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3.4.5 Citation Index

The following are the bibliometric of the publications for the academic year 2019-20 based on average Citation index in Scopus and Web of Science.

Table 1: Citation Index for Publication in Scopus

S.No	Title of the paper	Name of the Authors	Title of the Journal	Year of the Publication	Citation Index
1.	Technical efficiency estimates of stochastic production frontier model using Rayleigh distribution	Kannaki S., Louis L.M.	AIP Conference Proceedings	2020	0
2.	Solving LPP with stochastic neutrosophic Pythagorean Z numbers	Revathy M., Sudha A.S.	AIP Conference Proceedings	2020	0
3.	Effect of Vikor operator in transportation problem	Sangeetha M.	AIP Conference Proceedings	2020	0
4.	Molecular descriptors of dodecagonal network with python program and bounds based on new parameters for some topological indices	Manimekalai S., Mary U.	AIP Conference Proceedings	2020	0

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5.	Upgradation of maize stalk waste as an alternate agrarian raw material for the production of amorphous silica composites	Kamaraj M., Sudarshan K., Sonia S.V.R.K.N., Chidambararajan P., Bekele A.	Journal of Analytical and Applied Pyrolysis	2020	0
6.	Comparison of Eosin yellowish dye–sensitized and CdS-sensitized TiO2 nanomaterial–based solid-state solar cells	Kanmani S.S., Rajamanickam N., Ramachandran K.	Journal of Solid State Electrochemistry	2020	5
7.	Functional and antimicrobial properties of herbal nanocomposites from Piper betle plant leaves for enhanced cotton fabrics	Subramani K., Shanmugam B.K., Rangaraj S., Murugan V., Srinivasan S., Awitor O.K., Massard C., Venkatachalam R.	Journal of Coatings Technology and Research	2020	1
8.	Assessment of Antioxidant, Antibacterial Activity and Phytoactive Compounds of Aqueous Extracts of Avocado Fruit Peel from Ethiopia	Kamaraj M., Dhana Rangesh Kumar V., Nithya T.G., Danya U.	International Journal of Peptide Research and Therapeutics	2020	2
9.	Preface: ICNTMMA 2019	Sivasankaran S., Sankar M., Eswaramoorthi S., Govindan V.	Journal of Physics: Conference Series	2020	0

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10	MHD bioconvective flow of a thermally radiative nanoliquid in a stratified medium considering gyrotactic microorganisms	Eswaramoorthi S., Jagan K., Sivasankaran S.	Journal of Physics: Conference Series	2020	3
11	Efficient and tunable shape selective synthesis of Ag/CeO2nanostructures modified highly stable SERS substrate for ultrasensitive detection of pesticides on the surface of an apple	Thirumalairajan S., Girija K.	Nanoscale Advances	2020	4
12	Ephemeral schnorr signcryption for secure data transaction in cloud	Kavitha K., Saravanan V.	International Journal of Advanced Trends in Computer Science and Engineering	2020	0
13	Enhanced ultrasensitive detection of ozone gas using reduced graphene oxide-incorporated LaFeO3 nanospheres for environmental remediation process	Thirumalairajan S., Girija K., Mastelaro V.R., Subramanian K.S.	Journal of Materials Science: Materials in Electronics	2020	1

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14	Insulinoma-associated protein 1 (INSM1): a potential biomarker and therapeutic target for neuroendocrine tumors	Mahalakshmi B., Baskaran R., Shanmugavadivu M., Nguyen N.T., Velmurugan B.K.	Cellular Oncology	2020	5
15	Biomimetic TiO2-chitosan/sodium alginate blended nanocomposite scaffolds for tissue engineering applications	Kolathupalayam Shanmugam B., Rangaraj S., Subramani K., Srinivasan S., Aicher W.K., Venkatachalam R.	Materials Science and Engineering C	2020	20
16	Photocatalytic degradation of Bisphenol-A in water under sunlight irradiation over ZnO nanoparticles fabricated by Ethiopian cactus pear fruit peel infusions	Kamaraj M., Nithya T.G., Chidambararajan P., Kebede M.	Optik	2020	2
17	Antihyperlipidemic effect of Kaempferia galanga in streptozotocin-induced diabetic rats	Subbaian K., Balliah R.	Drug Invention Today	2020	0
18	Gas sensing nature and characterization of Zr doped TiO2 films prepared by automated nebulizer spray pyrolysis technique	Gopala Krishnan V., Ravikumar N., Dilip R., Elango P.	Optik	2020	1

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19	Competency mapping conflicts and resolutions for industrial engineering	Mahalakshmi D., Abirami V.	AIP Conference Proceedings	2020	0
20	Dual property of chitosan blended copolymer membranes: Antidiabetic drug release profile and antimicrobial assay	Jaisankar E., Pavithra M.E., Krishna S., Thirumarimurugan M., Azarudeen R.S.	International Journal of Biological Macromolecules	2020	3
21	Free radical scavenging activity of developed herbal formulation	Subramani S., Nachimuthu K.	Drug Invention Today	2020	0
22	High dimension multi class algorithms (Hdmca) for classification and prediction: An analysis of different algorithms, performance measures and datasets.	Shobana V., Nandhini K.	International Journal of Scientific and Technology Research	2020	0
23	Adaptive fuzzy chaotic genetic clustering based continuous Keystroke authentication	Rathi M., Senthil Kumar A.V., Musirin I.	International Journal of Scientific and Technology Research	2020	0
24	A Contemporary Approach on Neutrosophic Nano Topological Spaces	Sasikala D., Radhamani K.C.	Neutrosophic Sets and Systems	2020	0

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25	Publication Output Of Journal 'Clinical Cancer Research' (2005-2018): A Bibliometric Analysis	Muthukrishnan M., Librarian N.G.P.	Library Philosophy and Practice	2020	0
26	Optical character recognition based on local invariant features	Poodikkalam S.B., Loganathan P.	Imaging Science Journal	2020	1
27	Analytical and numerical study on cross diffusion effects on magneto-convection of a chemically reacting fluid with suction/injection and convective boundary condition	Eswaramoorthi S., Bhuvaneswari M., Sivasankaran S., Makinde O.D.	Defect and Diffusion Forum	2020	0
28	Extraction, Characterization and Enzymatic Degumming of Banana Fiber	Paramasivam S.K., Panneerselvam D., Sundaram D., Shiva K.N., Subbaraya U.	Journal of Natural Fibers	2020	3
29	A recent work on nano j-closed sets in nano topological spaces	Sasikala D., Radhamani K.C., Shalini R.	Journal of Advanced Research in Dynamical and Control Systems	2020	0
30	In vitro antiviral activity of banlec against herpes simplex viruses type 1 and 2	Batcha A.T.M., Wadhwani A., Subramaniam G.	Bangladesh Journal of Pharmacology	2020	0

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31	Extremely-randomized-tree-based prediction of N6-methyladenosine sites in saccharomyces cerevisiae	Govindaraj R.G., Subramaniyam S., Manavalan B.	Current Genomics	2020	6
32	Analytical and numerical study on cross diffusion effects on magneto-convection of a chemically reacting fluid with suction/injection and convective boundary condition	Eswaramoorthi S., Bhuvaneswari M., Sivasankaran S., Makinde O.D.	Defect and Diffusion Forum	2020	0
33	Extraction, Characterization and Enzymatic Degumming of Banana Fiber	Paramasivam S.K., Panneerselvam D., Sundaram D., Shiva K.N., Subbaraya U.	Journal of Natural Fibers	2020	3
34	A recent work on nano j-closed sets in nano topological spaces	Sasikala D., Radhamani K.C., Shalini R.	Journal of Advanced Research in Dynamical and Control Systems	2020	0
35	In vitro antiviral activity of banlec against herpes simplex viruses type 1 and 2	Batcha A.T.M., Wadhwani A., Subramaniam G.	Bangladesh Journal of Pharmacology	2020	0

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| 36 | Extremely-randomized-tree-based prediction of N6-methyladenosine sites in saccharomyces cerevisiae | Govindaraj R.G., Subramaniyam S., Manavalan B. | Current Genomics | 2020 | 6 |

Table 2: Citation Index for Publication in Web of Science

S.No	Title of the paper	Name of the Authors	Title of the Journal	Year of the Publication	Citation Index
1.	A Contemporary Approach on Neutrosophic Nano Topological Spaces	Sasikala, D.; Radhamani, K. C.	Neutrosophic Sets And Systems	2020	0
2.	Revitalizing property of banana peel extracts by antioxidant activity and antibacterial activity against acne causing Staphylococcus epidermidis	Kumari, P. Saravana; Ranjitha, R.; Vidhya, N.	Annals Of Phytomedicine-An International Journal	2020	0

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3.	Gas sensing nature and characterization of Zr doped TiO2 films prepared by automated nebulizer spray pyrolysis technique	Krishnan, V. Gopala; Ravikumar, N.; Dilip, R.; Elango, P.	OPTIK	2020	0
4.	Recurrent Neural Network for Content Based Image Retrieval Using Image Captioning Model	Sindu, S.; Kousalya, R.	Computational Vision And Bio-Inspired Computing	2020	0
5.	Efficient and tunable shape selective synthesis of Ag/CeO2 nanostructures modified highly stable SERS substrate for ultrasensitive detection of pesticides on the surface of an apple	Thirumalairajan, S.; Girija, K.	Nanoscale Advances	2020	4

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6.	Structural, morphological and magnetic properties of algae/CoFe2O4 and algae/Ag-Fe-O nanocomposites and their biomedical applications	Satheeshkumar, M. K.; Kumar, E. Ranjith; Indhurnathi, P.; Srinivas, Ch.; Deepty, M.; Sathiyaraj, S.; Suriyanarayanan, N.; Sastry, D. L.	Inorganic Chemistry Communications	2020	5
7.	Development of CuAlO2-Encapsulated Reduced Graphene Oxide Nanocomposites: An Efficient and Selective Electrocatalyst for Detection of Neurodegenerative Disorders	Subramaniam, Thirumalairajan; Kesavan, Girija; Venkatachalam, Ganesh	Acs applied bio materials	2020	0
8.	Predicting Students Academic Performance using an Improved Random Forest Classifier	Jayaprakash, Sujith; Krishnan, Sangeetha; Jaiganesh, V	2020 International Conference On Emerging Smart Computing And Informatics (Esci)	2020	0

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9.	In vitro antiviral activity of BanLec against herpes simplex viruses type 1 and 2	Batcha, Arisha Taj Mahaboob; Wadhwani, Ashish; Subramaniam, Gowri	Bangladesh journal of pharmacology	2020	0
10	Biomimetic TiO2-chitosan/sodium alginate blended nanocomposite scaffolds for tissue engineering applications	Shanmugam, Balu Kolathupalayam; Rangaraj, Suriyaprabha; Subramani, Karthik; Srinivasan, Surendhiran; Aicher, Wilhelm K.; Venkatachalam, Rajendran	Materials science & engineering c-materials for biological applications	2020	17
11	Functional and antimicrobial properties of herbal nanocomposites fromPiper betleplant leaves for enhanced cotton fabrics	Subramani, Karthik; Shanmugam, Balu Kolathupalayam; Rangaraj, Suriyaprabha; Murugan, Vinoth; Srinivasan, Massard, Chiristophe; Venkatachalam, Rajendran	Journal of coatings technology and research	2020	1

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12	Hydrothermal synthesis of ZnO-CdS nanocomposites: Structural, optical and electrical behavior	Yuvaraj, S.; Fernandez, Alison Christina; Sundararajan, M.; Dash, Chandra Sekhar; Sakthivel, P.	Ceramics international	2020	19
13	Comparison of Eosin yellowish dye-sensitized and CdS-sensitized TiO(2)nanomaterial-based solid-state solar cells	Kanmani, S. S.; Rajamanickam, N.; Ramachandran, K.	Journal of solid state electrochemistry	2020	4
14	Extremely-randomized-tree-based Prediction of N-6-Methyladenosine Sites in Saccharomyces cerevisiae	Govindaraj, Rajiv G.; Subramaniyam, Sathiyamoorthy; Manavalan, Balachandran	Current genomics	2020	6
15	Till 2018: a survey of biomolecular sequences in genus Panax	Boopathi, Vinothini; Subramaniyam, Sathiyamoorthy; Mathiyalagan, Ramya; Yang, Deok-Chun	Journal of ginseng research	2020	3
16	Insulinoma-associated protein 1 (INSM1): a potential biomarker and therapeutic target for neuroendocrine tumors	Mahalakshmi, B.; Baskaran, Rathinasamy; Shanmugavadivu, M.; Nguyen, Ngoc Tuan; Velmurugan, Bharath Kumar	Cellular oncology	2020	5

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Publications in Scopus for Academic Year 2019-20

Development of CuAlO₂-Encapsulated Reduced Graphene Oxide Nanocomposites: An Efficient and Selective Electrocatalyst for Detection of Neurodegenerative Disorders

Thirumalairajan Subramaniam,* Girija Kesavan, and Ganesh Venkatachalam

ABSTRACT: Carbon-based nanomaterials continue to simulate wide interest in diverse disciplines including electrochemical biosensors, which have great ability to function as next-generation clinical diagnostics. Motivated by this point, we for the first time developed a CuAlO₂-encapsulated reduced graphene oxide (rGO) nanocomposite by a facile wet-chemical process to modify a glassy carbon electrode for dopamine detection with high selectivity and good sensitivity. The size, shape, phase purity, chemical composition, and surface area were investigated for the samples through transmission electron microscopy, scanning electron microscopy, high-resolution transmission electron microscopy, X-ray photoelectron spectroscopy, X-ray diffraction, and Brunauer−Emmett−Teller analysis. The electrocatalytic performance was studied using cyclic voltammetry and amperometric technique. The modified rGO/CuAlO₂ nanocomposite electrode showed an enhanced electrochemical performance compared to other electrodes and pure CuAlO₂ electrodes due to the strong promoting effect between rGO and CuAlO₂. Both the oxidation current and concentration were proportional and show a linear range of 9.2×10^{-8} to 1.6×10^{-7} M having a detection limit of 15 nM at S/N = 3. Further, the biosensor successfully neglected the interference of ascorbic and uric acid and exhibited enhanced selectivity, improved sensitivity, and stability toward dopamine formulations. Most obviously, the real-time analysis of the electrochemical biosensor may be proved using the clinical diagnostics in the near future.

