Janki Devi Bajaj Government Girls College, Kota

Self-Study Report
Criterion -3
3.3.1. Number of research papers published per teacher in the Journals notified on UGC care list during the last five year

S. N.	Content		Page No
1	Jan 2018-Dec 2018	Number of research papers published per teacher in the Journals notified on UGC care	1-15

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3.3.1. *Number of research papers published per teacher in the Journals notified on UGC care list during the last five year*

Jan 2018 to Dec. 2018

J. Phytol. Res. **31** (1 & 2) : 1-16, 2018 **ISSN 0970-5767**

ETHNOMEDICINAL PLANTS OF HARSHNATH HILLS OF SHEKHAWATI REGION OF RAJASTHAN

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A botanical survey of medicinal plants found in the arid and semi-arid regions of Harshnath hills Sikar district was conducted. The local and tribal people of the area use these plant species in day to day life for various purposes. The information was collected based on the interviews with local people practicing indigenous medicines. During the survey, 105 ethnobotanical plant species belonging to 49 families were recorded from the study area. The plant species along with their plant parts used and the mode of administration are listed categorically.

Keywords: Ethnobotany, Herbs, Medicinal plants, Traditional methods, Tribal.

Introduction:

Herbs and herbal medicines are a major elements in Ayurvedic, Homeopathic, Naturopathic system of medicines and oriented towards traditional knowledge. Presently, medicinal plants are more valued for their chemical composition and so their demand in the market has increased many times in all over the world. As these products are neutral, non-narcotic in nature, having no side-effects and are affordable by all easily.

Sikar is one of the three districts of shekhawati region of Rajasthan state of India which is located on $74.44^0 - 75.25^0$ E longitude and $27.21^0 - 28.12^0$ N latitude. It lies in the North-eastern part of the state, and most of the area under investigation comes in the arid and semi-arid climate. Meenas, Sansis, Bhopas etc are main tribals of this area (Fig. 1). The traditional healers of the district have commendable knowledge of medicinal plants which grow in the area. This knowledge possessed by the rural people is vanishing rapidly owing to interference of modern culture leading to disrespect for traditional methods by young generation. The decline in their uses can also be attributed to the scarcity or non-availability of medicinal herbs, due to various human activities such as mining activities, different agricultural practices, colonization etc along with natural calamities like drought and floods.

Due to these reasons, the conservation and verification of endangered & rare species are of significance. Therefore, there is an urgent need to document this knowledge before it vanishes completely.

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PREPARATION OF COLLOIDAL MANGANESE DIOXIDE AND THEIR APPLICATION IN DEGRADATION OF ANTIBACTERIAL DRUG

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ABSTRACT

Pharmaceuticals, especially fluoroquinolone antibiotics, have received increasing global concern, since they have been recognize as emerging environmental pollutants. Degradation of antibiotics, such as oxidative degradation by metal oxides, often plays an important role in the elimination of antibiotics from the environment. The kinetics of oxidation of moxifloxacin by colloidal manganese dioxide has been studied in aqueous acidic medium at 25 °C temperature. The stoichiometry for the reaction indicates that the oxidation of one mole of moxifloxacin requires one mole of manganese dioxide. The reaction is second order that is first order with respect to manganese dioxide and moxifloxacin. The rate of reaction increases with the increasing [H⁺] ion concentration. A probable reaction mechanism, in agreement with the observed kinetic results, has been proposed and discussed.

Keywords: Colloidal Manganese dioxide, Kinetics, Moxifloxacin and Oxidation.

I. INTRODUCTION

Moxifloxacin (MF), 1-cyclopropyl-6-fluoro-1,4-dihydro-8-methoxy-7-[(4as,7as)-octa-hydro-6H-pyrrolo[3,4-b] pyridine-6-yl]-4-oxo-3-quinolone carboxylic acid monohydrochloride, is an antibacterial synthetic drug that belongs to the fourth generation of fluoroquinolones [1]. The use of this newer generation fluoroquinolone is increasing due to expand antibacterial spectrum. But these are not fully metabolized in the body and are partially excreated in its pharmaceutically active form Due to the limited biodegradability and widespread use of these antibiotics, an incomplete removal is obtained in typical waste water treatment plants and analogous huge quantities are discharged into the environment. For the removal of these Fluoroquinolone many studies are used, in which oxidation process is mostly used and degrade them from the environment. A literature survey revealed that the kinetics and mechanism of oxidation of MF by different oxidants was carried out in both acidic and alkaline medium [2-5]. Manganese dioxide (MnO_2)is one of the most active and important oxidative component, showing high potency in degrading various organic pollutants such as antibacterial agents [6]. Perez-Benito et al. found first time that water-soluble manganese dioxide can be prepared from reduction of aqueous potassium permanganate by sodium thiosulphate under neutral condition [7]. A literature survey confessed that the kinetics and mechanism of degradation of some antibiotics by MnO_2 in aqueous acidic/alkaline medium have been

