Y.A. Government College for Women:Chirala, A.P.

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SOUVENIR

of

NATIONAL SEMINAR
ON
"CHALLENGING ENVIRONMENTAL CONDITIONS-BARRIER FOR HUMAN DEVELOPMENT"

Organized by

Dept. of Chemistry

20th OCTOBER 2022

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MESSAGE

I am glad to know that the Department of Chemistry YAGCW, Chirala conducting one day National Seminar on "Challenging environmental conditions-barrier for human development"

Environmental conditions influence the human growth and development. A healthy natural environment is the foundation of successful long-term development. Nature and environment provide essential goods and services for human development. Human well-being and quality of life depend crucially on the quantity and quality of food, water, energy and biodiversity available to man. Biodiversity, crucial for delivering ecosystem services, is deteriorating at an unprecedented rate. The most important pressure factor is agricultural expansion. In the future, climate change could be a very important pressure on biodiversity as well. Human induced climate change poses an increasing risk to the achievement of sustainable development in the longer term. Higher yields are often associated with higher emissions to air, water and soil. Increasing inputs of nutrients in agriculture results in eutrophication of inland water bodies and coastal waters poses risks to health and fresh water and marine ecosystems. Malnutrition, inadequate water supply and environmental pollution pose serious problems to human health. From an environmental perspective shortage of arable land and water stress are important drivers for food vulnerability. Unsafe drinking water and indoor air pollution are the most serious environmental culprits, in view of current loss of human health.

I appreciate and compliment the Department of Chemistry for organizing one day National Seminar on "Challenging environmental conditions-barrier for human development"

PRINCIPAL's MESSAGE

Dr. Ch. Ramanamma,
Principal & Chief Patron
YA Govt. College for
Women, Chirala

Widespread improvements in the quality of life of many of the world's populations have gone hand-in-hand with increased demands on natural resources. The planet is struggling to keep up, with increases in the average global temperature and the frequency of extreme weather events transforming ecosystems around the world and threatening entire species of plants and animals. Forests are drying up, there is less rainfall and more fires, and the glaciers of both the North and South Poles are shrinking. The consequences of climate change affect all of us, but in order to react and adapt to it, we must first understand it.

The footprint of climate change can already be seen in every corner of the planet. Erratic weather patterns, rising sea levels and melting glaciers due to climate change, are reshaping societies across the globe. Through multilingual news and expert analysis, The Third Pole captures how these changes are unfolding in India, one of the world's most climate vulnerable countries. In India, climate change is already affecting human health, wildlife, food production, clean water access and the economy at large. But in the case of India, these vulnerabilities come with a unique potential for change. Home to nearly 20% of the world's population, the country is looking to transform its fast growing infrastructure and energy systems to reduce heat trapping emissions on a massive scale.

The relationship between humanity and the environment is a delicate balance. Since the industrial revolution, the world's population has increased exponentially, and with the population growth, the environment has been profoundly affected. Deforestation, pollution and global climate changes are amongst the adverse effects the population and technological expansion has introduced. Included in this category are both subjects dealing with attempts to reduce the negative impact on the environment, and subjects which aim to gain a greater understanding of the environment itself.

I am appreciating Smt.Ch.Bala Bharathi, Lecturer in Chemistry and Organizing Secretary for chosen such an important and widely debated concept for this national seminar. I believe that the event with expert interactions of scientists, scholars, lecturers and students will definitely provide to emerge with constructive conclusions for the eco sustainable development.

- **Dr. Ch. Ramanamma**

Report by the Convenor of the Seminar

First, I am grateful to God for giving success in every step of my career, in giving energy and health. I would like to express my heartfelt gratitude to our beloved Principal, Dr.Ch. RAMANAMMA in giving support, encouragement, and advices in all my activities relating to National seminar conducted on 20th day of October 2022.

The atmosphere absorbs a lot of energy and emits it as radiation both into space and back down to the planet's surface. In fact, Earth's surface gets almost twice as much radiation from the atmosphere as it does from direct sunshine. That's primarily because the Sun heats the surface only during the day, while the warm atmosphere is up there 24/7.Together, the energy reaching Earth's surface from the Sun and from the atmosphere is about 504 watts per square meter. Earth's surface emits about 79% of that back out. The remaining surface energy goes into evaporating water and warming the air, oceans and land. The residual between incoming sunshine and outgoing infrared is due to the accumulation of greenhouse gases like carbon dioxide in the air. These gases are transparent to sunlight but opaque to infrared rays – they absorb and emit a lot of infrared rays back down. Earth's surface temperature must increase in response until the balance between incoming and outgoing radiation is restored.

Due to the these threatens to be faced in future because of imbalance of energy budget we have chosen this topic for organizing National Seminar at Y.A. Government College for Women, Chirala.

I thank all my colleagues, resource persons, participants for their valuable and precious advice and contributions to make this event grand success. Finally, I am thankful to Ramananda Trust, Vadarevu and Swathi Textiles, Chirala who have financially supported this seminar to some extent.

Ch. Bala Bharathi
In-charge Dept. of Chemistry & Convenor

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ORGANIZED BY DEPARTMENT OF CHEMISTRY

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A brief review on Earth's energy budget

- Dr.K.Vijaya Babu, Govt.Degree College, Nagari

Abstract

Earth's energy budget accounts for the balance between the energy that Earth receives from the Sun and the energy the Earth loses back into outer space. Smaller energy sources, such as Earth's internal heat, are taken into consideration, but make a tiny contribution compared to solar energy.

Keywords: *Energy, Sun, Energy, Outer Space, Earth*

Introduction

The energy budget also accounts for how energy moves through the climate system. Because the Sun heats the equatorial tropics more than the polar regions, received solar irradiance is unevenly distributed. As the energy seeks equilibrium across the planet, it drives interactions in Earth's climate system, i.e., Earth's water, ice, atmosphere, rocky crust, and all living things. The result is Earth's climate.

Earth's energy budget depends on many factors, such as atmospheric aerosols, greenhouse gases, the planet's surface albedo (reflectivity), clouds, vegetation, land use patterns, and more. When the incoming and outgoing energy fluxes are in balance, Earth is in radiative equilibrium and the climate system will be relatively stable. Global warming occurs when earth receives more energy than it gives back to space, and global cooling takes place when the outgoing energy is greater. Multiple types of measurements and observations show a warming imbalance since at least year 1970. The rate of heating from this human-caused event is without precedent.

When the energy budget changes, there is a delay before average global surface temperature changes significantly. This is due to the thermal inertia of the oceans, land and cryosphere. Accurate quantification of these energy flows and storage amounts is a requirement within most climate models.

Earth energy flows

Incoming, top-of-atmosphere (TOA) shortwave flux radiation, shows energy received from the Sun as inferred from CERES measurements (26–27 Jan 2012). Brightest white areas show the highest reflectivity (least absorption) of solar energy, while darkest blue areas show the greatest absorption.

In spite of the enormous transfers of energy into and from the Earth, it maintains a relatively constant temperature because, as a whole, there is little net gain or loss: Earth emits via

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atmospheric and terrestrial radiation (shifted to longer electromagnetic wavelengths) to space about the same amount of energy as it receives via solar insolation (all forms of electromagnetic radiation).

Incoming solar energy

The total amount of energy received per second at the top of Earth's atmosphere (TOA) is measured in watts and is given by the solar constant times the cross-sectional area of the Earth corresponded to the radiation. Because the surface area of a sphere is four times the cross-sectional area of a sphere (i.e. the area of a circle), the globally and yearly averaged TOA flux is one quarter of the solar constant and so is approximately 340 watts per square meter (W/m^2). Since the absorption varies with location as well as with diurnal, seasonal and annual variations, the numbers quoted are multi-year averages obtained from multiple satellite measurements.

Of the ~340 W/m^2 of solar radiation received by the Earth, an average of ~77 W/m^2 is reflected back to space by clouds and the atmosphere and ~23 W/m^2 is reflected by the surface albedo, leaving ~240 W/m^2 of solar energy input to the Earth's energy budget.

4.Outgoing longwave radiation

Outgoing, longwave flux radiation at the top-of-atmosphere (26–27 Jan 2012). Heat energy radiated from Earth (in watts per square metre) is shown in shades of yellow, red, blue and white. The brightest-yellow areas are the hottest and are emitting the most energy out to space, while the dark blue areas and the bright white clouds are much colder, emitting the least energy.

Outgoing longwave radiation (OLR) is usually defined as outgoing energy leaving the planet, most of which is in the infrared band. Generally, absorbed solar energy is converted to different forms of heat energy. Some of this energy is emitted as OLR directly to space, while the rest is first transported through the climate system as radiant and other forms of thermal energy. For example, indirect emissions occur following heat transport from the planet's surface layers (land and ocean) to the atmosphere via evapotranspiration and latent heat fluxes or conduction/convection process-ses. Ultimately, all outgoing energy is radiated in the form of longwave radiation back into space.

The transport of OLR from Earth's surface through its multi-layered atmosphere follows Kirchoff's law of thermal radiation. A one-layer model produces an approximate description of OLR which yields temperatures at the surface (T_s=288 Kelvin) and at the middle of the troposphere (T_a=242 Kelvin) that are close to observed average values

In this expression σ is the Stefan-Boltzmann constant and ε represents the emissivity of the atmosphere. Aerosols, clouds, water vapor, and trace greenhouse gases contribute to an average value of about ε=0.78. The strong (fourth-power) temperature

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sensitivity acts to help maintain a near-balance of the outgoing energy flow to the incoming flow via small changes in the planet's absolute temperatures.

Earth's internal heat sources and other small effects

The geothermal heat flow from the Earth's interior is estimated to be 47 terawatts (TW) and split approximately equally between radiogenic heat and heat left over from the Earth's formation. This corresponds to an average flux of 0.087 W/m^2 and represents only 0.027% of Earth's total energy budget at the surface, being dwarfed by the 173,000 TW of incoming solar radiation.

Human production of energy is even lower at an estimated 160,000 TW-hr for all of year 2019. This corresponds to an average continuous heat flow of about 18 TW. However, consumption is growing rapidly and energy production with fossil fuels also produces an increase in atmospheric greenhouse gases, leading to a more than 20 times larger imbalance in the incoming/outgoing flows that originate from solar radiation.

Photosynthesis also has a significant effect: An estimated 140 TW (or around 0.08%) of incident energy gets captured by photosynthesis, giving energy to plants to produce biomass.[16] A similar flow of thermal energy is released over the course of a year when plants are used as food or fuel.

Other minor sources of energy are usually ignored in the calculations, including accretion of interplanetary dust and solar wind, light from stars other than the Sun and the thermal radiation from space. Earlier, Joseph Fourier had claimed that deep space radiation was significant in a paper often cited as the first on the greenhouse effect.

Conclusion

To understand how the anti-greenhouse effect impacts a planet or large moon with its host star as an external source of energy, an energy budget can be calculated, similar to how it is done for Earth. For each component in the system, incoming energy needs to equal outgoing energy to uphold the conservation of energy and remain at a constant temperature. If one energy contributor is larger than the other, there is an energy imbalance and the temperature of an object will change to reestablish a balance. Energy sources across the whole electromagnetic spectrum need to be accounted for when calculating the energy balance. In the case of Earth, for example, a balance is struck between incoming shortwave radiation from the Sun and outgoing longwave radiation from the surface and the atmosphere. After establishing a component's energy balance, a temperature can be derived.

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An outlook on Environmental History

- I. Suguna Kumari, HOD, History Department, YAGC(W), Chirala

Abstract

The environmental challenges we currently face are very real, grave, and not rarely induced by modern humans. Finding sustainable solutions to them feature high on the international agenda. But where do the problems come from? In order to tackle current challenges of biodiversity loss, climate change, pollution and degrading natural resources, we should address the recent and distant past to understand their roots. We should learn from the failures and successes of past initiatives to tackle environmental problems. We should delve deeply into the cultural conditions and conceptualizations of nature and humans that enabled, and made reasonable, environmental degradation. We should also examine human-nature interactions that proved sustainable, and that might show us a way to live with and off nature past our own lifetimes. We should investigate the entangled dynamics of cultural and environmental processes over time.

Key words: *Environmental Challenges, Diverse Developments*

Introduction

Environmental History deals with the history of human impacts on nature and the interactions between humans and nature. It asks how nature influences humans, how humans intervene in nature and how nature and humans interact. To be able to understand these processes, it also investigates changes in nature not caused by human action. The terms nature and environment are largely seen as being synonymous. In traditional, preindustrial societies

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generally they describe the natural environment, comprising elements such as the landscape, rivers, climate and weather, animals, plants, etc. These natural factors are also of importance for industrial societies. At the same time, their environments are shaped more and more by human action citing, for example, the environment of modern towns, in which today more than half of the world's population lives. In addition, nature itself increasingly is shaped by human action. In Europe, there are hardly any and world-wide relatively few regions where humans did not interfere, so that in today's world we can speak of a man-made or even an artificial nature.

To understand such diverse developments the term environment as well as environmental history has to be defined very broadly. In practice, however, mostly it signifies the natural environment, being aware that in modern societies a pristine nature hardly exists anymore. But this terminological ambiguity is acceptable since environmental history above all is interested in the interactions between humans and nature and the transitions between these two. In doing this kind of research, the contribution of other disciplines such as geography, geology, biology, and many others is important, and it is sometimes argued that environmental history as a matter of principle should adopt an interdisciplinary approach. In practice, however, interdisciplinary approaches have proved to be demanding so that most of the contributions to environmental history still come within from single disciplines, not just from historians, but also from geographers, biologists, social scientists, and others.

Significance of environmental history

What is environmental history and why should we do it? Environmental History has been described variously as the interdisciplinary study of the relations of culture, technology and nature through time by historians such as Donald Worster and as the historically documented part of the story of the life and death, not of human individuals but of societies and species, in terms of their relationship with the world around them by Richard Grove and Mark Elvin. Clearly some environmental historians argue from a materialist/structuralist perspective while others argue from much more of a cultural perspective. There is some disagreement about whether the natural world constitutes any kind of order or pattern that we can know and, if it does, whether that order can be apprehended by means of science or not. There is also debate on what is natural and what is not, whether indigenous people managed the whole environment or only some part of it, how much was wilderness and how much was mythical. There are divergent opinions over the extent to which nature influences human affairs, some taking the position of limited environmental determinism, others insisting that culture determines all. Worster believes in straddling both worlds by asserting that the cultural history of nature is as significant as the ecological history of culture. In considering how the field has developed historians have given a prime role to the workings of nature independent of human actions while at the same time continuing to place more of an emphasis on human interactions with the rural and nonarable environment. As Caroline Ford had argued many of the recent studies in environmental history stress the blurred aspect of the nature–culture

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divide. This article attempts to explore the various themes within colonial environmental history by examining the work of some of its practitioners.

History of Technology

During the 1990s, the history of technology and environmental history intersected in the works of a number of historians. Earlier Leo Marx in The Machine in the Garden: Technology and the Pastoral Ideal in America (1964, Oxford University Press, New York) discussed the ideas of early American visionaries, such as Ralph Waldo Emerson who envisioned the harmonization of nature and technology in a pastoral landscape. In Nature's Metropolis (1991, W.W. Norton, New York). William Cronon describes the way in which Chicago's transportation and manufacturing technologies interacted seamlessly with the exploitation of the hinterland's natural resources to produce enormous quantities of marketable goods and nurture the enormous growth of Chicago.

Richard White, a social and environmental historian, further explores the seamless web theme in an imaginatively titled book The Organic Machine (1995, Hill and Wang, New York). It tells of the transformation of the Columbia River Basin in the states of Oregon and Washington into an artifact blending the natural and human built. White believes that the history of technology and the history of the environment can no more be told separately than the story of a marriage.

Environment, Historical Geography Of West-Political Approaches As attested above, the influence of political ecology and environmental history approaches, with their shared emphasis on the politics of environmental exploitation and appropriation, remains arguably the major area of concern. A cursory look through any recent issue of the Journal of Historical Geography [5]shows not only the vibrancy of the field in terms of journal papers but also monographs and edited collections of essays. Work in what we might label the "politics of the environment" approach has transcended the initial places of influence—the United States for environmental history, and the Global South for political ecology—to be a genuinely global endeavor, for while North America remains the dominant focus the approach also usefully transcends borders, something typified by the developing body of work on the historical geographies of the Arctic.

By way of example, recent studies by Akhter (2017) on the hydropolitics of water distribution in the Indus Basin in the context of the border conflict between Pakistan and India in the aftermath of independence in 1947, and by Tyner and Will (2015) on the structures of violence that contributed to deaths through famine-related causes in "post conflict" Cambodia, demonstrate the way in which violence against the most impoverished were often writ through environmental management projects. Both papers also allude to the fact that such work is with few exceptions focused on the recent past, Brian Short's studies of the

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conflict-riven life spaces of Ashdown Forest in southern England notable for focusing even as far ago as the late 19th Century.

Eco ethics

Eco ethics as a discipline is directly related to peace and conflict studies. The environmental history of this century charts the course that humanity has taken in putting ourselves increasingly in conflict with our planet's habitat requirements, environmental structures, and climate patterns that have given sustenance, nurture, and indeed, given evolutionary form and biological structure to the wide diversity of animal and plant species and whole ecosystems.

conclusions

In this context, we witness how the environmental and social histories of the medieval period could combine in a kaleidoscope of influences. The diversity of disciplines involved in urban ecology research, research sites, and research foci are reflected in a similar heterogeneity of research interests within geography.

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A review on resource recovery of industrial wastewater

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Abstract

This article include advanced oxidation process, membrane filtration technique, microbial technologies, bio-electrochemical degradation, photocatalytic degradation, etc. Among these technologies, microbial degradation seems highly promising for resource recovery and sustainability and has been discussed in detail as a promising approach.

Introduction

Rapid industrialization has provided comforts to mankind but has also impacted the environment harmfully. There has been severe increase in the pollution due to several industries, in particular due to dye industry, which generate huge quantities of wastewater containing hazardous chemicals. Although tremendous developments have taken place for

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the treatment and management of such wastewater through chemical or biological processes, there is an emerging shift in the approach, with focus shifting on resource recovery from such wastewater and also their management in sustainable manner.

Advanced oxidation processes

The advanced oxidation process (AOP) has been reported as one of the efficient procedure to reduce organic pollutants from dye industry effluent from the environment and improving availability of organic contaminants free water for humanity. AOP is a most suitable technique for degradation of organic dyes by radiation of visible light due to its eco-friendly nature, complete degradation, low cost, increase reusability of water and decrease in the pollutant load .

Combined bio-advanced oxidation process

Combined biological treatment with AOPs treatment (Bio-AOP) gives 100% decolorization of Remazol Red (RR), Reactive Black 5 and Reactive Red 180 (RR 180) by *Aeromonas hydrophila* SK16. However for individual treatment 72% decolorization rate was reported. Combination of AOPs treatment with biological treatment is more effective than single wastewater treatment.

Photocatalytic degradation Photocatalytic degradation has been reported for treatment of dye containing wastewater. Heterogeneous photocatalytic oxidation is one of the most important technique among the AOPs which is commonly known as photo-catalysis Semiconductor nanoparticles are used for photocatalytic degradation of organic contaminants.

Bio-electrochemical system

BES is a developing technology to improve energy and environment relevant problems by making wastewater treatment procedures more sustainable and more economical. The bio-electrocatalytic reaction combined with extracellular electron transfer can drive several procedures such as synthesizing chemicals, producing electricity from wastewater, removing pollutants and desalinating seawater .Removal of untreated wastewater from different industries such as textile, dyestuff, paper, etc., involves 70% identified commercial dyes which includes common chromophores in reactive dyes. Bio-electrochemical systems (BESs) contain great potential for azo dye removal used bio-electrochemical systems to decrease the concentration of Reactive Black 5 (RB5) from 0.503 ± 0.002 mM to 0.124 ± 0.007 mM after 10 h of operating.

Microbial degradation

Various microorganisms like bacteria, algae, fungi and yeast can be used for dye degradation .

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Bacterial biodegradation

Many bacterial strains are used to degrade dyes in aerobic or anaerobic conditions *Pseudomonas luteola, Xanthophilus azovorans, Klebsiella pneumonia, Clostridium perfringens*, are used in azo dye degradation. The genetically engineered *E. coli* strain gives increased azo reductase activity .

Bioaugmentation by *Aeromonas hydrophila* LZ-MG14 in a membrane bioreactor [MBR) improved the efficiency of malachite green degradation, have reported that *Pseudomonas aeruginosa* and *Bacillus subtilis* can reduce 92.13% and 88.21% Allura Red (R-40] dye respectively, under microaerophilic conditions. *Halomonas sp*. strain was isolated from coastal sediments which was contaminated by chemical wastewater and was found to give 90% azo dye degradation in 24 hours using yeast extract as a carbon source at temperature 30° C. The result showed that bacterial strain decolorizes different azo dyes in higher saline conditions.

Fungal biodegradation

Filamentous fungi can grow on range of ecological niches like living plants, soil and organic waste because of their speedy adaptation and metabolism on varying nitrogen and carbon sources. Fungi produce a huge quantity of extracellular and intracellular enzymes with degrading capability of many types of organic contaminants, like dye effluents, organic waste, steroid compounds and polyaromatic hydrocarbons. Various studies have reported on biodegradation of azo dyes by using white-rot fungi .Mycoremediation has been reported as a safe, low-cost and natural procedure for dye removal

Enzymes used for textile dye degradation:

The use of enzymes for degradation of textile dye is the most popular method. Triphenylmethane dyes come from the most significant group of synthetic dyes and are used extensively in textile dye industries. They are usually included as xenobiotic compounds. *Penicillium ochrochloron* decolorizes cotton blue dye within 2 hrs under static condition at temperature 25 °C and 6.5 pH.

Algal biodegradation

Algae are photosynthetic microbes and they are universally spread in a wide range of surroundings. Studies reported that azo dye degradation by algae can be induced by azoreductase. Some algal species like *Oscillatoria* and *Chlorella* were able to transform toxic aromatic amines into simple metabolic intermediates like water and CO_2., have reported

98.20% and 94.19% removal of methylene blue using *C. pyrenoidosa* and *Spirulina maxima*, respectively.