KEYWORDS: rGO/CuAlO₂, electrochemical, biosensor, shape, size, dopamine

1. INTRODUCTION

Neurotransmitters are the most significant messengers of the nervous system, and any deviation in their activities and balances can cause serious neurological, psychiatric, and cognitive disorders.[1,2] Among them, neurological disorders such as depression, schizophrenia, stress-related disease, and addiction are caused because of the abnormal function of the

and the following changes all happen in less than a few seconds, and hence the small changes in the concentration can be misestimated due to time-based resolution of these methods.[13]

Electrochemical biosensor-modified electrode can sense DA from the cerebral system at the nanomole level.[14−17] However, these biosensors have poor selectivity toward DA as these were

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Technical efficiency estimates of stochastic production frontier model using Rayleigh distribution

Show affiliations

Kannaki, S. ; Louis, L. Mary

The present study is attempted to estimate the Technical Efficiency level of paddy farmers in Thiruvarur District of Tamil Nadu, India using Stochastic Production Frontier Model to know the variations in efficiency among the farmers and to analyse the policy making decisions for improving the efficiency. A Cobb-Douglas Production function was considered in which the technical inefficiency effects are defined by a model with Rayleigh distribution. Primary data from 300 households in Thiruvarur district during the year 2015-16, Tamil Nadu were used. The results show that the Technical Efficiency of paddy farmers in the study area ranged from 11 to 85 percent with an average of 55 percent. The average Technical Efficiency level implied 55 percent of the farmers in the study area realised their technical abilities. Based on the technical efficiency score, the average potential to increase the paddy production was 35 percent and if the minimum efficiency farmer can reach the maximum level then the cost can save up to 87 percent. The MLE result shows that Farm Yard Manure and Chemical fertilizers are positively related to the Technical Efficiency. The socio economic factors influencing Technical Efficiency was identified using linear regression model and the result shows that sex of the farmer, education and credit are the important factors to increase the Technical Efficiency.

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Solving linear programming problem by means of fuzzy Z numbers

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[2] Department of Mathematics, Nirmala College for Women, Coimbatore

Abstract. Obtaining the result of linear programming problem is an appealing chore. Recently, Z-number has been developed by Zadeh to sculpt fuzzy statistics with the poise degree. Here, a new Multi Criteria Decision Making Matrix (MCDMM) found taking place Z-number be projected towards pact by means of linguistic decision making problems. The decision making problem is then converted to linear programming problem and hence we can find the optimum solution. A mathematical illustration on MCDMM is second-hand to point up the competence of the projected technique.

Keywords: fuzzy set; triangular fuzzy number; Z-number; decision-making; linear programming problem.

1. Introduction

In the true globe, ambiguity is a insidious happening. A large amount of the data taking place which decisions be found be unsure. We have a significant potential to build logical decisions found on data which is unsure, inaccurate as well as/otherwise unfinished. Formalization of this facility, at smallest amount to a little degree, is a brave so as to is rigid to congregate. The majority frequently used method in foundries is a linear programming problem (LPP). In veracity, a firm might fire up a creation process by means of resources i.e. a slightest amount in favour of deal. In due itinerary of instance the firms have to endow a slight extra than the beginning anticipated budget in the attention of his creation process. In this circumstances fuzzy set theory can be second-hand to plan sculpt with the assist of membership functions. In true existence circumstances, a linear programming sculpt involves parameters whose ideals are not famous however assigned by experts. These assigned ideals are not accurate and the decision maker has to contract with doubts so as to describe by firm. Zadeh wished-for an idea, specifically Z-number [3].

In the history the minority decades, classical fuzzy set have been hotly functional in the fields like fuzzy control, fuzzy decision making etc. and many fruits have been achieved [5, 6, 7, 8, 9, 10,11, 12, 13]. But a problem is that the trustworthiness of the information provided is not well taking into deliberation. Compared with the conventional fuzzy number, Z-number has supplementary skill to explain the knowledge of human. It can explain both restraint and reliability. In this paper, the Z-number is applied to solve the multi-criteria decision making, and the frame of decision making using Z-number is planned. At last, a numerical example is used to demonstrate the procedure of the presented method.

AIP Conference Proceedings

Effect of Vikor operator in transportation problem

M. Sangeetha

ABSTRACT

In this paper entitled contributions to the study of Robust ranking Vikor fuzzy variable and its applications, new concepts of fuzzy vikor ranking is formulated. Vikor fuzzy transportation problem are introduced to model and analyse imprecisely valued measurable functions associated with the real life of the experiment. In order to deal with this difficulty, fuzzy set theory has been applied to multiple criteria decision making and many approaches have been proposed. Decision making in many planning problem involves VIKOR operator. Decision making in many planning problem involves VIKOR operator, which involves decisions of several index with independent and conflicting objectives. VIKOR operator and imprecise parameters are harder to solve with the traditional approaches and hence to overcome this difficulty fuzzy set theory has been used.

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On Molecular descriptors with python of 3D fullerene

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Abstract—Topological index of a graph G is a numerical value which reveals it's topological properties. Lattice of fullerne is an infinite arrangement of discrete molecules with orientation and arrangement appears exactly same.We give properties for the connectivity and neighbourhood degree based indices for frequently used three dimensional fullerene .
Keywords—bounds, connectivity, lattice,neighborhood, topological indices.
MSC (2010): 05C12.

I. INTRODUCTION

When the graph (*G*) represents the molecular structure of a chemical compound, it is called a molecular graph. This types of graphs are widely used in designing and create new things in all field of Science.First topological index was introduced by Wiener. We present various neighborhood degree based index of widely used chemical structures which will appear in mathematical chemistry and solid state physics.Solid state physics is study about solid through crystallography, metallurgy and others.

Molecular structure modeling is High priority in Proteins , Enzymes , Medical drugs,Virus, Bacteria, Field of Nano Science etc.There are so many 2D and 3D models to investigate the property and the activity of molecules.Simple 3D molecular formula is CH_4.

Atom's Quantum mechanical model uses complex shapes of electron clouds, volumes of (electron) space and to study the characteristics of solid phase systems are something different

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Upgradation of maize stalk waste as an alternate agrarian raw material for the production of amorphous silica composites

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ARTICLE INFO

ABSTRACT

Silica is derived from the diverse agricultural sources due to its extensive applications. This study reports the extraction of amorphous silica from the maize stalk cultivated in Ethiopia due to its abundant disposal, low price, and environmental impacts. Three different methods are used to extract silica and the resultant materials were characterized. The results demonstrate that the particles are in the amorphous structure and have disordered morphology with the particle attached through the grain boundary to form agglomerated structure. Reduction in the level of impurities and increment of silica content are found among the resultant materials. Besides, the occurrence of silanol and siloxane groups along with other functional groups and their variation between the products is reported. This study highlights the possible adaptation of the Ethiopian maize stalk as an alternative raw material for the production of silica and also reduces the environmental pollution caused by indiscriminate disposal of maize stalk.

1. Introduction

Maize (*Zea mays* L.) has expanded rapidly and transformed production systems in Africa as a major food crop. In Ethiopia, maize is widely cultivated and the cropping area is still increasing than any other crop. According to the survey of the Central Statistical Agency of Ethiopia, a total of 1.8 million hectares is held by 7.1 million maize- cropping households at the national level in 2010 [1]. In 2019, maize production expanded to 8,500 thousand tonnes from 939 thousand tonnes in 1970 with an average annual growth rate of 7.62 %. After harvesting, the technique used for the production of silica such as acidification of sodium silicate by silica containing reacting material is ingested large extent of energy. So, it would be beneficial to develop an easy, cost-effective, and low-energy method for the production of silica by utilizing agricultural waste [5]. In general, amorphous silica is prepared using silicon alkoxide raw materials; such as tetramethylorthosilicate (TMOS), tetraethylorthosilicate (TEOS), and polyethoxydisiloxane (PEDS), etc. However, such precursors are fairly expensive [2]. Thus alternative low-cost amorphous silica precursors are required to substitute alkoxides. In that respect, bio-origin based material would be

ORIGINAL PAPER

Comparison of Eosin yellowish dye–sensitized and CdS-sensitized TiO₂ nanomaterial–based solid-state solar cells

S. S. Kanmani[1] · N. Rajamanickam[2,3] · K. Ramachandran[3]

Abstract

In the present work, Eosin yellowish (EY) dye–sensitized and CdS-sensitized TiO_2 photoanodes prepared by doctor blade technique, for dye (DSSC)- and semiconductor-sensitized solar cell (SSSC) by engaging different forms of solid-state electrolyte. To begin with, the TiO_2 and CdS/TiO_2 nanomaterials are synthesized by the solvothermal method and the changing of physical properties is examined from structural, optical, morphological, and chemical composition measurements. The formation of anatase tetragonal phase TiO_2 and hexagonal phase CdS are investigated from XRD. UV-vis and photoluminescence studies expose that the nanomaterials loaded with different amounts of CdS on TiO_2 extend the absorption wavelength region from ultraviolet to visible. The photovoltaic performances of pure and CdS-added TiO_2 nanoparticle have studied by current-voltage measurement and impedance spectral response. We have achieved the highest solar conversion efficiency of 2.89% with the aid of the CdS-sensitized TiO_2 photoanode. CdS-sensitized TiO_2 photoanode shows good stability as inferred from transient photocurrent and photovoltage measurements. Overall investigation describes that the inclusion of CdS into the TiO_2 photoanodes gradually increase efficiency and stability.

Keywords TiO_2 · Nanoparticles · CdS sensitizer · Solid-state electrolyte · Impedance spectra

Introduction

Nowadays, nanomaterials and its various forms of nanostructures have attracted great attention as fundamental building blocks for the development of next-generation solar energy devices and those have high performance with novel functionalities such as flexibility and mobility [1]. The solar conversion efficiency of wide bandgap semiconductors is not enough to satisfy social needs since only 3% of solar light lies in the ultraviolet range. Many research groups have made considerable efforts to extend the solar conversion response up to visible region from UV by using organic dyes and narrow bandgap semiconductors as a sensitizer.

Already different types of dye-sensitized solar cells (DSSC) have been worked out by employing various forms of photoanodes like TiO_2 and ZnO nanostructures, making a composite of TiO_2 with ZnO and doping with different periodic elements like Ti, Sn, Mg, Zn, and also with various dyes (Ru N719, N3, eosin yellowish (EY), etc.) [2]. Along with new features and progress remarks made for last few decades in the area of DSSC and bulk heterojunction polymer solar cell using organic chromophores like dyes and polymers, respectively, called semiconductor-sensitized solar cells (SSSC) have attracted greater attention due to its superior visible light

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Functional and antimicrobial properties of herbal nanocomposites from *Piper betle* plant leaves for enhanced cotton fabrics

Karthik Subramani, Balu Kolathupalayam Shanmugam, Suriyaprabha Rangaraj, Vinoth Murugan, Surendhiran Srinivasan, Oscar Komla Awitor, Chiristophe Massard, Rajendran Venkatachalam

Abstract In the current times, the application of nanoparticles in the textile industry has become increasingly high due to the possibility of having anticipated properties, such as captivating colors, superior stability, antibacterial activity, and high-end UV-protection to the fabrics. In this study, natural herbal nanoparticles of different sizes were prepared from shade-dried leaves of *Piper betle* employing ball milling technique. Going forward, structural, morphological, UV-protective, and antibacterial properties of herbal nanocomposites coated on fabrics were thoroughly analyzed and interrelated with uncoated fabrics. Herbal nanoparticles were amalgamated with chitosan to make nanocomposites and are coated on cotton fabrics with the help of the pad-dry cure method. The analysis done to study physical properties of the coated fabrics, such as air permeability, crease recovery angle, tensile strength, tearing strength, thickness, and bursting strength, explicitly showed that coated fabrics have better functional properties as compared to uncoated fabrics. Along the same lines, herbal nanoparticles reflected good antibacterial and UV-absorption properties as compared to uncoated and chitosan-coated fabrics. Comprehension of functional properties revealed that herbal nanoparticle-coated fabrics highlights the potential applications of *Piper betle* nanoparticles in protective clothing.

Keywords *Piper betle*, Herbal nanoparticles, Nanocomposite, UV-protection, Chitosan, Antibacterial activity

Introduction

Nanoparticles play a critical yet unique role in an array of fields due to their unmatched properties and applications.[1] A textile is an impeccable growth medium for microbial growth as it is rich in organic compounds that are appropriate for biofilm formation and sweat absorption. This, in turn, is responsible for providing moisture conditions and causing infections to humans.[2-4] Commonly, *Staphylococcus aureus* (*S. aureus*) and *Staphylococcus epidermidis* (*S. epider-*

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Assessment of Antioxidant, Antibacterial Activity and Phytoactive Compounds of Aqueous Extracts of Avocado Fruit Peel from Ethiopia

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Abstract

The present study is focused to assess the efficiency of avocado fruit peel waste in different in vitro activities in order to explore the possibility of utilizing waste as a value-added product in various applications. Preliminary phytochemical screening confirmed the presence of alkaloids, flavonoids, phenols, tannins, glycosides, and absence of sterols, saponins, resins, and thiols. Remarkable free radicals scavenging ability was observed in all the tested radicals namely, DPPH($IC_{50} = 71.96 \pm 0.44$ µg/ml), nitric oxide (NO˙) ($IC_{50} = 149.46$ µg/ml), hydroxyl (˙OH) (107.91 ± 3.59 µg/ml), Superoxide ($O_2{}^{˙-}$) ($IC_{50} = 103.05 \pm 2.19$ µg/ml). In the antibacterial assay, the zone of inhibition was recorded as 9.5 ± 0.5, 12.0 ± 1.21, 7.5 ± 0.35, 6.0 ± 0.5 and 10.0 ± 1.0 for the strains of *Escherichia coli*, *Klebsiella pneumonia*, *Pseudomonas* spp., *Staphylococcus aureus*, and *Bacillus* spp. respectively. The Fourier Transform Infrared (FTIR) profiling indicated the existence of resilient functional groups and the gas chromatography–mass spectrometry (GC–MS) profiling was exhibited the presence of eighteen major components highly accountable for its pharmaceutical activities.

Keywords Therapeutic · Antagonistic · Antioxidant · Functional groups · Waste conversion

Introduction

Avocado (also addressed as 'Alligator pear') is a significantly nourishing fruit with high nutritional value and it is regarded as a major tropical fruit. It contains a high source of protein, carbohydrate, fiber and essential micronutrients such as minerals, vitamins, and polyphenols (Pennington and Fisher 2009; Rotta et al. 2016). The volume of fruit yield is high in avocado trees and it produces a yield of 138 kg at seven year span after planting. The avocado (*Persea americana* Mill.) is a perennial plant cultivated on rough locations and does not compete with the annuals adopted to flatlands (Bleinroth and Castro 1992; Duarte et al. 2016). Studies report that there is a very less knowledge among farmers about the nutritional as well as value-added elements present in vegetable and fruit waste; Thus the residual waste accumulating in tons are not harnessed or channeled for other valuable purposes (Rotta et al. 2016). Along the same line, avocado wastages can be very well harnessed, and recently avocado tree has attracted much interest among farmers as it is one of the most important productive plants per unit of the cultivated field (Vinha et al. 2013). The non-edible parts of the fruit (peel and seed) were also analyzed in order to evaluate their possible role as an inexpensive source of precursor/substrate for several applications. The utilization of non-edible parts

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Preface: ICNTMMA 2019

This volume of proceedings from the conference provides an opportunity for readers to engage with a selection of best papers that were presented during Two Days International Conference on New Trends in Mathematical Modeling with Applications (ICNTMMA 2019) held during 29 to 30, July 2019, organized by Sri Vidya Mandir Arts & Science College, Uthangarai, Tamilnadu, India.

