stem, roots, fruits, seeds contain various bioactive constituents such as phytochemicals, alkaloids, lectins, resins, adenine derivatives, diterpenes, triterpenoids, etc. Presently, cancer disease is among the leading causes of deaths worldwide (MartÃ-nOrtega and SeguraCampos, 2019). Cancerous cells lose the property of contact inhibition and, thus, grow uncontrollably forming a mass called a tumor. Currently, cancer treatment includes radiotherapy, chemotherapy and chemicals-based therapy shows toxic side effects to patient's health. So, an alternative approach based on naturally derived compounds from plants should be followed for treatment and prevention of cancer. Scope of this chapter includes plant species from several countries, their common name, family to which particular species belong, various bioactive phyto-constituents they contain, structure of these chemical compounds, information about mechanism/ mode of their action, pathways involved and effect of these on various cancer cell lines. Some of the phytoconstituents, alkaloids mentioned in this chapter are currently used as chemotherapeutic agents to control tumor cells by exploiting their anti-tumor promoting activity in the treatment of cancer.

Plant species and their role in various cancers:

1. *Annona muricata* Linn - Commonly known as soursop, graviola and guanabana (Gajalakshmi *et al.*, 2012). *Annona muricata* is a member of the Annonaceae family and native plant of America, Caribbean, Cuba, Southern Mexico, Bermuda, Colombia, Brazil and Ecuador. Also, cultivated in parts of Southeast areas of Asia such as Malaysia, Indonesia and Philippines (Sanuai *et al.*, 2018). Annonacin (*Annonaceous acetogenin*) is a bioactive isolate of *A. muricata* leaves that shows apoptosis of skin tumor cells via inhibition of P13K/ AKT, mTOR, p38, PTEN, ERK and src signalling pathways (Md Roduan *et al.*, 2019). Breast cancer cell line - 4T1 when administered with crude extract of *A. muricata* showed apoptotic activity in both *in vitro* and *in vivo* and also inhibited metastatic property of cancerous cells (Syed Najmuddin *et al.*, 2016).

2. *Elaeodendron buchananii* Loes - Also known as root bark and member of Celastraceae family. *E. buchananii* is commonly found in parts of Eastern Africa (Kubo *et al.*, 1990) and contains a biologically active compound - Elabunin (dammarane triterpene) that shows cytotoxic activity against L-1210 leukemic cells (Omara *et al.*, 2020).

3. *Euphorbia caducifolia* - Commonly known as Leafless milk hedge, is a member of the Euphorbiaceae family (Venumadhay and

Lead Phyto-toxicity and its Phytoremediation

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Abstract:

Soil contamination by heavy metals is an important environmental concern as it is of widespread occurrence resulting due to human, agricultural and industrial activities. Among heavy metals, Lead (Pb) is one of the most widespread heavy metal contaminant in soils. It is highly toxic to living organisms. Although lead is not an essential element for plants and has no biological function but still it gets easily absorbed and accumulated in different plant parts. The regulation of Pb uptake is mediated by factors like cation exchange capacity, pH and particle size of the soil as well as some physico-chemical factors. Pb toxicity leads to many deleterious symptoms in plants like chlorosis, blackening of root system and stunted growth. Pb toxicity also affects membrane structure and permeability, mineral nutrition and water balance, hormonal balance and leads to photosynthetic inhibition. This review paper elucidates various deleterious effects of Pb phyto-toxicity and various plant responses for developing tolerance and Pb-detoxification. Apart from this phytoremediation and rhizofiltration technologies have great potential for remediation of Pb-contaminated soils.

Keywords: Lead, sources, uptake, toxicity, tolerance, phytoremediation

Introduction:

Various toxic and heavy metal pollutants have been introduced into the environment at an alarming rate since the Industrial Revolution. These pollutants include various organic compounds and heavy metals (HMs) which can drastically affect human and animal health and ecosystems. One such heavy metal is lead (Pb) as it accumulates in soils, sediments and water and is extremely persistent in the environment (Traunfeld and Clement, 2001). Lead (Pb), is a bluish or silvery-grey heavy metal, with atomic number-82, atomic weight-207.19, and a specific gravity-11.34, with a melting point-327.5°C and a boiling point at atmospheric pressure of 1740°C. Although lead is not an essential element for plants and has no biological function but still it gets easily absorbed and accumulated in different plant parts.

The regulation of Pb uptake is mediated by factors like cation exchange capacity, pH and particle size of the soil as well as some physico-chemical factors. Pb toxicity leads to many deleterious symptoms in plants like chlorosis, blackening of root system and stunted growth. Pb toxicity also affects membrane structure and permeability, mineral nutrition and water balance, hormonal balance, and leads to photosynthetic inhibition. This review paper elucidates various deleterious effects of Pb phyto-toxicity and various plant responses for developing tolerance and Pb-detoxification. Apart from this phytoremediation and rhizofiltration technologies have great potential for remediation of Pb-contaminated soils (McComb *et al.*, 2012).

Sources of lead contamination

Lead is one of the most widely distributed trace metals and is ranked second of all hazardous substances by the Agency for Toxic Substances and Disease Registry (ATSDR, 2007). Because of natural deposition and prolonged human activities, Pb has become widespread in the soil and the environment. Natural sources include weathering, erosion of parent rocks and volcanic eruptions which transfer large quantities of metals to water reservoirs and soil (Gadd, 2010).

A Comprehensive Review on the Use of Low Cost Adsorbent in the Treatment of Wastewater

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Abstract

All over the world water bodies get highly polluted due to uncontrolled contamination of harmful wastes, heavy metal particles, toxic dyes etc. For the protection of water sources various methodologies are to be followed. The adsorption technique is highly useful to control the contamination. Bioadsorbents, natural materials, waste material from agriculture and industry can be used in the form of inexpensive adsorbents. The concept of the use of waste materials and used water adsorbents for water purification is widely used. Nanomaterials are also effective adsorbents for wastewater treatment. Nanomaterials are cost-effective, environmental friendly and innovative in the treatment of wastewater. Sorbents have the capability to remove various pollutants and they can be reused after adsorption process. In this review article adsorption techniques and adsorbents are discussed for the treatment of wastewater.

Keywords: Adsorbents, Bioadsorbents, Nanomaterials

Introduction

Water is required in suitable form for survival on earth. Apart from survival, domestic, agriculture and industrial purposes also need pure water. (Ahmed, 2016) But in recent era many activities such as unplanned urbanization, rapid industrialization, population growth deteriorates the quality of water. Heavy metal ions, dyes, organic pollutants are the most common toxic materials present in water. (Karnik *et al.*, 2005)

To minimize water pollution a variety of treatment techniques are available. Treatment technologies involve the removal of harmful microorganisms, organic pollutants, solid materials from wastewater. Treatment process involving low cost and low energy is desired. (Joss *et al.*, 2006) Adsorption process is a better tool for water treatment as it is easy to operate, simple to design. Activated carbon is used as an adsorbent due to its capability to remove organic pollutants. (Crini, 2006). The relation of high surface area, pore volume and porosity to adsorption capacity of activated carbon make them significant. To remove various types of pollutants from water large variety of low cost adsorbents have been examined (Sulekha, 2016).

By products coming from various activities such as agriculture, industry could be used as low cost adsorbents which provide two fold advantage to environment. Firstly, reduction in the volume of by-products and secondly, the treatment of wastewater at reasonable cost. (Theron *et al.*, 2008) .

Adsorption Technique

Adsorption is a mass transfer process in which adhesion of molecules from gas, liquid or dissolved solid to surface takes place. (Manchisi *et al.*, 2020). Adsorbate is the substance being adsorbed and the adsorbing material is adsorbent. Adsorbate and adsorbent possess specific properties which depend upon their constituents. (Lofrano, 2012). If the interaction that takes place between the solid surface and adsorbed molecules possess physical nature then it is a physisorption and if it involves chemical bonding then it is chemisorption (Ali, 2014). Decrease in free energy and entropy of the system takes place in physisorption and it is exothermic process (Tchobanoglous *et al.*,

Water Pollution: cause, effects and its control measures

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Abstract:

Water is present on Earth's surface as a main constituent. It also forms the major component of all living organisms. Now-a-day's water is polluted by various anthropogenic activities like industrialization, domestic work, agriculture, chemicals and many more. Polluted water contains many pathogens which causes serious diseases in humans and animals. Water pollution is now becoming a global issue and constant examination of water management policy is required to address it. Water contamination leads to death and sicknesses all across the world and around 14000 people die every day as a result of it. Water contamination is a concern in both established and poor countries. Precipitation, weather, soil composition, flora, geology, flow rates, groundwater aquifers and anthropogenic activities all have an impact on water quality. Point sources from industries and municipalities pose the biggest threat to quality of water. Mining, agriculture activities and urban development agriculture also affect the water quality. Nutrients, sediments and hazardous pollutants are all examples of non-point source pollution. This paper emphasised on various sources and effects of water pollution generated by various anthropogenic activities and control measures to control water pollution.

Keywords: Water pollution, anthropogenic activities, control measures

Introduction

There is plenty of water around us but unfortunately most of it cannot be used. Ocean water has too much salt in it that it is not fit for drinking or any other use (Pal *et al.*, 2014). Most of the water that precipitates on earth's surface runs off from land into the oceans thereby getting wasted. 96.5% of Earth's total water is salty that leaves only 2.5% water which is fresh (Shanon *et al.*, 2008). 68.7% of the freshwater is frozen in the form of glaciers, in snow on high mountain tops and in polar ice caps due to which only 1.2% of freshwater is available to meet the needs of all plants, animals and human beings (Ortiz, *et al.*, 2015). Water contamination is a major issue in the twenty-first century. Fresh water has become increasingly limited as result of water contamination. Water contamination is mostly caused by development and population growth (CGWB, 2013). People are getting extremely unwell as a result of drinking contaminated water. Pollutant is a material that, when released into the environment creates negative effects or depletes resources (Kolpin *et al.*, 2002). Pollutants can cause long-term or short-term negative effects on the environment. Short-term harm is caused by biodegradable contaminants. Some pollutants, such as DDT, degrade to generate pollutants like DDD and DDE (Sakadevan *et al.*, 2017). Contaminants can be of several types and have varjous features, like non-biodegradable polymers, synthetic chemicals, and heavy metals, having no or very low absorption capability in stock (Martinez, 2009). With the passing of years, these toxins build in the environment. As their number grows, so does their destruction. Stock pollution is a burden for future generations (Bennett and Vitale, 2001).

Water Pollution

When rain water accumulated in the underground of earth's surface then it is called groundwater which is one of the least viable and principal natural resource for the water (Aulakh *et al.*, 2009). Contaminants like pesticides, fertilisers, landfills waste, toxic chemicals and septic systems get mixed with ground water aquifers and make it polluted. Contaminants

Chemistry of Natural products

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Abstract

Natural products are the products that are produced by living organisms. Natural products contain large classes of complex organic molecules. Natural products are used prolonged for commercial purposes for cosmetics, as dietary supplements and foods. Natural products includes biotic materials like wood, bio-liquids like milk, bio- based materials like bio-plastics and other natural materials like bio fuels, soil and coal. This review concludes that natural products have many unique and important properties. The integrated application of natural products can be a significant contributor to commercial viability in the future.

Keywords: Natural products, living organisms, Biotic-materials

Introduction

A substance or chemical which is produced by a living organism is known as natural product (Lal *et al.*, 2013). In other words, natural products include any organic molecules produced by life e.g. natural sources, plants, animals and microbes (Shaikh and Siu, 2016). An important role is played by natural products in the field of synthetic organic chemistry where these natural products are prepared by chemical methods and in semi-synthetic organic chemistry where natural products can be modify to improve their function (Potowski *et al.*, 2012). Natural products are used by human in a number of ways, it is used in cosmetics, dietary supplements, food and in medicine. Natural products has been used in both traditional and modern drug for handling illness (Franke *et al.*, 2013). Classification of natural products depends on their biological function, biosynthetic path and their natural source. It is mainly classified in two categories – (A) Primary metabolites (B) Secondary metabolites (Nakamura *et al.*, 2014).

A) Primary metabolites - It is a type of metabolites that have an intrinsic function and directly involved in primary growth, photosynthesis, regular development and in reproduction e.g. DNA, RNA, proteins, carbohydrates and lipids (Klitgaard *et al.*, 2014). These are responsible for physiological processes in the organisms (Hennicke *et al.*, 2013).

These are produced during the growth phase. These are distributed in two assemblies- Primary essential metabolites and other one is primary metabolic end products (Coyne *et al.*, 2013).

B) Secondary metabolites - These are chemical molecules obtained by plants which yet have no role in growth, photosynthesis, reproduction or other primary functions (Duckert *et al.*, 2012). These are derivatives of primary type of metabolites and play a substantial role in human health. These are used in maintaining ecological functions (FAO, 2011). These are also known as specialized metabolites or natural products.

Classification of Plant –centered secondary metabolites

These are categorized in three classes- (a) Phenolic compounds; (b) Nitrogen containing compounds and (C) Terpenes

a) Terpenes- These are considered as a major class of natural products containing isoprene units (a type of hydrocarbon contains five carbon atom attached to eight carbon atoms) (Genilloud, 2014). These are the main component of essential oils (Khandelwal *et al.*, 2016).

These are classified in following categories:

Evaluation of Learning Outcomes of Virtual Lab Usage

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Abstract

Virtual Lab, an Emerging ICT Tool of learning experiments, has emerged as a very effective tool for Simulating Experiments. Various workshops were organized by Kanoria PG Mahila Mahavidyalaya, Jaipur for college students to make them familiar with the Virtual Lab. Virtual Lab is an initiative by the Ministry of Education, India to make capable students to perform the experiments at their own pace which is available 24×7 hours. In this article learning outcomes and the feedback from students have been presented to evaluate the learning process from students' perception.

Keywords- Virtual Lab, Simulation, Experiment

Introduction

Present Scenario of Teaching-Learning system needs to be techno-savvy, so in this context students should be well informed about the latest ICT tools for theory as well as for laboratory experiments. Virtual Lab is a free access for laboratory experiments for College Students. Students can perform the experiments on this platform without entering physically into the lab. Various experiments related to different streams like Botany, Chemistry, Zoology, Physics, Computer Science are available on this platform. Research related simulations are also provided there via different educational institutes like IIT, Amrita Vidyapeeth etc (Ambusaidi *et al.*, 2018; VLab, 2022). A survey has been conducted to evaluate the learning outcomes on the usage of virtual lab among the students studying Zoology and Physics subject.

Observations

Laboratory work is an essential component of the syllabus of science stream students, so in this context, a comprehensive study has been presented on the learning outcomes of the Virtual lab usage for the students studying Zoology subject. The virtual lab comprises theory section along with quiz and assignments which help students to learn concepts and hands-on skills and to illustrate theory of environmental science. This practice increases students' curiosity and positive attitudes towards environmental science. There is a scope for self-assessment before and after performance of the experiment. Student's learn to perform practical via simulations and animated videos. The feedback taken from the students studying Zoology subject has been presented in Figure 1-4.

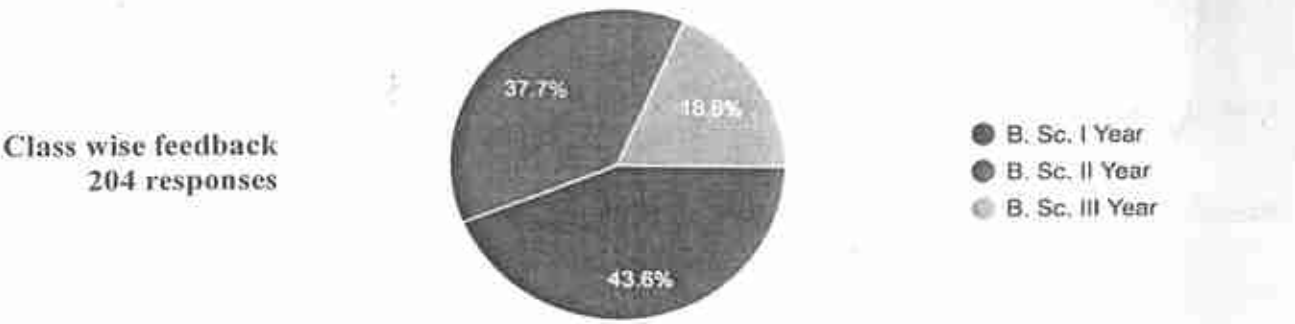

Figure 1: Class wise feedback Data collected from Students studying Zoology Subject

Advancement in Antifungal Drug Development: A Need of the Present World

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Abstract

It is widely acknowledged that we necessitate improved antifungal medication given the high mortality rates linked to systemic infections, the scarcity of antifungal classes, their toxicity, and the rise in infections brought on by strains with innate or acquired resistance. Scientists have been searching for additional antifungal targets in recent years as opposed to the traditional ones now being employed because of the need to increase the variety of therapeutic choices for the fungal infection treatment. Though new possible targets are discovered, it takes a while for these discoveries to make it from the lab to the patient, and the majority of these medications never reach them. In this review, we talk about the progression of antifungal medications with an emphasis on current treatments and recent developments.