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Application of Copper Nanoparticles in the Degradation of Methyl Orange in aqueous medium

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ABSTRACT

The study was primarily focused on novel, simple and environmentally benign technique for the synthesis of copper nanoparticles (CuNPs) and find out catalytic activity in CuNPs/ Peroxomonosulfate (PMS) system for degradation of Methyl Orange (MO). Green synthesized CuNPs were characterized by different instrumental techniques and results indicate synthesized NPs are in crystalline nature and cubical shape with 48 nm size. The increasing concentration of nanocatalyst, peroxomonosulfate, Dye, initial pH and high temperature rapidly promoted the degradation kinetics of MO. The degradation of MO in CuNPs/Peroxomonosulfate system is modeled as pseudo-first order kinetics and activation parameters were also determined. The maximum degradation efficiency of MO reached 98% in 30 min for CuNPs/PMS system at optimum reaction condition. Sulfate radicals (SRs) ($SO_4^{\bullet-}$) were identified as oxidative species using specific alcohols. Employing CuNPs to enhance oxidation capacity of peroxomonosulfate for degradation of MO is a novel, efficient, promising and environmental-friendly method.

***Keywords*: Copper nanoparticle, Methyl Orange degradation, Peroxomonosulfate, Reaction parameters, Kinetic study.**

I. INTRODUCTION

Azo dyes are difficult degraded by conventional treatment methods, because of their complex structure and the stability. The treatment processes like adsorption and flocculation are not efficient methods because they result in solid waste, thus creating other environmental problems requires further treatment [1]. Sulfate radicals ($SO_4^{\bullet-}$) based advanced oxidation process have recently gaining attention due to their high efficiency and selectivity towards degradation of organic pollutants [2]. Here, we have developed a rapid, eco-friendly and convenient green route for the synthesis of CuNPs from copper chloride using leaf broth of Indian medicinal plant namely *A. indica* (Neem). *A. indica* belongs to Meliaceae family and found abundantly in India and in nearby subcontinents. *A. indica* leaf extracts often contain flavonoids, proteins, terpenoids, polyphenols etc. These biomolecules act as reducing as well as capping agents to minimize the coagulation of NPs. A textile azo dye, Methyl Orange (MO) was chosen as the model compound because it is a widely used dye and resistant to degradation by conventional methods [3, 4].

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Synthesis of copper nanoparticles and their catalytic activity in oxidation of threonine

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Abstract

Present study describes the fabrication of CuNPs (copper nanoparticles) by chemical reduction method and L-AA (L-ascorbic acid) use as a reducing as well as capping agent. Size of CuNPs was depending on the various concentration of L-AA. The synthesized CuNPs have resistance to oxidation by atmospheric oxygen for two months. The copper nanoparticles were studied by spectrophotometric techniques. The average sizes of copper nanoparticles were found to be 28, 16, 12 nm at increasing concentrations of L-ascorbic acid respectively. Interestingly, it was observed that, the activity depends on the size of particles. The catalysis by colloidal copper nanomaterials was studied kinetically with the oxidation of L-threonine (Thr) by peroxodi sulfate (PDS) at neutral pH. The copper nanoparticles are expected to be play important role in the field of catalysis and reduce water pollution.

Keywords: Copper nanoparticles, L-Ascorbic acid, peroxodisulfate, threonine, catalysis.

Introduction

Research on nanoparticles has received considerable attention since they have unique properties and numerous applications in different areas[1-5]. Metallic nanomaterials are of great interest due to their good chemical, physical and catalyticproperties[4]. Among colloidal transition metal nanomaterials, copper nanomateials receive considerable attention since they are used as an advanced material with electronic, optical and thermal properties[5]. CuNPs were assumed to be cheaper than noble metals. Hence, they are widely use in the field of catalysis and conductive links[6]. Among various methods, the chemical reduction process is potentially selected for the synthesis of CuNPs due to their low price, high efficiency and no need special equipments. It is simple and control of size and shape of particles obtained under controlled conditions is seen[7]. Although the fabrication of CuNPs has been done by different methods, very few studied reported about the size effective NPs as a catalyst[8].

The major problem in fabrication of CuNPs are stability towards the air oxidation and coagulation. So many approaches relevant to the coagulation and oxygen resistance which needs to the remove before use. Some studies reveal that to secure CuNPs by the oxygen, ascorbic acid is use as anantioxidant[9-11]. Therefore this experiment was carried out without inert atmosphere.