The major goal of this conference is to provide a platform for discussing new developments in Mathematical modeling of various physical problems and their future directions. Professors from various research fields were invited to deliver lectures on the latest developments in their respective areas of expertise. It was a wonderful opportunity for the students, researchers and academicians to interact with the experts and specialists to get their advice or suggestions.

We have received 132 full-length paper submissions from all over India and abroad. By submitting a paper to ICNTMMA 2019, the authors agreed to the review process and understood that papers would undergo a peer-review process based on quality of content, level of innovation, significance, originality and legibility. Manuscripts were reviewed by appropriately qualified experts in the field selected by the conference committee, who took detailed comments and if the submission was accepted, the authors would submit a revised version incorporating the feedback of reviewers. All papers were reviewed using a single-blind review process. Based on the expertise review comments, we accepted only 59 research manuscripts for final publication. The accepted papers are published by **IOP Conference Series** "*Journal of Physics: Conference Series (JPCS)*".

The editors are extremely thankful to all the reviewers involved in the evaluation of the papers for their wonderful contributions. We acknowledge all the keynote speakers, participants, members of the technical program committee and advisory board who have contributed their huge effect to reviewing the conference papers and forming its program. Also, our heartfelt thanks and appreciation to the Editors and Managers, IOP Publishing Ltd., for their help and kind cooperation during the preparation of the proceedings.

We hope you will enjoy reading this proceedings and discovering new and original research

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Computation of eccentricity associated topological descriptors through Python for comb tree

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Abstract. Topological manifestation of a graph G is a numerical value which reveals it's topological properties. The eccentricity of one node $u \in V(G)$ (that is $e_c(u)$), is the greatest distance between u and also any other vertex of G. The degree of a In this paper, we are using Python program to compute eccentricity related Topological indices for Comb tree with any number of vertices, relation between descriptors and the bounds for indices also.

Keywords: Comb tree; eccentricity; Python; topological index;

1. Introduction

An chemical compound's molecular structure can be represented by a graph in which we represent atoms of molecule as vertex of that graph and bonds between atoms as edges of the graph. This type of graph is called molecular graph or chemical graph. In Recent days inter discipline research is has high impact, especially mathematical chemistry is highly influencing in drug manufacturing, medicinal chemistry and bio chemistry etc.

We present bounds and comparison of various greatest distance based index of widely used chemical structures which often appear in mathematical chemistry.

Using Python we can compute all topological descriptors in minimum ravage of all resources. Python is dynamic language. Now a days python is highly influencing language in all fields. Readers who are having significance can test out the program in the net repl.it

https://repl.it/@Manimekalai/eccentricity-based-index
https://repl.it/@Manimekalai/Total-Eccentricity-index

Various indices was introduced in various periods of time for a graph A,

Eccentric connectivity descriptor [4,8,9,10], $\xi(A) = \sum_{v \in \Gamma} d(v)\varepsilon(v)$

MHD bioconvective flow of a thermally radiative nanoliquid in a stratified medium considering gyrotactic microorganisms

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Abstract.
    The impact of gyrotactic microorganisms of a stratified flow of a thermally radiative NL with heat absorption is highlighted. In addition, magneto NL with an inclined magnetic field is included. Suitable transformations are adopted to convert the governing PDEs into an nonlinear ODEs. Homotopy analysis method (HAM) is employed to solve these ODEs analytically. The impact of sundry parameters on VP, TP, NPVFP, MMDP, SFC, LNN and LDMM are graphically explained. We compare our results to available results in literature survey.
Keywords: Nanoliquid, Heat generation/absorption, Gyrotactic microorganisms, Radiation, Stratification.

1. Introduction

Most of the engineering and industrial processes, the HT phenomenon is essential. The ordinary fluids, like, ethylene, oil, water, glycol, toluene are poor HT properties, since they have poor thermal conductivity. Many scientists tried in several ways to raise the thermal conductivity.

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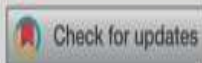
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Efficient and tunable shape selective synthesis of Ag/CeO₂ nanostructures modified highly stable SERS substrate for ultrasensitive detection of pesticides on the surface of an apple

S. Thirumalairajan [*a] and K. Girija [b]

Detection of pesticide residues from fruits and vegetables is of significant importance to ensuring human health and environmental safety. An efficient and tunable shape-selective synthesis of Ag/CeO₂ nanostructures as an active flexible SERS substrate for the detection of thiram on an apple surface via a paste, peel off, and paste again process was performed. The well-controlled formation of silver assembled CeO₂ microspheres constituting nanospheres and nanospindles with an average size of approximately 56 and 32 nm with anisotropic structures has been confirmed through morphological and crystallographic analysis. Interestingly, CeO₂ (111) was strongly anchored in the Ag (111) matrix, which provides a more adequate pathway for rapid ion-electron transportation, as observed from the structural and chemical composition analysis. The detection of thiram on the surface of an apple using our proposed nanospindle SERS active substrate achieves a wide detection range from 10^{-2} to 10^{-9} M with a correlation coefficient of 0.9929 and a low detection limit of 27 nM at S/N = 3. In addition, the charge transfer mechanism between the Ag/CeO₂ nanostructures and thiram molecules has also been proposed. We believe that the present work could provide novel ways to develop SERS active substrates for highly efficient onsite detection of pesticides on fruits in the near future.

1. Introduction

Conventional processes such as gas chromatography-mass spectrometry (GC-MS) and high performance liquid

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Ephemeral Schnorr Signcryption for Secure Data Transaction in Cloud

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ABSTRACT

Cloud computing is a new method used to offer the various services. Security is a major concern for protecting the data from the unauthorized user access while performing the data transaction from cloud user and server. However, the conventional methods still have the issues of data transaction security. In order to improve the security level during the data transaction, Ephemeral Schnorr Signcryption based Secured Data Transaction (ESS-SDC) method is introduced for improving the data confidentiality rate in cloud environment. The ESS-SDC method includes the three processes, namely ephemeral key generation, signcryption and signature verification. Initially, the cloud server generates the ephemeral key pair (i.e., private key and public key) for each registered cloud user to access the data. When a cloud user wants to access the data from server, the data owner performs identity based authentication. If a cloud user is an authorized user, data owner request the cloud server to transmit the data in the form of ciphertext and signature to the cloud user. Finally, the signature verification is performed at the receiver

1. INTRODUCTION

Security issue on secure data transaction is to allow users for accessing their data over the cloud. Cloud computing provides flexible access through the internet-based computing to the users. As the users communicate with the cloud server, security is an essential issue for protecting the data from unauthorized access. To prevent unauthorized access in the cloud, signcryption is performed for improving the transaction security.

A Multi-Authority ciphertext policy attribute based sigcryption (MACP-ABSC) scheme was introduced in [1] for secure data access control. The designed scheme minimizes the complexity but the authentication was not performed to attain higher security. A DNA inspired symmetric key encryption technique (BDNA) was developed in [2] to prevent the unauthorized users accessing the data. Through the technique minimizes the encryption time but data confidentiality was not improved. A secure and practical searchable symmetric encryption method

Enhanced ultrasensitive detection of ozone gas using reduced graphene oxide-incorporated LaFeO3 nanospheres for environmental remediation process

S. Thirumalairajan[1] · K. Girija[2] · Valmor R. Mastelaro[3] · K. S. Subramanian[1]

Abstract

An efficient and facile benign approach to develop reduced graphene oxide (rGO) incorporated into perovskite $LaFeO_3$ nanostructure with excellent surface area to detect ultrasensitive Ozone (O_3) gas for environmental remediation has been demonstrated. The prepared $rGO/LaFeO_3$ nanocomposites have diameter in the range ~ 1 μm constituting nanospheres with average size ~ 50 nm. Phase purity and chemical composition of $rGO/LaFeO_3$ nanocomposites were revealed through XRD and XPS analysis. The ozone gas sensing performance of $rGO/LaFeO_3$ nanocomposites was investigated and found to exhibit excellent sensitivity, high selectivity, good response (20 and 31 s) and recovery time (39 and 31 s) for 80 ppb at 100 °C when compared to pure $LaFeO_3$ nanostructures. These results indicate that the composites of rGO not only enhanced the ozone gas sensing response at low ppb concentration, but also a decrease in the working temperature. From these perspectives, $rGO/LaFeO_3$ nanocomposites based ozone gas sensor can be regarded as a promising candidate for environmental remediation process in near future.

1 Introduction

Detection of toxic gases play a critical role in environment remediation process, because fast development in industries and passionate use of automobile have caused sever air pollution. The monitoring of toxic gases such as carbon monoxide (CO), nitrogen dioxide (NO_2), ammonia (NH_3) and ozone (O_3) etc., have attracted huge attention [1–3]. In particular, O_3 is the most common air pollutant produced and powerful oxidizing reagent, having continuing demand for its efficient detection not only for industrial safety concerns but also environment remediation [4, 5]. Those exposed to ppm of O_3 for 10 h did not survive as reported by World Health Organization, WHO [6]. Thus, the sensitivity and selectivity measurement of O_3 has dynamic importance for a pollutant-free ecosystem [7]. In this regard, intensive attention to develop new ozone gas sensor reliable at ppb level detection with fast response, recovery time and low operating temperature is required.

To meet these requirements, shape-dependent perovskite (ABO_3)/graphene oxide (GO) nanocomposite based toxic gas sensors have considerable interest, because it significantly enhances the catalytic properties. Reduced GO (rGO), an attractive carbon family member and allotrope

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Insulinoma-associated protein 1 (INSM1): a potential biomarker and therapeutic target for neuroendocrine tumors

B. Mahalakshmi, Rathinasamy Baskaran, M. Shanmugavadivu, Ngoc Tuan Nguyen & Bharath Kumar Velmurugan ✉

Abstract

Background

Insulinoma-associated protein 1 (INSM1), a transcriptional regulator with a zinc-finger DNA-binding domain, has been validated as a cytoplasmic marker for neuroendocrine differentiation of tumor cells. Next to its abundant expression in the fetal pancreas, it is expressed in brain tumors, pheochromocytomas, medullary thyroid carcinomas, insulinomas and pituitary and small-cell lung carcinomas. INSM1 is not expressed in normal adult tissues and/or most non-neuroendocrine tumors. It regulates various downstream signaling pathways, including the Sonic Hedgehog, PI3K/AKT, MEK/ERK1/2, ADK, p53, Wnt, histone acetylation, LSD1, cyclin D1, Ascl1 and N-Myc pathways. Although INSM1 appears to be a subtle and specific biomarker for neuroendocrine tumors, its role in tumor development has remained unclear.

Conclusions

Here, we highlight INSMI expression, as well as its diagnostic significance and use as a therapeutic target in various neuroendocrine tumors. Targeting signaling pathways or gene

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Biomimetic TiO$_2$-chitosan/sodium alginate blended nanocomposite scaffolds for tissue engineering applications

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ARTICLE INFO

ABSTRACT

The study is aimed to synthesize potent metal oxide based biomimetic nanocomposites to overcome the risk associated with artificial bone tissue engineering. High purity TiO$_2$ nanoparticles are synthesized via hydrothermal route. A biomimetic nanocomposite scaffolds containing chitosan-sodium alginate (4: 4) blended with three different (0.5, 1, and 1.5 wt%) concentrations of hydrothermally synthesized TiO$_2$ nanoparticles are obtained by solvent casting technique. The physico-chemical and thermal degradation properties of as-synthesized TiO$_2$ nanoparticles and their nanocomposite scaffolds are analyzed. In-vitro cytotoxicity and biocompatibility of the prepared TiO$_2$ nanoparticles and nanocomposites are tested against human bladder tumor (UC6) and osteosarcoma (MG-63) cell lines. Antibacterial property is tested against *Escherichia coli* and *Staphylococcus aureus*. These studies reveal that TiO$_2$ nanoparticles and polymeric nanocomposites contain good physico-chemical and mechanical properties for enhanced in-vitro biocompatibility suitable for biomedical applications. Biomimetically prepared chitosan-sodium alginate scaffold containing TiO$_2$ nanoparticles (1 wt%) is found to exhibit superior biocompatibility for bone tissue engineering applications.

1. Introduction

At present scenario, nanocomposites provide novel and trade prospect in entire industrial sectors and eco-friendly in nature. Polymers are extensively used in industries due to their easy manufacturing, low weight and flexibility [1]. In the field of bioinspired material science, experimental studies are successfully carried out with biopolymers [2]. Specifically, scaffolds are prepared from naturally existing degradable polymers such as collagen, hyaluronan, chitosan, alginate and gelatin

amine-2-deoxy-D-glucopyranose units and little quantity of *N*-acetyl-d-glucosamine residues. Sodium alginate is derived from brown seaweed. It is a linear polysaccharide copolymer that contains of two sterically different repeating units of (1,4)-β-d-mannuronic acid and α-L-guluronicacid in varying concentrations [14] . Chitosan is mechanically fragile and prone to swelling; cells don't attach directly to alginate, as well as rejection protein adsorption occurred in negatively charged alginate [15]. A physico-chemical modification of biopolymers leads to formation of novel properties as well as defeat the drawbacks of me-

Research Article

Wet chemical preparation of herbal nanocomposites from medicinal plant leaves for enhanced coating on textile fabrics with multifunctional properties

Karthik Subramani[1] · Raunak Saha[2] · Siva Palanisamy[2] · Balu Kolathupalayam Shanmugam[2] ·
Suriyaprabha Rangaraj[2] · Vinoth Murugan[2] · Surendhiran Srinivasan[2] · Rajendran Venkatachalam[2,3] ·
Wilhelm K. Aicher[4]

Abstract

The present study is aimed at the synthesis of different herbal nanoparticles from *Acalypha indica, Azadirachta indica, Piper betle, Tridax procumbens* and *Aloe vera* plant leaves through wet processing method i.e., solution based synthesis for the development of a biocompatible nanomaterials with excellent medicinal properties. The efficiency of herbal nanoparticles are determined by subjecting a comparative assessment among the various herbal nanoparticles in virtue of their physico-chemical as well as their functional properties when coated on cotton fabrics. The prepared five different herbal nanoparticles show amorphous nature having an average particle size distribution ranges from 21 to 27 nm. *Tridax procumbens* nanoparticles exhibit higher antioxidant activity (98.17%) while tested against DPPH assessment. Nevertheless, the herbal nanocomposites prepared from *Aloe vera* with chitosan polymer shows higher protection (UPF = 62.3) than the fabric coated with other herbal nanoparticles. The superhydrophobic properties (154.5°) and higher antibacterial properties against *Escherichia coli* (33.13 mm) and *Staphylococcus aureus* (35.62 mm) for the *Azadirachta indica* nanocomposite coated cotton fabrics shows comparably more effectiveness than that of the other counterpart. The present study helps to identify the appropriate processing methods as well as herbal nanoparticles for enhanced the self-cleaning, UV-protection, antibacterial and antioxidant activity in biomedical textiles.