Key words: Antifungal therapy, Advancement in antifungal drugs, Drug development.

Introduction

The lifetime of immuno- compromised individuals has increased in recent decades as a result of advancements in the medical profession brought about by the discovery of new medications and the creation of therapy protocols. Only a few antifungal medications are now included in the approved therapeutic drug array for therapy, and most of them have drawbacks such high toxicity and low effectiveness. Additionally, it is mentioned as a challenge to controlling those infections as some fungus species are resilient to the existing medications (Nicola *et al.*, 2019). Antifungal medications have become much more crucial to the practice of modern medicine during the past 30 years. The rising prevalence of invasive fungal infectious diseases can be linked to an increase in the percentage of people undergoing illnesses or therapies that affect immune function, such as HIV/AIDS, primary immune deficiency, cancer chemotherapy, hematologic and solid organ transplantation, prematurity, and immune-modulatory drugs, as the great majority of life-threatening fungal diseases affect people with changed immune function (Richardson, 2005). Even with these latest recent treatments, the clinical results for the majority of invasive fungal infections are still far from optimal. In fact, drug-resistant strains of more widespread organisms like *Candida albicans* and *Candida glabrata* as well as infections brought on by mould species for which there is no effective medical treatment are evolving. Consequently, it becomes quite obvious that the speed of antifungal drug development has not matched up with the demands of clinical practice (Brown *et al.* 2012a,b; Roemer and Krysan, 2014). Since there is an immediate requirement for discovery of novel antifungal substances or new therapy regimens, researchers have been exploring for solutions to these issues. This review will emphasize on the unmet clinical needs in medical mycology, the difficulties in developing novel antifungal drugs, and fresh approaches to some of these difficulties. It also discusses recent achievements in the field of antifungal research, particularly the creation of new medications.

Current antifungal therapies

Fungal pathogens frequently induce invasive disorders including aspergillosis, candidiasis, or cryptococcus. The effectiveness of existing antifungal approaches in treating fungal infections is frequently very low, in part due to the narrow spectrum of action of provided

From Microscope to AI: Exploring the evolution of technology's role in Scientific Research

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Over the past few decades, technology has revolutionized the field of scientific research. From the invention of the microscope in the 17th century to the use of artificial intelligence today, technology has played a pivotal role in advancing our understanding of the world around us. With each new breakthrough, scientists have been able to delve deeper into the mysteries of the universe, uncovering new insights and pushing the boundaries of what is possible. But as technology continues to evolve, so too does its impact on scientific research. In this chapter, we'll take a closer look at the history of technology in science, exploring how it has shaped the way we conduct research and what the future might hold. It includes from the early days of the microscope to the cutting-edge world of AI and discover the incredible ways in which technology has transformed the field of science forever.

Technology has revolutionized the way scientific research is conducted, offering new tools and methods for gathering and analyzing data as well as facilitating greater collaboration among researchers. Each of the three fields of science, technology and innovation belongs to a much larger group of related but separate activity. Technology benefits from science in at least six different ways: (1) new knowledge that serves as a direct source of concepts for novel technological possibilities; (2) tools and techniques for more effective engineering design and a knowledge base for assessing the viability of designs; (3) research instruments, laboratory techniques and analytical methods used in research that eventually find their way into design or industrial practices, frequently through intermediate disciplines; and (4) Using research to develop and assimilate new human skills and abilities that will eventually be useful for technology; (5) developing a knowledge base that is crucial for evaluating technology in terms of its broader social and environmental impacts; and (6) developing a knowledge base that enables more effective applied research, development and improvement of new technology strategies.

The opposite impact of technology on science is at least as significant (1) by serving as a fertile source of novel scientific questions and thereby aiding in the justification of the allocation of resources required to address these questions in an effective and timely manner, extending the agenda of science; and (2) as a source of instrumentation and techniques that would not otherwise be available and are necessary to more effectively address novel and more challenging scientific questions. Looking simply at the direct links between science and technology would give the impression that the research portfolio of potential social benefits is much smaller and less varied.

This chapter begins by discussing the challenges posed by the increasing volume of data generated by scientific research and the role of technology in managing and analyzing this data. The chapter concludes by highlighting the potential for technology to continue to shape the future of scientific research and to drive new advances in the years to come.

Herbal pharmacotherapy from Indian Kitchen

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Abstract

The present articles deals with the characteristics of some important Indian spices, their usages, active components present in them along with exploring their health benefits, functional and pharmacological properties.

Keywords: Indian kitchen, spices, active component, pharmacological activity

Introduction

Plants are always a key source of drug or treatment strategy in different traditional medicinal systems. In recent years, many people are choosing plant based medicines or products to improve their health conditions or as curative substance either alone or in combination with others. It is estimated that nearly 75% of the plant based therapeutic entities used worldwide were included from traditional/folk medicine. In India, approximately 70% of modern drugs are discovered from natural resources and a number of other synthetic analogues have been prepared from prototype compounds isolated from plants (Sen *et al.*, 2009; Sen *et al.*, 2011; Pan *et al.*, 2014). It was reported that more than 60% of cancer drug available in market or in testing are based on natural products. Currently, about 80% of anti-microbial, immune-suppressive, cardio-vascular and anti-cancer drugs are derived from plant sources. More than 70% entities among 177 anticancer drugs approved are based on natural products or mimetic. About 25% prescription drug found globally are derived from plant sources and nearly 121 such drugs entity are in use. Thirteen drugs of natural origin are approved in United States between 2005 and 2007 and clinical trials are going on more than 100 natural product-based drugs. It was also estimated that 11% of the total 252 drugs found in essential medicine list of WHO are exclusively of plant origin (Pan *et al.*, 2013). In Indian traditional medicine a large number of plants are used.

Early records indicate that herbs and spices were used as medicines in ancient Egypt and Asia and as food preservatives in ancient Rome and Greece (Vasanthi and Parameswari, 2010). Herbs and spices continued to be used during the middle ages for flavoring, food preservation, and/or medicinal purposes (Martins, 2018).

In countries like India where poverty and malnutrition is unbridled, knowledge of plant derived antioxidants and spices could reduce the cost of health care. India has a rich history of using various herbs, spices and herbal components for treating various diseases (Sharangi and Guha, 2013). It has been believed for some time that dietary factors play a key role in the development of some human diseases including cardiovascular disease. Several herbs and spices of culinary origin were included in the "approved" monographs, such as caraway oil and seed, cardamom seed, cinnamon bark, cloves, coriander seed, dill seed, fennel oil and seed, garlic, ginger root, licorice root, mint oil, onion, paprika, parsley herb and root, peppermint leaf and oil, rosemary, sage, thyme, turmeric root, and white mustard seed (Banerjee and Sarkar, 2003).

Herbs and spices have been used for hundreds of years in cooking and medicine.

Gastrulation

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Abstract

Gastrulation is an important characteristic of animal embryos at the developmental stage. In this article we describe the various cellular and molecular changes as well as functional aspects involved in the process of gastrulation which are critical during the developmental phase.

Key-words: Gastrulation, embryo, cellular movements, molecular changes

Introduction

The terms "gastrula" and "gastrulation" were coined by Ernst Haeckel in his 1872 work "Biology of Calcareous Sponges". Gastrulation is a critical process during 3rd week of human development. Gastrulation is defined as an early developmental process in which an embryo transforms from a one-dimensional layer of epithelial cells (blastula) and reorganizes into a multilayered and multidimensional structure called the gastrula. In reptiles, avians and mammals, which are triploblastic organisms, gastrulation derives a three tissue layered organism composed of endoderm, mesoderm and ectoderm; each germ layer corresponds to the development of specific primitive systems during organogenesis. In addition to setting the embryo up for organ formation, gastrulation provides a mechanism to develop a multileveled body plan that demarcates anatomical axis formation with dorsal/ventral and cranial/caudal axis (also termed anterior or rostral/posterior, respectively), retention of global left/right symmetry, and the loss of bilateral symmetry in specific systems (e.g., heart).

Although the details of gastrulation differ between various groups of animals, the cellular mechanisms involved in gastrulation are common to all animals. Gastrulation involves changes in cell motility, cell shape and cell adhesion.

Major types of cell movements occur during gastrulation (Fig. 1)

Invagination: a sheet of cells (called an epithelial sheet) bends inward.

Ingression: individual cells leave an epithelial sheet and become freely migrating mesenchyme cells.

Involution: an epithelial sheet rolls inward to form an underlying layer.

Epiboly: a sheet of cells spreads by thinning.

Intercalation: rows of cells move between one another, creating an array of cells that is longer (in one or more dimensions) but thinner.

Convergent Extension: rows of cells intercalate but the intercalation is highly directional.

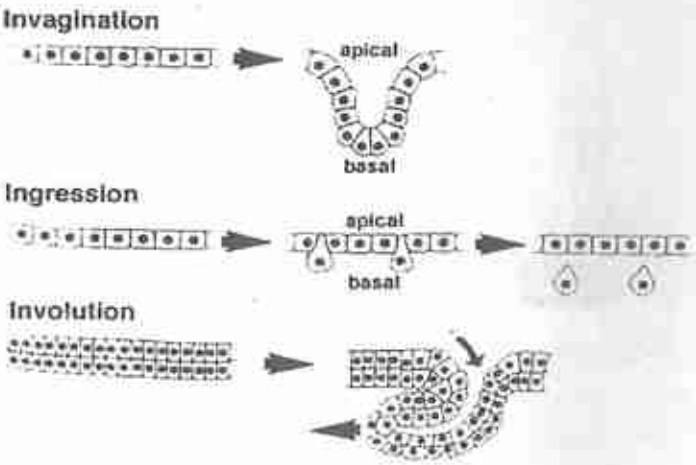

Figure 1: Types of cell movements

Current Trends of Transparent conductive oxides

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Abstract

Transparent conducting oxides (TCOs) are a class of materials adorn with a peculiar combination of metal like electrical conductivity along with transparency for visible spectrum. The added advantage in terms of higher reflectivity towards IR (Infra-red) and NIR (Near Infra-red) wavelength regions make them unique specially for their prospective uses in a variety of domains. The major applications of TCO's include smart windows, transparent contacts for solar cells, optoelectronic devices, flat panel displays, liquid crystal devices, touch screens, EMI shielding and automobile window de-icing and defogging. The research from five four decades have unlocked the full potential of TCO's and opened up path for the next generation TCO based devices. The present review is intended to present a summary of the most promising TCOs.

Key-words: Transparent conductive oxides, Indium Tin Oxide, ITO replacement, Graphene

1. Introduction:

Over the last few decades, the demand for optoelectronic devices has surged. According to statista.com, there are over six billion smartphone subscriptions, and this number is expected to expand by several hundred million over the next several years (Statista, 2022). Aside from smartphones, there is a significant growth in demand for touch screen displays, smart windows and solar panels. Among all of these, transparent conducting oxide is a critical component.

The first reference of transparent conductive materials (TCM), transparent conductive oxides (TCOs), and transparent semiconductors was by their discoverer Karl Wilhelm Bädeker in the year 1907 (Badeker, 1907; Grundman, 2015). He observed the transparency and higher electric conductivity in oxidized Cd films. While it being classified as human carcinogen Balmuri *et al.*, 2017) the use of CdO as TCO did not gained much popularity as compared to Indium Tin Oxide (ITO) which was developed almost four decades later (MsMaster, 1947; Mochel, 1951). The prime application of these films were to act as anti-static coatings and as a transparent electrode in electroluminescent panels. With the advancement of optoelectronics, the ITO made its recognition. The n-type semiconductor with large band gap ~4 eV, lower electrical resistivity ($\sim 10^{-4}$ Ω·cm) and higher optical transmittance (Granqvist and Hultaker, 2002) makes it industry's favourite for flat panel displays, solar cells and smart windows.

2. Figure of Merit (FoM)

There are many parameters which define the prospecting usage of a TCO. A desirable amount of sheet resistance is required e.g. 10 ohms/sq for large area flat panel displays and 400-700 ohms/sq for thin film solar cells in addition to the higher optical transmittance (Fahlan *et al.*, 2008). All of these necessary parameters are combined into a single parameter which is called figure of merit (FoM) of TCO. The FoM was first used by D.B. Fraser and D. Cook (Fraser and Cook, 1972) which was later redefined by Haacke (Haacke, 1976).

The Haacke's FoM is defined as $\Phi_{TC} = \frac{T^{x}}{R_{sh}}$

Where, T is transmittance at 500 nm or an average value between 450 nm to 550 nm and R_{sh} is sheet resistance per square centimeter.

Application of Nanoparticle: Waste Water Treatment

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Abstract

The enormous task of this recent era is to come up with enough cheap, clean and potable water for everyone. Water supply fails to meet the world's escalating demand, which is made worse by population increase, a changing climate and declining water quality. Water and wastewater treatment might be advanced by nanotechnology to increase treatment effectiveness and expand water supplies. Studies on nanomaterials have proven that they serve as efficient tool for the analysis and removal of impurities from waste water. The current study identifies the prospects and constraints for further leveraging these special qualities for sustainable water management by linking these technical advancements to the physicochemical properties of nanoparticles. This review article provides a summary of current developments in nanotechniques for wastewater treatment processes, including nanobead materials like nanoadsorbents, nanometals and nanomembranes.

Keywords: Nanoadsorbent, Zerovalent metal, Leptospirosis, Scalability.

Introduction

The resource that is most valuable for human survival is high quality water. Groundwater contamination and drinking water quality have both been impacted in recent decades by a variety of human and natural activities. Conditions are exceedingly bad, especially in developing nations since most countries today struggle with drinking water issues. The availability of freshwater is dwindling because of:

(I) population expansion

(II) endless droughts

(III) stricter fitness restrictions, and

(IV) conflicting requirements across a range of peoples, posing tremendous problems for the globe in fulfilling growing needs for clean water (US, 1998a; US, 1999; US, 2003).

According to World Health Organization a 100mL sample of water that is to be utilized must be free from faecal and bacterial counts (WHO, 1996). The ultimate action should be to conduct research and use the techniques for the removal of harmful chemicals dyes and bacteria (US, 1998b).

The industrial sector is a main factor of hazardous wastewater release, which is a big threat for groundwater contamination (Singh *et al.*, 2019). Emerging pollutants in water released from industries are often chemicals such as nitroarenes, dyes which are imperishable, sustain in the surrounding, accumulate via the food chain, thus, creating negative impacts on the ecosystem, microbiota, etc. in addition to human health (Larramendy and Soloneski, 2015; Kumar *et al.*, 2015; Singh *et al.*, 2015b; Sidhu *et al.*, 2019). Planning for water resources must now consider how to safeguard water treatment facilities from potential chemical and biological terrorist attacks (US, 1998; US, 1999).

Wastewater contains a variety of pathogenic organisms including bacteria, viruses, protozoans and helminths that are directly linked to fatal conditions like hepatitis-A, campylobacteriosis and leptospirosis (Lin and Ganesh, 2013; Kumar *et al.*, 2014a; Kumar *et al.*, 2014b; Singh *et al.*, 2016; Singh *et al.*, 2017a; Singh *et al.*, 2017b; Kaur *et al.*, 2018). Researchers had found that nanoparticles are a better choice for treating wastewater as they possess distinctive properties like their nanosize, vast surface area, porosity characters, hydrophilicity, dispersibility, and hydrophobicity.

A review - impact of vehicular pollution on roadside plants

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Abstract

Automobiles have expanded in tandem with population growth, as has pollution from car emissions. The initial targets of these vehicular pollutants are roadside plants and roadway vegetation. This review provides a basic overview of how automobile emissions might impact plants. On the other hand, the positive viewpoint of how roadside plants may be able to alter and influence the dangers of vehicular emissions have also been highlighted. There has also been speculation that they may become potential bio markers of air pollution, because of the nanocarbon particle component of vehicular emissions and its interactions with roadside vegetation. It has been argued that the issue of roadside agricultural crops, in particular, has not been well examined as a primary priority. The importance of developing mitigation strategies to find long-term solutions to these growing challenges has been emphasized.

