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A spatial, temporal and sentiment based framework for indexing and clustering in twitter blogosphere

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Abstract

As the number of social networks users has increased day by day so has the user's dependency for communication on the social networks. Social networks enable people to connect with one another in many different ways. Many social networks such as Twitter provide their users the functionality to tag the user's current location to the post. This geographical information can be used in various information retrieval processes. Currently many methods are present which cluster the tweets using traditional K-means algorithm in which user has to specify the number of clusters to be formed, and if the tweets do not lie within those clusters they are then treated as outliers and discarded. This paper presents a framework which focuses on clustering and indexing of tweets on the basis of its geographical and temporal features. The X-means clustering has been used which does not require the cluster number input from the user but rather it takes input from the index of the specified characteristics created from tweets. The indexing mechanism will not only help in ease of searching but will also aid in many retrieval tasks. The experimental analysis shows that the proposed framework generates improved results over traditional tweet clustering methods.

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An adaptive energy balanced and energy efficient approach for data gathering in wireless sensor networks

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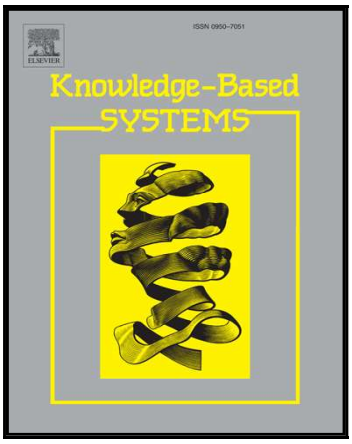
Abstract

Energy efficiency and energy balancing are the most stringent needs of wireless sensor network for prolonging its lifetime. As direct transmissions are costly, multi-hop approach is often used to collect the data of the nodes at the sink. However, many-to-one communication pattern in multi-hop communication may result in an unbalanced energy consumption in the network. Nodes closer to the sink deplete their energy at a faster rate than nodes that are further away. Mixed transmission approach, where each node trades-off between the cheaper hop-by-hop transmission and costlier direct transmission, is a good solution for balancing energy consumption. This paper proposes a receiver contention based mixed transmission scheme for energy balancing. In addition to distance and residual energy of the receivers, it also considers the link reliability and the number of neighboring nodes, in setting of the timer that will determine the relay node selection. The proposed approach gives more efficient and effective energy balanced data transmission as compared with the other works proposed in the literature. Its performance is evaluated and presented both analytically and through simulations, and the analytical estimations are validated by the simulation results. The simulation results show a significant improvement over the other closely related approaches.



A novel Fuzzy-PSO term weighting Automatic Query Expansion approach using combined semantic filtering

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Hybrid tracking model and GSLM based neural network for crowd behavior recognition

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Abstract: Crowd behaviors analysis is the 'state of art' research topic in the field of computer vision which provides applications in video surveillance to crowd safety, event detection, security, etc. Literature presents some of the works related to crowd behavior detection and analysis. In crowd behavior detection, varying density of crowds and motion patterns appears to be complex occlusions for the researchers. This work presents a novel crowd behavior detection system to improve these restrictions. The proposed crowd behavior detection system is developed using hybrid tracking model and integrated features enabled neural network. The object movement and activity in the proposed crowded behavior detection system is assessed using proposed GSLM-based neural network. GSLM based neural network is developed by integrating the gravitational search algorithm with LM algorithm of the neural network to increase the learning process of the network. The performance of the proposed crowd behavior detection system is validated over five different videos and analyzed using accuracy. The experimentation results in the crowd behavior detection with a maximum accuracy of 93% which proves the efficacy of the proposed system in video surveillance with security concerns.

Key words: crowd video; crowd behavior; tracking; recognition; neural network; gravitational search algorithm

1 Introduction

In the field of computer vision, intelligent video surveillance is one of the 'state of art' research areas because of the sensitive security concerns. Many research topics are available in intelligent video surveillance despite the fact that tracking and behavior analysis from the crowded video are considered significant problem because of a number of applications comprising of behavior modeling, traffic control, event monitoring and security applications [1−4]. However, tracking and behavior detection in dense crowd is challenging [5, 6]. This is because in crowd large number of objects is close with each other, which makes it tough to establish correspondences across frames. In recent years, a number of security agencies focused in dense crowd management have emerged to respond to the need.

Attention over the automatic crowd beachgoer detection system comes across the research community because of abnormal crowd behavior in public events [7]. Crow behavior analysis is majorly performed in two tasks: 1) Motion information extraction and 2) abnormal behavior modeling. Motion information extraction is centered to crowd tracking which is the process used to estimate the speed, direction and location of crowd in a video sequence. The latter task abnormal behavior modeling is used to detect the anomalous events [8].

Conversely, the abnormal behavior modeling is vulnerable by general difficulties of the anomaly detection problem [9]. The basic restriction is the lack of universal definition of anomaly. Another constraint is infeasibility to enumerate the set of anomalies that are present in a given surveillance scenario [10]. The anomaly count is impossible to achieve because of the sparseness, rarity, and discontinuity of anomalous events which limits the number of the examples available to train an anomaly detection system. These constrictions lead the anomaly detection system an exceptionally challenging one. While this has motivated a great diversity of solutions, it is generally quite difficult to quantitatively compare different methods. Normally, these combine dissimilar representations of motion and appearance with different graphical models of normalcy, which are usually made to specific scene domains. Abnormalities are themselves defined in a somewhat subjective form, sometimes according to what the algorithms can detect. In some cases, different authors even define different anomalies on common data sets [10].

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Crowd Behavior Recognition Using Hybrid Tracking Model and Genetic algorithm Enabled Neural Network

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Abstract

In the current era, crowd behavior analysis is important topic due to the significance of video surveillance in the public area. Literature presents a handful of works for crowd behavior detection and analysis. Even though, the complicated challenges such as, low quality video, wide variation in the density of crowds and difficult motion patterns pose a complicated challenges for the researchers in crowd behavior detection. In order to alleviate these issues, we develop a crowd behavior detection system using hybrid tracking model and integrated features enabled neural network. The proposed crowd behavior detection system estimate the direction of movement of objects as well their activity using proposed GLM-based neural network. The proposed GLM-based neural network integrates the LM algorithm with genetic algorithm to improve the learning process of neural network. The performance of the proposed crowd behavior detection algorithm is validated with five different video and the performance is extensively analyzed using accuracy. From research outcome, we proved that the proposed system obtained the maximum accuracy of 95% which is higher than the existing methods taken for comparison.

Keywords: Crowd video, crowd behavior, tracking, recognition, neural network

1. Introduction

Intelligent video surveillance has been became one of thekey research area in computer vision due to heightened security concerns. Even though many research topics are available in video surveillance, tracking and behavior analysis from the crowded video are challenging problem because it has a number of applications including eventmonitoring, behavior modeling, traffic control and security applications [1-4]. In dense crowds, tracking and behavior detection is a major problem [5, 6] because the large number of object is in close which makes it difficult to establish correspondences across frames. In recent years, a number of security agencies specialized in dense crowd management have emerged to respond to the need. Especially, this problem has started to draw attention of the research community for automatic detection of abnormal crowd behaviors during public events [14]. Technically speaking, crowd behavior analysis can be divided into two tasks: (1) motion information extraction and (2) abnormal behavior modeling. The former usually amounts to crowd tracking. It is a process by which we estimate the speed, direction and location of crowd in a video sequence. Higher level models of crowd behavior can be used to detect anomalous events [15].

However, this effort is hampered by general difficulties of the anomaly detection problem [16]. One fundamental limitation is the lack of a universal definition of anomaly. For crowds, it is also infeasible to enumerate the set of anomalies that are possible in a given surveillance scenario [17]. This is compounded by the sparseness, rarity, and discontinuity of anomalous events, which limit the number of examples available to

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Forgery detection using feature-clustering in recompressed JPEG images

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Abstract JPEG images are widely used in a large range of applications. The properties of JPEG compression can be used for detection of forgery in digital images. The forgery in JPEG images requires the image to be resaved thereby, re-compression of image. Therefore, the traces of recompression can be identified in order to detect manipulation. In this paper, a method to detect forgery in JPEG image is presented and an algorithm is designed to classify the image blocks as forged or non-forged based on a particular feature present in multi-compressed JPEG images. The method performs better than the previous methods which use the probability based approach for detecting forgery in JPEG images.

Keywords Recompression · Forgery detection · JPEG images

1 Introduction

Use of digital images in the digital world has increased rapidly in the past few decades. Digital images are used in almost every aspect of life. Due to a wide variety of applications and usage, various image editing methods and software are used. The images can be edited in many ways. These editing methods result in manipulated images with no obvious traces of these operations. For the detection of these manipulations, the techniques are widely known as image forgery detection. Image forgery detection and forensics deal with detecting whether an image has been edited or manipulated in order to determine the trustworthiness of the image [3]. An example of forgery is shown in Fig. 1 where a flower is copied from an image and pasted on some other location in the same image.

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LSB based non blind predictive edge adaptive image steganography

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Abstract

Image steganography is the art of hiding secret message in grayscale or color images. Easy detection of secret message for any state-of-art image steganography can break the stego system. To prevent the breakdown of the stego system data is embedded in the selected area of an image which reduces the probability of detection. Most of the existing adaptive image steganography techniques achieve low embedding capacity. In this paper a high capacity Predictive Edge Adaptive image steganography technique is proposed where selective area of cover image is predicted using Modified Median Edge Detector (MMED) predictor to embed the binary payload (data). The cover image used to embed the payload is a grayscale image. Experimental results show that the proposed scheme achieves better embedding capacity with minimum level of distortion and higher level of security. The proposed scheme is compared with the existing image steganography schemes. Results show that the proposed scheme achieves better embedding rate with lower level of distortion. © 2016, Springer Science+Business Media New York.

Author keywords

Edge adaptive; High level bit plane; Low level bit plane; Predictive image

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Multi-view human activity recognition based on silhouette and uniform rotation invariant local binary patterns

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Abstract

This paper addresses the problem of silhouette-based human activity recognition. Most of the previous work on silhouette based human activity recognition focus on recognition from a single view and ignores the issue of view invariance. In this paper, a system framework has been presented to recognize a view invariant human activity recognition approach that uses both contour-based pose features from silhouettes and uniform rotation local binary patterns for view invariant activity representation. The framework is composed of three consecutive modules: (1) detecting and locating people by background subtraction, (2) combined scale invariant contour-based pose features from silhouettes and uniform rotation invariant local binary patterns (LBP) are extracted, and (3) finally classifying activities of people by Multiclass Support vector machine (SVM) classifier. The rotation invariant nature of uniform LBP provides view invariant recognition of multi-view human activities. We have tested our approach successfully in the indoor and outdoor environment results on four multi-view datasets namely: our own view point dataset, VideoWeb Multi-view dataset [28], i3DPost multi-view dataset [29], and WVU multi-view human action recognition dataset [30]. The

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Zero-stopping constraint-based hybrid tracking model for dynamic and high-dense crowd videos

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Save all to author list

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Abstract

Owing to the importance of video surveillance in the public area, tracking finds significant applications using computer vision algorithms to observe the activity of human. In tracking, multi-object tracking is an active research to analyse and detect the activity of anomalies in the crowded scenes. Accordingly, different multi-object tracking algorithms are proposed in the literature to track the human behaviour of the crowded scenes. In this paper, we have presented a zero-stopping criteria-based hybrid tracking algorithm for high-dense crowd videos. Here, head objects are detected using the proposed objective function which considers both colour and texture property of videos. Then, tracking based on motion is performed using the proposed HSIM measure which includes structural similarity (SSIM) and the proposed similarity function. Along with, the data prediction model, exponential weighted moving average (EWMA), is also utilised to track the spatial location of human objects. These two tracking models are then hybridised to obtain the final tracked output. The experimentation is performed with three marathon sequences and the performance is evaluated with particle filtering-based algorithm using tracking number, tracking distance and optimal subpattern assignment metric (OSPA). © 2017 The Royal Photographic Society.

Author keywords

crowd video; head object; motion estimation; object tracking; Video surveillance

Dealing with Interdependency among NFR using ISM.

- **Source:** Pertanika Journal of Science & Technology . Jul2017, Vol. 25 Issue 3, p871-889. 19p.

- **Author(s):** Kaur, H.; Sharma, A.

- **Abstract:** Non-Functional Requirements (NFRs) determine the utility and effectiveness of a framework. Due to the subjective nature and complexity of NFRs, it is quite unrealistic to concentrate on each NFR. Consequently, agreement between groups of cross-utilitarian and cross functional decision makers are important. This paper models NFRs in the form of Soft Goal Interdependency Digraph (SID). The SID is based on Interpretive Structural Modelling (ISM) method which in turn utilises MICMAC (Matrices Impacts Croise's Multiplication Appliquée a UN Classement) and AHP (Analytic Hierarchy Process) approaches for identification of critical NFRs. These objectives allow the analysts and developers to accept the best possible trade off choices among NFRs. This is discussed using a general case of cafeteria ordering framework. The proposed model contrasts well with other positioning methodologies.

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Clustering based hybrid approach for facility location problem

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A B S T R A C T

The main objective of facility location problem is the utilization of the facility by maximum number of possible customers so that the profit is maximized. For instance, in some services like wireless sensor networks, Wi-Fi, repeaters, etc., where the service area is limited, some specific equipment is installed in such a way that it could be used by maximum number of users. Here, the number of users for a particular facility is optimized with the help of clustering technique. The study develops a model for facility allocation problem. For the solution algorithm, a hybrid approach which is based on clustering and mixed integer linear programming (MILP) is proposed. The proposed method consists of two parts where in the first part, the K- means clustering technique is used and in the second part, for each cluster an MILP technique is implemented so that the facility which yields the maximum profit is obtained. Numerical examples for clustering and without clustering are presented. Analysis shows that due to clustering the average distance between facility and customer is significantly reduced.