Keywords Herbal nanoparticles · Cotton fabrics · Antimicrobial activity · UV-protection · Antioxidant activity · Hydrophobicity

1 Introduction

Nanotechnology, the study of the technological aspects of nanoparticles is playing a major role in terms of textile due to the ease of surface modification of these materials [1] and its higher surface to volume ratio [2]. The growing public awareness of contagious pathogens facilitates the need of new surface modification of cotton fabrics, because of its large surface area and moisture retainment ability resulting in an excellent medium for microbial growth [3, 4]. The development of new cotton fabrics based nanocomposites to wide spectrum applications in different fields such as antimicrobial [5], wound healing [6], water repellence [7, 8], hygienic application [9]

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Research Article

Antihyperlipidemic effect of *Kaempferia galanga* in streptozotocin-induced diabetic rats

Kokila Subbaian[1]*, Ragavan Balliah[1]

ABSTRACT

Background: Diabetes mellitus is one of the worldwide increasing problems characterized by metabolic deregulation. One of the major factors contributing to cardiovascular risk in patients with Type 2 diabetes is abnormalities of lipoprotein metabolism. Due to various side effects caused by available drugs, the search for new antidiabetic and antihyperlipidemic drugs from herbal plants has become essential. **Aim:** The present study was carried out to evaluate the antihyperlipidemic potential of hydroethanolic extract of *Kaempferia galanga* rhizome in streptozotocin (STZ)-induced diabetic rats. **Materials and Methods:** Male albino Wistar rats (6 weeks old), weighing 170-200 g, were used for the present study. Diabetes was induced by intraperitoneal injection of STZ at a dose of 60 mg/kg body weight (bw). Oral administration of hydroethanolic extract of *K. galanga* rhizome at 250 mg/kg bw and 500 mg/kg bw was carried out for 28 days. Blood was collected by cardiac puncture and the serum was separated and analyzed for biochemical parameters. **Results:** The reports showed a significant reduction in the levels of protein, total cholesterol, phospholipids, triglyceride, very low-density lipoproteins (LDL), and LDL compared to the diabetic group which was reverted to near-normal levels in treated groups. The level of high-density lipoprotein cholesterol significantly increased in treated groups with the improvement of diabetic dyslipidemia. **Conclusion:** The present findings infer that the rhizome extract is capable of controlling hyperlipidemia. Further studies can be carried out to isolate the active compound for the management of diabetes-induced complications.

KEY WORDS: Cholesterol, Diabetes, Hyperlipidemia, *Kaempferia galanga*, Lipid level, Streptozotocin

INTRODUCTION

Diabetes mellitus (DM), a chronic a metabolic disorder, is characterized by elevated levels of blood glucose resulting from an abnormality in insulin production, insulin action, or both.[1] It is one of the worldwide increasing problems associated with peripheral vascular disease, nephropathy, neuropathy, and retinopathy.[2] India is one of the epicenters of the global DM pandemic. Demographic changes and rapid socioeconomic development, along with increased susceptibility for Indian individuals, have increased by DM in India.[3] Type 1 DM, also referred

apoptosis.[5] Patients with T2DM experienced high risk of cardiovascular disease and cardiovascular mortality relative to healthy individual. A major contributor to the increased cardiovascular risk linked with Type 2 diabetes is dyslipidemia, which encompasses abnormalities in all lipoproteins.[6]

New drug discoveries rely on natural products, such as plant extract, either as isolated compounds or as standardized extracts, due to matchless availability of chemical diversity.[7] Traditional plant remedies or herbal formulations exist and are still widely used since ancient times. Many plants and plant-derived

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Original research article

Gas sensing nature and characterization of Zr doped TiO_2 films prepared by automated nebulizer spray pyrolysis technique

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ARTICLE INFO

ABSTRACT

This paper investigates the Zr doped TiO_2 films deposited by automated nebulizer spray pyrolysis (ANSP) technique at 500 °C as coating temperature. The manipulation of Ti/Zr ratio on XRD study shows the stabilized anatase tetragonal crystal structure in all deposited films, and the XPS study shows C 1s, Ti 2p, Zr 3d and O 1s are spin orbits of the relative elements. The surface morphological study of FESEM shows the compact granular spherical structure for all the Zr doped TiO_2 films. The optical study reveals the blue-shift of band gap energy E_g = 3.20 eV to 3.64 eV with respect to dopant (Zr). Gas sensitivity response of all films exhibits the better response to NH_3 reducing gas among the other gas (C_2H_6O, C_3H_6O, CH_4O, C_2H_8O) with a function of constant temperature (°C) and gas concentration (ppm).

1. Introduction

The gas sensor materials of metal oxide holds an enormous of unpleasant properties; such as long-range signal drift, humidity sensitivity, slow sensor response and high cross sensitivity. In order to improve sensor performance, a progression of different metal-oxide semiconductors has been tested. The n-type metal oxide of TiO_2 semiconductors have been gained more attention due to their low cost, non-toxicity, long term stability, high and quick response with relatively simplicity of their uses; and ability to detect a maximum number of gases. Especially, the doping component is used to modify and improve the progression of oxides for the new and advanced performance of various electronic devices, thus modifying the electrical, structural, optical and morphological properties of parent metal oxides (TiO_2). The recent survey report says that the introduction of few amount of Zr could drastically improve the thermal stability of anatase phase and surface properties of the coated films [1]. The elements IV B of Ti and Zr have the same valence state (+ 4) and the same diameters Ti: 2 Å, Zr: 2.16 Å. Both oxides are in n-type semiconductors with similar physicochemical properties. Therefore, it is possible that Zr enters the TiO_2 lattice, changes and increases the length of the bond to form anatase crystallites of Zr doped TiO_2 [2-7].

The Zr doped TiO_2 have been prepared by various methods, such as electro spinning [1], spray pyrolysis [2], APCVS [3] sol-gel [5,8,9], co-precipitation [10] complexation of citric acid [11,12], screen printing [13,14], RF magnetron sputtering [15], mechanical

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Competency mapping conflicts and resolutions for industrial engineering

D. Mahalakshmi[1,a] and V. Abirami[1]

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ABSTRACT

Competency Mapping in an exceedingly structure language could be a method of characteristic key competencies for a corporation or employment, including the incorporation of the skills in the entire assorted stages i.e. job analysis, training and recruitment in the company. Businesses applied for profit or not, face amendment like ne'er before. Competency is nothing but the ability to do something successfully or efficiently where the key factors and destination is kept in mind with the determinate motive. In competency there are many changes that are to be monitored. All the involved driving factors to enhance transformation include globalization to outside markets, boosting competition, indiscrimination from the consumers, technology availability and new inventions in the market. This research paper clearly explains the key competencies and the

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Dual property of chitosan blended copolymer membranes: Antidiabetic drug release profile and antimicrobial assay

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ABSTRACT

Membranes were fabricated from a blend of synthetic copolymer (thiourea, phenylhydrazine and formaldehyde) and chitosan to study the metformin drug release profile and its kinetics. The membranes were characterized with elemental, scanning electron microscopy, FTIR and ¹H NMR spectroscopy to identify the empirical formula & weight, surface morphology and functional group changes occurred during the incorporation of chitosan to the copolymer. The swelling behaviour, drug loading efficiency and drug release profile of the membranes were studied using UV–visible spectroscopy. The mechanical properties and in vitro degradation studies were also performed. The reactive sites, better porosity and larger surface area provided by chitosan to the copolymer led to higher drug loading efficiency and controlled drug release profile. Kinetic study revealed swelling and diffusion controlled mechanism for the membranes, which obtained from Ritger-Peppas and Higuchi model. The chitosan and its copolymer membranes were tested for antimicrobial assay using selective gram-positive and gram-negative bacterial and fungal strains. The CS-TPF-drug membranes showed an acceptable control of the growth of all the microbial species compared to CS, CS-drug and the standard metformin drug.

1. Introduction

Chitosan based membranes attracted the researchers in the field of biomedical and pharmaceutical industries that exhibits biodegradable, biocompatible, hydrophilic, low-toxic, and bio-adhesive properties [1,2]. Chitosan is a polysaccharide natural polymer derived from chitin obtained from the crustaceans such as crabs and shrimp cells [3]. Chitosan is widely used in drug delivery applications for controlled release of drugs in human and animal cells and also as non-steroids in antiinflammatory drugs used in agrochemicals exhibiting good antimicro-

ophthalmic drug delivery system's ocular inserts were beneficial treatment for tropical infections with the help of polymeric drug carriers like polyvinyl alcohol and sodium carboxymethyl cellulose hybrid polymeric membranes [14]. Chitosan membranes have been reported to extend the retention of the dosage in oral drug delivery in stomach and chitosan - hydroxyl propyl methyl cellulose blend membranes was used in transdermal drug delivery system with high mechanical strength and optical clarity [15,16]. Chitosan grafted poly (2-hydroxyethyl methacrylate-co-itaconic acid) biopolymers were prepared to adjust the hydrophobic and hydrophilic nature to achieve

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Research Article

Free radical scavenging activity of developed herbal formulation

Sasikala Subramani[a], Kannikaparameswari Nachimuthu

ABSTRACT

Objective: Medicinal plants have played a key role in the prevention and treatment of diseases since ancient period. They are also potential sources of drugs and nutrients. *Boerhavia diffusa* and *Achyranthes aspera* are widely used medicinal plants in Ayurvedic treatment for a variety of ailments including kidney diseases. The present study was designed to assess the free radical scavenging capacity of herbal formulated medicinal plants, *B. diffusa* and *A. aspera*. **Materials and Methods:** Ethanolic extracts of herbal formulation were prepared and evaluated for their free radical scavenging capacity using various *in vitro* chemical assays such as 2,2-diphenyl-1-picrylhydrazyl, 2,2'-azinobis(3-ethylbenzothiazolin-6-sulfonic acid), ferric reducing antioxidant power, hydroxyl radical, and superoxide anion radical scavenging activities. **Results:** The ethanolic extract of herbal formulation showed potential radical scavenging activity against the radicals generated *in vitro* as the result was compared with the standard at the same concentration. **Conclusion:** The present research concluded that herbal formulated medicinal plants, *B. diffusa* and *A. aspera*, were found to be more effective due to the combined activity of the individual components. Hence, it is concluded that herbal formulation of these plants may provide efficient, supportive, or alternative treatment procedures for numerous health ailments.

KEY WORDS: 2, 2-Azinobis(3-ethyl benzoline-6-sulfonic acid), 2;2-Diphenyl-1-picrylhydrazyl, Ferric ion, Hydroxyl, Superoxide

INTRODUCTION

The traditional drugs all over the globe nowadays revealed by an extensive activity of researches on diverse plant species and their therapeutic values. Plants possess different bioactivities such as antioxidant anticancer and anti-inflammatory activities. Every biomolecule presents in the living cells is damaged by oxidative reaction with reactive oxygen species (ROS).[1]

ROS and their metabolites can direct consequences on cell injury and may stimulate the development of disease. Free radicals have been concerned on the basis of several diseases such as liver cirrhosis, atherosclerosis, cancer, and diabetes and compounds that can scavenge free radicals have immense effect in ameliorating these diseases.[2] Antioxidants thus play a key role to defend the human body against

therefore, reducing its ability to damage. Natural products have served as a chief resource of drugs for centuries, and about half of the pharmaceutical in use today are derived from natural products. The use of natural products, mostly plants, to manage diseases, is a century-old practice that leads to the innovation of more than half of all recent pharmaceuticals.[3]

Boerhavia diffusa Linn. (Nictaginaceae) has been extensively studied for its therapeutic actions and chemical constituents. The roots are the source of a novel class of isoflavonoids known as rotenoids, flavonoids, glycosides, purine nucleoside, lignans, ecdysteroids, xanthones, and steroids. A variety of animal studies and their trials have confirmed the presence of potential therapeutic activities, such as immunomodulation, hepatoprotection, antidiabetic activity, anti-inflammation, antifibrinolysis, anticancer activity, and dieresis.[4]

High Dimension Multi Class Algorithms (HDMCA) For Classification And Prediction: An Analysis Of Different Algorithms, Performance Measures And Datasets.

V.Shobana, Dr. K.Nandhini

Abstract: The dissection of a particular disorder is a needy one in the modern environment of our living. Our modern living which is not of much physical activity prone to many disorders in our body. Healthcare is a paramount part where so many research designs and proposals are made. Most of the algorithms entangled in healthcare, lets in for a number of results each of which was finer in their own way. The line of work carried out in this research is of applying a dataset for most leading algorithms and the best one is chosen for the next stage. The work is administered through the big data tool R and the results are compared across different metrics. From the results the top two sustaining algorithms are chosen for the forthcoming part.