Keywords: Vehicular pollution, nanoparticles, mitigation

Introduction

Clean air cannot be taken for granted any more. Today, the air in most Indian big cities is significantly polluted and this pollution has a significant influence on the population's health. Industrialization, an increase in the number of cars in urban areas and the use of biofuels in rural families have all contributed to a significant decline in interior and outdoor air quality. Delhi is the most polluted among India's 23 metro and megacities, followed by Mumbai, Calcutta, Bangalore, Chennai, Kanpur, Ahmadabad and Nagpur. They have serious air pollution issues, with average levels of suspended particle matter far above the authorised norms (Agrawal and Agrawal, 1999). So far, clean air has been viewed as an infinite and unrestricted natural resource. People are just now realising the need of clean air as the health consequences of filthy air rise. Pollution has a significant negative influence on health. Premature fatalities from respiratory and cardiovascular illnesses as well as suffering from chronic respiratory disorders such as asthma and bronchitis, are on the rise. According to a World Bank research, air pollution may have caused 40,350 premature deaths, 19,805 thousand hospital admissions and 1201 million minor illnesses in 1995 (Bakshi, 2001). Premature deaths have climbed by 28% in the previous four years, while illness and hospital admissions have grown by 30%. Another study indicates that indoor air pollution produced by the combustion of biofuels in poorly ventilated households kills 4,10,000 to 5,70,000 women and children prematurely each year.

Urban air pollution is increasing as a result of rising energy consumption, industrialisation and car usage. In several cities evaluated by the Central Pollution Control Board, the level of Suspended Particulate Matter (SPM) in residential areas surpasses critical levels specified by the board. These investigations demonstrated that bigger cities are not necessarily the more polluting. Kanpur, for example, has higher levels of particle matter in the air than Mumbai, Calcutta, or Delhi (Bayramzadeh *et al.*, 2019).

Surprisingly, neither factories nor cars are the primary sources of air pollution in India. The greatest pollution is caused by the use of raw cooking fuels in the house. Pollutants emitted indoors are significantly more harmful than those released outside owing to their closeness to humans. The world population has gradually increased over the last few decades, from 7.4 billion in 2016 to 7.7 billion in 2019, 7.8 billion in 2020, and 7.9 billion in 2021. By 2050, the world's population is predicted to reach 9.9 billion.

Prediction of effective thermal conductivity of nanofluids using Series-Resistor model

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Abstract

Nanofluids have unique features different from conventional solid-liquid mixtures. Due to their excellent characteristics, nanofluids find wide applications in enhancing heat transfer coefficients. Nanofluids containing metal oxide particles exhibit high thermal conductivity that can be used for enhancing heat transfer performance of conventional systems. The enhancement in the thermal conductivity of nanofluids may be due to the layering of base liquid at the liquid particle interface. In this work, a unit cell model approach has been proposed to predict the effective thermal conductivity (ETC) of nanofluids (k_{eff}), without disturbing the basic physics of heat transport. The particles are assumed to be mono-dispersed, without agglomeration. The effects of nanolayer thickness, nanoparticle size, the thermal conductivity of particle and fluid and volume fraction have been discussed. A relevant equation of ETC is evaluated by introducing a non-linear term with effective volume fraction which depends on the equivalent volume fraction (ϕ_e) and the ratio of conductivities of filler and matrix. The equation have been used for calculating the ETC for metal oxides of different sizes. Using an artificial neural network (ANN) approach, the ETC of nanofluids has also been calculated. Results of the present model validates the results of ANN technique and that with available experimental results in literature.

Keywords: Thermal conductivity, Metal oxide particles, ANN, Nanofluid

Introduction

Nanofluids, a relatively new class of fluids, is a dilute suspension of nanometer size particles dispersed in a liquid. Compared to conventional solid-liquid suspensions for heat transfer intensifications, properly engineered thermal nanofluids possess the advantages like high specific surface area, high dispersion stability etc, thus promoting system miniaturization to suit different applications. Classical models such as Maxwell (Maxwell, 1891) and Hamilton–Crosser (Hamilton, 1962) were developed for predicting the effective thermal conductivity of nanofluids but they were found to be unable to predict the anomalously high thermal conductivity of nanofluids. Various researchers (Yu and Choi, 2003; Xue, 2003; Yu and Choi, 2004; Xiw *et al.*, 2005; Leong *et al.*, 2006; Eastman *et al.*, 2008) developed new theoretical models taking into account most of possible parameters such as particle size, nanolayer, particle movements, interactions and surface chemistry of nanoparticles.

In the present work, a new equation is derived for predicting the effective thermal conductivity of nanofluids using series-resistor model. It is based on the law of minimal thermal resistance and the equal law of the specific equivalent thermal conductivity for mono-dispersed sphere-filled nanofluids. In place of equivalent volume fraction a non-linear second-order empirical relation has been proposed. The unknown coefficients have been determined with the help of boundary conditions and experimental results in the literature. Equivalent volume fraction of fillers is then replaced by the non-linear second-order term introduced. The results thus obtained with a non-linear term are then compared with the experimental results. An artificial neural network (ANN) technique is also been used for calculation of ETC of nanofluids using MATLAB R2010bSP1.

Qualitative study and chemical analysis of adulterants in Chilli

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Abstract:

Adulteration in food stuffs is often present in its crude form as prohibited substance are either partially added or substituted. Generally, adulteration in food occurs for different reasons i.e for financial gain, lack in processing of hygienic conditions, transportation, selling it. Within the past few decades, the adulteration in food is one of the most intense issue.

The spice chilli is considered as the most important commercial spice crop and is widely used as a universal spice. Chilli is named as the wonder spice as it is rich in pungency, taste, flavour and give colour different dishes. Adultered spices are more pungent, rich in chemical and due to addition of adulterant they provide distinct colour. Adulteration process occur to increase the amount of the product and reduce its original property for financial gain.

In this paper we will discuss and analyse the adulteration present in the samples of chilli collected from the local market of Jaipur.

Keywords: Adulteration, Chilli, Detection method

Introduction:

The name of chilli is derived from the Mexican word, *chilli*. From prehistoric times chilli is known in Peru and they believed that chilli originated in tropical America. In America around 7500BC, chilli peppers were included in human diet. It is one of the first cultivated spices in the Central and South America which is 'self-pollinating'. Chillies were first introduced in Europe by Christopher Columbus in 1493 and called them peppers because they, like black and white pepper of the pepper genus known in Europe, have a spicy hot taste unlike other foodstuffs. After its introduction into Europe, chillies were grown as botanical curiosities in the gardens of Spanish and Portuguese monasteries (Mehta, 2017). In pharmaceutical industries, Capsicum has played an important role for many centuries. Generally, the races of chillies are divided into two species i.e. *Capsicum annum* and *Capsicum frutescens*.

Capsicum annum berries also known as sweet peppers while *Capsicum frutescens* berries known as Hot peppers and are more pungent. After Columbus, chillies are cultivated around the globe.

A highly efficient, simple, and ecofriendly green methods for the synthesis of bis indoles

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Abstract

Synthesis of 3,3'-(phenylmethylene)bis(2-phenyl-1H-indole) (5a-h) was prepared by the 3-Formyl-2-phenylindole derivatives (3a-f) and appropriate aldehyde in quantitative yield by applying green synthetic methods as microwave irradiation and grindstone methods using different catalysts under solvent-free mild reaction conditions with high product yields. The structures of the synthesized compounds were characterized on the basis of elemental analysis, IR, ^{1}HNMR, ^{13}C NMR and mass spectral data.

Keywords: Indole, Microwave irradiation, Grindstone.

Introduction

Indole derivatives are interesting class of heterocyclic compounds with a wide range of biological activities and widely used as scaffold in agriculture and medicinal chemistry. In particular, C-3 substituted indoles are important building blocks for the synthesis of many biologically active compounds especially with anticancer (Ali and Saad, 2018), antirheumatoidal (Rahman and Farghaly, 2010), anti HIV (Ragno *et al.*, 2006), anti-inflammatory (Chavan, 2011), anti-diabetic (Acton *et al.*, 2005), anti-histaminic (Swathi *et al.*, 2010), anti-convulsant (Ahuja and Siddiqui, 2014), AT1 Antagonists (Zhu *et al.*, 2016), antihypertensive (Monica *et al.*, 2010), antioxidant (Medvedev *et al.*, 1996). Among these biologically active scaffolds, bisindoles also have a broad spectrum of biological activities such as antibacterial (Qin *et al.*, 2020), cytotoxic (Jiang and Gu, 2000), anti-inflammatory (Sarva *et al.*, 2016) and analgesic (Yuan *et al.*, 2020) activity and also beneficial in promoting estrogen metabolism in men and women (Bey *et al.*, 1985). Therefore, a great interest has been shown by chemists on their synthesis.

Bisindoles are generally prepared by the reaction of indole with other aromatic or aliphatic aldehydes and ketones in presence of either a lewis acid (Babu *et al.*, 2000) or a protic acid. However, some mentioned methods usually involve expensive reagents and relatively harsh conditions which make these methods environmentally hazardous. Use of organic solvents either during condensation reaction or during extraction of the product is also hazardous for human health and environment. To improve these methods towards organic synthesis and reactions, the procedure under solvent-free condition have attained much important as being ecofriendly alternatives.

As a part of this programme, we wish to report various strategies for this synthesis of 3,3'-(phenyl methylene) bis (2-phenyl-1H-indole) bisindoles and assess the efficiency of these synthetic routes to make a comparative study. We have used various Green Chemistry Techniques viz, Microwave and Grindstone Chemistry for its synthesis. Silica supported polyphosphoric acid (PPA) was used to obtain target molecules, it has been employed as an efficient protic acid catalyst, easy to prepare and handle and could be separated simply by filtration and could also be recycled six times without significant loss of its catalytic activity.

Rate enhancement, (Wathey *et al.*, 2002) selectivity and fewer byproduct contamination has made microwave chemistry a popular area

A review article on consequences of pesticides on living system and environment

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Abstract:

The substances which are used in agriculture to protect plants from pests, disease and weeds. Pesticides also protect humans from various diseases. But overuses of pesticides can be affect the human health in terms of various severe diseases. Overuse of pesticides affects the environment also, so permitted levels of pesticides are consumed. In this review we discussed the pesticides types and the impact of pesticides on human health and environment.

Keywords: Pesticides, Diseases, Consumed, Environment, Human health

Introduction

Pesticides are the chemicals or natural agents which applied to control the pests, plant diseases and weeds. Pesticides are the chemicals used in agriculture to protect the crop from insects and pests for increasing the efficiency and yield of crops. Pesticides became an important component of agriculture system during the past decades. Pesticides are the chemicals which include many compounds like organophosphate, organochlorine, carbamate and neonicotinoids (Willey, 2023).

The organochlorine (OC) pesticides were noted as environmentally persistant which remaining in soil for long time. So human health is affected by organochlorine residues which are transferred in the foodchains (Kohler and Triebskon. 2013). Different toxic mechanisms are shown by those pesticides which have different chemical groups. Fungicides, insecticides, rodenticides and herbicides are some examples of pesticides (WHO, 1990; Alewu and Nosiri, 2011). Many of pesticides can remain in soil and water which is harmful for living system and environment. Pesticides should be used safely and disposed of properly due to their toxic nature. General population is affected from low level of pesticides through food and water. But those people at high risk which are directly contact with pesticides like agricultural workers and have adverse health effects.

Classification of pesticides

Pesticides can be classified into three categories:

(1) On the basis of chemical nature: On the basis of chemical nature pesticides can be categorised as organo-phosphates, carba-mates, organochlorines etc.

(2) On the basis of applications: On the basis of applications pesticides can be categorised as agriculture, public health and domestic pesticides.

(3) On the basis of target organism: On the basis of target organism pesticides can be categorised as rodenticides, herbicides, fungicides and insecticides.

Insecticides: Insecticides are the pesticides which can be used to kill the insects.

Herbicides: Herbicides are the pesticides which can be used to kill the weeds.

Fungicides: Fungicides are the pesticides which can be used to kill the fungus.

Rodenticides: Rodenticides are the pesticides which can be used to kill the rodents (Jayaraj, 2016).

Probiotics – A paradigm shift in gut flora regulation raises a health concern

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Abstract

Probiotics are beneficial microorganisms that colonize and regulate intestinal microflora to improve host immunity. They exist naturally in fermented foods like yogurt, buttermilk, Kefir, Sauerkraut, Kimchi, Tempeh and cultured milk and are used commercially for the preparation of infant food and dietary supplements The most common probiotics are members of the genera *Lactobacillus* and *Bifidobacterium.* This review brings insights into the beneficial aspects of probiotics in improving human health but at the same time, focusses on the health concern associated with them.

Keywords: probiotics, microorganisms, gut flora, health, immunity.

Introduction

An amazing world of microorganisms that reside in the digestive tract of an organism, popularly known as the gut flora or microbiota, make a complex community of about 3-5 hundred bacterial species (Quigley, 2013). The intestinal tract of new-born initially sterile, is primarily populated by the faecal and vaginal microbiota of maternal origin during birth and persistently colonized by feeding and other environmental contacts. (Sekirov *et al*, 2010). Studies reveal infant's gut microbiota initially is less diverse and dominated prominently by phyla *Proteobacteria* and *Actinobacteria*.
However, in adults, it becomes more diverse and specified by the dominance of *Firmicutes* and *Bacteroidetes* (Eckburg *et al*, 2005; Qin *et al.*, 2010; Backhed, 2011). As compared to elderly, young adults have higher number of *bifidobacteria* and lesser of *enterobacteria* and *clostridia*. The bacterial genes are 150 times larger than that of human in the gut and the bacterial biomass can make upto 1500 g or approximately 2% of the weight of an average 75 kg person (Wen and Duffy, 2017). The composition of the infant's gut flora is governed by various factors, diet being the prime one while others include genetics; the mode of delivery (vaginal or assisted delivery) at birth, the method of infant feeding and the use of medications (primarily antibiotics), gestational age and sanitation level (Marques *et al*, 2010; Fouhy *et al*, 2012). However, the alteration in the diet, digestive tract physiology and activity of host immune system affect microbiota composition in older people (Macfarlane and Macfarlane, 2009).

Maintenance of gut flora is paramount because of their beneficial aspects like metabolic function, protection against pathogens and educating the immune system. Besides regular exercise and adequate amount of sleep, a balanced diet and dietary supplements are important for maintenance and restoration of gut flora. Moreover, modification of the gut microbiota is clinically crucial for the treatment of all diseases related to imbalances in gut microbiota. Thus, one of the prominent methods for maintenance of that balance include probiotics (Hasan and Yang, 2019). This review brings insights into the beneficial aspects of probiotics in improving human health but at the same time, focusses on the health concern associated with them.

Probiotics and potential health benefits

Probiotics, well-known as health friendly bacteria, play significant roles in gut microbiota composition, are "generally regarded as safe" (GRAS). Owing to the proximal correlation between the gut microbiota and human immunity, an extremely effective way to

Graphene Oxide-based Nano-biomaterials: Applications in Cancer Therapy

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Abstract

Graphene has attracted considerable attention over last few decades because of better surface and mechanical properties they possess in the field of biomedical sciences. In order to meet the needs of targeted delivery and drug delivery capacity, Graphene oxide (GO) nanocarriers were designed. A growing number of biomedical nanomaterials based on graphene oxide have been proposed in the past decade, including graphene oxide (GO) and reduced graphene oxide (RGO). Human history has recorded several deadly diseases, including cancer, which is one of the most lethal diseases. Cancer stem cells (CSCs) also known as Tumor-initiating cells (TICs) are troublesome to annihilate with customary approaches to cancer treatment such as chemotherapy and radiations. Graphene oxide's potential as a therapeutic target against cancer stem cells will be studied in this article. The primary chemical features of graphene include its ability to form stable dispersions in a range of solvents, relative inertness and potential non-toxicity. It is possible to use GO (on both large and small-sized flakes) to selectively inhibit the proliferation of cancer stem cells across a wide range of different types of tumors. This review focuses on the approach of targeted nanoparticles in cancer therapy and summarizes their *in vivo* biocompatibility. Particularly, we discuss the chemistry and properties of GO and GO-metal nanoparticles in nanomedicine applications such as cancer treatment and delivery of an anticancer drug.

Keywords: Graphene oxide, nanomaterial, drug delivery, chemotherapy, biocompatibility

Introduction

In terms of health issues, cancer is one of the most serious diseases at present. The second biggest cause of death in the world right now is cancer, accounting for one out of every six deaths. An uncontrolled division of cells can lead to cancer development throughout the body. Most commonly found cancer in men are of prostate, lungs, colorectal, liver and stomach while women are most affected with cervical, breast, colorectal, lungs and thyroid cancer. Tobacco use, alcohol intake, a poor diet, inactivity, and pollution are major risk factors for cancer and other non-communicable illnesses. While these extrinsic variables have been identified as key drivers of cancer, the role of proto-oncogene mutations, tumor suppressor gene expression patterns and DNA repair genes have been difficult to quantify. Surgery, chemotherapy, radiation therapy targeted therapy, and hormone therapy are some of the traditional therapeutic techniques utilized in cancer treatment.

Chemotherapy is still one of the most popular treatments, and it has been shown to be effective in slowing tumor cell development. Despite that, it has a number of flaws, including drug elimination, inability to achieve the optimal target site concentration, and non-specific cytotoxicity. The use of nanomaterials in cancer treatment shows considerable promise in overcoming the limits of existing standard techniques. In the biomedical field, nanomaterials, which provide precise targeting, fewer side effects and antimicrobial properties, have revolutionized research. Nano-therapeutic medications have advanced in the fields of anti-tumor multidrug resistance and drug delivery systems due to their unique features.