1. Introduction

In some situations like wireless sensor networks, Wi-Fi, repeaters, signals transmission etc. the service area for a facility is limited. In other words, if the customer is in the range of a particular facility then only s/he can avail services. Another observation in day to day life is that customers generally prefer the facilities like automated telling machine (ATM), Petrol pumps, etc. which are near to them. In both the situations we can conclude that the distance between the facility and the customer plays an important role for the utilization of the facility. Thus in the installation of the facility one of the primary objectives is to keep the low distance between the customers and the facility so that the facility would be utilized by a large number of customers which resultantly increases the profit.

After going in the deep discussion with experts and published literatures of the clustering, we think that this objective can be met by using clustering techniques. By clustering we can club the customers which lie in a specific range. In the literature we have found that many authors considered clustering for FLP. Geetha et al. (2009) proposed a solution procedure for the capacitated clustering problem (CCP) by

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Test case prioritisation during web application testing

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Abstract: Owing to frequent alterations in the existing web applications, performing regression testing becomes necessary for the identification and rectification of the newly generated unwanted faults. Owing to various resource constraints, test case prioritisation is one of the strategies followed, rather than running test cases blindly. This paper proposes a novel approach towards prioritisation of test cases during regression testing of web application (dynamic website) using Bayesian network. Initially, a Bayesian network is formed using various parameters which affect the success of a test case as well as promote testing of more crucial sections of the web application. Thereafter, the conditional probability table and probabilistic inference algorithms are applied to evaluate the success probability and ultimately priority (importance) of a test case. Execution of the test cases takes place on the basis of their respective priority. The performance of proposed technique is compared with existing work, 2-opt inspired heuristic algorithm and genetic algorithm.

Keywords: test case prioritisation; Bayesian belief network; regression testing; web application testing.

Reference to this paper should be made as follows: Khanna, M., Chauhan, N., Sharma, D.K. and Toofani, A. (2017) 'Test case prioritisation during web application testing', *Int. J. Computer Applications in Technology*, Vol. 56, No. 3, pp.230–243.

Biographical notes: Munish Khanna is presently an Assistant Professor at Department of Computer Science & Engineering, Hindustan College of Science & Technology, Mathura, India. He has a teaching experience of 14 years and pursuing his PhD from YMCA University of Science & Technology, Faridabad, India. He has published papers in SCI, ESCI and Scopus indexed journals. He is member of professional technical societies like CSI and IEEE. His research interest includes algorithms, software testing, automata theory, applications of soft computing techniques in computer science.

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Mobility Adaptive Density Connected Clustering Approach in Vehicular Ad Hoc Networks

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***Abstract*:** Clustering is one of the popular topology management approaches that can positively influence the performance of networks. It plays significant role in VANETs. However, VANETs having highly mobile nodes lead to dynamic topology and hence, it is very difficult to construct stable clusters. More homogeneous environment produces more stable clusters. Homogeneous neighborhood for a vehicle is strongly driven by density and standard deviation of average relative velocity of vehicles in its communication range. So, we propose Mobility Adaptive Density Connected Clustering Algorithm (MADCCA), a density based clustering algorithm. The Cluster Heads (CHs) are selected based on the standard deviation of average relative velocity and density matrices in their neighborhood. Vehicle, which is having more homogeneous environments, will become the cluster heads and rest of the vehicles in their communication range will be the Cluster Members (CMs). The simulation results demonstrate the better performance of MADCCA over other clustering algorithms new ALM and MOBICA.

Keywords: Clustering, VANETs, Cluster Head, Cluster Member, Relative velocity.

1. Introduction

VANETs play a key role in realizing the dream of smarter planet by supporting variety of the applications like, intelligent transportation systems, roadside advertisement and online entertainment. The growth of traffic on roads can be the potential carrier for data packets. This also indicates the availability of suitable or even free of charge network between the vehicles [1-2]. VANETs have two kinds of nodes which participate in communication, one is static road side units and other is mobile vehicle as a node well equipped with all kind of necessary equipment required for navigation and communication. The communication over any VANETs can be classified into different categories like vehicle to vehicle communication (V2V), vehicle to infrastructure (V2I). V2V communication transfers the information without the help of road side unit. Vehicles use the IEEE802.11p to communicate with other vehicles and have a broadcast range of 1000 meters [3]. In case of V2V communication every vehicle is considered to have been installed with onboard sensing units, which allow large scale sensing, decision making and controlling actions to perform a number of tasks that arises in wireless communication system. In V2I Communication, vehicle uses both infrastructure as well as vehicles as packet forwarder towards to the destination.

In any network majority of decisions are based on topology information of the network. However, due to high mobility of the vehicles, the topology information is one of the challenging tasks of the networks. Clustering is one of the strategies which make global topology updates more adaptive and less complex. The clustering process brings similar kinds of objects within the same cluster. Moreover, in case of networks the clusters are generally identified based on the unique member termed as Cluster Head (CH), which facilitates and coordinates the Cluster members (CMs). Most of the clustering algorithms in VANETs are derived from those proposed for MANET. Vehicle clustering has the potential to improve the scalability of networking protocols such as for routing and medium access control protocols, the CHs can act as central coordinators that manages the access of its CMs to the wireless channel(s) [4]. However, for vehicles cluster forming and maintaining the clusters require explicit exchange of control messages. In VANETs, vehicles moving with high and variable speeds cause frequent changes in the network topology, which can significantly increase the cluster maintenance cost. Therefore, forming stable clusters that last for a long time is a major issue in clustering of VANETs. Frequent changes in the internal cluster structure consume the networks radio resources and causes service disruption for the cluster-based routing protocols. On the other hand, an external change in the cluster structure is concerned with cluster's relationship with the other clusters in the network. One metric that evaluates the external relationship of a cluster with other clusters, is the overlapping among clusters. The time variations of the distance between neighboring CHs, due to vehicle mobility, can cause the coverage ranges of the clusters to overlap. However, as the overlapping range between the two clusters increases, it may cause the merging of the two clusters into a single cluster [5,6,7]. The non-overlapped clustered structure produces the less number of clusters and reduces the design complexity, On the other hand, a highly overlapping clustered structure may, cause complexity in the channel assignment, lead to broadcast storm. Additional channel resources ought to be used to prevent inter-cluster interference due to overlapping. Many research works focused the attention on non-overlapped clustering, due to the fact that real networks are better characterized by well-defined statistics of disjoint partitions.

In this work, we propose a new clustering approach which works in non-overlapped manner, i.e. successive CHs are not under communication range of each other. This approach takes the standard deviation of average relative velocity and average of absolute density difference with respect to its neighboring, in addition to the location and direction of movement into consideration in the clustering process. The way which we are adopting, will help us to generate much more stable clusters. The grouping of the vehicles will take place based on density, and least standard deviation in average relative velocity with neighbor vehicles.

The standard deviation of the average relative velocity will be low only when all the neighbors vehicles of a vehicle are homogeneous with respect to the average relative velocity, i.e. either all are moving in the group with low speed or with high speed. While the standard deviation of the average

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Hybrid Algorithm for the Facility Location Problem based on Density based Clustering and Profit Maximization

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Abstract

The objective in the allocation of the facility depends up to the situation under consideration. For instance, in case of ATM, shopping malls, public utility services like schools, hospitals, etc. the facility is assigned, to such locations where the density of the users is more so that the facility will be utilized by as large as possible users. In such situation, the profit is at second priority as compared to utilization of facility. In this paper, we consider the same scenario and provide a hybrid algorithm for the solution of facility allocation problem. In the first-step, we use DBSCAN clustering technique, and after clustering, mixed integer linear programming technique is used in each cluster to get the best facility which will generate the maximum profit. Flowchart of the proposed algorithm and numerical example is presented.

Keywords: *Facility location, Proximity, Density, Approximation, MILP, Algorithm*

1. Introduction

The facility location problem deals with the finding of the best location among the available one, which fulfills the objectives under consideration. The objective of the facility location problem depends upon the situation for example if we want to install a business outlet then the main objective will be the profit, on the other hand, if we want to install a medical facility then the main objective will be the utilization of the facility by as much as possible beneficiary. Similarly, bank ATM is also generally installed in a densely populated area. In such situations, generally the density-based clustering algorithms are used in order to get the information that which area contains the dense population. After getting the information about density, a facility is installed and if more than one option for opening the facilities are available then the preference will be given to those locations which will provide the maximum profit. For the density-based clustering, DBSCAN is one of the well-known clustering techniques, which is very much used by researchers.

In real-life applications, DBSCAN are used in many areas for instance [1] proposes a modification of DBSCAN clustering algorithm for identifying traffic accident-prone locations. [2] apply an ontological approach to the DBSCAN algorithm in the form of knowledge representation for constraint clustering. [3] applied two clustering techniques, k-means and DBSCAN, to an annotated Twitter dataset in order to evaluate the use of clustering for detecting different types of sentiment. They find that the results are very encouraging for DBSCAN as compared to k-means [4] proposed a modified generalized density-based clustering algorithm to deal with fuzziness in the values describing the population demographics which can be used for ATM location.

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Position Based Density Conscious Routing Protocol in Vehicular Ad Hoc Networks

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Abstract

Vehicular ad hoc networks (VANETs) have high mobility of vehicles resulting in frequent disconnections in routes. Geographic routing protocols are commonly preferred in VANETs as they do not require, route formation prior to forward the data packets as well as route maintenance. Most of the position based routing protocols adopt the greedy mode to establish the route and switch to some recovery mechanism like perimeter routing, in case of failure. Due to high mobility characteristic, selection of next forwarder based on greedy approach basically affects the performance of the routing protocols. At the same time neighborhood density of a vehicle play significant role for the selection of next forwarder toward to the direction of destination. In this paper, we propose a routing strategy that uses the restricted greedy forwarding to select next best fit forwarder, which will reduce the frequency of switching to recovery mode. Vehicle seeking the next forwarder will consider neighborhood vehicles having a sufficiently dense neighborhood and the vehicle out of these considered set having the least standard deviation of average relative velocity with its own neighboring vehicles will be selected as the next forwarder. The objective is to increase the longevity of the route and thus increasing the throughput without greatly affecting the end to end delay. The performance of the proposed approach is compared with E-GyTAR and GPSR, and the simulation results are presented for both highways as well as city scenarios.

Keywords: *Best fit forwarder; VANETs; Restricted Greedy Forwarder*

1. Introduction

Vehicular Ad hoc Networks (VANETs) play key role in realizing intelligent transportation systems. These networks also have tremendous potential in applications targeting road safety, acquisition of current traffic and weather information, sharing of multimedia information etc. The communication over VANETs can be broadly classified into two different categories like Vehicle to Vehicle communication (V2V), Vehicle to infrastructure (V2I). In V2V communications, vehicles transfer information among themselves, without the help of road side units. However, in the V2I communications, the road side units also become a part of, and actively participate in the VANETs. In case of V2V communication every vehicle is considered to have been installed with various onboard sensing units, which allow large scale sensing, decision making and controlling actions to perform a number of tasks that arises in wireless communication system. The wireless communication system in VANETs adopts certain technology from IEEE802.11 with some modification like IEEE 802.11p. United States, Federal Communications Commission (FCC) has allotted 75 MHz of licensed spectrum from 5.85 GHz to 5.925GHz for Intelligent Transport Systems (ITS). The allocated band support seven channels each of 10 MHz. Moreover, the wireless communication system for VANETs (V2V) can provide a broadcast range between 200 to 1000 meters [8]. Most of the

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Self-Adaptive Ontology based Focused Crawler for Social Bookmarking Sites

Aamir Khan (GLA University, Mathura, India) and Dilip Kumar Sharma (GLA University Mathura, India)

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Abstract

It is not possible for one person to explore or surf all the relevant websites pre-training to his/her topic. A user might not be able to get the results that he/she expects from the search engine but another user might have some knowledge about some website containing the information about the first user's topical query. Users share their information on a common sharing platform known as SBS (Social Bookmarking Sites). In SBS a user posts a question seeking some knowledge about a certain topic, and then the people who have some knowledge about any website related to the query topic post the URLs of the website. This paper presents a novel method to verify the authenticity and validity of the URL posted in the SBS. The performance of our method is further increased by using a dictionary based learning methodology that finds the contextually similar words that are added to the Ontology.

Introduction

Scopus

Documents

Pandey, B.P.

Electronic and transmission properties of low buckled gaas armchair nanoribbons

(2017) *Journal of Surface Science and Technology*, 33 (3-4), pp. 91-95. Cited 2 times.

Abstract
The electronic and transmission properties of N atom width (N: 4, 8, 12, 16)low-buckled (LB) armchair GaAs hydrogen (H) passivated nanoribbons (NA GaAs NRs) are studied with the help of first-principle theory. In low buckled armchair GaAs nanoribbon, quantum confinement effect is observed due to which all of the investigated NA GaAs NRs with H passivated are found to be semiconducting. The fundamental direct band gap at k-point ? (gamma) have been calculated, which exhibit interesting width dependent (N: 4∼16) behaviour of bandgap. The H passivated edge of NA GaAs NRs with different width of nanoribbons provides great flexibility to modulate fundamental bandgap. The transmission coefficient is calculated from which thermal conductance has been calculated for all width of GaAs armchair nanoribbon. © 2017, Informatics Publishing Limited & Indian Society for Surface Science and Technology. All rights reserved.

Author Keywords
Armchair; Bandgap; Conductance; DFT; MGGA; Nanoribbon (NR); Transmission coefficient

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Documents

Shukla, A., Deolia, V.K.

Performance analysis of modified tent map interleaver in IDMA systems
(2017) *Journal of Electrical Engineering*, 68 (4), pp. 318-321. Cited 7 times.