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1 INTRODUCTION

Algorithms based on data mining are very much useful in the field of healthcare for prediction of disorders. Classification and prediction are the two forms of data analysis. Of the entire classification algorithms decision tree takes a predominant position in predicting the target variable. Decision tree induction or decision tree is a flowchart like tree structure used to predict and classify data more precisely. Many researchers have formulated so many hypothesis using decision trees and they all have shown good results. The dataset taken in this research is thyroid data. The thyroid disorder is one of the most common endocrine disorders which is common worldwide especially in women. Most of the women around the globe suffer from this particular disorder and if they are not treated on time, it will result in serious issues. For predicting thyroid disorders various researches has been done worldwide. The main objective of this research is to compare some of the well known decision tree algorithms such as LDA, CART, kNN, SVM and random forest. These algorithms are performed on the data set using big data open source tools. The performance metrics such as ACC, MAE, PRE, REC, FME and kappa statistic are used to measure the performance of the algorithms.. These algorithms are compared with the

The thyroid dataset analysis started in the year 1984 by Breiman et.al[1984], followed by Cestnik et.al in 1987,Quinana in 1988 and 1989. In the year 1992, Wray Buntine et al. [1] compared the decision tree for several datasets such as breast cancer, hypothyroid, iris etc., the decision tree implementation applied in his work was proposed originally by David Harper, Chris Carter, and other students at the University of Sydney from 1984 to 1988. Bruntine then proposed new splitting rules for decision tree induction. In his article [2] he used CART and ID3 algorithms and compared their performance. J. Huang et al. [3] compared NaiveBayes, SVM and decision trees with AUC and accuracy as performance metrics. The performance metric AUC (Area under Curve of ROC) exhibits several desirable properties compared to other metrics. In 2008, Keles. A et al. [4] formulated an expert system which was based on Neuro-Fuzzy classification for thyroid disorders, with an accuracy of 95.33%. Yuwei Hao et.al [5] generated as MsaDtd (Decision Tree based on MS-Apriori) approach that follows association rule mining and turns out with an accuracy of 87.21%.Maysanjaya et al. [6] used Multilayer Perceptron method to identify the type of thyroid (normal, hypothyroid, hyperthyroid) using WEKA tool. The accuracy of the prediction was 96.74%. A. Tyagi et al. [7] proposed a analysis of thyroid dataset using kNN

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Adaptive Fuzzy Chaotic Genetic Clustering Based Continuous Keystroke Authentication

M. Rathi, A. V. Senthil Kumar, Ismail Musirin

Abstract: Exponential growth in technology, has increased the security breaches day today. This is because the system which is standalone or connected with networks, are handled by different users for various purposes. The security of individuals is preserved using identification and authentication to prevent from intruders. The authentication of an individual is done either by using behavioral or physiological characteristics of the concern user. This paper aims to develop an optimized approach based on ballistic nature of typing behavior based authentication system. This system is used to identify an individual by their typing rhythm to confirm their genuineness. Determining authenticated persons by keystroke dynamics is very difficult in presence of uncertainty in their typing rhythm. This proposed model devised a fuzzy inference model with gene clustering to discover the pattern of the user as genuine or an intruder. There is no proper proof of handling indeterminacy in impersonate users as authenticated or not by discovering the keystroke pattern. Hence, this proposed work handles the indeterminacy of user keystroke recondition by applying membership degree with the obtained features involved in behavioral keystroke typing rhythm based authentication model

Index Terms: continuous keystroke dynamic, behavioral, typing rhythm, indeterminacy, Fuzzy inference model, Gene clustering, Buffalo Dataset

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1. INTRODUCTION

DUE to rapid increase in demand of strong security mechanism, conventional methods fail to face the challenges due to tokens and passwords are too many to evoke. One of the important issues in a restricted access of using computer system in remote is user authentication. Continuous spread of internet usage makes effectual remote authentication a key issue providing additional difficulties. Many biometric authentication models need dedicated hardware which was unhandy for remote applications [1]. Related with other biometrics, one of the emerging and attractive user-friendly biometric mechanisms is keystroke authentication. The dynamic data of keystroke can be gathered without disturbing the activities of the corresponding user. The keystroke dynamics is mainly used for recognition of an authenticated user by their typing rhythm. While a keystroke pattern sequence successfully matches a user input, then it spots the user as an authenticated person or if it is mismatched the user is treated as an intruder. An approach which uses rhythm of typing as a pattern of biometric authentication is referred as continuous keystroke authentication. This kind of authentication not only checks the value of the password but

the field of security mechanism. The major difference between the static keystroke dynamics and the continuous keystroke dynamics is that in the former static method, the typed information used for authentication is fixed, while in latter the information is never fixed [2]. The main requirement of the continuous authentication is as follows:

- During continuous authentication the user is not interrupted in their daily activities
- The system utilizes each single keystroke to discover the genuineness of the user

This paper introduced the concept of uncertainty in determining the continuous keystroke pattern when there is a high degree of similarity in typing rhythm among the normal user and the impostor. This paper introduces genetic clustering based continuous keystroke pattern recognition in an optimized way.

2 RELATED WORK

This section discusses about some of the existing works related to keystroke dynamics and the authentication process. Dowland et al. [3] developed a digraph, word latency and tri

A Contemporary Approach on Neutrosophic Nano Topological Spaces

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Abstract: In this article, we implement a new notion of sets namely neutrosophic nano j-closed set, neutrosophic nano generalized closed set, neutrosophic nano generalized j-closed set and neutrosophic nano generalized j*-closed set in neutrosophic nano topological spaces. We also provide some appropriate examples to study the properties of these sets. The existing relations between some of these sets in neutrosophic nano topological space have been investigated.

Keywords: Neutrosophic nano j-closed set, neutrosophic nano generalized closed set, neutrosophic nano generalized j-closed set, neutrosophic nano generalized j*-closed set.

I. Introduction

In recent years, Topology plays a vast role in research area. In particular, the concept of neutrosophy is a trending tool in topology. We use fuzzy concept where we consider only the membership value. The intuitionistic fuzzy concept is used where the membership and the non-membership values are considered. But, more real life problems deal with indeterminacy. The suitable concept for the situation where the indeterminacy occurs is neutrosophy which is represented by the degree of membership (truth value), the degree of non-membership (falsity value) and the degree of indeterminacy.

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PUBLICATION OUTPUT OF JOURNAL 'CLINICAL CANCER RESEARCH' (2005-2018): A BIBLIOMETRIC ANALYSIS

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ABSTRACT

The paper analysis, authorship productivity and collaborative research of research articles available on Clinical Cancer Research for a period of fourteen years from 2005 to 2018. The data were downloaded from the Clarivate Analytics - web of science database. The data included fourteen thousand one hundred fifty six (14156) research articles and sixty eight thousand one hundred seventy (68170) authors. This paper analysis the co-authorship network using CiteSpace Java application with the aim of the understanding of research collaboration in this journal. This paper test the appropriateness of relative growth rate and doubling time.

KEYWORDS: Authorship pattern, Bibliometrics, Co-authorship network; Centrality Analysis, Degree of collaboration, CiteSpace application.

INTRODUCTION

Clinical Cancer Research (CCR) (Print ISSN: 1078-0432; Online ISSN: 1557-3265) published by the American Association for Cancer Research (AACR) has been treated as a source journal for this study. It is noted in the indexes of Current Contents/Clinical Medicine, MEDLINE, Scopus and Web of Science. CCR as a month to month publication from 1995 to 2003, its interest has stimulated a double in size and exchange to fortnightly distribution in August 2003 onwards. The Journal is particularly keen on clinical preliminaries assessing new medicines, joined by research in pharmacology, and atomic modifications or biomarkers that foresee reaction or protection from treatment. The impact factor (IF) of the journal in 2018-2019 was 8.911 and five years IF is 9.174 (AACR Journals Metrics). The scientometric analysis of the journal will give an outline of the journal information at a small scale level and the components of oncology research at a macro level.

OBJECTIVES

Scientometric techniques were applied to analyze the research documents published in the Clinical Cancer Research (CCR) for the period of the selected 14 years between 2005 and 2018. The foremost objectives of the bibliometric study are to spot and carry out these facets:

- To analysis the annual distribution of research publications and the number of

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RESEARCH ARTICLE

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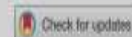
Optical character recognition based on local invariant features

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ABSTRACT

The Optical Character Reader (OCR) process means the transition from scanned manual or written images to a machine-determined document. The American Standard Code for Information Interchange (ASCII) in cognitive processing uses OCR. The challenge is two primary folds: word segmentation by letters and character recognition. Implement a new approach to include the two functions by Scale-Invariant Transforming Feature (SIFT) descriptors. To compare SIFT descriptors (RootSIFT), devise a new procedure, that offers outstanding results without increasing computation or storage requirements. In order to identify English characters, Artificial Bee Colony (ABC) method suggests that the back propagation neural network for classification of character be utilized. Conducted experiments with more than 10 measures intended for every character and tested the accuracy for numerical numbers, chart letters, small letters and alphanumeric characters. The performance analysis of ABC optimized neural network algorithm has achieved a maximum accuracy of 97.3077% compared with precision recall and f-measure.

Introduction

The recognition of character [1,2] has become one of the main research fields in Patterns [3–5]. It transforms the scanned text file into a readable form for the user. Records may be scanned by printer or written documents manually. The writing of the hands may be limited or restricted. Probably depends on the document aspect, scanning, segmentation and recognized technologies, the efficiency of an Optical Character Reader (OCR) system varies significantly. This relies

introduced recently and used in [11] damaged manuscripts written in Latin. In Ahmad et al. [12] shown use of the SIFT descriptor; the performance of the terms of strategy attribute type PCA [13] is greater than that of a cursive text recognition. The keypoints [9] are used as locations of the SIFT descriptors. The fonts of the printed Arabic text were also differentiated by this descriptor [14].

In the latest work [15], a newly optimized back propagation method for English alphanumeric charac-

Analytical and Numerical Study on Cross Diffusion Effects on Magneto-Convection of a Chemically Reacting Fluid with Suction/Injection and Convective Boundary Condition

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Abstract: The purpose of this paper is to investigate the Soret and Dufour effects on unsteady mixed convective boundary layer flow of a viscous fluid over a stretching surface in a porous medium in the presence of magnetic field with heat generation/absorption, chemical reaction, suction/injection and convective boundary condition. The governing time-dependent partial differential equations are transformed into non-linear ordinary differential equations using similarity transformations. These equations subject to the appropriate boundary conditions are solved analytically by homotopy analysis method (HAM) and numerically by Runge-Kutta fourth order method and shooting technique. The numerical solution is compared with analytical solution. The influence of the different parameters on velocity, temperature and concentration profiles are discussed in graphical as well as in tabular form. It is observed that the fluid velocity and temperature increase on increasing the buoyancy ratio parameter and heat generation/absorption parameter. Also found that the surface heat and mass transfer rates increase on increasing the suction/injection and heat generation/absorption parameters.

Nomenclature

a,b,c	positive constants	h_f, h_θ, h_ϕ	non-zero auxiliary parameters
A	unsteady parameter	j_w	surface mass flux
B_0	magnetic strength	k_1	permeability of the porous medium
Bi	Biot number	k_2	coefficient of chemical reaction
C	concentration of the fluid	k_m	mass transfer coefficient
C_f	local skin friction coefficient	k_T	thermal diffusion ratio
C_i, (i = 1 to 7)	arbitrary constants	L_f, L_θ, L_ϕ	linear operators
c_p	specific heat	N	buoyancy ratio parameter

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Extraction, Characterization and Enzymatic Degumming of Banana Fiber

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Karur Nallappagounder Shiva[a], and Uma Subbaraya[a]

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ABSTRACT

Pseudostem is the major biomass being generated and not utilized after harvesting of banana bunches. The present study was aimed to characterize the banana fiber and to explore the possibilities of improving the quality of extracted fiber by degumming using enzymes. Fiber from pseudostem of five cultivars, viz., Grand Naine (AAA), Red Banana (AAA), Poovan (AAB), Popoulu (AAB) and Karpuravalli (ABB), were extracted using Raspador machine. Fibers were treated with pectinase, laccase and combination of both enzymes at varying concentrations. The highest fiber recovery was obtained from Karupuravalli (2.49%) and the least was recorded in Grand Naine (1.10%). Properties like breaking strength, breaking extension, tex and tenacity were found to be better in Red Banana fiber (975.97 gf, 3.17%, 33.7 tex, 28.40 cN/tex and 180.25 MPa respectively). SEM results revealed that laccase enzyme was more efficient in improving the surface quality of fibers followed by pectinase + laccase (25:75). Removal of pectinolytic substances from intact cells in cell wall of fiber resulted in surface smoothening of banana fiber.

KEYWORDS

Banana fiber; pseudostem; extraction; enzyme; degumming; environment

关键词

香蕉纤维; 分之一叶; 提取; 酶; 脱胶; 环境

摘要

假茎是香蕉收获后产生和未利用的主要生物量。研究了香蕉纤维的特性，探讨了酶法脱胶提高纤维质量的可能性。采用树梢机提取了5个栽培品种的假茎纤维，Grand Naine (AAA)、红香蕉(AAA)、普凡(AAB)、波香鲁(AAB)和卡普拉瓦利(ABB)。以不同浓度的果胶酶、漆酶和两种酶的组合处理纤维。Karupuravalli纤维回收率最高(2.49%)，Grand Naine纤维回收率最低(1.10%)。红香蕉纤维(975.97 gf、3.17%、33.7 tex、28.40 cN/tex、180.25 MPa)的断裂强度、断裂伸长率、tex、固性等性能较好。SEM结果显示漆酶在提高纤维表面质量方面更有效，其次是果胶酶+漆酶 (25:75)。去除纤维细胞壁完整细胞中的果胶分解物质，可使香蕉纤维表面光滑。

Introduction

Management of crop residues in eco-friendly and profitable way is one of the major issues in agriculture. It has been achieved to some extent in crops like sugarcane, wheat, rice and maize, yet many of the horticultural wastes are left unutilized (Singaraj et al. 2019). Since long time, plant fibers have been used for versatile applications. Natural fiber from agro-waste exhibit excellent characteristics like good mechanical strength, stiffness, low density, non-abrasiveness,

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A Recent Work on Nano j-closed Sets in Nano Topological Spaces

D.Sasikala, K.C.Radhamani

Abstract

In this paper, we introduce a new class of closed sets namely nano j-closed sets. Also, we define nano generalized j-closed sets, nano generalized j*-closed sets, nano j-continuous mapping, nano generalized j-continuous mapping, nano generalized j*-continuous mapping and study some of their properties.

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In vitro antiviral activity of BanLec against herpes simplex viruses type 1 and 2

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Article Info

Abstract

The present study evaluates the antiviral activity of banana lectin (BanLec) against herpes simplex virus type 1 and 2 (HSV-1 and HSV-2). Lectin was isolated from the ripen pulp of bananas (*Musa paradisiaca*). The study showed that lectin exhibited hemagglutination activity towards human erythrocytes A, B, AB and O group. The molecular weight of BanLec using SDS gel-electrophoresis was found to be 14,000-30,000 Da. Cytotoxicity of BanLec on the Vero cell lines showed an inhibitory concentration of 172.7 µg/mL. BanLec was virucidal and showed no cytotoxicity at the concentration tested. The lectin showed a dose-dependent antiviral activities, inhibiting HSV-1 by 16.0 µg/mL with selectivity index 10.8 and HSV-2 inhibition by 67.7 µg/mL with selectivity index 2.6. These results corroborate that BanLec could be a rich source of potential antiviral compound for HSV-1 when compared to HSV-2.

RESEARCH ARTICLE

Extremely-randomized-tree-based Prediction of N⁶-Methyladenosine Sites in *Saccharomyces cerevisiae*

Rajiv G. Govindaraj[1], Sathiyamoorthy Subramaniyam[2,3] and Balachandran Manavalan[4,*]

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Abstract: *Introduction:* N⁶-methyladenosine (m6A) is one of the most common post-transcriptional modifications in RNA, which has been related to several biological processes. The accurate prediction of m6A sites from RNA sequences is one of the challenging tasks in computational biology. Several computational methods utilizing machine-learning algorithms have been proposed that accelerate *in silico* screening of m6A sites, thereby drastically reducing the experimental time and labor costs involved.

Methodology: In this study, we proposed a novel computational predictor termed ERT-m6Apred, for the accurate prediction of m6A sites. To identify the feature encodings with more discriminative capability, we applied a two-step feature selection technique on seven different feature encodings and identified the corresponding optimal feature set.

Results: Subsequently, performance comparison of the corresponding optimal feature set-based extremely randomized tree model revealed that Pseudo k-tuple composition encoding, which includes 14 physicochemical properties significantly outperformed other encodings. Moreover, ERT-m6Apred achieved an accuracy of 78.84% during cross-validation analysis, which is comparatively better than recently reported predictors.

Conclusion: In summary, ERT-m6Apred predicts *Saccharomyces cerevisiae* m6A sites with higher accuracy, thus facilitating biological hypothesis generation and experimental validations.