Liposomes, micelles and peptides are only a few of the nanocarriers that are being used in cancer therapy. Graphene oxide-based nanomaterials,

Scrutinizing the role of Green Nanotechnology in Food and Water Management

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Introduction

The ultimate goal of any scientific development is to increase well-being and human health. One of the great scientific and technical achievements at the end of 20th century is the creation of nanomaterials and nanotechnology. Nano-technology is hailed as having the potential to increase the efficiency of energy consumption, help clean the environment and solve major health problems. It is said to be able to massively increase manufacturing production at significantly reduced costs. Products of nanotechnology will be smaller, cheaper, lighter yet more functional and require less energy and fewer raw materials to manufacture. An illustrious strategy for amelioration in biomedical and biotechnological applications, is the development of nanoparticles. Nano (from the Greek word for "dwarf" is defined as at least one dimension be in range of 1-100 nanometer in length on the scale. One nanometer is a billionth of a meter, or 10^{-9} of a meter. Nanotechnology allows scientists to create, explore, and manipulate materials measured in nanometers (billionths of a meter). Such materials can have chemical, physical, and biological properties that differ from those of their larger counterparts.

Green nanotechnology is a branch of green technology that utilizes the concepts of green chemistry and green engineering. The reason behind the utilization of plants in nanoparticle formulations is that they are easily available and possess a broad variability of metabolites, such as vitamins, antioxidants, and nucleotides. For example; Gold (Au) nanoparticles have attracted substantial attention for their controllable size, shape and surface properties. A variety of copper (Cu) and copper oxide (CuO) nanoparticles have also been synthesized from plant extracts.

Titanium dioxide and Zinc oxide nanoparticles are also important metal oxide nanomaterials that have been synthesized from a number of a plant extracts.

Green nanotechnology in phytoformulations, significantly contributes to environmental sustainability through the production of nanomaterials and nanoproducts without causing harm to human health or the environment.

Applications of Green Nanotechnology

1. Water and Wastewater treatment
2. Biotechnology and Agriculture
3. Medicine and Health
4. Textiles and Clothing
5. Food Preservation
6. Energy and Environment

Nanotechnology in Food Preservation

The rising consumer concerns about food quality and health benefits are impelling the researchers to find the way that can enhance food quality while disturbing least the nutritional value of the product. The demand of nanoparticle-based materials has been increased in the food industry as many of them contain essential elements and also found to be non-toxic (Roselli *et al.*, 2003). They have been also found to be stable at high temperature and pressures (Sawai, 2003). Nanotechnology offers complete food solutions from food manufacturing, processing to packaging. Nanomaterials bring about a great difference not only in the food quality and safety but also in health benefits that food delivers. Many organizations, researchers and industries are coming up with novel techniques, methods and products that have a direct application of nanotechnology in food science (Dasgupta *et al.*, 2015).

Fluid Dynamics – A Boon to Society

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Introduction

The process of evolution and the urge to survive led human beings to increase their skills and knowledge which led to the development of specific disciplines. For human survival, food was the most essential commodity and this motivated ancient people to irrigation of agricultural crops. Naturally, this became the main focus which led to the development of water delivery systems. In fact, early civilizations used water to develop cities, for example, the Harrapan people of the Indus Valley developed drainage systems while the Egyptians transported huge stones on the river Nile to build pyramids. Each one of the early civilizations has contributed to the advancement of the understanding of fluid, water in particular, which led to the development of specific scientific and technical disciplines. In order to carry out specific jobs efficiently required knowledge of the systems being used. Efficient transfer of knowledge becomes possible only when it is documented in systematic disciplines. Among the several disciplines that were developed, Fluid Mechanics occupied an important position. The study of Fluid Mechanics originated in the days of ancient Greece and the first evidence of recorded scientific theory in this domain is the principle of Buoyancy which is credited to Archimedes in the 3rd century BC. Leonardo da Vinci, based on experimentation, developed a theory that was particularly useful in the development of water management which proved to be an important advancement in Fluid Mechanics. His work is suggestive of modern concepts such as no-slip condition, hydraulic jump and the distinctive path taken by bubbles in fluids. Several leading personalities have contributed to the development of Fluid Mechanics. Evangelista Torricelli invented the barometer, Isaac Newton introduced the concept of viscosity and Blaise Pascal worked on Hydrostatics and formulated Pascal's Law. The mathematical concepts were introduced by David Bernoulli and were further analyzed by Jean le Rond d'Alembert, Joseph Louis Lagrange, Pierre-Simon Laplace and Simeon Denis Poisson. The study of viscous flow was explored by several engineers, the most prominent names being Jean Leonard Marie Poiseuille and Gotthilf Hagen.

Nineteenth century witnessed great progress in both theoretical and experimental Fluid Mechanics but along separate paths, the theoretical work under Hydrodynamics and the experimental work, particularly that associated with water under Hydraulics. During this century, a general differential equation describing fluid motion was developed. The beginning of the twentieth century witnessed a grand unification of these two branches of study which was mainly due to the introduction of the concept of "fluid boundary layer", by a German professor, Ludwig Prandtl in 1904. He introduced the existence of friction between the fluid flowing past a solid. Prandtl's idea was that for flow next to a solid boundary, a thin fluid layer (boundary layer) develops in which friction is very important but outside this layer, the fluid behaves very much like a frictionless fluid. The introduction of this simple concept resolved the conflict that existed between theoretical and experimental scientists and engineers. Prandtl came to be accepted as the founder of modern fluid mechanics. Several other scientists like Osborne Reynolds, Andrey Kolmogorov and Geoffrey Ingram Taylor advanced the understanding through their works on "streamlined flow" and "turbulence." Around this period, a need was felt to understand the Physics of fluid flow around solids and present an accurate mathematical description, which led to the development of a subdiscipline that goes by the name "Fluid Dynamics". Rapid progress happened in this

Inflation to chaotic inflation in general theory of relativity

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Introduction

Theory of relativity was proposed by Albert Einstein. He published special theory of relativity in 1905 and general theory in 1915. Special theory of relativity can be applied to all physical phenomena in absence of gravity. But the general theory of relativity can be applied to the cosmological and astrophysical fields. So, G.T.R. (General Theory of Relativity) mainly explains the law of gravitation and its relation with other forces of nature. Now, let's know about some uses of general theory of relativity which are as follows:

- The light entering the earth's atmosphere gets bent due to the gravity of the earth.
- The cathode ray tube in television also works on the relativistic effects.
- Metals like gold, copper look shiny and appear red, yellow, orange in color due to the absorption and re-emission of light based on the theory of relativity.

Cosmology is the study of universe as whole. Here, we construct the model of the universe and see to what extent this model resembles the actual universe.

A fundamental tenet of the general theory was that the geometric structure of a region of space time is not an independent, self-determined entity but is determined by mass energy.

In modern notation, that idea is expressed as the field equations

$$G_{ij} = \beta T_{ij}$$

Where G_{ij} is four dimensional tensor that describe the geometry of a region of space time and T_{ij} is a four dimensional tensor that describes the flux of mass – energy within that region (β is constant).

But very soon Einstein found that universe is a static distribution of matter. So, after the formulation of field equation of GR, he applied these field equations for constructing the model of the universe. At that time the universe was supposed to be static.

Further astronomical evidences pointed to homogeneity and isotropy of the matter distribution in the large matter, of course consisted of galaxies as point particles so that on the large scale the distribution could be assumed to be a perfect fluid. The assumption of isotropy at every point of the space-time requires that metric of the space-time be spherically symmetric. The assumption of homogeneity requires that the density and pressure are constant.

In modern cosmology, inflation is an essential ingredient. During the inflationary epoch, the scale factor of the universe grows exponentially allowing a small casually coherent region to become big enough to be identified with the present observable universe. Therefore, the inflationary scenario is a satisfactory solution to some of the conceptional issues in cosmology but it is not understood in standard Big Bang theory. The inflationary scenario explains several mysteries of modern cosmology like homogeneity isotropy flatness of observed universe. 'Guth' (Guth, 1981) introduced the concept of inflation while investigating the problem of why we do not see magnetic monopole today.

The inflationary scenario is also confirmed by CMB (Cosmic Microwave Background) observation. Inflation plays an important role in isotropization of the universe. Inflation does not start at the end of isotropization. The inflationary scenario for homogeneous and isotropic (FRW) models has been studied by many authors (Wald, 1983; Bunn et *al.*, 1986; Barrow, 2011). Keeping in mind these investigations, some inflationary models were studied with a flat potential in different context

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Ies – Government Must Began Indian Education Services Like Ias / Ips Services Who Has Full Devotion For Development Of Education Policy
Education Policy Should Be Updated Time To Time In A Way That It Helps In Personality Development Of Students Along With Enhancement Of Cultural, Social And Moral Values

Opportunities

Equality Of Opportunities - The Education System Should Be In Such A Way That All Sections Of The Society Such As Urban Poor, Scheduled Castes, Scheduled Tribes And Women Not Only Get Equal Opportunities In Education But They Also Get Equal Opportunities In Success.

Employment Opportunities - There Is A Dearth Of Institutions And Teachers In The Field Of Higher Education In India. Therefore, To Increase The Quality In Proper Education, There Is A Need To Increase The New Private And Government Institutions And The Budget For This Is Being Increased By The Government And New Institutions Are Being Opened On The Basis Of Ppp

Conclusion

Now A Days Lots Of Positive Changes Are Happening In The Education System Of India.

There Is A Definite Need Of Revolutionary Changes In The Indian Education System.

With The Effective Learning System, India Can Successfully Utilize Its Vast Human Resources, And By That The Dream Of A Great India Can Come True

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Employability issues in Handloom sector

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Abstract

Handlooms represent the prosperity, diversity, culture, tradition and heritage of India. This sector is essentially skill & labour intensive, require low capital investment & are eco-friendly. Despite the richness of our handloom, weavers and artisans are surrounded by multifarious problems. However, the industry is facing challenges with declining number of weavers and looms over the years, as the next generations of weavers do not want to do weaving but engage in other economic activities. Unfortunately, with next generation opting out, these traditional industries today are under threat of extinction. The purpose of this paper is to understand the work profile of handloom weavers and the satisfaction level of the weavers. The present study was carried out in Jaipur district. Primary data from 500 weavers was collected. Primary data was collected by structured, semi structured interview schedule and observation. Secondary data from government reports, newspaper articles was also collected. Further remedies are suggested to make these sectors an economic venture and at the same time maintain its traditional value.

Introduction

The handloom sector is an age-old and the largest sector among all cottage industries in the State. In terms of employment, it ranks only next to agriculture and providing a livelihood tAccording to the Fourth All India Handloom Census, the total number of households in India engaged in handloom activities (weaving and allied activities) is 31.45 lakhs. The sector has rightly been termed an art and craft sector Handloom is unparalleled in its flexibility and versatility, permitting experimentation and encouraging innovation. The state of Rajasthan is widely known for its significant contribution in the field of handloom industry. In the state of Rajasthan handloom industry is operated and developed by three main government organizations.

These organizations are Rajasthan Rajya Bunkar Sahakari Sangh (RRBSS), which was established in 1957 with the main objective to provide raw materials & form handloom co-operative societies in the state. Another government organization is Rajasthan Handloom Development Corporation (RHDC), which was established in March 1984.The main objective was to promote and assist the growth and development of individual/non cooperative handloom weavers. To upgrade the skill and productivity of the weavers through training, government of India established Weavers Service Centre (WSC).

Jaipur is the heart of Rajasthan, the city has great potential for marketing and export of handloom products. Being the capital city it is also the central place from where all the government policies and programmes are implemented throughout the state for the development of handloom industry. If we view the handloom industry in Rajasthan closely we see that no. of handloom cooperative societies were being reduced since its inception to the present date. The staff of RHDC had not received salaries from the last 18 months or so. Considering the above facts of the cooperative societies shrinking & RHDC's staff not getting salaries on one hand and government's constant efforts for improving handloom sector on the other hand, inspired and motivated the researcher to conduct a thorough study of the situation of the handloom industry.

Objectives

- To explore the work profile of handloom weavers.
- To get an insight about the satisfaction level of handloom weavers.

Methodology

The present study was carried out in Jaipur district. Primary data from 500 weavers from 33 cooperative societies and senior officials attached to the three government organizations i.e.RRBSS, RHDC and WSC was collected. The weavers and senior officials were administered with the structured and semi structured interview schedule respectively. Observation method was used to observe the products, exhibition and retail outlet scenario. Informal discussions with the customers at exhibitions were also held. Secondary data from government reports, newspaper articles was also collected.

Results and discussion

The scenario on certain issues related to work profile of handloomweavers was explored. These were working days and hours, weaving related activity and satisfaction level.

Work profile of weavers:

It is necessary to know about the work profile which includes working days and hours of the weavers, reason for selecting present activity, particulars of the previous work, satisfaction level of the handloom weavers and the children of weavers want to come in this activity or not. Unlike other industrial establishment handloom weavers do not follow fixed holidays. They stop the operation when they like. The number of days a weaver works varies from 20-30 as shown in the results.

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Table 1: Work profile of the weavers

S.No.	Working days and hours of the weavers	RRBSS weavers n=180	RHDC weavers n=320	Total weavers n=500
1	**No. of days/month weaving is done**			
	20	30(17%)	55(17%)	85(17%)
	25	40(22%)	70(22%)	110(22%)
	28	80(44%)	140(44%)	220(44%)
	30	30(17%)	55(17%)	85(17%)
2	**No. of hours /day weaving is done**			
	8	150(83%)	265(83%)	415(83%)
	10	31(17%)	54(17%)	85(17%)

(Figures in paranthesis represent percent values)

Table 1 depicts the working days and hours of the weavers of both the organizations. Weavers working for 28 day/month were 44 percent in totality and the same percentages of weavers of RHDC & RRBSS were working for 28 days/ month. Weavers of RRBSS & RHDC working for 25days /month were 22 percent. weavers working 20 days and 30 days of each of the organizations were 17 percent respectively.

Out of the total sample 83 percent weavers work 8 hours/day and 17 percent weavers work 10 hours/day of both the organization as well as in totality. The weavers work throughout the year, the brisk working period commence from October and ends with February, since most of the festivals are celebrated during these months & they need to weave additional for exhibitions besides their supply to government departments. **SEE TABLE-2 ON NEXT PAGE**

The overall results show that the reason for 69 percent weavers for selecting the present line of work was traditional, for 26 percent weavers it was only work known and only 6 percent selected the present activity as it requires less capital. Moreover results revealed that 94 percent weavers of RRBSS and 55 percent weavers of RHDC selected present work as it was pursued traditionally by their forefathers, the only work known was reason said by 3 percent weavers of RRBSS and 38 percent weavers of RHDC and less capital requirement was reason said by 3 percent weavers of RRBSS and 7 percent weavers of RHDC.

The details of previous job show that out of the total sample 72 percent weavers did weaving and 22 percent were involved in agriculture. The table further shows that previous job of 80 percent respondents of RRBSS and 68 percent of RHDC was weaving and 20 percent weavers of RRBSS and 32 percent of RHDC did farming. The overall data revealed that about 61 percent weavers were satisfied with the present work and 39 percent weavers were not satisfied. Furthermore table show that most (67 percent) of the weavers of RRBSS were satisfied and 33

Dimensions of Gender
in
Women Empowerment

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Possibilities of Empowering Women in Handloom Industry

ABSTRACT

In this dynamic world, women empowerment is a significant part of the global expedition for sustained economic development and social progress. Women contribute substantially to the economic prosperity of India. The handloom sector, with a long tradition of excellence in craftsmanship, not only plays an important role in preserving the country's heritage and culture, it also makes a major contribution to the economy. The handloom weaving is household profession, followed by generations. In these households, women play an important role. Handloom sector is the only manufacturing sector in which women produces for women. In spite of all the protection granted to women by the Constitution of India, they have always been identified as the second gender. Therefore objective of this paper is to assess the female work participation in handloom industry in Jaipur district. The study is based on the socioeconomic conditions, derived from primary data collected through questionnaire. The data depicts that there were significant numbers of women weavers in Jaipur district. The paper also suggests strategies for empowering women in handloom industry.