Metallic ions play an important role in the oxidative kinetic studies of amino acids by the different oxidants like hexacyanoferrate (III), peroxomonosulfate, peroxodisulfate, cerium(IV), chromium(VI)in the presence of metal catalysts as well as hexacyanoferrate (III), hydrogen peroxide, peroxomonosulfate in the presence of transition metal nanoparticles in aqueous medium have been studied[12-19]. However, different kinds of reaction mechanisms have been suggested but the specific details are yet to be found out.

The peroxodisulphate ion is strong oxidizing agents known in aqueous solution. The standard oxidation reduction potential is calculated to be -2.01V.

$$2\ SO_4^{2-}S_2O_8^{2-} + 2e^-$$

The reactions of these ions are slowest in absence of any catalyst[20]. The most thoroughly investigated catalyst is Ag(I) ion although reaction involving Cu(II) and Fe(III) ions also have been studied[21].

Decarboxylation of amino acids by peroxo oxidants is an area of demanding research because peroxo oxidants are environmentally benign oxidants and do not produce toxic compounds during their reduction. The applications of metal nanoparticles as catalyst for organic conversion include hydrogenation, hydrosilation and hydration reaction of unsaturated organic molecules as well as redox and other electron transfer process[22-26]. Though studies on kinetic study of amino acid with peroxodisulphate have been extensively done, but in the present study, the universal nature of CuNPs as catalysts was highlighted by employing highly efficient copper nanoparticles for the oxidation of threonine by peroxodisulphate in aqueous medium[14,27].

Materials and methods

Material: For this work, used chemicals are cuprous chloride dihydrate ($CuCl_2.2H_2O$-97%), L-ascorbicacid (vitamin C-98%),

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Oxidative degradation of Orange G by peroxomonosulfate in presence of biosynthesized copper nanoparticles—A kinetic study

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ABSTRACT

The present study reports the highly stable dispersed nanosized copper particles (CuNPs) was prepared by the biosynthesis process. The reduction of copper salts by *Azadirachta indica* (neem) leaf broth is a new and green approach, in which biomolecules present in leaf broth is act as reducing and stabilizing agent in aqueous medium. The effect of reaction temperature on the size of dispersed CuNPs was studied. The morphology of CuNPs was investigated by Transmission Electron Microscopy (TEM) and Scanning Electron Microscopy (SEM) analysis. Fourier Transform Infrared Spectroscopy (FTIR) studies reveal the presence of bioactive functional groups such as phenolic, amines and an aromatic ring are responsible for capping and stabilizing of nanoparticles (NPs). Further, the catalytic activity of synthesized NPs was measured on the degradation of Orange G (OG) in presence of peroxomonosulfate (PMS) spectrophotometrically. The results indicates that biosynthesized CuNPs at different temperature have different degradation efficiency at different average size 48.01 > 50.57 > 68.54 > 73.54 nm respectively. The effect of different experimental condition as well as addition of neutral salts on the rate of degradation was also studied.

1. Introduction

The textile industry effluents contain large amounts of dye chemicals which may cause severe water pollution. There are many processes available for the removal of dyes by biological, physical and chemical processes (Robinson et al., 2001; Ahmad et al., 2012; Harrelkas et al., 2009; Hammami et al., 2012; Khouni et al., 2012). These methods are often very costly and not eco-friendly due to their low efficiency and a large amount of sludge generation. Advanced oxidation process (AOPs) has been widely studied to degrade pollutants in water treatment. Peroxomonosulphate (PMS) is the newest oxidant used in chemical oxidation for water treatment (Lou et al., 2014). The degradation of organic pollutants by sulfate radicals (SRs) ($SO_4^{\bullet-}$) based AOPs have draw attention due to their high efficiency and selectivity towards pollutants (Anipsitakis et al., 2008; Ahmad et al., 2013). SRs have higher redox potential (2.5–3.1 V) (Lou et al., 2014) than hydroxyl radicals ($HO^{\bullet}$) (1.8–2.7 V) (Zhang et al., 2016a, b). The SRs can be generated from activating PMS by various transition metal such as Fe(II), Co(II), Ru(III), Ce(III), Mn(II), and Ag(I) (Anipsitakis and Dionysiou, 2004; Wang and Chu, 2011; Zou et al., 2013) has been widely studied. Among these transition metal ion, copper-mediated decomposition of PMS is an efficient catalytic system to generate $SO_4^{\bullet-}$ as the major oxidizing species (Deng and Zhao, 2015). The CuNPs/PMS system for the degradation of organic

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Kinetics and Mechanism of Electron-Transfer Reactions: Oxidation of Nalidixic Acid by Diperiodatocuprate (III) in Aqueous Alkaline Medium

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Keywords: Diperiodatocuprate (III); Nalidixic acid; Oxidation; Kinetics; Mechanism.

