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Principal

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'System of Income and Expenditure in 18th Century Maratha Reign'

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Introduction-

Maratha state and its economy was established by Chhatrapati Shivaji. His grandson got his legacy as a dynasty but he had never got any administrative setup or any documentation and treasury. All these things were developed through Peishwa. 18th century Maratha economy was state economy was developed on substructure of 17th century Maratha Swaraj. It is having a concrete administrative structure. The administration had never getting back effect of political or military jerk. It could work very smoothly in these types of up and downs.

Aims and objectives:-

1. To understand the System of income and expenditure through Modi Script documents on state finance.
2. To study the sources of income and nature of expenditure in the reign.
3. To understand the silent features of the income and expenditure
4. Similarities and differences in income and expenditure of village to central govt.
5. Nature of income and expenditure of village, town, Prant (sub-district), fort, custom duty or octroi and central govt's Income-expenditure.
6. To search uniformity income and expenditure at village to central Government level.

Concepts-

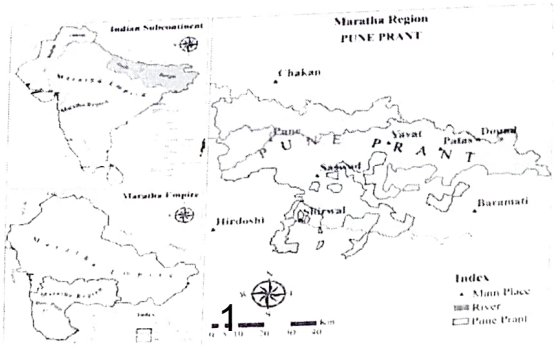
1. *Sal-gudasta* (सालगुदस्ता)- means Revenue collection in or during the past year.
2. *Sal-majakur* सालमजकूर- Means the afore – mentioned year or the present or passing year.[1]
3. *Ek-berji* (एकबेरजी)- The first entering upon the books of sums disbursed or received. It is actually a single entry.

There is also a *Ekaberjii Daftar* (एकबेरजी दप्तर) means an office for arrangements, registry, and deposit of all accounts from the other departments; and from them where framed abstracts of the total receipt, expenditures, and balances of government on all accounts for the year.[2]

4. *Du-berji* (दुबेरजी) means twice brought to a account; regularly entered; i.e. a sum is first set down under the name of him from whom it is received, or to whom it is advanced for expenditure; and afterwards accounted for under the articles purchased, payments & c. made. It also applied to money received for another, entered on the deposit side, and remitted; entered afterwards upon the expenditure side upon intelligence of its having been received and credited.[3]
5. *Varata* (वरात) – It's an assignment or order upon revenue or a treasury[4]. It's a promissory note issued by government for their departments or its stakeholders, to provide money, indirectly through their departments.

Administrative procedure in respect to finance-

Higher authorities like *Kamaavisadaar* (कमाविसदार) or *Mamalatadaar* were appointed by central government. Reliance, financial credit and relations with *Peshwa*, these are the basic eligibility to became a *Kamaavisadar*. After appointment or continuation on post of higher officers (like *Kamaavisadar*) they started to work with the help of previous years accounts. Few months later the central government had to send a copy of estimated income and expenditure sheet or budget, it is known as '*aajamaas*' (अजमास). There was a separate budget or '*Aajamas*' for every *Prant*, which noted down gross demand, deductions, and gross balance and temporary additions etc[5]. It's mandatory to run the account through '*Aajamas*' After completion of the financial year and closing the accounts, *kamavisadar* had to submit the account, known as *taleband* (ताळेबंद). Similarly Balance Sheet / *taleband*, *hishob* (हिशोब), *tarjuma* (तर्जुमा), Details of receipts and expenditure or *jhadati* (झडती) these are documents were prepared. Audit was also performed by higher authorities.



Status of Covid -19 Pandemic In Indapur Tehsil

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Abstract

The corona virus is showing its strength and spreading exponentially in all the corners of India. In Maharashtra Pune is highly infected district Therefore, this paper aims to study the infection level and current scenario of fatality cases in Indapur tehsil. All the supported data is collected from Sub-District Hospital (SDH), Indapur. Fatality rate defined as per the number of currently active cases per 100 positive cases of covid-19. This paper deals with the village wise current situations of current cases, recovered cases, deceased cases .There are reported 4667 confirmed cases up to the month of December 2020. These infected cases are found in 138 villages and tehsil headquarter. Out of them 2.95% deaths occurred in the study area. A wide variation was observed across the tehsil .There was no single fatality case found in 0 to 14 age group people in the study period. Only four villages has not infected by COVID-19. As compare to the rural area the infection level of corona virus is high in urban area.The infected cases are increasing on one side and on another side the numbers of recovered cases are also increasing in the study area.

Key words: *COVID19, infection, mortality, pandemic,*

Introduction

Society is an asset of the every nation. Due to the corona virus almost every nation of the world are suffering from pandemic situation. The corona virus (COVID-19) is spreading rapidly, and scientists are endeavoring to discover drugs for its efficacious treatment in the world (Gao et al., 2020). Older people, suffering from medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer, are more likely to develop severe illness (Remuzzi & Remuzzi, 2020; Singhal, 2020). Maharashtra has more than 1984768 confirmed cumulative infected cases (31 December 2020). The impact of preventive measures on daily infected-rate is discussed for each village of Indapur tehsil dist. Pune.

Objectives

1. To identify the infection level in the study area.
2. To study the mortality status in the study area.
3. To make favorable suggestions for COVID-19 control.

Database and methodology

For the present research work secondary data source are used. All the supported data is collected from Indapur TehsilHealth Office, Indapur, Dist. Pune, Maharashtra.This office provides the most updated information on the daily and total confirmed cases, active cases, recovered and deaths from each village of the study area. Data considered for analysis up to 31 December 2020. Fatality rate defined as per the number of currently active cases per 100 positive cases of covid-19.

Month wise COVID-19 infection in the study area

In the study area, the disease was first detected on 27th April 2020 in Bhigwan station a women who returned from Pune. The gradual incidence of COVID-19 cases has increased in June and July and in the month of August and September these cases has increased rapidly. Mostly the daily infection-rate (DIR) is higher in urban area than the rural. In the high population-density area has found high COVID-19 infected cases i.e. Indapur city and western side villages. Indapur Tehsil Health Office reported total 4667 new confirmed cases up to month of December 2020 (**Table 1**). In this period in urban area 673 and in the rural area 3994 cases found. There are also reports of near capacity utilization of ICU and Ward beds, in the Sub-District hospital in the study area. **Table 1:-** Month wise COVID-19 positive patients in Indapur tehsil.

Sr. No.	Month	March	April	May	June	July	Aug.	Sept.	Octo.	Nove.	Dece.	Total	Perc.
1	Urban	0	0	0	14	45	166	230	68	71	79	673	14.42
2	Rural	0	1	4	10	111	466	1562	738	673	429	3994	85.58
3	Total	0	1	4	24	156	632	1792	806	744	508	4667	100

Source: Indapur Tehsil Health Office, Indapur.

Above Table and figure shows the month wise infection of corona virus. After the first five cases during 27th April to 20th May 2020, there were no more confirmed COVID-19 cases was not found for the next two months. The COVID-19 cases appeared again from 3rd June 2020 onwards. These cases are

Status of Covid -19 Pandemic In Indapur Tehsil

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Synthesis of 3D nanoflower-like mesoporous $NiCo_2O_4$ N-doped CNTs nanocomposite for solid-state hybrid supercapacitor; efficient material for the positive electrode

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ABSTRACT

In this research work, we report a novel method for developing ternary $NiCo_2O_4$ compounds using deep eutectic solvents (DESs) and a strategy for improving their pseudocapacitive performance. $NiCo_2O_4$ composites with N-doped carbon nanotubes (NCNTs) were fabricated on Ni foam using a hydrothermal method. The electrochemical performance of the $NiCo_2O_4$ was altered with the change in the reaction temperature. The composite of $NiCo_2O_4$ and NCNTs demonstrated a maximum value of specific capacity of 303 mAh g^{-1} at a scan rate of 5 mV s^{-1}. The specific capacity for the composite compound was 1.3-fold greater than that of the pristine $NiCo_2O_4$ sample. For practical applications, we constructed a flexible solid-state hybrid supercapacitor comprised of $NiCo_2O_4$/NCNTs//activated carbon (AC) cells with an excellent energy density of 12.31 Wh kg^{-1}, outstanding power density of 8.96 kW kg^{-1}, and tremendous electrode stability. The three-dimensional mesoporous nanoflowers and nanotubes-like nanostructures of $NiCo_2O_4$ are well-suited for use in hybrid devices as well as convenient for flexible electronic devices.

1. Introduction

Supercapacitors are actively being investigated by researchers for extended commercial use due to the increasing demand for energy storage devices in smart-grid digital electronic gadgets [1]. However, supercapacitors are currently limited by their low energy density compared to Li-ion batteries. Therefore, improving the energy density is the fundamental goal of current supercapacitor research. To this end, many attempts have been made to develop highly efficient supercapacitive materials such as metal oxides, chalcogenides, polymers, polyoxometalates, metal-organic frameworks, Mxene, and siloxene [2,3]. The combination of two different metals to form bimetallic oxides is also an efficient approach to enhance the electrochemical performance of supercapacitors compared to bare metal oxides [1,4].

Recently, various binary and ternary metal oxides have been synthesized for supercapacitor applications including $MnCo_2O_4$, $FeCo_2O_4$, $CoFe_2O_4$, $ZnFe_2O_4$, and $ZnCo_2O_4$, $NiCo_2S_4$, $NiCo_2Se_4$, etc. Among them, the $NiCo_2O_4$ is widely used as a supercapacitor electrode because of its various properties like good electrical conductivity, excellent redox activity, long-term stability, environmental nontoxic, easily available on the earth, and simple preparation [5]. Interestingly, $NiCo_2O_4$ has been utilized for various applications in several research fields such as supercapacitors, Li-ion batteries, water splitting, solar cells, oxygen reduction, hydrogen evolution, and electrocatalysts [1,3]. Recently, many researchers focus on the ternary $NiCo_2O_4$ nanocompounds with various nanostructures for supercapacitor applications. Because, it offers good electrical conductivity and better electrochemical performance, faster redox reaction, multivalence states of Ni^{3+}/Ni^{2+} and Co^{3+}/Co^{2+}, good cycling stability as compared to the binary NiO and Co_3O_4 [3].

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Review—Mitigating Supercapacitor Self-Discharge Through Strategic Materials Modification

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A high-power density, rapid charge-discharge and long cycle life are important features of supercapacitors (SCs). However, SCs are mainly suffered from their high self-discharge (SD) which is a spontaneous decay of voltage with time under open-circuit conditions. Due to SD behavior, SCs cannot be employed or coupled with many important energy harvesting devices including piezoelectric and triboelectric nanogenerators. It is highly desired to develop different innovative strategies to mitigate the SD. This review aims at discussing a SD mechanism and reviewing different mitigation strategies based on the modification of materials and devices. We discuss design, underlying principle, mechanism of the mitigation strategies and corresponding SD performance in detail. Moreover, the summary and prospects in this field have been provided. It is recommended to test an individual electrode for SD, identify the mechanism and develop different strategies for suppression. This review will be beneficial for researchers around the world to have a better understanding of the SD mechanism and to develop innovative strategies for SD mitigation and thereby the high-performance SCs.
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As a high-performance energy storage device, supercapacitor (SC) has gained major interest owing to its rapid charging-discharging ability, high power density and long cycle life.[1–5] Based on electrode material used, SCs are classified into electric double-layer capacitors (EDLC) and pseudocapacitors.[6–9] The EDLC stores charge via physical adsorption/desorption of electrolytic ions on the electrode surface, whereas, pseudocapacitor stores charge via fast redox reaction at/near the surface of the electrode.[10–12] SCs are normally characterized by their energy density, power density and cycle life, however, one of the important parameters, such as self-discharge (SD) is often ignored by the research community.[13,14] The SD is nothing but the spontaneous voltage decay of charged SC with time in the absence of an external load. Since the energy and power densities are voltage-dependent parameters, the loss of a significant amount of energy due to SD has raised a question on the energy storage efficiency of SCs. The SD rate in SCs is greater than the batteries, in conventional SCs, the voltage reduces about 40% after 12 h.[15] This is a serious decrement since SCs are mainly utilized in the first half of their operating potential window. Owing to this limiting character, SCs cannot be employed or coupled with many important energy harvesting devices including piezoelectric and triboelectric nanogenerators.[16] Previously, different models have been developed to study and predict the SD mechanism.[17–20] The SD originates due to the higher thermodynamic state of the charged SCs from which it finds ways to naturally relax and return to the lower energy state (uncharged). In general, the main contributions to the SD are ohmic leakage, parasitic faradaic reaction and charge redistribution.[21–23] It is imperative to identify the main SD mechanism involved in a particular electrode or device and develop different strategies to mitigate it. Previously, different strategies have been developed and effectively employed on the materials and device level. However, in literature, most of the SD profiles are obtained for full cells rather than for individual electrodes. Besides, the data has been poorly analyzed and presented. Therefore, it is the need of the hour to discuss different SD mechanisms, find efficient methodologies for identifying the mechanism and recognize effective strategies from the literature. There are very few review articles focusing on SD, for instance, Ike et al.[13] emphasized understanding the SD mechanism and its suppression in electrochemical SCs and hybrid SCs. In another perceptive review, Andreas[24] touched upon some important aspects such as the theoretical background, identification of SD mechanism and future directions. Recently, the work of Liu et al.[25] have sufficiently reviewed the SD mechanism and different strategies of suppression, however, recent important developments and comprehensive description of strategies are missing.

Herein, we updated an SD mechanism by referring to recently published important contributions. Furthermore, different strategies have been reviewed and classified based on their employment made not only on materials but also on device level to mitigate the SD. We discussed mitigation strategies, their design, underlying principle, mechanism and corresponding SD performance in detail. Moreover, the summary and prospects in this field have been provided.

Self-Discharge Mechanism

The SD of a conventional capacitor is governed by the equation $V = V_{initial}e^{\frac{-t}{RC}}$ where V, $V_{initial}$, R and C are potential difference, initial voltage, ohmic resistance and capacitance, respectively. In this case, the SD process is completed within microseconds that leads to negligible retention of energy. The RC is the time constant which is the intrinsic property of the capacitor that decides the value of SD.[26] However, in SCs, the SD mechanism involves mainly three processes, (1) ohmic leakage between the electrodes of a full cell, (2) parasitic faradaic reactions on the electrode surface and (3) the charge redistribution.

Self-discharge due to ohmic leakage.—The ohmic leakage between the electrodes is the least discussed mechanism because it is originated due to the faulty construction of the cell (Fig. 1a). This can be avoided by eliminating the resistive pathways which connect the positive and negative electrodes. This can be easily identified by modeling the SD profile using the equation, $\log\left(\frac{V_t}{V_i}\right) = \frac{-t}{RC}$. As shown in Fig. 1d, if the plot of $\log\left(\frac{V_t}{V_i}\right)$ versus the time (t) is a straight line, the main contribution to SD will be due to the ohmic leakage.

Self-discharge due to parasitic faradaic reactions.—In this type, SD takes place due to the oxidation and reduction reactions on the charged electrode surface that lead to the discharge of the electrode and the overall cell (Fig. 1b). This can be easily understood by the following reactions at positive and negative carbon electrode surfaces (C) in sulfuric acid.[24]

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Impact of Annealing Temperature on the Morphological, Optical and Photoelectrochemical Properties of Cauliflower-like $CdSe_{0.6}Te_{0.4}$ Photoelectrodes; Enhanced Solar Cell Performance

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Abstract: We are reporting on the impact of air annealing temperatures on the physicochemical properties of electrochemically synthesized cadmium selenium telluride ($CdSe_{0.6}Te_{0.4}$) samples for their application in a photoelectrochemical (PEC) solar cell. The $CdSe_{0.6}Te_{0.4}$ samples were characterized with several sophisticated techniques to understand their characteristic properties. The XRD results presented the pure phase formation of the ternary $CdSe_{0.6}Te_{0.4}$ nanocompound with a hexagonal crystal structure, indicating that the annealing temperature influences the XRD peak intensity. The XPS study confirmed the existence of Cd, Se, and Te elements, indicating the formation of ternary $CdSe_{0.6}Te_{0.4}$ compounds. The FE-SEM results showed that the morphological engineering of the $CdSe_{0.6}Te_{0.4}$ samples can be achieved simply by changing the annealing temperatures from 300 to 400 °C with intervals of 50 °C. The efficiencies (η) of the $CdSe_{0.6}Te_{0.4}$ photoelectrodes were found to be 2.0% for the non-annealed and 3.1, 3.6, and 2.5% for the annealed at 300, 350, and 400 °C, respectively. Most interestingly, the PEC cell analysis indicated that the annealing temperatures played an important role in boosting the performance of the photoelectrochemical properties of the solar cells.

Keywords: electrodeposition; $CdSe_{0.6}Te_{0.4}$; thin films; XRD; EDS; DSSC; solar cell

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1. Introduction

With the rapid increase in the world's population and environmental pollution, there is limited availability of energy sources. A worldwide demand therefore exists for new energy sources that are clean, cost-effective, and simple and that do not cause environmental pollution [1,2]. Various energy storage devices available on the electronic markets include fuel cells [3], solar cells [4,5], H_2 evolution systems [6,7], light-emitting diodes (LED) [8], capacitors [9], supercapacitors [10,11], and batteries [12]. Among these, the photoelectrochemical (PEC) cell is the best electronic device because of the easy and whole-day availability of sunlight on Earth, whereas the convenience of the other sources of materials is geographically limited. To improve the electrical properties of its solar cells, the PEC has two main principal requirements, which are related to the band gap energy and the stability of the photoelectrodes. First, the photoelectrode should provide the band gap of materials whose band gap energy is nearly matched to the extreme sunlight intensity in the visible spectrum to use the solar spectrum resourcefully (1–3 eV). Second, the semiconductor photoelectrode materials need to be stable with respect to the 1 M polysulfide ($NaOH:Na_2S:S$) liquid electrolytes during the PEC measurements.

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Review

COVID-19 Pandemic: Public Health Risk Assessment and Risk Mitigation Strategies

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Abstract: A newly emerged respiratory viral disease called severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) is also known as pandemic coronavirus disease (COVID-19). This pandemic has resulted an unprecedented global health crisis and devastating impact on several sectors of human lives and economies. Fortunately, the average case fatality ratio for SARS-CoV-2 is below 2%, much lower than that estimated for MERS (34%) and SARS (11%). However, COVID-19 has a much higher transmissibility rate, as evident from the constant increase in the count of infections worldwide. This article explores the reasons behind how COVID-19 was able to cause a global pandemic crisis. The current outbreak scenario and causes of rapid global spread are examined using recent developments in the literature, epidemiological features relevant to public health awareness, and critical perspective of risk assessment and mitigation strategies. Effective pandemic risk mitigation measures have been established and amended against COVID-19 diseases, but there is still much scope for upgrading execution and coordination among authorities in terms of organizational leadership's commitment and diverse range of safety measures, including administrative control measures, engineering control measures, and personal protective equipment (PPE). The significance of containment interventions against the COVID-19 pandemic is now well established; however, there is a need for its effective execution across the globe, and for the improvement of the performance of risk mitigation practices and suppression of future pandemic crises.