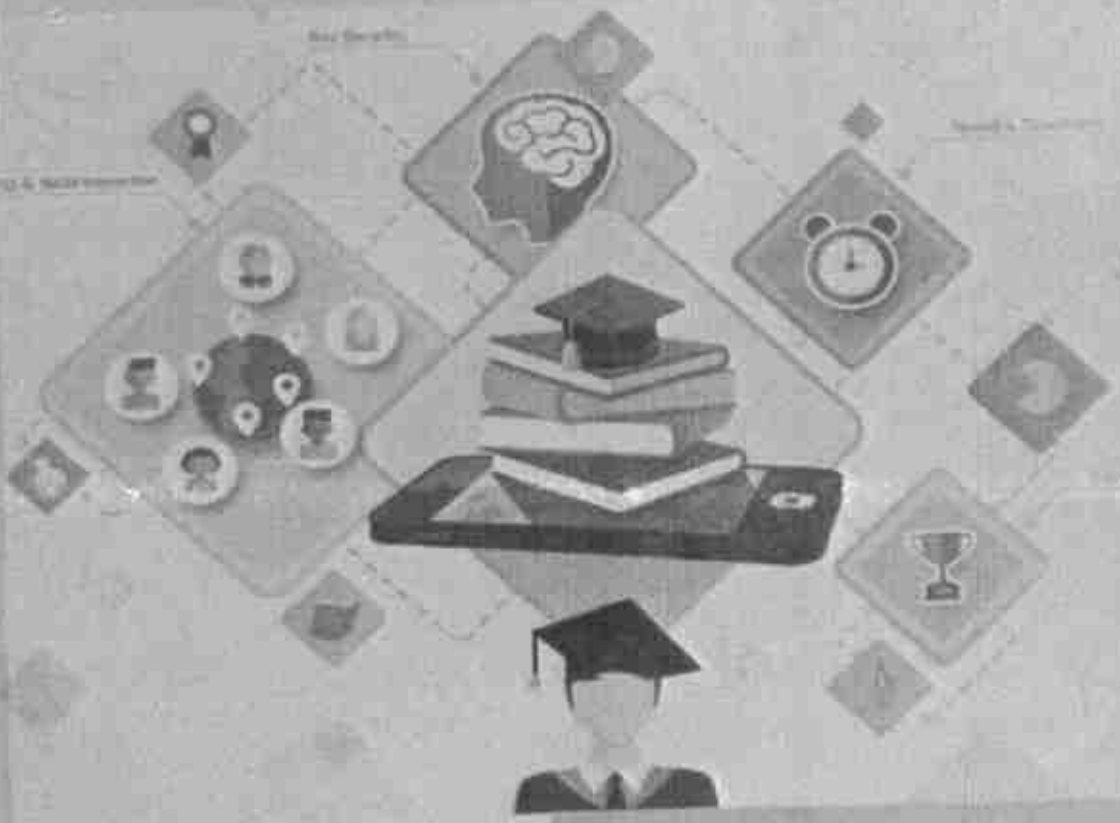
Keywords: Handloom industry, Women empowerment, Strategies

Introduction

Empowerment of women means their capacity to participate as equal partners in cultural, social, economic and political systems of a society. It is the creation of an environment where women can make independent decisions on their personal development as well as shine as equals in society. This can only happen if there is a channelized route for the empowerment of women. (Raju, 2014)

Handloom sector, predominately a rural occupation, is one of the largest generators, next to agriculture in India. Nearly 28.2 Lakh handlooms provide direct and indirect employment to 31.45 lakh weavers and allied workers, out of which, 72.3% are women.

Modern Education



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Impact of Social Media on- Education: Review of Literature

Dr. Preeti Agarwal

ABSTRACT:

Social Media is the means of communication and interactions among people in which they can create, share, develop and/or can interchange [illegible] ... According to an Article Published in The Economic Times on 4th June, 2021 Social Media was defined as [illegible] ... Social Media have both positive as well as negative impacts on Education. In this research paper literature has been reviewed to know both the positive as well as the negative impacts of Social Media on Education.

Keywords: *Social Media, Education, positive, Negative Impact, Review of Literature*

Introduction:

[illegible] ... growth of technology which has paved path for social media. Modern Education is [illegible] ... NEP 2020 [illegible]

Social Media [illegible] ... COVID [illegible] ... social Media ... Modern Education ... Our NEP [illegible]

[illegible] ... it has both negative and positive impact on students.

In an Article Published in India Today (2021) [illegible] ... NEP: National Education Policy 2020 [illegible]

New education has introduced digital education as a need of time.

In Point 24.1 of Para 24, Page 58 (Online And Digital Education: Ensuring Equitable Use of Technology) [illegible] ... its potential risks and dangers [illegible]

Different Social Media Platforms [illegible] ... Facebook Messenger, WeChat, Instagram, Tik Tok, [illegible] ... Reddit, Snapchat, Qzone, LinkedIn etc.

[illegible] ... Blogs and Microblogs etc.

In this regard [illegible] ... many ways of using Social Media in Education:

1. Social media such as LinkedIn helps us [illegible] ... about their subjects and skills.
2. Help us to connect with [illegible]

Early detection and treatment

It is very important to understand the need of individual during adolescence and their need of state of mind. Avoiding institutionalization and over-lexicalization, prioritizing non-pharmacological approaches, and respecting the rights of children in line with The United Nations Convention on the Rights of the Child and other human rights instruments are key for adolescents' mental health.

Conclusions

Adolescent youth experiences many psychological changes in every aspects of their lives during transitions from childhood to adulthood. The purpose of this article is to provide parents and other guardians the foundational information to recognize the psychological changes occurring in their adolescent children and the way to understand and fulfill their psychological needs.

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ADOLESCENTS ATTITUDE TO PARENTAL DISCIPLINE

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Introduction

A thorough understanding of adolescence in society depends on information from various perspectives, including psychology, biology, history, sociology, education and anthropology. Within all of these perspectives, adolescence is viewed as a transitional period between childhood and adulthood, whose cultural purpose is the preparation of children for adult roles. It is a period of multiple transitions involving education, training, employment and unemployment, as well as transactions from one living circumstances to another. Hence, the end of adolescence and beginning of adulthood varies by country and by function. Furthermore, Adolescents Attitude even within a single nation, state or culture there can be different ages at which an individual is considered mature enough for society to entrust them with certain privileges and responsibilities. Such milestones includes driving a vehicle, having legal sexual relations, serving in armed forces or in a jury, purchasing and drinking alcohol, voting, enticing into contracts, finishing certain levels of education and marriage.

Transitional period or stage of physical and psychological human development creates in the adolescents a feeling of tension between dependency on their parents and the need to break away. Tension and behavior disorder, disagreement increases as friends demonstrate a greater impact on one another, new influences on the adolescents that may be in opposition to parents' values. All these conflicts create in parents mixed feelings and makes parenting a complex task, with specific parenting practices which are less important in predicting child well-being. It would be interesting to investigate the parenting style and its influence on adolescents' behavior. One such analysis revealed that parenting styles significantly influence adolescents' behavior. Recommendations were made based on the result, that parents and adolescents should maintain cordial relationship and interaction to guide against behavior misconduct and family conflict, leading to depression, anxiety, aggression and worries on the growing person.

Adolescent attitude

Adolescence is usually accompanied by an increased independence allowed by the parents and legal guardians, including less supervision as compared to pre adolescence. Adolescence is a search for risk taking, without which, teenagers would not have the motivation or confidence necessary to make a change in society from childhood to

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Application of Nanotechnology in Reproduction

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In Reproductive Healthcare and its management, nano-materials and the nanotechnology have a tremendous impact in improving the therapeutics, treatment, imaging, and diagnosis. The technology is useful in conception, contraception, assisted reproduction, treatment of postmenopausal syndromes and in the treatment of Sexually Transmitted Infections. In Assisted Reproduction, gold, silver, carbon and magnetic nano materials are used in Preimplantation Genetic Screening (PGS) and Preimplantation Genetic Diagnosis (PGD) for a faster, easier, specific and sensitive method development. Silica nano particles, magnetic iron nano particles, and poly(vinyl alcohol) coated iron oxide nano particles have been shown to enhance the delivery of nucleic acids to produce modified embryos via gene transfer in bovine spermatozoa. In bovine oocyte culture, nanoencapsulated melatonin in in vitro maturation medium (IVM) showed decreased apoptosis, decreased Reactive Oxygen Species (ROS), increased cleavage and increased blastocyst production rate. Nano encapsulated tretinoin in Lipid Core Nano Capsules (LNC) is also showed higher cleavage and blastocyst, decreased ROS of bovine oocytes in IVM. IVM medium supplemented with melatonin loaded LNC showed increased embryo quality and blastocyst hatching. Nanotechnology in reproductive medicine, particularly in assisted reproduction, although closer to commercial application, the nano toxicity may be detrimental to embryo development and embryo quality, as these nano materials can cross the placental barrier and can cause damage [illegible] tissues particularly, silver nano materials and carbon nano tubes can cause damag in live foetuses and increase foetus resorption.

Keywords: Nanotechnology, Preimplantation Geneti Screening (PGS), Preimplantation Genetic Diagnosi (PGD), Lipid Core Nano Capsules (LNC), I vitroMaturation (IVM)

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Impact of Cashless economy in India

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The downsides of going cashless include less privacy, greater exposure to hacking, technological dependency, magnifying economic inequality, and more. Credit and debit cards, electronic payment apps, mobile payment services, and virtual currencies in use today could pave the way to a full cashless society.The present paper aims to study the impact of demonetization and cashless society in the country. The research indicates the overall development of the market

The purpose of a cashless economy is to control the movement of illegal money from circulation in the economy, better tracking of transactions and ease of carrying of financial transactions at any point of time from any place.The cashless transaction guarantees more manageable payment across the nation. Since a cashless economy is very straightforward, it can lead to overspending of money. Cashless payment is an excellent option for those people.But with a cashless economy, there will be records of transaction and therefore people will avoid being traced for corruption purpose since the evidence will be available. Therefore a cashless economy when well implemented will reduce or curb the level of corruption in a country.

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RISE OF GAMING IN INDIA LINKING TO LIFESTYLE DISORDERS ON ADOLESCENTS

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Introduction and benefits of gaming

With the steady rise in households gaining internet access, India's gaming market has seen an unprecedented rise. An estimated 35% of the population was classified as gamers in 2021. Playing video games or gaming as it is commonly called can be a fun way to relax and wind down after a long day for a lot of people. While for a select few it grows on to become a lucrative career with the increasing popularity of esports tournaments. But as it is said time and time again anything in excess can prove to have disastrous consequences.

Though there have been studies that show gaming increases cognitive abilities, promotes an effective motivational style, and has a variety of positive emotional and social benefits. Gaming, especially those with an inbuilt chat (text or voice) system can improve social skills and give a sense of community both within and outside the context of actively playing. As a lot of these players form a group with their peers surrounding shared interests. Studies show the advantages of playing video games for people suffering from depression, anxiety and schizophrenia. But prolonged sessions, notability those without adequate breaks can lead to various lifestyle disorders.

Musculoskeletal issues

There have been numerous reports of gamer's thumb, technically called de Quervain's Tenosynovitis, which is caused by overuse and constant strain on the tendons on the thumb side of the wrist. To be specific it affects the extensor pollicis brevis and abductor pollicis longus muscles' tendon

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Counselling

Youth is like a supernova of energy and enthusiasm accompanied with highest order of complexities of mind and unresting high scales of curiosity. Here comes the play part of counselling. Friendly humans advise by properly trained counsellors can surely raise the might for the fight against HIV. Counselling at school-college/University level can prevent the detonation of HIV among the teens. The emotionally unstable teenage mind loiters in the fantasies and illusions of their own weaved dream nest. With thumb control access to the fabricated digital content our youth is more prone to the luring & craving of teenage addictions. Today's youth is much pampered by the unavailability of regular parenting. Counselling may cater some less dealt issues like harmful effects of tattoo art, pornographic literature and media content, drug abuse, juvenile criminality, etc. socially disturbing issues.

Counselling of the subject(s) after positive conformation of HIV has to catered separately otherwise the testing and treatments will surely become a futile exercise. There has been reporting in the media bites about incidents when a HIV affected guy tried to infuse the same microbe in other healthy persons in crowdie gatherings after being traumatised by the social reactions and stigma attached with this syndrome. It's apt to say that HIV-AIDS is a social syndrome before it becomes a medical syndrome. Pre and post-test counselling and on the same lines pre and post treatment counselling is a prerequisite or let's rephrase it by saying that it's a precursor for ensuring professional medical care for HIV infected teens and rehabilitating them into the mainstream of the society.

Conclusion

The millions of teens who are fighting in their mind and heart with the various dilemma, FAQs related to sex need to be educated in a very professional and mature methodological ways. Also, the prevailing social-religious setup has to be kept in mind. Our youth knows how to learn the best lessons about their health and career through the wise word of their learned and caring parents, teachers and medical professionals but in a very user-friendly way and not just like rote-dry learning. Forced learning about sex and allied areas may lead to undesirable and unpredictable outcomes leading to mass sufferings and totally dismantled social systems.

May the war against the lethal HIV-AIDS we win by lending a helping hand to the young ignited minds who aspire which are too high to be ignored and yet too fragile to be handled with a cane or harsh words! Prayers and well wishes for the ongoing red ribbon crusade.

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BENEFITS OF YOGA AND MEDITATION IN ADOLESCENTS

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Introduction

Yoga has a deep connection to Indian tradition and has been accepted by western countries due to its beneficiary role in complementary medicine. It is a mind-body therapy which consists of three elements- physical poses, breathing and meditation. It is the union of body, mind and soul. Our elders advise us to practice yoga daily to be physically fit, mentally active and spiritually alert. It increases our focus and makes our memory strong. It helps in the overall coordination of the body.

It was once known for spiritual enlightenment, but subsequent studies revealed it to be effective in maintaining good health, curing a variety of diseases, and increasing immunity. It has also been shown to improve physical, mental, social, and spiritual well-being. In this competitive world, the diet pattern and lifestyles of people have changed resulting in the rise in lifestyle disorders like diabetes mellitus, obesity, cardiovascular diseases etc.

Yoga's benefits include reversing memory loss and lowering stress, depression, and other biological illness signs like anxiety. Due to the growing awareness about the advantages

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PSYCHOLOGICAL CHANGES THAT OCCUR DURING ADOLESCENCE

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What is adolescence?

Adolescence is the phase of life that marks transition from childhood to adulthood. Adolescence begins with puberty, which is characterized by biological, physiological and mental or psychological changes. This phase is associated with sexual, physical and mental maturation.

From physiological point of view, adolescence includes all the individuals who take part in processes initiated by adolescents during puberty that undergoes or contends with and learn to cope with somatic changes and their responses towards society's responsibilities.

It can also be defined as an intermediate stage in which sexual maturity has already been reached biological senses (puberty), but the individual has not yet come into possessions of general rights and responsibilities that enable, and indeed complete responsible participation in fundamental processes of society.

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INDIA'S NEW DRUGS AND CLINICAL TRAIL RULES: IMPACT ON CLINICAL REPRODUCTIVE MEDICINE

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Discovery of new drugs for human application involves many years, many processes, often failures with much uncertainty. There are many hits and trials to identify a new molecule from basic research in to discovery and development of new drug in application point of view. The process is too complex, time consuming, expensive and to resolve many operational issues to target the human application.

Developing a new medicine in regulatory point of view, i.e., an Investigational New Drug (IND) primarily of its mode of action different form the approved medicine intended for an indication that is not addressed yet, involves several stages, viz., target identification, mode of action, process development, process standardization and validation, proof of potency, safety and convenience to use in mass application.

Development of a new molecule towards commercial application that is from target identification to market authorization approximately takes over 12 years many times, even more, costing about $ 1-2.5 billion and even more, an estimate based on analysis across several therapeutic development. The developmental activities of an IND involve basic research, preclinical studies in animal models, clinical studies in human participants (Phase I, Phase II and Phase III).

Developmental Research Activities (R&D): This stage is the identification of the lead molecule, patents risks and infringements, if any, process development and standardization, control process, process scale up and validation, efficacy and safety of the products through in vitro or in vivo (animal models) studies and extrapolation of the

promotes diet diversity and food combinations that improve iron absorption; fortification of staple or routinely consumed foods with iron; point-of-use fortification with multiple micronutrients and iron supplementation. To improve the success of this intervention, the World Health Organization (WHO) encourages the integration of intermittent iron supplementation programmes with other public health measures, including deworming to prevent hookworm infections, improved bioavailable dietary iron intake, and interventions to control other prevalent causes of anaemia and vitamin A deficiency.

Wealth or financial status is also seen associated with the occurrence of anaemia among male adolescents. Higher wealth was associated with a reduced frequency of anaemia. Children belonging to rich families tend to have improved availability of rich B12 containing & Iron containing foods, which may be attributed to better Iron levels than their counterparts from the poor families. Adolescents from poor households have a less access to diversified diets, their diets are deficient in micronutrients, like folic acid & B12 resulting in higher risk of developing anaemia.

