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Number of research papers in the Journals notified on UGC CARE list year 2020

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2	Hunger as a Metaphor of Emasculation in Bhabani Bhattacharya' He Who Rides a Jourr Tiger	Saswata Kusari	English	Asian Quarterly: An International Journal of Contemporary issues	https://www.iasepune.in/aq/
3	Adsorption and anti-corrosion characteristics of vanillin Schiff bases on mild steel in 1 M HCl: experimental and theoretical study	Sanjoy Satpati	Chemistry	RSC Advances	https://pubs.rsc.org/en/content/articlehtml/2020/ra/c9ra07982c
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5	Threats of plastic pollution and awareness among common people: A multi attribute problem	Supratim Mukherjee	Mathematics	Eco. Env. & Cons	http://www.envirobiotechjournals.com/EEC/v26i420/EEC-65.pdf

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6	Bis-benzothiazoles as efficient corrosion inhibitors for mild steel in aqueous HCl: Molecular structure-reactivity correlation study	Sanjoy Satpati	Chemistry	Journal of Molecular Liquids	https://www.sciencedirect.com/science/article/abs/pii/S0167732220313453
7	বিপ্লবে বারুদের গন্ধ নেই সুভাষ মুখোপাধ্যায়ের সমকালিনতা ও বিশ্বজনীনতা	Avijhit Saha	Political Science	Anustup	https://anustup.org.in/
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10	A Spectroscopic Approach towards the Comparative Binding Studies of the Antioxidizing Flavonol Myricetin with Various Single-Stranded RNA	Susmita Chowdhury	Chemistry	Chemistry Select	https://chemistry-europe.onlinelibrary.wiley.com/doi/epdf/10.1002/slct.202003601

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সপ্তদশ লোকসভা নির্বাচন (২০১৯): মুর্শিদাবাদ জেলার নির্বাচনী ফলাফলের একটি পর্যালোচনা

অভিজিৎ সাহা*

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সারসংক্ষেপ

আলোচ্য প্রবন্ধটিতে সপ্তদশ জাতীয় লোকসভা নির্বাচনের (২০১৯) পরিপ্রেক্ষিতে মুর্শিদাবাদ জেলার তিনটি লোকসভা কেন্দ্রের ফলাফলকে পর্যালোচনা করা হয়েছে। নির্বাচনী ফলাফলকে বিশ্লেষণ করার জন্য যে সমস্ত পদ্ধতি ও মাপকাঠি অনুসরণ করা দরকার, আলোচ্য প্রবন্ধে উক্ত মাপকাঠিগুলিকে যতটা সম্ভব অনুসরণ করার চেষ্টা করা হয়েছে। প্রবন্ধটির মূল উদ্দেশ্য হল, প্রাপ্ত ফলাফলের ভিত্তিতে জেলার রাজনৈতিক বিন্যাসকে উপলব্ধি করা এবং এই নির্বাচনী ফলাফল যদি জেলার রাজনৈতিক বিন্যাসে কোনোরূপ মৌলিক পরিবর্তন নিয়ে আনতে সমর্থ হয়, তাহলে সেই রাজনৈতিক পরিবর্তনের ঝোঁকটিকেও চিহ্নিত করার চেষ্টা করা। মূলত চারটি অংশে বিভক্ত করে প্রবন্ধটি আলোচিত হয়েছে। এগুলি হল—(ক) সর্বভারতীয় লোকসভা নির্বাচনের পরিপ্রেক্ষিতে জেলার নির্বাচনী ফলাফলকে পর্যালোচনা করা; (খ) পশ্চিমবঙ্গের নির্বাচনী ফলাফলের পরিপ্রেক্ষিতে সংশ্লিষ্ট জেলার নির্বাচনী ফলাফলকে বিশ্লেষণ করা; (গ) উক্ত নির্বাচনে জেলার স্থানীয় ও নিজস্ব রাজনৈতিক সমীকরণ কতখানি ক্রিয়াশীল ছিল তার ওপর আলোকপাতের চেষ্টা করা; (ঘ) সাম্প্রতিক নির্বাচনী ফলাফল জেলার রাজনৈতিক সংস্কৃতিতে কোনোরূপ পরিবর্তন আনতে পেরেছে কিনা—সেটাও পর্যালোচনার মধ্যে রাখা হয়েছে। সবশেষে, উপরোক্ত মাত্রাগুলির পরিপ্রেক্ষিতে জেলার নির্বাচনী ফলাফলগুলিকে চিহ্নিত করার চেষ্টা করা হয়েছে।

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HUNGER AS A METAPHOR OF EMASCULATION IN BHABANI BHATTACHARYA'S *HE WHO RIDES A TIGER*