ABSTRACT

The kinetics and mechanism of oxidation of nalidixic acid by diperiodatocuprate (III) in aqueous alkaline medium has been studied spectrophotometrically at 303 K. The reaction exhibits first-order with respect to oxidant but substrate dependence is complex. The stoichiometry of the reaction has been observed to be two moles of the oxidant for a mole of the substrate. The oxidation product of the substrate is 1-ethyl-2-hydroxy-1, 4-dihydro-7-methyl-4-oxo-1, 8-naphthyridine-3-carboxylic acid as established spectrally. The active species of diperiodatocuprate (III) is understood to be as monoperiodatocuprate (III). The activation parameters were also determined and discussed. The activation parameters and thermodynamics quantities were also determined and discussed. A plausible reaction mechanism has been suggested to account for experimental observations.

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Green synthesis and characterization of copper nanoparticles using *Azadirachta indica* leaves

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HIGHLIGHTS

- Develop a novel, simple and greener method for CuNPs synthesis by *A. indica* leaves.
- Effects of different reaction parameters on the formation of CuNPs were analyzed.
- Synthesized CuNPs are cubical and 48 nm size with high zeta potential (−17.5 mV).
- Biomolecules present in Neem leaves reduce Cu^{2+} ions and also stabilize NPs.

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ABSTRACT

Development of an eco-friendly process for the synthesis of copper nanoparticles (CuNPs) is an important aspect in the field of nanotechnology. In recent years the utilization of secondary metabolites from plant leaf broth has emerged as a novel technology for the synthesis of various nanoparticles. In this report, copper nanoparticles were synthesized by the leaf broth of *Azadirachta indica* and effect of different reaction parameters such as precursor salt concentration, leaf broth percentage, temperature and pH of the medium on the conversion rate and morphology of the CuNPs were analyzed. The plant biomolecules induce the reduction of Cu^{2+} ions to CuNPs and also act as a capping and stabilizing agent. The formation of CuNPs was monitored by absorbance spectra of UV-visible spectrophotometer at different stages during the synthesis process. The biosynthesized CuNPs were characterized by different instrumental techniques and results described the particles are crystalline, cubical shape with the average size 48 nm and highly stable. The optimum conditions for synthesis are as follows: percentage of leaf broth 20%, $[CuCl_2] = 7.5 \times 10^{-3}$ M, pH 6.6 and temperature 85 °C. The present study could prove to have an enormous impact in the immediate future to synthesize metallic nanoparticles on an industrial scale.

1. Introduction

Nanoparticles (NPs) are being considered to be the fundamental building blocks of nanotechnology. Nanotechnology branch is interdisciplinary which includes physics, biology, chemistry, medicines and material science. Presently, synthesis of metal NPs has been reported by many physical and chemical means [1–4]. All reported chemical methods and energy-intensive routes, which make these choices eco-hazardous and preclude their applications in biology, medicine, and clinical field. Therefore developing environmental friendly protocols are the need of the hour in nanomaterial synthesis [5–7]. A focused integration of bio and nano-techniques for biosynthesis of NPs, known as biotechnology has emerged from nanotechnology [8–10]. The recent emerging field of nano-biotechnology is at the primary stage of development due to lack of implementation of innovative methods in industrial scale and yet has been improved with the modern methods. There is a need to design an economic, commercially feasible as well as eco-friendly sustainable route for the synthesis of metal NPs in order to meet its growing demand in various sectors. The biosynthesis of NPs has been mainly focused on noble metal NPs like silver, gold, platinum [11–16] and their alloys. Amongst them, CuNPs are of great interest because of low cost, easy availability and properties possessed are similar o that of other metallic NPs [17–19]. CuNPs finds applications in heat transfer fluids, sensors,

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Kinetic and mechanistic study of ciprofloxacin in aqueous alkaline medium

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Abstract

The existence of fluoroquinolone drugs in environment, may harmful to the human health. Hence the present study aimed to oxidative degradation of antibacterial drug ciprofloxacin by hexacyanoferrate(III) (HCF) in aqueous alkali medium at 40°C temperature. The stoichiometry for the reaction indicates that the oxidation of a mole of ciprofloxacin requires twice moles of HCF. The reaction exhibited first order kinetics with respect to [HCF] and [ciprofloxacin] and less than unit order with respect to [OH⁻]. The products were also distinguished on the basis of stoichiometric results and confirm by the characterization results of LC-MS and FT-IR analysis. The major product of the reaction obtained by the decarboxylation of the quinolones molety and hence it may retain the antibacterial activity. From the experimental results the rate law is derived. The activation results with respect to the slowest step of the proposed mechanism were evaluated and thermodynamic parameters are calculated.

Keywords: Poultry dust, allergy, occupational asthma, working practices, health surveillance.