Keywords: pandemic crisis; SARS-CoV-2; coronavirus; risk assessment; risk mitigation; administrative controls; engineering controls

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1. Introduction

Coronaviruses were generally not considered highly infectious to humans before 2002; however, after the occurrence of the severe acute respiratory syndrome (i.e., SARS; 2002) [1,2], Middle East respiratory syndrome (i.e., MERS; 2015) [3,4] and COVID-19 pandemic attracted serious attention of the scientific community and public health authorities. SARS-CoV-2 is the ninth known coronavirus to cause infections in humans, causes severe respiratory illness, and breathing discomfort. Its symptoms are similar to those of pneumonia and seasonal Influenza virus, as well as some other coronaviruses [5,6]. Notably, the worldwide spread of this virus was observed within a few months of its first appearance in December 2019 at Wuhan, China [7]. The SARS-CoV-2 outbreak has created a prolonged global public health and economic crisis and created confusion over the need for travel bans and border closures, the closure of educational institutions and businesses, and the implementation of preventive measures [8].

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Article

Histidine Functionalized Gold Nanoparticles for Screening Aminoglycosides and Nanomolar Level Detection of Streptomycin in Water, Milk, and Whey

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Abstract: Aminoglycoside (AMG) antibiotics are being applied to treat infections caused by Gram-negative bacteria, mainly in livestock, and are prescribed only in severe cases because of their adverse impacts on human health and the environment. Monitoring antibiotic residues in dairy products relies on the accessibility of portable and efficient analytical techniques. Presently, high-throughput screening techniques have been proposed to detect several antimicrobial drugs having identical structural and functional features. The L-histidine functionalized gold nanoparticles (His@AuNPs) do not form a complex with other tested antibiotic classes but show high selectivity for AMG antibiotics. We used ligand-induced aggregation of His@AuNPs as a rapid and sensitive localized surface plasmon resonance (LSPR) assay for AMG antibiotics, producing longitudinal extinction shifts at 660 nm. Herein, we explore the practical application of His@AuNPs to detect streptomycin spiked in water, milk, and whey fraction of milk with nanomolar level sensitivity. The ability of the analytical method to recognize target analytes sensitively and rapidly is of great significance to perform monitoring, thus would certainly reassure widespread use of AMG antibiotics. The biosynthesis of hybrid organic–inorganic metal nanoparticles like His@AuNPs with desired size distribution, stability, and specific host–guest recognition proficiency, would further facilitate applications in various other fields.

Keywords: histidine; gold nanoparticles; aminoglycoside; antibiotics; colorimetric changes; spectral shift; real samples; milk samples; whey fraction

1. Introduction

Antibacterial drugs have been commonly applied as human and veterinary medicine to treat a wide range of infectious diseases [1–3]. Aminoglycosides (AMG) are broad-spectrum antibiotics, are commonly prescribed for humans and a range of livestock, mainly for infections caused by Gram-negative bacteria. Thus, there is an ever-growing concern of direct exposure of residual drugs [4] and adulteration of the food chains [4–6]. Besides this, AMG antibiotics induce adverse effects on human health include allergic reactions [7], cytotoxicity [8,9], nephrotoxicity [10], as well as negative impacts on the environment and risk of antibiotic resistance [11–13]. In this account, we target the development of an

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Review

MOFs-Graphene Composites Synthesis and Application for Electrochemical Supercapacitor: A Review

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Abstract: Today's world requires high-performance energy storage devices such as hybrid supercapacitors (HSc), which play an important role in the modern electronic market because supercapacitors (Sc) show better electrical properties for electronics devices. In the last few years, the scientific community has focused on the coupling of Sc and battery-type materials to improve energy and power density. Recently, various hybrid electrode materials have been reported in the literature; out of these, coordination polymers such as metal-organic frameworks (MOFs) are highly porous, stable, and widely explored for various applications. The poor conductivity of classical MOFs restricts their applications. The composite of MOFs with highly porous graphene (G), graphene oxide (GO), or reduced graphene oxide (rGO) nanomaterials is a promising strategy in the field of electrochemical applications. In this review, we have discussed the strategy, device structure, and function of the MOFs/G, MOFs/GO, and MOFs/rGO nanocomposites on Sc. The structural, morphological, and electrochemical performance of coordination polymers composites towards Sc application has been discussed. The reported results indicate the considerable improvement in the structural, surface morphological, and electrochemical performance of the Sc due to their positive synergistic effect. Finally, we focused on the recent development in preparation methods optimization, and the opportunities for MOFs/G based nanomaterials as electrode materials for energy storage applications have been discussed in detail.

Keywords: coordination polymers MOFs; graphene; supercapacitors; chemical method; nanomaterials; porous nanostructures

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1. Introduction

Restrictions in renewable energy resources and the rising air pollution have catalyzed the request for green and clean sustainable energy. To solve this problem, researchers from around the globe have been actively working on the development of a novel composite electrode material for the efficient environmental remediation, conversion, and storage of electrical energy in the form of electrochemical energy [1]. In the electric market, the main two systems are available batteries and supercapacitors (Scs). Among these electrochemical energy storage devices, batteries store charge via the oxidation/reduction of electrode-active materials and/or intercalation/de-intercalation of the ions into/out of the electrode

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Review

Significance of Immune Status of SARS-CoV-2 Infected Patients in Determining the Efficacy of Therapeutic Interventions

Ganesh Dattatraya Saratale [1], Han-Seung Shin [1], Surendra Krushna Shinde [2], Dae-Young Kim [2], Rijuta Ganesh Saratale [3], Avinash Ashok Kadam [3], Manu Kumar [4], Ali Hassan Bahkali [5], Asad Syed [5] and Gajanan Sampatrao Ghodake [2,*]

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Abstract: Coronavirus disease 2019 (COVID-19) is now being investigated for its distinctive patterns in the course of disease development which can be indicated with miscellaneous immune responses in infected individuals. Besides this series of investigations on the pathophysiology of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), significant fundamental immunological and physiological processes are indispensable to address clinical markers of COVID-19 disease and essential to identify or design effective therapeutics. Recent developments in the literature suggest that deficiency of type I interferon (IFN) in serum samples can be used to represent a severe progression of COVID-19 disease and can be used as the basis to develop combined immunotherapeutic strategies. Precise control over inflammatory response is a significant aspect of targeting viral infections. This account presents a brief review of the pathophysiological characteristics of the SARS-CoV-2 virus and the understanding of the immune status of infected patients. We further discuss the immune system's interaction with the SARS-CoV-2 virus and their subsequent involvement of dysfunctional immune responses during the progression of the disease. Finally, we highlight some of the implications of the different approaches applicable in developing promising therapeutic interventions that redirect immunoregulation and viral infection.

Keywords: coronavirus; SARS-CoV-2; immune response; therapeutic interventions; immunopathogenesis

1. Introduction

In consideration of public health emergency and global reach, on 11 March 2020, the World Health Organization (WHO) specified coronavirus disease 2019 (COVID-19) as a global pandemic outbreak of international public health concern [1]. A novel, highly transmissible enveloped RNA betacoronavirus unexpectedly emerged in December 2019 in Wuhan, China, and then was formally named as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2. The most common clinical symptoms and manifestations of SARS-CoV-2 infection are pneumonia-like, including fever, hypoxia, dyspnea (labored breathing), headache, myalgia, cough, and in some cases, intestinal symptoms [2,3]. COVID-19 is now characterized as a mild to severe respiratory disease, and its clinical presentation

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Effect of Customized Training Programme on Selected Physical Fitness Variables of College Female Students

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Abstract:

The primary purpose of the study was to find out the effect of Customized training on selected physical fitness variables among college female students. The study was hypothesized that there would be significant difference in improving muscular strength and muscular endurance due to the effect of training programmes among college female students. To achieve the purpose of this study convenient, available and interested (N=75) female students will be randomly selected from Girls Hostel of Arts, Science and Commerce College, Indapur affiliated to the Savitribai Phule Pune University of Pune, Maharashtra. Their age ranged from 18 to 22 years. Non-equivalent control group design with repeated measures was used for this study. They will be assigned into three equal groups with (N=25) female students by lottery technique. Two experimental groups, namely Functional exercise Training Group I and Yogic Exercise Training Group II and one act as Control Group III. Customized training programme of 12 weeks 3 alternate days a week was applied on experimental groups. Taking consideration of the feasibility criteria availability of instrument and the relevance of the variable to the study, selected variables upper and lower body muscular strength and endurance were measured by using standard testing procedure of muscular strength of upper body by modified push ups, for abdominal strength by modified Sit-ups and muscular strength of lower body by Squats. The data was collected before training, during training and end of the training. The data was analysed by applying repeated measure ANOVA test and post Hoc test. The level of significance was set at 0.05. The result of the study reveals that, there is significant effect of functional exercise training as well as Yogic exercise training on dependent variables.

Key words: Functional exercise and Yogic exercise training, Muscular strength and endurance

Introduction:

Muscular strength and muscular endurance is one of the most important factors of physical fitness. It is important for daily life to do activities like lifting, pushing. Daily exercise and physical activities enhance muscles strength and endurance. Exercises are done by turning, bending and stretching the body. The movement of each and every part of the body is an ideal exercise. Walking, Running, Cycling, Playing, Skipping, as well as Yoga are common exercises which keep people Fit. (Namita Jain., 2013.)

Normally in India scenario girls are restricted and threatened by the parents, family member, and close relatives. They are under psychological pressure that they should come back to their own home in a stipulated time. Indirectly this restricts their movements. As they are not allowed move to side and there is no house hold work there remains no exercise to them in seating in front of T.V. for watching programs or using smart phones continuous. In rural area only 11.6% students are participating in physical activities conducting by college. (Ravi Shekhar. 2016)

Sports participation of girls at higher secondary school and College level

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Abstract:

Participating in sports and games has a positive impact in many areas. It supports improves social skills along with promoting physical health and positive mental health. Participating in games and sports develops healthy living habits that beneficial for developing self-confidence, coordination, strength and promotes physical fitness.

The study was carried out in two co-education institutions.The data for the paper comes from twenty seven in-depth interviews with higher secondary school girls and college girls students aged between 17 to 22 years. The respondents belonged to rural areas as well as from urban areas. The sample size was carrying out with the help of theoretical sampling technique. The interview consisted of open-ended questions. When the college girls' students were asked about their participation in sports, based on the information they provide conclusions have been drawn. The data were analysed in accordance with the principles of qualitative data analysis.

Key words: Participation in sports, Higher Secondary School, College Girls Students, physical fitness

Introduction:

The culture of sport itself presents a problem.Women were allowed to participate for the first time at the 1900 Paris Olympic Games with the inclusion of women's events in lawn tennis and golf only. Women participate in swimming events for the first time in 1912, but none of them was from America. In 1992 Olympic they did not allow its female athletes to compete in events without long skirts. In swimming the first women gold medal was won by the Australian Sarah 'Fanny' Durack, who won the 100m freestyle in 1912. In **1928**, women allowed to participate in track and field events for the first time. In 1984 Women's shooting events were first included in the Olympics.Women's athletics and gymnastics introduced at the 1928 Olympics. The 2000 Olympics was the first time weightlifting was allowed to compete in the Olympics for women. A women's wrestling competition was introduced in **2004**.

Games and sports have greatly strengthens the body, improving the body's defensive system to hold any of the diseases alone. Many studies highlight that with constant involvement of the students in the games and sports they tend to increase their immune system and thus are better able to fight against the diseases. Playing indoor games or outdoor games have huge impact on holistic development of child.

Resistance towards sports and games of school and college younger generation is often affected by modern forms of entertainment like online gaming, videos, what's up and instagram etc. Therefore, the younger generation tends to lean more towards virtual online gaming worlds so the drive for sports activities has lost its entertaining attraction. Developing entertainment outlets like social media has only made sports events much less popular. Importance of sports and games is repeatedly undecided by the parents as well as the students. Playing indoor games or outdoor have huge impact on holistic development of child. Indoor or outdoor games and sports not only involve the development of skills but it also stimulates competitive behaviour among students. It makes confidence in the minds of the students. It not only strengthens the physical development but it also contributes towards the mental growth.

04

Impact of Inculcating Sports Culture in Higher Education through Best Practices

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Abstract:

Inculcating sports temperament amongst the students was a challenging task. It has been seen that there is always poor response in sports activities at UG & PG level. In a sustainability of sports culture amongst the youth, we have adopted various innovative practices since past few years. The activities like 'karke to dekho', 'sports week' iPL enhanced sports activities in college and helps to grow the continuous participation and achievement of students through various games at the college, university, state and national levels. Also it was observed that the students who were toppers improved their academic records involving in either sport.

Keywords: Karke to dekho, Sports, Academic, Strength, Physical Activity etc.

Introduction:

The intention of the present investigation was to determine and check the impact of best innovative practice in higher education through improving sports culture. It has been seen that the independent contributions of physical activity not associated with structured physical education and school based physical education participation to academic Early research shown that, educators should recognize that activity- based physical education is not negatively associated with achievement, but provides a great potential avenue for improving cognitive functioning indices that should translate into improved academic performance.[1]

According to WHO report, physical activity and healthy sports are essential for our health and wellbeing. Appropriate physical activity and sports for all constitute one of the major components of a healthy lifestyle, along with healthy diet, tobacco free life and avoidance of other substances harmful to health. The recent research shown that the regular practice of appropriate physical activity and sports provides people, male and female, of all ages and conditions, including persons with disability, with wide range of physical, social and mental health benefits.[2]

There has been three step search method adopted by the researchers to identify studies that used measures of physical activity or fitness to assess either degree of association with or effect on academic achievement and cognitive performance.[3] Researchers introduced a novel framework for understanding the relationships between physical activity (and specific forms of activity like sports) and different aspects of human development. It was proposed that the outcomes of physical activity can be framed as differential 'capitals' that represent investments in domain-specific assets- Emotional, Financial, Individual, Intellectual, Physical, and Social.[4]

The further study emphasized on moderate physical activity and the focus on integration of physical activity into one's lifestyle which offers additional opportunities for sedentary individuals to improve their health through participation in physical activities that are enjoyable, personally meaningful and fit more easily into daily schedules.[5]

There had been examined the association between physical activity (PA), physical fitness, and health-related quality of life (HRQOL) among school-aged children; that were posi-

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Rainfall Runoff in the Indapur Tahsil

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Abstract: General hydrological equation to compute runoff has been estimated. The average surface water village wise runoff of the study area is estimated. There is great deal of variations in terms of volume of runoff by different villages. The entire tahsil is drought prone and faces the problem of water scarcity throughout the year. Observing these outcomes in the present context, this paper calculates the rainfall runoff in the Indapur tahsil. The outcomes of these studies are briefly presented in this paper. It has been observed that the very high runoff found in the study area.
Key words: Rainfall, runoff, surface water, groundwater

Introduction

The nature and distribution of rainfall of the study area discussed earlier indicates that about 90 percent rainfall takes place during the short period of four months from June to September. There is a great variation in the number of rainy days. The maximum water holding capacity of soils is the basic controlling elements of runoff. Outputs are the processes that remove water from the system; these include evapotranspiration, the various uses of water by humans, and outflow from surface water and groundwater. In the present study examined the rainfall runoff in the Indapur tahsil.

Objectives

1. To calculate the runoff of the study area.
2. To make favourable suggestions to low runoff and sufficient water available

Study area

The area extends from 17° 53′ 42" to 18° 19′ 58" North latitudes and 74° 39′ 16" to 75° 09′ 39" East longitudes **(Fig. 1)**. The area is drained by the river Bhima on north and east both sides. Nira River flows south of Indapur tahsil. Total geographical area of the tahsil is 1575.38km^2 (Census 2011), out of which Nira river catchment area compress about 586.8 km^2 and Bhima river catchment covers an area of 902.43km^2. Nira River joins the Bhima River at famous tourist place i.e. Narsinhapur village after travelling a course of 209 Kms from origin. The slope of region is towards east. There are three soil types, namely, coarse shallow, medium black and deep black soils occupying 30, 40 and 30 percent respectively.

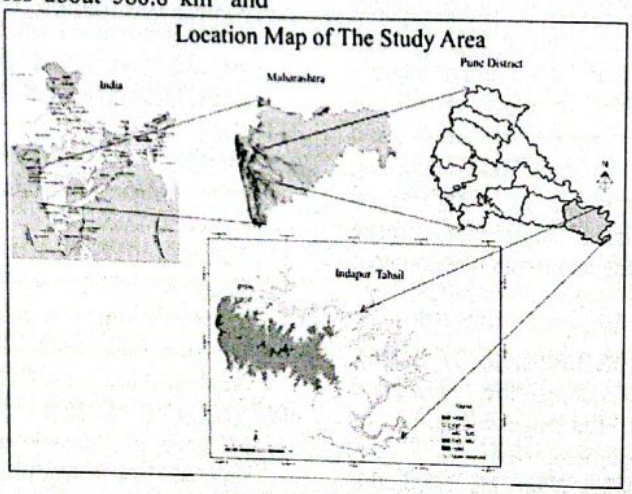

Fig. 1 Location map

Database and methodology

For the present research work secondary data source are used. This work is to develop digital database at large scale using spatial and attribute data All the supported data is collected from survey of India, Maharashtra Governments department of irrigation, department of water conservation. The Dickens, Inglis and Nawab Ali Jung Bahadur formula was used to estimate the runoff. These data base converted to Microsoft access format to suit to the link up for processing through Arc View 9.3, Global Mapper version 11.

Water Estimation of the Indapur Tahsil

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Abstract

A water estimate commonly provides the info of quantity and place of it. Water estimate studies consider the volumes of water within the various reservoirs of the hydrologic cycle and the flow paths from recharge to discharge. The reservoirs of surface and underground water are about 1542.695 MCM; Out of this only 601.38 MCM water is required for use. Water estimate are developed by measuring or estimating the inputs and outputs of a hydrologic system. Inputs are the processes that add water to the system; these include precipitation and inflow from surface water and groundwater. Outputs are the processes that remove water from the system; these include evapotranspiration, the various uses of water by humans, and outflow from surface water and groundwater. General hydrological equation to compute water balance and runoff has been estimated. The average surface water village wise runoff of the study area is estimated. There is great deal of variations in terms of volume of runoff by different villages. The entire tahsil is drought prone and faces the problem of water scarcity throughout the year. Observing these outcomes in the present context, this paper calculates the water budget of the Indapur tahsil. The outcomes of these studies are briefly presented in this paper. It has been observed that the water resources are not uniformly available in the study area.

Key words: Precipitation, evapotranspiration, runoff, surface water, groundwater water balance, water estimation.