Sawata Kusari*

In a typically heteropatriarchal society, man's position in the society is almost always dictated by his ability (or inability) to be a breadwinner. In Manliness and Its Discontents, Martin Summers argues the same. It is with this desire to have a 'manly' aura, Kalo, the protagonist of Bhabani Bhattacharya's He Who Rides the Tiger, decides to escape the village and his poverty and goes to the big city in expectation of financial escalation. However, after repeated failures to do so, Kalo, realizing more that he would fail as a man without being economically potent, decides to ride the tiger—a symbol for wealth and power and also of manliness. This paper, using the theoretical framework of Masculinity studies, especially that of R.W. Connell, would seek to explore how various shades of masculinities are very often inexorably linked with various economic conditions.

Key Words: *Poverty, Hunger, Masculinity, Hegemony, Caste*

One of the most devastating effects of colonialism in India was perceived in 1943 when Bengal suffered its worst famine. However, historians

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and critics have shown that this famine was not a natural calamity; rather it has been deemed as a man-made disaster. Rakhi Chakrabarty points the role of Winston Churchill behind this catastrophic event. She writes:

> Winston Churchill, the hallowed British War prime minister who saved Europe from a monster like Hitler was disturbingly callous about the roaring famine that was swallowing Bengal's population. He casually diverted the supplies of medical aid and food that was being dispatched to the starving victims to the already well supplied soldiers of Europe. When entreated upon, he said, "Famine or no famine, Indians will breed like rabbits." The Delhi Government sent a telegram to him painting a picture of the horrible devastation and the number of people who had died. His only response was, "Then why hasn't Gandhi died yet?" (Para 7)

The utter recklessness of Churchill is a ghastly reminder of how the white men dehumanized the natives. Many Bengali intellectuals, through various creative mediums, have showcased this catastrophic event. And Bhabani Bhattacharya is undoubtedly one of the most prominent voices to bring out the catastrophic magnitude of this man-made disaster. Bhattacharya was one of the earliest social realists of Indian literature and remained unapologetically so throughout his life. M.K Naik writes, "Bhattacharya believes that 'Art must teach, but unobstrusively, by its vivid interpretation of life. Art must preach, but only by being a vehicle of truth" (223). This paper would strive to show, using the lenses of gender studies and masculinity studies, how Bhattacharya's exploration of the issue of hunger, with special reference to his finest work, *He Who Rides a Tiger*, in many ways,

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Adsorption and anti-corrosion characteristics of vanillin Schiff bases on mild steel in 1 M HCl: experimental and theoretical study†

Sanjoy Satpati,[a] Sourav Kr. Saha,[bd] Aditya Suhasaria,[a] Priyabrata Banerjee[*bc] and Dipankar Sukul[*a]

Herein, two Schiff base derivatives of vanillin and divanillin with 2-picolylamine, namely, 2-methoxy-4-((pyridin-2-ylmethylimino)methyl)phenol (compound **A**) and 3,3′-dimethoxy-5,5′-bis-((pyridin-2-ylmethylimino)methyl)-[1,1′-biphenyl]-2,2′-diol (compound **B**), respectively, were synthesized. Additionally, their adsorption characteristics and corrosion inhibition behavior were compared for mild steel in 1 M HCl using electrochemical impedance spectroscopy, potentiodynamic polarization and weight loss methods. Compound **B** was found to impart a better anti-corrosive effect (around 95% inhibition efficiency at 313 K) than compound **A**. The inhibitors act as effective mixed-type inhibitors and exhibit Langmuir-type adsorption behaviour. The kinetic–thermodynamic parameters together with the data obtained from density functional theory (DFT) and molecular dynamics (MD) simulations illustrate the mechanism of corrosion and mode of adsorption of both inhibitors on the metal surface. The better corrosion mitigation propensity of the dimeric form of the inhibitor (compound **B**) over the monomeric form (compound **A**) was tested experimentally and explained according to the theoretical data.

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Introduction

The application of suitable corrosion inhibitors for the control of corrosion in metals and alloys is very important.[1–4] However, due to ecological concerns, the use of inorganic inhibitors is gradually being restricted. This has resulted in a surge of studies involving organic corrosion inhibitors. Organic compounds containing N, S, and O atoms generally show good inhibition efficiency for mild steel in acidic media.[5–12] In addition to various heterocycles,[13] amines[14] and imines,[15] different other classes of organics, such as amino acids,[16,17] vitamins,[18] polysaccharides,[19] surfactants,[20] polypeptides,[21] lipids,[22] polyphenols[1] and others, have been reported to act as efficient corrosion inhibitors. Schiff bases are versatile compounds, which are synthesized *via* the condensation of primary amines and carbonyl compounds, and used widely in pharmaceuticals, agrochemicals and materials science.[23–25] In this work, we aimed to investigate the corrosion inhibition properties of two newly synthesized Schiff base derivatives of vanillin and divanillin with 2-picolylamine for mild steel in 1 M HCl.