Conclusion

Although the deficiency of iron in adolescents may not be life-threatening, it can still pose a significant impact on the quality of life of an adolescent. Therefore, identification and treatment of this deficiency is important to improve potential health conditions for adulthood. Improving iron and folate nutrition of adolescent and adult menstruating women will contribute to adequate mental and physical performance and reproductive health, which may, in turn, significantly enhance maternal and infant health outcomes. Therefore while addressing women's health across the life course, intermittent iron supplementation is the effective intervention that comes to mind to address anaemia. But we must keep in mind that the selection of the most appropriate method of iron supplementation should be with consideration of the iron requirements of the anaemic adolescent. In addition to the above, it is also essential to promote healthy diets & lifestyles by eating a variety of foods prepared under hygienic conditions, fruits and vegetables, and also limiting the consumption of sugary, salty, oily/fatty and refined foods and drinks to address the same. So let us build wellness rather than treating diseases.

"If we could give every individual the right amount of nourishment and exercise, not too little and not too much, we would have the safest way to health." – Hippocrates

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SUICIDE: CONTEMPORARY INDISPOSITION OF PUBESCENT'S FATE

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Youth suicide is a significant public health problem in low- and middle-income countries (LMIC), including India. It is a distinct phenomenon with various bio-psycho-social determinants. Despite this, comprehensive literature on this

The Role of Implementing Cloud Computing Technology for Addressing Critical Security Issues and Overcoming the Challenges Effectively

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Abstract- **The term cloud computing possesses the critical aspect to enhance the network by leveraging the available resources in an effective manner. It has been widely stated that the usage of enhanced IT infrastructure support in realising the goals of the stakeholders in an easier aspect. Cloud computing is a shared pool of operations that is growing in popularity due to its low cost, high efficiency, and high output. Along with its many advantages, cloud computing presents a considerably more difficult scenario in terms of data privacy, intellectual property rights, authenticated access, data security, and so on. Cloud computing technology is becoming ever more challenging in today's society as a result of these challenges. This paper aims to evaluate the security issues in cloud services and implementation of advanced technology to prevent these challenges. In this context, mixed method has been considered (primary quantitative and secondary qualitative) to gather relevant and factual information.**

Keywords: Cloud computing, technology, security, Cloud technology, challenges, Cloud security, security breach.

I. INTRODUCTION

Cloud computing model presents a number of issues for enterprises, particularly safeguarding confidential material such as proprietary information and classified information, as well as personally-identifying relevant data that might fall into the hands of hackers. Possessing critical information freely available online needs a large expenditure in security methods and surveillance of information access. The company may seem to have little knowledge of storing and restoration operations in the cloud computing system, along with limited access to storage solutions. [1]. Cloud computing's novel features, such as multi-tenancy, resource sharing, and remote data storage, have not only put the current security system to the test but have also uncovered new security issues. Safety and confidentiality are the most challenging aspect of cloud computing. A range of security vulnerabilities and issues linked with cloud computing has been investigated recently, the bulk of which affect cloud administration consoles and "virtual machine (VM)" images. The biggest challenges with cloud technology are virtualization and multi-tenancy. Since the cloud is a shared resource platform, organizations must guarantee that all tenant zones are adequately segregated from one another, with no risk of data or activities leaking from one to another. Clients must be able to set up trustworthy virtual domains as well as security zones depending on policies. There may be different data misuse which might impact the delivery of the performance and impact the overall computational element.The problem for software developers in terms of privacy is to build cloud services in such a way that they reduce privacy concerns while yet ensuring legal compliance [2]. There is a risk involved with cloud storage and analysing remotely, as well as growing used of virtualization and platform sharing among users.

The purpose of this paper is to provide a complete review of cloud computing technology and how it may be used to adequately meet security aspects and overcome handles.

II. LITERATURE REVIEW

Cloud computing refers to both the program that are made available as resources through the Internet and the equipment and operating system on the systems that provide these functions. The first cloud-like technology ("Cloud 1.0") was created by encapsulating TCP/IP layers, in which networking devices connect with one another using TCP/IP required specifications without knowing where or who the other is. Because of its unique properties, such as dynamically large expansion, adaptability, quantifiable service and self-provisioning of assets, availability as well as internet

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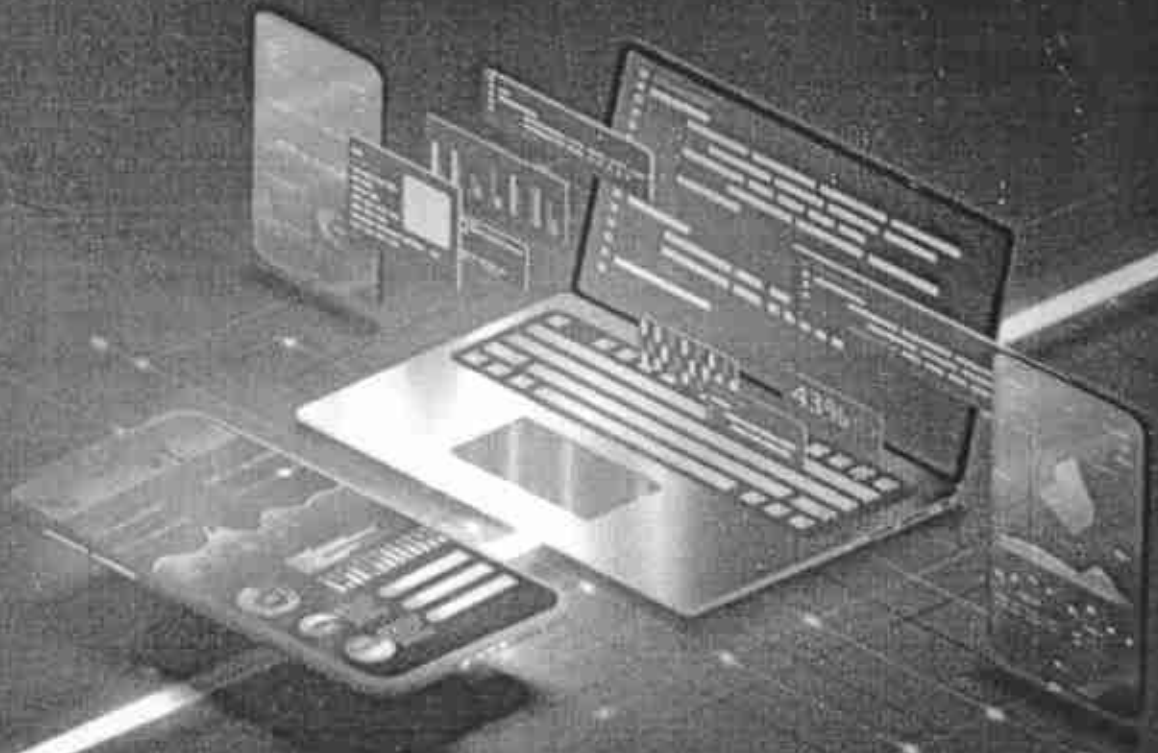

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IMPACT OF INDIA'S NEW TAX: GOODS AND SERVICE TAX (GST) ON COMPANIES

Priya Sharma

Research Scholar, Department of Commerce (ABST), MJRP University, Jaipur

When India eventually, after years of delay, adopted the Goods and Services Tax, the nation's commitment to long-delayed fiscal improvements was universally applauded at face value. This was because the country had been delaying the implementation of the tax for years. This was owing to the fact that the changes had been needed for a very long time. This occurred as a result of the fact that India, after a protracted period of delay spanning several years, finally gave its approval for the tax. This is the situation as a direct consequence of the fact that India utilises a federal system, which is something that has received a significant amount of praise in recent years (GST). The overriding objective of this body of work was to carry out a macroeconomic study with the purpose of determining how the introduction of GST has impacted the overall fiscal well-being of a democratic political economy such as India. Doing so within a theoretical framework for innovation diffusion is planned. The Indian government introduced a new tax on goods and services in 2017; the policy has received both support and criticism since then. Following liberalisation in 1991, the Government of India made two significant systemic economic modifications to the Indian economic system. Both the elimination of paper currency in 2016 and the introduction of a national sales tax (GST) took place in 2017. Experts opined that GST would avoid double taxation and bring down the cost of production and enhance the operating profits of companies. GST is essentially a tax on value addition covering the entire range of production activity from manufacturer to the consumer. Hence, this study has investigated the impact of GST on profitability and its interaction with the working capital of Indian companies Pre and Post impact of taxes.

A REVIEW PAPER ON NETWORK SECURITY AND CRYPTOGRAPHY

Pratiksha Sharma

Cryptography is the study and practice of techniques for secure communication in the presence of third parties called adversaries. With the increasing growth in the internet, Network Security has become a big concern and threat for organizations whose private network is connected to the internet. Information security is the most extreme basic issue in guaranteeing safe transmission of data through the web.In order to secure data transmission and network, cryptography and network encryption are used. Cryptography ensures that the content of messages remain confidential. Network Security has become one the major concerns as the world transitions to digital world. Network security provides security for administrator managed data. Network security is setup to guard against unauthorized access, alteration, or modification of information, and unauthorized denial of service. In this paper, we have discussed about cryptography process, security mechanism, security services, attacks, types of cryptography, Steganography.

ACADEMICS IN THE ERA OF CHATGPT: EXPLORATION OF CAPABILITIES AND LIMITATION

Nikita Gupta

Faculty, Department of Computer Science, S.S. Jain Subodh P.G. Mahila Mahavidyalaya, Jaipur

Neelam Sunda

Assistant Professor, Department of Computer Science, Kanoria P.G. Mahila Mahavidyalaya, Jaipur

Dr. Neha Agarwal

Assistant Professor, Department of Computer Science, Maheshwari Girls P.G. College, Jaipur

"ChatGPT", the fastest growing app of all the time. A Natural Language Processing tool driven by Artificial Intelligence allowing human like conversations is expected to impact every aspect of society. The impact of this tool on education is enormous. It can bring a lot of change in learning, assessment and evaluation. It will help the scholars to become cognizant of the AI technologies that will play an important role over the course of their careers to a great extent. The teachers can well organize their lessons and provide their students wide information .Inadequate originality, the risk of plagiarism and dependency on the model are major challenges for students conducting research. Educators must guide the students to make right use of this application. It is going to be a boon. It has the potential to create realistic virtual simulations for hands-on learning and offer personalized and effective learning experiences by providing students with customized feedback and explanations. There can be adoption of the strategies to ensure that chatAPIs are used ethically and responsibly, including creating the policies and procedures, providing training and support, and using different methods to detect and prevent cheating. Technology usually disrupts conventional approaches, requiring people to adapt

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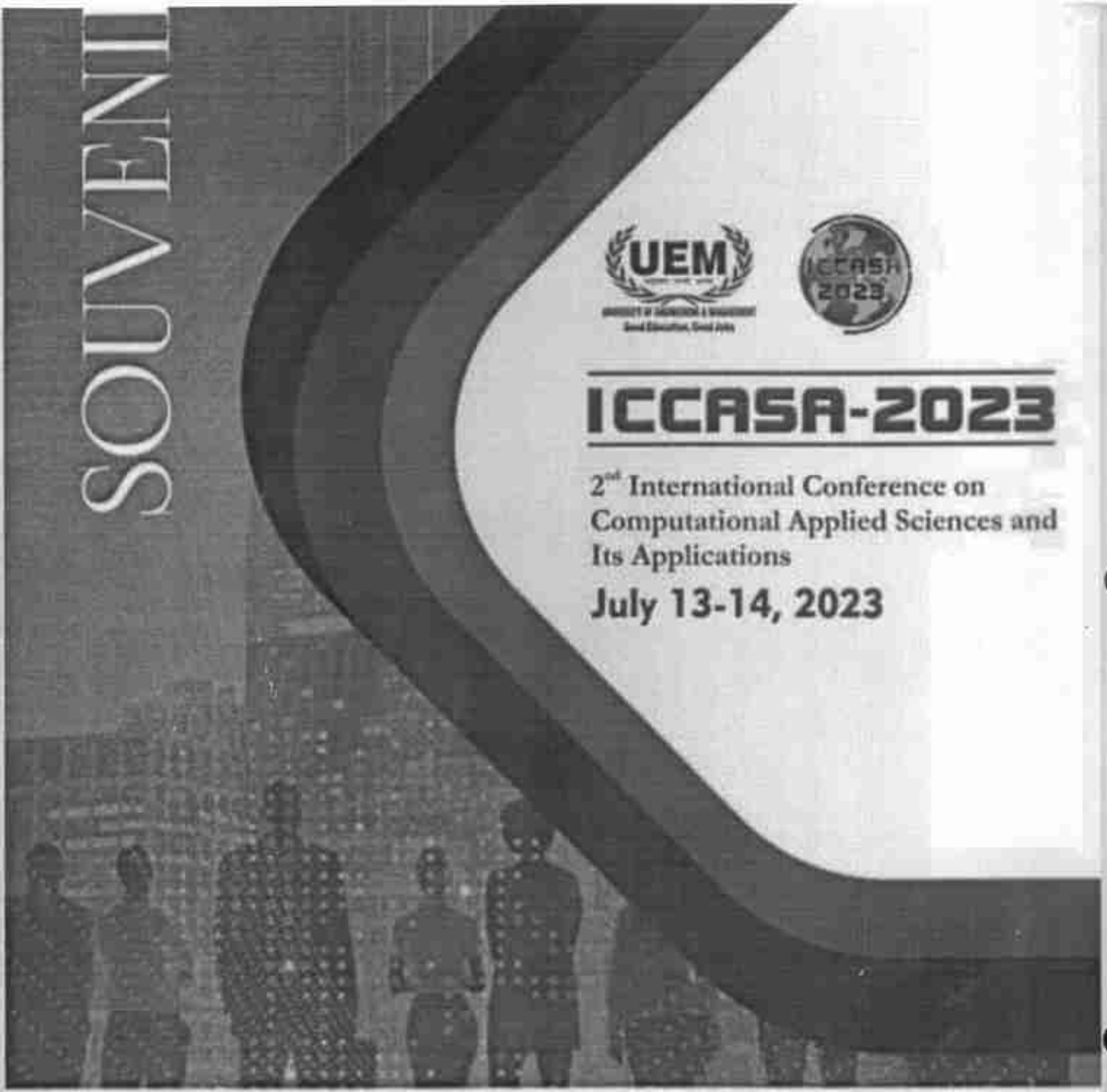

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Advancements in NLP - Based Writing Machines: Harnessing the power of Language Models for Enhanced Text Generation and organization using K means clustering

Shilpa Pareek[1], Sweta Pareek[2], Kavita[3] and Sparsh Bhardwaj[4]

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Abstract:

These days, we're attempting to use robots to automate a lot of our regular tasks. These systems reduce human effort and facilitate our work; they are especially useful for those of us who have certain physical impairments. We repeatedly came to the conclusion that those without arms or with hearing problems find writing in class to be quite difficult. They encounter numerous difficulties as a result, such as the inability to write in tests or prepare for classes without assistance, while occasionally people without disabilities also experience writing difficulties due to time constraints or other circumstances. The purpose of this study is to provide a tool that will facilitate writing for us and organized generated data. The proposed model will reduce the necessity for stenographers because they are more prone to error. The model focuses on accurately transcribing speech into text and writes it down on the paper. The combination of an NLP-based writing machine and the K-means clustering algorithm can be utilized to enhance the capabilities of text generation and organization.

These machines have found applications in multiple domains, including content creation, customer support, translation, and creative writing. In content creation, NLP-based writing machines can automate the generation of articles, blog posts, and product descriptions, saving time and effort for content creators. They can also provide personalized responses and support in customer service interactions, enhancing user experiences and improving efficiency. Moreover, these machines are instrumental in translation tasks, facilitating cross-lingual communication by swiftly translating text between languages. As the field of NLP continues to advance, future research could focus on improving the models' abilities to understand and generate context-specific content, enhance multi-modal capabilities by integrating text with other forms of media, and address the challenges of bias and fairness in automated text generation. By combining NLP-based text generation with K-means clustering, it is possible to organize and generate text in a more structured and contextually meaningful manner. This integration can facilitate applications such as content generation for specific domains, personalized text generation, or organizing large text corpora into coherent clusters for analysis and exploration.

Keywords: NLP, K means Clustering Algorithm, AI Writing Assistants, Neural Networks.