Introduction

A water estimate is a basic tool that can be used to evaluate the occurrence and movement of water through the natural environment. Water estimate provide a foundation for evaluating its use in relationship to other important influencing conditions such as other ecological systems and features, as well as social and economic components – how much water is being used by agriculture, industry and residents etc. The water estimate process can encompass various levels of assessment which start simple and grow more complex if there are concerns about how much water is available at any level. Water estimate commonly provides the info of quantity and place of it. Water estimate studies consider the volumes of water within the various reservoirs of the hydrologic cycle and the flow paths from recharge to discharge. Water budgets need to consider this information on a variety of spatial and temporal scales (Hazel Breton 2010). The maximum water holding capacity of soils, rainfall and potential evapotranspiration are the basic controlling elements of water balance. The distribution of these elements decides droughts or water surplus condition. Therefore rainfall, potential evapotranspiration, aridity, humidity and soil moisture are become primary controlling factors of agriculture (Saikia 1994). In the present study water balance technique is used to estimate the availability of rainwater resource in the study area. The nature and distribution of rainfall of the study area discussed earlier indicates that about 90 percent rainfall takes place during the short period of four months from June to September. There is a great variation in the number of rainy days.

Objectives

1. To identify inputs and outputs of a hydrologic system
2. To identify place and quantity of water.
3. To calculate the runoff of the study area.
4. To make favourable suggestions to low runoff and sufficient water available.

Study area

Indapur tahsil is one of the tahsils in the Pune district consisting of 142 villages along with one urban centre in the study area. There are eight revenue circles in the tahsil. The area extends from 17° 53′ 42" to 18° 19′ 58" North latitudes and 74° 39′ 16" to 75° 09′ 39" East longitudes **(Fig. 1)**. The area is drained by the river Bhima on north and east both sides. Nira River flows south of Indapur tahsil. Total geographical area of the tahsil is 1575.38km^2 (Census 2011), out of which Nira river catchment area compress about 586.8 km^2 and Bhima river catchment covers an area of 902.43km^2. Nira River joins the Bhima River at famous tourist place i.e. Narsinhapur village after travelling a course of 209 Kms from origin. The slope of region is towards east. There are three soil types, namely, coarse shallow, medium black and deep black soils occupying 30, 40 and 30 percent respectively.

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Socioeconomic Impact and Environmental Status in Ujjani Dam Affected Area of Indapur Tehsil, Dist - Pune (MH)

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Abstract: ***Ujjani dam project provides the opportunity to study the current status of livelihoods of the people affected by the dam, and the aftermath of displacement and rehabilitation. The livelihoods of project - affected people (PAP) are still at risk from the development of the ujjani dam. In the case of the dam many studies that have been done on the resettlement and rehabilitation policy. Due to a large submersion of forest and agriculture land by the reservoir, over 4, 000 families were classified as affected according to the Government of India. Those who received official designation as Project Affected People (PAP) some studies estimate that the number of families and people affected is much greater than the number accounted for by the Indian government's policies. Some estimates project that nearly 10, 000 people have been affected by this phase of the dam development. The numbers of families living around the dam and reservoir who require compensation due to impacts of the dam. Some of the major's issues and conclusions that emerge from this review. It has invariably led to dispersal of communities, breakdown of traditional support systems and devaluation of their cultural identity and curtailed their access to natural resource base, affecting their mental and physical wellbeing. The resettlement and rehabilitation process is largely dependent and affected by the lifestyle of the families before displacement.***

Keywords: Questionnaires Method, Physico-chemical parameters of soil water

1. Introduction

Project affected persons (PAP) is a broad term which includes all those who are adversely affected by Dam project. To focuses on Socio - economic status of these populations with the help of questionnaire and interview methods due to which to understand the present status of the project affected families. For the rehabilitation of families who have lost their houses and land in ujjani irrigation project, the authorities have selected some sites near Pandharpur for their rehabilitation. Environmental Assessment (EA) is a comprehensive process to identify and evaluate the potential effects of a proposed major project and ways to avoid adverse effects and led to dispersal of communities.

Hydrology is the study of the movement distribution and quality of water throughout the earth. The study of the distribution and movement of groundwater is hydrogeology. Climate change causes unpredictable fluctuations in rainfall and hydrology [1]The study of glaciers is glaciology and distribution of oceans is oceanography. The collective mass of water found on under and over the over a surface of a planet is called hydrosphere. Earth's approximate water volume is 1360, 000, 000 km³ of this volume.

a) Effects of dams on the atmospheric system
Variations in moisture percentage, temperature and air body movement caused by the water bodies differentiate the climatic conditions related to topography. Regional scaled climatic changes can be observed by these effects. As climate change increases, effective planning to avoid cost overrun will become nearly impossible. Climate change causes unpredictable fluctuations in rainfall and hydrology such alterations don't affect human health directly, but they are notable from many plants and animals. Their secondary effects influence human being.

b) Effects of dams on territorial biological system
Biological life of the river changes fast both in the reservoir and in downstream. During the filling works of the dam, while the land remains under water the land part of the region decreases. However, the water - land boundary extends. Thus plant, animal or human being settlement areas changes. Forests, agricultural areas may come under water. Compulsory changes occur in flora, fauna and the algae and the agricultural traditions of people in the region. This effect can extend for kilometers.

c) Effects of dams on aquatic ecosystem
The decomposing of organism causes increase in the nutrient substance in water body in a short period of time. Therefore, BOD (biological oxygen demand) value of water increases. The plants covering the water surface as large green–dark bodies, macro flora grow upon the water surface.

d) Effects of dams on human life
The dams are an important for development; they are not easily acceptable for the people whose agricultural areas, houses on the environment they are living in go under water. For example, when the ujjini dam was created in Solapur district in ujjini village, although a much better settlement area was provided for 20, 000 people in another location. the new settlement improve by this way and result in second ecological needs and changes. For example, drinking water, domestic water waste, water waste treatment etc. moreover, the social life becomes active, trade increases, cultural activities rise. Dams decrease the flood risk in the downstream, by their storing opportunity in their reservoir.

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Assesment of Soil Quality Parameters of Ujjani Dam Affected Areain Indapur Tehsil (MH)

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ABSTRACT:
Soil is the essential medium on which agriculture is supported. Water is equally important resource for agriculture. Soil is composed for four major constituents as inorganic particles, organic matter, water and air.Conservation of water has got special importance in increasing the agricultural productivity and maintaining nature and quality of soils. The soil samples were collected in the study area are sampling sites as Palasadev, Kalthan, Shaha, Kuroli etc. Physicochemical parameter analysis of soil of study area should be extensively monitored since deterioration of soil and water quality was clearly observed.

KEY WORDS: Physicochemical parameter of soil, Questionnaire Survey, Occupation Status.

I. INTRODUCTION:

The most challenging social impact of dam is the displacement of native people. After resettlement, the displacement of native people have faced many social problem such as disturb family relationship, poor drinking water facilities, lack of infrastructure amenities, lack of educational, medical, road and transportation, electrical facilities, absence of public toilet facilities, deficiency of market Centre.[1]The Irrigation has played an important role in changing the agricultural scenario and brought about lot of change in the social,political and economic factor .However introduction of large scale irrigation coupled with overuse of chemical ,fertilizers and practicing of monoculture type of cropping pattern have accelerated the process of soil and water degradation in the study area This degradation includes water logging soil salinity and water quality deterioration. Therefore environmental regulatory bodies such as Environmental Department and Water Resources Board should be more aggressive and effective in environmental monitoring, assessment and enforcement of environmental laws and regulations so as to preserve the soil from further degradation.

A dam interrupting a river leads to unpredictable social impact. First, many communities must resettle to provide land for the dam and the reservoir [3]Over irrigation causes rise in the water levels thereby resulting in water logging of the area this leads to continuous decline in agricultural productivity The fact is that irrigation creates a certain risk of soil degradation such degradation depends upon the composition of soil to be irrigated quality of water and management practices adopted these negative impacts on soil as salinity of soil alkalization, water logging, Depletion in soil fertility, Change in soil properties.Farmer adopts cultivation of crop as traditional method. Excess use of industrial effluent, fertilizer cause calcium, magnesium ammonium ions in various amount increasing their concentration in soil and water which leads to water loggings and salinity of soil and water.Soil enzymes are the important moderator and catalysts of significant roles in soil. [4]

Soil enzymes catalyze the cycling of nutrients such as carbon, Nitrogen, Phosphate and Sulphur decomposition in soil,[6]Excessive use of fertilizers particularly in soil under intensive monoculture type of land use leads to lose organic matter and its ability to retain moisture due to this soil erosion and ultimately lose their fertility and productivity. The burning of waste in the site to reduce garbage releases toxic particulate matter and smokes that cause of respiratory complications and other health problems for people and other living organism [5]

Methods of Sampling:

A field can be sampled to estimate its fertility through soil analysis by several methods. A sampling pattern in a heterogeneous land. Analytical methods employed for the soil analysis of samples from the fourvillage area

The Physico–chemical parameters of Soil analyzed in lab by standard Techniques.[2] Soil and water resources are important for environment that is to reduce the erosion rate and the destructive effects of torrential flooding.

१७. महाराष्ट्राच्या राजकारणात मराठा जातीची भूमिका

नामदेव अशोक पवार
संशोधक विद्यार्थी, राज्यशास्त्र विभाग, हिंद सेवा मंडळाचे पेमराज सारडा महाविद्यालय, अहमदनगर.
प्रो. डॉ. दत्तात्रय वाबळे
साहेबराव शंकरराव ढमढेरे कला व वाणिज्य महाविद्यालय, तळेगाव, पुणे.

प्रस्तावना

भारताच्या लोकशाही राजकीय प्रक्रियेवर अनेक घटकांचा प्रभाव सातत्याने पडत असतो त्यामध्ये धर्म, भाषा, जात, पंथ आणि वर्ग इत्यादींचा समावेश होतो. देशाच्या आणि राज्याच्या राजकारणात जातींची भूमिका महत्वपूर्ण राहिलेली आहे. समकालीन सामाजिक शास्त्रांच्या चर्चाविश्वामध्ये जात व राजकारण यांच्या अभ्यासासंदर्भात 'जाती संघटना' (Caste Organization) आणि जातीचा आग्रही आविष्कार (Caste Assertion) यांचे अभ्यास मध्यवर्ती आहेत. प्रस्तुत संशोधनपर लेखांमध्ये महाराष्ट्रातील मराठा जातीच्या बदलत्या राजकीय पार्श्वभूमीवर मराठा सेवा संघाचा उदय कसा झाला याचा शोध घेण्याचा प्रयत्न केलेला आहे.

महाराष्ट्राच्या राजकारणात मराठा ही जात केंद्रभागी होती तसेच सुरुवातीच्या टप्प्यात मराठा जातीच्या नेतृत्वाने सर्वसमावेशक राजकारण करत मराठा जातीच्या राजकारणाला सर्वजातीय संमती मिळवली होती. परंतु १९८० नंतर मराठा जातीच्या राजकारणाचे खच्चीकरण करण्याचा प्रयत्न देशपातळीवरील काँग्रेस नेतृत्वाने पद्धतशीरपणे केला त्याचबरोबर मराठा जातीतील नेतृत्वातही फाटाफूट झालेली दिसून येते, जागतिकीकरण, मंडल आयोगाच्या पार्श्वभूमीवर इतर मागास जातीच्या अस्मिता जाग्या झाल्या व त्या राजकारणात सक्रिय सहभाग घेऊन सत्तेत वाटा मिळवू लागल्या त्याचबरोबर इतर मागास जातीमध्ये जाती संघटनांचा उदय होऊ लागला परिणामी मराठा राजकारणाला शह बसू लागला व मराठा समाजाची आपण राजकारणात डावलले जात आहोत अशी धारणा बनत गेली. या धारणेतून समाजाला एकत्र करण्यासाठी मराठा जातीतही अनेक संघटनांचा उदय होऊ लागला.

जात व राजकारण

ब्रिटिश काळातील जातिव्यवस्थेच्या पारंपरिक संघटनेमध्ये महत्वपूर्ण बदल झालेले आहेत. स्वातंत्र्यानंतरच्या काळात उदार लोकशाही, भांडवलशाही विकासाचे मॉडेल, राजकीय अर्थव्यवस्था इत्यादीच्या स्वीकारामुळे या बदलात गुंतागुंत होताना दिसते. तसेच औद्योगीकरण, शहरीकरण वाढीबरोबर समकालीन जातीचे स्वरूप गुंतागुंतीचे बनले.[१]

राजकारण व समाजातील जाती हा घटक अभ्यासकांचे लक्ष वेधून घेण्यास तीन प्रक्रिया महत्वाच्या आहेत. पहिली प्रक्रिया - आर्थिक क्षेत्रातील बलामुळे जाती व व्यवसाय यातील पारंपरिक स्वरूपाचे संबंध बदलले

Morphometric Analysis of Linear Aspects of Sina River Basin, Maharashtra

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Abstract

Watershed managers require understanding and synthesizing hydrologic response of river basin for which they have started looking into its basin characteristics or morphologic features and establish connection of fluvial geomorphology to hydrology. According to Strahler (1968), the science of geomorphology treats the origin and systematic development of all types of landforms and is a major part of Physical Geography. Drainage basin is an ideal unit of the earth surface for the study of its landform. Therefore the present study deals with the quantitative analysis of selected drainage basin. Using drainage basin as a basic unit in morphometric analysis is the most logical choice because all hydrologic and geomorphic processes occur within the drainage basin. Measurement of shape, or geometry, of any natural form- be it plant, animal, or relief feature- is termed as morphometry (Strahler, 1957). Systematic description of the geometry of a drainage basin and its stream channel system requires measurement of linear, areal and relief aspect of drainage network. In current research paper only linear aspects are analyzed such as stream order, Stream numbers, bifurcation ratio, stream length, mean stream length and stream length ratio.

***Keywords** : Morphometric, drainage network, linear aspects.*

Introduction

Watershed and its characteristics are controlled by nature and its hydro-climatic parameters are mostly interrelated with each other. Watershed managers require understanding and synthesizing hydrologic response of such basin for which they have started looking into its basin characteristics or morphologic features and establish connection of fluvial geomorphology to hydrology. Geomorphology is the study of landforms (valley, gorge, waterfall, cavity, sand-dunes). Worcester defines geomorphology, the interpretative description of relief features. (Worcester, 1948) Drainage basin is an ideal unit of the earth surface for the study of its landform (Singh S. a., 1974). Therefore the present study deals with the quantitative analysis of selected drainage basin. (Singh S. a., 1974). Using drainage basin as a basic unit in morphometric analysis is the most logical choice because all hydrologic and geomorphic processes occur within the drainage basin. The landscape as well as relief features play a dominant role to influence source of transportation, location of cities and agriculture field so their study is great importance and interest to geomorphologist. The aim of the watershed management is to conserve the soil and water resources, so as to achieve improvement in the agriculture. So the emphasis is on the development of regional resources.

Study Area

The basin used in this study is the drainage area of the *Sina* River. It's catchment area of about 12365.3 sq. km. (approximate). Topographically the basin shows low degree of slopes, less dissection index and typical features of Western Ghats at the origin region of river. The *Sina* River basin is part of the upper Bhima river basin situated in the North part of Krishna River Basin. Actually, Sina river have two main tributaries which are arises from two opposite side, one from (West) Village Jamgaon (height 844 m) and another from (East) Village Sasewadi (height 970 m), and meet at Village Sawedi. River Bhogawati, river Upla, river Mehkari, river Kheri are the major tributaries which join Sina river. The latitudinal and longitudinal extension of the entire basin is from 17^0 21' 25.92" N to 19^0 15' 49.32" N and 74^0 28' 46.56" E to 76^0 05' 52.44" E respectively (fig. 1). The eastern part of the basin is comparatively less rugged and possesses flat rolling topography. The region experiences tropical type of climate. The rainfall pattern in the area is highly variable. About 85% of the rains occur in the months of June to September. The rainfall is below 800 mm.

The entire river basin area rather the Deccan plateau portion is mainly formed during the Late Cretaceous to Palaeogene age. The prolonged weathering of these trap rocks gave rise to residual sedimentary rock known as Laterite. Banks of stream are covered with alluvium patches. The upper part is mainly covered with red-brown soil and at places lateritic soils while the lower most portions is known for black cotton soil. The middle part of the basin mostly comprises of coarse shallow soils and alluvium. The lateritic soil is rich in Iron and Alumina.

Effectiveness of Employment Training and Development Programme at *Dudh Ganga Sahakari Dudhutpadak Sangh Limited Indapur Dist. Pune* Maharashtra State

Dr. Gajanan Kadam*

ABSTRACT

Dudhganga Milk grown multi fold and has been known for quality of its raw milk and for offering milk & milk Products Moved by the plight of Milk Farmers being exploited by Milk Dealers, he started milk collection and packing to help reduce Farm to Consumer cycle. Being Farmer, he improvised the systems for milk collection which reduced milk contamination and delivered healthy milk at Dairy.

This project began small with a milk collection of just 12,000 liters of milk every day. Continuous Innovation at Processing and Milk Collection and a dedicated and committed staff has resulted in Dudhganga processing 70 thousand liters milk per day. Dudhganga continues to grow rapidly scaling new milestones every year. It is one of the fastest growing large Dairy units in Maharashtra.

Dudhganga Dairy is based on the traditional values of trust and Farmer welfare. It also follows industry standards that define the quality of its products. The entire process from collecting the milk to delivering the final products moves under strict hygienic conditions and maintaining exceptional work ethics to fulfill international commitments and local standards,in which process departments includes Milk & Milk Products manufacturing, & warehouse. Engineering includes mechanical, electrical, instrumentation, civil, Fire & safety, environment, and support services departments include store, commercial, accounts, canteen, administrative & human resources. In, training of employees at various level gives highest important from human resources point of view. For training of employees, identification of training needs through department head is must. On the basis of requirements human resources is arranging various training programme for employees. Indapur Dairy & Milk Products Ltd this organization selected for project, on the basis of best training practices in present corporate companies. Training improves the efficiency of employee and the ultimately of company. The apprentices working in different factories used toget vocational training when use of computers, automatic machines etc. increased and because of rapidly changing techniques the need of training is recognized as one of the most important organizational activities.

Training held at Dudhganga Sahakari Dudh Utpadak Sangh Limited Indapur is given when there is a difference between the job requirements and employees present with their specifications. Organizational efficiency, productivity, progress, development, organization viability, stability and growth to greater extent depend on training.

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8. Nationalization and Privatization Impact in the Context of Indian Banking Industry

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Abstract

The facilitation of economic transactions and friendly investor environment is undertaken through effective performance of financial systems. Mobilization of savings and funding the profitable business opportunities are essential in improving the efficiency of intermediation. The study aims to evaluate the effects of nationalization and privatization on Indian banks. Various factors have been considered to examine the effects of privatization and nationalization, including sources of public sector inefficiency, measures of firm performance, econometric issues, and the mode of privatization. The data was collected for the period of 2015 to 2020 from Indian banks. Data Envelopment Analysis (DEA) was used to evaluate the financial reports of the banks selected to evaluate the efficiency of input and output variables. Positive results were observed, concerning the efficiency and profitability of banking industry after banks privatization. Performance of private banks has been observed effective and efficient as compared to the public sector banks. Privatization of banks must be increased and maintained to sustain the efficiency of the banks and implement strategies to maintain the assets. Future studies may recruit more appropriate sample size to evaluate the privatization and nationalization effects of Indian banking industry. Greater number of banks will provide more precise results, using data envelopment analysis.