Vanillin, a biomass-derived phenolic aldehyde, is widely used as a flavoring agent in foods, beverages and pharmaceuticals owing to its anti-microbial and anti-oxidant properties.[26] It was first extracted from vanilla beans, which are primarily obtained from the orchid *Vanilla planifolia*. The synthetic production of vanillin from the abundant lignin *via* metal-catalyzed air oxidation converts it into a potential renewable feedstock chemical.[27,28] Herein, we provide further value to vanillin and explore its potential for applications in a new arena of green corrosion inhibitors, which are essentially of bio-origin and less toxic to the environment. To date, vanillin has been tested for its anti-corrosive propensity for aluminum in acid solutions.[29] However, since vanillin itself failed in this effort for ferrous metal, it was derivatized into a Schiff base, *i.e.*, 2-methoxy-4-((pyridin-2-ylmethylimino)methyl)phenol (compound **A**). Further, we synthesized divanillin, which was subsequently converted to another Schiff base, 3,3′-dimethoxy-5,5′-bis(((pyridin-2-ylmethyl)imino)methyl)-[1,1′-biphenyl]-2,2′-diol (compound **B**). The molecular formulae of these two Schiff bases are shown in Fig. 1. Compound **B** is essentially the dimeric form of compound **A**. One of our main intentions of

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† Electronic supplementary information (ESI) available: NMR, FTIR and mass spectra of the synthesized inhibitors, potentiodynamic polarization plots and impedance spectra in the presence of the inhibitors at different temperatures, variation in the free energy of adsorption with temperature, Arrhenius plots, electronic distribution in the frontier molecular orbitals for the protonated forms of the inhibitors, closest distance between the inhibitor atoms, metal surface data and various other relevant data. See DOI: 10.1039/c9ra07982c

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Waves in generalized thermo-viscoelastic infinite continuum with cylindrical cavity due to three-phase-lag time-nonlocal heat transfer

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ABSTRACT

Generalized thermoelastic interactions due to three-phase-lag time-nonlocal heat transfer in a Kelvin-Voigt type infinitely extended visco-thermoelastic continuum with cylindrical cavity has been investigated. The two-temperature generalized thermoelasticity theory has also been taken into account. The problem has been solved in the domain of Laplace on the assumption that the surface of the cavity is free from traction and is subjected to a smooth and time-dependent-heating effect. Laplace inversion of the transformed solutions has been carried out numerically. The obtained numerical data for different considerations are plotted in graphs to study the effects of time-nonlocal parameter, two-temperature parameter and visco-thermoelastic relaxation parameter on different thermoelastic quantities of physical interest.

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Introduction

Thermoelasticity theories are divided into two sections, classical thermoelasticity theories and generalized thermoelasticity theories. Classical thermoelasticity theories are also partitioned into classical uncoupled thermoelasticity theories and classical coupled thermoelasticity theories [1]. Both classical uncoupled and coupled thermoelasticity theories suffer from the crucial imperfection that the heat conduction equation of these theories recommends an unrealistic observation of unbounded speed of thermal wave propagation [2]. To prevail over this untenable observation, generalized thermoelasticity theories were introduced surpassing the classical thermoelasticity theories. First impressive contribution to this new horizon of thermoelasticity theories was due to Lord and Shulman [3]. Later on Green and Lindsay [4], Green and Naghdi [5–7], Tzou [8], S. K. Roy Choudhuri [9] and several other researchers developed different generalized thermoelasticity theories. The works of Ignaczak and Ostoja-Starzewski [10] and Chandrasekharaiah [11, 12] may be referred for details in this perspective. From the experimental view-points, it is evident that the theories of generalized thermoelasticity are more suitable than the classical theories of thermoelasticity to cope with short-lived practical problems with excessive heat fluxes which occur generally in nuclear power plant and laser beam etc.

Thermoelasticity theories for elastically deformable continuum accommodate two different sorts of temperatures [13–16], represented by θ, ϕ and respectively known as the thermodynamic temperature and the conductive temperature. θ appears for thermal processes and ϕ appears for

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Threats of plastic pollution and awareness among common people: A multi attribute problem

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ABSTRACT

Pollution is a global issue. It does not consider the international borders or any other human restricted conditions while spreading. Specially Plastic Pollution has been a recent topic of deep concern due to its immense capacity of causing Environmental threats. This work searches for the logical consistency between the threat and the awareness of the threat among common people. Uncertainty based logical tools have been used to determine the nature of the Multi Attribute Problem.