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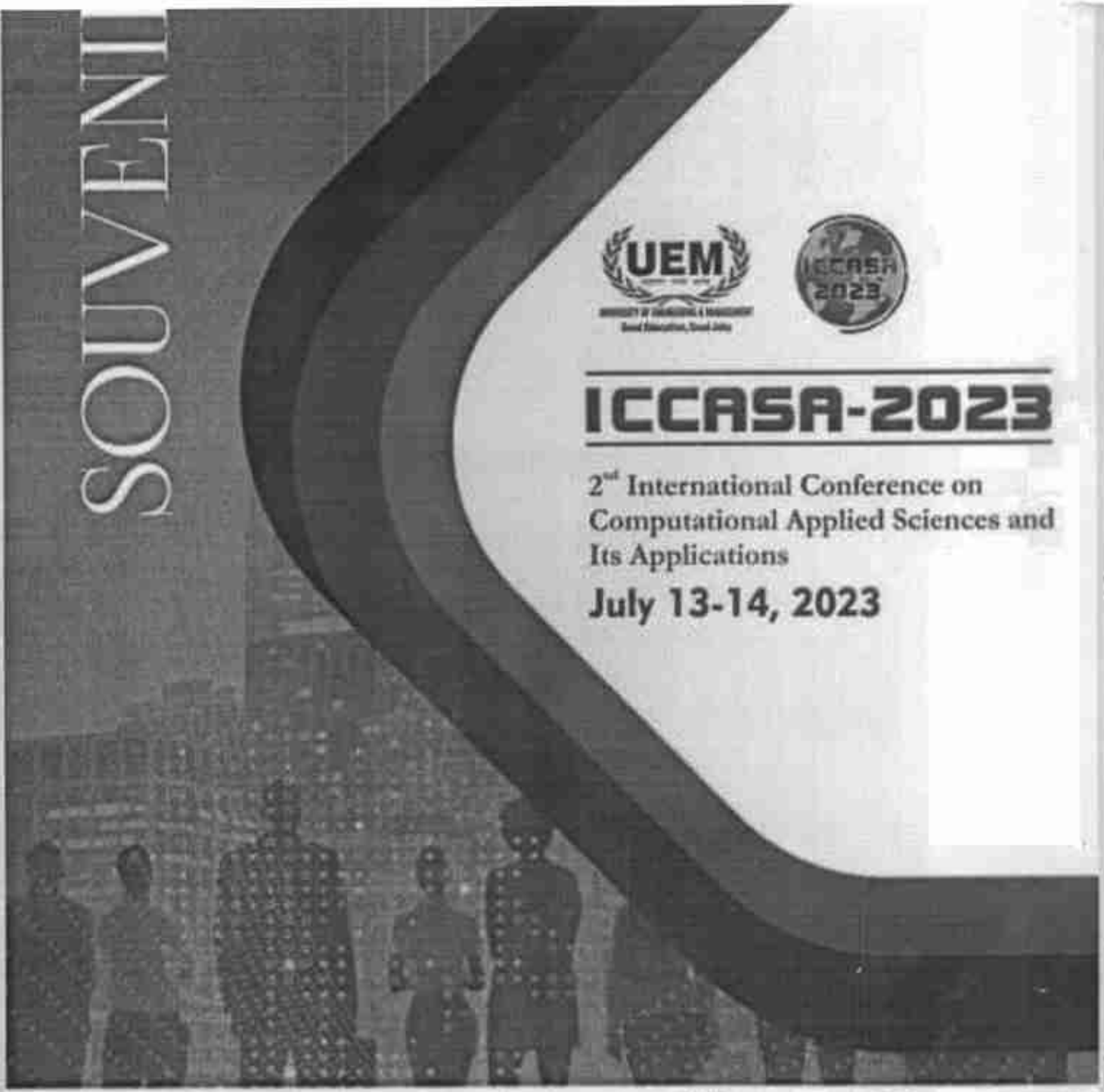

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Statistical Model for the Planning of Human Resources in the Production Process

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Abstract:
Planning, management, and the best utilization of the available human resources in the manufacturing process are abstract issues that are crucial for sane company management. It is economically necessary to teach employees to handle additional tasks or operate several equipment in order to reduce the number of employees needed for the manufacturing process and balance the burden. The issue of fewer employees in the industrial facility was made much more evident by the COVID 19 epidemic. An analytical model for human resource planning is presented in this study. The model's applicability was looked at in terms of the production system's potential for employment among people with different disciplinary backgrounds.

Keywords: Management, planning, human potential and mathematical model.

Dr. Vishnu Brijesh Tomar

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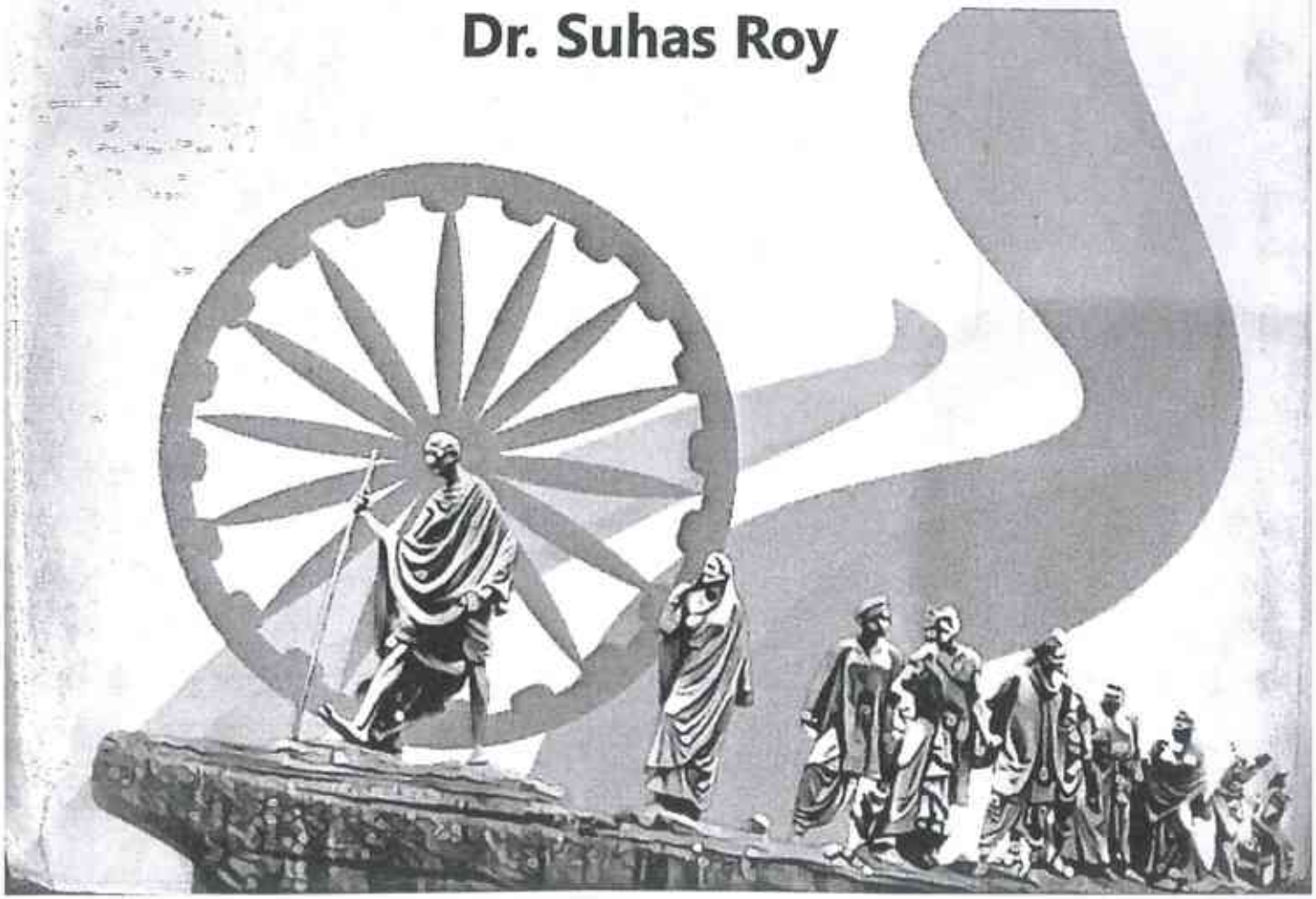

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Challenges and Opportunities for Women Entrepreneurs in India

Dr. Vishnu Priya Temani

Abstract

Everyone wants more gender diversity. Whether it's a startup founder, an investor, the hiring manager of a large company, or even a government official. Everybody agrees, in theory, that more women on board is a great idea. But why are there so few women, not just in the workforce, but also in our startup ecosystem? This study is based on the current gender position of the Indian Business Environment and about the challenges and opportunities for women Entrepreneurs.According to the sixth economic census, by the Ministry of Statistics and Programme Implementation, women comprise only 13.76% of the total entrepreneurs in India which is 8.05 million out of the total 58.5 million entrepreneurs. In India 20.37% of women are MSME owners which account for 23.3% of the labour force. They are considered to be the backbone of the economy. Entrepreneurship by women is Important not just for gender equality, but the entire economy. Today our country witnessed number of successful women entrepreneurs who have created successful business brands across the world, but journey has not been so easy. Only when their families, investors and the society at large make conscious attempts to bring down the gender

walls, women entrepreneurs would then shine in the corporate world.

Key Words: Women Entrepreneurs, Indian Economy, Government Initiatives

Introduction

According to APJ Abdul Kalam"Empowering women is a prerequisite for creating a good nation, when women are empowered, society with stability is assured. Empowerment of women is essential as their thoughts and their value systems lead to the development of a good family, good society and ultimately a good nation.

Everyone wants more gender diversity. Whether it's a startup founder, an investor, the hiring manager of a large company, or even a government official. Everybody agrees, in theory, that more women on board is a great idea. But why are there so few women, not just in the workforce, but also in our startup ecosystem.

Education of woman have no doubt given them immense confidence & encouragement to serve & discover new business avenues. However the ground realities do differ to a great extent as far as geographical boundaries are concerned. Globally women are considered as weaker gender physically and emotionally, therefore prospects open for them to develop into business professionals is an area still quite unexplored and needs attention

Women entrepreneurs and their increasing presence in India have significantly influenced the social and economic demographics of the country. The participation of women in the labour force has helped millions of families to pull out of poverty and has led to job creation. Women are well known for their leadership skills

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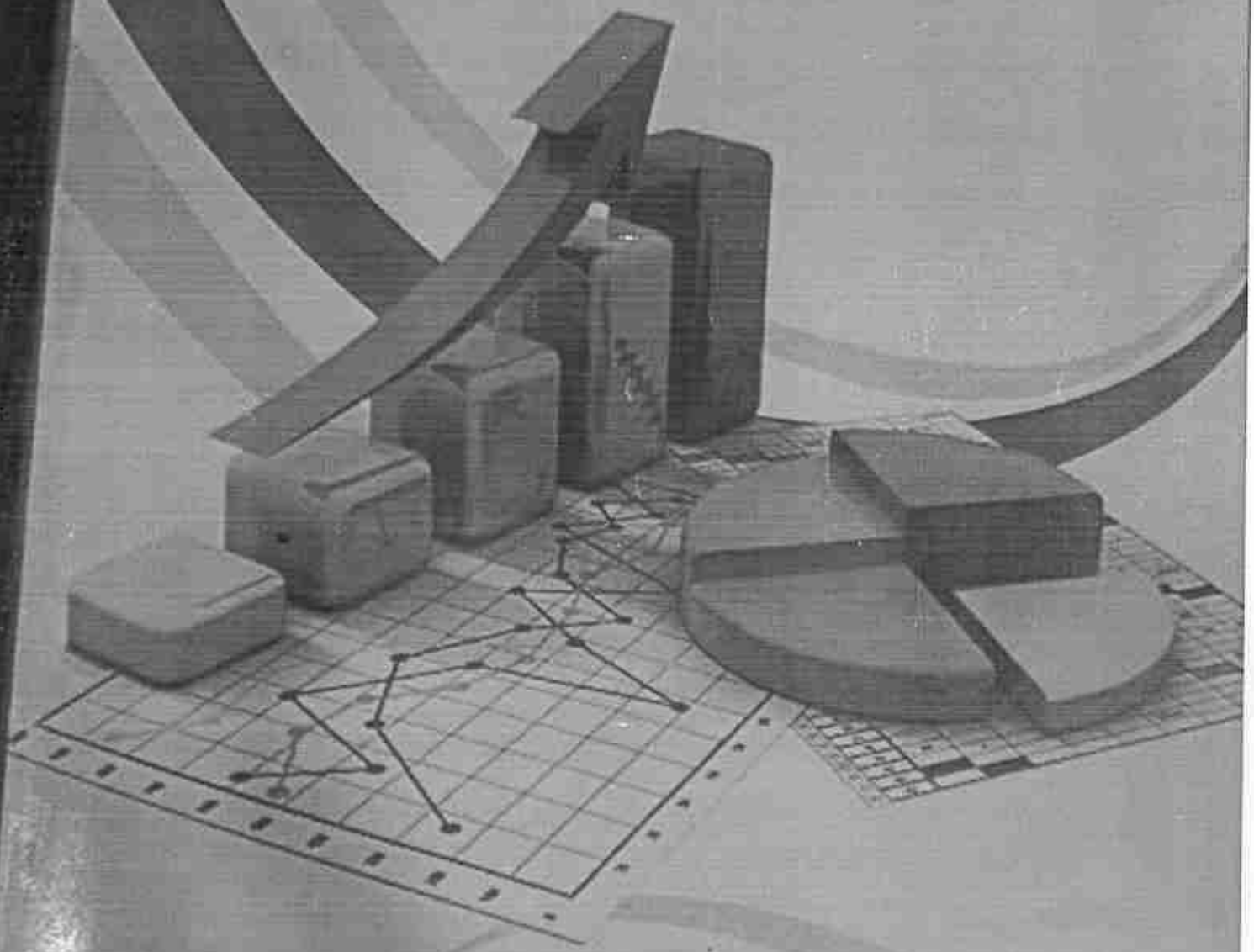

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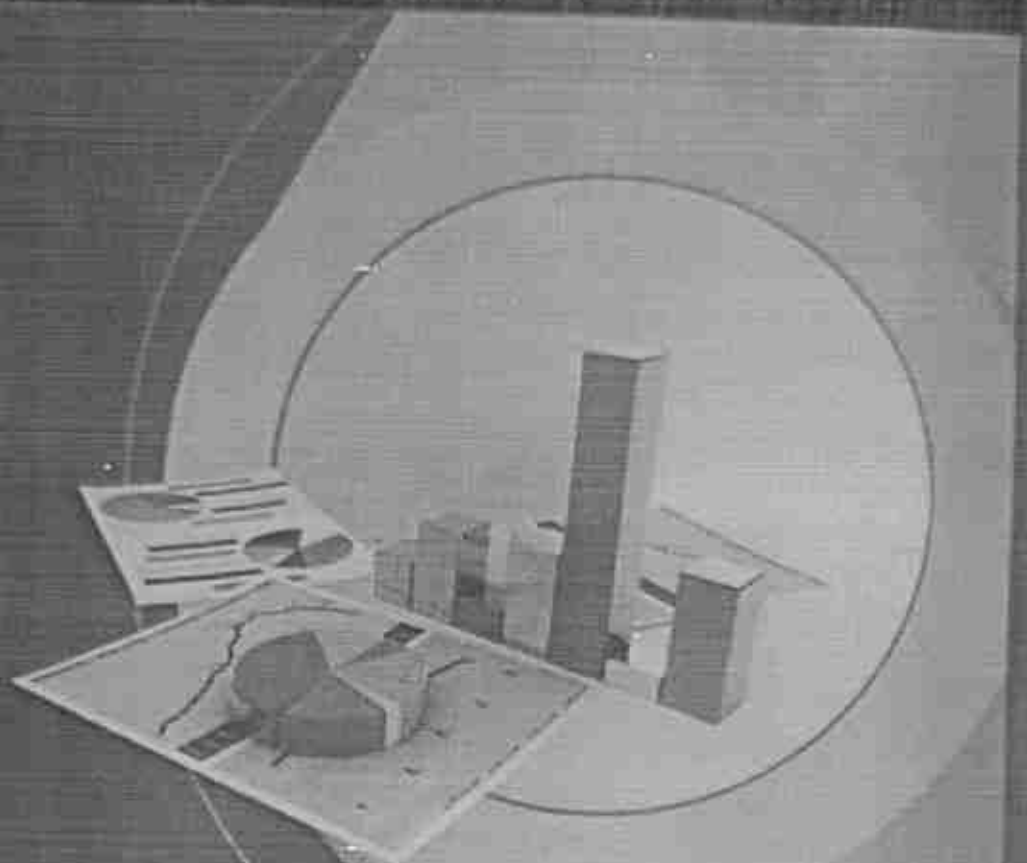

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A study on Change in work-personal life balance of IT sector employees due to work from home policy

Divya Sharma[1] and Rejoice Solomon[2]

[1]*Assistant Professor, Kanoria P.G. Mahila Mahavidyalaya , Jaipur*

[2]*Assistant Professor, Laxmi Devi Institute of Engineering and Technology, Alwar*

Abstract :

Global overnight shift to remote work was one of the most visible changes in 2020. Though it started before the pandemic in several organizations, many organizations did not prefer to implement this policy. While we don't expect the pandemic to transform every single company that can become fully distributed to do so, we do believe that work from home will remain an important part of how the IT industry works. Experts predict that work from home policy will prevail even after the pandemic ends. Our study analyses the pros and cons of this policy. Also, it tries to find out if there is a need to reframe the HRM policies if work from home is applied.