Abstract
In the last years, Interleave Division Multiple Access (IDMA) has been presented as a potential alternate of Code Division Multiple Access (CDMA) system. In IDMA systems, the interleavers are used to separate the users of the system in multiple access environments. Random interleaver is popular and basic taxonomy, which scrambles information bits of craving users with different patterns. However the indispensable characteristics of a random interleaver such as bandwidth requirement, computational complexity, and memory restraint at both transmitter and receiver end is uttermost. Further, it has also been observed that the study of role of chaos in interleaver design is very limited in literature. Hence, in this paper, a low complexity chaos based interleaver named as modified Tent map interleaver is designed for further performance improvement of IDMA system and the characteristic parameters are compared with the random interleaver. The IDMA system model uses a BPSK modulation and repetition coder with a code rate of 1/2. The system is simulated in MATLAB and results show that the better BER performance without the need of extra memory resources. © 2017 F EI STU.

Author Keywords
Chaos; Computational complexity; IDMA; Random interleaver; Tent map

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A Fast Computational Interleaver Design for Iterative IDMA Scheme Based on Tent Map and Chaos

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Abstract

Interleave Division Multiple Access (IDMA henceforth) with iterative multi user detector (MUD) is the special case of CDMA and a suitable candidate for future communication requirements. IDMA uses low rate coding for spreading and interleavers for users separation. The random interleaver is the fundamental anatomy in the IDMA system and also related to the system throughput. However indispensable characteristics of random interleavers, such as computational complexity, memory requirement and bit error rate analysis are the crucial performance parameters. Further it has also been observed that, the interleaver design based on chaos theory is presented only in limited volume of research papers. In this paper, a fast computational chaotic Tent map based interleaving scheme is proposed for further performance improvement of IDMA scheme. Improved version of Tent map has also been utilized in the generation of interleaver, which make IDMA system more suitable for secure communication. The IDMA system is simulated in MATLAB. BPSK modulation and repletion coder of rate R_r is used for the purpose to find simulation results to verify that modified Tent map based IDMA is efficient and gives better bit error rate performance without the need of extra memory resources and offers less computational complexity than existing prevailing models in the domain.

Keywords: *IDMA, chaos theory, Tent map based interleaver, Logistic map, CDMA*

1. Introduction

Multiple access schemes are required to fulfill the needs of communication in the multi-user environment. Code division multiple access (CDMA) can be considered as a suitable and popular for 3G and future communication requirements. In this scheme, all the users are separated on the basis of spreading codes and share the whole spectrum simultaneously. CDMA was deployed in many countries for 2G and 3G services and it was found suitable too. But later, multiple access interference (MAI) and Intersymbol Interference (ISI) were aroused as a major concern [1-3]. To mitigate the concerns and for performance improvement of CDMA, the mixing of spreading and coding is being suggested. The entire bandwidth is devoted to the coding and interleavers are dedicated to distinguish the users. So, the use of interleavers enhances the system throughput in multi-user environment and the bursty channel appears like random error channel. The interleaver based multiple access is popularly named as Interleave division multiple access [4-7].

Many popular interleaver designs are available in the literature and the researchers in the past had given proper attention to the design of an efficient interleaver matrix. Orthogonal Interleaver (OI), Pseudo-random interleaver, Tree based Interleaver (TBI), Helical Interleaver, Nested Interleaver, Shifting Interleaver, Deterministic Interleavers are

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Non-invasive techniques for the screening of diabetic retinopathy.

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Abstract

Health presents a great challenge for all nations. Improving the health of a nation's citizens can directly affect the economic growth. Even developed countries, where government spend huge amount of money for establishing medical care units, are found more or less in the custody of various hazardous diseases. Similarly, developing countries particularly like India is facing widespread occurrence of non-communicable disease such as diabetes. Almost 60 million people are diabetic in India. According to the International Diabetes Federation (IDF), diabetes took 0.9 million deaths in 2015 in comparison to other non-communicable diseases. In order to combat the situation, healthy diet plan and physical activity followed by regular check- ups are required to prevent and control diabetes. If not, then the raised blood glucose concentration which is the main cause of diabetes imposes a severe damage to nerves and blood vessels. Among its effects, Diabetic Retinopathy (DR) is the common complication among 10-20% of diabetic subjects. An intervention of Computer Aided Design (CAD) and computer vision technique opens new dimension for medical practitioners in the diagnosis of various abnormalities. The main objective of this literature is to be acquainted with non-invasive methods or procedures for the determination of blood glucose level and screening of DR. Emphasis has been put on mentioning experimental data, applied methodology, clinical applications, and shortcomings.

Keywords Burden of diabetes, CAD, Glucose, Non-invasive glucose monitoring, Retinopathy.

Accepted on August 30, 2017

Introduction

Earlier, determining the health status of a person was the prime most challenge before medical experts. In 1940, first blood test was invented for the diagnosis of anaemia. This is one kind of invasive method which is more prevalent nowadays. There are some consequences of it like the subject experiences pain, faces trauma and sense the fear of other type of complications too. Also one has to wait for 2-3 days or 1 week in some cases for the out-coming of diagnosis report. Beside various effects, this method is widely accepted as gold standard method and considered as a reference for validation of several non-invasive diagnostic techniques. However, whether it is the matter of inaccessible complex organs or some common medical conditions like high/low glucose level, blood pressure, jaundice etc almost all medical centers were facing the scarcity of fast, accurate and non-invasive devices.

Non-invasive medical procedure neither requires exploratory surgery nor requires any kind of incision. Numerous impressive non-invasive devices are available in the market. Some of them are already used by physicians generally such as stethoscope (for listening of heart and breath sounds), thermometers (for body temperature examination), sphygmomanometer (for measuring blood pressure) etc. Beside these, many hand held devices like sensor based smart watch and smartphone that are easy to use are also available, so that a person gets health status in a fraction of second.

In recent years, there has been a tremendous research in the field of design and development of Computer Aided Diagnostic (CAD) tools. These tools work on the basis of several imaging modalities such as X-Ray, Magnetic Resonance Imaging (MRI), Computerized Tomography (CT) scan, ultrasound, optical imaging etc. The nightmare of diabetes coerced the inventors and researchers for continuously developing techniques, algorithms, experimental set-ups for the determination of blood glucose level. Through this, severity can be prevented by the timely screening of various disorders such as atherosclerosis, peripheral neuropathy, foot problems, cataract, glaucoma etc caused due to diabetes. Early detection of DR through computer vision has already achieved higher accuracy. This involves pattern recognition, classification and analysis of fundus retinal images.

This literature has been organized into four sections. Section II discusses few commercially available non-invasive devices for the monitoring of blood glucose elevation, blood pressure and bilirubin concentration. Section III focuses on several CAD tools for the determination of blood glucose level. Section IV describes the methods available for the early detection of most occurring effect of diabetes i.e. DR through computer vision.

Non-invasive devices/gadgets for the monitoring of common medical conditions

Several glucose monitoring devices are available in the market. Dexcom G5 Continuous Glucose Monitoring System (CGM) manufactured by Dexcom Inc as shown in Figure 1a and active blood glucose meter manufactured by Accu-Chek as is shown in Figure 1b are in vogue currently. These devices help us to monitor and track glucose level continuously and remotely. Doctors also adjust the therapy for the subject according to the

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Performance Evaluation of Spectrum Sensing Techniques in Cognitive Radio Network

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Abstract: *Cognitive radio (CR) is a promising technique that offers a solution to the spectrum scarcity problem by dynamically exploiting the underutilization of the spectrum among the bands. There are numerous procedures to detect spectrum using CRs like energy detection (ED), matched filter detection (MFD), cyclostationary feature detection (CFD), waveform based detection (WBD) and so on. In this paper, the most popular techniques i.e. ED, MFD and CFD and their comparative analysis are discussed. Investigation is done by discussing theoretical aspect of the spectrum sensing techniques that are based on primary transmitter detection and receiver operating characteristics (ROC) of "Energy based detection", "Matched filter detection" and "Cyclostationary feature detection" in AWGN and we also validate ROC at different SNRs and* evaluated for their detection performance. This analysis shows that CFD shows better results among the three *techniques as discussed.*

Keywords: *Cognitive Radio; Energy detection; Matched filter detection, Cyclostationary feature detection.*

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I. Introduction

Cognitive radio (CR) is a cutting edge technology for wireless communications and requires the design of novel spectrum sensing schemes which have a high degree of reliability, even at low SNR [1]. The CR paradigm allows a set of unlicensed or secondary users to opportunistically access unused spectrum bands licensed to primary users, thus radically improving the efficiency of spectrum usage. These systems can powerfully distribute range to numerous clients, subsequently facilitating system congestion.CR innovation permits unlicensed users, also called cognitive users (CUs), to misuse the spectrum vacancies whenever with no or constrained additional impedance at the licensed users. Typically, cognitive radios make arranges with a specific end goal to better recognize spectrum sensing, maintain a strategic distance from resultant impedance, and thusly, amplify their revenues [2]. One of the primary difficulties in cognitive radio systems is the high vitality utilization, which may restrain their execution particularly in battery-controlled terminals. In spectrum sensing, a CU detects the spectrum with a specific end goal to distinguish the movement of the authorized users.

II. Spectrum Sensing In Cognitive Radio

Spectrum sensing is a radio process for determining whether a signal is present across a specified RF bandwidth. It is the capacity to gauge, sense and know about the parameters identified with the radio channel qualities, accessibility of range and transmit power, obstruction and clamor, radio's working condition [3]. This process has many applications and usages, including dynamic spectrum access networks, which are designed to maximize spectrum efficiency and capacity within congested wireless transmission environments. Dynamic spectrum access temporarily utilizes spectral white spaces in order to transmit data means that if a licensed (primary) user is allocated a predetermined frequency to operate on, an unlicensed (secondary) user can temporarily "borrow" the unoccupied spectrum for transmission. In a system consisting of many primary users and secondary users, the secondary users need to be able to jump into and utilize the unused spectrum of the primary users as it becomes available [4,5]. In order to accomplish this action, spectrum sensing techniques are employed to avoid spectral collisions. Practically speaking, the unlicensed clients, likewise called secondary users (SUs), need to ceaselessly screen the exercises of the authorized users, additionally called Primary Users (PUs), to discover the spectrum holes (SHs), which is characterized as the spectrum bands that can be utilized by the SUs without meddling with the PUs. This procedure is called spectrum sensing [10,11].

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LEAKAGE POWER REDUCTION IN DEEP SUB MICRON SRAM DESIGN - A REVIEW

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ABSTRACT

Present day electronic industry faces the major problem of standby leakage current, as the processor speed increases, there is requirement of high speed cache memory. SRAM being mainly used for cache memory design, several low power techniques are being used for SRAM cell design. Full CMOS 6T SRAM cell is the most preferred choice for digital circuits. This paper reviews various leakage power techniques used in 6T SRAM cell and their comparative study.

Key words: CMOS; SRAM; SNM; DRV.

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1. INTRODUCTION

Power consumption particularly off-state leakage current is the major technical problem being faced by present day electronic industry. As the chip densities increase to a billion of transistors or more, power is the major limiter of design performance or integration. According to International Technology Roadmap for Semiconductors (ITRS) projections, the number of transistors per chip and the local clock frequencies for high- performance microprocessors will continue to grow exponentially in next 10 years too. As the speed of microprocessor based electronic equipment increases, there is requirement of large quantity of data at very high speed which is difficult accomplish. This has led to design of cache memory as major concern. Mostly SRAM is used for cache memory design and full CMOS 6T SRAM cell is preferred choice mostly. Static (or leakage) power affects all kinds of Complementary Metal Oxide Semiconductor (CMOS) circuits but is particularly critical for Static Random Access Memories (SRAMs) since memories have been designed as performance being the

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PERFORMANCE IMPROVEMENT OF IDMA SCHEME USING CHAOTIC MAP INTERLEAVERS FOR FUTURE RADIO COMMUNICATION

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Abstract

In this paper, chaos based interleavers are proposed for the performance improvement of Interleave Division Multiple Access (IDMA henceforth) for future radio communication (FRC) requirements. 'IDMA' can be mean as the modified case of direct sequence code division multiple access (DS-CDMA) with the same spreading sequences and user specific interleavers for distinguishing the users in multi-user environment. In IDMA systems, the roles of interleavers are pre-eminent and an efficient interleaver contributes in optimizing the system performance. Random interleaver is the popular and basic taxonomy in IDMA. The performance of chaos based interleavers is compared to random interleaver. Simulation results authenticate the performance of chaos based IDMA. Further the proposed chaotic map-interleavers have the less computational complexity and efficient in bandwidth compared to the existing prevailing interleaver algorithms in the domain. The IDMA system model uses a BPSK modulation and repetition coder with a code rate of ½. The system is simulated in MATLAB and results show the BER superiority of chaotic interleaver based IDMA without the need of extra storage resources and less computational complexity.

Keywords:

IDMA, Chaos, Tent Map, Logistic Interleaver, CDMA

1. INTRODUCTION

IDMA is one of the popular spread spectrum multiple access scheme which can be seen as a special case direct sequence code division multiple access (CDMA for short hence forth). In IDMA interleavers are used for user separation rather than by spreading sequences like in CDMA. Interleavers are the crucial part of wireless communication, specifically over noisy channel. Chip interleaving was first introduced to combat the effect of burst impulsive noise disturbance. The interleaver scrambles the ordering of bits in sequences and hence converts the bursty channel into random error channel [1].

CDMA was widely used in third generation mobile communication system but the performance of this technique has been limited due to the mutual interference among multiple users (MAI) and inters symbol interference (ISI). Although several researches are given for the cancellation of MAI such as successive interference cancellation (SIC) and parallel interference cancellation(PIC), but these challenges in CDMA restrict its role in future communication. In order to enhance the spectrum efficiency, Ping et al. proposed a new multiple access scheme i.e. Interleave division multiple access (IDMA) [2]. However the performance of IDMA is improved, because the entire bandwidth expansion is devoted to the coding and interleavers are dedicated to distinguish the users. Hence IDMA inherits many advantages of CDMA and also allows a simple iterative Multi User Detection (MUD) strategy [3]. With many benefits, IDMA offers some challenges too. Some of them can be listed as:

- *Bandwidth requirement*: Interleaving sequence is also sent along with information bits and hence it increases the bandwidth requirement.
- *Computational Complexity*: Each user is assigned a different interleaver which enhances the system complexity.
- *Storage resources requirement:* Interleaving algorithm is needed to store at the side of transmitter as well as at receiver which may become a major challenge, especially when number of user is large.