Keywords: Extremely randomized tree, feature optimization, N⁶-methyladenosine sites, cross-validation, RNA sequences, *Saccharomyces cerevisiae*.

1. INTRODUCTION

Post-transcriptional modifications in RNA are the variations that occur on a newly transcribed primary RNA transcript. To date, approximately 150 kinds of RNA modifications have been determined [1, 2]. The most abundant RNA modification is N⁶-methyladenosine (m6A), which is prevalent among viruses, plants, insects, mammals, and eukaryotes such as yeast [3-7]. m6A denotes the methylation at N-6 position of adenosine nucleotide catalyzed by a methyltransferase complex and this reaction is reversible by demethylases (ALKBH5 and FTO). m6A modification has been in-

Several experimental approaches, including high performance liquid chromatography [14], next-generation sequencing technologies [15, 16], and two-dimensional thin layer chromatography [17] have been widely applied in the identification of m6A sites. Particularly, next-generation sequencing is not available for large-scale genomic sequences' m6A identification. Overall, these experimental approaches are time-consuming and cost-ineffective, when applied on large-scale genome analysis. Therefore, the development of an accurate and efficient computational method for m6A identification is necessary to complement experimental approaches.

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Recurrent Neural Network for Content Based Image Retrieval Using Image Captioning Model

Authors   Authors and affiliations

S. Sindu ✉, R. Kousalya

Abstract

With the tremendous growth in the collection of digital images by social media, ecommerce applications, medial applications and so on, there is a need for Content based image retrieval. Automatic retrieval process is one of the main focus of CBIR, whereas traditional keyword based search approach is time consuming. Semantic based image retrieval is performed using CBIR where the user query is matched based on the perception of the contents of the image rather than the query which is in text format. One of the main research issue in CBIR is the semantic gap which can be reduced by deep learning. This paper focuses on image captioning model for image retrieval based on the content using recurrent and convolutional neural network in deep learning.

Keywords

Content based image retrieval   Deep learning   Convolutional neural network

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Molecular Geometry, NLO, MEP, HOMO-LUMO and Mulliken Charges of Substituted Piperidine Phenyl Hydrazines by Using Density Functional Theory

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The quantum chemical calculations of organic compounds *viz.* (*E*)-1-(2,6-*bis*(4-chlorophenyl)-3-ethylpiperidine-4-ylidene)-2-phenyl-hydrazine (3ECl), (*E*)-1-(2,6-*bis*(4-chlorophenyl)-3-methylpiperidine-4-ylidene)-2-phenylhydrazine (3MCl) and (*E*)-1-(2,6-*bis*(4-chloro-phenyl)-3,5-dimethylpiperidine-4-ylidene)-2-phenylhydrazine (3,5-DMCl) have been performed by density functional theory (DFT) using B3LYP method with 6-311G (d,p) basis set. The electronic properties such as Frontier orbital and band gap energies have been calculated using DFT. Global reactivity descriptor has been computed to predict chemical stability and reactivity of the molecule. The chemical reactivity sites of compounds were predicted by mapping molecular electrostatic potential (MEP) surface over optimized geometries and comparing these with MEP map generated over crystal structures. The charge distribution of molecules predict by using Mulliken atomic charges. The non-linear optical property was predicted and interpreted the dipole moment (μ), polarizability (α) and hyperpolarizability (β) by using density functional theory.

Keywords: Mulliken charges, Molecular electrostatic potential, Non-linear optical property, Molecular geometry, Piperidin-4-ones.

INTRODUCTION

To analyze the biological activity of a molecule is a risk task today. Every molecule possesses some hidden properties based upon their electronic interactions with neighboring atoms and their biological activities are based on these interactions. Molecular docking is such type of a technique gives a basic idea of binding potency of a ligand with different selective proteins in a 3D arrangement [1]. It is an attractive platform to prospect rational drug design and discovery [2]. Another imp-

Advances in organic chemistry were generally measured by the availability of simple and highly functionalized building blocks. It could be used in synthesizing larger molecules with tuning properties and its applications. Piperidine ring system plays a wide role in innumerable natural compounds and drugs. This variety of compounds manifests countless pharmacological properties [5]. Generally, substituted 4-piperidones are the modules of a many alkaloids which holds broad-ranging of biological activity [6]. Piperidine-4-one compound has been attained much attention in recent years due to their biological

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Review Article

Till 2018: a survey of biomolecular sequences in genus *Panax*

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ARTICLE INFO

ABSTRACT

Ginseng is popularly known to be the king of ancient medicines and is used widely in most of the traditional medicinal compositions due to its various pharmaceutical properties. Numerous studies are being focused on this plant's curative effects to discover their potential health benefits in most human diseases, including cancer— the most life-threatening disease worldwide. Modern pharmacological research has focused mainly on ginsenosides, the major bioactive compounds of ginseng, because of their multiple therapeutic applications. Various issues on ginseng plant development, physiological processes, and agricultural issues have also been studied widely through state-of-the-art, high-throughput sequencing technologies. Since the beginning of the 21st century, the number of publications on ginseng has rapidly increased, with a recent count of more than 6,000 articles and reviews focusing notably on ginseng. Owing to the implementation of various technologies and continuous efforts, the ginseng plant genomes have been decoded effectively in recent years. Therefore, this review focuses mainly on the cellular biomolecular sequences in ginseng plants from the perspective of the central molecular dogma, with an emphasis on genomes, transcriptomes, and proteomes, together with a few other related studies.

1. Introduction

Decoding the genetics of medicinal plants is significant in understanding their phytochemical constituents with the trace of characterized enzymes in their genome, and the knowledge acquired from each plant is greatly benefiting the pharmaceutical industries in standardizing the development of natural drugs. So far, the knowledge obtained from the history of traditional medi-

phytochemicals. For example, the "gene-to-metabolite" concepts have been successfully applied in *Arabidopsis thaliana* to characterize its flavonoids and also in other plants to characterize their secondary metabolites [4,5]. This field of study is becoming extensively acceptable as a proof-of-concept to annotate the array of novel phytochemicals and their biosynthesis mechanisms through derived and multitested hypotheses [5]. The "gene-to-metabolite" concept is more familiar among model plants, as they

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Short communication

Structural, morphological and magnetic properties of algae/CoFe$_2$O$_4$ and algae/Ag-Fe-O nanocomposites and their biomedical applications

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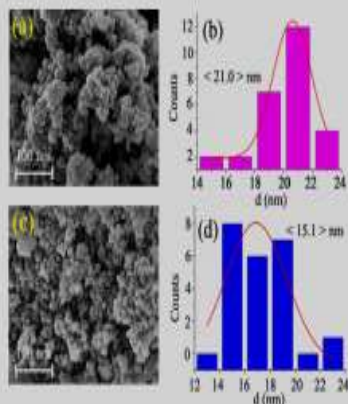[d] Department of Physics, Sasi Institute of Technology & Engineering, Tadepalligudem 534101, Andhra Pradesh, India
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GRAPHICAL ABSTRACT

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ABSTRACT

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Hydrothermal synthesis of ZnO–CdS nanocomposites: Structural, optical and electrical behavior

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ARTICLE INFO

ABSTRACT

ZnO–CdS nanocomposites with three different molar ratios of 25:75, 50:50 and 75:25 were synthesized by simple hydrothermal technique. Powder X-ray diffraction patterns confirmed the phase formation of ZnO and CdS in ZnO–CdS nanocomposites. The calculated crystallite size was found in the range of 33–38 nm and 15–21 nm for ZnO and CdS respectively. HRSEM images revealed flake-like morphology for all samples. Energy dispersive X-ray spectra confirmed the presence of all the elements. The estimated optical bandgap was found in the range of 3.71–3.35 eV. IR spectra confirmed the formation of stretching vibration in ZnO and CdS. Dielectric analysis was performed in order to study Ac conductivity, dielectric constant and dielectric loss. Photoconductivity studies revealed that ZnO–CdS nanocomposites material exhibited sound photo-response characteristics.

1. Introduction

Inorganic composite materials at nano scale region exhibit unique electrical and optical properties which make them suitable for versatile applications [1-7]. Zinc oxide is a well-known wide band gap semiconductor (II-VI) compound and it exhibits high exciton binding energy (60 meV) at ambient temperature. Taking aid of such attractive behavior zinc oxide is widely used to fabricate electronics devices such as photonic and optical modulators, waveguides, phosphor material in Cathode Ray Tube (CRT) screens and ultra-violet laser diodes [8-15]. In particular, quantum confinement effects and surface to volume

It is found that the performance of ZnO–CdS nanocomposite is enhanced due to the combination of cadmium sulphide and zinc oxide [25]. ZnO nanowires [26,27] and CdS nanoribbons [28,29] were investigated for their photoconductivity properties and it is found that these nanomaterials possess higher photoresponse with strong polarization dependence [30-32]. Photoconductivity is a well-known tool to obtain detail information about the nature of the photo-excitations. The photoconductive behavior of the inorganic nanomaterials has been investigated successfully in the last decade [33]. Recently, ZnO nanoparticles enhanced with ultrathin coatings of other metal oxides to develop new electrode for getting electrons in photovoltaic devices

Publications in Web of Science for Academic Year 2019-20

Dual property of chitosan blended copolymer membranes: Antidiabetic drug release profile and antimicrobial assay

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ARTICLE INFO

ABSTRACT

Membranes were fabricated from a blend of synthetic copolymer (thiourea, phenylhydrazine and formaldehyde) and chitosan to study the metformin drug release profile and its kinetics. The membranes were characterized with elemental, scanning electron microscopy, FTIR and ^{1}H NMR spectroscopy to identify the empirical formula & weight, surface morphology and functional group changes occurred during the incorporation of chitosan to the copolymer. The swelling behaviour, drug loading efficiency and drug release profile of the membranes were studied using UV–visible spectroscopy. The mechanical properties and in vitro degradation studies were also performed. The reactive sites, better porosity and larger surface area provided by chitosan to the copolymer led to higher drug loading efficiency and controlled drug release profile. Kinetic study revealed swelling and diffusion controlled mechanism for the membranes, which obtained from Ritger-Peppas and Higuchi model. The chitosan and its copolymer membranes were tested for antimicrobial assay using selective gram-positive and gram-negative bacterial and fungal strains. The CS-TPF-drug membranes showed an acceptable control of the growth of all the microbial species compared to CS, CS-drug and the standard metformin drug.

1. Introduction

Chitosan based membranes attracted the researchers in the field of biomedical and pharmaceutical industries that exhibits biodegradable, biocompatible, hydrophilic, low-toxic, and bio-adhesive properties [1,2]. Chitosan is a polysaccharide natural polymer derived from chitin obtained from the crustaceans such as crabs and shrimp cells [3]. Chitosan is widely used in drug delivery applications for controlled release of drugs in human and animal cells and also as non-steroids in anti-inflammatory drugs used in agrochemicals exhibiting good antimicro-ophthalmic drug delivery system's ocular inserts were beneficial treatment for tropical infections with the help of polymeric drug carriers like polyvinyl alcohol and sodium carboxymethyl cellulose hybrid polymeric membranes [14]. Chitosan membranes have been reported to extend the retention of the dosage in oral drug delivery in stomach and chitosan - hydroxyl propyl methyl cellulose blend membranes was used in transdermal drug delivery system with high mechanical strength and optical clarity [15,16]. Chitosan grafted poly (2-hydroxyethyl methacrylate-co-itaconic acid) biopolymers were prepared to adjust the hydrophobic and hydrophilic nature to achieve

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A Contemporary Approach on Neutrosophic Nano Topological Spaces

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Abstract: In this article, we implement a new notion of sets namely neutrosophic nano j-closed set, neutrosophic nano generalized closed set, neutrosophic nano generalized j-closed set and neutrosophic nano generalized j*-closed set in neutrosophic nano topological spaces. We also provide some appropriate examples to study the properties of these sets. The existing relations between some of these sets in neutrosophic nano topological space have been investigated.

Keywords: Neutrosophic nano j-closed set, neutrosophic nano generalized closed set, neutrosophic nano generalized j-closed set, neutrosophic nano generalized j*-closed set.

I. Introduction

In recent years, Topology plays a vast role in research area. In particular, the concept of neutrosophy is a trending tool in topology. We use fuzzy concept where we consider only the membership value. The intuitionistic fuzzy concept is used where the membership and the non-membership values are considered. But, more real life problems deal with indeterminacy. The

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Original article: Open access

Revitalizing property of banana peel extracts by antioxidant activity and antibacterial activity against acne causing *Staphylococcus epidermidis*

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Abstract

Acne vulgaris is a common skin inflammatory lesion caused by the bacteria, *Propionibacterium acnes*, *Staphylococcus epidermidis* and *Malassezia furfur* in the follicular canal of the epidermal layer of skin. In order to combat the problem, *Propionibacterium acnes* and *Staphylococcus epidermidis* are the target for many antiacne drugs. Increasing awareness towards the use of organic based products paved the way to search for medicines from banana peel. *In vitro* antibacterial activity of acetone extract of banana fruit peel from *Musa sapientum* investigated on isolated species of acne causing *Staphylococcus epidermidis* by agar well diffusion technique and minimal inhibitory concentration (MIC). Antioxidant activity assayed for the extract by DPPH and ABTS assay methods. Active principle in the extract was separated by analytical and preparative TLC and its antibacterial activity assayed against the pathogen. Maximum antibacterial activity of acetone extract against *Staphylococcus epidermidis* recorded as 17 mm in diameter, the MIC of the acetone extract recorded as 32 µg/ml and banana fruit peel powder showed 70% of sorption of pathogen. Phytochemical analysis showed the presence of 31.56 ± 0.21 mg gallic acid equivalent of phenols/g of dry banana peel extract and maximum antioxidant activity of 71.21 ± 0.91 and 86.78 ± 0.88 and IC_{50} as 36.2% and 44.6% by DPPH and ABTS methods, respectively. Further assays confirmed the presence of phenolics, alkaloids, saponins and lipid peroxidase. As banana peel is having biosorption property, high biocompatible phenolics, antibacterial alkaloids and free radical scavenging activity, recommended for facial application to control acne causing *Staphylococcus epidermidis*.