The study identifies if there is a change in work-personal life balance of IT sector employees due to work from home policy or not and to show the impact of 'Work from home' policy on the life of employees and management and analysis on 'Is there a need to reframe the HR policies due to work from home scenario in IT industry?' The study focuses mainly on the applicability of HR practices in the IT industry. The study focused the employees and management of the IT sector and covered employees of more than 7 companies for conducting surveys.

Keywords: IT, Covid, Policies, Work from home, Covid

Introduction: India is emerging as the hub for "Digital Skills". The industry is the largest employer within the private Information Technology sector. In the financial year 2020, the IT industry employed over 4 million personnel directly. Further, every job in the technology sector had a multiplier effect leading to the creation of 2.5 indirect jobs in the adjacent sectors. India is transforming into a digital economy with over 750 million internet subscribers; which accounts as the second in the world after China. During the lockdown, the IT sector was one of the quickest to adapt to remote work culture. During the global pandemic, the hiring intent of employees came with the benefits of working from home for more than 2 million IT professionals working remotely. India's cost competitiveness in providing IT services is approximately 3-4 times more cost-effective than the US and continues to maintain its unique selling proposition in the global sourcing market. The global sourcing market in India continues to grow at a higher pace compared to the IT-BPM industry. India is the leading sourcing destination across the world, accounting for approximately 55% market share of the US$ 200-250 billion global services sourcing business in 2019-20. The IT industry accounted for 8% of India's total GDP in the financial year 2020. Exports from the Indian

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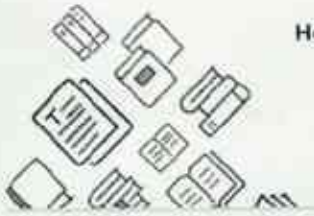

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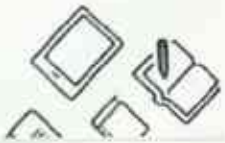

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Water Pollution: Case Studies of Rivers in India

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Abstract: In this world of industrialization and urbanization, water pollution is a major threat to the world. Water pollution occurs when pollutants are released into bodies of water, making them unsuitable for human consumption and disrupting aquatic ecosystems. Water contamination can result from a variety of impurities, including toxic waste, petroleum, and disease-causing bacteria. Water contamination has a significant impact on human health. It has the potential to contaminate drinking water, contributing to the spread of waterborne infections and thus affect the ecological balance. This article provides an overview of how water pollution affects the Ganga River and Yamuna River during a particular period of time and how to control the ill effects of water pollution.

Introduction to Water Pollution

The occupancy of hazardous chemicals and biological agents in groundwater that surpass what is naturally contained in the water and may constitute a threat to human health and or the environment is referred to as water pollution. Water pollution (also known as aquatic pollution) can also include substances that are introduced into water bodies as a result of numerous human activities, industrial waste, domestic waste, agricultural waste, chemicals and medical waste. Water pollution diminishes the water's ability to deliver ecosystem services that it might otherwise give. When toxins are injected into water bodies like lakes, rivers, oceans, reservoirs, and glaciers contamination occurs. Water pollution can cause water-borne diseases in humans, in addition to causing harm to various aquatic plants and animals. This results in the devaluing and contamination of drinking water which is a matter of risk to human health and environment. The polluted water also leads to the disturbances in food chain and hence the ecosystem is disturbed.

Sources of Pollution

Water pollution originates by discharge of sewage waste, urbanization, deforestation, effluents from industry, religious and social custom, detergents and fertilizers, insecticides and pesticides used in agricultural run-offs, disposing off dead and decaying matter in water bodies and oil spills.

There are three main types of sources of pollution.

Point Sources

When contamination occurs from one source only, it is known as Point source. Despite the fact that this pollution starts from a single location or source, it may pollute kilometers of streams and other water bodies such as the sea or seas.

Point sources include wastewater, which is known as effluent, sewage treatment plant waste, legally or illegally discharged from a manufacturing unit or industries, medical industry waste, oil refinery or wastewater treatment facility, smoke stacks or storm water.

Nonpoint Sources

When contamination occurs from various or scattered sources is referred to as Nonpoint source pollution. Nonpoint sources include excess fertilizers, herbicides from agricultural lands, contaminated rainwater, agricultural runoff, and debris blown into streams from the land, atmospheric deposition, or hydrologic modification. Nonpoint source pollution is the most common cause of water pollution, yet it's difficult to control because there's no single source to blame.

Trans-Boundary Sources

When contamination occurs from one country to other via polluted water is referred as trans boundary sources. It includes oil spill, industrial or municipal discharge.

Causes of Pollution

The causes of water pollution vary and may be both natural and anthropogenic or artificial. Anthropogenic sources of water contamination are the most pervasive and include:

- **Agriculture runoff** – Water carrying fertilizers, pesticides/insecticides/herbicides and other pollutants into water bodies such as lakes, rivers, ponds, sea, waterfall etc. Larger number of phosphates and nitrates can be detected by noticing the quantity of green algae produced suddenly in water bodies that could be harmful to human well-being as well as for marine bodies.
- **Storm water runoff** – Storm water contains various oils and refineries, petroleum products, industrial debris, and other adulterants from urban and rural areas such as ditches. These sources usually form a layer of contamination on the water surface.
- **Leaking sewer lines** – The sewage sludge may add trihalomethanes (such as chloroform), nitrogen, phosphorus as well as other harmful chemicals into groundwater which ultimately contaminates the surface

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Adulterants in Universal spice Turmeric

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Abstract: Adulteration in any food occurs by the addition or substitution of any substance to or from food due to this the quality and the quantity or natural composition of the food is affected.

Adulteration can be either **INTENTIONAL** (by the removal of substance from the food and alter its natural properties) and **UNINTENTIONAL** (adulteration occurs due to carelessness or lack of facilities for maintaining the quality of food).

Generally, adulteration in food occurs for different reasons i.e for financial gain lack in processing of hygienic conditions, transportation, selling it. Within the past few decades, the adulteration in food is one of the most intense issue.

Turmeric is considered as the most important commercial spice crops and widely used universal spice. It is named as the wonder spice as it is rich in pungency, taste, flavour and give colour to the different dishes.Turmeric consist of different biological activity. Adultered spices are more pungent, rich in chemical and due to addition of adulterant they provide distinct colour.

In this paper we had discussed adulteration present in the turmeric samples collected from the local market of Jaipur. The main aim is to bring about the awareness among the people on the subject of spice adulteration.

Keywords: Adulterated, adulteration, pungency.

Introduction (Turmeric)

SCIENTIFIC NAME:- ***Curcuma longa***.

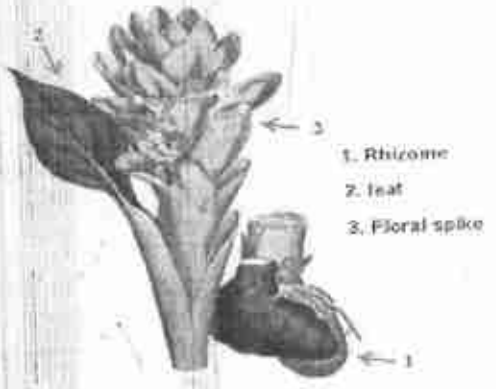
Turmeric is a type of herb, belonging to 'zingiberaceae' family and it is mostly grown in southern and south western tropical Asia region. For many centuries turmeric used in India and China for the medical treatment of illness such as dermatologic diseases, infections, stress and depression. In turmeric an orange-yellow coloured, lipophilic polyphenol substance called "curcumin" which is acquired from the rhizomes of the herb. Curcumin consisting property like – antioxidant, anti-inflammatory, anticancer effects. It also show important role in prevention and treatment of various illness ranging notably from cancer to autoimmune, neurological, cardiovascular disease and diabetic. It also contains the property to increase the biological activity and physiological effects of the curcumin on the body by synthesizing curcumin analogues.

Description

The height of the turmeric is about 60-90cm height ,consist of short stew. The plant of turmeric is herbaceous perennial. Turmeric consist of large leaves oblong and approx. 1 meter long. Flowers are yellow white in colour and appears on a spike like the stalk. They are sterile i.e viable seed is not formed as produced. Lamina is pale green at below and the green at above and ISS 8-12cm wide and 30-40cm long.

Turmeric plant (culinary) Parts of turmeric plant

Generally in the spike approximately 30 flowers are produced. A central spike which is 10-15cm in height and is inflorescence.[1,2]



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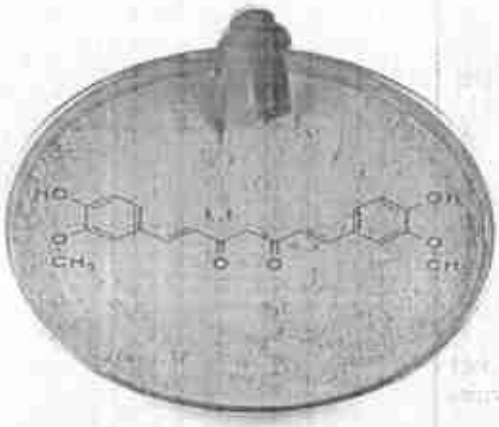
Chemical Constituents

When turmeric firstly harvested is always 'cured' before being dried and polished. The process of curing is done by boiling the fresh rhizomes for approx.45 minutes, due to this gelatinize the starch for a more uniform drying, reducing in microbial load ,reducing the fresh earthy aroma. Once cured the rhizomes are dried and then polished in a polishing drum to remove the rough surface.

Curcumin Molecule

In turmeric approx.230 compounds present which shows biological activity. The essential oils and curcuminoids are also considered to be most important.



Curcuminoids consist of 3 parts – *curcumin, desmethoxycurcumin, bismethoxycurcumin.*

Major polyphenolic compounds in turmeric rhizomes are by *curcuminoids(3-6%).*

*Curcuminoids includes curcumin, demethoxycurcumin and bisdemethoxycurcumin.

The chemical structure of curcumin was determined by *Roughley and Whiting (1973).* In turmeric many other phenolic compounds are present. The pale yellow to orange-yellow volatile oil(4-6%) obtained from turmeric consists of a number of mono and sesquiterpenes. Cymene, Tumereon , isdemethoxycurcumin and diarylheptanoids are chemical constituents present in the turmeric plants [1,2].

Uses

- **Hay fever-** Taking in small amount of turmeric seems to reduce hay fever symptoms like sneezing, runny nose and congestion.
- **Depression** - Curcumin is also used to reduce depression and use as antidepressant.
- **Hyperlipidemia** - Turmeric is also use to lower the blood fats (triglycerides).
- **Osteoarthritis-** Taking turmeric alone or in combination with other herbal ingredients, can use to reduce pain and improve function in people with knee osteoarthritis.
- **Itching-** Researchers suggests that taking turmeric by mouth three times daily for 8 weeks reduce itching in people with long term kidney disease.
- **Biological activity** – Anti- inflammatory ,antioxidant, anti- tumour and anti- cancer, anti HIV ,antimutagenic, antifungal, antidiabetic, antifibrinogenic,wound healing, lipid lowering, radio protective, immunomodulating,etc. These all biological activities shown by the curcumin present in the turmeric4.

Adulterants Used in Turmeric and their Effects on Human Health

- **Chalk powder** – Cause Indigestion and other stomach disorder. In turmeric powder chalk powder is used for increase the amount(chalk powder is used as adulterant because it is a cheap substance).
- **Topioca starch** -Cause stomach disorder. For the increment in the quantity of turmeric.
- **Metanil yellow** -Cause cancer and it is toxic. - It is an unpermitted food dye ,because of its bright yellow color it is used as adulterant in turmeric.
- **Yellow lead salt** - It is carcinogenic.
- **Aniline dye** - contains carcinogenic property. It is use as a colouring agent in turmeric powder.
- **Rhodamine B** - Potentially consist of genotoxic properties and also carcinogenic properties. It is a type of azo dye and used as colouring source.
- **Sudan I & IV** - Sudan I is genotoxic and carcinogenic in rats. Both these dyes are used as the colouring agents.

Chemical Test for Identification of Adulterants

- **Reagents Required**
  1. Dilute Nitric acid
  2. Potassium Iodide
  3. Diethyl ether
  4. Dilute Hydrochloric acid
  5. Acetone
  6. Hexane
  7. Acetonitrile:Water (7:3)
  8. 13N Sulphuric acid
  9. Spirit

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10. Distilled water
11. Test tubes, filter paper, test tube holder, dropper, beaker, measuring cylinder, and other equipment.

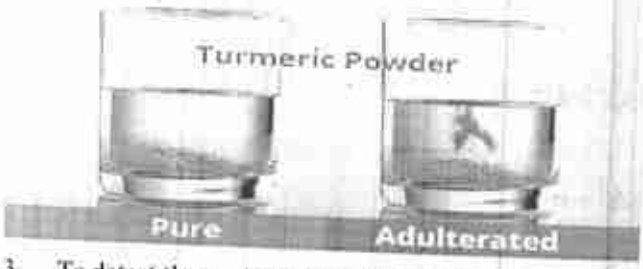
Sampling

Samples of turmeric were taken from local and branded vendors and named as sample no. 1, sample no. 2, sample no. 3 and sample no. 4 (from local vendors) and sample no. 5 (from branded vendor)

Methodology of Detection of Adulterants in Turmeric Powder

1. **For the detection of yellow lead salt**
   - In a test tube 2gm of turmeric powder is taken and add concentrated HCl to it and shake well.
   - If magenta color appears in the solution indicates the presence of yellow oxides of lead.
2. **To detect the presence of chalk powder**
   - In a test tube add 2gm of turmeric powder and then add few drops of water to it.
   - Then add few drops of conc.HCl to it.
   - If effervescence comes then it indicates the presence of chalk powder.

   Or
   - It is density based chemical test.
   - Take a test tube containing distil water add turmeric powder to it. After sometime the pure turmeric settle down while the chalk powder floats.
   - This indicates the presence of chalk powder in it.



3. **To detect the presence of Metanil yellow**
   - A sample of turmeric powder is taken in a test tube.
   - Add 13N solution of Sulphuric acid then red color appears in the solution.
   - Disappearance of red color on adding distil water indicates the presence of metanil yellow in the sample.
4. **For the identification of aniline dyes**
   - In a test tube take a sample of turmeric powder added few drops of water.
   - Then add 5ml of spirit to it.
   - Immediate disappearance of yellow colour indicates the presence of aniline dyes.
5. **To detect the presence of starch of maize , wheat and rice**

Microscopic view reveals that the pure turmeric is yellow in color and bigger in size as compare to starch or chalk. Also the turmeric in powder form consist angular shape.

Discussion of the Result for Turmeric Samples

1. **Detection of yellow lead salt** - From chemical test analysis that the sample 4theonsist of yellow lead salt and other are free from this adulterant. Lead yellow salt is a chemical compound i.e., Lead chromate is a yellow color compound, insoluble in water and used as adulterant to increase the amount and retailer earn profit.
2. **Detection of presence of chalk powder** - All the samples show negative test result for the chalk powder test. Chalk powder is used as adulterant to extend the sample amount. Generally the size of chalk powder is comparably small than the size of the pure turmeric.
3. **Detection of presence of metanil yellow** - Turmeric powder is mostly adultered with metanil yellow. It is a type of azo dye used as food colorant. It belongs to "non-permitted" category of food color. Metanil yellow is toxic and banned for use in food. It is extensively used as a colouring agent because it is cheap and easily available. From the chemical test analysis shows that among the sample taken, the sample 1and 4 consist of metanil yellow as a colouring agent.
4. **Detection of presence of Aniline dyes** - From the chemical test result shows that none of the sample containing aniline dyes. These dyes are used to enhance the presentation of the turmeric powder which make the turmeric powder more pungent and the retailer earn profit from this process.
5. **Detection of the presence of starch of maize, wheat and rice** - From the result of the chemical test analyse that the sample 1 and 3 containing starch of maize. This type of adulteration occur to increase the amount of turmeric powder.

Potential Threat to Public Health

Generally, three types of food fraud risk that pose a threat to the public or human health:-

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1. Direct - The consumer is put at immediate risk from a short time exposure leading to acute toxicity or lethality.
2. Indirect - The consumer is put at risk over long term exposure with potential chronic effects.
3. Technical - Food documentation may not be representative of food content. Example:- Turmeric consist of various adulterants that threaten public health. In turmeric chalk powder (cheap material) has been used to increase the amount of turmeric. The adulterant can cause – swelling on face, loss of appetite, nausea and vomiting. [3,4]

Conclusion

The main aim of this study is to bring about the awareness among the people on the subject of spices adulteration so that they can easily distinguish between the packed and unpacked spices and they can follow various simple methods to easily detect the adulteration. The spice adulteration can be prevented by changing few steps in our society, like the price of the food items should be checked by government. While purchasing food items, it is necessary to make sure that the selection of wholesome and non-adultered food and make sure that such the food do not cause any health problems.

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