To conquer above limitations, researchers have suggested different design and algorithms of interleavers. There are many popular interleaver designs available in the literature such as Orthogonal Interleaver (OI), Pseudo-random interleaver, Tree based Interleaver (TBI), Helical Interleaver, Nested Interleaver, Shifting Interleaver, Deterministic Interleavers and many more [4][5][6]. Based on the work carried in the research, it can be concluded that the choice of optimum interleaver may have a great impact on the performance of IDMA system. Ramsey reported the basic interleaver design in 1970.

The paper focus on the random interleaving algorithm to minimize the delay and storage resources requirement. However, the randomly generated interleaving pattern also has some limitations, such as large storage requirement and high complexity. Pupeza et al. [7] proposed the generation of Nested interleaver (NI), which choose the first interleaver sequence from pseudo-random interleaver and rest interleavers are generated by re-ordering procedure with the limitation that, it consumes large memory and bandwidth, although, the bit error rate (BER) performance was better than random interleaver. Pupeza et al. also presented Orthogonal Interleaver (OI), which guarantee the users to be orthogonal and hence diminish the effect of multiple access interference [7][8]. However the performance of OI is limited due the requirement of large number of orthogonal sequences for simultaneous users. Zhang proposed a shifting interleaver for IDMA scheme and cyclically shifting interleaver. Both the interleavers were not suitable for MUD receiver. Tseng et al. suggested a novel design of deterministic interleaver which was firstly used in turbo codes. The design of this interleaver was less complex and more bandwidth efficient with the only limitation that the use of look up table, the need of the table increases the memory requirement at the transmitter [8]. Shukla et al. also suggested a new Tree Based Interleaver with the scope of further improvement in memory requirement. Many other algorithms of interleaver design also have been proposed by researchers but the journey towards the search of optimum interleaver is still on for making IDMA suitable for future communication [9].

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Modeling and control strategies for energy management system in electric vehicles☆

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KEYWORDS
Auxiliary source;
DC-DC converter;
Electric vehicles;
Fuel cell;
Main energy source;
Ultracapacitor.

Summary These days, electric vehicle (EV) is using fuel cell as a prime source of energy because of its high promising performance and clean source of energy. However, due to low dynamic performance it alone cannot meet the fast changing load requirement during acceleration or sudden uphill, deceleration or sudden downhill. Therefore, in EV, main source is used in appropriate combination with auxiliary source. This article presents a comprehensive state-of-the-art of control strategies for maintaining constant DC bus voltage under transient load condition. It also presents a complete modeling by including boost converter modeling with main source and buck boost converter modeling with auxiliary source. Further, the dynamic evolution controller and Lyapunov-based control strategies for EV has been discussed with drive cycle.

Introduction

The conventional vehicles are mainly using petrol or diesel as a fuel which causes pollution and emission of green house gases. Pollution caused by vehicle emissions poses dangerous consequences to the human life and environment. So, it becomes the urgent need to think an alternate transportation medium such as electric vehicles (EVs) (Gao and Member, 2005). Now these days, EV is more efficient and promising perspective for the future generation because they have many advantages such as reduction of carbon emission, improved efficiency and performance (Chan et al., 2010). The traction motors used in EVs are mainly DC motors, induction motor, synchronous motor and switched reluctance motor. The decision of selection of traction depends on power density, efficiency, controllability, reliability, technological maturity, and cost (Vicatos and Tegopoulos, 2003; Yang et al., 2015; Zeraoulia, 2006).

Generally, EVs use two sources of energy namely, main source and auxiliary source. Main energy source is characterized with high energy density while auxiliary source with high power density. Main source provides continuous energy and whenever the load increases, the auxiliary source supplies the surplus power. Moreover, the auxiliary source stores the energy at the time of breaking termed as regenerative breaking which makes vehicles more efficient. The development of fuel cell technology and higher energy storage

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ORIGINAL PAPER

Frequency Regulation of Micro-grid Connected Hybrid Power System with SMES

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Abstract This paper presents the frequency regulation analysis of a micro-grid connected hybrid power system based on solar Photovoltaic (PV), Wind and Diesel-Engine Generator (DEG) with Superconducting Magnetic Energy Storage system (SMES) unit. Abrupt change in load demand and power fluctuations from PV and wind power source causes frequency variability in the system. In order to mitigate this issue, the hybrid power system incorporates along with the energy storage devices. A case study of the impact of SMES operations on the performance of frequency stability of hybrid system has been carried out. Simulation of a Hybrid Power System (HPS) model has been carried out in two different scenarios with the two phases. First is the steady state investigation of HPS using PI controller with step load change response. Second is the dynamic performance study throughout a typical day with arbitrary variation in load demands. Controller parameters are tuned with Genetic Algorithm based optimization approach. The limits on the inductor (coil) current due to the possibilities of discontinuous conduction in the presence of large disturbances and limited storage capacity have also been incorporated. HPS has analyzed in the Matlab Simulink environment. Simulation results indicate that SMES system can contribute towards the frequency stability in both cases for variable power generations from renewable sources and irregular demand loads.

Keywords Renewable power · Photovoltaic · Energy storage · SMES · Micro-grid · Frequency stability · Hybrid power system

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Introduction

The adverse effect of the greenhouse gases on atmosphere and decreasing fossil fuel reserves drags attentions towards clean and pollution free energy. In modern era, the leading clean energy sources are hydro energy, solar energy, wind energy and biogas mainly [1, 2]. Moreover, generations from the wind and solar have enhanced their contribution in most of the world's electricity generation [3].The primary application of solar power system is to provide power to the off-grid area where the extension of the grid is not possible. However, wind power is more commonly used for grid integrations. Solar PV arrays have more installation flexibility and can be easily mounted on domestic locations [4]. In the current scenario, the wind, and solar PV power plants are widely deployed for distributed generations and microgrids (MGs). Generated power from PV and wind sources is variable in nature; it can be used to compensate the load demand locally and/or injected into local grids [5]. Renewable technology is also facing a lot of technical, economic and social barriers because of their intermittency nature and uncertainty issues [6]. Moreover, the interconnection of these renewables into the grids/MGs creates some technical problems such as frequency and voltage regulations. Operational issues in distributed system also raised due to high/low penetrations of distributed renewable sources [7]. Therefore,

Size optimization and demand response of a stand-alone Integrated Renewable Energy System

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ABSTRACT

In the present context, energy access to remote rural households through local energy generating systems has been recognized as a cost effective and extent efficient option. With increased emphasis on eco-friendly technologies and high fuel cost associated with conventional energy generation, the use of renewable energy resources (small hydro, biomass, solar, wind energy etc.) are being explored. The present paper is focused on the optimal sizing of a stand-alone Integrated Renewable Energy System (IRES) which comprises the resources of micro hydro power (MHP), biogas, biomass, solar and wind energy. Initially, a demand response (DR) strategy based on energy consumption scheduling of appliances has been suggested and modelled in the paper. This strategy aims to minimize the peak hourly energy consumption of the study area. Further, different combinations of system components without and with DR strategy were considered and optimized for power reliability criteria of 0% and 5% unmet load. It has been found that significant amount of savings in system sizes and costs are obtained with DR strategy compared to system without DR.

Keywords: Renewable energy, stand-alone, unmet load (UL), solar energy, demand response (DR).

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Section G: Thin Films

Glass transition temperature of functionalized graphene epoxy composites using molecular dynamics simulation

Anurag Yadav, **Amit Kumar**, Pradeep K. Singh & Kamal Sharma

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Full Article Figures & data References Citations Metrics

International Journal of Green Energy ›
Volume 14, 2017 - Issue 7

Original Articles

Heat transfer augmentation and flow characteristics in ribbed triangular duct solar air heater: An experimental analysis

Gaurav Bharadwaj, Varun, Rajneesh Kumar & Avdhesh Sharma

Pages 587-598 | Accepted author version posted online: 24 Mar 2017, Published online: 27 Apr 2017

Full Article Figures & data References Citations Metrics

Advances in Materials and Processing Technologies

Volume 3, 2017 - Issue 4

Research Article

Flow behaviour of TiHy 600 alloy under hot deformation using gleeble 3800

Basanth Kumar Kodli, Rajamallu Karre, Kuldeep K. Saxena, Vivek Pancholi, Suhash R. Dey & Amit Bhattacharjee

Pages 490-510 | Accepted 10 Jun 2017, Published online: 19 Jun 2017

Download citation https://doi.org/10.1080/2374068X.2017.1342065 Check for updates

Abstract

To understand deformation behaviour of TiHy 600 alloy at higher temperatures, hot compression tests are performed in α region (1173 K), *α* + *β* regions (1223, 1248, and 1273 K) and *β* region (1323 K) at strain rates (0.001, 0.01, 0.1, 1 and 10/s) for up to 50% deformation in Gleeble 3800® thermo-mechanical simulator. Flow curve plots

Article

A novel approach to understand the deformation behavior in two phase region using processing map

February 2017 · Journal of Alloys and Compounds Accepetd
DOI:10.1016/j.jallcom.2017.02.177
Project: Hot deformation behavior - Processing maps and constitutive equation

Authors:

Kuldeep K Saxena
GLA University

Vivek Pancholi
Indian Institute of Technology Roorkee

Sanjay Kumar Jha

G. P. Chaudhari

Show all 6 authors

Abstract

Zr-1Nb alloy is normally processed in two phase region to get desirable microstructure and properties for fuel cladding tube application in the nuclear reactor. Thus, it is important to know the deformation behavior of individual phases in the two phase region. However, the conventional approach to develop processing maps is to use flow stress data obtained from hot compression experiments, without accounting for the phases present at different temperatures. This approach fails to bring out the details about the operating deformation mechanism in the individual phases. In order to bring out these details, two new approaches are proposed for developing processing maps. The validity of the approaches is confirmed by performing microstructural analysis using electron backscattered diffraction (EBSD) studies. EBSD analysis of the microstructures obtained after deformation in the two phase region confirmed that α−phase had undergone dynamic recrystallization (DRX) whereas, β−phase exhibited coarse elongated grains. Processing maps developed using the new approaches were able to predict domains of high dissipation efficiency, which is corroborated by microstructural analysis. Also, one of the novel approaches proposed in this work could delineate the contribution of each phase in the two phase region.

... With the increase of strain, the degree of inhomogeneous recrystallization does not increase due to the flow localization. [30][31] [32] In addition, it can be seen from Fig. 4 (b) that at a temperature of 773 K, maximum u is achieved at a strain rate of 0.01 s Â1 . This might be a result of metallurgical phenomena such as DRX consuming the input power. ...

Article

Role of activation energies of individual phases in two-phase range on constitutive equation of Zr–2.5Nb–0.5Cu alloy

January 2017 · Transactions of Nonferrous Metals Society of China 27(1):172-183
DOI:10.1016/S1003-6326(17)60020-7
Project: Hot deformation behavior - Processing maps and constitutive equation

Authors:

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Show all 7 authors

Citations (11) References (69)

Abstract

Dominant phase during hot deformation in the two-phase region of Zr–2.5Nb–0.5Cu (ZNC) alloy was studied using activation energy calculation of individual phases. Thermo-mechanical compression tests were performed on a two-phase ZNC alloy in the temperature range of 700–925 °C and strain rate range of 10^{-2}–10 s^{-1}. Flow stress data of the single phase were extrapolated in the two-phase range to calculate flow stress data of individual phases. Activation energies of individual phases were then calculated using calculated flow stress data in the two-phase range. Comparison of activation energies revealed that α phase is the dominant phase (deformation controlling phase) in the two-phase range. Constitutive equations were also developed on the basis of the deformation temperature range (or according to phases present) using a sine-hyperbolic type constitutive equation. The statistical analysis revealed that the constitutive equation developed for a particular phase showed good agreement with the experimental results in terms of correlation coefficient (R) and average absolute relative error (AARE).

No full-text available

Citations (11) References (69)

... Yu Lei et al observed Martensitic changes in CuAlMn SMA at low temp(100K) [8].Observation also reveals the grain boundaries and crossing points may develops new nucleation sites. Paz et al studied

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Experimental evaluation of flat plate solar collector using nanofluids [2017]

Verma, Sujit Kumar; Arun Kumar Tiwari; Durg Singh Chauhan;

Journal Article

The present analysis focuses on a wide variety of nanofluids for evaluating performance of flat plate solar collector in terms of various parameters as well as in respect of energy and exergy efficiency. Also, based on our experimental findings on varying mass flow rate, the present investigation has been conducted with optimum particle volume concentration. Experiments indicate that for â¼0.75% particle volume concentration at a mass flow rate of 0.025kg/s, exergy efficiency for Multi walled carbon nanotube/water nanofluid is enhanced by 29.32% followed by 21.46%, 16.67%, 10.86%, 6.97% and 5.74%, respectively for Graphene/water, Copper Oxide water, Aluminum Oxide/water, Titanium oxide/water, and Silicon Oxide/water respectively instead of water as the base fluid. Entropy generation, which is a drawback, is also minimum in Multiwalled carbon nanotube/water nanofluids. Under the same thermophysical parameters, the maximum drop in entropy generation can be observed in Multiwalled carbon nanotube/water, which is 65.55%, followed by 57.89%, 48.32%, 36.84%, 24.49% and 10.04%, respectively for graphene/water, copper oxide/water, Aluminum/water, Titanium Oxide /water, and Silicon oxide /water instead of water as the base fluid. Rise of Bejan number towards unity emphasizes improved system performance in terms of efficient conversion of the available energy into useful functions. The highest rise in energy efficiency of a collector has been recorded in Multiwalle
d carbon nanotube/water, which is 23.47%, followed by 16.97%, 12.64%, 8.28%, 5.09% and 4.08%, respectively for graphene/water, Copper oxide/water, Aluminum oxide/water, Titanium oxide /water, and Silicon oxide/water instead of water as the base fluid.