Yeast biodegradation

Numerous yeasts have been reported having ability to degrade dyes by metabolic activity such as enzymatic, biosorption, or a mixture of both. Several yeasts species like *Candida tropicali, Debaryomyces polymorphous*, *Candida albicans*, and *Issatchenkia occidentalis* were reported for decolorization and enzymatic biodegradation of different azo dyes.

Conclusions

Dye industrial wastewater can be used as a promising source for recovery of value-added products and treated wastewater can also be used for agriculture applications. Overall, while dye(s] degradation using microbial system is quite promising, use of single culture is time consuming whereas; use of microbial consortium or mixed culture decreases degradation time and leads improved removal of pollutants. In this regard, membrane based processes offer potential performance benefits, especially when they are coupled with electrochemical advanced oxidation procedures such as photoelectron-catalysis, electro-Fenton and electro-catalysis, etc. However, membrane blockage and fouling still remain as major challenge when it comes to the use of pressure driven membrane process. Bio-electrochemical systems play an important role in the resource recovery process by producing clean energy, low sludge and microbial biomass.

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A Review on Treatment of Dye Industry Waste water

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Abstract: This review article aims to present and discuss the most advanced and state-of-art technical and scientific developments about the classification of dyes,effect of dyes on environment and biodiversity, stages involved and types of treatment of dye industry wastewater.

Introduction

The atmosphere is mainly polluted by release of crude and unprocessed waste in the ecosystem which mainly contains majority emissions produced by industrial activities. Textile industries emit greenhouse gases by manufacturing processes and release hazardous gases and pollutants which are harmful for human, and plants. Most dyes contain mutagenic, toxic, and carcinogenic properties.

Industrial dyes as well as their by-products are main contaminants that are carcinogenic and toxic. Hence, they lead harmful effects on ecosystem. Various reports are available which shows harmful effects of azo dyes on plants (plant growth and germination).

Characteristics of dye industry wastewater

The effluent discharged from dye industries contain a mixture of metals, dyes and other pollutants. Two types of industrial wastes (liquid and solid) are frequently formed due to manufacturing processes and they contain any material that can be reduced through product manufacturing procedure. Liquid waste (i.e. wastewaters released from industries) is dangerous to existing living organisms as well as to the environment as it also carries different types of toxic contaminants. However, the characteristics and nature of industrial effluent are based on type of manufacturing process and products.

The wastewater produced through the wet process from dye industries is marked by a high level of dissimilarities in many parameters like chemical oxygen demand (COD), pH, total solids (TS), biological oxygen demand, water usage, and color. Wastewater having 0.25 BOD/COD ratio determines that the industrial wastewater having vast actions of organic material which is non-biodegradable. Composition of industrial wastewater is based on various types of raw materials, chemicals, organic-based compounds and different types of dyes used in wet and dry processing phases. The industrial manufacturing procedure discards unsafe and colored dyes mostly azo dyes. These dyes are a vital base of environmental pollution that causes harmful effects on aquatic life because of its low biodegradability, strong color, high COD and BOD. Despite the pollutants, dye industrial wastewater contains adjustable ionic strength, high salt concentration, and pH variations.

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Process waste is generated during different industrial manufacturing procedures. This type of waste is highly polluted and contains high COD and BOD levels, color pigments, pH, high salt concentration, etc.

Classification of dyes

The dyes can be classified as synthetic dyes and natural dyes. The synthetic dyes are easily produced in different colors and characterized by their fastness, so it is more widely used dye as compared to natural dyes. Synthetic dyes are classified into different groups (i) based on their mode of application like direct, reactive, basic, disperse and vat dying, etc. and (ii) based on their chemical structure like anthraquinone, azo, phthalocyanine, sulfur and triarylmethane, etc.

Azodyes

The azo dyes are characterized by comparatively high recalcitrance and high polarization. When particles contain other acidic groups like carboxyl, hydroxyl or sulfonyl substituents azo dyes can be categorized by amphoteric properties. The azo dyes are cationic, anionic, or nonionic. Existence of an amino group causes high water solubility and high mobility in comparison with hydrocarbons, high boiling point and a lower Henry's law constant.

Effects of azo dyes on plants and human health

Textile industries release number of hazardous pollutants and which are toxic and carcinogenic effects in their nature. Hence, they cause environmental degradation and various diseases in humans, animals and plants. Red-S3B (3.19% N) azo dye is the most toxic to growth and germination of 7 days old wheat saplings. *Aspergillus terreus* NIAB-FM10 and *Shewanella sp*. NIAB-BM15 were found to be more effective for degradation of Red-S3B. The mixture of these two species give complete decolorization of Red-S3B (500 mg) in 4 hour. After treatment with industrially important consortium increased shoot length and root length, shoot biomass, root biomass of 30 day old wheat saplings were noted.

Sudan I dye (Solvent Yellow 14) belongs to the family of azo-lipophilic complexes commonly used in industrial segments. When they present in the humans and animal bodies, it is enzymatically transformed into carcinogenic aromatic amines through the action of the intestinal flora.

Basic Red 9 dye having high environmental toxicity and carcinogenicity, it breaks down under anaerobic condition into carcinogenic aromatic amines and have potential for skin irritation, cancer itself, allergic dermatitis, and mutations.

Treatment process for dye industry wastewater

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The dye industrial wastewater treatment process is mainly classified into three types: (i) biological, (ii) chemical and (iii) physical treatments. General wastewater treatment includes preliminary treatment, primary treatment, secondary treatment and tertiary treatment to treat dye industry effluents. Preliminary treatment includes neutralization and equalization . The primary treatment includes sedimentation, screening, chemical coagulation, flocculation and floatation. Secondary treatment includes chemical/physical separation or biological oxidation and used to reduce organic compounds. Tertiary treatment is more significant than others because it enhances effluent treatment .

Preliminary treatment

The first step in wastewater treatment is equalization and mixing wastewater streams that were discharged at different intervals from different stages during the manufacturing process. Equalization confirms that the waste has a uniform characteristics in terms of pH, pollution load and temperature.

Primary treatment

The primary treatment involves screening, sedimentation and floatation. However, by use of steps above some suspended, fine and colloidal elements cannot be efficiently removed. In some cases, chemical coagulation and mechanical flocculation is employed. In chemical coagulation, addition of coagulants like ferrous sulfate ($FeSO_4$), polyelectrolyte, alum, ferric chloride ($FeCl_3$), lime [$Ca(OH)_2$] are used for flash mixing. This procedure was carried out on flocculation and settling tank or in clariflocculator. Iron salts and aluminum are commonly used as coagulants in water and wastewater treatment.Chemical treatments are used to reduce suspended solids, color, COD and BOD. Chemical coagulation procedure efficiently decolorizes insoluble dyes, but it is not very much effective in reduction of soluble dyes .

Secondary treatment

In secondary wastewater treatment, color and dissolved or colloidal organic material present in dye wastewater is stabilized . This procedure is carried out with the help of fungi, bacteria, algae, yeast and other microbes. This procedure can be anaerobic or aerobic. In aerobic procedure bacteria, algae and some other microbes utilize organic compounds as food and show successive modifications: (i) Flocculation and coagulation of colloidal compounds, (ii) Oxidation of dissolved organic compounds to CO_2, and (iii) Degradation of nitrogenous organic compounds to ammonia, which is then converted into nitrite and then nitrate. Anaerobic treatment is mostly used for digestion of waste. The capability of this procedure depends on temperature, pH, absence of oxygen, waste loading and presence of toxic material. Aerobic treatment for azo dyes has proven unsuccessful in maximum cases however, nowadays it is used as typical treatment methods .

Tertiary treatment

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The dye industrial wastewater contains various types of hazardous dyes. They require advanced treatment method or tertiary treatment to remove particular pollutants. Generally, tertiary treatment is used to remove organic color compounds by adsorption and dissolved solids by membrane filtration techniques. The wastewater can be treated with ozone (O_3) or another oxidizing agent to destroy many contaminants .

Treatment methods

The recent treatment approaches for dye industrial wastewater include membrane separation, adsorption, advanced oxidation procedures (AOPs), bio-electrochemical treatments and photocatalytic degradation for reduction of organic pollutants from industrial effluent .

Membrane techniques

Membrane separation is an advanced technology for wastewater treatment. In this process, wastewater is allowed to pass through a porous membrane. If any solute is bigger than membrane pore size than it will be trapped and rest of the solution will pass through the membrane. The trapped solutes from filter cake or layer, are removed constantly during the filtration procedure. The membrane separation procedures are classified based on size of porous membranes.

Pressure-driven membrane procedures can be divided into four main classes, (i) RO (Reverse osmosis), (ii) UF (Ultrafiltration), (iii) MF (Microfiltration) and (iv) NF (Nanofiltration). NF membranes contain 0.1 to 10 mm pore size with the lowest applied pressure. UF membranes contain 2 to 100 nm pore size with high applied pressure and low water permeability. MF and UF involve the same sieving mechanism, which is innovative and sustainable technology .UF is used for the recycling and separation of water-insoluble dyes such as disperse dye and indigo dye, whereas NF and RO procedures are used to hydrolyze reactive dyes from dye wastewater. MF is generally not used for wastewater treatment because of their large pore size .Type of membrane filter used for separation depends on numerous factors like nature of dye, dyeing process and chemical composition of pollutants, etc. Membrane used for reverse osmosis and ultra-filtration are generally prepared from different polymers like polyacrylonitrile, polysulphonates, polycarbonate, polyamides, fluorocarbon-based polymers and polypropylene etc .

Ultrafiltration

Ultrafiltration technique requires lower pressure than reverse osmosis and nanofiltration, thus make it more efficient. Polyether sulfone (PES) membrane is used for removal of dyes from wastewater. PES contains 1kDa and 10kDa porous membranes used for dyes removal. 1kDa polyether sulfone (PES) membrane gives 80% to 100% dye removal whereas 10kDa polyether sulfone (PES) membrane is not useful for the removal of dyes. The ultrafiltration technique is more suitable to be used as a pre-treatment procedure .

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Nanofiltration

NF shows higher permeability and low transmembrane pressure. The energy consumption in NF is lower than MF . Hence, NF is one type of competitive technique to treat dye industrial wastewater. In the past decade many researchers have focused on removal of reactive dyes from dye industrial wastewater.

Microfiltration

This method is used as a pre-treatment procedure for nanofiltration or reverses osmosis. Microfiltration with 0.1–1 μm porous membrane was used for removal of dye pigments from the dye industrial effluent .

Reverse osmosis

Reverse osmosis procedure is used to eliminate chemical compounds as well as decolorization of different dyes from dye wastewater. Decolorization and removal of chemical complexes from dyehouse wastewater can be passed out in a single phase of reverse osmosis procedure. RO membrane has 90% retention rate for most types of ionic compounds. Reverse osmosis supports elimination of chemical compounds, hydrolyzed reactive dyes and minimal salts .

Conclusions

Dyes are generally released by textile, paper, pulp, tannery, cosmetic and leather industries. These types of dyes are mostly toxic when released in the environment. Substantial advancement has been made on the treatment and management of dye wastewater, which could be treated employing biological, physical and chemical methods .

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A Review on Water Management Methods

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ABSTRACT: Increasing freshwater use and reduction of utilizable freshwater assets. Water draw on has been mounting internationally get doubled the tempo of population increase in the last century, and an increasing number of areas are attaining the limit at which water services can

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be sustainably delivered, in particular in parched regions. Water shortage will be exacerbated as quickly rising metropolitan areas situate grave strain on adjoining water resources.

Introduction:

At the global level, 31 countries are already short of water and by 2025 there will be 48 countries facing serious water shortages. The UN has estimated that by the year 2050, 4 billion people will be seriously affected by water shortages. This will lead to multiple conflicts between countries over the sharing of water. Around 20 major cities in India face chronic or interrupted water shortages. There are 100 countries that share the waters of 13 large rivers and lakes. International accords that will look at a fair distribution of water in such areas will become critical to world peace. India and Bangladesh already have a negotiated agreement on the water use of the Ganges. Water management, therefore, is the need of time. It is the management of water resources for the coming generations. It involves the activity of planning, developing, distributing and managing the optimum use of water resources. There are different methods through which water management preservation can be done, some of them are explained below.

Rain Water Harvesting

Rainwater harvesting (RWH) is the collection and storage of rain, rather than allowing it to run off. Rainwater is collected from a roof-like surface and redirected to a tank, cistern, deep pit (well, shaft, or borehole), aquifer, or a reservoir with percolation. Dew and fog can also be collected with nets or other tools. Rainwater harvesting differs from stormwater harvesting as the runoff is collected from roofs, rather than creeks, drains, roads, or any other land surfaces. Its uses include watering gardens, livestock, irrigation, domestic use with proper treatment, and domestic heating. The harvested water can also be committed to longer-term storage or groundwater recharge.

Trickle irrigation

Trickle irrigation is a type of micro-irrigation system that has the potential to save water and nutrients by allowing water to drip slowly to the roots of plants, either from above the soil surface or buried below the surface. The goal is to place water directly into the root zone and minimize evaporation. Drip irrigation systems distribute water through a network of valves, pipes, tubing, and emitters. Depending on how well designed, installed, maintained, and operated it is, a drip irrigation system can be more efficient than other types of irrigation systems, such as surface irrigation or sprinkler irrigation.

In the drip irrigation process, water and nutrients are delivered across the field in pipes called ‘dripper lines’ featuring smaller units known as ‘drippers’. Each dripper emits drops containing water and fertilizers, resulting in the uniform application of water and nutrients directly to each plant’s root zone, across an entire field. Drip irrigation system delivers water to the crop using a network of mainlines, sub-mains and lateral lines with emission points spaced along their lengths.

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Each dripper/emitter orifice supplies a measured, precisely controlled uniform application of water, nutrients, and other required growth substances directly into the root zone of the plant.

Sewage water handling

Sewage treatment is the process of removing contaminants from municipal wastewater, containing mainly household sewage plus some industrial wastewater. Physical, chemical, and biological processes are used to remove contaminants and produce treated wastewater (or treated effluent) that is safe enough for release into the environment. A by-product of sewage treatment is a semi-solid waste or slurry, called sewage sludge. The sludge has to undergo further treatment before being suitable for disposal or application to land.

Greywater revive

Greywater is gently used water from your bathroom sinks, showers, tubs, and washing machines. It is not water that has come into contact with feces, either from the toilet or from washing diapers. Greywater may contain traces of dirt, food, grease, hair, and certain household cleaning products. While greywater may look "dirty," it is a safe and even beneficial source of irrigation water in a yard.

Greywater is water from basins, baths and showers that is piped to a surge tank. The greywater is held briefly in the tank before being discharged to an irrigation or treatment system. The greywater can be diverted either by gravity or by using a pump. The surge tank can be any type of container that is suitable for holding (but not storing) the initial surge of water. The surge tank must be emptied completely each time greywater is dispersed to the irrigation or treatment system – greywater must not sit for extended periods of time in the tank. A gravity system can only be used when there is sufficient fall from the laundry/bathroom drain to the surge tank.

Groundwater revive

Groundwater is recharged naturally by rain and snowmelt and to a smaller extent by surface water (rivers and lakes). Recharge may be impeded somewhat by human activities including paving, development, or logging. These activities can result in loss of topsoil resulting in reduced water infiltration, enhanced surface runoff and reduction in recharge. The use of groundwaters, especially for irrigation, may also lower the water tables. Groundwater recharge is an important process for sustainable groundwater management since the volume-rate abstracted from an aquifer in the long term should be less than or equal to the volume-rate that is recharged. Recharge can help move excess salts that accumulate in the root zone to deeper soil layers, or into the groundwater system. Tree roots increase water saturation into groundwater reducing water runoff. Flooding temporarily increases river bed permeability by moving clay soils downstream, and this increases aquifer recharge.

Mock groundwater revive

Groundwater levels are declining across the country as our withdrawals exceed the rate of aquifers to naturally replenish themselves, called recharge. One method of controlling declining water levels is by using artificial groundwater recharge. Artificial recharge is the practice of increasing the amount of water that enters an aquifer through human-controlled means. For example, groundwater can be artificially recharged by redirecting water across the land surface

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through canals, infiltration basins, or ponds; adding irrigation furrows or sprinkler systems; or simply injecting water directly into the subsurface through injection wells. Artificial groundwater recharge is becoming increasingly important in India, where the over-pumping of groundwater by farmers has led to underground resources becoming depleted. In 2007, on the recommendations of the International Water Management Institute, the Indian government allocated 1,800 crores to fund dug-well recharge projects (a dug-well is a wide, shallow well, often lined with concrete) in 100 districts within seven states where water stored in hard-rock aquifers had been over-exploited. Another environmental issue is the disposal of waste through water flux such as dairy farms, industrial, and urban runoff.

Conjunctive utilize

Conjunctive use is a catch-phrase for coordinated use of surface water and groundwater—literally going with the flow to maximize sufficient yield. Conjunctive use of groundwater and surface water in an irrigation setting is the process of using water from the two different sources for consumptive purposes. Conjunctive use can refer to the practice at the farm level of sourcing water from both a well and from an irrigation delivery canal, or can refer to a strategic approach at the irrigation command level where surface water and groundwater inputs are centrally managed as an input to irrigation systems.

Aquifer storage and recuperation

Aquifer storage and recovery (ASR) is the direct injection of surface water supplies such as potable water, reclaimed water (i.e. rainwater), or river water into an aquifer for later recovery and use. The injection and extraction is often done by means of a well. In areas where the rainwater cannot percolate the soil or where it is not capable of percolating it fast enough (i.e. urban areas) and where the rainwater is thus diverted to rivers, rainwater ASR could help to keep the rainwater within an area. ASR is used for municipal, industrial and agricultural purposes.

The objective of AR is to replenish water in an aquifer. Injecting water into AR wells can prevent saltwater intrusion into freshwater aquifers and control land subsidence. In contrast, ASR wells are used to store water in the ground and recover the stored water for drinking water supplies, irrigation, industrial needs, or ecosystem restoration projects.

Desalination

Desalination is a process that takes away mineral components from saline water. More generally, desalination refers to the removal of salts and minerals from a target substance, as in soil desalination, which is an issue for agriculture. Saltwater is desalinated to produce water suitable for human consumption or irrigation. The by-product of the desalination process is brine. Desalination is used on many seagoing ships and submarines. Most of the modern interest in desalination is focused on the cost-effective provision of freshwater for human use. Along with recycled wastewater, it is one of the few rainfall-independent water sources.

Conclusion

Water management methods should be adopted strategically, keeping in mind the need for the work to be implemented. Planning groups must address the needs of all water users, if feasible.

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Comparative Recoveries of Rodenticide By Using Different Working Electrodes In Voltammetry

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Abstract:

This article explains the difference in reduction behavior of nitro group containing rodenticide bromethalin on the surface of a variety of working electrodes electrodes that is hanging mercury drop electrode,bare carbon electrode,carbon nano tubes paste electrode by using a selective and sencitive adsorptive stripping voltammetry and reduction patern determined by using cyclic voltammetry. Borate buffer used as supporting electrolyte which is usefull to enhance the conductivity during experiment. Calculations were made by by standard addition method.

Key words: *Bromethalin, Adsorptive Stripping Voltammetry, Electrodes That Is Hanging Mercury Drop Electrode,Bare Carbon Electrode,Carbon Nano Tubes Paste Electrode.*

Introduction: As application of agrochemicals is unavoidable now a days for enhancement of yields to compensate the growing population there is necessity to minimize the damage to the environment .Being agrochemicals has collateral effects application should be selective that is based on the persistence and effect on biodiversity. Rodentinticides are a variety of pesticides which are helpful to kill rodetents usually rats in paddy fields but they kill several species and also remaining will persist a long time this disturb the soil as well as water. There is a need to identify the rodenticides easily decomposed and with little impact on biodiversity. In this connection one has to know about the amount of residual remaining

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and the span of persistence for this I have chosen voltammetry which is best analytical method with high sensitivity. In this research I have studied the reduction of nitro group at variety of working electrodes that is hanging mercury drop electrode, bare carbon electrode, carbon nano tubes paste elect rode and results summarized.

Experimental

a) Apparatus and Electrodes

The electrochemical measurements were carried out with Metrohm model 101 potentiostat and galvanostat. hanging mercury drop electrode, bare carbon electrode, carbon nano tubes paste electrode are used as working electrodes simultaneously.

. Ag/AgCl reference electrode and a platinum wire used as auxiliary electrode. The electrodes joined the cell through holes in its Teflon cover. All of the potentials given in this work were measured with respect to this reference system. Electrochemical experiments were carried out in a voltametric cell at room temperature. A magnetic stirrer was used during the accumulation step. The Eli co Li-129 model glass calomel combined electrode was employed for measuring pH values.

b) Reagents and solutions

All reagents used were of analytical reagent grade. Double distilled water is used throughout the analysis. In the present investigation, universal buffers in the pH range 2.0 to 6.0 are used as supporting electrolytes and prepared using 0.2 M boric acid, 0.05 M citric acid and 0.1 M tri sodium orthophosphate solutions. Pesticide samples are obtained from Bayer crop, India, Ltd.

Result and Discussion

Bromethalin is found to a give a single well defined peak in acidic solutions ($2 < pH < 6$). Increase of pH from 4.0 leads to decrease of the peak current. In the acidic medium, the peak of the compound is due to the reduction of 2 nitro groups in 4 electron process. The reduction process of bromethalin is found to be diffusion controlled and adsorption on the electrode surface in the buffer systems studied as evidenced from linear plot i p vs v 1/2 passing through origin. The shift of peak potential (E p) towards more negative values with increase in concentration of depolarizer, shows that the electrode process is irreversible. This is further confirmed by log-plot analysis. The variation of peak potentials with scan rates and absence of anodic peak in the reverse scan in cyclic voltammetry indicates the irreversible nature of the electrode processes. The dependence of i p /pH curves shows a behavior in accordance with a process in which a proton transfer provides the reduction of the acid form to form an electro active species. The number of protons taking part in the rate determining step is 4. Millicoulometry is employed to find out the number of electrons involved in the electrode process. The results obtained from millicoulometry have shown that the number of electrons is 4 for bromethalin. The number of protons involved in the rate determining step of the electrode process is 4. Controlled potential electrolysis experiments are carried out at -0.8 V at saturated colomel electrode at pH 4.0.to collect reduction product.