Keywords: Banks, Data Envelopment Analysis, Efficiency, Indian banking industry, Privatization, Nationalization

Introduction

The performance of financial system is a fundamental angle in the improvement of economy for any country. The presence of set up monetary framework can be utilized to advance the monetary dependability of a country. Actually, twisting can be capable by a temperamental financial framework among loan costs, monetary movement, and expansion. In this way,

ROLE OF E-BANKING IN ECONOMY DEVELOPMENT OF INDIA

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Abstract
The Indian Banks are the backbone of Indian financial sector and Indian economy. Now a day in Indian economic scenario, the Indian financial system is in a process of rapid transformation. The shift from the formal banking to E-Banking has been a remarkable 'leap change' in Indian banking history. E-banking has experienced strong and sustained growth. E-Banking, also known as net banking, online banking or internet banking, is the facility provided by banks and financial institutions which allows customers to use banking services via internet. There are scores of services like online money transfer, account opening, bill payment, tracking account activity, etc., which are made available to customers with the help of e-banking. This research paper shows the relationship between e-banking and economic development in India and helps to know the present economic scenario of e-banking. It highlights the role of e-banking in ensuring a speedy Indian economic recovery.
Keywords: E-banking, economic development, present economic scenario.

Introduction

India has arisen as the quickest developing significant economy on the planet and is relied upon to be One of the best three financial powers of the world throughout the following 10-15 years, upheld by its Solid majority rules government and associations. The public authority of India has thought of Digital India drives, which centers around three center parts: production of advanced framework, conveying administrations carefully and to build the advanced literacy. Banking through electronic channels has acquired expanding prevalence as of late. The improvement and the expanding progress experienced in the Information and Communication Innovation combined with the development of the worldwide economy prepared for the change of the Indian financial framework's job from customary exchange financing to activating and directing monetary assets all the more really in practically all features of life.

Objectives of the study

1. To examine the role of e-banking in economic development of India.
2. To highlight the role of e-banking in ensuring a speedy economic recovery of India.
3. To examine the need for e-banking among the Indian populace.

Methodology of the study

The study is mainly descriptive in nature. The data for the purpose of the study has been collected through secondary sources, which mainly include websites, various articles and journals.

A Study of National Agricultural Insurance Scheme in Indapur Tehsil Dist. Pune Maharashtra State

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Abstract
Agricultural production and farm income in India involve several risks. Crop insurance is the only mechanism available to safeguard against production risks. Against this background, this paper has examined the features and performance of National Agricultural Insurance Scheme (NAIS) operating in Indapur tehsil Dist. Pune of Maharashtra state and has suggested some modifications to make it more effective. NAIS coverage in terms of crop area, number of farmers and value of agricultural output is very small. If crop insurance programme is to be made an important tool in agricultural risk management, the present level of coverage will have to be improved, at least by 3-4 fold. Such an expansion can occur only with improvements in and broad-basing of the insurance scheme. Every suggested improvement has financial implications and affects the concerned insurance practices. It requires renewed efforts by the government in terms of designing appropriate mechanisms and providing financial support to agricultural insurance. Providing of similar support to the private sector insurers would help in increasing the insurance coverage and improving the viability of insurance schemes over time.

***Keyword**: farmer, agricultural, insurance, debt, indebt, loss, agriculture risk, remedies.*

Review of National Agricultural Insurance Scheme (NAIS)

Agricultural production and farm income in India involve several risks. These relate to natural events, weather aberrations, epidemics and manmade disasters. All these affect both crop area and yield. Further, with the growing of agricultural commercialization and climatic changes, the degree of risk due to unfavorable eventualities is increasing. Sharp fluctuations in agricultural prices are causing a wide variability in farm income. For a section of the farming community, the Minimum Support Prices (MSP) for certain crops provide a means of their income stability (Vyas and Singh, 2018). But, for most of the crops and in many of the states, MSP has not been implemented. Recently, mechanisms like 'contract farming' and 'future trades' have been introduced and these are expected to provide some risk cover against price fluctuations, directly or indirectly. It is believed that crop insurance is the only mechanism available to safeguard against production risks in agriculture. Considering this need, the Government of India had introduced a Comprehensive Crop Insurance Scheme (CCIS) in 1985 and later, a National Agricultural Insurance Scheme (NAIS) in 1999-2000. But, this scheme also has not been able to make the expected impact and acceptability. Against this background, this study has examined the features and performance of National Agricultural Insurance Scheme (NAIS), operating in the country and has suggested changes to make it more effective. The main objective of the scheme is to protect farmers against losses suffered by them due to crop failure on account of natural calamities, such as drought, flood, hailstorm, cyclone, fire, pest/ diseases, so as to restore their credit worthiness for the ensuing season. The paper has presented the results of detailed analysis of secondary data for 13 crop seasons, since the inception of NAIS, covering the period rabi 1999-2000 to rabi 2005-06. Field investigations were also conducted for the state of Maharashtra special in Indapur tehsil Dist. Pune during October, 2019 to assess the perception of loanee and non-loanee insured farmers, bankers and other functionaries of NAIS. Besides the field study, discussions were also held with experts in Agriculture Insurance Company (AIC) and agricultural departments, and bankers, academicians and farmers' representatives.

Main Features of NAIS

The National Agricultural Insurance Scheme (NAIS) was introduced in the country from the rabi season of 1999-2000. Agricultural Insurance Company of India Ltd (AIC), which was incorporated in December, 2002, and which started operating from April, 2003, took over the implementation of NAIS. This scheme is available to both loanees and non-loanees. It covers all food grains, oilseeds and annual horticultural / commercial crops for which past yield data are available for an adequate number of years.

Testing of Adulterants in Milk and Milk Products by Using Household Chemicals

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Abstract:

Milk is essential sustenance for human life. Health of human being depends on quality of milk that they consume every day. The quality of milk can be lowered by addition of some substances. Milk is declared to be adulterated when some unwanted cheaper substance is added or removal of valuable constituents partly or wholly. Sometimes the various chemicals are added in milk and milk products to improve its appearance and taste. In many countries, the main cause of adulteration is financial gain to increase the quantity of milk and milk products and to make it more attractive. Milk prepared, processed, packaged or stored in unhygienic condition is also one of the major cause of adulteration. Milk adulteration is punishable act and many rules have been imposed by government agency, but still adulteration is reported on daily basis. Awareness and knowledge of detecting common adulterant by some simple methods can prove to be a one of the most weapon to fight against adulteration. Day by day milk can be adulterated, to know the little knowledge about identification of some adulterants, which is discussed here.

Keywords- Adulterants, Household, Organoleptic, Preservatives, MST, LDL

I.INTRODUCTION

The health of mankind depends on the quality of food they consume. Milk is adulterated if its quality is lowered or affected by the addition of substances which are injurious to health or by the removal substances which are nutritious. According to Food Safety and Standard Authority of India (FSSAI), the technical definition of adulteration is addition or removal of substances to or from food substance so that natural composition and quality of food substance get affected. Purpose of adulteration is not only to increase the weight but also to improve taste, lifetime, appearance and productivity of milk and milk products. All these above mentioned practices are responsible for milk adulteration. The addition or removal of some substances, physical contamination of some metals and chemicals are added during the processing of milk and milk products beyond permissible level, affects the quality and can prove to be toxic. The microbial contamination of milk is also one of the biggest cause of health problems. Sometimes metals may also enter into milk by contamination and also proves to fatal if cross certain limits. So the milk that gets contaminated or adulterated becomes unfit for consumption. The adulteration of milk can occurs at various stages.

Producer- 1) Poor agriculture practices.

Comparative Studies on Extraction of Essential Oils from Different Medicinal Plants.

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Abstract:
Medicinal plants are considerable significance due to their special attributes. The large number of phytochemicals present may lead to the development of novel drugs.The extraction of medicinal plants with traditional methods plays an important role in the extraction outcomes. Essential oils extracted from flowers and leaves are the mixture of chemical constituents which contains less molecular weight compounds as alcohols, polyphenols, terphenols, aliphatic and carbonyl compounds, which possess various biological properties.Here in this study, a very simple method as hydrodistillation and steam distillation for extraction of oil is adopted and compared for evaluation of their properties and extraction outcomes.
Keywords:Medicinal plants,Hydrodistillation,Extraction , Essential oil.

1.INTRODUCTION:

As a traditional medicinal herb and valuable natural spice, essential oil has many significant effect[1-4]. Interest in utilizing natural sources in the development and formulation of skin products, as an alternative to conventional drugs and synthetic products, contribute to increase interest in research and industrial application of medicinal plants. High content of phenolic and flavonoids in medicinal plants have been associated with their antioxidant activities that play a role in the prevention of the development of age-related disease, particularly cause by oxidative stress. With regards to the beneficial phytochemicals in medicinal plants and the shift towards natural products in pharmaceuticals and cosmetic industry, the research on medicinal plants particularly are as important as the research on conventional drugs. The study of medicinal plants starts with the extraction procedures, which is an important step in the processing of the bioactive constituents from plant materials.

Conventionally, the essential oil is taken from plant raw material by different extraction methods [5,6] including solvent extraction and steam distillation. However these methods have drawbacks such as loss of volatile compounds, low yield and accruement of toxic solvent residues[7,8].Essential oils are lipophilic and soluble in organic solvents due to their hydrophobic nature and lower density than water. In this study, the selected plants essential oil has various applications.As a part of our investigation on evaluation of aromatic medicinal plants. The aim of this work is to provide comparative record of analysis on essential oils of Geranium, Eucalyptus and Lantana Camara.

2.MATERIALS AND METHODS:

2.1.Preparation of Plants:

The fresh,green fleshy leaves of Geranium, Eucalyptus and Lantana Camara were collected from local area and A. S. C. College campus,Indapur. Collected leaves were washed with distilled water to remove dirt and dust and dried in shade for 1 hour, chopped into fine pices and was used for further study.

2.2. Extraction of oil by Hydrodistillation method:

Hydrodistillation is an advanced method for extracting essential oils from plants because of its abilityto maintain the original quality of plants. The fresh leaves of each plant about 250 g was taken in 500 ml round bottom flask and added with 250 ml of solvent(distilled water).The reaction was heated at 100 ^{O}C for about 2 hours.The distillate was collected in conical flask. Shown in fig.1(9-12).After completion of distillation,essential oil was separated by using separated funnel and rotavapours.The collected essential oils (from different plants) were collected and stored in dark glass bottles and stored at 4 ^{O}C. The infusion will be stronger for six months to 1 year.

2.3. Extraction of oil by Autoclave method:

Autoclave method is used for large scale extraction of oils.The autoclave containing water is arranged in such a way to remove the steamfrom it using copper pipes at the top.The ratio of solvent and plant material was kept same for all plants (7 kg plant material : 5000 ml solvent) at 100 ^{O}C for 2 hours. The pressure of steam was reduced by adjusting knob and condensed by passing through circular copper tubular coil dipped in icecold water can.The distillate was collected through pipes which was fitted at the base.

In this procedure, two distinct phases were obtained: an organic phase (EO: essential oil) and an aqueous phase containing a part of the essential oil. The organic phase was separated from the aqueous phase by shaking it with 10 ml hexane (solvent) and separated by separating funnel and finally on rotavapour (13).The essential oils were collected and labelled in air tight glass bottles and stored at 4 ^{O}C.

Biosynthesis, Characterization and Antimicrobial activity of Silver Nanoparticles using Justicia Adhatoda.

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***Abstract*: Biosynthesis is a simple, non-toxic, economical and eco-friendly approach for the synthesis of nanoparticles. In the present work, nanoparticles of silver were synthesized by using aqueous solution of *Justicia Adhatoda* leaf extract as a reducing agent. These synthesized Ag-NPs were further evaluated for antimicrobial activity against *Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa* and *Bacillus subtilis.* The characteristics of silver nanoparticles were studied using UV-Visible spectroscopy and Fourier Transform Infra-red spectroscopy (FTIR). The potential applications of bio-synthesized nanoparticles showed antimicrobial efficacy against *Escherichia Coli* (12 mm) and *Bacillus subtilis* (11 mm) respectively.**

***Keywords*: Biosynthesis; *Justicia Adhatoda* extract; Silver nanoparticles; Antimicrobial activity.**

1. INTRODUCTION

Nanotechnology is an important field of modern research mainly concern with synthesis of nanoparticles of variable sizes, shapes, chemical compositions and controlled dispersity and their potential use of human benefits. Biosynthesis provides advancement over chemical and physical method as it has no need to use high pressure, energy, temperature and toxic chemicals ¤1¥. Nanomaterials are seen as a solution to many technological and environmental challenges in the field of solar energy conversion, catalysis, medicine, and water treatment. Research on the synthesis of Nano sized material is of great interest because of their unique properties like optoelectronic, magnetic and mechanical which differs from bulk.

The biosynthesis of Silver oxide nanoparticles of different sizes and shapes has been reported using bacteria, fungi and plant extract ¤2¥. Plants provide a better platform for nanoparticles synthesis as they are free from toxic chemicals as well as provide natural capping agents. Physical and chemical methods uses harmful chemicals such as sodium borohydride, sodium citrate dehydrate which are possibly hazardous and very costly to the natural settings and organic functions. Bio inspired synthesis of these particles proves to be cost effective environmental alternative to chemical and physical methods in preparing of nanoparticles, ecofriendly and helps to reduce harmful effects on environment ¤3,4¥.

In the present study Silver nanoparticles were synthesized through bio inspired synthetic approach. The applications of Silver nanoparticles (AgNPs) are a very promising, efficient and cost effective method for remediating this environmental health concern. Plant extracts have shown prospects in AgNPS synthesis which is a green chemistry synthetic approach ¤5¥. Plant extract mediated synthesis of nanoparticle is one of the stable and suitable alternatives in comparision with other conventional methods. *Justicia Adhatoda* known as Vasaka or Malabar nut belongs to *Acanthaceae* family. It has many medicinal properties such as antibacterial, antifungal, anti-inflammatory. Biologically synthesized silver nanoparticles could be of immense use in medical textiles for their efficient antibacterial and antimicrobial properties ¤6, 7¥.The synthesized silver nanoparticles were characterized by UV-Visible spectroscopy, FTIR spectroscopy and tested for their antimicrobial activity.

2. MATERIALS AND METHODS

2.1 Preparation of *Justicia Adhatoda* Leaf Extract

Fresh leaves of *Justicia Adhatoda* were collected from A.S.C College campus, Indapur. The collected leaves were thoroughly washed several times with distilled water and shade dried for a day. 10 g leaves was added in 100 mL of distilled water and heated at 80 °C for 15-20 minutes. Allowed to cool at room temperature and filtered through Whatman No. 42. The filtrate was centrifuged at 1500 rpm for 10 minutes. The supernatant filtrate was used as leaf extract for the synthesis of nanoparticles, stored for further use.

2.2 Preparation of 0.01M $AgNO_3$ solutions

0.169 gm. A.R grade $AgNO_3$ dissolved in 100 mL distilled water (DW) and stored in amber colored bottle in cool and dry place.

2.3 Preparation of Silver Nanoparticles

50 mL 0.01 M Silver nitrate were taken in beaker and stirred using a magnetic stirrer for 5 minutes. After 5 minutes, 25 mL leaf extract was added slowly into this beaker for uniform precipitation of silver nanoparticles. The solution was left undisturbed and allowed to room temperature. The yellowish brown colored precipitate get deposited at the bottom, indicates the formation of nanoparticles. The deposited nanoparticles were washed with sterile distilled water and was subjected to centrifugation at 10,000 rpm for 20 minutes. The nanoparticles was dried in hot air oven for 1 hour at 80°C and subjected for characterization. Reduction of silver ions to silver nanoparticles was confirmed by color changes from colorless to yellowish brown (figure 2).

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REMOVAL OF NICKEL (II) FROM AQUEOUS SOLUTION USING *POMEGRANATE* PEEL POWDER

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ABSTRACT

Removal of Nickel (II) from aqueous solution using *Pomegranate* peel powder as a new biosorbent was studied. Investigations have been made to study various sorption parameters such as biomass amount, contact time, pH, temperature and initial ion concentration. The selected adsorbent was effective for the removal of Nickel (II) ions in acidic medium and attained the equilibrium in 30 minutes. The adsorption process is endothermic in nature. This adopted method is quite feasible, economic, time saving and low cost.

KEYWARDS: Adsorption**,** *Pomegranate* peel powder, Heavy metal, Aqueous solution.

1. INTRODUCTION

Industrialization to a larger degree is responsible for the contamination of environment especially water where lakes and rivers are overwhelmed with a large number of toxic substances. Heavy metals are reaching hazardous levels when compared with the other toxic substances [1]. Heavy metals are a unique group of naturally occurring compounds. Their continuous release leads to overconsumption and accumulation. Many industries such as fertilizers, metallurgy, leather, mining, electroplating, energy and fuel production, discharge waste containing heavy metals either directly or indirectly into the water resources.[2] There are several conventional methods can be adopted for the removal of heavy metal from wastewater like chemical precipitation, electroplating, ion-exchange, reverse osmosis, chemical coagulation and adsorption. These methods are highly costly, not effective, require high energy input and non-ecofriendly in nature.[3-4] Among these, adsorption technique has gained importance due to its cost economy, high efficiency, harmless nature and ease handling.[5]

Pomegranate is a widely available fruit, belongs to *Lythraceae* family. *Pomegrante* has various properties as anti-oxidant, anti-viral, anti-tumor and many more. *Pomegranate* fruit is a good source of vitamins as well as folic acid. *Pomegranate* fruit peel is full of flavonoids and tannins.[6] The main objectives of this research is to investigate the effects of various parameters as biomass amount, contact time, pH, temperature and initial ion concentration on the adsorption efficiency of Nickel (II) ion on the *Pomegranate* fruit peel powder.

2. MATERIALS AND METHOD

2.1. Preparation of Biomass

The fruit peels of *Pomegranate* were collected and washed severally followed by distilled water to remove dirt and dust. After washing, peels were dried in shade for 6-7 days, till becomes crispy. Dried peels were grinded on grinder to obtain a desired size powder. Dried powder were further used throughout the experiment.

2.2. Preparation of Stock solution

The stock solution of Nickel (II) 1000 mg/L was prepared by dissolving 1.1343 g of $NiSO_4.6H_2O$ in distilled water. All chemicals used were of analytical grade. For working solutions, it was further diluted to desired concentration by diluting the Nickel stock solutions. The concentrations of Nickel (II) ion in the solution was determined complexometrically.