Introduction

Ciprofloxacin (CIP) {1-cyclopropyl-6-fluoro-1,4-dihydro-4-oxo-7-(piperazine-1-yl)-quinolone-3-carboxylic acid} is a second generation fluoroquinolone antibacterial agent[1].The fluoroquinolones are most popular class of antibiotics for different uses so they are excessively used in the world. Most of them are partially metabolized and excreted by humans and animals and spilled into water. The existence and collection of fluoroquinolone antibiotics in ecosystem, requires progression of the different oxidation methods for the conversion of fluoroquinolones in environment. CIP possess two concerning ionisable functional groups: a basic piperazinyl group and a carboxylic group which relevant to antimicrobial activity.

These antibiotics react with various antibacterial agents and natural supplements. Such reactions increase the problem of anticoagulation and the preparation of non-absorbable complexes, as well as increasing the possibility of toxicity.

The great attention is being paidtooxidizing agents in attacking particular groups in simple and large molecules. Among these a potassium hexacyanoferrate(III) {HCF(III)}[2], a single electron oxidant with + 0.45V redox potential for the HCF(III)/ HCF(II) couple in alkali medium preeminent to its degradation to hexacyanoferrate (II)[3,4]. HCF(III) has widely being used as oxidizing agent for various chemicals in alkaline media. The earlier studies[5,6] reveals that alkali HCF(III) ion act as one electron intellectual testing agent for redox processes. On the other hand Speakman and Wats[7]recommendedvarious path of aldehydes, ketone and nitroparaffins oxidation reactions by HCF(III). Singh et al[8] reported about the formation of free radical intermediate the oxidation of formaldehyde, acetone and ethyl methyl ketone by HCF(III) access through an electrone transfer process. Although, HCF(III) has some assistance that becomes proper oxidizing agent for various organic substrate[9]. In accurate, its stability over the entire pH scale and being a moderate oxidant, its reactions with some nitrogen containing compounds are not facile and requires the catalyst[10]. Although the oxidative study of CIP by different oxidants has been finalized[11-14], no study have existence about the oxidation of this drug by HCF(III). Such studies have importance in considering the properties of CIP in redox processes and furnish an observation for the reaction of such ion with the substrate to determine the active forms of HCF(III), a description of this work becomes beneficial. Consequently, this work designed to originate the reactivity of CIP towards HCF(III) in the reaction and attempt to explore the mechanism on the basis of kinetic parameters. Furthermore, the oxidation products of the CIP are previously reported and the distribution of products appears to depend upon the nature and potentiality of the oxidants. This was the additional interest of undertaking the title study.

Materials and methods

Chemicals: The solution of CIP (KORES India Limited) was formed by accurate amount of the samples and cleanness of this solution was analyzed by their melting point (205°C). A stock solution of oxidant, HCF (III) was prepared by dissolving K_3 $[Fe(CN)_6]$ (BDH) and standardizing the solution iodometrically[15]. Other chemicals were either Analar or guaranteed reagent grade and used as received.

Twice distilled water, second distillation being from alkaline permanganate solution in an all glass still, was used in all preparations and kinetic studies.

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RESEARCH ARTICLE

Kinetic Analysis of Oxidation of Ofloxacin by Permanganate Ion in Sulphuric Acid Medium: A Mechanistic Approach

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ABSTRACT

The Kinetic and mechanism of oxidation of ofloxacin by permanganate ion in acidic medium have been studied at 30°C. The stoichiometry has been observed to be 2:5 in terms of mole ratio of permanganate ion and ofloxacin consumed. The reaction shows fractional order with respect to oxidant and fractional order in both the substrate and hydrogen ion concentration. The effect of Dielectric Constant and Ionic Strength has also been investigated. The major products identified were, ofloxacin-quinolone and Mn(II). From the above experimental evidences a mechanism in accordance with the rate law has been derived.

Keywords: Oxidation Mechanism, Ofloxacin, Permanganate ion

INTRODUCTION

Ofloxacin (OFL) [9-fluoro-2,3-dihydro-3-methyl-10-(4-methyl-1-piperazinyl)-7-oxo-7H-pyrido-[1,2,3-de]-1,4-benzoxazine-6-carboxylic acid] belongs to the fluoroquinolone class of antibiotics. They are synthetic broad spectrum antibacterial drugs that exhibit significant activity against both gram-positive and gram-negative bacteria (Zhang, *et. al.*, 2005). Ofloxacin possess two relevant ionisable functional groups: a basic piperazinyl group and a carboxylic group. The carboxylic group and the carbonyl groups are required for antimicrobial activity.