Key words: *Plastic pollution, Fuzzy logic, MADM, Grey sets, Fuzzy sets, TFN.*

Introduction

Fuzzy logic accommodates semantics for multivariate logic. Normally crisp sets are Cantorian collections consisting of core elements, but Fuzzy sets are like Russellian classes, based on membership grades criteria. Because Fuzzy sets are locally subjective, while assigning membership degrees, at least one membership degree has to be made subjective and also it relies on expert's choice, i.e., in broad sense it is context dependent. Fuzzy logic is a concept derived from the branch of mathematical theory of Fuzzy Sets. Unlike the basic Aristotelian theory that recognizes statements as only "true" or "false" (i.e., 1 or 0) as represented in digital computers, Fuzzy logic is capable of expressing Linguistic terms such as "may be false" or "sort of true". Fuzzy Logic allows one to emulate the human reasoning process, quantify the imprecise information, provide decision based on vague and incomplete data and arrive at a definite conclusion. The logic underlying Fuzzy set theory is multivalent. In general, a multivalent logic can be regarded as a calculus of either on the level of credibility of propositions or on the truth values of the Fuzzy predicates. In most of the multivalent logics there is no longer an excluded middle law; this environment can be rendered as either the absence of decisive belief in one of the sides of an alternative or the imbrications of contrastive Fuzzy concepts.

The threats of plastic pollution are now a global issue. Almost in every Country, regular awareness programs are being arranged and executed to resist the threat. In this work, the aim is to evaluate country wise threats of Plastic Pollution by Fuzzy Multi Attribute Decision Making. In section 2, preliminaries on Fuzzy Sets and Fuzzy Logic are discussed. Section 3 briefly describes the model of Fuzzy Multi Attribute Decision Making Problem. In Section 4, some analytical results are revealed. Section 5 concludes the findings.

Fuzzy Logic and Fuzzy Sets

A Fuzzy set is normally expressed as a collection of elements with a continuum of grades of membership. It is characterized by a membership function,

(Assistant Professor)

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Bis-benzothiazoles as efficient corrosion inhibitors for mild steel in aqueous HCl: Molecular structure-reactivity correlation study

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ABSTRACT

Three different bis-benzothiazole (BBT) derivatives namely 2,6-bis(2-benzothiazolyl)pyridine (BBTP), bis(2-benzothiazolylmethyl)sulphide (BBTMS), and 1,2-bis(benzothiazolyl)ethylene (BBTE) are synthesized and characterized. Corrosion mitigation performance of these bis-benzothiazole derivatives have been inspected for mild steel in aqueous 1 M HCl using electrochemical and gravimetric methods. Corrosion inhibition potentiality of these inhibitors are in the order BBTP > BBTMS > BBTE. This is further substantiated from SEM images. Mixed type corrosion inhibition for all the inhibitors is affirmed from potentiodynamic polarization study. Effect of temperature and exposure time is also evaluated employing gravimetric method. Following Langmuir adsorption isotherm, thermodynamic parameters related to adsorption process are enumerated. Adsorption data together with activation parameters are used to deduce nature of adsorption process of these inhibitors on metal surface. Density functional theory (DFT) and molecular dynamics (MD) simulation are done to explain experimentally obtained result from theoretical view point. Observed corrosion inhibition trend is found to be related to spatial orientation of inhibitor molecules in their most stable energy states in aqueous medium as well as to their intrinsic molecular parameters.

1. Introduction

Inhibition of corrosion of metals in acidic media by heterocyclic organic bases remains an active field of research for many years now. Among these, azoles find a special interest due to good corrosion inhibition power, cost effectiveness, relatively low toxicity, bio-degradability, and solubility in acidic aqueous media. Accordingly, different azoles like indole, imidazole, benzimidazole, triazole, benzotriazole, pyrazole, tetrazole, and their derivatives have been studied [1–9]. Effect of different molecular parameters on corrosion mitigation like molecular volume, unsaturation, heteroatoms, energies of frontier molecular orbitals (FMO) and other intrinsic molecular parameters have been investigated in details. Our group has reported some interesting result on the effect of spatial orientation, particularly how it affects the energies of FMOs, and the nature of interaction with the metal surface employing benzimidazole (BI) derivatives for mild steel in aqueous HCl [8,9]. Here, we intend to extend our work for benzothiazole (BT) derivatives.