2.3. Adsorption study

In this study, adsorption experiments were conducted for the adsorption of Nickel (II) on natural *Pomegranate* fruit peel powder as a function of biomass amount, contact time, pH, temperature, and initial ion concentration. Aqueous 25 ml Nickel (II) solution of different concentrations were taken in 100 ml Erlenmeyer flask. The experiment was carried with 0.2 to 0.6 g of *Pomegranate* fruit peel powder varying with contact time. We varied the experiment for different

Cost and Return From The Cultivation Of Sugarcane: A Case Study Of Indapur Tahsil (Pune District)

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Indapur, Dist. -Pune, Maharashtra

1. Introduction

Sugarcane is one of the important industry based crop in the world. About 195 countries grow sugarcane crop to produce 1324 million tonnes of sugarcane (more than six times the amount of sugar beet produced). Indian sugar industry has been playing a vital role in the socio economic transformation of the country. India is the second largest sugarcane producer and the highest sugar consumer in the world. Apart from sugar, sugarcane is grown for many other uses like fodder, paper and biofuel. In spite of its growing demand, there are a number of problems which affect the sugarcane producing farmers in their production and increasing their profit.

2. Study Area

Indapur tahsil is situated in Pune district. The northern and eastern border is demarcated by Bhima River in Pune and Solapur districts while southern boundary is confined by Nira River in Pune and Satara and Solapur districts. The west boundary is confined by Baramati and north boundary is delimited by Daund tahsil of Pune district. The region extends between 17° 53′ to 18° 15′ north latitudes and 74° 35′ to 75° 8′east longitudes. The total geographical area of this tahsil is 1552.93 square kilometres having 3, 83,183 population (2011). This tahsil consists of 142 settlements and three urban settlements.

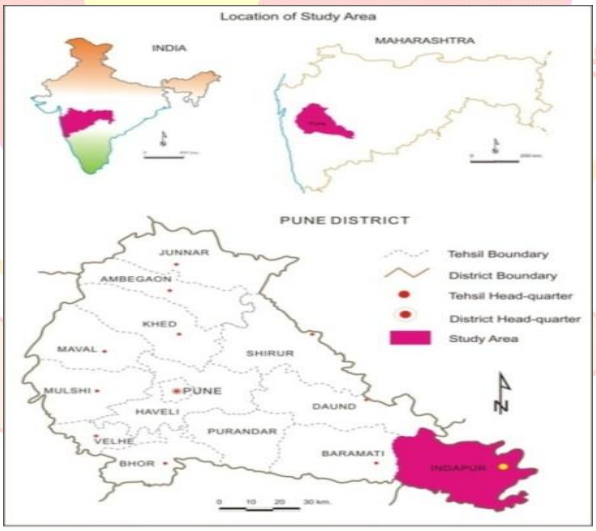

Fig-1: Location of Study Area

Review of Literature

Patil S. R., (2014) Carried out his study on "Cost benefits analysis of sugarcane cultivation of Walva tahsil, dist. - Sangali (MS). The study deals with sugarcane crop as a agricultural model to get money for utilization of natural resources present in the region and also brought outside the region. The study of cost benefit analysis is very important for any crop that can be observed the economic profitability of the farmer.

Singh Gomatee (2013) carried out his study on, 'An empirical study of economics of sugarcane cultivation and processing based farming in Uttar Pradesh'. The main objective of this study was changes in area,

Spatio-Temporal Changes in Urban Landuse and Land Cover Pattern of Indapur *Tahsil*

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Introduction

Maharashtra is one of the most urbanized state in India. The proportion of population in Maharashtra is (45.23%) as per the latest census of 2011, which was (38.69%) in 1991. In absolute terms, the urban population increased from 30.5 million to 41.00 million and net addition to states urban population was 10.5 million during the 1991 to 2001 and 20.2 million additions in 2001 to 2011. The state of Maharashtra is highly urbanized in comparison to the country, as a whole (31.15%), but its urban population is mostly concentrated in few major cities. For this skewed distribution, the socio-spatial factors are responsible and this imbalanced situation needs to be corrected after investigation.In the state, the number of urban centers has increased from 336 in 1991 to 534 in 2011 and the growth of urban centers was (12.50%). During the same period the proliferation of the urban unit was from 336 to 534 with the percentage growth rate of (41.26%).The state was less than above 10%, which was much less than the growth of towns in India as whole. But the share of urban population in the total population of Maharashtra states (45.23%) was much higher than in the entire country (31.15%). Indapur has historic significance in the expansion of Mughal empires in Central-South India, and subsequent Maratha resistance. Indapur is the Jagir of Malojiraje and Shahajiraje Bhosale. The historical place where Chatrapati Shivaji Maharaj's grandfather Shri Malojiraje was living & died in a war. This place is also famous for the Shri Shantinath Digambar Jain Teerthkshetra. It is also the part of sugar belt and various industries as like paper mill, fruit processing declares product factories. Similarly agro based industries and other industries are located around Indapur town. On the basis of observations and field work it would be investigated that how far the urban center of Indapur Tahsil has been baring developed.

Objectives

1. To examine the existing landuse and plan for a proposed landuse of main urban centers of Indapur tashil.
2. To appraise the infrastructural development in urban centers.
3. To assess the impact of urban centers on their peripheries.

Data Base and Research Methodology

Exhaustive literature survey of the topic of investigation is to been undertaken. Published Literature, Census Reports have collected from various libraries, institutes; Government departments etc. Besides, relevant literature is obtained through Internet. Visiting to the study area and its fringe areas in different seasons, GPS surveys, Instrumental surveys, Photographs, Questioner survey etc. facilitated the understanding of the complexity of a dynamic phenomenon such as urban sprawl, land use changes, urban sprawl pattern.

The Study Region

Indapur tahsil is one of the administrative blocks in Pune district consisting of 142 villages and three urban settlements. It lies entirely in Bhima-Nira basin. Geographically, this region extents from 17° 53´ to 18° 15´north latitudes and 74° 35´ to 75° 8´east longitudes and located at 527m elevation from mean sea level. The region is drained by Bhima on north and east sides and the Nira River in south side. Indapur tahsil lies in southeast of Pune district, it is surrounded by Baramati tahsil in west side, to the northwest lies Daund tahsil, to the southwest lies Satara district and Solapur districts belong to east, south and north side.The geographical area of study region is 1552.93Sqkm according to 2001 Census. The Bhima River and its tributary Nira flow in study region .According to the 2011 Census, study region has 383183 persons (93.34 percent rural and 6.65 percent urban population). The density of Pune district is 603 that may be attributed to the rapid growth in the industrial and commercial sectors. Immigration due to job opportunities and educational institutes has also resulted in the influx of a large amount of persons. The urban agglomeration around the Pune city along with high level of urbanization is also an added reason for the population growth of Pune city. According to the 2001 census, total urban population of the district is 42.01 lakh and the rural population is 30.32 lakh. Higher population density in the urban area, i.e. 6,700 as against 202 in the rural area, is because of employment opportunities in the secondary and Tertiary sector, which includes the manufacturing, processing, servicing and the construction sector. The urban to rural population ratio in the district is highly imbalanced. Of the total population, urban population is 58%, which is spread over on only 4 per cent geographical area. Whereas, remaining 42% rural population is spread over on 96 per cent geographical area of the district. The urban population density indicates the degree of urbanization in the district.

Cost Benefit Analysis of Sugarcane Production under Flood and Drip Method of Irrigation

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Abstract

The Present Study deals with the cost and return of sugarcane production under drip and flood method of irrigation in the Indapurtashil of Pune district. The primary data was collected for the year 2017- 2018 from the sample respondents by conducting personal interview and pretested. 600 farmers were selected randomly from eight division of the study area.On an average, farmers received yield of sugarcane36 to 41 tonnes per acreunder flood method and53 to 60 tonnes per acre in all divisions of the study area.The net return of cultivation of sugarcane was found averagely in range of Rs.7808 to Rs.21020 per acre under flood method andRs.40235 to Rs.50020 per acre under drip method. Profit margin is the major concern of the study and found to be quite high on drip method than flood method.

Introduction

Man has developed various agriculture activities for his stable life. Agriculture is one of the most important activitieswhich help the farmers for his socio - economic development. Agriculture activity provides various employments in rural part of the country, not only foods and labour but also services, trade, industry, transportation and market etc. Farmers take production of various crops on their physical, social and economic condition. The production is variable and change according to region to region, therefore, the production of any crop is necessary to check out benefit or profit analysis.

Irrigation is basic need for crop growth. It helps in the development of agriculture as well as human life. Canal, river, well, tube well and tanks are the main sources of irrigation, developed by man from last several years. Sugarcane cultivation depends on farmer's behaviour in various operations. There are traditional and drip methods for sugarcane cultivation but farmers use traditional methods on large scale.

In last decade, input price of sugarcane in the study area has increased continuously. Sugarcane growing farmers are facing various problems, such as rate given by sugar industry, increasing transportation expenditure, diseases on sugarcane, water scarcity, irregular supply of electricity, increasing labour rate etc. Today's situation,especially in Maharashtra state and in study area, farmers are demanding to the Government to increase the FRP of sugarcane. So we can say that there are some problems in sugarcane cultivation. Therefore, it is necessary to study the economics of sugarcane production at micro level.

Study Area

Indapurtahsil is situated in Pune district. The northern and eastern border is demarcated by BhimaRiver in Pune and Solapur districts while southern boundary is confined by NiraRiver in Pune and Satara and Solapur districts. The west boundary is confined by Baramati and north boundary is delimited by Daundtahsil of Pune district. The region extends between 17° 53′ to 18° 15′ north latitudes and 74° 35′ to 75° 8′east longitudes. The total geographical area of this tahsil is 1552.93 square kilometres having 3, 83,183 population (2011). This tahsil consists of 140 rural settlements and three urban settlements.

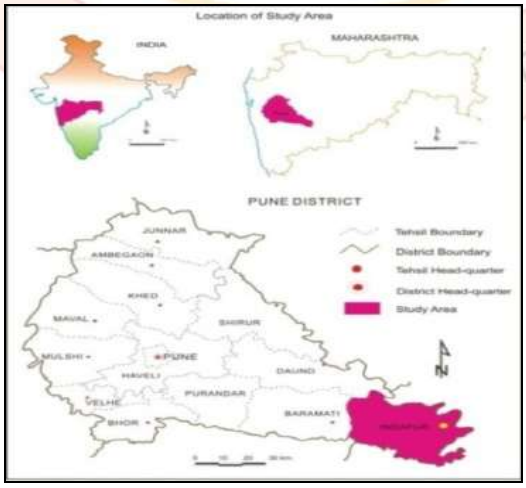

Fig-1: Location of Study Area

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CHALLENGES BEFORE THE HIGHER EDUCATION: PRE AND POST COVID -19 IN INDIA

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Abstract
Before Covid -19 there were number of challenges in higher education Sector. But Due to pandemic challenges are increases before HE. The corona pandemic has made all the schools and colleges across the country to adapt online teaching through various apps like Zoom, Google meet, cisco WebEx meetings, team's app and many more. Institutes like IIM's and IIT's have an infrastructure to connect students but the experience shows that not all students had a good interaction due to various reasons. The present research work based on secondary data .In the present paper focus on the challenges in higher education sector before the pandemic and during covid-19.
Keywords: Pandemic, HE, Digital Infrastructure.

Introduction

Education is nation's top priority because it is a basic human right and the foundation on which to build peace and drive sustainable development. In Indian scenario access in higher education has significantly improved in the past few decades, but is still not sufficient to reach all our young citizens because number of challenges in higher education. The global health pandemic has shined a harsh light on the vulnerabilities and challenges humanity faces. It has provided a clear picture of existing inequalities—and a clearer picture of what steps forward we need to take, chief among them addressing the education of more than 1.5 billion students whose learning has been hampered due to school and colleges closures.

The corona pandemic has made all the schools and colleges across the country to adapt online teaching. The experience shows that not all students had a good interaction due to various reasons in online teaching mode.

Objectives:

1. To Study the challenges before HE in India.
2. To study the challenges during Covid -19 in Higher education.

Present Scenario of Higher Education in India: It has a large higher education sector — the third largest in the world in student numbers. There are 1043 Universities, 42343 Colleges and 11779 Stand Alone Institutions listed on AISHE web portal and out of them 1019 Universities, 39955 Colleges and 9599 Stand-alone Institutions have responded during the survey.

Challenges before higher Education:

India's colleges and universities have become large, under-funded, ungovernable institutions. Under-investment in libraries, information technology, laboratories, and classrooms makes it very difficult to provide top-quality instruction or engage in cutting-edge research. Indian Higher education facing the number of challenges such as

1. Fragmentation of the higher education system:

India has over 1043 universities and approximately 42343 colleges, reflecting the overall severe fragmentation and small size of HEIs currently in the country. Remarkably, over 40% of all colleges in the country run only a single programme, far from the multidisciplinary style of higher education that will be required in the 21st century. In fact, over 20% of colleges have enrolment below 100, while only 4% of colleges have enrolment over 3000 (AISHE 2016-17). To make matters worse, thousands of the smaller colleges hardly have any teaching faculty at all, and there is little or no education taking place - thus affecting severely the integrity of the higher education system in the country. This fragmentation of the system leads directly to severe sub optimality on various fronts: resource utilization, the range and number of programmes and disciplines, the range and number of faculty, and the ability to carry out high-quality multidisciplinary research.

2. Too many silos; too much early specialization and streaming of students into disciplines:

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महानगरीय कथा साहित्य में नारी विमर्श

डॉ. पवार सीताबाई नामदेव
अध्यक्ष हिंदी विभाग
कला, विज्ञान एवं वाणिज्य महाविद्यालय इंदापुर

प्रस्तुत शोध आलेख में कतिपय महानगरीय कथाओं में से स्त्री पात्रों को प्रतिनिधिक रूप में रखकर स्त्री के विविध पहलुओं को स्पर्श कर उनके सामाजिक, राजनैतिक, आर्थिक एवं पारिवारिक दृष्टि से गुणात्मक परिवर्तन का विश्लेषण करते हुए उनके जीवन में उभरकर आये हुए तरह-तरह की समस्याओं का चित्रण यथार्थ महानगरीय नारी में हमें गुणात्मक परिवर्तन होता हुआ दिखाई देता है, जिसमें उसकी एक नवीन मानसिकता और अस्तित्व उभरकर सामने आया है। भारतीय समाज के आर्थिक ,सामाजिक, पारिवारिक बदलाव के परिणाम स्वरुप नारी के विविध रूपों में भी परिवर्तन आया है । उसके बदलते रूप विमर्श निम्नलिखित कारणों के माध्यम से किया जा सकता है –

अ.सामाजिक ब. राजनैतिक क.आर्थिक ई. पारिवारिक

सामाजिक दृष्टि से महानगरीय नारी का गुणात्मक परिवर्तन :-

सामाजिक परिवेश में नारी समाज का एक अविभाज्य घटक है । हर युग में उसका बदलता हुआ रूप समाज के बदलते परिवेश को जिम्मेदार है। सामाजिक तौर पर नारी का गुणात्मक परिवर्तन महानगरीय कहानियों में होता है। डॉ.गणेश दास के मतानुसार- "समाज में संवैधानिक, आर्थिक, शैक्षणिक , नैतिक परिवर्तनों से नारी के समक्ष संबंधों का एक नए क्षितिज खुला । वह समाज में केवल पारिवारिक संबंधों को लेकर प्रतिष्ठित हुई है । सामाजिक क्षेत्र में जिससे यह स्पष्ट हुआ है कि उसका अपना अलग अस्तित्व भी है और महत्व भी है । अब वह पुरुष के साथ वैचारिक एवं भावनात्मक स्तर पर जीवन जीने लगी है । उसे शिक्षा और अर्थ से संबंध क्षेत्रों में पुरुष के साथ रहना पड़ा है"। चार दीवारों में रहनेवाली नारी घर की दहलीज पार कर पुरुषों के कंधे से कंधा लगाकर वह अलग-अलग क्षेत्रों में काम करके अपने व्यक्तित्व की तलाश करते हुए सामाजिक अस्तित्व का निर्माण करने चली । किसी पर निर्भर न रहकर पारिवारिक भूमिका संभालते हुए सामाजिक जीवन में अपनी नई छबी बनाने का प्रयास करती हुई दिखाई देती है । साथ ही वह अपने व्यक्तित्व को तलाशते हुए स्वच्छंद जीवन जीने की अभिलाषा रखती है। सामाजिक के प्रति नारी की सजगता का प्रमाण यह है कि सन 1952 से लेकर आज तक उन्होंने भारतीय संसद में प्रवेश नहीं किया बल्कि संसद में अपनी स्वतंत्र छवि को प्रस्तुत किया। अखिल भारतीय महिला सम्मेलन, भारतीय राष्ट्रीय महिला परिषद, भारतीय राष्ट्रीय महिला आयोग और अंतर्राष्ट्रीय महिला सबलीकरण वर्षा भारत में मनाना आदि इस बात का प्रमाण है कि वह पुरुष की भांति एक अस्तित्व लेकर भारतीय समाज में उभर कर आई है।

महानगरीय नारी के राजनीतिक रूप का चित्रण हमें मन्नू भंडारी की 'हार' इस कथा में दीपा के माध्यम से मिलता है। दीपा राजनीति में भाग लेती है। विवाह पूर्व और विवाह पश्चात वह राजनीति में सक्रिय रहती है और पति के विरोध में चुनाव में खड़ी रहती है। वह अपने पति से कहती है कि- "अभी तक तुम्हारी पार्टी की विरोधानी थी, अब तुम्हारा भी सामना करना पड़ेगा तुम हारो यह नहीं चाहती और तुम जीतो यह तो कभी भी नहीं चाहती.... कल हम लोगों ने बहुत बड़ी सभा का आयोजन किया है। तुम्हारी कसकर धज्जियां बिखरने वाली हूं।" इसके अलावा निर्मल वर्मा के 'डेढ़ इंच ऊपर' इस कथा में पत्नी भी हमें राजनीति जीवन में सक्रिय दिखाई देती है। महानगरीय नारियों का अपना अलग राजनीतिक अस्तित्व दिखाने का प्रयास इन कहानीकारों ने किया है।

मन्नू भंडारी कि ईसा के घर इंसान इस कहानी में एंजिला एक ऐसी महानगरीय नारी का प्रतिनिधित्व कर रही है, जो धर्म के नाम पर चलने वाले नारी शोषण के खिलाफ आवाज उठाती दिखाई देती है। मानसिक संस्कारों और आत्म शुद्धि के नाम पर चर्च के फादर युवतियों से अपनी काम तृप्ति कर उन्हें जिंदा लाश बना देते हैं। एंजिला ऐसे अन्याय के प्रति विद्रोह करती है एक राजनीति नेता की भांति वह नारी स्वतंत्रता के लिए आवाज उठाती है। समाज में होने वाले ऐसे अन्याय के खिलाफ शोषित महिलाओं में जन जागरण कर आत्म रक्षा कर फादर का भंडाफोड़ देती है।

महानगरीय नारी का आर्थिक धरातल पर परिवर्तन:-

राजनीतिक अधिकारों के साथ-साथ नारी को आर्थिक स्वाधीनता भी प्राप्त हुई। वह आत्म निर्भर बनने के साथ समाज के हर क्षेत्रों में कार्य करने लगी। जहां एक और उसमें वयक्तिक अस्तित्व की चेतना ने जन्म लेकर वह स्वावलंबी बनी, वहीं दूसरी और घर

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Novel and efficient hybrid supercapacitor of chemically synthesized quaternary 3D nanoflower-like $NiCuCo_2S_4$ electrode

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ABSTRACT

In this work, we employed a simple and cost-effective chemical route to obtain a highly stable and efficient quaternary mesoporous 3D nanoflower-like $NiCuCo_2S_4$ nanocomposite for supercapacitor applications. The $NiCuCo_2S_4$ composite exhibited a mixture of $NiCo_2S_4$ and $CuCo_2S_4$ phases, confirming the formation a quaternary $NiCuCo_2S_4$ thin film. A surface morphological analysis revealed the unique nanoflower-like nanostructure of the annealed composite. The electrochemical analysis of the $NiCuCo_2S_4$ electrode demonstrated a high specific capacity (Cs) of 414 mAh g^{-1} at a lower scan rate of 10 mV s^{-1} and a superior cycling stability up to 3000 cycles. A solid-state hybrid supercapacitor (SHS) was also constructed by the $NiCuCo_2S_4$ and AC powder as positive and negative electrodes, respectively. The $NiCuCo_2S_4$//AC hybrid cell produced a high Cs, energy density, and power density of 159 F g^{-1}, 35.19 Wh kg^{-1}, and 0.66 kW kg^{-1}, respectively at a current density of 10 mA with good cycling stability. The results demonstrated that the fabrication process is effective for the development of a novel quaternary transition metal sulfide (TMS) electrode.