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- silica
- solar collectors

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Processing map-microstructure evolution correlation of hot compressed near alpha titanium alloy (TiHy 600)

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Abstract

Hot compression tests on TiHy 600 alloy (equivalent to IMI 834) is performed using Gleeble-3800® thermo-mechanical simulator. The hot deformation behaviour of TiHy 600 alloy is characterized on the basis of flow stress variation with true stress-true strain curves at different strain rates ranging from 10−3 s−1 to 10 s−1 and hot deformation temperatures ranging from 900 °C to 1050 °C, with maximum engineering strain up to 50%. The flow stress is found to be strongly dependent on deformation temperature, strain rate and strain, and it decreases with increasing temperature and decreasing strain rate. The flow curves at various temperatures and strain rates also showed dynamic recrystallization process at temperature range (900 °C–975 °C) in all strain rates and dynamic recovery process at high temperature range (1000 °C and above) in all the strain rates. Using flow stress values from the true stress-true strain curves and by applying dynamic material modeling approach, processing maps are developed at various true strains of 0.3, 0.4, 0.5 and 0.6. Processing maps exhibited safe and unsafe domains with varying efficiency of power dissipation values. Safe and unsafe domains at 0.6 strain are derived from their flow curves are correlated with its related microstructures and misorientation distribution profiles. Hot compression at 900 °C (α-rich region) mostly resulted into new fine dynamic recrystallized equiaxed α grains along grain boundaries of large deformed α grains. Higher temperature (950 °C–975 °C) compression in the (α+β) region generated mixture of deformed large alpha grains containing subgrain boundaries and secondary α laths generates from deformed β. Further compression at higher temperature (1000 °C -β-rich region and 1050 °C -single β region) resulted in the formation of secondary α laths from deformed β with few equiaxed α grains at 1000 °C sample only. The misorientation profile of α phase corroborates with the deformation mechanism in α region through its equiaxed α grains and in β region through its secondary α variant laths misorientations.
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MECHANICAL PROPERTIES OF ALUMINUM SHEETS AFTER ACCUMULATIVE ROLL BONDING USING TWO AND FOUR-HIGH ROLLING MILL

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MECHANICAL PROPERTIES OF ALUMINUM SHEETS AFTER ACCUMULATIVE ROLL BONDING USING TWO AND FOUR-HIGH ROLLING MILL

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ABSTRACT

This paper emphasized that there are a number of factors contributing to slightly different mechanical properties of aluminum sheets after rolling using a two or a four-high rolling mill. The major ones are the roll diameter, angular velocity, deformation zone, and surface roughness. In two-high rolling mill required annealing of the edges of the sheets, which was used to suppress the development of cracks. While higher rolling speed of the four high mill leads to higher deformation rates and a smaller deformation zone to higher pressures the in-between annealing of the edges, which was necessary on the two-high rolling mill allowed for prior precipitation evolution and therefore strengthening. The development of the oxide layer on the rolls of a two-high rolling mill was more rapid than on the rolls of a four-high rolling mill, because of relatively old and worn out surfaces, higher surface roughness as well as a bigger roll diameter. Thus, the mechanical properties of the sheets produced by a two-high and of four-high rolling mill cannot be directly compared. It is also worth pointing out that the hardness evolution of samples rolled using a two-high rolling mill preceded more quickly within the first 6 ARB cycles, but then subsided more quickly compared to a four-high rolling mill.

KEYWORDS: Two-high rolling mill, Four-high rolling mill, Accumulative Roll Bonding, Severe Plastic Deformation, Ultra-Fine Grain.

INTRODUCTION

Accumulative roll bonding is a relatively new severe plastic deformation (SPD) process, which was originally introduced and developed by Saito et al. [1,2]. The ARB process shown in figure1, involves wire brushing of metal sheet surfaces in order to remove the oxide layer, stacking of two sheets on top of each other and roll bonding them together[3,4] The two sheets are generally rolled to 50% thickness reduction and therefore leave the rolls with the original sheets thickness. During rolling the two metal sheets join together to form a solid body and once again same process repeated, wire brushed and roll bonded. The process can be repeated many number of times. In most cases, the process is repeated up to ten times

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Holographic diode

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ABSTRACT

In a symmetrical manifold with polygonal molecules, free electrons and other charges are absorbed symmetrically by all molecules and these charges tend not to move in a particular direction. Once the manifold is broken the symmetry too, naturally, gets broken and as a resultant the act produces two manifolds. The manifolds unfold such that the number of sides for molecules at boundary of each of the manifolds is different. The sequential events lead to the situation that one of the manifolds absorbs electrons and charges whereas the repel is asserted by the another. This also creates anomaly between the two manifolds. In order to fill the vacuum and to remove the anomaly, Chern–Simons bridge gets emerged that transmits charges between the two manifolds. In such a situation, charges can be paired on the Chern–Simons bridge and a diode is formed. This diode can be used in both solid state and in cosmology.

1. Introduction

A diode typically consists of one subsystem with extra electrons which are inspired with extra holes in other subsystem. By applying one external force, these pairs are broken and an electrical current gets emerged. As on date there has not been much research and discussions on polygonal diodes like graphene diode. For example – the investigations of the past few years have demonstrated that graphene can form junctions with 3D or 2D semiconducting materials which have rectifying characteristics which behave as excellent Schottky diodes [1]. The main novelty of these devices is the tunable Schottky barrier height—a feature which makes the graphene/semiconductor junction a great platform for the study of interface transport mechanisms, as well as for applications in photo-detection [2], high-speed communications [3], solar cells [4], chemical and biological sensing [5], etc. Also, realizing an optimal Schottky interface of graphene, on other matters like Si, is challenging, as the electrical transport strongly depends on the graphene quality and the temperature. Such interfaces are of increasing research interest for integration in diverse electronic devices as they are thermally and chemically stable in all environments, unlike standard metal/semiconductor interfaces [6].

Previously, we have shown that in a graphene system, heptagonal molecules repel electrons and pentagonal molecules absorb them [7,8]. This is because the angle between atoms in heptagonal molecules with respect to center of it is less than pentagonal molecules and according to the Pauli exclusion principle, parallel electrons become more close to each other and repelled. Also, parallel electrons in pentagonal molecules are much distant and some holes are appeared. If one heptagonal molecule is connected to one pentagonal molecule, electrons move from heptagonal, paired with holes in pentagonal and one diode is formed. Now, we extend this consideration to polygonal manifolds and discuss about the role of anomaly in emerging diodes. In our model, first there is a big manifold with polygonal molecules. By breaking this manifold, two lower dimensional manifolds are produced. Molecules produced this way are different at boundary. This system is similar to the diodes and the differences, between shapes of molecules at boundary, produce the anomaly. In event of happenings this anomaly causes such situation that electrons are transmitted from one manifold to another and are paired with them in the space between two manifolds. This space is called the Chern–Simons bridge.

Now, the question arises that is this only a theoretical idea, or there exists any possibility to verify it through observations? The answer to this question is as follows: In fact, this is a real diode that can be constructed by putting heptagonal and pentagonal molecules among the hexagonal molecules of graphene. We need two graphene sheets which are connected through a bridge. Molecules, at the connected points of one side of the bridge, should have the heptagonal shapes and other molecules

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Cosmology in modified $f(R,T)$-gravity theory in a variant $\Lambda(T)$ scenario-revisited

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Three new cosmological models of the present Universe are obtained with $f(R,T)$ modified theory of gravity proposed by Harko et al. [*Phys. Rev. D* **84** (2011) 024020, arXiv: 1104.2669 [gr-qc]] in a general class of Bianchi space-time. In this paper, we have generalized the modified $f(R,T)$ field equations with $\Lambda(T)$-gravity, where R and T denote the curvature scalar and the trace of the stress–energy–momentum tensor, respectively. To find the deterministic solutions we have considered the linearly varying deceleration parameter q proposed by Akarsu and Dereli [Cosmological models with linearly varying deceleration parameter, *Int. J. Theor. Phys.* **51** (2011) 612]. We have made the analyses of the variation of pressure, energy density and cosmological term with cosmic time. It is observed that our derived models are unstable in early time whereas they are stable at late and future time (i.e. at present epoch). The physical and geometric properties of all three models are studied in detail.

Keywords: General Bianchi universe; $f(R,T)$-gravity theory; $\Lambda(T)$-gravity.

Mathematics Subject Classification 2010: 04.50.Kd, 98.80.Es

1. Introduction

Cosmic observations from supernova type Ia (SNeIa) [1, 2], Cosmic Microwave Background (CMB) [3], large scale structure [4], baryon acoustic oscillation [5], weak lensing [6], Planck collaboration [7], Baryon Oscillation Spectroscopic Survey (BOSS) collaboration [8], and Actacama Cosmology Telescope Polarimeters (ACT-Pol) collaboration [9] indicate that expansion of the universe is speeding up rather than decelerating. It is a fact that the general theory of relativity is a successful theory and is the basis for the description of most gravitational phenomena known as to date. However, it fails to explain the recent discovery of the accelerated expansion

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Transit Cosmological Models with Domain Walls in $f(R,T)$ Gravity

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Abstract—We study the physical behavior of the transition of a 5D perfect fluid universe from an early decelerating phase to the current accelerating phase in the framework of $f(R,T)$ theory of gravity in the presence of domain walls. The fifth dimension is not observed because it is compact. To determine the solution of the field equations, we use the concept of a time-dependent deceleration parameter which yields the scale factor $a(t) = \sinh^{1/n}(\alpha t)$, where n and α are positive constants. For $0 < n \leq 1$, this generates a class of accelerating models, while for $n > 1$ the universe attains a phase transition from an early decelerating phase to the present accelerating phase, consistent with the recent observations. Some physical and geometric properties of the models are also discussed.

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1. INTRODUCTION

Cosmic observations from supernova type Ia (SNeIa) [1, 2], Cosmic Microwave Background (CMB) [3], large-scale structure [4], baryon acoustic oscillations [5], weak lensing [6], Planck collaboration [7], Baryon Oscillation Spectroscopic Survey (BOSS) collaboration [8], and Atacama Cosmology Telescope Polarimeters (ACTPol) collaboration [9] indicate that the expansion of the universe is speeding up rather than decelerating. But it is also worth mentioning that criticisms against the fact that the universe is actually accelerating have been raised [10, 11]. Therefore, plenty of models have been created with the purpose of physically or mathematically describe the cause of such acceleration, named "dark energy" (DE). There are two illustrative consequences to address the issue of cosmic acceleration. One is to introduce the "exotic energy component" in the context of General Relativity (GR). Several candidates have been proposed [12–14] in this perspective to explore the nature of DE. The other direction is to modify the Einstein Lagrangian, i.e., use a modified gravity theory such as $f(R)$ gravity [15]. $f(R)$ static spherically symmetric solutions have been obtained in [16], while solutions coupled to an electromagnetic field are investigated in [17]. Moreover, solutions from extra-dimensional $f(R)$ models have been obtained in [18]. Several authors [19–21] have studied $f(R)$ gravity in different contexts.

To explain the observed late-time acceleration of the universe, we may assume that at large scales GR breaks down, and a more general action for the gravitational field needs to be invoked. In this paper, we investigate $f(R,T)$ gravity, which is a modification of GR where the geometric part of the Einstein-Hilbert action is different [22]. Apart from the Ricci scalar R in the Lagrangian, there is also an arbitrary function of the trace T of the energy-momentum tensor. This theory has attracted much attention in the recent past, and its various aspects have been studied. It is possible to explain DE and the observed late-time acceleration of the universe within this theory.

Modified theories of gravity justify a unification of dark matter and dark energy, help in describing the change from a decelerated to an accelerated epoch of the universe, provide a description of the hierarchy problem and dominance of the effective DE, which helps us to solve the coincidence problem, etc. The cosmic acceleration in the modified $f(R,T)$ theory results not only from a geometric contribution but also from the matter content. Recently, several authors (see [23–37] and references therein) have studied cosmological models in $f(R,T)$ gravity in different Bianchi type space-times.

The alternative gravity theories have already created well-behaved cosmological scenarios, as one can check in [38–42]. The nature of such cosmological

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Original Article

Establishing inherent uncertainty in the shifts determined by volumetric imaging

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Abstract

Objective: This study was conducted for establishing inherent uncertainty in the shift determination by X-ray volumetric imaging (XVI) and calculating margins due to this inherent uncertainty using van Herk formula.

Material and methods: The study was performed on the XVI which was cone-beam computed tomography integrated with the Elekta Axesse™ linear accelerator machine having six degree of freedom enabled HexaPOD couch. Penta-Guide phantom was used for inherent translational and rotational shift determination by repeated imaging. The process was repeated 20 times a day without moving the phantom for 30 consecutive working days. The measured shifts were used for margins calculation using van Herk formula.

Results: The mean standard deviations were calculated as 0·05, 0·05, 0·06 mm in the three translational (*x*, *y* and *z*) and 0·05°, 0·05°, 0·05° in the three rotational axes (about *x*, *y*, *z*). Paired sample *t*-test was performed between the mean values of translational shifts (*x*, *y*, *z*) and rotational shifts. The systematic errors were found to be 0·03, 0·04 and 0·03 mm while the random errors were 0·05, 0·06 and 0·06 mm in the lateral, cranio-caudal and antero-posterior directions, respectively. For the rotational shifts, the systematic errors were 0·02, 0·03 and 0·03 and the random errors were 0·06, 0·05 and 0·05 in the pitch, roll and yaw directions, respectively.

Conclusion: Our study concluded that there was an inherent uncertainty associated with the XVI tools, on the basis of these six-dimensional shifts, margins were calculated and recorded as a baseline for the quality assurance (QA) programme for XVI imaging tools by checking its reproducibility once in a year or after any major maintenance in hardware or upgradation in software. Although the shift determined was of the order of submillimetre order, still that shift had great significance for the image quality control of the XVI tools. Every departments practicing quality radiotherapy with such imaging tools should establish their own baseline value of inherent shifts and margins during the commissioning and must use an important QA protocol for the tools.