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Kinetic data such as diffusion coefficient, transfer coefficient and heterogeneous forward rate constants obtained for bromethalin is summarized in table 1.0.The diffusion coefficient values are noticed to be in good agreement from cyclic voltammetry. The heterogeneous forward rate constants were decreasing with an increase in pH of the supporting electrolyte, which may responsible for the shift of reduction potentials towards more negative values with increase in pH. This trend is particularly evident where the proton transfer is involved in the electrode process.

a) Dp-ASV studies and optimum conditions

Peak of bromethalin at working electrode (Fig. 1.0) is attributed to reduction of bromethalin.This peak followed to establish the optimum conditions. The standard addition and calibration methods have been employed to estimate the compound in grain samples. Maximum peak potentials are obtained with pH 4.0.The shift of the peak potentials towards more negative values indicating proton participation in the reduction process.The effects of varying the potential scan rate on the reduction peak current of bromethalin is examined.The reduction peak current increases linearly with scan rate over the range from 20 mVs -1 to 60 mVs -1 as expected for the reduction of being observed. Best sensitivity achieved at a scan rate of 50 mVs -1 .

Recovery Experiments

a) Analysis

Well defined and well resolved AdSV peaks of bromethalin obtained at pH 4.0 is used for the quantitative estimation of bromethalin in water and soil samples. Both calibration and standard addition methods are used for the quantitative determination of bromethalin. From the calibration method, it is observed that the peak current shows a trend found to be linear over the concentration range Peak currents were linear over the concentration range of 1.4x 10^{-8} M to 1.3×10^{-9} M with lower detection limit of 10^{-10} M.

b) Recommended analytical procedure

The stock solution (1.0 x 10^{-5} M) of bromethalin is prepared by dissolving the required quantity of the electroactive species in methanol. Standard solutions are prepared by dilution of stock solution with suitable amount of methanol. 1 mL of the standard solution is transferred into voltammetric cell and added with 9 mL of the supporting electrolyte and then deoxygenated by bubbling oxygen free nitrogen gas for 10 min. After recording the voltammogram, small increments of standard solutions (0.2 mL) added and then voltammograms recorded for each addition under similar experimental conditions. The optimum conditions for the analytical determination of bromethalin are pH 4.0 and scan rate 50 mVs -1 .

c) Determination of bromethalin in spiked grain samples

The developed analytical procedure has been applied to the quantitative estimation bromethalin in grain samples. Known amount of bromethalin is sprayed on grain samples (25 g) and left for 1-2 hours. Then the samples are weighed, crushed and homogenized and

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treated with 50mL acetone and evaporated to dryness. The residue of bromethalin dissolved in methanol and transferred to a 100 mL volumetric flask. 1 mL of the standard solution is transferred into voltammetric cell and added with 9 mL of the supporting electrolyte and then deoxygenated by bubbling oxygen free nitrogen gas for 10 min. After recording the voltammogram, small increments of standard solutions (0.2 mL) were added and then voltammograms recorded for each addition under similar experimental conditions. Results obtained for the determination of bromethalin in grains by this method ranged from 84.00% ,92.00% ,98.80% which indicates the high accuracy and reproducibility of the proposed method. The results are summarized in table.1.0.

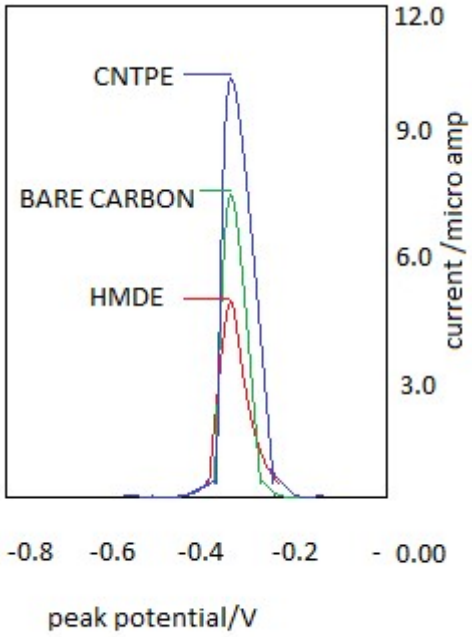

Fig 1.0.DPASV Responce at Different WE

Table 1.0: Recovery of bromethaline by using various working electrodes in voltammetry.

Working Electrode	Amount added(µg)	Amount found(µg)	Recovery(%)	Standard deviation
HMDE	5.0	4.20	84.00	0.043
Bare carbon	5.0	4.60	92.00	0.056
CNTPE	5.0	4.94	98.80	0.033

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Conclusion

The present part describes the detailed study of electrochemical reduction of nitro group containing pesticide bromethalin from the results obtained from cyclic voltammetry, differential pulse adsorptive stripping voltammetry, millicoulometry and controlled potential electrolysis in methanol as solvent in the supporting electrolytes of pH ranging 2.0 to 6.0. To overcome partial load over current density and for improved electrode kinetics polymer coated ion selective bare carbon electrode prepared hanging mercury drop electrode, bare carbon electrode, carbon nano tubes paste electrode. By this approach we can say that the method employed for the determination of rodenticide bromethaline differential pulse adsorptive stripping voltammetry is selective and sensitive and low consumption of sample and less tedios compare to chromatography and spectroscopy.

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Comprehensive Study of The Complex Of Environmental Costs

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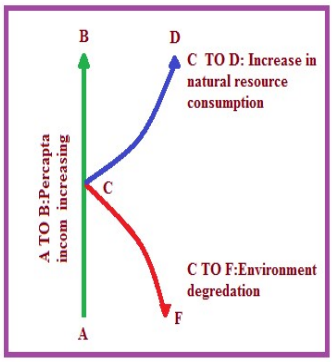
Abstract:
The study offers insight into the social and economic costs and benefits of the pesticide industry. Although the study's focus is the European market, pesticide exposure is widespread, and residues can travel across the globe.

Key words: *economic and environmental losses, organic forming.*

1.0 INTRODUCTION



An obvious need for an updated and comprehensive study prompted this investigation of the complex of environmental costs resulting from the nation's dependence on pesticides. Included in this assessment of an estimated $10 billion in environmental and societal damages [1-8]are analyses of: pesticide impacts on public health; livestock and livestock product losses; increased control expenses resulting from pesticide-related destruction of natural enemies and from the development of pesticide resistance in pests; crop pollination problems and honeybee losses; crop and crop product losses; bird, fish, and other wildlife losses; and governmental expenditures to reduce the environmental and social costs of the recommended application of pesticides.

The major economic and environmental losses due to the application of pesticides in the USA were: public health, $1.1 billion year−1; pesticide resistance in pests, $1.5 billion; crop losses caused by pesticides, $1.4 billion; bird losses due to pesticides, $2.2 billion; and groundwater contamination, $2.0 billion.

Pesticides cause serious damage to agricultural and natural ecosystems. Thus, there is a need to curtail pesticide use and reduce the environmental impacts of pesticides. This study confirms that it should be possible to reduce pesticide use in the US by 50% without any decrease in crop yields or change in 'cosmetic standards'. The estimated increase in food costs would be only 0.6%. This increased cost, however, does not take into account the environmental and public benefits of reducing pesticide use by 50%.

The cost to maintain crops using conventional pesticides outweighs the economic benefits from crop production and yield, according to a report, Pesticides 'cost double the amount

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they yield,' by the French-based organization Bureau for the Appraisal of Social Impacts for Citizen Information (BASIC).

Moreover, the annual cost of increasing organic farms three-fold by 2030 is less than the cost of pesticides to society (i.e., adverse health and ecological effects from pesticide use and contamination). However, the price to pay from pesticide use encompasses much more than the products themselves. Researchers point to the need for government and health officials to consider the billion-dollar costs associated with adverse health effects from pesticide use, especially as studies confirm that pesticides cause cancer, Parkinson's, and other diseases that are increasing.

Thus, this report adds to the growing body of research demonstrating the unsustainability of conventional, chemical-intensive agricultural practices. The National Academy of Sciences identifies four goals of sustainable agriculture—productivity, economics, environment, and social well-being for future generations. However, current chemical pesticide use threatens sustainable agriculture. Although the primary concerns about pesticide usage centers on health and ecological concerns, including food security, this report provides an economic assessment that offers an important holistic perspective on real costs and food sovereignty.

Thus, researchers analyze new pesticide data to evaluate the repercussions on the ecosystem, including effects on species health, diversity, and services. The researcher then established the cost from pesticide use and paid for by European citizens regarding these repercussions. Lastly, the organization evaluated the profits of the four major pesticide producers through pesticide use.

The report notes, "In a few decades, and thanks to the constant support of public authorities, the agricultural world has invested massively in the use of pesticides. While the profits of this sector are becoming increasingly concentrated in the hands of a few multinationals, society faces a considerable bill to pay each year to cover the costs linked to pesticide use.

But even those amounts will not be able to repair the irreversible damage caused to humans and the environment. In contrast, the varied agroecological models have proven to be more sustainable. While transition to these also requires investments, the latter will be smaller and above all more sustainable… in 2022, Member States will have to assume their responsibility and choose between a costly, polluting model concentrated in the hands of a few players whose decision-making centers are outside Europe, and a sustainable agro-ecological model championed by citizens and farmers. It is the future food sovereignty for the EU – and, more broadly, for the planet – that is at stake."

The United Nations' 1987 report, Our Common Future (the Brundtland Report), outlines the benefits of sustainable agriculture in protecting the Earth's natural resources for future generations, advancing equal income allocation from food production, and supporting small-scale farming. The report emphasizes the challenges of sustainable agriculture, highlighting, "[it] is to raise not just average productivity and incomes [from resources], but also the productivity and incomes of those poor in resources… Land use in agriculture and forestry

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must [use] scientific assessment of land capacity, and the annual depletion of topsoil, fish stock, or forest resources must not exceed the rate of regeneration."

However, a United Nations Environment Programme (UNEP) report establishes that pesticide use does not adhere to sustainable agriculture goals. Toxic pesticide residues readily contaminate soils, water (solid and liquid), and the surrounding air at levels exceeding U.S. Environmental Protection Agency (EPA) set standards. Scientific literature demonstrates pesticides' long history of adverse effects on the environment, including wildlife, biodiversity, and human health. Pesticides can present acute and long-term health impacts worldwide, especially to farmers, 44 percent of whom experience pesticide poisoning every year. Furthermore, a 2020 study attributes ~385 million cases of non-fatal unintentional poisonings and 11,000 deaths annually to pesticides. Thus, increased use of pesticides and synthetic fertilizers—driven by rising demand for food, fiber, fuel, and feedstock crops—puts public and environmental health at risk.

PAST SCENARIO

Despite an increase in agricultural activity since the 1950s, crop yields are declining. Moreover, scientists cited in the report point to previous studies on lower yields in specialized crops—such as monocrops. The current agricultural production system relies on pesticides that researchers attribute to the "growing phenomena such as pest resistance, soil and biodiversity degradation, and also the destruction of natural resources needed for agricultural production (soil, fauna, and flora required for crop development, etc.)." A 2003 report on pesticide caused damages, estimating a total cost of $10 billion to society. However, the BASIC report finds the number of pesticides used in agriculture doubled in the past 20 years, and so the economic damage is much greater than previous figures demonstrate. Although the pesticide industry carries out large-scale lobbying to defend current pesticide use, total costs for lobbying approaches 10 million euros per year, which is greater than the pesticide regulation budget for the European Food Safety Authority (EFSA).

Traditionally, tradeoffs between productivity and environmental benefits focused on productivity and overlooked hazards to the environment and general population. Scientists suggest payment incentives to compensate for any reduction in yield, helping farmers to reconsider excessive pesticide use to sustain profit.

Considering studies find that toxic pesticide use does little to benefit farmers through productivity or economic means, the primary focus on yield in agriculture is unsustainable. However, agricultural systems that commit to regenerative organic agriculture and land management can meet future, long-term sustainability goals. Past research shows that organic farming can help address economic insecurity, the climate crisis, and public health disparities. Although there are claims that organic agriculture cannot sustain global crop production, scientific studies argue organic yields are comparable to conventional and require significantly lower chemical inputs. Furthermore, the report reveals the cost to convert to organic farming is much less than the cost to sustain current pesticide use. Therefore, the

study researchers advocate for the organic solution to eliminate the economic costs of pesticide damages on society. Organic agriculture can and must feed the world.

PRESENT SCENARIO

Organic farming is increasing globally and on track to meet the European Union sustainability goals. However, the number of organic farms remains under two percent. Increased global participation in organic agriculture can protect human and animal health, promote biodiversity, improve the global socioeconomic status, and eliminate toxic chemical use in agriculture. Organically managed systems support biodiversity, improve soil health, sequester carbon (which helps mitigate the climate crisis), and safeguard surface- and groundwater quality. Everyone plays a key role in promoting a sustainable future through organic practices. Therefore, purchasing organic food whenever possible—which never allows synthetic pesticides—can help curb exposure and resulting adverse health effects. A common misconception is that organic products are "too expensive," but low-cost organic products exist in the marketplace.

CONCLUSION

Organic agriculture can and must feed the world. Education about organic agriculture, buying organic products (food and non-food items), growing your own organic produce, creating marketplace demand, and advocating for organic regulations in the marketplace can aid in the global transition to organic agriculture. Learn more about how consuming organic products can reduce pesticide exposure and the harmful health and environmental impacts of chemical-intensive farming produces.

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Conservational Policies, Politics and Litigations

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Abstract:
Conservational policy is the obligation of an union or regime to the laws, regulations, and other policy mechanisms concerning environmental issues. These issues generally include air and water pollution, waste management, ecosystem management, maintenance of biodiversity, the management of natural resources, wildlife and endangered species. For example, concerning environmental policy, the implementation of an eco-energy-oriented policy at a global level to address the issues of global warming and climate changes could be addressed. Policies concerning energy or regulation of toxic substances including pesticides and many types of industrial waste are part of the topic of environmental policy. This policy can be deliberately taken to influence human activities and thereby prevent undesirable effects on the biophysical environment and natural resources, as well as to make sure that changes in the environment do not have unacceptable effects on humans.
Key Words: *physical ecosystems, economic dimension, water pollution, waste management, ecosystem management, biodiversity protection.*

INTRODUCTION

One way is to describe environmental policy is that it comprises two major terms: environment and policy. Environment refers to the physical ecosystems, but can also take into consideration the social dimension (quality of life, health) and an economic dimension (resource management, biodiversity). Policy can be defined as a "course of action or principle adopted or proposed by a government, party, business or individual". Thus, environmental policy tends to focus on problems arising from human impact on the environment, which is important to human society by having a (negative) impact on human values. Such human values are often labeled as good health or the 'clean and green' environment. In practice, policy analysts provide a wide variety of types of information to the public decision making process.

Environmental issues typically addressed by environmental policy include (but are not limited to) air and water pollution, waste management, ecosystem management, biodiversity protection, the protection of natural resources, wildlife and endangered species, and the

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management of these natural resources for future generations. Relatively recently, environmental policy has also attended to the communication of environmental issues. In contrast to environmental policy, ecological policy addresses issues that focus on achieving benefits (both monetary and non monetary) from the non human ecological world. Broadly included in ecological policy is natural resource management (fisheries, forestry, wildlife, range, biodiversity, and at-risk species). This specialized area of policy possesses its own distinctive features.

Validation

The rationale for governmental involvement in the environment is often attributed to market failure in the form of forces beyond the control of one person, including the free rider problem and the tragedy of the commons. An example of an externality is when a factory produces waste pollution which may be discharged into a river, ultimately contaminating water. The cost of such action is paid by society-at-large when they must clean the water before drinking it and is external to the costs of the polluter. The free rider problem occurs when the private marginal cost of taking action to protect the environment is greater than the private marginal benefit, but the social marginal cost is less than the social marginal benefit. The tragedy of the commons is the condition that, because no one person owns the commons, each individual has an incentive to utilize common resources as much as possible. Without governmental involvement, the commons is overused. Examples of tragedies of the commons are overfishing and overgrazing.

The part of Non-Governmental Organizations

Non-Governmental organizations have the greatest influence on environmental policies. These days, many countries are facing huge environmental, social, and economic impacts of rapid population growth, development, and natural resource constraints. The need for a legal framework to recognize NGOs and enable them to access more diverse funding sources, high-level support/endorsement from local figureheads, and engaging NGOs in policy development and implementation is more important as environmental issues continue to increase.

International organizations have also made great impacts on environmental policies by creating programmes such as the United Nations Environment Programme and hosting conferences such as the United Nations Earth Summit to address environmental issues. UNEP is the leading global environmental authority tasked with policy guidance for environmental programs. The UNEP monitors environmental aspects, such as waste management, energy use, greenhouse gas inventory, and water use to promote environmental sustainability and address environmental issues.

Instruments, problems, and issues

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Environmental policy instruments are tools used by governments and other organizations to implement their environmental policies. Governments, for example, may use a number of different types of instruments. For example, economic incentives and market-based instruments such as taxes and tax exemptions, tradable permits, and fees can be very effective to encourage compliance with environmental policy. The assumption is that corporations and other organizations who engage in efficient environmental management and are transparent about their environmental data and reporting presumably benefit from improved business and organizational performance.

Bilateral agreements between the government and private firms and commitments made by firms independent of government requirement are examples of voluntary environmental measures. Another instrument is the implementation of greener public purchasing programs. Ideally, government policies are to be carefully formulated so that the individual measures do not undermine one another, or create a rigid and cost-ineffective framework. Overlapping policies result in unnecessary administrative costs, increasing the cost of implementation. To help governments realize their policy goals, the OECD Environment Directorate, for example, collects data on the efficiency and consequences of environmental policies implemented by the national governments. The website, www.economicinstruments.com, provides database detailing countries' experiences with their environmental policies. The United Nations Economic Commission for Europe, through UNECE Environmental Performance Reviews, evaluates progress made by its member countries in improving their environmental policies.

Exploration and modernization policy

Europe is particularly active in this field, via a set of strategies, actions and programmes to promote more and better research and innovation for building a resource-efficient, climate resilient society and thriving economy in sync with its natural environment. Research and innovation in Europe are financially supported by the programme Horizon 2020, which is also open to participation worldwide.

Past scenario

At the time, Environmental Policy was a bipartisan issue and the efforts of the United States of America helped spark countries around the world to create environmental policies. During this period, legislation was passed to regulate pollutants that go into the air, water tables, and solid waste disposal. President Nixon signed the Clean Air Act in 1970 which set the US as one of the world leaders in environmental conservation. The world's first minister of the environment was the British Politician Peter Walker from the Conservative Party in 1970. The German “Benzinbleigesetz” reduced Tetraethyllead since 1972.

Eco- policy amalgamation

The concept of environmental policy integration (EPI) refers to the process of integrating environmental objectives into non-environmental policy areas, such as energy, agriculture and transport, rather than leaving them to be pursued solely through purely environmental

policy practices. This is oftentimes particularly challenging because of the need to reconcile global objectives and international rules with domestic needs and laws. EPI is widely recognized as one of the key elements of sustainable development. More recently, the notion of 'climate policy integration', also denoted as 'mainstreaming', has been applied to indicate the integration of climate considerations (both mitigation and adaptation) into the normal (often economically focused) activity of government.

Eco- Policy Educations

Given the growing need for trained environmental practitioners, graduate schools throughout the world offer specialized professional degrees in environmental policy studies. While there is not a standard curriculum, students typically take classes in policy analysis, environmental science, environmental law and politics, ecology, energy, and natural resource management. Graduates of these programs are employed by governments, international organizations, private sector, think tanks, advocacy organizations, universities, and so on. Academic institutions use varying designations to refer to their environmental policy degrees.

Eco- policy motivations

Incentives for compliance with environmental policy is a way to encourage the population to be more sustainable. The article," Dynamic incentives by environmental policy instruments - a survey", covers that if the government can issue regulatory policies by virtue of administered prices (taxes), then this will be just as equivalent as companies issuing tradable permits. This means that if there is policies that directly tax unsustainable company practices, this will encourage them to become more sustainable and have them transition from tradable permits.

Conclusion

Environmental policies can increase environmental sustainability when implemented. The article," British Columbia's revenue-neutral carbon tax: A review of the latest 'grand experiment' in environmental policy" states that in 2012 the effect of the gasoline sales tax in British Columbia caused a reduction in gasoline sales of 11% to 17%. What is obtained from this information is that people are willing to find alternatives in transportation in save money. This could mean that the implementation of stricter environmental policies, could draw higher percentages of sustainability.

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Derivative spectrophotometric determination of uranium (VI) as an Environmental Pollutant using diacetylmonoximeisonicotinoylhydrazone(DMIH)

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ABSTRACT: Uranium (VI) forms a yellow coloured water soluble complex withdiacetylmonoximeisonicotinoylhydrazone(DMIH)reagentinacidicbufferofpH3.25withλ_{max}at 364 nm. The molar absorptivity and sandell's sensitivity are 1.63 X 10 ^{4}L.mol^{-1}.cm^{-1} and0.00307692 µg/cm ^{2}, respectively. The Beer's law validity range is 1.19–14.28µg/mL. Uranium (VI) forms (M:L) 1:1 complex with DMIH and stability constant of the complex is4.928 X 10^{6} .The derivative spectrophotometric determination of U (VI) was carried outby measuring peak height method. The developed derivative spectrophotometric method was employed for the determination of uranium (VI) in rock and synthetic samples. The effect of various diverse ions was also studied.

Keywords:*diacetylmonoximeisonicotinoylhydrazone(DMIH);derivativespectrophotometry; Uranium(VI)*

Introduction:

Uranium is a silvery-gray metallic element. It is malleable, ductile and slightly paramagnetic. It has very high density. It occurs naturally in low concentration in soil, rock and is commercially extracted from uranium bearing mineral like uranite. Uranium decays slowly by emitting an alpha particle. The half-life period ofuranium-238isotopeis4.47 billion years and Uranium-235 isotope is 704 years, making them useful in dating the age of the Earth. Uranium is a very good fuel in nuclear power generation. Apart from radioactive, uranium is a toxic metal and cause damage to the kidneys.