Potassium permanganate is widely used as an oxidizing, disinfectant and also as ananalytical reagent(Zhang, *et. al.*, 2008). The oxidation by Mn(VII) ions finds extensive applications in organic synthesis (Abbar, *et. al.*, 2011). Mn(VII) is the most potent oxidation state in acid medium with reduction potentials (Sunderland, *et. al.*, 1999)1.69√ of Mn(VII)/Mn(IV) couple and 1.51V of Mn(VII)/Mn(II) couple. $HMnO_4$, $H_2MnO_4^+$, $HMnO_3$ and $Mn_2O_7$are the active species of Mn^{+7} in the acidic medium (Kaur, *et. al.*, 2008; Wiberg, 1965).

The literature survey reveals that there are few study reports (Martinez, *et. al.*, 1996; Day, *et. al.*, 1985) on the oxidation of ofloxacin by MnO_2 followed by evaluation of the reaction kinetics and analysis of chemical structure of degradation products formed. It is noted that despite the importance of the drug, the literature survey reveals that there is no information aboutthe oxidation kinetics.

MATERIALS AND METHODS

1. CHEMICALS:

All chemicals used were of analytical grade and doubly distilled water was used throughout this study. Standard solution of ofloxacin (KORES India Limited) was prepared by dissolving calculated quantity of pure drug in 0.1 M H_2SO_4.The acid present in the substrate solution is also taken into account in the calculation of the total acid present in each case.

2. INSTRUMENTATION:

For kinetic measurements, a Peltier accessory (temperature-Controlled) attached to a U.V.3000+ UV-Visible spectrophotometer (LABINDIA) was used.

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MHD HEAT AND MASS TRANSFER FLOW OVER A SEMI INFINITE INCLINED PLATE AT CONSTANT CONCENTRATION GRADIENT EMBEDDED IN A POROUS MEDIUM WITH HEAT SOURCE

By
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(*Received: December* 10,2017 ; *Revised : April* 21,2018)

Abstract

We present analytical study of viscous incompressible fluid through porous medium with heat source and constant concentration gradient. The equations are solved analytically and results are obtained for velocity, temperature and concentration as well as skin friction coefficient and Nusselt number. The effect of angle of inclination, permeability parameter, magnetic field parameter, radiation parameter, heat source parameter, Schmidt number and Prandtl number are shown both in graphical and tabular form.

Keywords and phrases. MHD, heat and mass transfer, inclined plate, heat source and porous medium.

2010 Mathematics Subject Classification. 76R10, 76R50, 80A20, 76S05.

1 Introduction

The porous media plays an important role in technology. The most important areas of technology that depended upon porous media are

(1) Hydrology, which is related to water movement in earth and sand structure such as dam, flow of well from water bearing formation, insulation of sea water in coastal areas, filter beds for purification of drinking water etc.
(2) Petroleum engineering which is mainly concerned with petroleum and natural gas production, exploration, well drilling and logging etc.
(3) In chemical engineering, filtering of gases and liquids and drying the bulk of goods are the important technologies based on flow through porous media.
(4) In medicine and biochemical engineering, biological membranes and flow of blood and other body fluids are few examples where the role of porous media is critical.

A detailed review of convective heat transfer in Darcy and non-Darcy porous medium is available in the books of Nield and Bejan [16] and Ingham and Pop [12]. Magnetic field effects on the free convection and mass transfer flow through porous medium with constant suction and constant heat flux was studied by Acharya at al. [1]. Exact analysis of radiation convective flow heat and mass transfer over an inclined plate in a porous medium was presented by Bhuvaneswari et al. [7]. AbdusSamad and Rahman [3] studied the effects of thermal radiation for unsteady MHD flow over a vertical plate immersed in porous medium.

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MHD NON-DARCIAN FLOW DUE TO HORIZONTAL STRETCHING SHEET EMBEDDED IN A POROUS MEDIUM WITH THERMAL STRATIFICATION EFFECTS

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Abstract:

The aim of present study is to analyze the non- Darcian effects on unsteady non- linear MHD flow of an incompressible, electrically conducting and viscous fluid over a horizontal stretching sheet embedded in a porous medium with heat source, viscous dissipation and thermal stratification. The dimensionless governing equations have been solved numerically by using 4th order Runge - Kutta method with shooting technique. The effects of pertinent parameters on velocity and temperature are depicted graphically and discussed in details.

Keywords: Viscous dissipation, thermal stratification, heat source, Runge-Kutta method, non-Darcy flow.