Keywords: image-guided radiotherapy; quality assurance; X-ray volumetric imaging

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Birth of the GUP and its effect on the entropy of the universe in Lie-N-algebra

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On the origin of generalized uncertainty principle from compactified $M5$-brane

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In this paper, we demonstrate that compactification in M-theory can lead to a deformation of field theory consistent with the generalized uncertainty principle (GUP). We observe that the matter fields in the $M3$-brane action contain higher derivative terms. We demonstrate that such terms can also be constructed from a reformulation of the field theory by the GUP. In fact, we will construct the Heisenberg algebra consistent with this deformation, and explicitly demonstrate it to be the Heisenberg algebra obtained from the GUP. Thus, we use compactification in M-theory to motivate for the existence of the GUP.

Keywords: GUP; $M3$ and $M5$-branes; Lie 3-algebra.

PACS Nos.: 98.80.-k, 04.50.Gh, 11.25.Yb, 11.25.-w

1. Introduction

Despite the fact that we as yet do not have a full theory of quantum gravity (QG), various different approaches to quantum gravity have been proposed. These

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Emergence of anti-$F(R)$ Gravity in Type-IV Bouncing Cosmology as Due to $M0$-Brane

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Abstract—Recently, some authors considered the origin of a type-IV singular bounce in modified gravity and obtained the explicit form of $F(R)$ which can produce this type of cosmology. In this paper, we show that during the contracting branch of type-IV bouncing cosmology, the sign of gravity changes, and anti-gravity emerges. In our model, $M0$ branes get together and shape a universe, an anti-universe, and a wormhole which connects them. As time passes, this wormhole is dissolved in the universes, $F(R)$ gravity emerges, and the universe expands. When the brane universes become close to each other, the squared energy of their system becomes negative, and some tachyonic states are produced. To remove these states, universes are assumed to be compact, the sign of compacted gravity changes, and anti-$F(R)$ gravity arises, which causes getting away of the universes from each other. In this theory, a Type-IV singularity occurs at $t - t_s$, which is the time of producing tachyons between expansion and contraction branches.

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1. INTRODUCTION

Up to date, many models have been proposed in modified gravity to explain the universe evolution from inflation to late-time acceleration or during a bounce [1–6]. For example, some authors argued that for producing a matter bounce cosmology, $F(R)$ gravity should have a function with positive rational numbers as powers of the Ricci scalar R in the large cosmic time regime and a Gauss hypergeometric function at small cosmic times [1]. Some other authors found that $F(R)$ gravity which creates a super-bounce has the form $R + \alpha R^2$ in the large curvature regime and $R + e_1 R^{-1/2} + \Lambda$ at small curvatures [2]. In another research, a relation between different types of modified gravity like traditional $F(R)$ gravity, Horava-Lifshitz $F(R)$ gravity, scalar-tensor theory, string-inspired and Gauss–Bonnet theory, non-local gravity, nonminimally coupled models, and power-counting renormalizable covariant gravity was discussed. Also, different types of singularities, like type IV singularity, in each of these theories was considered [3]. In another scenario, a type IV realization in the context of suitably reconstructed $F(R)$ gravity was considered. Also, it was demonstrated that finite-time singularities of type IV can be consistently merged during the cosmological evolution, either appearing in the inflationary era or at late-times [4]. In another investigation, the authors discussed that the ΛCDM bounce model can be explained by pure $F(R)$ gravity, and this gravity can generate accelerating cosmologies [5]. And in more recent papers, it was discussed that a type IV singular bounce can be produced by $F(R)$ gravity which has the form $F(R) = R + \alpha R^2$ near the singularity [6]. This singularity occurs as the effective energy density $\rho_{\text{eff}} \to \rho_s$, the effective pressure $p \to p_s$, and the scale factor $a \to a_s$, but higher derivatives of the Hubble rate diverge [6]. Now, a question arises: what is the origin of type IV singular bounce? We answer it in M-theory.

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The evolution of Brown–York quasilocal energy as due to evolution of Lovelock gravity in a system of $M0$-branes

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Original Article

Trajectory modulated arc therapy using quasi-continuous couch motion layered on top of volumetric modulated arc therapy in left breast and chest wall irradiation: a feasibility study

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Abstract

Aim: To investigate the dosimetric advantage of quasi-continuous couch motion-enabled trajectory modulated arc radiotherapy therapy (TMAT) over the coplanar tangential partial arcs volumetric modulated arc radiotherapy (VMAT) for treating left breast and chest wall patients.

Method: Treatment plans of 43 patients who received radiotherapy for left breast (17) or for left chest wall (26) using coplanar partial tangential arcs VMAT (reference plan) were considered for this study. For each patient, in addition to the treatment plan, a TMAT plan was also generated using quasi-continuous couch rotation. The TMAT plan consisted of original two 30° tangential arc beams and two supplementary beams having a couch rotation of ±10°, ±20° and ±30°, respectively. The difference in PTV volume coverage (PTV V95%) between TMAT plan and VMAT plan was calculated for all the cases and normalised to the plan's prescription dose. Similarly, differences in PTV_V105% and several dose-volume parameters related to organs at risk (OAR) were also computed and tabulated.

Result: TMAT shows an increment in the PTV dose coverage V95% with respect to reference plan by 4·7 ± 2·5% when averaged overall prescription dose levels. Mean PTV dose (averaged overall prescription levels) for reference and TMAT plan was 4638·6 ± 423·8 and 4793·5 ± 447·2 cGy, respectively, and statistically insignificant ($p = 0·06$). However mean PTV_V105% values for TMAT and for reference plans were 6·7 ± 4·8 and 7·2 ± 5·2%, respectively, and were not statistically different ($p = 0·85$). Mean heart dose in TMAT was less than in VMAT plans, but not significantly. As regarding D1% to heart, TMAT plan was again found to be better with a mean difference of 137·1 cGy over VMAT plan. Other parameters evaluated were: mean dose and D1% to contralateral breast, and V20 Gy and V5 Gy for lung.

Conclusion: TMAT plans were found to be better than VMAT plans in terms of PTV coverage and D1% for heart. For evaluated dose parameters apart from PTV coverage and D1% to the heart, no significant differences were observed. Thus, TMAT plans yielded better dose distribution in terms of PTV dose coverage, hot spots and OAR doses.

Keywords: breast radiotherapy; couch rotation; TMAT; trajectory modulated arc therapy; VMAT

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Cosmic space and Pauli exclusion principle in a system of $M0$-branes

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Original Article

Inherent uncertainty involved in six-dimensional shift determination in ExacTrac imaging system

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(Received 26 January 2017; revised 2 April 2017; accepted 5 April 2017)

Abstract

Objective: This study was conducted for the assessment of in-built systematic and random errors in the ExacTrac imaging system due to the software of Brainlab, on that basis; recommending a new quality control programme for ExacTrac imaging system.

Methods: A program was developed to compare the image dataset of real time anthropomorphic pelvic phantom using ExacTrac with the reference image dataset from computed tomography. Images were acquired 20 times in a day, on single sitting for 20 conjugative days. On the basic of these translational and rotational shifts, systematic and random errors were calculated that had arisen due to multiple time image acquisition and image registration between acquired and reference image dataset of the phantom.

Results: Random errors were found as 0·006 cm in right-left (Rt-Lt) direction, 0·008 cm in superior-inferior (Sup-Inf) direction and 0·012 cm in anterior-posterior (Ant-Post) direction. On this basic, margins were calculated using Van Herk formula; it was found that there were 0·02 cm inherent shift in Rt-Lt direction, 0·03 cm in Sup-Inf direction and 0·03 cm in Ant-Post direction.

Conclusion: This study concluded that there was inherent error in ExacTrac system which can be quantified and used as a quality assurance tool for the ExacTrac system.

Keywords: ExacTrac; uncertainty; quality assurance

INTRODUCTION

Novel high-precision radiotherapy (R.T) techniques, including intensity-modulated radiation therapy and volumetric-modulated arc therapy, allow improved dose distribution within the target and spare a greater portion of normal tissue than conventional R.T. These techniques involve accurate tumour volume delineation as well as verification of target localisation and monitoring of organ motion, also the tumour response assessment during treatment delivery. New

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Dark energy models in LRS Bianchi type-II space-time in the new perspective of time-dependent deceleration parameter

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Before 1998, it was usually expected that the universe was expanding with a constant rate or the expansion was slowing down. In 1998, the surprising discovery based on type Ia supernovae, that the rate of expansion of the universe is increasing, forced the researchers to reconsider the various cosmological models proposed so far. The current study is also an effort to revisit the LRS Bianchi type-II, dark energy (DE) model by taking time-dependent deceleration parameter (DP) instead of constant DP. We have assumed the variable scale factor $a(t) = [\sinh(\alpha t)]^{\frac{1}{n}}$, which gives the variable DP as $q(t) = n\coth^2(\alpha t) - 1$, with these considerations, the solutions of field equations are calculated. Various parameters of DE models are also calculated, and it is found that these are consistent with the recent observations.

Keywords: LRS Bianchi type-II universe; dark energy; variable deceleration parameter; anisotropic model; accelerating universe.

1. Introduction

Before 1998, almost every researcher in the field of relativity and cosmology assumed that the universe was slowing down due to gravity acting on the matter. The question was: how quickly is it slowing? There was also the possibility, unlikely as it seemed, that some intrinsic property of empty space was in play, something called the cosmological constant Λ a term originally proposed by Einstein in 1917, in an attempt to balance the equations of General Relativity and preserve a picture of a stable universe that would neither expand nor collapse on itself. A dozen years after Einstein introduced the cosmological constant, astronomer Edwin Hubble found that the universe is indeed expanding; Einstein dismissed his cosmological constant idea as "the biggest blunder of my life".

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Original Article

Choice of appropriate beam model and gantry rotational angle for low-dose gradient-based craniospinal irradiation using volumetric-modulated arc therapy

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Abstract

Objectives: We aimed to assess the impact of advanced multileaf collimator (MLC) models and flattening filter-free (3F) beam in volumetric-modulated arc therapy (VMAT)-based craniospinal irradiation (CSI).

Methods: CT scans of five medulloblastoma patients who previously received CSI at our hospital were used for the present study. Patients were planned for a prescription dose of 35 Gy to craniospinal axis. A three-dimensional conformal radiotherapy (3DCRT) plan and a VMAT plan using 1 cm MLC leaf width were generated as the gold standard (reference arm). Test VMAT plans were generated using Agility MLC model (MLC leaf width 5 mm) for various combinations of flattened beam (F) and 3F beam for treating the brain and spine planning target volume (PTV). Organs at risks (OARs) were analysed for dose 5, 50, 75 and 90% volumes, mean dose and maximum dose.

Results: All 3DCRT plans and VMAT plans were aimed to cover 95% of PTV by at least 95% prescription dose. VMAT demonstrated lesser dose spillage than 3DCRT to body volume minus PTV (NTID: non tumor integral dose) for a dose threshold above 7·5 Gy. For the low-dose range (1–7 Gy), variation between the dose coverage between all VMAT plans (for either spine or brain PTV) was <1%. Intra-VMAT plan dose variation for all OAR's for all tested parameters was <1 Gy. Average monitor unit (MU) difference among different VMAT plans ranged between 1·52 and 2·13 when normalised to 3DCRT MU. For VMAT plans, flat beam with 1 cm MLC showed the highest MU, whereas Agility MLC with 3F beam had the least MU values for intra-VMAT plans. No statistical significance variation (p) was observed in between reference arm and test arm plans except for mean dose and V107% for PTV spine. When compared between reference arm 3DCRT and test arm VMAT plans. For OAR's, no statistical difference was observed between reference and test arm VMAT plans.

Conclusions: Reference arm plans and test arm plans exhibit no statistically significant difference. However, as compared with 3DCRT, VMAT plans are more conformal and produce lesser dose to OAR at the cost of higher delivered MU. 3F beams or finer width MLC's (width <5 mm) have no advantage over the conventional 1 cm MLC and flat beam except that 3F beams have a shorter beam delivery time. This study demonstrate a

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Analysis of the thermoelastic properties of nanocrystalline Foresterite using a thermodynamic equation of state

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ABSTRACT

A new potential independent equation of state is used in the present work to analyze the thermo-elastic properties of nanocrystalline Foresterite (nc- Fo) under varying temperature and pressure conditions. The newly developed EOS is found to be valid for explaining the elastic behavior of nanocrystalline forsterite satisfactorily over the temperature range from 300 K to 1573 K with a pressure variation from 0 to 9.6 GPa. The values calculated for the volume compression under varying temperature- pressure conditions are compared with the available experimental data and also with those obtained by using different approaches. It is found that the results obtained in the present study are more close to the experimental data in comparison to those reported earlier. The same model is further extended to study the variation in the bulk modulus and thermal expansion coefficient of Foresterite nano-mineral ver the temperature range from 300 K to 1573 K. The results show the same trend of expansion as observed in single nanocrystals at high temperature.

1. Introduction

The study of the thermo elastic behavior of minerals, ionic solids, metallic solids, alloys etc. under different pressure and temperature conditions is important for understanding the earth's deep interior and its evolution. It also provides vital information about the dynamics of the earth's lower mantle. A variation of the temperature-pressure conditions affects the atomic structure, stability and atomic interactions and thus modifies the physical properties, like the compressibility, electrical conductivity, elasticity, and thermal expansivity [1,2] of the material.

The physical and rheological properties of a material are greatly influenced by its size and shape, which in turns affects the geo-physical processes [3]. Despite of the limitation of the nanocrystalline forms of minerals in the earth's crust and mantle, its importance in geophysics cannot be neglected [4–6]. The effect of grain size on the elastic properties of nanocrystalline metal, alloys, ceramics, and oxides has been studied both experimentally [7,8] and theoretically [9,10] during the past years. Some of the experimental studies [11–13] on nanocrystalline materials have concluded that the elastic moduli of nanocrystalline materials decrease with a decrease in grain size. Though the olivine group of minerals are usually studied in bulk form [14–18], yet the nanostructured minerals in nano-form have been studied less under high pressure and high temperature.