Thepotentialapplicationofhydrazonederivativesforthespectrophotometricdetermination of metal ions had reviewed by Singh et al. The spectrophotometric determination of Uranium was reviewed by Marczenco and Snell. The spectrophotometric determination of uranium by using hydrazones is not used much. Few hydrazone reagents were used for the spectrophotometric determination of uranium (VI) which are given in the Table 6. In the light of good analytical characteristics of hydrazones, herein were port zero and first order derivative spectrophotometric determination of uranium (VI) in aqueous medium. The present paper describes a new, very simple, rapid and sensitive derivative spectrophotometric determination of uranium(VI) in aqueous medium.

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Materials & Methods:

Spectrophotometricmeasurementsweremadeinashimadzu160Amicrocomputer based on UV – Visible spectrophotometer equipped with 1.0 cm quartz cells, an ELICO LI- 120 digital were used in the present ork. All reagents were of AR grade unless otherwise stated. All solutions were prepared with distilled water. The standard stock solution 0.01 M was prepared by dissolving 0.516 grams. There agent DMIH was prepared by simple condensation of diacetyl monoxie and isonicotinic hydrazide in 1:1mole ratio and its structure is given in Fig.1.

The reagent solution (0.01 M) was prepared by dissolving 0.22 grams of DMIH in100 mL of dimethylformamide. The reagent is stable for 48 hours. Buffer solutions werepreparedbymixing1Mhydrochloricacid 0.2M sodium dihydrogen phosphate.

3.Reactionwithmetalions:

The reactions of some important metal ions were tested at different pH values. The samples were prepared in10 ml volumetric flasks by adding 3 mL of buffer(pH 1.0–11.0), 0.5 mL of metal ion (1X 10^{-3} M) and 0.5 mL of DMIH (1 X 10^{-2} M) solutions. The solution mixture was diluted up to the mark with distilled water. The absorbance was measured in 300–600nm range against reagent blank. The results are summarized in Table1.

Sl No	MetalIon	Molor absorptivity(L.mol^{-1}cm^{-1})X10^4
1	Ru(III)	1.4
2	Hg(II)	2.23
3	U(VI)	1.63
4	Th(IV)	2.265
5	Au(III)	1.5
6	Mo(VI)	1.93

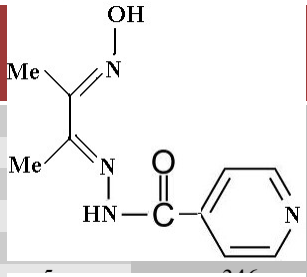

Figure1.Structure of DMIH

Table1.Analytical characteristics of DMIH

Recommended Procedure:

Determination of U(VI) (Zero order spectrophotometry): An aliquot of the solution containing 1.19–14.28 µg/mL of U (VI), 3 mL of buffer solution of pH 3.25 and 0.5 mL of 0.01 M DMIH reagent were taken in a 10 ml volumetric flask and the solution was diluted up to the mark with distilled water. The absorbance of the solution was recorded at 364 nm in a 1.0 cm cell against reagent blank prepared in the same way but without U (VI) metal

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solution. The measured absorbance was used to compute the amount of U(VI)from the calibration plot.

Determination of U(VI)by first ordered inactive spectrophotometry:

The first order derivative spectrum was recorded for the above solution of U(VI)–DMIH with a scan speed having degrees of freedom 9 in a wavelength range 300-600nm. The derivative spectrum was measured by peak height (h) method at 407 nm. The peak height (h) at 407 nm is proportional to the concentration of U (VI). There for the peak heights were measured at this wavelength for the construction of calibration plots.

Results and Discussions:

Diacetyl monoxime isonicotinoyl hydrazone(DMIH) reagent can be easily prepared like any other Schiff base reagent. This new chromogenic reagent DMIH was not used for spectrophotometric determination of U(VI) so far. The reactions of some important metal ions with DMIH are summarized in Table 1.The colour reactions are mainly due to the complex formation of DMIH with divalent, trivalent, tetravalent and hexavalent metal ions like Hg (II), Ru (III), As (III), Au (III),Th(IV) and U(VI) in acidic buffer medium to give intense coloured complexes.

Determination of U(VI) using DMIH:

U (VI) reacts with DMIH in acidic medium to give yellow coloured water soluble complex. The colour reaction between U (VI) and DMIH are instantaneous even at room temperature in the pH range 1.0-7.0. The absorbance of the yellowish coloured species remains constant for more than two hours. The maximum colour intensity is observed at pH3.25. A5 fold molar excess of reagent is adequate for full colour development. The order of addition of buffer solution, metal ion and reagent has no adverse effect on the absorbance. The complex formation reaction between U(VI) and DMIH has been studied in detail based on the composition of the complex as determined by using Job's and molar ratio methods. Some of the important physicochemical and analytic characteristics of U(VI)and DMIH are summarized in Table2.

Characteristics	Results
λ_{max}(nm)	364
pHRange(Optimum)	1.0-7.0
Mole of reagent required per mole of metal ion for full colour development	5folds
Molar absorptivity($L.mol^{-1}cm^{-1}$)	$1.63X10^4$
Sandell's sensitivity($\mu g/Cm^{2)}$	0.00307692
Beer's law validity range(µg/mL)	1.19–14.28
Composition of complex(M:L)obtained in job's and mole ratio method	1:1
Stability Constant of the complex	$4.982X10^6$

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Table2.Some of physico chemical and analytical characteristics of U(VI)–DMIH Complex

Derivative spectrophotometry is an important useful technique as it decreases the interference i.e. increase the tolerance limit value of the foreign ions. There fore it may be useful for the determination of metal ions having overlapped spectra. The recommended procedure has been used for the determination of U(VI). The zero order and first order derivative spectra of U (VI) complex of DMIH are given in figures2and 3, respectively.

Effect of diverse ions: The effect of various diverse ions in the determination of U(VI)was studied to find out the tolerance limit of foreign ions in the present method. The tolerance limit of foreign ions was taken as the amount of foreign ion required to cause an errorof±2% in the absorbance or amplitude. The results are given in Table 3. The data obtained in the derivative method is also incorporated.

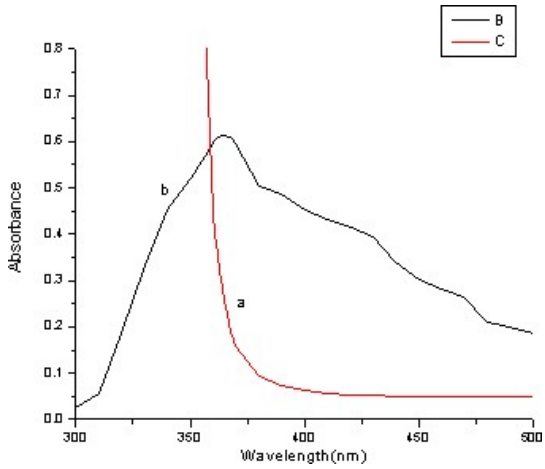

Figure 2.Zero order absorption spectra of (a) reagent DMIH 1X10-2 M vs water blank atpH3.25.(b)U(VI)–DMIHcomplexvs.reagentblankatpH3.25,U(VI)=1X10-3M;DMIH=1X10-2M.

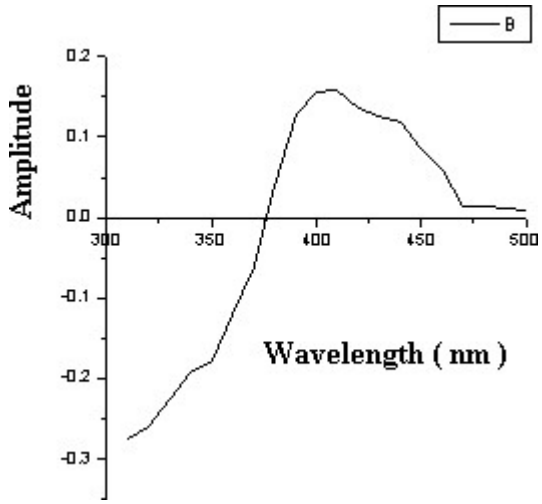

Figure 3. First order derivative spectrum of U (VI)– DMIH complex vs reagent blank at pH 3.25. (b)U(VI)–DMIH complex vs reagent blank at pH 3.25, U(VI)=1X10^{-3} M;DMIH=1X10^{-2}M.

Applications: The proposed method was applied for determination of U(VI) in rock and Pitch blende ore samples.

Preparation and analysis of synthetic sample of Pitchblende ore sample:

A synthetic mixture of Pitch blende ore was prepared by mixing in the same ratio, as the components would be present in Pitchblende ore. The resultant mixture was dissolved in conc. HCl and evaporated to dryness. The residue was redissolved in distilled water and made up to the mark in a 50 mL volumetric flask. U (VI) in this mixture was determined by the recommended procedure from the predetermined calibration plot.

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Recommended Procedure:

3 mL of buffer solution (pH 3.25) was taken in a 10 mL volumetric flask, known a liquot quantities of sample solution and 0.5mL of $1X10^{-2}$ M reagent solution were added. The solution was diluted to volume with distilled water and absorbance was measured at 364 nm against reagent blank.

Conclusions:

The present method using DMIH as a spectrophotometric reagent for the determination of Uranium (VI) in aqueous medium is sensitive and simple. Most of the spectrophotometric methods involve both extraction and heating of the reaction mixture or only extraction. The determination of U (VI) using DMIH is not laborious and time consuming process. Further it is easy to synthesis the reagent using available chemicals.More over the present method is simple, rapid, sensitive and selective for the determination of U (VI).

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Environmental Issues for Human Development

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Abstract :
Human Development and the Climate have been interlinked for a long, however, there has to be a balance between economic developments with environmental protection. Landslides, floods, etc. claim lives and render several human beings homeless. Climate change plays a major role in increasing the frequency of such hazards.

Keywords: Environment, climate, natural resources, climate change, hazards on human development.

1.Introduction:

Climate change is the most significant challenge to achieving sustainable development, and it threatens to drag millions of people into grinding poverty. Ecology has been a tool for the survival of humans on Earth. An important part of Ecology in the modern world is Climate. Climate is the determinant of various aspects of human life, food, shelter, clothes, and various biological and genetic adaptations. Climate for a long has been influencing human development. The modern world today has altered various environmental paradigms including Climate which has pushed the Earth towards degradation. Human development can be understood as qualitative development of human life which includes various facets such as economic, social, psychological. It focuses upon improving the lives of the people in all dimensions rather than simply assuming that economic wellbeing determines the quality of life.

Nature and environment

Nature and environment provide essential goods and services for human development. Human well-being and quality of life depend crucially on the quantity and quality of food, water, energy and biodiversity available to man. Often there will be direct conflicts between human development and environment.

Malnutrition

Malnutrition, inadequate water supply and environmental pollution pose serious problems to human health. From an environmental perspective shortage of arable land and water stress are important drivers for food vulnerability. Unsafe drinking water and indoor air pollution are the most serious environmental culprits, in view of current loss of human health.

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2.Biodiversity

Biodiversity, crucial for delivering ecosystem services, is deteriorating at an unprecedented rate. Africa and Asia face the highest loss rates currently. The most important pressure factor is agricultural expansion. In the future, climate change could be a very important pressure on biodiversity as well. Further increasing protected areas, reducing land conversion by intensification of agriculture and putting a halt to piecemeal encroachment along roads may be helpful actions.

Agriculture

Agriculture puts an upward pressure on the demand for arable land. This demand may even further increase if the international market for biofuels further develops. Moving to more intense practices may offset, at least in part, the need for expansion of agricultural land. However, higher yields are often associated with higher emissions to air, water and soil. Increasing inputs of nutrients in agriculture results in eutrophication of inland water bodies and coastal waters poses risks to health and fresh water and marine ecosystems (algae blooms, "dead zones"). Good agricultural practices can limit these impacts.

Over fishing

Over fishing of the world's marine stocks has an important impact on ecosystems and biodiversity. A large coastal population depends on fisheries for food and employment. Reducing destructive fishing practices asks for reducing fishing effort, transforming market and governance. Solutions have to be location specific to the different marine ecosystems.

Water stress will increase substantially in large parts of the world with growing population and expanding economies. Climate change enhances this development even more in several already vulnerable regions (e.g. Africa and parts of Asia). Competition for water between users (including the natural environment) requires strong water management preferably at river basin level. Improving supply of safe water is on track in many developing regions, but some African and Asian countries lag behind. Promoting water supply and sanitation seems to be the most effective direct environmental measure to be taken to enhance human health.

Energy

Energy is crucial for poverty alleviation and economic development. Currently 1.6 billion people lack access to electricity and 2.4 billion rely on traditional biomass for heating and cooking. Conventional development in energy is not realizing the necessary improvements

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in access to energy and is expected to lead to a serious increase of urban and regional air pollution in developing countries, as well as to a further increase of greenhouse gas concentrations in the atmosphere.

3.Limiting the risks

Limiting the risks of climate change for sustainable development requires global greenhouse gas emissions to be significantly reduced during this century. This requires developed countries to strengthen their reduction efforts, but also contributions from developing countries, in particular the more advanced developing economies in Asia and Latin America. Including climate considerations into current development planning in these regions is important in view of the longevity of energy infrastructure.

4.Conclusions

Without a robust policy or implementation program, the balance between human development and environmental preservation is not possible. Owing to this realization and the fact that the problem of environmental degradation is a global phenomenon, governments of various countries have come together to prepare a road map where development has been transformed into the concept of sustainable development.

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Finding of weedicide residues in water samples by using carbon nano tubes paste electrodes.

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Abstract:

This investigation is to estimate amount of **weedicide** in water samples based on reduction behaviour of various electroactive groups by using adsorptive stripping voltammetry. Mean quantities for ten replicates founded by via carbon nano tubes paste electrodes as working electrodes. Statistical aspects such as standard deviation and correlation coefficient and in the entire conclusion in this effort all the probable errors are minimized and accurateness is maximized. Water samples of different regions are collected and investigated for weedicide remaining prior as well as latter the application of pesticide.

Key words: Weedicide, adsorptive stripping voltammetry, carbon nano tubes paste electrodes water samples.

1.Introduction

Moreover weedicides has vital role in destroying weeds which anticipate appreciable yields of food and related products if weedicide are not apply in proper way, they can influence human health or cause severe damage or death to the pesticide machinist, other inhabitants or domestic pets. Weedicide can also unswervingly have an effect on other non-target animals. For example, a former applying his garden to kill weeds will perhaps also kill risk-free ladybird beetles and praying mantises. If weedicides are employed incorrectly or applied wrongly, they may find their way into places where they are not wanted, for example, they might be washed into rivers or into the soil. Although there are several analytical methods are in force being the chosen method is less tedious and viable. In this article an eletro analytical method adsorptive stripping voltammetry [1-6] supported by statistical findings was applied.

2.Equipment and reagents

Findings conducted using a model meterohm Auto Lab 101 PG stat (Netherlands). CNTPE as working electrode for differential pulse adsorptive stripping voltammetry and cyclic voltammetry. pH measurements were carried out with an Eutech PC_510 cyber scan. Meltzer Toledo (Japan) Xp26 delta range micro balancer were used to weigh the samples during the preparation of standard solutions. All the experiments were performed at 25^0C.

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All reagents used are analytical reagent grade. Double distilled water was used throughout the analysis. In the present investigation universal buffers of pH 5.0 was used as supporting electrolytes and are prepared by using 0.2 M boric acid, 0.05M citric acid and 0.1Mtrisodium orthophosphate solutions.

3.Calculations

In this standard addition method, the voltammogram of the unknown is first recorded after which a known volume of standard solution of the same electro active species is added to the cell and second voltammogram is taken. From the magnitude of the peak height, the unknown concentration of species may be calculated using the following equations.

$$\text{C (un known)} = \frac{C_s \, x V}{V_t \, x i_2} \, x \, i_1$$

4.Findings and Analysis

Fine resolvable peak obtained for each sample is useful for the analysis of water samples. The optimum pH to get well defined peak for the detection is found to be 5.0. The peak current is found to vary linearly with the concentration of the pesticide over the range 1.03 x 10^{-5}M to 1.04x 10^{-9}M. The lower detection was limit found to be 1.02 x 10^{-9}M. The correlation coefficient and relative standard deviation (for 5 replicates) obtained using the above procedure.

Recovery experiments

A stock solution (1.0 x 10^{-3} M) of each sample is prepared in dimethyl formamide. In voltammetric cell, 1 mL of standard solution is taken and 9 mL of the supporting electrolyte (pH 4.0) is added to it. Then the solution is deaerated with nitrogen gas for 10 min. after obtaining the voltammogram, small additions of standard solution are added and the voltammograms are recorded under similar experimental conditions. The optimum conditions for analytical estimation at pH 5.0 are found to be pulse amplitude of 30 mV, applied potential of -0.45V and scan rate 40 mVs.$^{-1}$.

Water samples are collected from paddy fields which sprayed by the weedicides under investigation 48 hours after spraying the pesticides. These samples were filtered through a Whatman No.41 filter paper and Aliquots of water samples were taken in a 25mL graduated tube, to it buffer solution was added and analyzed as described above. The recoveries of samples obtained in water samples ranged from 95.00 to 97.00% and the results are summarized in Table 1.0.

Table 1.0: Recoveries of weedicide in water samples

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Name of the pesticide	Amount added (mg/L)	Amount found (mg/L)	*Recovery (%)	Standard deviation
1.2,4,D,ethyl ester	5.0	4.75	95.00	0.07
2.glyphosphate	5.0	4.85	97.00	0.05
3.Ammonium Salt Of Glyphosphate	5.0	4.82	96.40	0.16

5.Conclusions: In this attempt statistical parameters for the determination of pesticide residues satisfactory applied to interpret the instrumental out puts without considerable errors. And during the estimations pollution arises due to heavy metal electrodes such as mercury electrodes is avoided by using carbon electrodes nanotubes paste electrodes.

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Finding of cidal remaining in environmental matricies through electronalytical methods

- Thommandru Raveendranath Babu, Reader Department of Chemistry, DKW GDC for women, Nellore, A.P., India

Abstract

Trace quantities of cidal samples in environmental matricies by electro chemical technique adsorptive stripping voltammetry. Mean quantities for ten replicates founded by via carbon nano tubes paste electrodes as functioning electrodes. Statistical Accepts such as standard deviation, Relative Standard Deviation and correlation coefficient and in the entire Out Come in this effort all the probable errors are minimized and accurateness is maximized. Water samples of various areas are collected and investigated for pesticide residues before and after the submission of pesticides.

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Key words: *peaticide, adsorptive stripping voltammetry, carbon nano tubes paste electrodes ,water samples.*

1.Introduction: Despite the fact that pesticides are useful for the control of various pests, many of them are hazardous chemicals. They are perilous because they can poison the land, the water and the air. Some pesticides do not break down for a long time. These types of pesticides are often used when something must be protected from pest attack for a long period of time, for example, protecting houses from termite attack. Pesticides which remain in the soil or on the treated surface are also often called residual chemicals. When residual pesticides get into the environment they can remain poisonous and active for many years. If applied incorrectly or used in the wrong place, these chemicals may spread to other land areas and possibly to the water supply.

There are good reasons (advantages pesticides are very effective. This means that nearly all the target pests which come in contact with these pesticides are killed Results are quick. This means the pests are killed within a very short time. Using pesticides can be an economical (cheap) way of controlling pests. Pesticides can be applied quickly and there is not the high labour cost which might apply to other methods of control, such as removing weeds by hand. If pesticides are not used correctly, they can affect human health or cause serious injury or death to the pesticide operator, other people or household pets. Pesticides can also directly affect other non-target animals. For example, a gardener spraying his garden to kill caterpillars will probably also kill harmless lady bird beetles and praying mantises. If pesticides are used incorrectly or applied wrongly, they may find their way into places where they are not wanted, for example, they might be washed into rivers or into the soil. In this article an elstro analytical method voltammetry supported by statistical findings was applied.

2.Instruments and reagents: Electro analytical determinations conducted using a model meterohm Auto Lab 101 PG stat (Netherlands). CNTPE was used as working electrode for differential pulse adsorptive stripping voltammetry and cyclic voltammetry. pH measurements were carried out with an Eutech PC_510 cyber scan. Meltzer Toledo (Japan) Xp26 delta range micro balancer were used to weigh the samples during the preparation of standard solutions. All the experiments were performed at 25^0C.

All reagents used are analytical reagent grade. Double distilled water was used throughout the analysis. In the present investigation universal buffers of pH 4.5 was used as supporting electrolytes and are prepared by using 0.2 M boric acid, 0.05M citric acid and 0.1M trisodium orthophosphate solutions.

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3.Result and Discussions: Well resolvable and reproducible peak obtained for each sample is useful for the analysis of water samples. The optimum pH to get well defined peak for the detection is found to be 4.0. The peak current is found to vary linearly with the concentration of the pesticide over the range 1.01 x 10^{-5}M to 1.04 x 10^{-9}M. The lower detection was limit found to be 1.02 x 10^{-9}M. The correlation coefficient and relative standard deviation (for 10 replicates) obtained using the above procedure.

4.Recovery experiments

A stock solution (1.0 x 10^{-3} M) of each sample is prepared in dimethyl formamide. In voltametric cell, 1 mL of standard solution is taken and 9 mL of the supporting electrolyte (pH 4.0) is added to it. Then the solution is de aerated with nitrogen gas for 10 min. after obtaining the voltammogram, small additions of standard solution are added and the voltammograms are recorded under similar experimental conditions. The optimum conditions for analytical estimation at pH 4.0 are found to be pulse amplitude of 25 mV, applied potential of -0.35V and scan rate 40 mVs.$^{-1}$.

Water samples are collected from paddy fields which sprayed by the pesticides under investigation 72 hours after spraying the pesticides. These samples were filtered through a Whatman No.41 filter paper and Aliquots of water samples were taken in a 25mL graduated tube, to it buffer solution was added and analyzed as described above. The recoveries of samples obtained in water samples ranged from 75% to 80% and the results are summarized in Table 1.0.

Table 1.0: Recoveries of pesticides in water samples

Name of the pesticide	Amount added (mg/L)	Amount found (mg/L)	*Recovery (%)	Standard deviation
1.dinitramine	3.0	2.40	80.00	0.07
2.bromethaline	3.0	2.36	78.00	0.05
3.oxabetrinill	3.0	2.31	77.00	0.16
4.topramezone	3.0	2.25	75.00	0.06

5.Conclusions

In this approach we came to know that Cntpe are more comfortable for reduction process than metal electrodes such as DME and HMDE statistical parameters for the determination of pesticide residues satisfactory applied to interpret the instrumental out puts without considerable errors. And during the estimations pollution arises due to heavy metal electrodes such as mercury electrodes is avoided by using carbon electrodes.