NOMENCLATURE

u, v	velocity components	C_f	Skin friction coefficient
f, f'	dimensionless velocity components	Nu	Nusselt number
B_0	Magnetic field intensity	k_1	Porous parameter
k	Permeability of medium	U	Dimension less free stream velocity
c_f	Form or drag coefficient	***Greek symbols***	
Q'	Rate of heat generation/absorption	υ	kinematic viscosity
C_p	Specific heat	σ	Electric conductivity
a, n	Stretching rate and constant	ρ	Density
Re_x	Reynolds number	η	Similarity variable
Pr	Prandtl number	μ	Dynamic viscosity
M	Magnetic parameter	α	Thermal conductivity
q_w	Heat transfer from sheet	θ	Dimensionless temperature
Ec	Eckert number	ψ	Stream function
F_s	Local inertia coefficient	**Subscript**	
T	temperature	w	Wall
x, y	directional coordinate along and normal the stretching sheet	∞	Free stream

1. Introduction

During the last decade fluid flow in porous media has an important bearing in many areas of reservoir engineering, such as petroleum, environmental and groundwater hydrology. Darcy' law also describes the phenomena of fluid flow in porous medium which is valid in a limited range of low velocities but at the high flow rate, inertia effect and turbulence become important and cause non Darcian flow. This type of flow in pours medium has many practical applications such as filtration, transpiration cooling, geothermal and biomechanical process. Many attempts have been made to study the non Darcian flow. Singh et al. (2011) studied the non-Darcian effects on natural convection flow in a vertical channel partially filled with porous

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PHYSICOCHEMICAL ANALYSIS OF GROUND WATER AND SURFACE WATER IN KOTA REGION, RAJASTHAN, INDIA

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ABSTRACT

India is a developing nation and is dependent on its natural resources for growth and development. Water, being one of the vital natural resource, must be used judicially for the sustainable development. Present study focuses on the analysis of physicochemical parameters (pH, Turbidity, Alkalinity, Total Hardness, Total dissolved solids, Conductivity, Chloride, Sulfate, Fluoride contents) of ground water and surface water in Kota City (Rajasthan). The study shows the adverse impact of exploitation and urbanization on water resources of Kota City (Rajasthan). Some physicochemical parameters exceed the desirable limits as defined by WHO and Indian Standards in the selected sites. The level of pollution in ground water and surface water of Kota City is increasing due to urbanization.

Figures : 10 References : 16 Table : 01
KEY WORDS : Analysis, Ground water, Physicochemical parameters, Surface water, Urbanization.

Introduction

The availability of liquid water and to a lesser extent its gaseous and solid forms, on earth are important for existence of life. The earth is located in the habitable zone of the Solar System. If it were slightly closer or farther from the sun, the conditions would have been adverse which may not support life on earth[6]. The collective mass of water on, under and over the surface of planet is known as Hydrosphere. India is a country with diverse landforms. Every State holds a unique geographical feature. Rajasthan is located in the North West region of India and is considered as a dry state, as it lacks sufficient rainfall and water resources. Still the South Eastern part of Rajasthan is blessed with sufficient annual rainfall and natural water resources. Therefore this part of the state has great social, economical and political importance. Being highly populated these resources are under the threat of overexploitation. Groundwater, rivers and ponds in Kota have provided livelihood to millions of people over the century. Owing to the human activities the water in these resources is getting polluted. With the increase in population the requirement for clean water increases constantly. The collection and disposal of domestic wastes is a major problem in urbanized area. The intensive use of natural resources and large production of waste in modern society often poses threat to ground and surface water quality[5]. Water from most of the resources is therefore unfit for immediate consumption without some sort of treatment. The selected sites for the present study, Kishore Sagar Talab, Chambal River, Kala Talab and Anantpura Talab cover almost every direction of Kota City area.

Materials and Methods

The present study was undertaken to examine the quality of the surface water and ground water in Kota city (Rajasthan) and to evaluate the potability of surface water and ground water in the vicinity. For surface water analysis the water was sampled at the following points-

i) Kishore Sagar Talab (lake water)
ii) Chambal River (river water)
iii) Kala Talab (lake water)
iv) Anantpura Talab (pond water)

The water samples were collected in November 2017 between 7:00 am to 9:00 am so as to obtain the least disturbed samples. The physicochemical

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Abstraction :-

Water is the most precious gift of nature. It is the most vital factor that determines the development of a nation. Present study focuses on the correlation amongst physicochemical parameters (pH, Turbidity, Alkalinity, Total Hardness, Total dissolved solids, Conductivity, Chloride, Sulfate, Fluoride content) of ground water and surface water in Kota City (Rajasthan, India). Interrelationship studies between different variables are very helpful tools in promoting research and opening new frontiers of knowledge. The study of correlation reduces the range of uncertainty associated with decision making for mitigating pollution level.

Keywords :-

Physicochemical parameters, Correlation, Ground water, Surface water

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CORRELATION BETWEEN DIFFERENT PHYSICOCHEMICAL PARAMETERS OF GROUND WATER AND SURFACE WATER IN BUNDI REGION, RAJASTHAN, INDIA

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Abstract

Water is extremely essential for survival of all living organisms. The quality of water is vital concern for mankind since it is directly linked to human welfare (10). The present study has been focused on determination of correlation between different physicochemical parameters (pH, Turbidity, Alkalinity, Total Hardness, Total dissolved solids, Conductivity, Chloride, Sulfate, Fluoride content) in major surface water and ground water bodies of Bundi Region. The deterioration in the quality of water could be accounted to rapid urbanization. The result of present work will help in analyzing pollution level in the selected sites of Bundi region of Rajasthan, India.