1. Introduction

Acne vulgaris is a common skin disease of pilosebaceous gland, which affects areas containing the largest oil glands includes the skin surface of the face, back, and trunk. It is generally characterized by formation of seborrhea, come-done that leads to inflammatory lesions by the normal flora *Propionibacterium acnes*, *Staphylococcus epidermidis* and *Malassezia furfur* in the follicular canal and leads to sebum production. Commonly, *Propionibacterium acnes* described as an obligate anaerobic bacteria. It is associated with the development of inflammatory acne by activating complement cascade on the skin. Whereas another inflammation causing bacteria,

epidermidis are the target for currently used chemical antiacne drugs. In many instances, medication fails to treat due to the long term usage results in aggravated side effects on the face and development of drug resistance by the pathogens. To overcome these problems, medicinal plants have been extensively studied as an alternative to treatment as it has different methods in control of pathogens and inflammatory response. Different parts of the plant extract traditionally know for microbial control now proven as effective in controlling the microbial infections. Secondary metabolites of the plants produced in micromolar concentrations that offers plant endurance, microbial resistance, stress resistance and extensive defense towards predation and these bioactive

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Original research article

Gas sensing nature and characterization of Zr doped TiO₂ films prepared by automated nebulizer spray pyrolysis technique

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ARTICLE INFO

ABSTRACT

This paper investigates the Zr doped TiO₂ films deposited by automated nebulizer spray pyrolysis (ANSP) technique at 500 °C as coating temperature. The manipulation of Ti/Zr ratio on XRD study shows the stabilized anatase tetragonal crystal structure in all deposited films, and the XPS study shows C 1s, Ti 2p, Zr 3d and O 1s are spin orbits of the relative elements. The surface morphological study of FESEM shows the compact granular spherical structure for all the Zr doped TiO₂ films. The optical study reveals the blue-shift of band gap energy E_g = 3.20 eV to 3.64 eV with respect to dopant (Zr). Gas sensitivity response of all films exhibits the better response to NH₃ reducing gas among the other gas (C_2H_6O, C_3H_8O, CH_4O, C_3H_8O) with a function of constant temperature (°C) and gas concentration (ppm).

1. Introduction

The gas sensor materials of metal oxide holds an enormous of unpleasant properties; such as long-range signal drift, humidity sensitivity, slow sensor response and high cross sensitivity. In order to improve sensor performance, a progression of different metal-oxide semiconductors has been tested. The n-type metal oxide of TiO₂ semiconductors have been gained more attention due to their low cost, non-toxicity, long term stability, high and quick response with relatively simplicity of their uses; and ability to detect a maximum number of gases. Especially, the doping component is used to modify and improve the progression of oxides for the new and advanced performance of various electronic devices, thus modifying the electrical, structural, optical and morphological properties of parent metal oxides (TiO₂). The recent survey report says that the introduction of few amount of Zr could drastically improve the thermal stability of anatase phase and surface properties of the coated films [1]. The elements IV B of Ti and Zr have the same valence state (+4) and the same diameters Ti: 2 Å, Zr: 2.16 Å. Both oxides are in n-type semiconductors with similar physicochemical properties. Therefore, it is possible that Zr enters the TiO₂ lattice, changes and increases the length of the bond to form anatase crystallites of Zr doped TiO₂ [2–7].

The Zr doped TiO₂ have been prepared by various methods, such as electro spinning [1], spray pyrolysis [2], APCVS [3] sol-gel

Recurrent Neural Network for Content Based Image Retrieval Using Image Captioning Model

Authors   Authors and affiliations

S. Sindu ✉ , R. Kousalya

Abstract

With the tremendous growth in the collection of digital images by social media, ecommerce applications, medial applications and so on, there is a need for Content based image retrieval. Automatic retrieval process is one of the main focus of CBIR, whereas traditional keyword based search approach is time consuming. Semantic based image retrieval is performed using CBIR where the user query is matched based on the perception of the contents of the image rather than the query which is in text format. One of the main research issue in CBIR is the semantic gap which can be reduced by deep learning. This paper focuses on image captioning model for image retrieval based on the content using recurrent and convolutional neural

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Nanoscale Advances

ROYAL SOCIETY OF CHEMISTRY

PAPER

Efficient and tunable shape selective synthesis of Ag/CeO$_2$ nanostructures modified highly stable SERS substrate for ultrasensitive detection of pesticides on the surface of an apple

S. Thirumalairajan [iD] *[a] and K. Girija [iD] [b]

Detection of pesticide residues from fruits and vegetables is of significant importance to ensuring human health and environmental safety. An efficient and tunable shape-selective synthesis of Ag/CeO$_2$ nanostructures as an active flexible SERS substrate for the detection of thiram on an apple surface *via* a paste, peel off, and paste again process was performed. The well-controlled formation of silver assembled CeO$_2$ microspheres constituting nanospheres and nanospindles with an average size of approximately 56 and 32 nm with anisotropic structures has been confirmed through morphological and crystallographic analysis. Interestingly, CeO$_2$ (111) was strongly anchored in the Ag (111) matrix, which provides a more adequate pathway for rapid ion-electron transportation, as observed from the structural and chemical composition analysis. The detection of thiram on the surface of an apple using our proposed nanospindle SERS active substrate achieves a wide detection range from 10^{-2} to 10^{-9} M with a correlation coefficient of 0.9929 and a low detection limit of 27 nM at S/N = 3. In addition, the charge transfer mechanism between the Ag/CeO$_2$ nanostructures and thiram molecules has also been proposed. We believe that the present work could provide novel ways to develop SERS active substrates for highly efficient onsite detection of pesticides on fruits in the near future.

1. Introduction

Conventional processes such as gas chromatography-mass spectrometry (GC-MS) and high performance liquid

Short communication

Structural, morphological and magnetic properties of algae/CoFe$_2$O$_4$ and algae/Ag-Fe-O nanocomposites and their biomedical applications

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GRAPHICAL ABSTRACT

ARTICLE INFO

ABSTRACT

Algae-assisted auto-combustion method was adopted to prepare Algae/CoFe$_2$O$_4$ and Algae/Ag-Fe-O nanoparticles (NPs). Structural properties of the samples were investigated using XRD (X-ray Diffraction) FTIR (Fourier Transform Infra-red Spectroscopy), SEM (Scanning Electron Microscopy), and EDX (Energy Dispersive X-ray Analysis) and

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Development of CuAlO$_2$-Encapsulated Reduced Graphene Oxide Nanocomposites: An Efficient and Selective Electrocatalyst for Detection of Neurodegenerative Disorders

Abstract

Carbon-based nanomaterials continue to simulate wide interest in diverse disciplines including electrochemical biosensors, which have great ability to function as next-generation clinical diagnostics. Motivated by this point, we for the first time developed a CuAlO$_2$-encapsulated reduced graphene oxide (rGO) nanocomposite by a facile wet-chemical process to modify a glassy carbon electrode for dopamine detection with high selectivity and good sensitivity. The size, shape, phase purity, chemical composition, and surface area were investigated for the samples through transmission electron microscopy, scanning electron microscopy, high-resolution transmission electron microscopy, X-ray photoelectron spectroscopy, X-ray diffraction, and Brunauer–Emmett–Teller analysis. The electrocatalytic performance was studied using cyclic voltammetry and amperometric technique. The modified rGO/CuAlO$_2$ nanocomposite electrode showed an enhanced electrochemical performance compared to other electrodes and pure CuAlO$_2$ electrodes due to the strong prom$_\square$ rGO and CuAlO$_2$. Both the oxidation current and concentration were proportional and show a linear range of 9. M having a detection limit of 15 nM at S/N = 3. Further, the biosensor successfully neglected the interference o$_\square$ acid and exhibited enhanced selectivity, improved sensitivity, and stability toward dopamine formulations. Mos$_\square$ time analysis of the electrochemical biosensor may be proved using the clinical diagnostics in the near future.

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Predicting Students Academic Performance using an Improved Random Forest Classifier

Publisher: IEEE

Cite This

PDF

Sujith Jayaprakash ; Sangeetha Krishnan ; V. Jaiganesh   **All Authors**

Abstract

Document Sections

I. Introduction

II. Related Research Works

III. Machine Learning

IV. Data Collection and Analysis

V. Implementation of Improved Random Forest

Abstract:

Increasing demand in the education sector has paved the way to many research works which highly focuses on the student's academic performance and their behaviour analysis. Machine learning algorithms are applied in Education Data mining to find meaningful patterns and insights from the Educational datasets. Mostly, it is used to foretell the performance of students; to classify the features that impact the performance of students and also to cluster the students based on their performance. Introducing an interim mechanism to analyse and predict the student performance at the early stage help the institution and the students to take immediate action and improv the performance. In this research work, we have discussed the two most important factors - Factors that impact the scholastic achievement of students and aid in predicting the students at risk. This study also proposes a technique named improved random forest classifier. This technique aims to produce a higher accuracy rate in classification and prediction in comparison with the other algorithms such as Naive Bayes, Bagging, Boosting and Random Forest.

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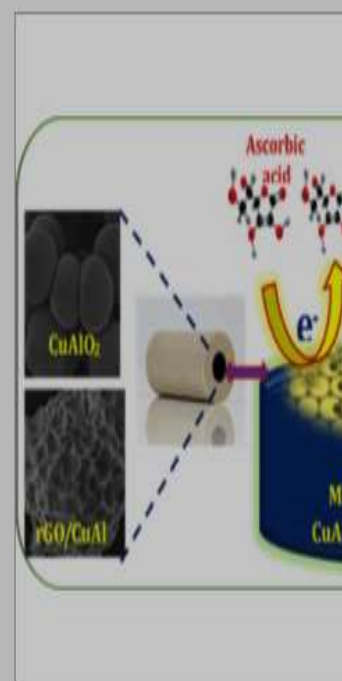Web: www.drngpasc.ac.in |Email: info@drngpasc.ac.in | Phone: +91-422-2369100

Home | Archives | Vol. 15 No. 1 (2020) | Research Articles

In vitro antiviral activity of BanLec against herpes simplex viruses type 1 and 2

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Abstract

The present study evaluates the antiviral activity of banana lectin (BanLec) against herpes simplex virus type 1 and 2 (HSV-1 and HSV-2). Lectin was isolated from the ripen pulp of bananas (Musa paradisiaca). The study showed that lectin exhibited hemagglutination activity towards human

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Biomimetic TiO$_2$-chitosan/sodium alginate blended nanocomposite scaffolds for tissue engineering applications

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ARTICLE INFO

ABSTRACT

The study is aimed to synthesize potent metal oxide based biomimetic nanocomposites to overcome the risk associated with artificial bone tissue engineering. High purity TiO$_2$ nanoparticles are synthesized via hydrothermal route. A biomimetic nanocomposite scaffolds containing chitosan-sodium alginate (4: 4) blended with three different (0.5, 1, and 1.5 wt%) concentrations of hydrothermally synthesized TiO$_2$ nanoparticles are obtained by solvent casting technique. The physico-chemical and thermal degradation properties of as-synthesized TiO$_2$ nanoparticles and their nanocomposite scaffolds are analyzed. In-vitro cytotoxicity and biocompatibility of the prepared TiO$_2$ nanoparticles and nanocomposites are tested against human bladder tumor (UC6) and osteosarcoma (MG-63) cell lines. Antibacterial property is tested against Escherichia coli and Staphylococcus aureus. These studies reveal that TiO$_2$ nanoparticles and polymeric nanocomposites contain good physico-chemical and mechanical properties for enhanced in-vitro biocompatibility suitable for biomedical applications. Biomimetically prepared chitosan-sodium alginate scaffold containing TiO$_2$ nanoparticles (1 wt%) is found to exhibit superior biocompatibility for bone tissue engineering applications.

Functional and antimicrobial properties of herbal nanocomposites from *Piper betle* plant leaves for enhanced cotton fabrics

Karthik Subramani, Balu Kolathupalayam Shanmugam, Suriyaprabha Rangaraj, Vinoth Murugan, Surendhiran Srinivasan, Oscar Komla Awitor, Chiristophe Massard, Rajendran Venkatachalam

Abstract In the current times, the application of nanoparticles in the textile industry has become increasingly high due to the possibility of having anticipated properties, such as captivating colors, superior stability, antibacterial activity, and high-end UV-protection to the fabrics. In this study, natural herbal nanoparticles of different sizes were prepared from shade-dried leaves of *Piper betle* employing ball milling technique. Going forward, structural, morphological, UV-protective, and antibacterial properties of herbal nanocomposites coated on fabrics were thoroughly analyzed and interrelated with uncoated fabrics. Herbal nanoparticles were amalgamated with chitosan to make nanocomposites and are coated on cotton fabrics with the help of the pad-dry cure method. The analysis done to study physical properties of the coated fabrics, such as air permeability, crease recovery angle, tensile strength, tearing strength, thickness, and bursting strength, explicitly showed that coated fabrics have better functional properties as compared to uncoated fabrics. Along the same lines, herbal nanoparticles reflected good antibacterial and UV-absorption properties as compared to uncoated and chitosan-coated fabrics. Comprehension of functional properties revealed that herbal nanoparticle-coated fabrics highlights the potential applications of *Piper betle* nanoparticles in protective clothing.

Keywords *Piper betle*, Herbal nanoparticles, Nanocomposite, UV-protection, Chitosan, Antibacterial activity

Introduction

Nanoparticles play a critical yet unique role in an array of fields due to their unmatched properties and applications.[1] A textile is an impeccable growth medium for microbial growth as it is rich in organic compounds that are appropriate for biofilm formation and sweat absorption. This, in turn, is responsible for providing moisture conditions and causing infections to humans.[2–4] Commonly, *Staphylococcus aureus* (*S. aureus*) and *Staphylococcus epidermidis* (*S. epidermidis*) lead to skin infections like boils, impetigo and cellulitis, and furuncle.[5,6] In a textile, microorganisms bring about negative effects such as dreadful odor,