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Impact of changing environmental conditions on Biodiversity of Pulicat lake.

B.Ratneswara Rao, Lecturer in Botany, Y.A. Govt. College for Women, Chirala, AP, India.

Abstract:

Pulicat Lake, saltwater lagoon on the Coromandel Coast of Andhra Pradesh. The lake is located on the swampy, sandy Andhra plains. The long and narrow Sriharikota Island, which separates Pulicat Lake from the Bay of Bengal. It is fed by the Araani River at the southern tip and the Kalangi River from the north west. Buckingham canal, a navigation channel, passes through the lagoon. The lagoon is a delicate system and requires constant inflow of seawater and gets adversely affected by sand deposition. Due to the closing of the mouth during the summer months, the tidal exchange between the lake and sea becomes affected. This changes the water quality of the lake ,especially its salinity, which causes major problems for the biodiversity of the lake. It also faces several anthropogenic, developmental, industrial and environmental issues threatening not only the livelihoods of fisher folk and also the very survival of this ancient lake itself. Major threat for Andhra Pradesh part of the lagoon is

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pollution from sewage, pesticides, industrial wastes from numerous fish processing units and oil spills from mechanized boats carries through Arani and Kalangi rivers. Climate change has its own specific impacts on the biodiversity.

Keywords: *Pulicat lake – Lagoon is a delicate system – requires constant water inflow – developmental, industrial and environmental issues – closure of mouth of the lagoon-effecting biodiversity.*

1.Introduction:

Pulicat Lake, saltwater lagoon on the Coromandel Coast of Andhra Pradesh state, southern India. the Pulicat Lake is the second largest brackish water lake in the country. The Pulicat Lake is situated between 13°25' and 13°55' North, and 80°3' and 80°19' East. It extends from the extreme south-eastern portion of Andhra Pradesh into the adjacent portion of Tamil Nadu state and has a length of about 30 miles (50 km) and a width of 3 to 10 miles (5 to 16 km). The lake is located on the swampy, sandy Andhra plains, and the surrounding area is sparsely settled. Towns along the lake include Dugarajupatnam and Pulicat. The lake yields salt and prawns. The long and narrow Sriharikota Island, which separates Pulicat Lake from the Bay of Bengal, is the site of Satish Dhawan Space Centre, India's satellite-launching facility. The only sea entrance into the lake is around the south end of the island, north of the town of Pulicat on the mainland.

Pulicat is an extensive brackish-to-saline lagoon with marshes and a brackish swamp on the north. It is fed by the Araani River at the southern tip and the Kalangi River from the north west. Buckingham canal, a navigation channel, passes through the lagoon. On the eastern boundary of this lagoon is Shriharikota island, which separates the lagoon from Bay of Bengal. The lagoon is shallow with large areas of mudflats and sandflats. In general, the seawater enters the lagoon through the northern end near Shriharikota Island and flows back into the Bay of Bengal through the southern end. The salinity is greatly affected by rains. There is a sand-bar formation at the north end where the lagoon is separated from the sea, and this has to be removed manually if the rains do not wash it away. The closure the of sand bar (either due to lack of rain or massive sand deposition) leads to depletion of fish stock, as the lagoon acts as nursery for the hatchlings. The lagoon is a delicate system and requires constant inflow of seawater and gets adversely affected by sand deposition.

2. Study Area: Pulicat Lake is located between the 13º26' and 13º43'N latitude and 80º03' and 80º18'E longitude. The dried parts of the lagoon extend up to 13º 60' N latitude. Pulicat Lagoon extends over the Ponneri and Gummudipundi taluks of Thiruvallur district in Tamil Nadu and Sulurpet and the Tada taluks(Revenue Division) of Nellore district in Andhra Pradesh. The lake is about 60km in length, with a width that varies from 0.2km to 17.5km.

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The lake is brackish to salty. The salinity values of the lake vary from zero during a monsoon to about 52 ppm during the post and pre–monsoon seasons. The area of the lake varies from 250-450 sq.km between low tide and high tide. The average depth of the water has decreased from 1.5m to about 1m. The three major primary inflows which feed the lagoon are the Arani River at the southern tip, the Kalangi River from the northwest, and the Swarnamukhi River at the northern end, in addition to some smaller streams. The tidal inlets that open into the lagoon are Tupillipalem, Rayadoravu and Pulicat. Irakkam, Venadu and several smaller islands are located inside the lake. Sriharikota, the village of Pulicat, Dugarajupatnam and Sullurpeta are the settlement areas located around the lake. The seawater enters the lake through the flood tide of the Bay of Bengal by two gateways, namely, Pamanjeri and Vepenjeri. The lake empties its water into the Bay of Bengal, through its mouths with each one on either side of a sand spit. The mouth is located in the southeastern corner of the lake. Due to the closing of the mouth during the summer months, the tidal exchange between the lake and sea becomes affected. This changes the water quality of the lake, especially its salinity, which causes major problems for the biodiversity of the lake.

3.Materials and Methods:

Study was undertaken in the Pulicat Lake and Bird Sanctuary and data of both flora and fauna collected by frequent visits. Photographs of both native and migratory birds were taken. Herbaria of various plants also collected for future reference. Herbaria-specimens are preserved at N.B.K.R. Medicinal Plant Research Centre, Vidyanagar, and Nellore District.

4.Biodiversity:

The lagoon is known to support 160 species of fish, 25 species of polycheates, 12 species of penaeid prawns, 29 species of crabs and 19 species of molluscs.1 It is also known to support rich growth of algae (especially filamentous algae) and high populations of invertebrate fauna, including annelids, coelenterates, mollusks, crustaceans and echinoderms.2 Pulicat is an important habitat for a wide variety of resident and migratory waterfowl, notably pelicans, herons, storks, flamingos, ducks, shorebirds, gulls, terns and many species of raptors. Pulicat is known to be the third most important wetland for migratory shorebirds along the eastern shore.

Avian Fauna: Pulicat Lake attracts 80-100 water birds belonging to 80 species (Jacebson and Sanjeeva Raj, 2009) every winter, some from Ladakh, Tibet and China. It is significant that the near threatened species like the spot billed pelican, Painted Stork, white Ibis, breed in the vicinity of the Pulicat Lake. The greater Flamingo about 15,000 of them spends the winter on this Lake. Eleven raptor species recorded on this Lake (Jacebson and Sanjeeva Raj, 2009). During Monsoon period, lake is filled by nutritious water and large numbers of both

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Phytoplankton and Zooplankton constitute essential food for invertebrates and fishes. This large amounts of food attracts numerous wet land birds especially Greater Flamingoes along with Pelicans, Kingfisher, Herons, Painted Storks, Spoon bills, Ducks, Black Drongo, Blue Jay, Common Teal, Coot, Cormorant little, Curlew, Dabchick, Egret large, Earget Little, Garganey, Little Stint, Open Billed Stork, Painted Stork, Pond Heron, Sand Piper, Shoveller, White Ibis, Herring Gull etc. The Concentration of Flamingoes depends on water level along with high algal, fish and benthic diversity. Kudiri, Moolah Kuppam, Annamalcheri are three important places large number of Flemingoes can be seen.Orienal White-backed Vulture (Gyps bengalensis) is the critically endangered species , Spot-billed Pelican (Pelecamusphilippensis) and Greater Spotted Eagle (Aquila clanga) are the Vulnerable species of Pulicat lake. In view of rich avifauna of the lagoon, two Bird Sancturies are established in the lagoon, one in each of the two states of Andhra Pradesh and Tamil Nadu. The Andhra Pradesh portion of Pulilcat Lake Bird Sanctuary established in September 1976 has an area of 172 km^2 (66 sq mi) in the Tada Taluk of Nellore District. The Tamil Nadu portion of Bird Sanctuary established in October 1980, has an area of 60 km^2 (23 sq mi) extending over the Ponneri and Gummidipundi taluks of ThiruvallurDistrict.s The checklist of Birds prepared by Wild Life Division of Andhra Pradesh has listed 115 species of both aquatic and terrestrial Birds in the Pulicat Bird Sanctuary.

Flora of the Lagoon: Salt Marshes are abundantly occupied by halophytic species like Aleuropouslagopoides, Etriplex repens, Cressacretica, Crotaleria retusa, Cyparushaspan, Fimbristylisferrugenea, Salichorniabrachiata, Sesuviumportulacastrum, suaedamonoica, suaedamonoicanudiflora and rare a few Macroptilumlathyroides plants were found along the road side in Pulicat lake. Halophila ovalis popularly called sea grass belong to the family Hydrochariticeae appear prominently all along the margins Buckingham canal. It grows above and below the ground level and provide a habitat for fish, shrimp and other aquatic species and also provide forage for waterfowl. Aquatic vegetation includes eight Cyanophyceae, seven Chlorophyceae and two Rhodophyceae. Invasive phytoplankton species of Spirulina major, Oscillatoria sps., Anabaena spp., Rhizosoleniacastracanei, Eucampiacornuta and Climacodiumfravenfeldianum in the plains on the periphery of the lake have been recorded. Common shrubs like Azimatetracantha, Cassia auriculata, Excoecariaagallocha, Gmelina asiatica, Jatropha gossypifolia, Lawsoniainermes, Maytenusemarginatus, Pandanus tectoreus, Salvodora persica, Zyziphusmauritiana etc., grow on the marzins of Marshes and along the canals. On the bunds of the canals trees like Azadirachta indica, Borassus flabellifer, Lepisanthustetraphylla, Sapindusemarginatus, Syziziumcumini, Thespesia populinea etc., appear here and there.Prosopis chilensis is the dominated exotic species invaded in many areas of other islands in the lake due to lack of protection. (Scott, 1989).Submerged macrophytes include species of Enteromorpha, Hypnea, Ulva, Halophila and Enhalus (Oswin, 1987). Brackish water is saltier than fresh water and

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less saltier than sea water. Hence it is biologically more productive than either freshwater or sea water. It shows very rich aquatic population diversity including free floating, submerged, suspended, marginal, amphibious plants along with halophytes and mangroves. But distribution of aquatic flora depends on environmental variables like COD, BOD, Nitrate ,phosphate and Potassium sediments of the lake. Region of pulicat lake includes salt marshes, canals and mangroves. Aquatic flora of the Lake exists in two forms namely microphytes and macrophytes which helps to maintain Biodiveristy of the Lake Basha et al., (2011). Common macrophytic plant species like Nymphea species., (Rooted floating) Lemna species., Azolla, Eichhornia, Pistia (Free floating, Hydrilla sp., Ceratophyllum sp., Chara sp., (submerged) and Cyperus sp., Typha sp., (Emergent) and Meremmia, Lippia, Phyla nodiflora, Oxalis, Hydrocotyl vulgaris are identified in and around the lake. Suaedanudiflora, suaedamonoica and rare a few Macroptilumlathyroides plants were found along the roadside in Pulicat Lake. Water hyacinth can remove 70%of the Lead from contaminated water within 24 hours and absorb Cadmium, Nickel, Chromium, Zinc, Copper, Iron and toxic substances such as pesticides. At two places that is near vapenjeri canal close to Chandrasikuppam, and Chengalpalem small mangrove pockets are located. Four species of mangroves belonging to four families are prominent over here. They include Aegicerascorniculatus of Myrsiraceae, Avicennia marina of Aviceiniaceae, Excoecariaagallocha of Euphorbiaceae and Lumintzeraracemosa of Combretaceae. They develop pneumatophores in response to oxygen deficient conditions. They are buffers between the land and the sea. They help in removing pollution, coastal erosion and protection from saline water intrusion and storms. The bio-diversity and food chains were prospers in Pulicat Lake during earlier days, perhaps due to the fertilizing of the waters by the mangrove leaves and due to the extra habitats that the mangrove root system and the trunks provided. If mangroves are restored to their original native soil of Pulicat Lake, the biodiversity and food chains may be promoted once again.

Threats to Pulicat Lagoon:

It also faces several anthropogenic, developmental, industrial and environmental issues threatening not only the livelihoods of fisher folk and also the very survival of this ancient lake itself. Major threat for Andhra Pradesh part of the lagoon is pollution from sewage, pesticides, industrial wastes from numerous fish processing units and oil spills from mechanized boats carries through Arani and Kalangi rivers draining into the lagoon. Marine chemicals and salt manufacturing industries and Shrimp farming on the eastern part of the lagoon affected the Pulicat Bird Sanctuary along with disturbing the livelihood of fishermen and agricultural workers. It has serious impact on aquaculture development. Major ecological threats to pulicat lagoon of Tamil Nadu part are Petrochemical complex, Power Plant and the Satellite port on Ennore Creek. Siltation and complete closure of Mouths at Tupilipalem and Rayadoruvu leads to fluctuation in salinity and water level of the lake. It has maximum effect on Biotic component of the ecosystem. The areas of Pulicat lake in Tamilnadu faces a greater

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threat than those of Andhra Pradesh. The 630 MW North Central Thermal power station (NCTPS), the Ennore satellite port project and a proposed Petro chemical park are major threats to the lake eco system. Thousands of acres of land have been cleared for three projects that will progressively damage the ecosystem stretching across 40 km from Ennore to Pulicat. NCTPS draws 44 lakh litres of fresh water from the Ennore creek, lets out hot coolant water in to the B. canal and discharges toxic fly ash in the form of slurry in to the lagoon. This has been resulted in increase of temperature 5 ^{0}C at the outlets. Despite precipitators and chemical filters the fly ash content toxic elements such as Arcinic, cadmium, Mercury, Lead, Manganese, Florene and Beryllium. In Athapattu village, 10km from NCTPS the concentration of salt pans has forced the people to give up their occupation. Fly ash is especially harmful as it can be inhaled and leads to permanent respiratory disorder, dermatitis, asthma, bronchitis and Cancer. The silica in fly ash could cause silicosis. The site of Ennore satellite port constructed brack water has caused the sea to ingress 50 m into the mainland that separates the Pulicat lagoon system and the sea. This has caused severe water erosion at Koraikuppam and eight other fishing hamlets. Pazhaberkade area which form an island with sea to its east and lagoon to the west. The Tamilnadu industrial development corporation(TIDCO) is acquiring 2900 ha for the proposed Rs. 600 million petro chemical industrial complex which may require 45 million litres of water per day, an amount that would seriously deplete coastal aquafers. Unethical practice of fishing through 'Padi-Valai', fishing net with very fine mesh has affected the aquatic resources. Edible oysters of the lagoon were lost now due to heavy siltation. This also causes rapid shrinking of water spread area of the lagoon.

Environmental Impacts and Climatic Change on Biodiversity of Pulicat Lake: Climate change has its own specific impacts on the biodiversity. These impacts were already felt, but rather sporadically, since the past 30 years. They have shown up through two major manifestations, through drought, and through cyclonic storms and floods. The water temperatures were uniformly high all over the lake 30^{0} c with incredibly high salinities of 70-80%. Sanjeev Raj (1985) described the impacts of Conclusion So far as the Pulicat Lake is concerned, management of the lake mouth is crucial for the health and prosperity of the eco-system. The wider and the deeper lake mouth is and the longer it opens into the sea, during the year, the more will be the vital inputs in the sea, like nutrients, oxygen, plankton and fish-seed, which are the very basis of life and food chains in this lake, Keeping the lake mouth open right round the year and opening of the extra mouth in the north, will surely enhance the productivity and food chains in the lake. Protection and conservation of Biodiversity is the urgent need of the hour in order to maintain the balance of nature and support the availability of natural resources for future generations Assessment of Biodiversity of a particular region is very important to formulate appropriate conservation strategies. Priority should be given to in-situ conservation by protecting the natural habitats. Each village

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panchayat of India should have the PBR (People's Biodiversity Register) according to the Biodiversity Act-002. PBR is record of traditional knowledge and practices of sustainable use of local bio-resources and conservation of biodiversity. They may form an appropriate instrument for designing conservation efforts. The plant species are chosen with the twin goal of raising the bio-shields and deriving livelihood to the local communities, creating awareness among local resident about the numerous benefits imparted by the coastal ecosystem on mankind. Along the beach line Casuarina is found to be quite ideal for plantation. In addition Anacardium occidentale is suitable species in preventing soil erosion.

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Impact of Environmental Changes on Mangroves

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Abstract:
Mangroves are large and extensive collections of medium height trees and shrubs that grow in saline coastal sediment areas in the tropics and subtropics. Mangroves grow at the

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intersection of oceans, freshwater, and land. They are the most productive and complex ecosystems on the planet, growing under environmental conditions that would kill ordinary plants very quickly. Mangrove forests support a wealth of life, from starfish to people, and are very important to the health of the planet.

Key words: Mangroves, saline coastal sediment areas, buffer zones

1.0 Introduction

Mangroves act as buffer zones between the land and sea, protect the land from erosion, provide a natural shield against cyclones, disasters and protect the shorelines, provide breeding and nursery grounds for a variety of marine animals, harbour a variety of lifeforms like invertebrates, fish, amphibians, reptiles, birds and mammals like tigers, provide a good source of timber, fuel and fodder, save the marine diversity, which is fast diminishing, purify the water by absorbing impurities and harmful heavy metals and help to clean the air by absorbing pollutants, provide a potential source for recreation and tourism.

2.0 Present focus

Mangrove forests cover just 0.1 per cent of the world's land area and just 15 countries account for more than 75 per cent of the total global mangrove forest area. India has a total mangrove cover of 4,975 sq km, which is 0.15 per cent of the country's total land area but amounts to 3 per cent of the global mangrove forest area and 8 per cent of Asia's mangrove forest area. Of this , about 60 per cent is located along the country's eastern coast, 27 per cent is located along the western coast, while the remaining 13 per cent is found in the Andaman and Nicobar Islands.

3.0Mangrove Cover in India

West Bengal has the largest mangrove forest and accounts for 42.45 per cent of the total mangroves cover, followed by Gujarat with 23.66 per cent. The mangrove forest cover of other maritime states is marginal compared to that of these two states. Daman and Diu, for instance, accounts for just 0.03 per cent (3 sq km), Puducherry 0.06 per cent (2 sq km), Goa 0.52 per cent (26 sq km), Kerala 0.20 per cent (9 sq km), Karnataka 0.205 per cent (10 sq km), and Tamil Nadu 0.09 per cent (45 sq km).

Within the states themselves, the density of mangrove forests is not uniform, as very dense mangrove comprises 1476 sq km (29.66%) of the mangrove cover and are limited to just three coastal states, namely, West Bengal (996 sq km), Andaman and Nicobar Islands (398 sq km) and Odisha (81 sq km). Globally mangroves are disappearing at a rate of 1 to 2 per cent per year, which is even faster than coral reefs and tropical rainforests. Since the 1950s, about 50 per cent of the mangroves biome has degraded due to inadequate protection and extensive alteration of their habitat. At the current rate, all the world's mangroves will be lost by the end of this century. India itself has lost as much as 40 per cent of its mangroves

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during the last century alone. India had a mangrove cover of about 6,749 sq km (the fourth largest mangrove area in the world), which dropped by nearly 59.18 sq km between 1972-75 and 1980-82, as per the 2019 report of the National Remote Sensing Agency, India.

4.0Analysis

Table 1: Mangrove Cover across India in 2019

Ser	State/UT	Very Dense	Moderately Dense	Open	Total (sq km)
1.	Andhra Pradesh	0.00	213.00	191.00	404.00
2.	Goa	0.00	20.00	6.00	26.00
3.	Gujarat	0.00	169.00	1,008.00	1,177.00
4.	Karnataka	0.00	2.00	8.00	10.00
5.	Kerala	0.00	5.00	4.00	9.00
6.	Maharashtra	0.00	88.00	232.00	320.00
7.	Odisha	81.00	94.00	76.00	251.00
8.	Tamil Nadu	1.00	27.00	17.00	45.00
9.	West Bengal	996.00	692.00	424.00	2,112.00
10.	A&N Islands	398.00	169.00	49.00	616.00
11.	Daman & Diu	0.00	0.00	3.00	3.00
12.	Puducherry	0.00	0.00	2.00	2.00
Total		**1,476.00**	**1,479.00**	**2,020.00**	**4,975.00**

Source: India State of Forest Report 2019

5.0 The effects of climate change on mangroves

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During the late 80s, India lost considerable areas of its mangrove cover to several anthropogenic pressures. The ongoing phenomenon of climate change has been predicted to pose a great threat to what's left of the Indian mangroves and other coastal ecosystems.

1. **Increased levels of Co_2:** Higher concentrations of Co_2 can be deleterious for several mangrove species leading to substantial changes in vegetation along salinity and aridity gradients. However, the actual impact of Co_2 on mangroves is poorly understood.
2. **Rising temperatures**: Higher temperatures are predicted to have an impact on the species, and sea level rise can strongly affect the mangrove forests. Mangrove plants need an ideal temperature for photosynthesis (28-32°C), which can significantly reduce when leaf temperatures reach high levels of 38-40°C, thereby affecting net productivity. It has been predicted that the mangroves could face species composition change as well as changes in the flowering and fruiting periods due to temperature changes. Continuous monitoring and detailed analysis indicate that the maximum temperature has been increasing during the last century over all the regions of India.
3. **Sea level rise**: This probably is the greatest threat facing coastal mangroves. Recent studies have shown that larger changes in sea level can lead to mangrove ecosystem collapse. sea-level rise is amongst the more critical of the various factors that contributes to the degradation of mangrove habitats. According to recent projections, global mean sea-level could rise by an estimated 0.61-1.1 metres by the year 2100, which would place most Indian coastal cities at high risk of complete submergence or, at the very least, of experiencing frequent inundation during high tide conditions. Changes in sea-level impact the structure, growth, and areal extent of the mangroves, while increase in temperature affects their density. Increased intensity of cyclones has also been found to damage the mangroves through defoliation, uprooting of trees and death of trees. In addition to tree mortality, the nature of soil sediments also gets modified. It can also lead to ecosystem conversion. Studies also show that cleared mangrove forests fail to recover due to changed hydrodynamics, salinity and acidity as well as low nutrient levels and poor essential substrates.
4. **Storms and Cyclones**: Besides sea-level rise, storms and tropical cyclones also have significant impacts on the coast, directly through damage caused by extreme winds, and indirectly through storm surges and high tides. For instance, following the *tsunami* that occurred in the Indian Ocean in 2004, it was reported that around 62-70 per cent of the mangrove forest in the Nicobar Islands was damaged and uprooted, and Pichavaram mangroves suffered 5–10 per cent damage.
5. **Reduced rainfall:** It has been predicted that poor rainfall and increased evaporation can lead to rise in the salinity of mangroves leading to decreased productivity, poor

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seedling and growth survival. It can also lead to the decreased diversity of mangrove zones and may also cause reduction in mangrove area by altering competition of existing species.