BTs are very important aromatic heterocyclic compounds having a 5-membered 1,3-thiazole ring fused to a benzene ring and its heterocyclic moiety is mostly substituted at the unique methyne center of the thiazole ring. Its applications comprise diversified fields; from medicinal chemistry to material science [10,11]. In addition, BTs are known for imparting good corrosion protection to different metals under varied conditions [12–17]. Still, corrosion mitigation study involving bis-benzothiazole (BBT) derivatives is scarce. Also, structure-reactivity correlation involving a series of structurally comparable BT derivatives requires further elaboration. From this aspect, in the present work we have used three different BBT derivatives, where each BT group is separated from each other by a pyridine (in BBTP), or dimethylene sulphide (in BBTMS), or ethylene (in BBTE) groups (*vide* Table 1). Effect of these spacer groups on corrosion inhibition of mild steel in 1 M HCl is investigated in details using electrochemical and weight loss methods. Thermodynamic parameters of adsorption and activation parameters of corrosion reaction are evaluated. From DFT study, we obtain intrinsic molecular parameters. Effect of spatial molecular configuration in the most stable energy state and evaluated intrinsic molecular parameters are examined to decide on their effect on the extent and mode of adsorption of these BBT derivatives on mild steel surface in acidic medium. Among the mineral acids, HCl is used profoundly in many industrial processes, such as steel pickling, electroplating, cleansing algae and zebra mussels accumulated on any underwater structure, activating oil wells, for maintaining acidity in

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৫৪ বর্ষ তৃতীয়-চতুর্থ সংখ্যা

অনুষ্টুপ

গ্রীষ্ম-বর্ষা ও প্রাক্-শারদীয় যুগ্মসংখ্যা ২০২০

বিপ্লবে বারুদের গন্ধ নেই
সুভাষ মুখোপাধ্যায়ের সমকালিনতা ও বিশ্বজনীনতা

অভিজিৎ সাহা

প্রগতিশীল রাজনীতি হল তাই, যা ঐতিহাসিক হাল-হকিকত এবং কোনো আচরণ বা অভ্যাসের সুনির্দিষ্ট বিধিবিধান সনাক্ত করে থাকে; অপরদিকে অন্য রাজনীতি শুধুমাত্র আদর্শিক প্রয়োজন, একস্বরিক সংকল্প এবং ব্যক্তিগত উদ্যোগের অবাধ প্রসারকে মেনে নেয়।

মিশেল ফুকো, *History, discourse and discontinuity*

আলোচ্য প্রবন্ধটিতে সুভাষ মুখোপাধ্যায়ের সাহিত্যকীর্তির নানানদিক উপলব্ধি করার চেষ্টা করা হয়েছে। এক্ষেত্রে সমগ্র প্রবন্ধটিকে কতকগুলি পর্যায়ে ভাগ করে আলোচনা করা হয়েছে। প্রথম ভাগে সুভাষ মুখোপাধ্যায়ের লেখার প্রেক্ষিত, দ্বিতীয় পর্যায়ে কবির কাব্যভাবনা, তৃতীয় পর্যায়ে তাঁর গদ্যভাবনা, চতুর্থ আর শেষ পর্যায়ে আজকের দিনে সুভাষপাঠের পদ্ধতি ও প্রাসঙ্গিকতাকে তুলে ধরার চেষ্টা করা হয়েছে। আর এই সবেরই মূল লক্ষ্য হল সুভাষপাঠের এক ক্ষুদ্র প্রচেষ্টা।

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সুভাষ মুখোপাধ্যায় ও তৎকালীন পরিস্থিতি

প্রথম বিশ্বযুদ্ধের (১৯১৪-১৯১৮) অব্যবহিত পরেই সুভাষ মুখোপাধ্যায়ের (১৯১৯-২০০৩) জন্ম। প্রথম বিশ্বযুদ্ধ নানান রকম শর্ত, চুক্তি/সন্ধির মাধ্যমে শেষ হলেও এর মধ্যেই ভবিষ্যতের অনেক সংকট নিহিত ছিল, এমনকি আরও একটি বিশ্বযুদ্ধের ইঙ্গিত। প্রথম বিশ্বযুদ্ধের পরবর্তী সময়ে প্রায় এক দশক পরেই প্রথম অর্থনৈতিক মন্দা (১৯২৯-১৯৩৯) দেখা দেয়। এই আর্থিক মন্দার প্রভাব কবির পরিবারের ওপর পড়েছিল। যার উল্লেখ কবি তাঁর আত্মজীবনীমূলক উপাখ্যানে ব্যক্ত করেছেন।[১] বিশ্বজুড়ে চলা আর্থিক মন্দা রাজনৈতিক ক্ষেত্রে সমগ্র ইউরোপ জুড়ে এক

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Influence of position of hydroxyl group of flavonoids on their binding with single stranded polyriboadenylic acid: A spectroscopic evaluation