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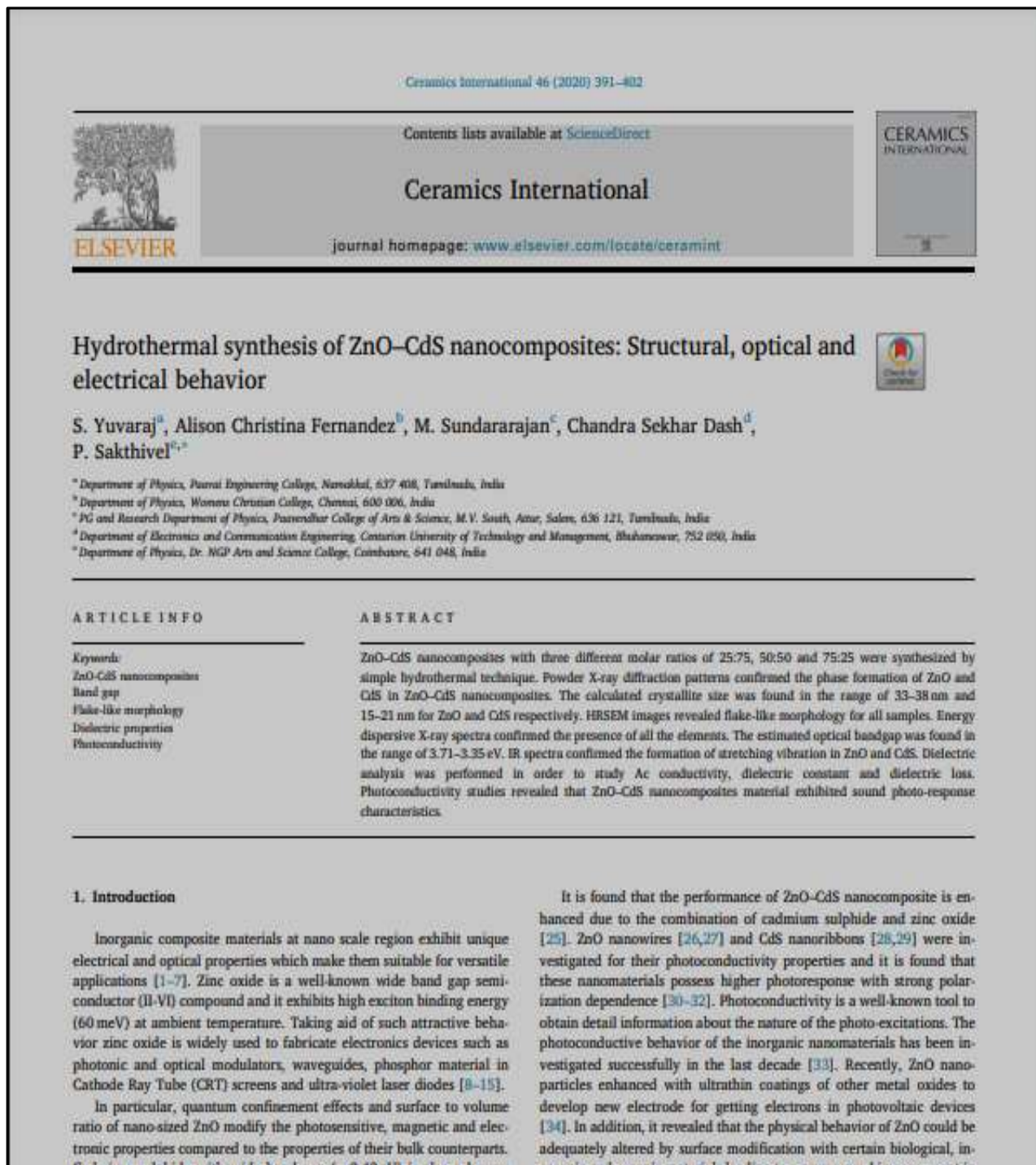
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Hydrothermal synthesis of ZnO–CdS nanocomposites: Structural, optical and electrical behavior

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ABSTRACT

ZnO-CdS nanocomposites with three different molar ratios of 25:75, 50:50 and 75:25 were synthesized by simple hydrothermal technique. Powder X-ray diffraction patterns confirmed the phase formation of ZnO and CdS in ZnO-CdS nanocomposites. The calculated crystallite size was found in the range of 33–38 nm and 15–21 nm for ZnO and CdS respectively. HRSEM images revealed flake-like morphology for all samples. Energy dispersive X-ray spectra confirmed the presence of all the elements. The estimated optical bandgap was found in the range of 3.71–3.35 eV. IR spectra confirmed the formation of stretching vibration in ZnO and CdS. Dielectric analysis was performed in order to study Ac conductivity, dielectric constant and dielectric loss. Photoconductivity studies revealed that ZnO-CdS nanocomposites material exhibited sound photo-response characteristics.

1. Introduction

Inorganic composite materials at nano scale region exhibit unique electrical and optical properties which make them suitable for versatile applications [1–7]. Zinc oxide is a well-known wide band gap semiconductor (II-VI) compound and it exhibits high exciton binding energy (60 meV) at ambient temperature. Taking aid of such attractive behavior zinc oxide is widely used to fabricate electronics devices such as photonic and optical modulators, waveguides, phosphor material in Cathode Ray Tube (CRT) screens and ultra-violet laser diodes [8–15].

In particular, quantum confinement effects and surface to volume ratio of nano-sized ZnO modify the photosensitive, magnetic and electronic properties compared to the properties of their bulk counterparts. Cadmium sulphide with wide band gap (~ 2.42 eV) is also a known

It is found that the performance of ZnO–CdS nanocomposite is enhanced due to the combination of cadmium sulphide and zinc oxide [25]. ZnO nanowires [26,27] and CdS nanoribbons [28,29] were investigated for their photoconductivity properties and it is found that these nanomaterials possess higher photoresponse with strong polarization dependence [30–32]. Photoconductivity is a well-known tool to obtain detail information about the nature of the photo-excitations. The photoconductive behavior of the inorganic nanomaterials has been investigated successfully in the last decade [33]. Recently, ZnO nanoparticles enhanced with ultrathin coatings of other metal oxides to develop new electrode for getting electrons in photovoltaic devices [34]. In addition, it revealed that the physical behavior of ZnO could be adequately altered by surface modification with certain biological, inorganic and organic materials leading to a pronounced improvement in

ORIGINAL PAPER

Comparison of Eosin yellowish dye–sensitized and CdS-sensitized TiO$_2$ nanomaterial–based solid-state solar cells

S. S. Kanmani[1] · N. Rajamanickam[2,3] · K. Ramachandran[3]

Abstract

In the present work, Eosin yellowish (EY) dye–sensitized and CdS-sensitized TiO$_2$ photoanodes prepared by doctor blade technique, for dye (DSSC)- and semiconductor-sensitized solar cell (SSSC) by engaging different forms of solid-state electrolyte. To begin with, the TiO$_2$ and CdS/TiO$_2$ nanomaterials are synthesized by the solvothermal method and the changing of physical properties is examined from structural, optical, morphological, and chemical composition measurements. The formation of anatase tetragonal phase TiO$_2$ and hexagonal phase CdS are investigated from XRD. UV-vis and photoluminescence studies expose that the nanomaterials loaded with different amounts of CdS on TiO$_2$ extend the absorption wavelength region from ultraviolet to visible. The photovoltaic performances of pure and CdS-added TiO$_2$ nanoparticle have studied by current-voltage measurement and impedance spectral response. We have achieved the highest solar conversion efficiency of 2.89% with the aid of the CdS-sensitized TiO$_2$ photoanode. CdS-sensitized TiO$_2$ photoanode shows good stability as inferred from transient photocurrent and photovoltage measurements. Overall investigation describes that the inclusion of CdS into the TiO$_2$ photoanodes gradually increase efficiency and stability.

Keywords TiO$_2$ · Nanoparticles · CdS sensitizer · Solid-state electrolyte · Impedance spectra

Introduction

Nowadays, nanomaterials and its various forms of nanostructures have attracted great attention as fundamental building blocks for the development of next-generation solar energy devices and those have high performance with novel functionalities such as flexibility and mobility [1]. The solar conversion efficiency of wide bandgap semiconductors is not enough to satisfy social needs since only 3% of solar light lies in the ultraviolet range. Many research groups have made considerable efforts to extend the solar conversion response up to visible region from UV by using organic dyes and narrow bandgap semiconductors as a sensitizer.

Already different types of dye-sensitized solar cells (DSSC) have been worked out by employing various forms of photoanodes like TiO$_2$ and ZnO nanostructures, making a composite of TiO$_2$ with ZnO and doping with different periodic elements like Ti, Sn, Mg, Zn, and also with various dyes (Ru N719, N3, eosin yellowish (EY), etc.) [2]. Along with new features and progress remarks made for last few decades in the area of DSSC and bulk heterojunction polymer solar cell using organic chromophores like dyes and polymers, respectively, called semiconductor-sensitized solar cells (SSSC) have attracted greater attention due to its superior visible light

✉ S. S. Kanmani

Extremely-randomized-tree-based Prediction of N⁶-Methyladenosine Sites in *Saccharomyces cerevisiae*

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Abstract: *Introduction:* N⁶-methyladenosine (m6A) is one of the most common post-transcriptional modifications in RNA, which has been related to several biological processes. The accurate prediction of m6A sites from RNA sequences is one of the challenging tasks in computational biology. Several computational methods utilizing machine-learning algorithms have been proposed that accelerate *in silico* screening of m6A sites, thereby drastically reducing the experimental time and labor costs involved.

Methodology: In this study, we proposed a novel computational predictor termed ERT-m6Apred, for the accurate prediction of m6A sites. To identify the feature encodings with more discriminative capability, we applied a two-step feature selection technique on seven different feature encodings and identified the corresponding optimal feature set.

Results: Subsequently, performance comparison of the corresponding optimal feature set-based extremely randomized tree model revealed that Pseudo k-tuple composition encoding, which includes 14 physicochemical properties significantly outperformed other encodings. Moreover, ERT-m6Apred achieved an accuracy of 78.84% during cross-validation analysis, which is comparatively better than recently reported predictors.

Conclusion: In summary, ERT-m6Apred predicts *Saccharomyces cerevisiae* m6A sites with higher accuracy, thus facilitating biological hypothesis generation and experimental validations.

Keywords: Extremely randomized tree, feature optimization, N⁶-methyladenosine sites, cross-validation, RNA sequences, *Saccharomyces cerevisiae*.

1. INTRODUCTION

Post-transcriptional modifications in RNA are the variations that occur on a newly transcribed primary RNA transcript. To date, approximately 150 kinds of RNA modifications have been determined [1, 2]. The most abundant RNA modification is N⁶-methyladenosine (m6A), which is prevalent among viruses, plants, insects, mammals, and eukaryotes such as yeast [3-7]. m6A denotes the methylation at N-6 position of adenosine nucleotide catalyzed by a methyltransferase complex and this reaction is reversible by demethylases (ALKBH5 and FTO). m6A modification has been involved in a series of biological processes, such as mRNA exporting, nascent mRNA synthesis, splicing events, nuclear translation, and translocation [8-10]. Importantly, unusual modifications of m6A have been associated with several diseases, including prostate cancer, thyroid tumor, leukemia, etc. [11-13]. Therefore, accurate identification of m6A modification sites would be of great benefit for cell biologists to better understand the disease mechanism.

Several experimental approaches, including high performance liquid chromatography [14], next-generation sequencing technologies [15, 16], and two-dimensional thin layer chromatography [17] have been widely applied in the identification of m6A sites. Particularly, next-generation sequencing is not available for large-scale genomic sequences' m6A identification. Overall, these experimental approaches are time-consuming and cost-ineffective, when applied on large-scale genome analysis. Therefore, the development of an accurate and efficient computational method for m6A identification is necessary to complement experimental approaches.

Previous decade has witnessed tremendous growth in the development of various machine-learning (ML)-based methods to predict m6A sites from RNA sequences in different species, such as *Homo sapiens*, *Saccharomyces cerevisiae*, *Mus musculus*, and *Arabidopsis thaliana*. In this study, we focused on *S. cerevisiae* because it has been widely recognized as an attractive model organism. To date, 14 prediction models have been developed for this species to predict m6A sites. Chen *et al.*, [18] proposed the first predictor, where they constructed a reliable benchmark dataset of 1307 posi-

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Review Article

Till 2018: a survey of biomolecular sequences in genus *Panax*

Vinothini Boopathi [1], Sathiyamoorthy Subramaniyam [2,3], Ramya Mathiyalagan [1], Deok-Chun Yang [1,2,*]

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ARTICLE INFO

ABSTRACT

Ginseng is popularly known to be the king of ancient medicines and is used widely in most of the traditional medicinal compositions due to its various pharmaceutical properties. Numerous studies are being focused on this plant's curative effects to discover their potential health benefits in most human diseases, including cancer— the most life-threatening disease worldwide. Modern pharmacological research has focused mainly on ginsenosides, the major bioactive compounds of ginseng, because of their multiple therapeutic applications. Various issues on ginseng plant development, physiological processes, and agricultural issues have also been studied widely through state-of-the-art, high-throughput sequencing technologies. Since the beginning of the 21st century, the number of publications on ginseng has rapidly increased, with a recent count of more than 6,000 articles and reviews focusing notably on ginseng. Owing to the implementation of various technologies and continuous efforts, the ginseng plant genomes have been decoded effectively in recent years. Therefore, this review focuses mainly on the cellular biomolecular sequences in ginseng plants from the perspective of the central molecular dogma, with an emphasis on genomes, transcriptomes, and proteomes, together with a few other related studies.
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1. Introduction

Decoding the genetics of medicinal plants is significant in understanding their phytochemical constituents with the trace of characterized enzymes in their genome, and the knowledge acquired from each plant is greatly benefiting the pharmaceutical industries in standardizing the development of natural drugs. So far, the knowledge obtained from the history of traditional medicine has taught the importance of medicinal plants and how they are useful in protecting the health of humans from various disorders [1]. Additionally, the current science is continuously

phytochemicals. For example, the "gene-to-metabolite" concepts have been successfully applied in *Arabidopsis thaliana* to characterize its flavonoids and also in other plants to characterize their secondary metabolites [4,5]. This field of study is becoming extensively acceptable as a proof-of-concept to annotate the array of novel phytochemicals and their biosynthesis mechanisms through derived and multitested hypotheses [5]. The "gene-to-metabolite" concept is more familiar among model plants, as they consist of enormous data sets in comparison to nonmodel plants, such as crops and medicinal plants. To produce similar data structure in nonmodel plants, a theoretical framework that was used to

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REVIEW

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Insulinoma-associated protein 1 (INSM1): a potential biomarker and therapeutic target for neuroendocrine tumors

B. Mahalakshmi[1] · Rathinasamy Baskaran[2] · M. Shanmugavadivu[3] · Ngoc Tuan Nguyen[4] ·
Bharath Kumar Velmurugan[5]

Abstract

Background Insulinoma-associated protein 1 (INSM1), a transcriptional regulator with a zinc-finger DNA-binding domain, has been validated as a cytoplasmic marker for neuroendocrine differentiation of tumor cells. Next to its abundant expression in the fetal pancreas, it is expressed in brain tumors, pheochromocytomas, medullary thyroid carcinomas, insulinomas and pituitary and small-cell lung carcinomas. INSM1 is not expressed in normal adult tissues and/or most non-neuroendocrine tumors. It regulates various downstream signaling pathways, including the Sonic Hedgehog, PI3K/AKT, MEK/ERK1/2, ADK, p53, Wnt, histone acetylation, LSD1, cyclin D1, Ascl1 and N-Myc pathways. Although INSM1 appears to be a subtle and specific biomarker for neuroendocrine tumors, its role in tumor development has remained unclear.

Conclusions Here, we highlight INSM1 expression, as well as its diagnostic significance and use as a therapeutic target in various neuroendocrine tumors. Targeting signaling pathways or gene expression alterations associated with INSM1 expression may be instrumental for the design of novel therapeutic strategies for neuroendocrine tumors.

Keywords Neuroendocrine tumor · Insulinoma-associated protein 1 · Tumor marker · Chromogranin A · Synaptophysin 1

1 Introduction

Neuroendocrine tumors (NETs) are epithelial neoplasms exhibiting neuroendocrine differentiation characteristics. Immunohistochemical markers are used to diagnostically evaluate these tumors [1]. As such, the transcription factor insulinoma-associated protein 1 (INSM1) is of relevance. Previously, Goto et al. constructed a human insulinoma cDNA library (ISL-153) and, by screening this library, identified a novel insulinoma-associated cDNA, i.e., insulin-associated antigen-1 (IA-1), which is now known as insulin-associated protein 1 (INSM1) [2]. The *INSM1* gene encodes a