6. **Anthropogenic Activities:** Another major cause for impairment of mangrove forests in India is due to anthropogenic activities such as conversion of mangrove habitats into agricultural land or for the promotion of aquaculture, tourism, and urban development in general. A majority of India's coastal communities are dependent on agriculture for their livelihood. It has been recorded that over the past 100 years, about 1,50,000 hectares of mangroves have been destroyed in India and Bangladesh in order to make land available for agricultural purposes. Further, Indian coastal cities are experiencing rapid urbanisation and the concomitant development of urban infrastructure, whereby the majority of mangrove forest in Indian coastlines have been lost to land-reclamation and other supposedly 'developmental' projects.

6.0 Conclusion:

Extreme climate change is a looming danger for the entire mangrove ecosystem. Since degradation of mangrove ecosystem is caused by a wide range of factors, which cannot be treated in isolation, it is necessary to adopt an integrated management approach by taking into consideration all the factors such as sea-level rise, extreme weather, and human exploitation, and involve all the stakeholders to protect and conserve mangroves.

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Implications of Climate Change on Biodiversity and Ecosystem

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Abstract

On all scalar levels, from local to global, the environment of the Earth is changing, mostly as a result of human activity. The stratospheric ozone layer has been compromised, the climate is warming faster than it has in the past 10,000 years, biodiversity is disappearing at an unprecedented rate, fisheries are declining in the majority of the world's oceans, air pollution is becoming an increasingly serious issue in and around many major cities, large populations of people live in areas with water scarcity or stress, and vast tracts of land are being degraded. This environmental degradation, which already undermines efforts to fight poverty and promote sustainable development, is largely the result of the unsustainable production and consumption of energy, water, food, and other biological resources. To make matters worse, the projected changes in the environment for the future are likely to have even worse repercussions.

Key words: environment, degradation, biological resources

1.Introduction

There is no doubt that the composition of the atmosphere and the Earth's climate has changed since the industrial revolution predominantly due to human activities, and it is inevitable that if those activities do not shift markedly, these changes will continue regionally and globally. The primary sources of the nearly 30% increase in atmospheric carbon dioxide from the pre-industrial era are the burning of fossil fuels and deforestation. Since the beginning of the industrial period, the average global surface temperature, which had been relatively steady for more than 1000 years, has already increased by around 0.75°C, and additional warming of between 0.5°C and 1.0°C is unavoidable due to historical emissions. Between 2000 and 2100, it is predicted to warm an additional 1.2–6.4oC, with terrestrial areas notably warming faster than oceans and the Arctic warming faster than the tropics.

Precipitation is likely to increase at high and middle latitudes and in the tropics but is likely to decrease in the subtropical continents. At the same time, evaporation increases at all latitudes. Over continents, water is likely to be more plentiful in those regions of the world that are already water-rich, increasing the rate of river discharge and the frequency of floods. On the other hand, water stress will increase in the sub-tropics and other water-poor regions and seasons that are already relatively dry, increasing the frequency of drought. Therefore, it is quite likely that global warming magnifies the existing contrast between the water-rich and water-poor regions of the world. Observations suggest that the frequencies of both floods and droughts have been increasing as predicted by the climate models.

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The Earth's climate is projected to change at a faster rate than during the past century. This will likely adversely affect freshwater, food and fibre, natural ecosystems, coastal systems and low-lying areas, human health and social systems. The effects of climate change will probably be widespread, primarily negative, and affect a wide range of industries. For example, throughout the world, biodiversity at the genetic, species and landscape levels is being lost, and ecosystems and their services are being degraded. Although climate change has been a relatively minor cause of the observed loss of biodiversity and degradation of ecosystems, it is projected to be a major threat in the coming decades.

2.Impact on Biodiversity, Ecosystems and their Services:

Biodiversity – the variety of genes, populations, species, communities, ecosystems, and ecological processes that makeup life on Earth – underpins ecosystem services, sustains humanity, is foundational to the resilience of life on Earth, and is integral to the fabric of all the world's cultures. Biodiversity provides a variety of ecosystem services that humankind relies on, including provisioning (e.g. food, fresh water, wood and fibre, and fuel); regulating (e.g. of climate, flood, diseases); cultural (e.g. aesthetic, spiritual, educational, and recreational), and supporting (e.g. nutrient cycling, soil formation, and primary production). These ecosystem services contribute to human well-being, including our security, health, social relations, and freedom of choice and action, yet they are fragile and being diminished across the globe.

Ecosystem services are ubiquitous, benefiting people in a variety of socioeconomic conditions, across virtually every economic sector, and over a range of spatial scales, now and in the future. The benefits that ecosystems contribute to human well-being have historically been provided free of charge, and demand for them is increasing. Although the global economic value of ecosystem services may be difficult to measure, it almost certainly rivals or exceeds the aggregate global gross domestic product, and ecosystem benefits frequently outweigh the costs of their conservation. Yet environmental benefits are seldom considered in conventional economic decision-making, and costs and benefits often don't accrue to the same community or at the same time or place.

3.The value of ecosystem

The value of these ecosystem services is being increasingly appreciated by a very large sector of society - extending from local stakeholders, the business community, agriculture, conservation, and governmental policymakers, including development agencies. Their economic value is enormous and a fundamental element of green economic development. However, we are degrading these services and squandering our natural capital for short-term gains. Two-thirds of ecosystem services are currently being degraded globally, which will soon amount to an estimated loss of $500 billion annually in benefits. Green

economic development will require technology development and technology transfer in order to increase value-added from biological resources, especially in developing countries. This would help shift from the exploitative resource method of conventional development to the resource enrichment method of sustainable development.

4.Approaches to Conserve and Sustainably Use Biodiversity:

We must take immediate action to halt climate change, stop biodiversity loss, and prepare for already-predetermined developments. Transitioning to a more sustainable future will require simultaneously redesigning the economic system, a technological revolution, and, above all, behavioural change. To lower the risks of climate change to acceptable levels, the world must reduce absolute emissions levels by at least a factor of 2.5 by 2050, which requires a reduction in emission per unit of output by around a factor of 8 if the world economy is three times larger in 2050 than today. Undoubtedly, we need another industrial revolution. Since significant climatic changes are inevitable, we must both mitigate climate change and be ready to adapt. In urban planning and irrigation, for example, development, mitigation, and adaptation are all linked.

The time has come to move more quickly. The financial and economic crises of the past few years have increased the likelihood of a protracted slowdown in the global economy. The only solid foundation for a recovery that is sustainable is low-carbon growth. High-carbon growth is unsustainable and would seriously endanger humankind's future.

To simultaneously provide significant advantages for various economic, environmental, and social goals is difficult. This synergy is advantageous and important, given that measures which lead to local and national benefits, e.g. improved local and immediate health and environment conditions, and support the local economy may be more easily adopted than measures mainly serving global and long-term goals, such as climate protection. An approach that emphasizes the local benefits of improved end-use efficiency and increased use of renewable energy would also help address global concerns.

The loss of biodiversity

The loss of biodiversity and degradation of ecosystem services can be stopped and reversed by concerted planning based on adequate data, a well-managed protected areas network, enhancement of the conservation value of agricultural areas supported by the new science of countryside biogeography, use of InVEST and other new tools for mapping and evaluating the services, and transformational shifts in the public and private sector that value the role of natural capital in economic development. The Convention on Biological Diversity (CBD) is the international umbrella for biodiversity, and its 2020 regional and global targets for protecting biodiversity, particularly targets on protected areas and preventing extinctions, are critically important.

Biodiversity and natural ecosystems are foundational to solving the climate crisis, as conservation can slow climate change, increase the adaptive capacity of both people and ecosystems, save lives and sustain livelihoods in myriad ways as Earth's climate changes.

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Tropical forests, coastal marine habitats, and other ecosystems play major roles in global biogeochemical cycles and are thus essential to mitigation. They are also widely available and, via protection and restoration, can be deployed immediately to reduce atmospheric greenhouse gas concentrations without waiting for new technology. An effective mechanism for Reducing Emissions from Deforestation and forest Degradation (REDD+) must be implemented and financed to support countries in either reducing deforestation or, for some countries, maintaining already low deforestation rates.

A great advantage of ecosystems as a climate solution is that they play many roles at once. Beyond mitigation, the climate adaptation services provided by healthy, diverse ecosystems will become ever more important in the face of climate change since they can help deal with impacts such as changing freshwater flows, rising sea levels, and shifts in disease-carrying organisms and other pests. Mangroves, for example, store carbon, support fisheries, harbour diverse species and can reduce storm impacts. Ecosystems also support human livelihoods by providing income and food alternatives that will be important where climate change disrupts current sources. Such diversification is helpful for all, but particularly the most vulnerable communities and countries, those with the least capacity to cope with climate change.

Climate mitigation and adaptation, for both nature and people, can no longer be thought of as separate problems, for they will not be solved in isolation. If human adaptation to climate change compromises forests or other ecosystems, this loss will speed up climate change. If mitigation of climate change is sought, for example, via reforestation using single-species stands rather than ensembles of native species, this will reduce biodiversity. These losses will increase the need for adaptation even as our capacity to accommodate it diminishes. An integrated approach makes this cycle virtuous: by conserving biodiversity, we decelerate climate change while increasing the adaptive capacity of people and ecosystems alike.A comprehensive, integrated ecosystem approach is a powerful ―tool‖ for identifying, analyzing and resolving complicated environmental problems, rather than the piecemeal approaches to multifaceted environmental problems that don't work. The inclusiveness of the ecosystem approach gives a powerful frame for identifying new environmental problems or reshaping existing ones and then tackling their complexity, especially when ecosystem processes are coupled with social and economic considerations.

5.Conclusion :

Climate change and loss of biodiversity undermine sustainable development. However, there is no dichotomy between economic progress and protecting our environment by limiting climate change and loss of biodiversity. Indeed, the cost to mitigate climate change is less than the cost of inaction if one takes the ethical position of not discounting future generations, and delaying action can significantly increase costs. Efficient resource use saves money for businesses and households. Ecosystem service valuation and market development can open up new business prospects. A green economy will be a source of future

employment and innovation. Governments, the private sector, and voluntary and civil society at large all have key roles to play in the transition to a low-carbon economy, adaptation to climate change and more sustainable use of ecosystems.Given the socioeconomic system's inertia and the fact that the negative effects of climate change and biodiversity loss cannot be reversed for generations or are irreversible, the time to act is now if we are to realise our dream. Acting now will protect current and future generations from poverty.

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Insights on the Global Marketing of Agrochemicals

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Abstract

Our Global Agrochemicals Market report provides deep insight into the current and future state of the Agrochemicals market across various regions. The report examines the market drivers and restraints that are influencing the growth in detail. The study also covers agrochemicals market size, CAGR, emerging market trends, market dynamics, developments, opportunities, and challenges in the industry.

Key words: *Agrochemicals, market trends, market dynamics*

1.Introduction

India is the second most populated country and accounts for 17% of the world's population. An increasing population, need for food security, and high emphasis on achieving food grain self-sufficiency is expected to drive the demand for the agrochemicals market for crop protection in the country. The agrochemical market in India is growing at a rapid pace due to the increasing production of crops for bio-fuel. Farmers are shifting to newer crops that need less water, have higher yields, and are more profitable. This shift has led to an increased need for stronger pesticides and herbicides, which is driving the growth of the agrochemical market.

Intensification leads to high inputs of nutrients in the form of agrochemicals which leads to its higher production and supply. Food safety and self-sufficiency is an important factor for a country's growth and progress, to achieve this target most of the countries heavily rely on multiple agrochemicals. North America is expected to be the most dominant region in the global market due to the availability of extensive agricultural land, technological advancements, high research and development in the field of agrochemical. In Europe, agricultural land plays a vital role in land use patterns across the region.

2.Agrochemicals

Nitrogen is an essential nutrient for plant growth. Nitrogen fertilizer plays a critical role in ensuring crop yield increase and food security. Yearly, more than 200 million tons of fertilizers are applied to crops, helping them grow stronger and better.

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Nitrogen fertilizers are majorly derived from synthesized ammonia. World fertilizer consumption is growing continuously with the global use of nitrogen fertilizer increasing by around 1.5%. East and South Asia combined use more than 60% of all nitrogen fertilizers. China is the largest consumer and manufacturer of nitrogen fertilizers in the world. From 2000 through 2017 the efficiency of nitrogen fertilizer use in China increased from 27% to 38% with 8% of the total arable land in the world . Nitrogen fertilizers, including ammonium and urea-based fertilizers, account for 70% of total fertilizer use in the European Union (EU). Urea is the most important nitrogenous fertilizers in the market, with the highest nitrogen content of about 46%. The global consumption of urea is approximately 180 million tons a year, of which around 80% is used as fertilizers.

3.Global Agrochemicals Market

Based on geography, the global agrochemicals market is segmented into North America, Europe, Asia-Pacific, South America, and Middle East & Africa. Asia Pacific region is expected to continue to dominate the market in the forecast period. Countries like China, India, Japan, and Australia in the region are promoting agrochemical use to enhance overall crop production and yield. There is a need for the countries to become food independent, which is going to drive the market in the foreseeable future.

North America has different pesticide regulatory systems designed to protect humans and the environment. The United States is one of the largest agricultural producers and users of agricultural pesticides globally. The country has distinct pesticide regulatory systems designed to protect humans and the environment. In the US, pesticide regulation is mostly overseen by the US EPA which regulates and enforces pesticide actions under the Federal Food, Drug, and Cosmetic Act (FFDCA). Corn and soybean production in the country has increased rapidly due to enhancement in farming technology, heightened demand, and the development of genetically engineered varieties.

4.Post Covid

The demand for agrochemicals has been hit severely after the outbreak of the COVID-19 Pandemic. The supply chain has been affected by the imposed lockdowns, majorly in the first two quarters of 2020. However, this decline in prices is likely to recover with the resumption of trade and the partial functioning of manufacturing facilities worldwide. COVID-19 has disrupted activities in agriculture and supply chains. Also, the non-availability of migrant labor across the globe had interrupted harvesting activities, and mainly in APAC, where wheat and pulses are being harvested. There were disruptions in supply chains because of transportation problems and other issues due to the lockdowns. Prices have declined for

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wheat, vegetables, and other crops, but the consumers are still paying more. The COVID-19 pandemic has led to the continuous rising of hunger or undernourishment. According to the United Nations estimates, as many as 132 million are likely to go hungry in 2020 due to the economic depression set off by the pandemic. This number would be in addition to the 690 million people that are currently going hungry now. Along with this, an estimated 135 million people suffer from acute food insecurity and are in need of urgent humanitarian assistance. An estimated -3.3% to -4.3% contraction in world GDP in 2020, which was far worse than during the 2008-2009 world financial crisis. The decline of the global agricultural sector has also led to the decline in demand for agrochemicals across the globe. Due to the COVID-19 Impact, there has been an increasing trend towards sustainable and environmentally viable solutions such as biologicals. The pandemic had a short-term impact on the market growth. Still, it is likely to boost the investment mainly in biologicals such as insecticides, fungicides, herbicides, and many more as a part of a broader shift to interest in food security and sustainable crop production and ensuring a more robust supply chains.

5.Conclusion

This report helps to Gain a deeper understanding of the impact of coronavirus on the agrochemicals market. Equip yourself with rigorous analysis and forward-looking insight into the agrochemicals market across various regions. Gain a deeper understanding of the impact of COVID-19 on the hydrogen peroxide market. Evaluate the attractiveness and state of competition in the industry to identify opportunities and develop a strategy. Gain an understanding of uncertainty and discover how the most influential growth drivers and restraints in the regions will impact market development. Assess market data and forecasts to understand how the demand for agrochemicals evolve over the next five years across various regions.

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Investigation of persistence of fungicide in soil samples

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Abstract

This approach is to estimate amount of fungicide in soil samples based on reduction behaviour of various electroactive groups by using adsorptive stripping voltammetry. Mean quantities for ten replicates founded by via multiwall carbon nanotubes paste electrodes as working electrodes. Statistical aspects such as standard deviation and correlation coefficient. In this effort all the probable errors are minimized and accurateness is maximized. Soil samples of different regions are collected and investigated for fungicide remaining pre as well as post appliance of fungicide.

***Key words**: Fungicides, Adsorptive Stripping Voltammetry, Multiwall Carbon Nanotubes Paste Electrodes, Soil Samples*

1.Introduction

Importance of pesticides not ignorable in agricultural yields if pesticides are used incorrectly or applied wrongly, they may find their way into places where they are not wanted, for example, they might be washed into rivers or into the soil. In this article an elstroanalytical method voltammetry supported by statistical findings was applied.

Many modern analytical methods are widely employed for determining active ingredient in formulations, and minute quantities of pesticide residues in various environmental samples. Although each pesticide requires a specific procedure, the following techniques are widely used for the detection and determination of fungicides individually or sometimes combinedly. These techniques are:

1. Spectrophotometry

2. Fluorescence spectrophotometry

3. Chromatography

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4. Radiochemical Methods

5. Electrochemical Methods

Being electro analytical techniques are selective and sensitive we adopted this method of analysis in this investigation.

2.Apparatus and Chemicals: Investigation conducted using a model meterohm Auto Lab 101 PG stat (Netherlands) (fig 1.0). Multiwall carbon nanotubes paste electrodes used as working electrode for differential pulse adsorptive stripping voltammetry and cyclic voltammetry. pH measurements were carried out with an Eutech PC_510 cyber scan. Meltzer Toledo (Japan) Xp26 delta range micro balancer were used to weigh the samples during the preparation of standard solutions. All the experiments were performed at 25^0C.

All reagents used are analytical reagent grade. Double distilled water was used throughout the analysis. In the present investigation universal buffers of pH 4.0 was used as supporting electrolytes and are prepared by using 0.2 M boric acid, 0.05M citric acid and 0.1Mtrisodium orthophosphate solutions.

Fig 1.0: Meterohm Auto Lab 101 PG stat (Netherlands)

3.Results and Analysis

Sensitive and resolvable peak obtained for each sample is useful for the analysis of water samples. The optimum pH to get well defined peak for the detection is found to be 4.0. The peak current is found to vary linearly with the concentration of the pesticide over the range 1.02×10^{-5}M to 1.06×10^{-9}M. The lower detection was limit found to be 1.02×10^{-9}M. The correlation coefficient and relative standard deviation (for 10 replicates) obtained using the above procedure.

4.Recovery Experiments

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A stock solution (1.0 x 10^{-3} M) of each sample is prepared in dimethyl formamide. In voltametric cell, 1 mL of standard solution is taken and 9 mL of the supporting electrolyte (pH 4.0) is added to it. Then the solution is reaerated with nitrogen gas for 10 min. after obtaining the voltammogram, small additions of standard solution are added and the voltammograms are recorded under similar experimental conditions. The optimum conditions for analytical estimation at pH 4.5 are found to be pulse amplitude of 25 mV, applied potential of -0.35V and scan rate 40 $mVs.^{-1}$.

Soil samples are collected from fields which sprayed by the pesticides under investigation 48 hours after spraying the fungicide. These samples were filtered through a Whatman No.41 filter paper and Aliquots of water samples were taken in a 25mL graduated tube, to it buffer solution was added and analyzed as described above. The recoveries of samples obtained in water samples ranged from 51.00 to 57.00% and the results are summarized in Table 1.0.

Table 1.0: Recoveries of fungicides in soil samples.

Name of the pesticide	Amount added (mg/L)	Amount found (mg/L)	*Recovery (%)	Standard deviation
1.mencozeb	4.0	2.15	53.75	0.07
2.meneb	4.0	2.36	59.00	0.05
3.nabam	4.0	2.31	57.75	0.16
4.zineb	4.0	2.25	56.25	0.06

5.Conclusions

From the results, it is concluded that sample of fungicides are found to exhibit a single well resolved wave / peak in the buffer systems studied (pH 4.50) owing to the reduction of electroactive group. It can be seen from the above-mentioned results and findings that modern electro analytical methods may even today play a very useful role in the field of monitoring the persistence of various fungicides having different electro active groups in environmental samples.

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Key Dates in Environmental History

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Abstract

This is a review article that reveals the development of environmental accepts, and year wise Events that taken place which led to the development of environmental science which is help full to alert the people of different countries regarding the threatens to the environment due to human activities and the resolutions to be taken towards to protect the globe.
Key wards: *Year wise Events, environmental science, threatens.*

1. Introduction

The environmental history of this century charts the course that humanity has taken in putting ourselves increasingly in conflict with our planet's habitat requirements, environmental structures, and climate patterns that have given sustenance, nurture, and indeed, given evolutionary form and biological structure to the wide diversity of animal and plant species and whole ecosystems.

2. Key Dates in last two decades

- 2000 - The population of the U.S. exceeds 281 million. Seventy-five percent of Americans live in and around cities, up from 20 percent at the time of the Civil War.
- 2001 - President Bush rejects the Kyoto Protocol as "fatally flawed in fundamental ways". 2002 - The USDA creates the National Organic Program, regulating organic food production.
- 2003 - The Bush administration wins a court victory on mountaintop removal mining that allows "spoils" to be dumped into streams.