1. Introduction

The expansion of a high-energy storage system has fascinated significant consideration due to the rising demand for efficient renewable energy sources. The capable energy storage systems such as supercapacitors (Sc) offer a high power density, energy density, cycling stability, lower resistance, and greater safety compared to batteries [1,2]. Electrochemical supercapacitors store energy either through ion adsorption (electrochemical double-layer capacitors, EDLCs) or fast, reversible, multi-electron surface redox reactions (pseudocapacitors). Highly reversible redox reactions are responsible for the high specific capacitance of pseudocapacitor devices [3–5]. Physicochemical properties of the selected materials strongly affect the performance of supercapacitor devices. For instance, the electrochemical performance can degrade during the cycling due to change in the morphology of selected materials. Therefore, it is important to improve the morphological stability of supercapacitive electrode materials to maximize their cycle life [6]. Materials with hierarchical pores and tabular or layered structures are well-known to increase the charge transport, ion diffusion, power density, and the cycling stability [1,7]. In addition to structural design, the electrode composition also have a crucial role in the performance of electroactive materials [8]. The electrochemical performance can be tuned by optimizing the ratio of metal ions.

Several nanomaterials with desirable properties fabricated from carbonaceous materials and metal oxides have been employed in supercapacitor applications. In particular, metal chalcogenides exhibit excellent physiochemical properties that are suitable for supercapacitor applications. Ni, Co, and Cu-based materials have attracted significant attention in various fields, the oxides and sulfides of these metals have been proven to be useful for electrochemical energy storage applications [9]. These metals are an important strategic resources which are mostly suitable in electrochemical energy storage systems, catalysis, and other fields due to their unusual structural, optical, and electronic properties [10]. Ni, Co, and Cu-based battery materials in aqueous and alkaline electrolytes have been reported to facilitate fast Faradaic reactions on or near their surface, thus offering both high energy storage and power

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Zoology

DIVERSITY OF PHYTOPLANKTONIC GROUPS IN THE RIVER KALI, WEST COAST OF INDIA.

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ABSTRACT Present study was carried out in Kali River and in all 44 genera were recorded , out of which 30 belonged to Bacillariophyceae , 6 each to Dinophyceae and Chlorophyceae and 1 each to Cyanophyceae and Rhodophyceae . In Kali River , primary peak was observed during post-monsoon and secondary during pre-monsoon . Annual percentage distribution data indicates that Bacillariophyceae was dominant (79.30%) followed by Chlorophyceae (11.09%) Dinophyceae (9.16%) while Rhodophyceae and Cyanophyceae were poor and noticed during certain period of present study. Positive correlation was observed between Cyanophyceae- pH , suspended load and nitrite while temperature and silicate showed positive correlation with Bacillariophyceae . Chlorophyceae exhibited positive correlation with dissolved Oxygen and phosphate . Negative correlation existed with air temperature and VEC with Dinophyceae members . Rhodophyceae exhibited correlation with water temperature and silicate . Phytoplankton distribution and abundance was governed by hydrological factors like Temperature , Salinity and nutrients .

KEYWORDS : Phytoplankton, Hydrological parameters, Kali river, Uttar Kannada.

INTRODUCTION

Studies on phytoplankton of different riverine systems of west coast of India have been carried out extensively projecting an ecology of phytoplankton and their role as a fin-fish diet and as an indicator of pollution and also the trophic status of water bodies (Qasim et.al., 1972, Zingde et.al.,1990,Naik and Neelkantan 1990)

Kali river is one of the major riverine system of maritime district of Uttar Kannada which originates in the western ghats at Kusavali Village in Supa Taluka after meandering nearly 165 Km and discharge the fresh water into the Arabian sea at Karwar, central west coast of india. Since a limited work was carried out on these area with an earlier works of Ramamurty (1965).Konnur (1981) and Naik And Neelkantan (1990) who have studied the distribution of phytoplankton in the Karwar Waters and in Kali river. No work has been carried out in the upper reaches of the river and hence the present investigation was carried out to study the variation in different groups of phytoplankton of this kali riverine system along with the hydrographic parameters. An attempt has also been made to correlate environmental variables and biotic entities.

MATERIALS AND METHODS

Kali river (14° 50' 21" N and 74°09' 05" E), one of the five major riverine systems of Uttara Kannada coast, located on the central West Coast of India. Kali River being the northern most riverine system of this coast is known for its fin-fish and Shell-fish fisheries. A monthly collection of water samples along with the plankton samples were made in this river from the fixed five study stations namely Kodibag (st-1), Sunkeri (st-2),Kinnar (st-3), Halga(st-4) and Kadra (st-5) for a period of 1 year(sept.2016-sept.2017).

The phytoplankton samples were collected from these study sites using a conical net of bolting nylon cloth of 0.018 mm mesh width, and mouth ring diameter of 35cms, with the help of an out trigger canoe. The net was hauled for the duration of 10 min as surface haul and volume of water filtered through it was determined by flowmeter attached to it. The net was back washed between the two stations to avoid clogging of meshes. The samples were preserved in 4% neutralized formaldehyde for further analysis in the laboratory. After diluting the sample to known volume, an aliquot of 1ml subsample was transferred to sedgewick's counting chamber and phytoplankton identified and quantified, similarly triplicate subsamples were analyzed and their mean was taken and multiplied to the total volume of the sample. Total standing crop of phytoplankton was represented as number of cells per 1cubic meter of water and their percentage composition is calculated. Hydrographic parameters such as temperature, salinity , dissolved oxygen , pH, suspended load, VEC, phosphate- phosphorous ,Nitrate-nitrogen, nitrite –nitrogen ,silicate-silicon were also recorded at the of plankton collection. These hydrographic parameters except water temperature were analyzed by following the standard methods as suggested by strickland and parsons (1975). Water temperature was recorded by using the ordinary thermometer.

RESULTS AND DISCUSSION

Steep fall in temperature from pre-monsoon to south-west monsoon was noticed while a gradual decreasing trend noticed from pre-monsoon to post-monsoon during the present study. The impact of south-west monsoon was severe which prevailed during June to September was vigorous on salinity the Table.1 and seasonal variation in Table.2. A similar trend was noticed by Naik And Neelkantan (1990). The salinity trends to decrease with increasing distance from the river mouth to upper reaches of the river and this could be probably due to run off the land, Rainfall during the monsoon season and evaporation from the river itself. In addition to this flow of fresh water from upper reaches through reservoirs and other tributaries of Kali River could be the reason for the lowering of salt content. Temporal variation of dissolved oxygen shows maximum during post monsoon (7.58 mg/l) and minimum during june (3.76 mg/l) while spatial variation showed a minimum value (4.35 mg/l) at station 2 , while a maximum (6.34 mg/l) at station 5. The pH value fluctuated between 7.19-8.71 with slightly higher values during post and pre-monsoon. According to Perkins (1976), the range of pH of estuarine waters at normal and unpolluted conditions is 6.7-9.25. Maximum suspended load was recorded during south-west monsoon period (0.0514 gm/l). The influence of highly turbid fresh water and land run off resulting in a higher suspending load as stated by Jerlov et.al., (1978) the concentration of suspended water vary from less than 0.1 mg/l in the open oceans to many grams per liter in the estuarine and nearshore waters. The present data coincides with the findings of the earlier workers Naik and Neelkantan (1990) .

Temporal variation in VEC shows a high value of 2.85 during the month of May and low value of 1.92 in July. Temporal variation of phosphate shows a high value (3.076 µg at/l) during the post-monsoon at station Halaga and low (0.445 µg at/l) during the pre-monsoon season. Nitrate was found maximum during post-monsoon (16.66 µg at/l) while minimum (3.19µg at/l) during the south west-monsoon. Comparatively an intermediate value (11.05µg at/l) noticed during pre-monsoon. A maximum concentration of this nutrient salt was observed at Kodibag (11.88 µg at/l) and lower value (6.14 µg at/l) at Hulga. Nitrite-N concentration was found maximum during the south-west monsoon (0.441 µg at/l) while the lowest values recorded during post-monsoon (0.063 µg at/l) concentration of content varied between (21.74 µg at/l – 43.26 µg at/l) with maximum during the pre-monsoon and minimum during post monsoon season. The present study was undertaken to evaluate an abundance and distribution of phytoplankton with respect to time and space. Totally 55 planktons were identified and are categorized into 5 groups. Namely Cyanophyceae, Bacillariophyceae, Dinophyceae, Rhodophyceae and Chlorophyceae . The biomass of phytoplankton varied between 0.12 – 2.0 ml/m³. It is summarized from the results that the annual mean of 5

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A review on electrodeposited layered double hydroxides for energy and environmental applications

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ABSTRACT

The great demand for efficient and low-cost materials for energy and environmental applications has been inspiring researchers to develop novel and advanced materials. Recently, layered double hydroxides (LDHs) are found to be admirable materials for various applications owing to their tunable elemental composition and diverse nanostructures. The preparation of binder-free LDHs thin-film electrodes has attracted great attention in the field of supercapacitors, electrocatalysts and sensors. The electrodeposition method exhibits the capability of fabricating binder-free, uniform and well-oriented thin films with tunable elemental composition. In the present review, we provide a detailed electrodeposition mechanism behind the formation of LDHs with nucleation and growth processes. Also, we summarize the literature on electrodeposited LDHs based electrode materials for energy and environmental applications. In energy storage applications, a loading amount of active materials on the substrate is crucial to improve the areal and volumetric capacities. Therefore, the utilization of low-cost and scalable scaffold materials such as carbon nanofibers, graphene foam, etc. is highly recommended.

1. Introduction

Layered double hydroxides (LDHs), often called hydrotalcite-like systems or anionic clays have attracted great attention owing to their tunable chemical and metal-anion compositions. The general formula for LDHs can be written as $[M^{II}_{1-x}M^{III}_{x}(OH)_2]^{x+}[A^{n-}_{x/n}\cdot yH_2O]^{x-}$ (where M^{II} and M^{III} represent the divalent and trivalent metal cations, A^{n-} represents n-valent anions). Depending upon the nature of cations and M^{II}/M^{III} molar ratios, LDHs can be prepared with a wide range of layered structures [1]. The tunability of the molar ratio of metal cations and the nature of interlaying compensating anions lead to the formation of different nanoarchitectures with versatile physical and chemical properties, extending their applicability in diverse fields [2]. LDHs have been reported for different energy and environmental applications such as electrochemical energy storage, electrocatalyst, sensors, etc. These applications demand well-oriented, uniform and high conducting thin films [3,4]. Previously, LDHs have been prepared by different chemical methods such as co-precipitation [5], hydrothermal [6], sol-gel [7] and urea hydrolysis [8], either in thin film or powder form. These chemical methods are time-consuming and complex. Also, the powdered materials need to be combined with binders and conducting additives to be applied for many energy and environment-related applications, imposing additional inactive mass to the electrode [9]. In order to overcome these disadvantages, a binder-free LDHs can be prepared using electrodeposition method. The electrodeposition is rapid, facile, and scalable method which deposits well oriented and high quality thin film materials on the conducting support with enhanced conductivity and electrochemically active sites [10]. Recently, variety of different LDHs thin films have been prepared using electrodeposition method. Fig. 1 shows the number of publications and number of citations received by the research papers published in the field of electrodeposited LDHs, indicating the influence of the field.

Recently, some review articles have been published in the field of LDHs [1,11–13]. However, they mainly focus on general synthesis methods and their different applications. To the best of our knowledge, there is no review article published that emphasizes the detailed electrodeposition mechanism behind the formation of LDHs and review of electrodeposited LDHs for energy and environmental applications. It is important to understand the detailed electrodeposition mechanism in preparing LDHs for a variety of applications to fabricate efficient materials by overcoming present difficulties. Therefore, in this review, we have discussed the fundamentals of electrodeposition methods with

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Original Research Paper

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A CASE STUDY OF LIPID CONTENT IN THE BRAIN OF *CIRRHINA MRIGALA* AND *LABEO ROHITA* FROM RAJARAM TANK NEAR SHIVAJI UNIVERSITY KOLHAPUR, MAHARASHTRA, INDIA.

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ABSTRACT

Neutral lipids (NL) and phospholipids (PL) with their constituents were studied in brain of *Cirrhina mrigala* and *Labeo rohita,* by employing TLC and Bioassay technique . The total lipid in the brain of *Labeo rohita* is 24.14 mg lipids / gm , increase to 127.9 mg lipids / gm in the brain of *Cirrhina mrigala* . The ratio of cholesterol and phosphotidylcholine in the same species is 5:1 and 4:1 respectively .

Neutral lipids consists of six components , triacylglycerol being main component . Cholesterol (CHO) , Diacylglycerol (DG) , Cholesterol-ester (CE) , and Monoacylglycerol (MG) were moderate in concentration . Free fatty acids (FFA) was low in quantity . Phospholipids exhibits seven constituents , Phosphatidylcholine (PCL) and phophatidyl - ethanolamine (PE) were major constituents , sphingomyelin (SPG) , phosphatidyl - inositol (PI) and phosphatidyl- serine (PS) were moderate in concentration . Lysophosphatidylcholine (LPC) were low in quantity .

KEYWORDS : Neutral Lipid, Phospholipid, TLC technique, Bioassay technique.

INTRODUCTION

The brain is amongst the most complex and highly evolved organ, involved with special function which has given man his unique place on the ladder of evolution. It is remarkable for its state of continuous activity as may be evidenced both by experience as well as by electrophysiological monitoring. Since it is an important organ of body it has been studied for many aspects, including the biochemical information.

From the critical review of literature on the lipids of fish brain, the following significant facts emerges especially in *Cirrhina mrigala* and *Labeo rohita*. The lipid contents in the various organs like liver, testis , ovary and accessory reproductive organs of fishes including mammals, seems to have received greater attention from the workers in the fields. However, the most important organ systems like brain are overlooked due to which there is a paucity in the information of brain lipids particularly in lower vertebrates. Some research workers studied parameters like lipid peroxidation in vivo and in vitro studies.

From the above literature indicates very scanty information is available on lipids of fish, especially in the above species. Hence in the present case study the attempt was made to find out the content and composition of lipids in the brain of *Cirrhina mrigala* and *Labeo rohita* . A few research workers have made their contribution in reporting the brain lipids in some fishes. Pravdina and Chebotareva (1974) eel, Dasiatis Pastinaca, Kreps et.al. (1976), teleost and elasmobranch fishes; Malkhede et.al. (1981), Clarias batrachus, Vadhva and Mahdi (1987) fish, Hollander (1970) goldfish and Ushkolova and Ioanidis (1985) white fish.

MATERIALS AND METHODS

For the present study two Vertebrates were selected, each one representing a class of sub phylum vertebrata, While selecting the animals, care was taken to see their evolutionary states, they are as follows;

Two species of fishes *Cirrhina mrigala* and *Labeo rohita* were collected from Rankala tank in Kolhapur city (Maharashtra, India). Fish species of each type were collected at a time and brought to the laboratory, where they were kept in plastic containers for about six hours for acclimatization. The average weight of fish was about 250gm. The fish were sacrificed to take out the brain for further studies.

METHODS

Thin layer chromatographic technique for the analysis of lipids in fish brain was used. This gives a good separation of both neutral and phospholipid components for quantification studies bioassay method is used.

Extraction of lipids

The brain tissue were homogenized with 20 volumes of chloroform methanol (2:1, v/v) at room temperature. The homogenates were allowed to stand for 4 to 6 hours at 4°C and then filtered through the sinctered funnel into glass-stoppered container. The precipitate was rehomogenised with 10ml of chloroform methanol mixture (2:1, v/v) and then filtered through the sinctered glass funnel. Both the filtrates were pooled together and the resultant mixture was shaken well with 0.2 volume of glass distilled water. Extract were allowed to partitioned into two distinct phases. The upper phase while generally contained the major part of the non-lipid contaminants were removed as completely as possible with a fine tipped pipette. The lower phase which mainly contained lipid fraction was transferred quantitatively through sodium sulphate to remove water completely from the lipid sample. The more chloroform was added to remove any lipid fraction from the sodium sulphate. Then it was transferred quantitatively into a glass stoppered container and evaporated under vacuum at 40°C.The lipid sample was weighed accurately and preserved by desiccation under vacuum at 20°C for further use.

The NL and PL were separated by thin layer chromatography (TLC) using silica gel G (about 200 mesh containing CaSO4 as a binder E Merck Germany), the TLC plates (20*20cm) were prepared according to Wagner et. al. The known quantities of sample dissolved in chloroform were applied with Hamilton's micro syringe (Number 8206.B) 2.5 to 3.0 cm from the bottom edge of the plates. For neutral lipids the plates were developed in Hexane (b.p.65° to 70°C): diethyl ether: acetic acid (85:15:2,v/v) as recommended by Gloster and Flecter. The phospholipids plates were developed in chloroform: methanol: ammonia (115:45:5,v/v) as recommended by Barval and Kalra. The standards of neutral lipid and phospholipid (Sigma, USA) were co- chromatographed in each respective run and then plates were kept in Iodine chamber for identification of individual spots of lipids.