The olivine group of minerals comprises of Foresterite and Fayalite. Foresterite (Mg_2SiO_4), commonly abbreviated as Fo, is the member of the olivine solid solution series rich in magnesium whereas Fayalite (Fe_2SiO_4) is the iron rich member. Fayalite has a high refractive index and is heavier than Foresterite. Foresterite is found to be the most abundant mineral in

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Upcoming OCP Events

December 2, 2021: Friends of Fairsted Lecture by Elizabeth Hope Cushing, author of *Beauty, Efficiency, and Economy: A Life of Frederick Law Olmsted Jr., Landscape Architect, Planner and Conservationist*

February 16-19, 2022: CAA 2022 Annual Conference

March 23-26, 2022: 2022 AWP Conference & Bookfair

June 8-9, 2022: 1st International Conference on Wettability Science and Associated Technologies

June 19-23, 2022: 15th Biennial Congress and Exhibition of the International Stereotactic Radiosurgery Society

HTHP 47.3, p. 195-204

HTHP Home • **Issue Contents** • **Forthcoming Papers**

Volume dependence of Grüneisen parameter for MgO and hcp iron

Sheelendra Kumar and Anuj Vijay

We have determined volume dependence of the Grüneisen parameter for MgO and hcp iron using the formulations due to Stacey and Davis based on the third-order of Grüneisen parameter. Values of higher order of Grüneisen parameters up to fourth order have also been obtained with the help of the Shanker reciprocal gamma relationship satisfying the thermodynamic constraints at extreme compression in the limit of infinite pressure. The results determined from the Stacey-Davis formulation present close agreement with those obtained from the Shanker formulation.

Keywords: Grüneisen parameter, higher-order volume derivatives of gamma, MgO, hcp iron, Equation of state

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High Temperatures-High Pressures, Vol. 47(1), pp. 51–63
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Size and shape dependent properties of wurtzite III nitride nanomaterials

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Received: November 28, 2016; Accepted: March 21, 2017.

A theoretical model is proposed for the study of size and shape dependent thermal-optical properties of group III wurtzite type nitride nanomaterials. The model proposed is used to calculate the variation in melting temperature, cohesive energy, Debye temperature and energy band gap in AlN, GaN, InN nanostructures in spherical form, nanowire shaped and in the form of nanofilm. The melting temperature, cohesive energy and Debye temperature are found to decrease with decrease in grain size in nanostructures in comparison to bulk. Depending on shape, melting temperature in spherical nanosolid is less in comparison to melting temperature in nanofilms and nanowires. However, energy band gap in wurtzite III nitrides increases with decrease in melting temperature and size of nanosolid. The results obtained from present model for wurtzite III nitrides are compared with the other simulation results available. A good consistency is obtained between both the results which confirm the accuracy of the present model.

Keywords: Nanomaterials, melting temperature, Debye temperature, energy band gap, cohesive energy

1 INTRODUCTION

The study on thermal, mechanical and optical properties of nanomaterials having dimensions less than 100 nm is of great scientific interest [1]. It is very crucial to investigate the shape and size dependent properties at nanolevel [2,3]. Group III nitrides such as AlN, InN, GaN have many attractive properties such as high thermal conductivity, hardness, and high thermal stability, high electrical conductivity, low thermal expansivity, wide energy band gap

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[redacted]

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A R T I C L E I N F O

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A B S T R A C T

Nickel telluride (NiTe) and cobalt telluride (CoTe) nanocrystallites were synthesized from homogeneous reaction mixtures of tartrate complex of Ni^{2+}/Co^{2+} and Te^{4+} at room temperature by reduction with sodium borohydride. The morphology and the structure of the synthesized particles were characterized by XRD, FESEM, TEM and EDX. The nanocrystallites have shown narrow size distribution with diameter 10.8 nm and 3.8 nm for NiTe and CoTe respectively. The electrochemical properties of the synthesized materials were carried out by cyclic voltammetry (CV) and differential pulse voltammetry (DPV). NiTe modified graphite paste electrode (NiTe/GP) showed electrocatalytic oxidation towards uric acid (UA) and adenine (AD) and two well separated oxidation peaks were obtained in DPV measurement. The peak separation between UA and AD was 633 mV. Under optimized experimental condition, the linear response ranges for the determination of UA and AD were 3–200 μM and 3–50 μM for NiTe/GP and the detection limits (S/N = 3) were 95 nM and 206 nM respectively in the mixture. CoTe modified graphite paste electrode (CoTe/GP) displayed electrocatalytic oxidation towards uric acid (UA) only. Both the modified electrodes were used in human urine and blood sample analysis with better sensitivities than earlier reports.

1. Introduction

Uric acid (UA) is the primary end product of the purine metabolism in human body. The normal concentration range of uric acid in human body ranges from 0.3 to 0.5 mM in serum and 1.4–4.4 mM in urinary excretion [1,2]. Abnormal levels of UA indicate the symptoms of various diseases like gout, Perkinson's, hyperuricemia etc [3–5]. Adenine (AD) is an important purine base of DNA and plays a vital role in protein biosynthesis. The extreme abnormalities of AD level suggest the deficiency and mutation of the immune system which may be sign of various diseases such as AIDS, carcinoma, epilepsy etc [6]. Usually UA and AD coexist in physiological fluids. Therefore sensitive and selective methods for simultaneous determination of these two molecules are very important for medical science. Several methods like fluorescence [7], high-performance liquid chromatography [8], electrophoresis [9] enzymatic method [10] and electrochemical method [11] have been developed for the determination of these small biomolecules. However, electrochemical techniques have attracted more attention due to low cost, high sensitivity, fast response and extreme selectivity. Electrochemically individual/simultaneous determination of biomolecules using traditional electrodes are very difficult since they have a tendency to foul the detection electrodes and the oxidized products are adsorbed on the electrode's surface leading to poor sensitivity [12]. To overcome these obstacles several materials like nitrogen doped graphene [13], Co doped CeO_2 nanoparticles (nps) [14], reduced graphene oxide [15], over-oxidised polyimidazole and graphene oxide copolymer [16], MWCNT-Fe_3O_4@PDA-Ag nanocomposite [17] have been developed and used as electrode modifiers to get good sensor response. Out of all these electrode materials, nanomaterials have attracted

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Electrochemical studies of DNA interaction and antimicrobial activities of Mn^{II}, Fe^{III}, Co^{II} and Ni^{II} Schiff base tetraazamacrocyclic complexes

Anuj Kumar [a], Vinod Kumar Vashistha [b], Prashant Tevatia [a], Randhir Singh [a]

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Chromatographia
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ORIGINAL

Sensitive RP-HPLC Enantioseparation of (*RS*)-Ketamine via Chiral Derivatization Based on (*S*)-Levofloxacin

Vinod Kumar Vashistha[1] · **Jürgen Martens**[2] · **Ravi Bhushan**[3]

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Abstract Enantioseparation of (*RS*)-ketamine has been achieved in the form of its diastereomeric hydrazones. A new chiral reagent was synthesized from enantiomerically pure (*S*)-levofloxacin by converting its carboxyl group into a hydrazide derivative: the reagent provided a reaction site for the ketonic group present in (*RS*)-ketamine. Because of the structural feature of the chiral reagent formation of diastereomeric hydrazones of (*RS*)-ketamine was successful without protection of its amino group. The diastereomeric hydrazones were separated on a reversed-phase C_{18} column with a mobile phase consisting of MeCN and 0.1% TFA under gradient elution from 35 to 65% of MeCN. The limit of detection was found to be 3.2 and 3.4 nmol for first and second eluting diastereomeric hydrazones, respectively. The separation mechanism and elution order of the diastereomeric hydrazones were proposed and supported by developing the geometry optimized 'lowest energy' structures of the two diastereomeric hydrazones using DFT-based Gaussian software.

Keywords HPLC · Enantioseparation · Chiral derivatizing reagent · (*S*)-Levofloxacin · (*RS*)-Ketamine · Diastereomeric hydrazones

Introduction

Ketamine [(*RS*)-KetA], having systematic chemical name, (*RS*)-2-(2-chlorophenyl)-2-(methylamino)cyclohexanone, [Fig. 1; (*RS*)-**1**] is a dissociative anaesthetic drug used in the treatment of anaesthesia, bronchospasm, and complex regional pain syndrome and as an antidepressant [1]. Ketamine is also classified as an *N*-methyl-D-aspartate (NMDA) receptor antagonist [2]. (*S*)-**1** has twice the anaesthetic potency of (*RS*)-**1** [3]. Also, the analgesic property of (*S*)-**1** is higher than (*R*)-**1** [4]. Ketamine is often administered as racemic mixture although each enantiomer exhibits significantly different pharmacodynamic activities [5].

Ketamine tops the list of psychoactive drugs in terms of consumption in several countries worldwide. It is sold under different brand names in India and worldwide. Ketamine is also a medication of abuse, e.g., in the year 2012–13 it was assessed that around 120,000 people had an abused application of ketamine [6]. The Crime Survey for England and Wales demonstrates that ketamine abuse is most basic in males, in the 20–24 years age group. Different reviews [7, 8] have mentioned that KetA consumption is more common in certain individuals. Thus, detection and analysis of KetA and its enantiomers in medicinal and forensic disciplines requires sensitive, simple, and fast methods.

The paper was prepared and submitted during RB's stay at the University of Oldenburg.

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Research Paper | Published: 14 February 2017

A simple fast microwave-assisted synthesis of thermoelectric bismuth telluride nanoparticles from homogeneous reaction-mixture

Susmita Pradhan, Rashmita Das, Radhaballabh Bhar, Rajib Bandyopadhyay & Panchanan Pramanik

Journal of Nanoparticle Research **19**, Article number: 69 (2017) | Cite this article

Abstract

A new simple chemical method for synthesis of nanocrystalline bismuth

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An efficient method for regioselective ring opening of epoxides by amines under microwave irradiation using $Bi(NO_3)_3 \cdot 5H_2O$ as a catalyst†

Shobha Bansal, Yogendra Kumar, Parveen Pippal, Dipak K. Das, Panchanan Pramanik and Prabal P. Singh*

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Bismuth(III)nitrate pentahydrate, a highly efficient environmentally benign catalyst, is used for the nucleophilic ring opening of epichlorohydrin and styrene oxide with aromatic, aliphatic and heteroaromatic amines under solvent free microwave conditions reducing the reaction time drastically to afford the corresponding β-amino alcohols in good to excellent yields with high regioselectivity. The products obtained were directly purified by column chromatography and characterised by ^1H & ^{13}C NMR, FTIR and mass spectroscopy.

Introduction

β-Amino alcohol has attracted a large number of researchers in the synthesis of a good amount of biologically active natural and synthetic products[1,2] including chiral auxiliaries.[3a] These play an increasingly vital role in medicinal chemistry, pharmaceuticals and organic synthesis. β-Blockers are used in the treatment of a wide variety of human disorders, like hypertension, sympathetic nervous system disorders, heart failure, and cardiac arrhythmias[3b] and also as insecticidal agents.[3c] The ring opening of epoxides with amines represents one of the most important and straightforward methods of preparing these compounds.[4] Various Lewis acid, *viz.* $Y(NO_3)_3 \cdot 6H_2O$,[5] $ZrCl_4$,[6] $Sc(OTf)_3$,[7] SmI_2,[8] $RuCl_3$,[9] and $NbCl_5$[10] catalysed reactions have been examined for this class of reactions. The classical synthesis of β-amino alcohol involves heating of epoxides with amines in excess at elevated temperatures[11] but high temperature may not be the standard condition for molecules having sensitive functional groups. Therefore a milder and improved procedure has been developed using alumina,[12] metal amides,[13] metal alkoxides,[14] metal halides,[15] and silica perchloric acid.[16] Due to the toxicity of metals, a better catalyst is still desirable for the nucleophilic ring opening of epoxides by various amines to afford the corresponding β-amino alcohols. A literature survey also reveals that epoxide ring opening reaction can be conducted under microwave irradiation.[17–20] Bismuth(III)chloride[21] has also been tried earlier for the ring opening of epoxides but it required a longer reaction time.

It is evident from the literature survey that bismuth(III)nitrate pentahydrate has been used for functional group transformation,[22] Michael addition,[23] synthesis of coumarins[24] and nitration.[25] The low toxicity,[26] lower cost and versatile nature of bismuth(III)nitrate pentahydrate as an efficient catalyst prompted us to investigate its activity for epoxide ring opening. Here the present report describes a highly regioselective and efficient protocol for the aminolysis of aliphatic and aromatic epoxides with a variety of amines under solvent free microwave conditions.

Results and discussion

In our initial efforts to optimise the finest reaction conditions for aminolysis of styrene oxide, aniline and bismuth(III)nitrate pentahydrate as catalysts were mixed and placed in a microwave for the appropriate time intervals as a model reaction. Monitoring of the reaction was done by TLC and the completion of the reaction was confirmed by the complete disappearance of the starting materials. To our delight the reaction was completed in much less time with a single isomer. The reaction mixture was treated with dichloromethane; the crude product thus obtained was purified by column chromatography to get the regioselective 2-phenyl-2-phenylaminoethanol in an appreciably good amount (Scheme 1).

To study the effect of catalyst loading and the wattage of the microwave on the ring opening of epoxides with amines, we next examined the model reaction in the presence and absence of the catalyst under varied microwave conditions (Table 1). The results in Table 1 depict that in the absence of a catalyst, the reaction did not proceed at all (Table 1, entry 1), while the desired product was isolated in 85% yield under optimized conditions (Table 1, entry 5). Reaction at a higher wattage of

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Calcium ferrite, an efficient catalyst for knoevenagel condensation(A green approach)

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ABSTRACT

Calcium ferrite NPs catalyst have been used as a cheaper and highly efficient catalyst for Knoevenagel condensation of active methylene substrate with various carbonyl compounds affording condensed products in excellent yields in shorter reaction time. The developed greener protocol is very simple, involving cleaner work up and the synthesized products do not require further purification. The catalyst can easily be removed and reused at least for four times without any appreciable change in reactivity.