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- 2004 - Russia ratifies the Kyoto Protocol, putting it into effect without U.S. approval. Wangari Maathai wins the Nobel Prize.
- 2005 - Hurricane Katrina devastates New Orleans and the Gulf Coast in August, heightening anxieties about global warming, a possible intensifier of the region's weather patterns.
- 2006 - The documentary film *An Inconvenient Truth*, featuring Al Gore giving a PowerPoint on the dangers of global warming, plays a transformative role in bringing back the issue of climate change.
- 2007 - After years of recovery, the bald eagle is removed from the list of threatened species. Melting across the Arctic takes off at a gallop; in September, satellite imagery reveals that the Northwest Passage is free of ice and fully navigable.
- 2008 - The polar bear is listed as a threatened species.
- 2009 - In President Obama's first year, auto mileage standards are raised 10 mpg to 35.5 mpg; EPA rules six greenhouse gases are a danger to the public and should be regulated; and the largest wilderness bill in 15 years sets aside 2 million acres.
- 2010 - On March 31, President Obama proposes an Offshore Drilling Plan which will open vast expanses along the Atlantic Ocean, Gulf of Mexico and north coast of Alaska. Less than three weeks later, disaster strikes: BP's Macondo oil well, being drilled by the Deepwater Horizon, explodes.
- 2011 - In Japan, following an earthquake and tsunami, the Fukushima nuclear power complex suffers reactor meltdown, explosions and fires ignited by fuel rods.
- 2013 - 350.org and the Sierra Club launch the year with the biggest climate action rally yet. Carbon trading begins in California.

3. Key resolutions

- In 2000 Toyota introduces a hybrid gasoline-electric auto, the Prius, which becomes a bestseller.
- In 2001 After secret meetings with industry leaders, Vice President Cheney announces a National Energy Policy emphasizing oil exploration and new coal and nuclear power plants.
- In 2002The German government announces plans for a massive increase in wind generation capacity over the next 25 years.
- In 2003 Bush proposes "Clear Skies" legislation to weaken targets for pollutants from power plants.

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- In 2004The National Wetlands Inventory reports that, since 1998, the U.S. has seen a small net gain in wetlands acreage: restoration programs and land set-asides have balanced ongoing losses from development.

- In 2006The state of California passes the Global Warming Solutions Act, mandating a reduction in greenhouse gases to 1990 levels by the year 2020.

- In 2008The Center for Biological Diversity pioneers use of the Endangered Species Act to address global warming.

- In 2009The G-8 industrial nations agree to cut greenhouse gas emissions 80 percent by 2050, a prelude to COP15. But in Copenhagen, climate negotiations collapse.

- In 2011 Germany decides to phase out nuclear power.

- In 2013Nuclear power plants begin to close around the U.S.: Crystal River in Florida, declared "inoperable"; San Onofre, due to "expensive repair bills"; Kewaunee in Wisconsin; and Zion near Chicago.

4. Conclusion

We should also examine human-nature interactions that proved sustainable, and that might show us a way to live with and off nature past our own lifetimes. We should investigate the entangled dynamics of cultural and environmental processes over time.

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OPTIMIZATION OF SOIL HEALTH

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Abstract:
Soil conservation is the application of operations, practices, and treatments to protect soil and enhance its performance (such as soil fertility or soil mechanics). It includes soil conservation, soil amendment, and optimal soil health. In agriculture, some amount of soil management is needed both in nonorganic and organic types to prevent agricultural land from becoming poorly productive over decades. Organic farming in particular emphasizes optimal soil management, because it uses soil health as the exclusive or nearly exclusive source of its fertilization and pest control.

Key words: agricultural land, soil fertility, pest control.

1. Introduction

Soil management is an important tool for addressing climate change by increasing soil carbon and as well as addressing other major environmental issues associated with modern industrial agriculture practices. Project Drawdown highlights three major soil management practices as actionable steps for climate change mitigation: improved nutrient management, conservation agriculture (including No-till agriculture), and use of regenerative agriculture.

2. Effect on ecosystem

According to the EPA, agricultural soil management practices can lead to production and emission of nitrous oxide (N_2O), a major greenhouse gas and air pollutant. Activities that can contribute to N_2O emissions include fertilizer usage, irrigation and tillage. The management of soils accounts for over half of the emissions from the Agriculture sector. Cattle livestock account for one third of emissions, through methane emissions. Manure management and rice cultivation also produce emissions. Using biochar may decrease N_2O emissions from soils by an average of 54%. the usage of artificial fertilizer in the agricultural field it leads to nutrition imbalance in the soil.

Soils can sequester carbon dioxide (CO_2) from the atmosphere, primarily by storing carbon as soil organic carbon (SOC) through the process of photosynthesis. CO_2 can also be stored as inorganic carbon but this is less common. Converting natural land to agricultural land releases carbon back into the atmosphere. The amount of carbon a soil can sequester depends on the climate and current and historical land-use and management.[6] Cropland has the potential to sequester 0.5–1.2 Pg C/year and grazing and pasture land could sequester 0.3–

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0.7 Pg C/year. Agricultural practices that sequester carbon can help mitigate climate change. Intensive farming deteriorates the functionality of soils.

Methods that significantly enhance carbon sequestration in soil include no-till farming, residue mulching, cover cropping, and crop rotation, all of which are more widely used in organic farming than in conventional farming. Because only 5% of US farmland currently uses no-till and residue mulching, there is a large potential for carbon sequestration. Similar practices such as arable land conversion to grasslands, crop residues and cover crops have been proposed in Europe.

3. Efforts

Conventional agriculture is driven by industrialization and aims to maximize efficiency. Practices include large-scale farming that specializes in monoculture and uses pesticides, herbicides, and fertilizers. Alternatives include conservation, regenerative, and organic agriculture, which can be broadly grouped as sustainable agriculture. Conservation agriculture has three main practices: minimizing soil disturbance, maintaining permanent soil coverage, and diversifying crop species. Similarly, regenerative agriculture practices use minimal to no tillage, cover crops, crop rotations, compost, and grazing. Organic agriculture incorporates most of these practices and emphasizes biological, not synthetic, management. There are three overarching practices that improve carbon sequestration in soils: increasing biomass inputs, decreasing SOC losses, and increasing the mean residence time (MRT) of SOC.

4. Conclusion

Controlling traffic on the soil surface helps to reduce soil compaction, which can reduce aeration and water infiltration. Planting cover crops that keep the soil anchored and covered in off-seasons so that the soil is not eroded by wind and rain. Crop rotations for row crops alternate high-residue crops with lower-residue crops to increase the amount of plant material left on the surface of the soil during the year to protect the soil from erosion. Nutrient management can help to improve the fertility of the soil and the amount of organic matter content, which improves soil structure and function. Tilling the soil, or tillage, is the breaking of soil, such as with a plough or harrow, to prepare the soil for new seeds. Tillage systems vary in intensity and disturbance. Conventional tillage is the most intense tillage system and disturbs the deepest level of soils. At least 30% of plant residue remains on the soil surface in conservation tillage.[19][20] Reduced-tillage or no-till operations limit the amount of soil disturbance while cultivating a new crop, and help to maintain plant residues on the surface of the soil for erosion protection and water retention. Adding organic matter to the soil surface can increase carbon in the soil and the abundance and diversity of microbial organisms in the soil.

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Reduction behaviors of residual rodentiscides on the surface of carbon nano tubes paste electrode.

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Abstract

In this paper, a sensitive differential pulse voltametric method to determine the residues of rodenticides. In water samples at CNTPE were reported. The significance of CNTPE is to result in low detection limits, high sensitivities, reduction of over-potentials, high mechanical strength and high conductivity and resistance to surface fouling. The universal buffer with pH range 2.0–6.0 is used as supporting electrolyte. Cyclic voltammetry employed to evaluate electrode mechanism and number of electrons involved in reduction process were found out by using Millicoulometry and the product collected by applying Controlled potential electrolysis. Experimental conditions such as accumulation potential, accumulation time and scan rate were optimized. Calculations were made by standard addition method.

Key Words: *Differential Pulse Voltammetric Method, Rodenticides. Water samples ,CNTPE*.

1.Introduction:

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Bromethalin[trifluoro-N-methyl-4,6-dinitro- N-(2,4,6-tribromophenyl)-o-toluidine] is a new commercial dinitroaniline rodenticide for the control of comensalrodents. Current methods for the analysis of pesticides containing nitro group compounds involve either liquid ñ liquid extraction, solid-phase extraction (SPE) [1]1or supercritical fluid extraction (SCFE) and solid phase micro extraction (SPME) [2]. The main disadvantages of these methods were use of large quantities are often toxic and not eco-friendly solvents, the elaborate cleaning up time-consuming procedures and the need for concentration of analytes before analysis [3, 4, 5].reported high performance liquid chromatography with UV-VIS spectrometric and HPLC negative-ion Atmospheric pressure chemical ionization (APCI)-Masss pectrometric approches which commonly used for detection and confirmation of bromethalin, reported TLC extended by GC/MS to determine bromethaline in environmental samples, employed GC-MS method for determination of bromethalinin dimethilated form.

2.Apparatus And Reagents

Voltammetric determinations were performed using a model meterohm Auto Lab 101 PG stat (Netherlands). CNTPE was used as working electrode for differential pulse adsorptive stripping voltammery and cyclic voltammetry. pH measurements were carried out with an Eutech PC_510 cyber scan.

3.Reagents and Solutions

All reagents used are analytical reagent grade. Double distilled water was used throughout the analysis. In the present investigation universal buffers of pH range 2.0 to 6.0 are used as supporting electrolytes and are prepared by using 0.2 M boric acid, 0.05M citric acid and 0.1Mtrisodium orthophosphate solutions.

4.Differential Pulse-Adsorptive Stripping Voltammetric Studies

DP-AdSV peaks of bromethaline CNTPE is attributed to two electron reduction of this peak followed to establish the optimum conditions. The standard addition and calibration methods have been employed to estimate the compound in water samples.

Analysis

Well defined and well resolved AdSV waves/ peaks obtained at pH 4.0 were used for the quantitative estimation of Binapycril and isoxydefen in water samples. Both calibration and standard addition methods were used for the quantitative determination of the sample. From the calibration method, it is observed that the peak current shows a trend found to be linear over the concentration range 3.0 x 10-8M to 1.0 x 10-4 with lower detection limit 0.89 x 10-6 M for sample for 6 replicates, relative standard deviation and correlation coefficient were found to be 0.95%.

Recommended Analytical Procedure

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The stock solution (1.0 x 10-3 M) of samples prepared by dissolving the required quantity of the electroactive species in methanol. Standard solutions prepared by dilution of stock solution with fitting amount of methanol. 1 mL of the standard solution is transferred into voltammetric cell and added with 9 mL of the supporting electrolyte and then de gasified by bubbling oxygen free nitrogen gas for 10 min. After recording the voltammogram, small amount of standard solutions added and then voltammograms recorded for each addition under similar experimental conditions.

Determination Of Bromethaline in Water Samples

The above mentioned procedure has been successfully applied for the determination of bromethaline in water samples. A100 mL sample of water is spiked with known concentrations pesticides and shaken for few minutes and filtered through a Whatman Nylan® membrane filter (0.45 nm pore size) and filtrate passed through a sep-pakc18 cartridge previously activated with 10 mL of methanol. Elution carried out with 30 mL of methanol. The organic phase was evaporated. The residues dissolved in methanol and added to cell containing a buffer solution. The average recoveries obtained for two samples ranged from 98.00% to 78.00% and given in Table 1.0.

Table 1.0: Recoveries of pesticides at CNTPE in spiked water samples

Sample	Amount added (µg/mL)	Amount found (µg/mL)	Recovery%	Standard deviation
Spiked water	5	4.9	98	0.04
Water Run Off From Paddy Fields	5	3.9	78	0.07

5.Conclusion:

Though several methods reported regarding pesticide analysis in the reported less tedious method consumption of sample is reduced in quantities and pollution arises due to heavy metal electrodes is avoided.

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Role of green chemistry in sustainable development.

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Abstract

The rising course of industrialization was a signpost for world fiscal growth. One of the most active areas of Research and Development in Green Chemistry is the progress of analytical methodologies, philanthropic rise to the ostensible Green Analytical Chemistry. The impression of green chemistry on pharmaceutical analyzes, ecological, inhabitants, analyst and corporation are explained in this examination, and they are multidimensional. All option and analytical outlook has cost both in the ultimate product and in all that surrounds it. The hope of green chemistry the same as our prospect and the surroundings is also contemplated in this review.

Keywords: *GC,SD, Institutional metrics, Laboratory metrics.*

1.Introduction

During last decades, the rapid global population growth and the increased standard of living contributed in drawing attention to hazardous materials released into the environment and degradation of natural resources.

Principles of Green Chemistry.

1. Prevention: It is better to prevent waste than to treat or clean up waste after it is formed.
2. Atom economy: Synthetic methods should be designed to maximize the incorporation of all materials used in the process into the final product.
3. Less hazardous chemical synthesis: Wherever practicable, synthetic methodologies should be designed to use and generate substances that possess little or no toxicity to human health and the environment.
4. Designing safer chemicals: Chemical products should be designed to preserve efficacy of function while reducing toxicity.
5. Safer solvents and auxiliaries: The use of auxiliary substances (e.g., solvents, separation agents, etc.) should be made unnecessary wherever possible and innocuous when used.
6. Design for energy efficiency: Energy requirements should be recognized for their environmental and economic impacts and should be minimized. Synthetic methods should be conducted at ambient temperature and pressure.
7. Use of renewable feedstocks: A raw material of feedstock should be renewable rather than depleting wherever technically and economically practicable.

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8. Reduce derivatives: Unnecessary derivatization (blocking group, protection/deprotection, temporary modification of physical/chemical processes) should be avoided whenever possible.
9. Catalysis: Catalytic reagents (as selective as possible) are superior to stoichiometric reagents.
10. Design for degradation: Chemical products should be designed so that at the end of their function they do not persist in the environment and break down into innocuous degradation products.
11. Real-time analysis for pollution prevention: Analytical methodologies need to be further developed to allow for real-time, in-process monitoring, and control prior to the formation of hazardous substances.
12. Inherently safer chemistry for accident prevention: Substances and the form of a substance used in a chemical process should be chosen to minimize the potential for chemical accidents, including releases, explosions, and fires.

2.Development of Green Chemistry (GC)

Since its birth the GC pattern has reached an vital status in the chemistry field; in this sense, many educational institutions and industries around the world have implemented the GC Protocol to contribute to Sustainable development [SD]. It is appropriate to discuss the main differences between "Green Chemistry" and "Sustainable Chemistry": green chemistry focuses on the design, manufacture, and use of chemicals to decrease pollution potential, according to Anastas and Warner. It "is an approach that provides a fundamental methodology for changing the intrinsic nature of a chemical product or process so that it is inherently of less risk to human and the environment, to prevent pollution, and thereby solve environmental problems, promoting pollution prevention and industrial ecology", while sustainable chemistry comprises both the impressions of green chemistry and the effects of processing, materials, energy, and economics. Nevertheless, the meaning of sustainable chemistry is engaged toward the life cycle assessment (LCA), which is associated with the entire life cycle of a product, process, or activity. Additionally, in an indirect way, GC is involved in SD because the economic impact is diminished, mainly the regulatory compliance, waste disposal cost, and others. Moreover, the social pillar aspect could attend to reduce the negative image of chemistry employing this strategy due to it being considered as the main contaminant source of the planet.

3.Institutional Metrics:

In general, Andraos (2005–2007) combined a set of four metrics, considering both experimental and calculated parameters and displaying the dependence between them:

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reaction yield, atom economy, stoichiometric factor (SF), and the corresponding value to the aspect that accounts for the solvent during and postreaction and/or the catalyst recovery, evaluating linear and convergent sequences. This was in addition to the kinetic resolution of chiral substrates. Andraos involved the construction of a synthesis plan tree to know the efficiency of linear and convergent synthesis by the determination of the gRME. In addition, a study involving costs and quantities in the different steps of a reaction depicted by Andraos and Sayed was performed employing a radial pentagon considering the key metrics; this was to guide bachelor students in understanding the green chemistry concept. Complementarily, Andraos, using a pentagram, displayed a simplified approach for a linear and convergent synthesis plan by direct application of green chemistry principles.

4.Laboratory metrics

Another interesting study relates to microscale (at a laboratory level), though in this analysis the microscale did not improve safety. This index includes the following variables: 1. hazard of substances, 2. the time of exposure to substances, and 3. the amounts of substances used. It is important to note that this index is a direct metric of the risk, being an inverse metric of safety and benignity.

Future Recommendations: The main objective of this review is to exhibit the published modes to evaluate how green a practice is, in addition to the fact that for encouraging the methods of synthesis of compounds as well as intermediates by using green reaction schemes. The analytical methods which needs meger amount of samples like spectroscopy, electro analytical techniques is to be supported. In daily life the bleaching agents and cleaning agents has to be replaced by green products.

5.Conclusions :Given that the role of green chemistry and consequently the requirements of greenness metrics are currently more important than ever, this work, following a profound search in the literature, in addition to an appropriated analysis of the corresponding papers, is to our knowledge the first review related to a greenness metric being offered.

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Upshot of pesticides on carbon dioxide production in soil

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Abstract

In light of the rapidly growing human population, extensive pesticides have been utilized to maximize crop production. This has become a major environmental concern. To assess the

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influence of commonly used pesticides on soil microorganisms counts and microbial activities in the form of CO2 production, a factorial experiment was conducted.
Key words: *soil, pesticides, herbicide, insecticide, bacteria, fungi, actinomycetes*

1. Introduction

Due to rapidly growing human population, extensive pesticides have been utilized to maximize crop production. The extensive consumption of pesticides in cultivated soils leads to the pollution of the soil with harmful materials. About 3 million tons of pesticides that costs about US$ 40 billion is utilized in world agriculture annually. About 99.9% from the applied pesticide not reached to target organisms and become as pesticide residues accumulation which pollute the soil environment and just 0.1% reached to target organisms. Both pesticides residues accumulation and microorganisms activity usually present in the same reign, soil top layer. The impact of different pesticides on the growth of soil microorganisms and its activity are difficult to expect.

Beneficial soil microorganisms play essential role in soil fertility and productivity such as organic matter biodegradation, nutrients recycling, humus formation, Soil structural stability, nitrogen fixation, plant growth promotion, disease biocontrol, and other biochemical transformation such as ammonification, nitrification phosphorus solubilizing. The effect of pesticides on soil microorganisms and their activity depend upon the type of pesticides used , quantities and soil conditions. The objective of this study is to assess the influence of three usually used pesticides on soil microorganisms counts and microbial activities in the in the form of CO2 production.

2. Measurement of microbial activity

The soil samples were taken from Srikalahasti area 5 km north of city. The soil was taken from surface area (0-20) cm. To remove debris, the soil was sieved with 2 mm sieve. The physical and chemical characteristics of the soil were determined as following. Soil texture by hydrometer method, Soil Reaction (pH) by glass electrode method (1:2.5 soil water suspension), soluble salts by Electrical Conductivity., Organic material by rapid titration method.

Activities of microorganisms were determined in the form of carbon dioxide. The glass tube was gently got out of flask weekly and the sodium hydroxide solution was transmitted to clean flask. For following incubation fresh sodium hydroxide solution was put in clean glass tube and placed in the same flask and it is gave back to the incubator. The process was reiterated at the finish of each former incubation period. After addition 10ml of 1M barium chloride solution and drops of phenolphthalein, to the recovered sodium hydroxide solution and titrated against 1 M hydrochloric acid solution till the pink color is gone. During the reaction one mole of carbon dioxide equalize two moles of sodium hydroxide. The quantity of released CO2 was adjusted as mg CO2/100g soil.

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3.Statistical analysis

Effect of pesticides on bacteria count

The results show that the presence of malathion insecticide decreased bacteria number. In the first week of incubation period, the addition of malathion 50ppm, 100ppm, and 200ppm decreased the number of bacteria 40%,42% and 59% respectively. While at 7th week of incubation period, the reduction was 32%, 38% and 41% respectively.

Effect of pesticides on fungal population

The results show that the addition of malathion decreased the fungi counts at all concentrations and periods. During the first week of incubation, the addition of malathion at 50ppm,100ppm and 200ppm decreased fungal population 56 %, 62% and 66% respectively. While during the 7th week, the reduction was 58%, 64% and 65% respectively. Similarly, studies have shown that the presence of malathion insecticide decreased fungal population. Our results show that the most adverse effect was seen in soil treated with malathion specially at 200ppm.

4.Conclusion

This study suggests that the investigated pesticides negatively affect microbial counts and activity in soil, which confirms and reinforces previously reported environmental concerns.

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Voltametric Behavior of Nitro Group Containing Pesticides

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Abstract— In this work the effect of functional groups on the reduction potentials of nitrogroup containing pesticides such as dinitramine, bromethalin and isopropalin were studied. Differential pulse adsorptive stripping voltammetry, cyclic voltammetry, millicoulometry and controlled potential electrolysis were used for the determination of reduction potentials and electrode mechanisms. Bare carbon electrode used as working electrode and universal buffer used as supporting electrolyte.

Key words— *dinitramine, bromethalin and isopropalin, Differential pulse adsorptive stripping voltametry, bare carbon electrode, universal buffer effect of pH, reduction potential.*

1. Introduction

Nitro group containing pesticides are playing vital role in the agriculture field. These pesticides are widely used as pre and post emergent weed control agents (herbicides) for a wide variety of crops, namely corn, sorghum, wheat, rice, sugar cane and for fruits, vegetables and wine yards, consequently, they are found in river water, ground water and soils. Dinitro compounds were reported to exhibit significant antiproliferative and anti infective activities against protozoan parasites including Leishmania spp. Trypanosome broucei and the intraerythrocytic forms of Plasmodium falciparum. The electrochemistry of nitro group containing pesticides probably the one that has received much attention in recent years due to the discovery that these compounds are present to varying degrees nearly in every section of the environment. Though nitro group containing pesticides reduces easily under certain conditions the electrochemistry of nitro group is complicated due to dimerisation, coupling, tautomerization and various interferences that are formed during electrochemical process. Hence, the electrochemical mechanisms and analytical investigations of nitro group compounds are very important.

2 .Experimental

Apparatus and Electrodes

Autolab PG stat 101 used for voltametric measurements bare carbon electrode used as working electrode. . pH measurements were carried out with Elico digital pH meter(Hyderabad, India).

Reagents and Solutions

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Pure samples obtained from Sarayu agrochemicals India limited. The purity of sample was tested with tin layer chromatography and melting point determinations. A stock solution of pesticides under investigation were prepared in dimethylformamide universal buffer containing 0.2Mboric acid, 0.05M citric acid and 0.1M trisodium orthophosphate were used as supporting electrolytes.