Estimation of neutral lipid and phospholipid

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Green synthesis of novel $CuCo_2O_4$ nanocomposite for stable hybrid supercapacitors by deep eutectic solvents

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ABSTRACT

Currently, many transition metal oxides (TMOs) have been demonstrated as attractive nanomaterials for application in supercapacitors for energy storage/conversion systems. Among TMOs, $CuCo_2O_4$ has presented excellent electrochemical properties, including higher electrical behavior. Also, they are readily accessible in earth, ecofriendly and cost effective compared to other nanocompunds. In this research, we have for the first time synthesized $CuCo_2O_4$ (CCO) nanomaterials using a deep eutectic solvents (DES) method for supercapacitor (SC) applications. We systematically studied the effect of annealing temperature of CCO on its structural, morphological, and electrical properties. The CCO was annealed at different temperature of 150, 200, 250, and 300 °C for 3 h. CCO annealed at 250 °C exhibited the superior performance compared to other as-synthesized and annealed samples. The optimized CCO electrode shows outstanding supercapacitive properties with specific capacity 421 mAh g^{-1} at 10 mV s^{-1}, excellent GCD capability, and super cycling stability. This indicates that the DES-prepared CCO shows better electrochemical performance due to highly porous nanostructure providing more active sites for easy transformation of the ions.

1. Introduction

Supercapacitors (SCs) are the core component in the development of sustainable energy storage systems with high power density, high energy density, fast charge–discharge, long life, cycling stability, and low cost [1–4]. SCs can be classified into two categories based on the charge storage mechanism: electrical double layer capacitors (EDLCs), which consist of electrostatic charge accumulation at the electrode/electrolyte interfaces, and pseudocapacitors, which comprise reversible Faradic reactions. Pseudocapacitors deliver much higher specific capacitance and energy density than the EDLC [5–7] Metal oxides of copper, nickel, cobalt, and manganese have gained increasing attention in SCs research because of their electrochemical properties [8,9]. Copper oxide and cobalt oxide has many potential applications in various scientific technologies. Among numerous metal oxides, binary transition metal oxides (TMOs) of copper and cobalt showed excellent electrochemical properties, such as specific capacitance, conductivity, cycling performance, and structural stability [10].

The earth abundant spinel type cobalt oxide and its derived compounds offer a promising alternative cheap material for electrochemical energy storage application because of its high theoretical capacitance ~ 3600 F g^{-1}, electrochemical reversibility, and stability. However, the electrochemical performance was slightly lower than expected due to the internal low conductivity, morphology, surface area, chemical composition, and crystallinity [11,12]. Recently, many efforts have been devoted to overcoming these obstacles by designing mixed-metal oxides, controlling morphology, size, and structural properties. Previous reports found that the introduction of Cu in the host cobalt oxide could be beneficial towards improving conductivity and electrochemical properties. Therefore, copper cobalt-based oxides have been highlighted because of their natural abundance, excellent stability, and low cost. Furthermore, amalgamation of metal oxides is a promising way to boost electrical conductivity, electro-chemical properties, and structural stability.

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Probing the electrochemical properties of $NiMn_2O_4$ nanoparticles as prominent electrode materials for supercapacitor applications

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ABSTRACT

$NiMn_2O_4$ (NMO) powders have been prepared by facile sol–gel route, and the effect of annealing temperature and the concentration of KOH electrolyte on its electrochemical performance has been investigated. The electrochemical performance of the NMO electrodes is tested via a three electrode arrangement in KOH electrolyte. The NMO electrode (NMO1) prepared from the powder synthesized at a temperature of 500 °C with an approximate crystallite size of 10 nm exhibits maximum specific capacitance of 571 Fg^{-1} at a scan rate of 5 mVs^{-1} in 1 M KOH electrolyte. The specific capacitance of the NMO1 electrode is found to be improved from 571 Fg^{-1} in 1 M KOH to 762 Fg^{-1} in 6 M KOH electrolyte. The improvement in the specific capacitance of the NMO1 working electrode in 6 M KOH electrolyte can be attributed to good electrochemical utilization and an effective charge storage mechanism.

1. Introduction

Supercapacitors (SCs) have attracted much attention because of the fast rechargeability, higher power density over the batteries, and more energy storage ability as compared to conventional capacitors. The SCs have enormous energy storage capacity besides possessing the combined property of both conventional capacitor and battery [1]. Based on the charge-storage mechanism, electrochemical SCs can be classified into three categories: viz, pseudocapacitors, electrical double-layer capacitors (EDLCs), and hybrid capacitors. The conducting polymers and various metal oxides are utilized as the active electrode materials in pseudocapacitors, whereas in EDLCs carbon-based materials such as activated carbon, graphene, and carbon nanotubes are used as active electrodes. One more type of SCs is a mixture of both pseudocapacitors and EDLCs, known as a hybrid capacitor. To construct these types of SCs, the active electrode materials are made by combining either two or three distinct elements which give very large specific capacitance and enhanced energy density than pseudocapacitors or EDLCs [2]. However, all the above-mentioned SCs still suffer from some significant disadvantages such as poor cyclic life span of conductive polymers, the low capacitance of carbon-based materials and high cost of typical transition metal oxides like RuO_2 [3]. RuO_2 has been extensively investigated as a promising material due to its high specific capacitance and excellent cycling stability, but rareness and the high cost of ruthenium element are putting significant barriers to its commercialization [4]. To overcome these significant disadvantages, it is necessary to explore other alternative materials for the fabrication of supercapacitors.

Mixed transition metal oxides (MTMOs) are preferred to fabricate electrode materials for supercapacitor application over the single transition metal oxide component due to its enhanced chemical stability and electrochemical properties [5]. Out of the different MTMOs, considerable attention has been centered towards the synthesis of cubic spinel $NiMn_2O_4$ (NMO) as it offers high conductivity, outstanding electrochemical capacitance, high redox-active sites, and exceptional chemical

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REPRODUCTIVE CYCLES IN TWO GEOGRAPHICALLY SEPARATED POPULATIONS OF THE OYSTER *Saccostrea cucullata* FROM SINDHUDURG DISTRICT, MAHARASHTRA STATE, INDIA

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Abstract:

Two geographically separated localities at Deogad (160 23' N ; 730 23' E) and Achra (160 15' N; 780 26' E) in Sindhudurg district of Maharashtra State ,India were selected on the basis of the differences in habitat , topography ,vegetation and local market value to study the reproductive cycles of the oyster Saccostrea cucullata. The maximum sizes attained by S. cucullata in the estuaries at Deogad and Achra were 44-45 mm shell length. However, comparatively larger sized oysters are found round the year in the estuary at Deogad than at Achra.

The environmental parameters such as tidal heights, pH, temperature, dissolved oxygen and salinity existing on the oyster beds in Deogad and Achra were recorded on every new-moon and full-moon days for a period of twelve months.

The microscopic details of the gonad tissue processed on every new moon (NM) and full moon (FM) days of each month revealed following stages ; (i) Gametogenesis ; (ii) Maturing ; (iii) Mature; (iv) Partial spawning ; (v) Complete spawning ; (vi) Recovery ;(vii) Neutral . The gonads of twenty oysters were staged for males and females separately on each NM and FM days and percentage of the males and females in these different stages were calculated.

The study on reproductive cycle in male oysters of S. cucullata from Deogad showed that many oysters were in gametogenesis stage in entire June and once again on November NM. Maturing stage was seen on March NM, May FM, July NM and again on November FM and in entire December. Many oysters were in mature stage on March FM, April FM and July FM and again on January NM. Most of oysters were under spent stage on March FM, in entire August and September, and on January FM. Many oysters were under recovery stage on May NM and in entire October. Most of the samples collected in entire February and on April NM showed prominent neutral stage. The female oysters showed that the gametogenesis was dominant on March NM, in entire June and on November NM; maximum on NM of March and on November. The maturing stage was dominant in entire April and May and on July NM and December NM. Oysters under spent condition were dominant on April NM and December FM, and all the gametes were released in entire August, September and on October NM. The recovery stage was recorded in many oysters on October FM and January FM, while the neutral stage was recorded in entire February.

The male oysters from Achra showed gametogenesis stage on March NM, April FM and June NM. The maturing stage was seen in most oysters on April FM, June FM, July NM, September NM and FM. The mature stage was very conspicuous on July FM and November NM. Most oysters were in the spent stage on May FM , August NM ,October NM and December FM. Oysters under recovery stage were in high percentage on December NM , January NM and February FM. The neutral condition was most prominent in many oysters on March NM and January FM. The female oysters at Achra showed that many oysters under the gametogenesis appeared on April NM, June NM and December FM. The maturing condition in oysters was dominant on April FM, June FM, August FM, entire September and on February NM. Many oysters in mature stage occurred on October NM and November NM. The spent stage in oysters was dominant on December NM, In entire May and on July FM. The recovery stage was recorded in December NM, while the neutral stage in oysters was dominant on January FM and March NM. These different stages of the gonads have been correlated with the changes in environmental conditions over the oyster beds from the two localities. The results are discussed in the light of possible impact of the environment on reproductive events.

Keywords: S. cucullata, Deogad, Achra, FM, NM, gametogenesis.

Introduction:

Along the west coast of India the backwaters and estuaries are very extensive and play an important role for food production. These are widely scattered and have an area of 30.7 lakhs acres (Mitra, 1970) from which Maharashtra coast constitutes 3.0 lakhs acres

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LIFE TABLE AND INTRINSIC RATE OF INCREASE IN LEPIDOPTERAN PEST *Hypsa producta*

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Abstract:
Hipsa producta is the Lepidopteran insect pest is forest pest which acts as defoliator of *A. excelsa.* Therefore life table and intrinsic rate increase have been studied. The first adult mortality was noted on 5th day. Average period of immature stages was 30 days. Maximum mean progeny production per day, mx was 26 on the 3rd day. The immate capacity for increase was found to be 0.141 per female per day and population of *H. producta* multiplied 76.76 times in generation 'T' of 30.78 days.
Keywords: *Alianthus excelsa, H. producta,* life table, intrinsic rate of increase.

Introduction:
The estimate of rate of growth of the pest have tremendous importance in pest management. The estimates of the rate of growth of the pests have tremandous importance in pest management (Howe, 1953). In a given environment an individual living animal shows its own characteristics qualitatively and quantitatively at longevity and fecundity. The value of development, are determined in part by the environment and in part by inherent characteristics of the living animal itself. According to Thompson (1924) the inherent characteristics of the animals are collectively called the 'innate capacity for increase". He visualised the first mathematical method for population dynamics. Later, Lotka (1925) derived the function for "the intrinsic rate of natural increase' and then Birch (1948) used the same for animal ecology and for the insect populations. In the present study the life tables were constructed according to Birch (1948) as elaborated by Howe (1952) and Watson (1964) .

Review of literature indicates that life table studies have been attempted in different orders of insects by several workers, noteworthy amongst them refers to Morris & Miller (1954) on Choristoneura fumiferana (Lepidoptera), Stark (1959) on Recurvaia starki (Lepidoptera), Richards & Waloff (1961) on Phytodecta olivacea (Coleoptera), Le Roux et al.,(1963) on Spilonota ocellana (Lepidoptera); Waloff (1968) on Sitona recansteinansis Herbst (Coleoptera) and on Arytacina cenistae (Homoptera), Mcleod (1972) on Neodiprion swainei Midd. (Hymenoptera), Tamaki et al.,(1972) on Zebra caterpillar (Lepidoptera), Bains & Shukla (1976) on Chilo partellus (Swinh.) (Lepidoptera), Bilapate & Pawar (1980) and Reddy & Bhattacharya (1988) on Helicoverpa armigera.

Material and methods:
Intrinsic rates of increase-

Birch (1948) visualized the following equation to study intrinsic rate of natural increase.

$$\sum e^{-r} m^{x} l_x \, m_x = 1$$

Where
'e' is the base of the natural logarithms,
'x' the age of the individual in days,
*l*x the number of individual alive at age, 'x' as a portion of one, and m_x the number of female offsprings produced per female in the age interval 'x'.
The sum of the products 1x mx is the net reproductive rate,
'R_0' which is the rate of multiplication of the population in each generation measured in terms of females produced per generation.

The approximate value of cohort generation time 'Tc' was calculated as follows:

$$T_c = \frac{l_x m_x X}{l_x m_x}$$

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CHEMNANOMAT
Minireview

Materials Development in Hybrid Zinc-Ion Capacitors

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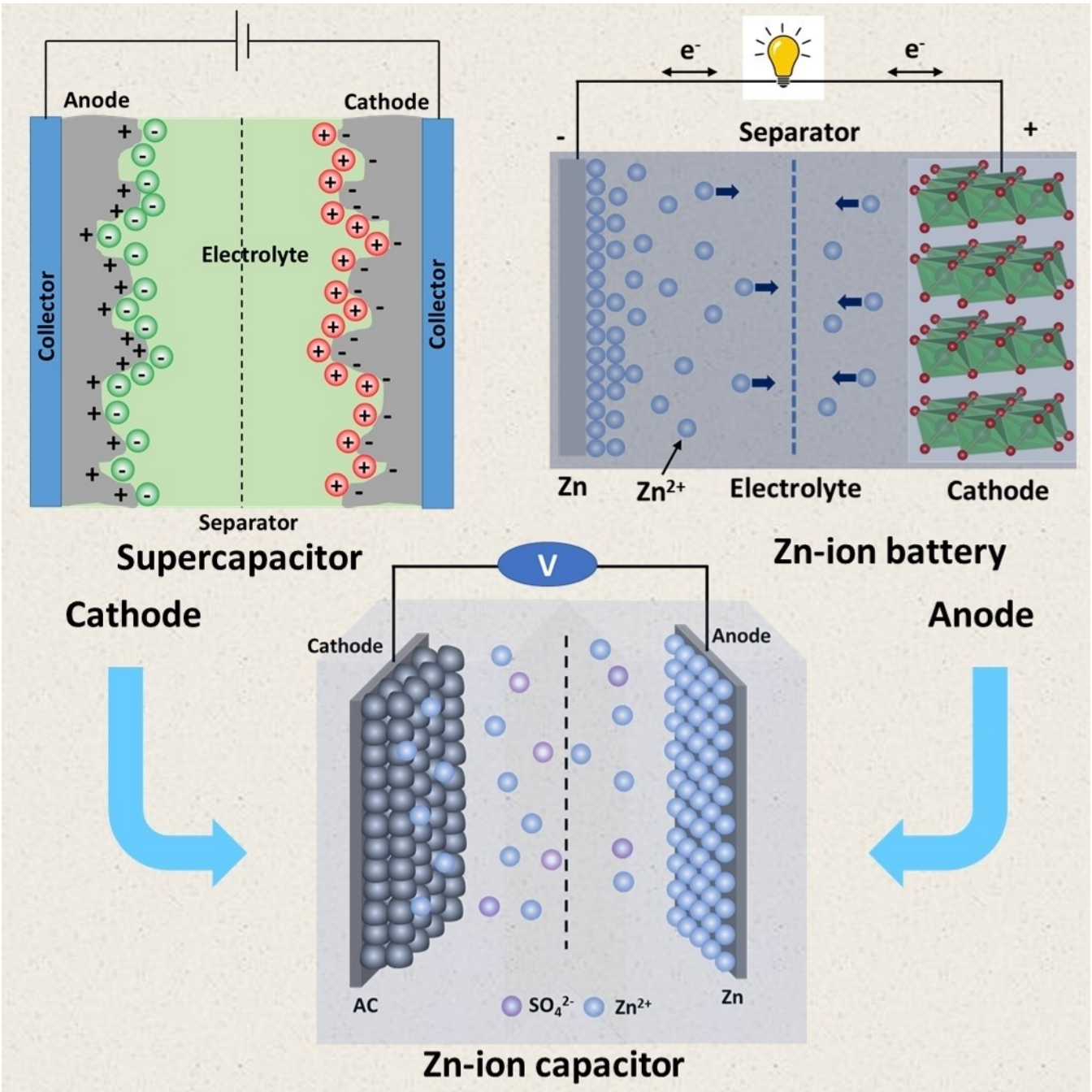

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HISTOPATHOLOGY OF PROSTATE GLAND IN TERRESTRIAL SLUG *Semperula Maculata* AFTER ACUTE EXPOSURE OF ZINC CHLORIDE

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Abstract:
This study enlights on terrestrial molluscan slug, *Semperula maculata*, against acute exposure of Zinc chloride ($ZnCl_2$). Histopathological changes were observed in the cellular arrangement of prostate gland. Prostate gland showed increased dilated secretory cells and damaged connective tissues were observed in the sectional view. These alterations found directly proportional to the time of exposure period. Evidence indicates that Zn degeneration and impact over the normal function and structure of prostate gland.
Keywords: *Semperula, maculate, Morus, indica*, alcohol, prostate gland

Introduction:

Molluscan species can also represent hazards or pests for human activities. Snails and slugs can also be serious agriculture pests, and accidental or deliberate introduction of some snail species into new environments has seriously damaged some ecosystems (Kadam *et al.* 2021). Terrestrial gastropods are highly sensitive to toxic chemicals producing alterations at the cellular level (Hernadi *et al.* 1992). He also reported the mussel *Elliptio complanata*, exposure to Cu had a significant effect on the mean percentage of destabilized lysosomes in different concentration. Now a day rapid industrial development in agricultural field leads to organic and inorganic contamination from hazardous chemicals and heavy metals of aquatic and terrestrial ecosystems. These form a major group of aquatic and terrestrial contaminants showing deleterious impact on terrestrial and aquatic media (Sanchez, 2008; Davidson *et al*. 2011; pack *et al*. 2014). Heavy metals are enter in the environment through anthropogenic sources, such as industrial effluent, traffic, smelting, combustion of fossil fuels, and certain agricultural practices (Uyear *et al*. (2009).

From above review it is clear that there is scanty information available on the effect of heavy metal on the reproductive organs i.e. on the prostate gland. Thus, the present study designed to study the effect of zinc chloride on the prostate gland of terrestrial slug.

Materials and Methods:

Experimental animals-

Adult herbivorous, hermaphrodite, terrestrial slugs *S. maculata* (Approximately of 67 cm length, 11.5 cm width and 34 g wt.) were collected from natural habitats from the village Panmala at Bedug, Miraj, district Sangli, Maharashtra, India. Animals were carried in aerated plastic bottles to the laboratory. Experimental animals were kept in open-air trough covered with aerated plastic lead covering to provide proper ventilation. Experimental animals were allowed to feed on fresh leaves of mulberry plant (*Morus indica*). All the animals were kept under controlled lab conditions of water, temperature, and fresh air for better acclimatization (Kadam *et al*. 2021).

Induction and tissue preparation-

Experimental animals, *S. maculata*, were acutely exposed to previously determined mean LC50 (377.7 ppm) concentration of $ZnCl_2$ (Londhe, 2013).Control and experimental animal were dissected after 24, 48, 72, or 96 hr., respectively, for prostate gland and fixed in Bouin's solution (75 ml picric acid + 25 ml formalin + 5 ml acetic acid) for 6-7 hr. at room temperature followed by washing with 70% ethanol for three days, dehydrated with ethanol-graded series, cleaned with xylene, and embedded in paraplast. Tissue blocks were prepared and sectioned with a rotary microtome at 6 mm thickness and for histological study (Londhe, 2013).

Histological study-

WATER REQUIREMENT IN THE INDAPUR TAHSIL DISTRICT PUNE MAHARASHTRA

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Abstract

The requirement of water is essential for every inhabitant and for a wide range of economic and informal sector activities. India accounts for about 17.5 % of the world's population and roughly 4% of the total available fresh water resources. With increasing population and growing demand from industrial and agricultural sectors the water consumption is set to jump up tremendously in the near future. Present study attempts to highlight the requirement of water resources in the Indapur tahsil Pune district of Maharashtra.