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ABSTRACT

Single stranded polyriboadenylic acid [poly (rA)] has been accepted widely as a suitable drug target owing to its vital role in the development of cancer since it controls gene expression during cell growth and differentiation. The biological properties of poly (rA) depend on its structural morphology. Pharmacologically active flavonoids can act as suitable binders to poly (rA) and significantly change its biophysical properties. Different factors favour flavonoid-poly (rA) binding. In our present work we have explored the role played by the position of hydroxyl groups in the flavonoids namely 3, 5, 6 and 7 hydroxyflavones in their course of interaction with poly (rA). A range of spectroscopic experiments reveal that 3HF binds best to poly (rA) among the four chosen flavonoids. This is probably due to the presence of a hydroxyl group in '3' position that enables it to exhibit ESIPT phenomenon which is missing for the other used flavonoids.

1. Introduction

The discovery of nucleic acid structures has revolutionized drug designing [1,2]. Their study has helped scientists to understand the basis of most of the diseases and how to treat them. In most organisms DNA is the carrier of hereditary unit [3] and hence most researches involve in the studies of structural and functional aspects of drug-DNA interactions. However during the last two decades there has been an inclination towards drug-RNA interaction [4]. This came as a consequence of the role played by RNA in most virus related deadly diseases namely HIV-AIDS, hepatitis, etc. [5,6]. But the exact mechanism of drug-RNA interaction has not been explicitly illustrated so far.

RNA exists in different polymorphic forms in nature depending upon sequence and environmental conditions and single helical structure is the most abundant one. Among these, polyriboadenylic acid, hereafter, poly (rA) has been observed to have numerous biological functions [7,8]. Poly (rA) shows a pH dependent conformational change [9–11]. It exists as a double helical structure at acidic pH but at neutral pH the single stranded structure is predominant [12,13]. This is confirmed from X-ray diffraction and circular dichroism. The gene expression during cell growth and differentiation is determined by polyadenylate [14]. Most eukaryotic mRNAs have a lengthy polyadenylate tail which serves a significant role in its maturity, stabilization and also in the translation process [15]. The polyadenylate tail prevents the enzymatic degradation of mRNAs in the cytoplasm [16]. Prokaryotes on the other hand do not have polyadenylate sequences. Thus, the longevity of eukaryotic mRNA over prokaryotic mRNA can be attributed to the presence of polyadenylate tails [17]. Poly (rA) has been found to be associated with a number of diseases. According to the reports of Green and Cartas, the genome of RNA tumour viruses contains polyadenylate sequences [18]. The polyadenylation of mRNA is catalysed by the enzyme poly A polymerase (PAP). In a recent study it was found that Neo-PAP, a human origin PAP, is dramatically expressed in cancer cells [19]. Thus, study of small molecules that can bind to poly (rA) in mRNA tail and may possibly interfere with its maturation and delay or rupture the encoded protein synthesis can open a new genre of therapeutic agents. This apart, polyadenylic acid has potential to develop G-Quadruplex structures [20] which play a significant role in immunoglobulin heavy chain switching [21].

Flavonoids are a multifunctional group of plant secondary metabolites that not only benefits the floral kingdom but has also contributed a lot towards modern day drug designing [22,23]. Their small size and planar structure make their binding to nucleic acids highly compatible. They have found a place as a part of dietary substituent since a long time. But it was their biological attributes that brought them into limelight. They have a wide range of biological activities ranging from antioxidising [24], anti-bacterial [25], anti-viral [26], anti-tumour [27], anti-inflammatory properties etc. [28]. They are well-known free radical scavengers responsible for DNA damage and tumours [29,30]. Studies show that their anti-oxidant property may be attributed to their extent and position of hydroxylation [31]. Flavonoids like quercetin and naringin are known to inhibit CYP3A4 which is the most abundant P450 enzyme in liver responsible for metabolism of carcinogens and medicines. This property has made them quite sought after as anti-

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Federalism at the Crossroads: Crisis of the Linguistic Minorities in India

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Abstract
Polyglot federations face a challenge in reconciling between the national identities and regional identities. Demand for a second States Reorganisation Commission (SRC) in India in 2015 by some groups bears testimony to this fact. On the question of political remapping in post-independence period, the constitutional ancestors sought to save India from another religious bigotry and the menace of casteism. The emergence of language as a viable alternative gained momentum in Nagpur session (1920) of the Indian National Congress (INC). But subsequent years encountered with a difficulty in adopting territorial solution for accommodating India's multilingual identities. Pre-constitutional, extra-constitutional and constitutional arrangements have faced the challenge of linguistic accommodation. Dar Commission warned the risk of federal remapping with existing linguistic pocket corridors in the states. Inter-state migration has proliferated the problem over the years. Even the SRC could not provide adequate safeguards for large number of linguistic minorities living in all states (Kerala becomes exception with 97.03% linguistic majorities). There new minority emerged and accommodated but with limits. Census report of 2011 shows India having 19,569 languages which stood 1369 after linguistic scrutiny. Territorial machinations appear inadequate to satisfy all linguistic groups but only to incur huge expenditure. Indian federalism seems deficient in non-territorial power sharing which has succeeded in countries like Belgium in the form of Consociational representation. With its promise of inclusivity by means of a possible alternative it demands the attention of the policy makers as well as the academia.