Aliquots of stock standard solution were diluted with appropriate amount of supporting electrolyte to yield a 1.0x10-5M solution and the solution was purged with oxygen free nitrogen gas for 10min, then cyclic voltammetry (CV) and DP-ASV current- voltage curves were recorded at the working electrode bare carbon electrode.

3. Results and Discussion

In this work highly effective and selective nitro group containing pesticides were chosen to understand the electrode kinetics and reduction mechanism concerned from the results of cyclic voltammetry, Differential pulse adsorptive stripping voltametry, controlled potential electolysis and millicoulometry in the universal buffer solutions of pH ranging from 2.0-12.0. Analytical procedures are described for their monitoring in various environmental samples by employing D-ASV method. From the experimental results obtained for the electrochemical reduction behaviour of the above said compounds, the total number of peaks observed is found to be one. All the three compounds studied at pH range 2.0 to 12.0 (both acidic and alkaline medium).

4.Reduction Behavior

A single well defined peak obtained and it is attributed to the simultaneous reduction of nitro groups to the corresponding hydroxylamine groups with an up take of eight electrons. In cyclic voltammetry, a small anodic peak is observed in the reverse scan. It is quite likely that a nitroso compound are formed, whose movement at the electrode surface may be responsible for the anodic peak at higher pH values (pH>10.0) for these three compounds. The reduction of nitro group is found to be facile in the above said compounds, apparently due to the orientation of different substituents to the surrounding nitro group.

5. Conclusion

From this study it is concluded that electro analytical techniques are most suitable to determine molecular structure of a compound based on reduction potentials Based on this work it is concluded that electrochemical techniques are sensitive and less Expensive and less tedious compared to other techniques such as chromatography and, spectrophotometry.

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Voltammetric determination of Chlorogenic acid (CGA) in Moringa tierosperma

Dr.Ch.Ramanamma, PRINCIPAL ,YAGCW, CHIRALA

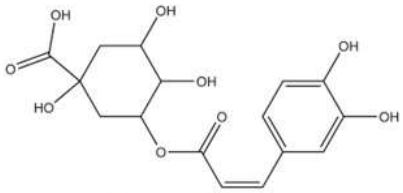
Abstract

In this work, a carbon nanotubes paste electrode was fabricated and the electrochemical behavior of chlorogenic acid was studied by differential pulse adsorptive stripping voltammetry. The analytical parameters were optimized. Under the optimized conditions, the Reduction peak current is linearly proportional to the concentration of CGA in the range from 2.00×10^{-7} to 1.20×10^{-5} mol/L and the detection limit is 4.00×10^{-8} mol/L. Further, the performance of the proposed method has been validated in terms of linearity, recovery (96.3–102.8%), reproducibility and robustness. The developed method has been successfully applied for the determination of CGA in Moringa tierosperma.

Keywords: chlorogenic acid, cyclic voltammetry, carbon nano tubes paste electrode.

1. Introduction

Cholorogenic acid (CGA), an ester of caffeic acid and quinic acid, is a naturally occurring phenolic compound. CGA is a potent antioxidant found in many foods and drinks, most notably in coffee. Clinical investigations have implied that consumption of CGA can have anti-hypertension and anti-obesity effects. CGA also can serve as anti-inflammatory, antitumor, antimutagenic and anticarcinogenic agent. As a bioactive compound that has many therapeutic effects, CGA can be found in more than 170 kinds of traditional Chinese pharmaceutical products such as tablets, capsules, and herbal injections. Therefore, fast and convenient determination of CGA in pharmaceutical products is of great importance.



Chlorogenic acid

Various methods for the determination of CGA have been developed, namely, near-infrared spectroscopy, capillary electrophoresis nano-liquid chromatography-electrospray

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ionization mass spectrometry , high-performance liquid chromatography , ultra-performance liquid chromatography , liquid chromatography-mass spectrometry , chemiluminescence , and electrochemical methods . Chromatographic methods require expensive equipment, large amounts of organic solvents, and are time-consuming. Electrochemical methods are obviously better due to their convenience, speed, higher sensitivity, and reproducibility . For electrochemical determination of CGA from the leaf extractions of moringa tierosperma, carbon nano tubes paste electrodes used as working electrode in this method.

2.Sample preparation

Leaves collected from YAGCW botanical garden was carefully ground to a fine powder and sieved through a 600-mesh screen, then 5.0 g of the powder was extracted with 30 mL of ethanol for 30 minutes with ultrasonic agitation. The resulting mixture was filtered and the residue was similarly extracted twice. All filtrates were transferred into a 100 mL volumetric flask and diluted to scale with ethanol.

3.Instrumentation

Investigations performed by taking assistance of a model meterohm Auto Lab 101 PG stat (Netherlands). CNTPE as working electrode for differential pulse adsorptive stripping voltammetry and cyclic voltammetry. pH measurements were carried out with an Eutech PC_510 cyber scan. Meltzer Toledo (Japan) Xp26 delta range micro balancer were used to weigh the samples during the preparation of standard solutions. All the experiments were performed at 25^0C.

4. Electrochemical measurement

voltammetry measurements were made in an unstirred, nondeaerated pH 4.0 borate buffer and all potentials were measured and reported versus Ag/AgCl. In a typical run, 10 mL of pH 4.0 borate buffer, 10 mL of ethanol/water and 0.025 mL of CGA sample solution were transferred into the electrolytic cell. Accumulation was firstly performed under open-circuit with stirring for 30 seconds. Then voltammograms were recorded .

5. Accuracy and precision

The precision of the method was validated under the optimized conditions in terms of repeatability (intra-day) and intermediate precision (inter-day). Six replicate measurements for each of five samples containing lower, middle, and higher concentrations in the linear range were made over a single day (intra-day, $n = 6$) and for 5 days over a period of 1 week (inter-day, $n = 6$). Satisfactory recoveries and relative standard deviations (RSD) were obtained and are reported. The recoveries obtained confirmed the high accuracy and the relative standard deviations obtained confirmed the good precision of the method.

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6. Conclusions

A CNTPE for the voltammetric determination of CGA was fabricated. The fabricated electrode showed an excellent electrocatalytic effect toward the redox of CGA and the redox peak currents of CGA were remarkably increased at the CNTPE. Based on the electrocatalytic effect, a convenient method for the determination of CGA was developed and the proposed method showed good recovery, reproducibility, and sensitivity.

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Water pollution and its Consequences, Causes, and Controlling Methods

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Abstract

Approximately 98% of the water is sea water and is unusable for drinking because the high concentration of salt. About 2% of planet water is fresh, but 1.6% is locked up in polar icecaps and glaciers. Another 0.36% is found underground in aquifers and wells. Therefore only about 0.036% of the planets water supply is accessible in lakes and rivers. The environment, economic growth and development are all highly influenced by water its regional and seasonal availability and the quality of surface and ground water. Polluted water not only affects the life of present generation but it also affect the life of upcoming generations because its effect remains for long.

Key words: *Environment, economic growth and development*

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1.Introduction

Based on the report of Andhra Pradesh state pollution control board (APPCB). The present study is tried to discuss basically what water pollution is and focused on different causes of water pollution, effects of this pollution on Earth. This study is based on secondary sources of data from different government reports, research articles, journals and books, internet sources and from the. In the study area water pollution is mainly caused due to overpopulation, agricultural practices, soil erosion, industrialization, and urbanization. Water is life for all but this water is polluting day by day in severe condition. So it can be said that our life (water) is not safe now. We are in crisis period. Water pollution is a major serious problem for all over the world. It affects drinking water, rivers, lakes and oceans all over the world. It consequently harms the health and wellbeing of human life and the natural environment. It is impossible to substitute for most of its uses, difficult to de pollute, expensive to transport, and it is truly a unique gift to mankind from nature. Water is also one of the most manageable natural resources as it is capable of diversion, transport, storage, and recycling. All these properties impart to water its great utility for human beings. The surface water and groundwater resources of the country play a major role in agriculture, hydropower generation, livestock production, industrial activities, forestry, fisheries, navigation, recreational activities etc.

If water is polluted in a area, then the all living creatures and people are faced to drink polluted water because they have no other option. It affects their bodies, skin, lungs, brain, liver and kidneys, caused cancers, birth defects and other diseases. Water is also one of the most manageable natural resources as it is capable of diversion, transport, storage, and recycling. All these properties impart to water its great utility for human beings. The surface water and groundwater resources of the country play a major role in agriculture, hydropower generation, livestock production, industrial activities, forestry, fisheries, navigation, recreational activities etc. The freshwater ecosystems of the world comprise only about 0.5% of the earth's surface and have a volume of $2.84x10^5$ Km3. Review of Literature:- Rivers constitute an insignificant amount (0.1%) of the land surface. Only 0.01% of the waters of the earth occur in river channels. Inspite of these low quantities, running waters are of enormous significance (Wetzel, 2001). India receives annual precipitation of about 4000 km3, including snowfall. Out of this, monsoon rainfall is of the order of 3000 km^3. Rainfall in India is dependent on the south-west and north-east monsoons, on shallow cyclonic depressions and disturbances and on local storms (Kumar et. al., 2005). Most of it takes place under the influence of south-west monsoon between June and September except in Tamil Nadu, where it is under the influence of north-east monsoon during October and November (Kumar et. al., 2005). In the last few decades, there has been a tremendous increase in the demand for freshwater due to rapid growth of population and the accelerated pace of industrialization.

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2.Causes of water Pollution:

Water pollution can occur from two sources. 1. Point source and 2. Non-point source. Point sources of pollution are those which have direct identifiable source. Example includes pipe attached to a factory, oil spill from a tanker, effluents coming out from industries. Point sources of pollution include wastewater effluent (both municipal and industrial) and storm sewer discharge and affect mostly the area near it. Whereas non-point sources of pollution are those which arrive from different sources of origin and number of ways by which contaminants enter into groundwater or surface water and arrive in the environment from different non identifiable sources. Examples are runoff from agricultural fields, urban waste etc. Sometimes pollution that enters the environment in one place has an effect hundreds or even thousands of miles away. This is known as transboundary pollution. One example is the radioactive waste that travels through the oceans from nuclear reprocessing plants to nearby countries. Water pollutants may be Organic and Inorganic water pollutant. i. Organic water pollutants: They comprise of insecticides and herbicides, organohalides and other forms of chemicals; bacteria from sewage and live stocks farming; food processing wastes; pathogens; volatile organic compounds etc. ii. Inorganic water pollutants: They may arise from heavy metals from acid mine drainage; silt from surface run-off, logging, slash and burning practices and land filling; fertilizers from agricultural run-off which include nitrates and phosphates etc. and chemical waste from industrial effluents.

3.Effects of Water Pollution:

Effects on Human Health Some of the chemicals affecting human health are the presence of heavy metals such as Fluoride, Arsenic, Lead, Cadmium, Mercury, petrochemicals, chlorinated solvents, pesticides and nitrates. Fluoride in water is essential for protection against dental carries and weakening of the bones. Concentration below 0.5 mg/l causes dental carries and mottling of teeth but exposure to higher levels above 0.5 mg/l for 5-6 years may lead to adverse effect on human health leading to a condition called fluorosis. Arsenic is a very toxic chemical that reaches the water naturally or from wastewater of tanneries, ceramic industry, and chemical factories and from insecticides such as lead arsenate, effluents from fertilizers factories and from fumes coming out from burning of coal and petroleum.

Mercury is used in industries such as smelters, manufactures of batteries, thermometers, pesticides, fungicides etc. The best known example of Mercury pollution in the oceans took place in 1938 when a Japanese factory discharged a significant amount of mercury into Minamata Bay, by contaminating the fish stocks there. It took several years to show its

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effects. By that time, many local people had eaten the fish and around 2000 were poisoned, hundreds of people were left dead and disabled (Akio, 1992) and the cause for death was named as "Minamata disease" due to consumption of fish containing methyl mercury. It causes chromosomal aberrations and neurological damages to human.

4.Prevention Measures:

- Removed concrete surfaces and replace them with ground cover
- Don`t use pesticides and herbicides
- Removed concrete surfaces and replace them with ground cover
- Prevent soil erosion from occurring
- Clean up waterways
- Inspects your septic system every 3-5 years
- Don`t wash paint brushes in the sink
- Use fewer chemicals to clean your home.
- Dispose of waste properly
- Don`t flush medication
- Don`t flush trash
- Conserve as much water as possible
- Avoid using plastic
- Making Swatch Bharat Abhiyan a success.

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Toxicity of the heavy metal Mercury (Hg): A review with recent update

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Abstract:
Mercury is a liquid metal found in the environment from natural and anthropogenic source. It is highly toxic to ecosystems and human beings. In India, there is an enormous contribution of human activities and industrial activities to the release of toxic mercury in to the atmosphere. These activities have caused massive increases in human exposure to mercury. These toxic metals are accumulated in the human body. Metal toxicity depends upon the absorbed dose, the route of exposure and duration of exposure. Mercury is the most common heavy metal that induced human poisonings. It exists in several forms like mercury vapor, mercurous (Hg+), mercuric (Hg++) and Inorganic mercury. This review gives details about the toxicity of mercury, to assess the available evidence on human exposure to Hg and its hematological effects.

Key words: *Heavy metals, inorganic and organic Mercury, exposure, toxicity, global production, health effects*

I. INTRODUCTION:

The heavy metals have a specific gravity of more than 5g/Cm$^{3.}$ Mercury is a heavy toxic non-radioactive metal and sometimes also called “Quick Silver” because of its silvery white appearance. It finds very wide commercial applications in industries, mercurial

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catalysts, health care sector for extensive use Thermometers, Sphygmomanometers (each Sphygmomanometer has approximately 60 g of Mercury),dental amalgams (mercury vapors from dental amalgam are the most dangerous form of mercury) etc. Due to extensive commercial use, the mercury consumption in the country is quite high. Mercury is a heavy, odorless, lustrous liquid metal that sinks in water. It is ductile mobile and converts in to malleable mass on being solidified at -39°C , which may be cut with a knife. The properties of Mercury are shown in Table 1.

Table 1 Properties of Mercury

Chemical symbol	Hg (Hydrorgyrum)
Density	13.456 g/Cm^3
Atomic number	80
Atomic weight	200.61
Boiling Point (B.P)	356.9°C
Melting Point (M.P)	-38.8°C
Group	12 th
Period	6 th

Mercury is extracted by heating Cinnabar (HgS) in a current of air and condensing the vapor.

$$Hg\,S + O_2 \longrightarrow Hg + SO_2$$

II. SOURCES OF EXPOSURE :

According to the report on human exposure to environmental chemicals (National Health and Nutrition Examination Survey 1V – NHANES),woman are the most exposed on non-occupational setting. The main exposure pathway for children was food consumption, mainly fish, although rice may be another methyl mercury source for Asians. Chlor – alkali industries had been the major source of mercury release to the environment. Thermal power plants, steel industries, cement plants, paper and pulp industries, plastic industries , medical instruments, certain agriculture and pharmaceutical industries are contribute substantially to mercury pollution. More than 90% of mercury is released by the seven countries; USA, Spain, Yugoslavia , former Soviet Union , China and Mexico. Amalgam fillings are the largest source of methyl mercury in non –industrial exposed population. Approximately 1g of Hg in a typical clinical thermometer is enough to contaminate water body with a surface are of about 20 acres, to the degree that the fishes inhabiting there would be unsafe to eat. MeHg and Me_2Hg usually originate from biological sources, mainly fresh or salt water fish. Nearly 3000 lakes in the U.S have been closed to fishing due to Hg contamination.

Table 2 Industrial Sources of Mercury

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Heavy metal	Industrial Source
Hg	Mining and refining of Hg, Organic mercurial's used in pesticides, laboratories using mercury.

All the metals can be divided into three groups based on the extensive Carcinogenic studies by the International Agency for Research on Cancer (IARC) are shown in table 3.

Table 3 IARC classification

Metal/Metalloid	IARC classification	Type of cancer causes
As and its compounds,Ni,Cd Ni, Cd	Group 1	Lung, liver, urinary bladder cancer
Pb (Inorganic compounds)	Group 2 A	Lung
Pb (metallic)	Group 2B	Lung
Hg	**Group 3**	**Lung, nose and nasal sinuses**

III. GLOBAL PRODUCTION OF HG

The estimates for Global primary production of Hg, as reported by the US Geological Survey, are shown in table 4.

Table 4 US Geological Survey

Estimated World production of primary (mined) mercury (Metric tons)

COUNTRY	2019
China	4000
Mexico	240
Tajikistan	100
Peru	40
Argentina	30
Kyrgystan	20
Norway	20
Others	20

IV. HG IN THE ENVIRONMENT

Table 5:Natural and Anthropogenic Sources

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Natural Sources	Anthropogenic Sources
1.Natural degassing of earth's crust 2. Degradation of minerals and forest fires 3 Elemental and oxidized forms of Hg	**A. From mobilization of Hg impurities** 1) Coal fired power generation and heat production 2) Petroleum production 3) Cement production (Mercury in lime) 4) Energy production from other fossil carbon fuels 5) Mining and other metallurgical activities
	B. From waste treatment and cremation 1) Land fills 2) Recycling and storage **3)** Municipal, medical and hazardous water incineration
	C. From intentional Extraction and use of Hg 1) Use of batteries, fireworks and laboratory chemicals 2) Chlor – alkali production **3)** Products such as thermometers, manometers and other instruments

V. PATH WAYS OF HG TO THE ENVIRONMENT

Emissions from power plants

↓

Atmospheric Transport and deposition

↓

Mercury transform in to methyl mercury in soils and water, then can bioaccumulate in fish

↓

Humans and wild life affected primarily by eating fish containg mercury

↓

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Best documented impacts on the developing fetus : impaired motor and cognitive skills.

VI. TOXICITY

The severity of health effects from mercury exposure are influenced by following factors :- a) Chemical form of Mercury (Inorganic / Organic) b) Hg dose c) Duration of exposure d) Age and health status of the person exposed e) Route of exposure (inhalation/ingestion/dermal contacts)

A. Inorganic Hg

Hg in all forms damage cellular function by change the tertiary and quaternary structure of proteins. Mainly target organ of Hg vapor is the brain.[1] With massive acute exposure to mercury vapor, erosive bronchitis and bronchiolitis potentially leading to respiratory failure may be accompanied by CNS symptoms such as erethism. At low level exposures, non specific symptoms like weakness, anorexia, fatigue, weight loss and gastrointestinal disturbance have been described.

B. Mercuric Mercury (Hg^{2+})

Acute poisoning with mercuric salts (typically $HgCl_2$) targets the gastrointestinal tract and the kidneys. Extensive precipitation of enterocyte proteins occurs, with abdominal pain , vomiting , and bloody diarrhea with potential necrosis of the gut mucosa.

C. Organic Hg (MeHg)

Methyl mercury reacts with sulfhydryl groups throughout the body, therefore potentially interfering with the function of any cellular or sub-cellular structure. Methyl mercury interferes with DNA transcription and protein synthesis. Recent studies suggest that methyl mercury, when combined with cystein has a structure, which resembles methionine and enters brain and other cells via the neutral amino acid carriers. The Central Nervous System (CNS) is the target organ for CH_3Hg toxicity. The earliest symptoms are paranesthesia , malaise and blurring of the vision. More severe exposure leads to constriction of the visual fields, deafness, dysarthria, ataxia and finally mental derangement, coma and death and other symptoms/diseases are mentioned in Table 6.

Table 6 Symptoms/Diseases of Mercury compounds

Mercury compounds	Symptoms / Signs/ Diseases/ Disasters
CH_3Hg / Hg / $HgCl_2$	Depression, Emotional instability , memory reduction and irritability.
	Defects in hearing , vision and speech
	Difficulty in writing, delays in motor and language development, 96in ability to walk properly

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	Death in extreme case
	Minamata disease*
	Pink disease
	Methyl mercury poisoning episode in Iraq **

***Minamata Disease :-** Minamata disease was discovered for the first time in the world at Minamata City, Japan in 1956. This case was attributed to the methyl mercury that was generated in the process for producing acetaldehyde using mercury as catalyst. Methyl mercury had accumulated in fishes and shellfishes and those who consumed them had been poisoned with it. Such type of exposure to methyl mercury was highly uncommon and unusual, although the number of victims eventually certified with Minimata disease was over 2,200.

****Methyl mercury poisoning in Iraq:-** In Iraq, three epidemic poisonings have been reported in 1955 – 60 and the largest outbreak in 1971 – 1972. These outbreaks were caused by the distribution of seed grains treated with methyl mercury. Rural people consumed the grains by using it to make homemade bread, instead of planting the seeds. The total number of victims was 6530, including 459 deaths.

Alternative available for Mercury Commercial Use :- (Source :- Global Mercury Assessment , UNEP Chemicals)

The substitution of Mercury with mercury free alternatives is one of the preventive actions against mercury release to environment and its toxicity. Increased awareness is required for substitution of mercury with mercury free alternatives for major uses of mercury. The mercury alternatives available are detailed in table 7.

Table 7 Alternatives to Mercury products

S.NO	Chemical / Product of Application	Available alternatives
01	Mercury (+2) Oxide	Copper Catalyst
02	Mercuric Chloride	Magnesium Chloride / H_2SO_4 / Zinc
03	Mercuric nitrate for anti-fungal uses	Ammonia / Copper Sulphate, mycin
04	Zenkar's solution	Zinc formalin
05	Mercuric Sulphate	$AgNO_3$ / k_2SO_4
06	Mercury cell process in Chlor – alkali industry	Membrane technology

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07	Mercury used in dental amalgam	Gold, Silver, Ceramic, porcelain, polymers, composites
08	Thermometers	Other liquids, gas, electric and electronic sensors

VII CONCLUSION

Mercury pollution has now become a global phenomena and thus with growing concern number of international organizations have mandate to address the impacts of mercury on health and environment. Awareness should be created among the communities regarding its sources of exposure, features of toxicity. Awareness programmes should be launched to educate the population about the risk and impact of mercury. In this review, I reviewed the toxicity of mercury and its compounds on the environment and living organisms. Toxic metals (Hg) cause genomic instability. Defects in DNA repair following the induction of oxidative stress and DNA damage by these metals is considered as the cause of their carcinogenicity. This could be another aspect of heavy metals to be reviewed in the future.

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