Figures: 10 References: 15 Table: 3

Key Words: Physicochemical parameters, Ground water, Surface water, Correlation.

Introduction

The most vital renewable resource on the blue jewel i.e. the earth is water. It is the fundamental ingredient of life. It is found in liquid form at the temperature mostly found on the earth. Water is one of the abundant resources on earth. About 97% of the earth water is saline water in the ocean and 3% is fresh water contained in the poles (inform of ice), ground water lakes and rivers which supply the most of human and animal needs. Nearly, 70% of this tiny 3% of the world's fresh water is frozen in glaciers, permanent snow cover, ice and permafrost. The other 30% percent of all fresh water is in ground most of it in deep, hard to reach aquifers. Lakes and rivers together contain just a little more than0.25% of all fresh water. Lakes contain most of it (4).

The adverse effects on ground water and surface water qualities are the result of man's activity at surface, unintentionally by agriculture, domestic and industrial effluents unexpectedly by sub surface or surface disposal of sewage and industrial wastes (5). The quality of ground water and surface water is of great importance in determining the suitability of particular ground water and surface water for certain use (public water supply, irrigation, industrial application, power house generation, etc.). Quality of ground water and surface water is the resultant of all the processes and reactions that have acted on the water.

Therefore, the quality of ground water varies from place to place and is primarily governed by the extent and composition of dissolved solids present in it. Most ground water quality problems are difficult to detect

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PHYSICOCHEMICAL ANALYSIS OF GROUND WATER AND SURFACE WATER IN BUNDI REGION, RAJASTHAN, INDIA

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ABSTRACT

The present study has been focused on analysis of physicochemical parameters (pH, Turbidity, Alkalinity, Total Hardness, Total dissolved solids, Conductivity, Chloride, Sulfate, Fluoride content) in major surface water and ground water bodies of Bundi Region. All results were compared with the standard limits as per WHO guideline for drinking water. The deterioration in the quality of water could be accounted to rapid urbanization. The result of present work reveals that surface water and ground water collected from selected sites showed alkalinity, except surface water of site II and IV whereas parameters such as turbidity, total solids, total hardness, chloride, sulfate, fluoride content values were high at site III and IV, while in case of conductivity site III showed highest degree of occurrence indicating adverse impact of anthropogenic activities in Bundi.

Figures : 13 References : 19 Table : 01

KEY WORDS : Anthropogenic activities, Ground water, Physicochemical parameters, Surface water.

Introduction

Of all the natural resources, water is unarguably the most essential and appreciated. Life began in water and spirit is nurtured by water. It is a universal solvent which provides the ionic balance and nutrients which supports all forms of life. Water is one of the abundant resources on earth. About 97% of the earth water is saline water in the ocean and 3% is fresh water contained in the poles (in form of ice), ground water lakes and rivers which fulfill the most of human and animal needs. Nearly, 70% of this tiny 3% of the world's fresh water is frozen in glaciers, permanent snow cover, ice and permafrost. The other 30% percent of all fresh water is in ground, most of it in deep, hard to reach aquifers. Lakes and rivers together contain just a little more than0.25% of all fresh water. Lakes contain most of it[4].

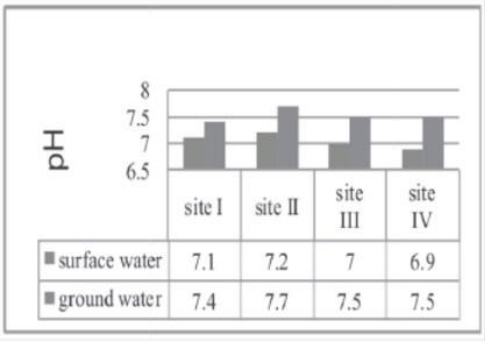

Fig. 1 : pH Analysis

In recent years, an increasing threat to ground water and surface water quality due to human activities has become of deep concern. The adverse effects on ground water and surface water qualities are the result of man's activity at surface, unintentionally by agriculture, domestic and industrial effluents unexpectedly by sub surface or surface disposal of sewage and industrial wastes[5]. The quality of ground water and surface water is of great importance in determining the suitability of particular ground water and surface water for certain use (public water supply, irrigation, industrial application, power house generation, *etc.*). Quality of ground water and surface water is the resultant of all the processes and reactions that have acted on the water.

Therefore, the quality of ground water varies from place to place and is primarily governed by the extent and composition of dissolved solids present in it. Most ground water quality problems are difficult to detect and

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