Keywords: Polyglot federations, political remapping, States Reorganisation Commission, linguistic minorities, Consociational Representation

Introduction

India with her vast multi-ethnic diversities has been commendably successful in maintaining a federation, as compared to the developed federal systems of the first world. Somewhat surprisingly, federal paradigm has been reduced to a half-cultivated discipline among the pupils of constitutional and political studies in India where federalism is meant to be a politico-administrative mechanism in a large region. Administrative decentralization may be possible without having a federated system, but remains hostile where demography of the region is enriched with vibrant diversity. This diversity lies with one's identity ranging from caste, religion, region, culture to language. India like any other multi-ethnic and polyglot federation seeks to accommodate her diverse identities with her national identity. After the fatal consequences of religion and caste, language appeared to be an obvious choice in the process of such accommodation which remains to be a challenge for any federal governance.

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A Spectroscopic Approach towards the Comparative Binding Studies of the Antioxidizing Flavonol Myricetin with Various Single-Stranded RNA

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RNA based drugs have come to limelight owing to the major role played by RNA in the development of many viral diseases. Molecules which can effectively bind with RNA can induce morphological changes in RNA which further modifies its biological properties. Flavonoids are phytochemicals having a wide range of pharmacological properties and are known to interact with DNA. We have used RNA instead of DNA and aimed at establishing a comparison of binding of three single stranded forms of RNA homopolymers namely polyriboadenylic acid [poly(rA)], polyuridylic acid [poly(rU)] and polycytidylic acid [poly(rC)] with the flavonol myricetin (herein after MTN), our probe of interest. A series of spectroscopic experiments like spectrophotometry, spectrofluorimetry and circular dichroism studies indicate a stronger binding of myricetin with poly(rA) followed by poly(rU) and finally poly(rC). This was confirmed from the construction of Scatchard plot using the Mc-Ghee von Hippel equation for cooperative binding. The magnitude of the order of binding was 10^3 M^{-1} at 25 °C in all the cases. It is to be noted that most eukaryotic mRNAs have a poly adenylate tail. Binding of MTN to poly(rA) in virulent cells could effectively alter the encoded protein synthesis and reduce chances of occurrence of the disease.

1. Introduction

Flavonoids are Nature's doctor with the exemption of fees. They are phytohormones, more specifically; secondary metabolites belonging to the polyphenolic class and are abundant in citrus fruits, apple, olive oil, tea, red wine, berries and soy.[1] They act as potent anti-proliferators and free radical scavengers - properties that have long mesmerized the scientists and encouraged them to indulge in flavonoid dependent drug designing.[2] Myricetin, (hereafter, MTN) [IUPAC{3, 5, 7-Trihydroxy-2-(3, 4, 5-trihydroxyphenyl)-4-chromenone}], is a widespread flavonol. Its structure is analogous to fisetin and kaempferol only differing in the number of hydroxyl groups [Figure 1]. It has diverse pharmacological functions including antioxidizing as well as pro-oxidizing properties, anti-viral, anti-carcinogenic, mutagenic, anti-atherosclerotic[3–5] anti-inflammatory, anti-diabetic and neuroprotective activities.[6–8] It is also reputed to aid prevention of platelet aggregation.[9,10] Its antioxidizing properties are attributed to the hydrogen donating ability resulting from the multiple hydroxyl groups attached to the aromatic rings.[11] Research says that bivalent cations such as Fe^{2+}, Zn^{2+} and Ni^{2+} increase chances of lipid oxidation in cooked fish which degrades its nutritional value; this oxidation process is arrested in presence of MTN.[11] Studies in mice have revealed that MTN increases muscle strength and tolerance to reduced temperatures.[12] MTN is useful in inducing apoptosis in carcinogenic liver cells and can benefit the cancer treatment sector.[13] It has an important role in the inhibition of DNA/RNA replication and repair.[14]