The proportion of water requirement is in three different activities i.e. domestic purpose, agriculture purpose and industrial purpose in Indapur tahsil are also discussed in the paper. The water requirement statistics has also been worked out through secondary data and personal interviews conducted during the field visits. For this purpose a questionnaire was framed. Questions are related to domestic, agriculture, livestock and industrial water requirement has also been incorporated accordingly. These data base converted to Microsoft access format to suit to the link up for processing through Arc View 9.3, Surfer version 10, Global Mapper version 11. The outcomes of these studies are briefly presented in the paper. It has been observed that the requirements of water resources are not uniform over the study area. The total water requirement for domestic, agricultural and Industrial purpose claims to 601.38MCM.

Key words: domestic, agriculture, industrial, requirement of water.

Introduction

A given water requirement is the amount of water which is necessary for the undisturbed course of any natural or technological process. It includes water consumption (consumed flow), i. e. the difference between water withdrawal and the net return flow that consists of consumptive use and losses. The water loss represents that part of the water requirement, water consumption, water withdrawal or water resource which returns into the hydrologic cycle in the form of seepage, leakage, percolation, evaporation etc. losses may be either ways. Water requirements and water consumption in the course of agricultural and industrial processes may be distinguished as

(a) Minimum,

(b) Optimum,

(c) Non-Economic.

Minimum water requirement or minimum water consumption during a specific production process can be achieved under special conditions, e.g. in

STUDY OF REPRODUCTIVE BIOLOGY OF A MOTH *EUTECTONA MACHAERALIS WALKER*

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ABSTRACT:

*Eutectonamachaeralis Walker*Lepidopteran moth and is pest for *T. grandis.* Biology of the *Eutectonamachaeralis Walker*have been studied. In ten individuals, preoviposition period ranges from 2 to 3 days with an average of 2.6 ± 0.52 days. and post oviposition period ranged from 1.0 to 2.1 to 2 days with an average of 1.4 ± 0.52 days.Average egg hatching percentage was 75 78.5 ± 9.88. The developmental period of larval instars ranged from 15 to 18 days with an average of 17.0 ± 1.12 days. Instars of *Eutectonamachaeralis Walker*showed head capsule, body width and body length.

KEY WORDS: *Eutectonamachaeralis Walker,*preoviposition, oviposition and postoviposition.

INTRODUCTION:

Pachauri and Sridharan, 1998 reported that much damage is done to our natural resources and wealth.Beeson (1913) reported that *H. puera* and several species of Arctiids such as *Aularchesmiliaris*, *Teratodesmonticollis* Grey and *Spilosomaobliqua* defoliate teak forests. Garthwaite (1939) reported that *Calopeplaleayana* was a serious defoliator of *Gmelinaarborea* in Assam, Bengal, Mumbai and Chennai. *Celosternascabrator* was a most notorius pests of babul, *Acacia arabica* and teak plantations (Beeson, 1941). Khan *et al,*(1988) studied the seasonal activity and abundance of *H. purea*, *Euproctis* sp. and *E. machaeralis* in forest. listed various insect pests of teak, including lepidopterous such as *S.* Sensharma and Thakur (1988) *malabaricus*Moore, *H. puera,* and *E. machaeralis.* Beeson (1941) studied the biology of teak skeletoniser, *E. machaeralis.* David andKumarswami (1982) reported that female of *E. machaeralis* lays 250 to 500 eggs on leaves and as many as 10-12 generations were completed in a year.

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MORPHOLOGICAL CHANGES IN CHICK EMBRYO NEURAL TISSUE ASSOCIATED WITH WARFARIN USE DURING PRENATAL DEVELOPMENT

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ABSTRACT:

Warfarin is generally called as blood thinner that inhibits the clotting of blood by reducing the production of factors by the liver that promotes clotting. It is anticoagulant drug due to this it helps to keep blood flowing smoothly in our body. The liver is dependent on a good enough amount of vitamin K due to the production of these factors by the liver. Warfarin is responsible for reducing the production of the factors. The aim of this study was to determine the effect of prenatal warfarin exposure on cell viability and cell morphology in chick embryonic neurons; specifically, to identify areas of the hindbrain that may be affected, to an extent contributing to Dandy-Walker Syndrome (DWS). histological staining technique namely Haematoxylin and Eosin (H&E) staining was used to evaluate chick embryonic neural tissue exposed to 4.865mM and 5.838mM warfarin on day 5 (Carnegie stage 17) and day 7 (Carnegie stage 20) of development. For further analysis of cell viability, primary chick embryonic Neuronal Cultures were prepared and increasing concentrations of warfarin (1.625mM, 2.435mM, 3.25mM, 4.865mM, and 5.838mM) were added. The percentage of cell viability was determined by the MTT assay method. We observed that warfarin indicated neurotoxicity at high concentrations of exposure. Although cell death could be detected, the exact mechanism needs to be yet investigated. Since the developing brain is so susceptible to chemical toxicity, care must be taken while administering warfarin to pregnant mothers or young children.

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HYDROBIOLOGY OF THE SHELF WATERS OFF KARNATAKA COAST, INDIA

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ABSTRACT:

Results of a comprehensive hydrological sampling programme of the shelf waters off Karnataka coast was conducted on the R.V.Gaveshani Cruise No. 208. Eight transects across the shelf, covering 25 stations were studied. Depth of stations varied from 17 to 1650 m. Findings of study described the hydrographical parameters as temperature, salinity, pH, dissolved oxygen, phosphate, nitrate, nitrite of surface and bottom waters.

Results presented were on the basis of a sampling trip conducted during the end of Post-monsoon period, thus providing information on the spatial pattern of various parameters. Information on temporal (seasonal) variation is essential in order to define the hydrographic dynamics of shelf waters of the region over the temporal sequence.

Key words: Temperature, salinity, pH, dissolved oxygen, phosphate, nitrate and nitrite.

INTRODUCTION:

Research vessel Gaveshani Cruise No.208 was carried to investigate the hydrography of the shelf waters off Karanataka coast. With the existence of six major estuarine systems namely, Kali at northmost, Gangavali, Aghanashini, Sharavati, Bhatkal, Koondapur and at southern Netravati (**Fig. 1**). Though the influence of the these on the fairly high fish production of Karnataka is understood, a systematic study to investigate the different abiotic and biotic factors was lacking long since. The present work is an effort to fill the lacuna besides to obtain a baseline data exclusively for the shelf and deep waters of Karnataka coast (from Netravati to Karwar). Environmental factors play a vital role in the productivity of the sea. Prevalence of the favourable hydrographical conditions is a prerequisite for optimum primary and secondary productions on which depends the fish production. The role of nutrients in limiting the distribution and abundance of plankton on which the fish thrive is also well understood. Since the coastal waters of North Kanara support an important fishery for the Indian mackerel. Earlier investigation at Karwar [1][2][4] and Mangalore [13] have contributed to our knowledge of the hydrological conditions of Karnataka coast. According to Shenoi *et al.* [11] the surface hydrography during March–April was dominated by the intrusion of low-salinity waters from the south; during May–June, the low-salinity waters were beginning to be replaced by the high salinity waters from the north.

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DISSOLUTION AND REFORMATION OF CRYSTALLINE STYLEOF THE EDIBLEOYSTER*SACCOSTREACUCULLATA*FROM SINDHUDURGDISTRICT, MAHARASHTRA STATE

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ABSTRACT:
Two geographically separated estuarine localities at Deogad (16^0 23' N; 73^0 23' E) and Achra (16^0 15' N; 78^0 26' E) in Sindhudurg district of Maharashtra State,India were selected on the basis of the differences in habitat, topography,vegetation and local market value to study the dissolution and reformation of the crystalline style of the oyster *Saccostrea cucullata*. The maximum sizes observed by S. *cucullata* in the estuaries at Deogad and Achra were 44-45 mm shell length. Comparatively large sized oysters are found round the year in the estuary at Deogad than at Achra.

The environmental parameters such as pH, temperature, dissolved oxygen and salinity existing on the oyster beds in Deogad and Achra were recorded at the time of the experiment. The oyster beds in Deogad gets exposed to atmospheric air for comparatively a long time than those at Achra and with the commencement of high tide oyster bed at Achra gets reimmersed to the sea water earlier than the bed at Deogad. The time required for dissolution of crystalline style from the oysters of estuary at Achra is less than those from the estuary at Deogad. Further, time required for the reformation of style after immersion in sea water was less in the oysters from the estuary atAchra than at Deogad.

Key words:*S. cucullata*, Deogad, Achra, estuary,oyster, dissolution and reformation.

INTRODUCTION:
[15] Along the west coast of India the backwaters and estuaries are very extensive and play an important role for food production. These are widely scattered, have an area of 30.7 lakhs acres from which Maharashtra coast constitutes 3.0 lakhs acres combining together 2.0 lakh acres for brackish water and one lakhs acre for estuaries. [9] The backwater and estuaries are very productive along the coast and are being used for various purposes. They are the breeding grounds of various species of marine and estuarine fauna.

Two geographically separated localities at Deogad (16^0 23' N; 73^0 23' E) and Achra (16^0 15' N; 78^0 26' E) in Sindhudurg district of Maharashtra State were selected on the basis of the differences in habitat, topography, vegetation and local market value to study the dissolution and reformation of the crystalline style of the oyster

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RECAPITULATION OF GERONTOLOGY AND FRAILTY; DISCOVERING A CURRENT REVIEW

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ABSTRACT:

Gerontology is the study of the social, cultural, psychological, cognitive, and biological aspects of ageing. Due to the advancements in technology the studies concerning ageing has grown impressively. One of the most important fields of study under ageing is frailty, which is the main highlight of this article. Frailty is a dynamic syndrome which affects an individual not just physically but also mentally, socially and psychologically. Each of the mentioned domains has copious factors which lead to frailty. Finding out these factors in an individual can be helpful as it will aid in recognizing the correct interventions with the help of which frailty can be somewhat reversed and prevented. According to the several amount of research it has been found that the onset of frailty is not just because of ageing but also due to several environmental factors, chronic diseases and genetics, which further tells us that frailty is not just common to old adults but can be developed at a younger age as well. Some well-known models for instance, Phenotype and Cumulative deficit model and various other assessment tools have been developed in order to identify frailty in old individuals. Frailty also had a major impact on Covid-19 patients. Frail individuals were more severely harmed by the Corona Virus, similar rise in Cluster of Differentiation molecules can be observed in both frail and Covid-19 patients. Also, several biomarkers have been recognized that occur in an increased level in majority of frail individuals. According to a study it was found that not all old adults who are frail will identify themselves as frail, and for almost every

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Discovery of oxazole-dehydrozingerone based hybrid molecules as potential anti-tubercular agents and their docking for M*tb* DNA gyrase

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ABSTRACT

The oxazole-dehydrozingerone hybrid molecules (4a-j) and oxazole-dehydrozingerone-thiophene derivatives (6a-e) were synthesized via cyclisation, coupling and aldol condensation reactions. Final compounds were characterized by FTIR, ^{1}H and ^{13}C NMR spectroscopy. Synthesized compounds were screened against Mycobacterium tuberculosis H37Rv, MDR, and XDR strains. Compound 4f showed potential activity of 6.25 μg/mL against H37Rv, while compound 4c exhibited potential activity of 12.5 μg/mL. For the XDR strain, structure 4a, 4b demonstrated moderate efficiency of 12.5 μg/mL. All of the synthesized molecules were tested in comparison with a standard drug. Computational docking studies were performed for the active compound 4f against the enzyme M*tb* DNA Gyrase. The outcomes of the presented research will broadly help to the researchers working on developing antituberculosis drugs.

1. Introduction

Tuberculosis is an air-born contagious disease caused by mycobacterium tuberculosis (Mtb) [1,2]. In 2012, World Health Organization (WHO) reported 8.6 million infections, and among them, 1.3 million people died because of infectious diseases, and in 2016, 490,000 new cases of multidrug resistance were widely estimated [3]. There is a growing resistance to existing drugs resulting from deadly diseases that become more deadly and difficult to treat. MDR and extensive drug resistance (XDR) Mtb are diseases caused by bacteria that don't respond to first-line antitubercular drugs [4]. Existing treatment consists of various drugs that need to be taken for more than a year, resulting in numerous side effects and a substantial economic burden. In developing countries, pollution is the primary reason as Mtb can increase through the air. In recent years the death rate was declined, but it is still a significant cause of death after AIDS [5]. The drugs used for the treatment are streptomycin, Isoniazid, Ethambutol, Rifampicin, Ethionamide, Cycloserine, and Kanamycin. Most of these drugs have been discovered and used for the last 70 years [1]. Hence, there is an alarming concern about the drug-resistant strains of Mtb [6-9]. A constant research is underway for understanding the reasons behind the evolution and existence of resistant strains of Mtb [10]. Synthesis and high-throughput screenings of different derivatives with a broad spectrum of novel and known scaffolds were carried out to obtain lead derivatives as anti-TB [11-13]. The drug discovery and role of heterocyclic nuclei well known since the early 18th century [14]. The heterocyclic compounds are five or six-member rings bearing heteroatoms like nitrogen (N), oxygen (O), or sulfur (S). They play an essential role in all living cells' biochemical processes and find in natural and synthetic forms [15,16].

The fused heterocycles, such as oxazole and oxazoline, were commonly disturbed in nature and attracted considerable interest because of their various medicinal activities [17]. They were initially isolated from a marine source [18]. These hetero cores contains nitrogen and oxygen atoms in an aromatic five-membered ring that can bind with different receptors and enzymes in the biological system through non -covalent interactions [19]. Several advantages of the oxazole ring in medicinal chemistry are that it has weak interactions with H-bond, ion–dipole, π-π stacking, and a weak hydrophobic character. These nuclei found their applications in medicinal and agrochemical chemistry [20]. The natural and synthetic 1,3-oxazole nuclei exerts diverse range of biological activities like anti-mycobacterial [21], anti-tubercular [22-24], anti-bacterial [25], glycomimetic inhibitors [26], antiviral [27],

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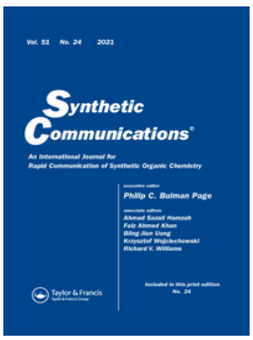

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A systematic appraisal on catalytic synthesis of 1,3-oxazole derivatives: A mechanistic review on metal dependent synthesis

Suraj R. Shinde, Pankaj Girase, Sanjeev Dhawan, Shaukatali N. Inamdar, Vishal Kumar, Chandrakant Pawar, Mahesh B. Palkar, Mahadev Shinde & Rajshekhar Karpoormath

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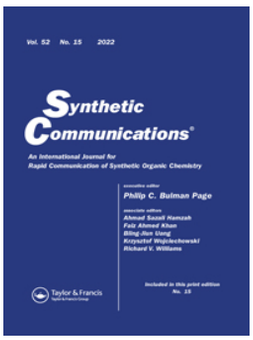

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Recent advances and approaches in the metal-free synthesis of 1,3-oxazole derivatives

Suraj Shinde, Shaukatali Inamdar, Mahadev Shinde, Narvadeshwar Kushwaha, Vincent Obakachi, Pankaj Girase, Babita Kushwaha, Sanjeev Dhawan, Vishal Kumar & Rajshekhar Karpoormath

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Water Budget of the Indapur Tahsil

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Abstract

Water budgets provide a foundation for evaluating its use in relationship to other important influencing conditions such as other ecological systems and features, as well as social and economic components – how much water is being used by agriculture, industry and residents etc. A water budget commonly provides the info of quantity and place of it. Water budget studies consider the volumes of water within the various reservoirs of the hydrologic cycle and the flow paths from recharge to discharge. The reservoirs of surface and underground water are about 1542.695 MCM; Out of this only 601.38 MCM water is required for use. Water budgets are developed by measuring or estimating the inputs and outputs of a hydrologic system. Inputs are the processes that add water to the system; these include precipitation and inflow from surface water and groundwater. Outputs are the processes that remove water from the system; these include evapotranspiration, the various uses of water by humans, and outflow from surface water and groundwater. General hydrological equation to compute water balance and runoff has been estimated. The average surface water village wise runoff of the study area is estimated. There is great deal of variations in terms of volume of runoff by different villages. The entire tahsil is drought prone and faces the problem of water scarcity throughout the year. Observing these outcomes in the present context, this paper calculates the water budget of the Indapur tahsil. The outcomes of these studies are briefly presented in this paper. It has been observed that the water resources are not uniformly available in the study area.

Key words: *Precipitation, evapotranspiration, runoff, surface water, groundwater* water balance, water budget.

Introduction

A water budget is a basic tool that can be used to evaluate the occurrence and movement of water through the natural environment. Water budgets provide a foundation for evaluating its use in relationship to other important influencing conditions such as other ecological systems and features, as well as social and economic components – how much water is being used by agriculture, industry and residents etc. The water budget process can encompass various levels of assessment which start simple and grow more complex if there are concerns about how much water is available at any level. Water budgets commonly provides the info of quantity and place of it. Water budget studies consider the volumes of water within the various reservoirs of the hydrologic cycle and the flow paths from recharge to discharge. Water budgets need to consider this information on a variety of spatial and temporal scales (Hazel Breton 2010). The maximum water holding capacity of soils, rainfall and potential evapotranspiration are the basic controlling elements of water balance. The distribution of these elements decides droughts or water surplus condition. Therefore rainfall, potential evapotranspiration, aridity, humidity and soil moisture are become primary controlling factors of agriculture (Saikia 1994). In the present study water balance technique is used to estimate the availability of rainwater resource in the study area. The nature and distribution of rainfall of the study area discussed earlier indicates that about 90 percent rainfall takes place during the short period of four months from June to September. There is a great variation in the number of rainy days.

Objectives

1. To identify inputs and outputs of a hydrologic system
2. To identify place and quantity of water.
3. To calculate the runoff of the study area.
4. To make favourable suggestions to low runoff and sufficient water available.

Study area

Indapur tahsil is one of the tahsils in the Pune district consisting of 142 villages along with one urban centre in the study area. There are eight revenue circles in the tahsil. The area extends from 17° 53′ 42" to 18° 19′ 58" North latitudes and 74° 39′ 16" to 75° 09′ 39" East longitudes **(Fig. 1)**. The area is drained by the river Bhima on north and east both sides. Nira River flows south of Indapur tahsil. Total geographical area of the tahsil is 1575.38km^2 (Census 2011), out of which Nira river catchment area compress about 586.8 km^2 and Bhima river catchment covers an area of 902.43km^2. Nira River joins the Bhima River at famous tourist place i.e. Narsinhapur village after travelling a course of 209 Kms from origin. The slope of region is towards east. There are three soil types, namely, coarse shallow, medium black and deep black soils occupying 30, 40 and 30 percent respectively.