Recent advances have revealed the indispensable role of RNA in vital cellular processes *viz.* transcription, translation and a trail of processes leading to protein formation.[15] The role played by RNA in the progression of critical diseases like HIV AIDS, Hepatitis C and cancer earned it an overwhelming importance.[16] RNAs undergo allosteric conformational changes carving out suitable pockets for specific drug recognition.[17] Biological relevance of single-stranded RNA (hereafter ss-RNA) having different sequences namely polyadenylic acid [poly(rA)], polyuridylic acid [poly(rU)], polycytidylic acid [poly(rC)] *etc.* have been documented in the literature. Poly(rA) is present in the mRNA (messenger RNA) tail. When this tail is bound to a drug, the encoded protein synthesis gets altered.[18,19] Marshall Nirenberg discovered that poly(rU) encodes the homopolypeptide phenylalanine which has significant effects on depression, pain and skin disorders.[20] Adenylate and uridylate also play an imperative role in supervising gene expression during cell growth and differentiation and in immune response.[21,22]

A lot of research has been carried out on flavonoid-DNA interaction owing to easy availability of DNA in nature and much is known about its structure.[23–26] Flavonoids like quercetin and kaempferol show high binding affinity towards DNA and RNA duplexes.[27] Another flavonoid luteolin has been found to stabilize the Hoogsteen paired strand in triple helical RNA.[28] Compared to DNA, knowledge on structure and

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Amino acid and cinnamaldehyde conjugated Schiff bases as proficient corrosion inhibitors for mild steel in 1 M HCl at higher temperature and prolonged exposure: Detailed electrochemical, adsorption and theoretical study

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ABSTRACT

Three Schiff bases composing of cinnamaldehyde and three different amino acids, namely glycine (CGSB), histidine (CHSB) and tryptophan (CTSB) have been synthesized and investigated for their anti-corrosion propensity on mild steel in 1 M HCl. Both gravimetric and electrochemical experimentation establish the CTSB as superior inhibitor, while the CGSB as the least effective among the three. Effectiveness of the Schiff bases is tested upto 60 °C for an exposure of 6 h in HCl. Effect of various exposure times, maximum being 96 h, is also investigated at a fixed temperature of 30 °C. All the three inhibitors impart appreciable extent of corrosion inhibition efficiency under these extreme conditions. Thermodynamic adsorption and kinetic parameters ascertain chemisorption of these mixed-type corrosion inhibitors on mild steel. Mode and extent of interaction between Schiff bases and mild steel are evaluated from quantum mechanical calculation and molecular dynamics simulation.

1. Introduction

Evaluating structure-reactivity correlation remains an important aspect towards devising new and efficient organic corrosion inhibitors for potential industrial application [1–7]. Organic inhibitors available from bio-resources, including essential oils, have gained special attention for their sustainable availability, relative low cost and, most importantly environmental benign characteristics; and are termed as so-called green corrosion inhibitors [8–17]. Cinnamaldehyde, a major constituent of cinnamon oil, is an aromatic compound with a benzene ring and an aldehyde group attached to an unsaturated C = C bond at both ends. This unique combination has bestowed cinnamaldehyde some special properties conducive for its application in medicine [18], as well as in material science as corrosion inhibitor in high acid concentration and at elevated temperature [19–21]. To enhance solubility of cinnamaldehyde in aqueous medium and also to improve its other biological activities, cinnamaldehyde is derivatized in many ways, including formation of Schiff bases [22]. Some of these Schiff bases have been tested for anti-corrosion effectiveness [23–25]. But, no report on the corrosion mitigation by cinnamaldehyde and an amino acid conjugated Schiff base is available till now. As a matter of fact, such study involving an amino acid Schiff base is very limited. Whatever literature suggests includes benzaldehyde and vanillin as the corresponding aldehyde precursor [26,27]. Amino acids, in general provide relatively lower degree of protection from corrosion for mild steel in aqueous HCl [28]. A Schiff base derived from an amino acid and cinnamaldehyde is expected to yield significant corrosion protection, as it will possess high electron density due to the aromatic moieties and heteroatoms like nitrogen, in addition to C = C and the imine (C = N) bonds. This should facilitate bonding with the metal through transfer a part of excess charge. To accomplish this, we have selected three different amino acids, namely glycine, histidine and tryptophan, which represents gradual enhancement of structural complexity. Corresponding Schiff bases are shown in Table 1 along with their IUPAC nomenclature.

The main objectives of this work are to elucidate the influence of structural factor, spatial orientation, and intrinsic molecular properties of these synthesized Schiff bases towards their adsorption characteristics on mild steel in aqueous HCl (1 M) and the extent of corrosion protection of the metal. In addition, how the conjugation of two naturally available products influence the corrosion inhibitory effect for prolonged time and at higher temperature will be interesting to investigate.

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