Keywords: Knoevenagel condensation; Calcium ferrite; Ethylcyanoacetate; Malononitrile; Reusable catalyst.

INTRODUCTION

Knoevenagel condensation is a very useful reaction in organic chemistry known for its synthetic utility in carbon carbon bond formation[1] and their enormous applications particularly in fine chemicals[2] and therapeutic and pharmacological products[3-5]. The condensation reaction is generally performed by using stoichiometric or catalytic amounts of ammonia, primary and secondary amines, pyridine, piperadine[6] dimethylamino[7-10] Al_2O_3[11], SmI_3[12], $CdCl_2$[13], $LaCl_3$[14], $ZnCl_2$[15], Zeolite[16], $ZnCl_4$-SiO_2[17], fluorapatite[18], hydroxyapatite[19], metal oxides[20], ionic liquids like [Bmim]Cl.x$AlCl_3$[21], [MMIm][MSO_4][22], ethylenediammonium diacetate in ionic liquids[23], hydrotalcite in ionic liquids[24], mesoporous organosilica supported potassium carbonate (BPMO-IL-KCO_3)[25], UiO-66-NH_2[26]. In addition, there are certain reports on the use of electrochemical induced, microwave and ultra sound irradiation methods for Knoevenagel condensation[27-28]. Recently nano particles like $BaAl_2O_3$[29], Fe_3O_4@SiO_2[30], P4VP/Al_2O_3-SiO_2[31], Nitridated KCC-1[32], amine functionalized PAN[33], Pd(0)[34] has been reported to catalyze the Knoevenagel condensation reaction. Various MOF[35-37] has also been tried to catalyze the above reaction. However these methods suffer from disadvantages such as unsatisfactory yields, long reaction times, stoichiometric amount of catalyst, harsh reaction conditions, use of hazardous

Original Article

Conjugation of Antibodies with Radiogold Nanoparticles, as an Effector Targeting Agents in Radiobioconjugate Cancer Therapy: Optimized Labeling and Biodistribution Results

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Abstract

Purpose of the Study: Drug accessibility to the tumor cells is an important area of concern with an anticipation of increasing the efficacy of the drug to be delivered to a specific site. The biogenesis of gold nanoparticles using plant-mediated phytochemical extracts and their possible linkage to cancer antibodies with an aim at delivering the conjugate specifically to the tumor-associated antigen is the basic objective of the research. **Materials and Methodology:** Radiolabeling of antibodies with gold nanoparticles was carried out by a protocol, and the labeling extent of antibodies was compared with that of a radiogold solution to ordinary particulate size (AuNO-Ab). The amount of radiolabeling was estimated by subjecting the reaction mixtures to thin layer chromatography (ITLC-Silica-gel) in different solvent mediums, both by visual inspection of images of the Siemens Orbitor Gamma Camera ZLC-7500 and also by *in vitro* counting of the radioactive counts in different quarters of the chromatographic strips. Biodistribution relating to the deposition of injected dose in nontargeting sites (reticuloendothelial system [RES]-localization) was studied and efforts were made for reducing the same. **Results:** Much improved gold incorporation was confirmed at various molar ratios of gold to immunoglobulin (antibody) using nanogold solution (>85%). The RES uptake in the liver, spleen etc., was observed as a problem and the prior administration of unlabeled nonspecific gammaglobulin (before the actual radiolabeled product) was identified as the suitable blocking agent for this purpose. **Conclusion:** The study signifies the potential for PEGylated gold nanoparticles of a precise size range, suitable to use as a delivery vehicle for targeting small biomolecules (antibody etc.) to the tumor site. The stability of this labeled immunoconjugate and other toxicity effects under physiological conditions needs further evaluation. If successful, this could be a role model for attaining high tumor/nontumor ratio.

Keywords: *Monoclonal antibody, radioimmunotherapy, radiolabeled gold nanoparticles, reticuloendothelial localization*

Introduction

Cancer is one of the foremost problems affecting human health. Its impact globally is significant in all the strata of society and there are several projections emphasizing the increasing magnitude of the problem with both the developed and developing nation.[1,2]

Radiobioconjugate targeting in cancer relates to the specific and selective targeting of cancer cells by the delivery of a localized radiation, using an appropriate radionuclide war head coupled to a biological carrier molecule (antibody), which has a relative specificity for tumor tissue. Radiobioconjugate targeting using monoclonal antibodies (MoAbs) (radioimmunotargeting) linked to a high energy radionuclides is a promising approach for treating metastatic cancer. MoAbs with favorable characteristics should produce high tumor uptake accompanied with low background activity i.e., high target/nontarget ratio, thus representing the measure of its efficiency.[3-7]

Gold has been advocated as a promising radionuclide for radioimmunotherapy of cancer cells. Gold (Au-199), because of having an effective beta emissions of the range 0.30 MeV (70%), 0.2530 MeV (24%), 0.46 MeV (6%), along with useful gamma radiation of 0.158 MeV range, considered as an ideal radionuclide both for therapy and scintigraphic (imaging) purposes. It has a favorable half-life of 3.15 days, which is compatible with the time course of accumulation of antibody

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5FU Synergistically Inhibits MCF-7 in Combination with Methylglyoxal

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Abstract

Reduction of toxicity due to uses of conventional chemotherapeutics drugs is a major challenge in cancer treatment. With this aim we combined 5FU, a widely used chemotherapeutic drug and methylglyoxal (MG), a non toxic anticancer agent in breast cancer cell line, MCF-7. Treatment with 5-FU in combination with MG on MCF 7 cells exert synergistic effects in proliferation and destruction of those cells as determined by MTT, clonogenic assay and scratch wound healing assay. Results clearly showed that 5FU is more effective at lower doses in presence of MG. Taken together, our preliminary results revealed that MG can be used in combination therapy to reduce the concentration of toxic 5-FU against breast cancer cell.

Keywords: Methylglyoxal; 5Fluoro Uracil; Cancer; MCF-7

Introduction

Cancer is one of the leading cause of mortality worldwide having death rate of 9 million in 2016. Among different type of cancers like colon, breast, pancreas, stomach, colorectal, lung there is an increased surge of breast carcinoma has been observed over several years [1]. Breast cancer is the second leading cause of cancer death in women with a mortality rate 1 in 37 (about 2.7%) [2].

Chemotherapy is the best option in different types of treatments for advanced stages of tumors. Existing therapy includes the widespread use of chemotherapeutic drugs such as Doxorubicin, Paclitaxel, Cisplatin, Etoposide, 5-Flurouracil, Methoxetrate etc [3]. Molecular targeting by these drugs surely have had a substantial impact on cancer treatment, but patients either eventually develop resistance to these agents or gets affected by their toxic side effects. Among different types of chemotherapeutic drugs we have chosen 5-FU as a targeting chemotherapeutic drug in this current study. The anticancer effects of 5FU already have been studied on different cell lines like cardiomyocytes [4], colorectal cancer cells [5,6,7] and breast cancers [8] etc. 5-FU is an structural analogue of pyrimidine .5-FU has some common side effects like nausea, vomiting, headache, itching, diarrhea etc and also some critical adverse effects like cardiotoxicity [9], vein pigmentation [10], GI ulceration and bleeding etc.

Reduction of toxic and adverse effects of chemotherapeutic drugs with minimum impact on efficacy has led to the concept of combination therapy. Combination therapy has a potential for long term disease modification [11]. Combination of drugs with differing modes of action often attains a synergistic effect without the toxic side effects associated with a particular drug when used at its optimal dose. So in this study we want to develop a logical combination of 5-FU and MG to achieve synergistic killing of cancer cells while avoiding additive toxicity.

The anticancer role of methylglyoxal (MG) has been investigated and established in our laboratory. Methylglyoxal generally targets malignant cells by affecting glycolysis and mitochondrial respiration with minimum or no toxicity on normal cells [12-17]. Methylglyoxal is formed as a byproduct of several metabolic pathways. MG specifically decreases cellular ATP pool by blocking glycolysis and mitochondrial electron transport chain by inhibiting Glyceraldehyde-3-phosphate dehydrogenase and mitochondrial complex I respectively of malignant cells. This selectivity of MG towards malignant cells has been attributed to the differential molecular association of GAPDH (glyceraldehyde-3-phosphate dehydrogenase) in cancer cells compared to normal cells. It is well established that GAPDH from normal tissue sources is a homo-tetrameric protein with four identical subunits of 36 kDa each [18]. By contrast, GAPDH from Ehrlich Ascites carcinoma (EAC) cells and other cancer cells is a heterodimers having two non-identical subunits of ~33 and 55 kDa

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Sensitive RP-HPLC Enantioseparation of (*RS*)-Ketamine via Chiral Derivatization Based on (*S*)-Levofloxacin

Vinod Kumar Vashistha, Jürgen Martens & Ravi Bhushan

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Abstract

Enantioseparation of (*RS*)-ketamine has been achieved in the form of its diastereomeric hydrazones. A new chiral reagent was synthesized from enantiomerically pure (*S*)-levofloxacin by converting its carboxyl group

Original Article

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Transcending the Self through Shadows: a Psychological Study of *Pesum Padam* or *Pushpak*

*Avishek Deb

The cartography of life experiences, man or his variant ideologies, can be traced as an ontological association of the conflict between the real and its shadow. In order to introduce clarity, the word real is at more ease if it might be comprehended as the 'self'. In August 15, 1947, when the dream of sculpting a newly free nation began: scathed and free of colonial impacts, the dream was pictured through the onset of the 'great Indian dream', largely built on the architectural model of the free and the greater 'American dream'. But it suddenly got effaced due to the call of Emergency and all that was left for the 'self' in a post-colonial nation like India, was a ridicule of the 'shadow' of the virtual reality, while Bharat remained the real self in the macrocosmic structure: a nation where the common mass or proletarian section was being still exploited by the neo-colonial bourgeoisie. The duty of the individual self from the proletarian section that remains then, subsequent to the Emergency being called off belied in combating those nuisances of shadow of the overhauling politically silenced episode, is to transcend his real self through the characteristic feature of a shadowy Emergency, which is silence itself. Production in arts took place radiated with versatility where silence played the role as one of the main characters. In the literary field of studies, be it fiction, dramatic representation or even visual fiction (primarily recognised as cinema); silence plays either the role as the apparent epigram or the subversive anagram. For instance in the genre of fiction, in Salman Rushdie's *Midnight's Children*(1985), Emergency plays a key role in tearing apart the prolific virtues of the protagonist Saleem Sinai by silencing even his child Adam. Here Ádam transcends the silencing holocaust through a postmodern magic realistic technique and utters '*abracadabra*' while the nation meets its freed scalp from a dystopian matrix. In theatrical representation, Badal Sircar made his audience and readers

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FEMALE PREDICAMENT AND NATHANIEL HAWTHORNE: A CRITIQUE

Divya Gupta

Nathaniel Hawthorne has been recognized as a significant Puritan novelist who has given a new dimension to modern American fiction. His life, his ancestry and personality shaped his fiction. He has created some remarkable women characters. His every novel has a women character at the centre of the action. Each woman is distinguished by her typical traits and portrays the picture of puritan society. His women protagonists are, therefore, anti-patriarchy and become the central character. These women are born and brought up in the puritan era of seventeenth-century America. His women characters like Hester (*The Scarlet Letter),* Hilda *(The Marble Faun)*, Zenobia and Priscilla (*The Blithedale Romance*) etc. are continuously at war with their existing orthodox, superstitious society for their liberation and individual identity.

Generally, woman becomes an epitome of sacrifice, tolerance and a paragon of virtue and chastity to be appreciated by academicians, versifiers and priests. On the contrary, Nathaniel Hawthorne reflects the distinct shift in the sensibility of the novelist as well as reader. He was against existing witchcraft, trials and women extortion. So many female leads have to bear the allegations of witchcraft like Hester, Zenobia, and Miriam etc. Zenobia (*The Blithedale Romance*) was accused of being a sorceress with the power to tempt Satan.

Hawthorne's connection with woman characters is clearly visible when he co-relates the torture of society and their protracted adjustments with his life upheavals. His characters perfectly present isolation, fear, and bewilderment of his own life. He paints them realistically. He revealed their genuine problems that grow from the age-old dichotomy between woman and harsh puritanical dogmas. His reason to choose the seventeenth century puritan woman might be: a) His puritanical background as he followed the legacy of his forefathers. He was ashamed of their bigotry and witch hunting. b) His present sufferings due to witchcraft trials. c) He stands somewhere in the middle of Puritanism and Protestantism. His female characters are those who make consistent revolt against the existing and sustaining hypocritical dual faced males of the Puritan society. Hester (*The Scarlet Letter*)

From Inaction to Action : Sindi Oberoi in Arun Joshi's *The Foreigner*

Mukund Kumar Mishra *

In discussing the theme of alienation in Arun Joshi's novels, we are concerned with man's alienation from society, from one –self and from the world. Sindi Oberoi in *The Foreigner* is alienated from world. In her review of the novel, Meenakshi Mukherjee describes Sindi as "a perennial outsider". K. Radha sums up the career of Sindi Oberoi in the words "from detachment to involvement ". Madhusudan Prasad describes *The Foreigner* as " a study of an uprooted young man living in the later half of twentieth century,"[3] who looks out concernedly for moorings and meanings in his life.

The Foreigner is written in the form of a remembrance of things past, probes the existential predicament of Surrender Oberoi, Sindi, the nowhere man. O.P. Bhatnagar observes " A strange feeling of aloneness and aloofness.... Permeates the entire narrative and provides necessary texture and structure of the novel."[4] Sindi Oberoi is in search of his roots and meaning of his life. Born of an English mother and Indian father, he is not only a foreigner to the two cultures between which he settles, but also to his soul. He was not an African because neither of his parents belongs to Africa. He was not an English man because his father was an Indian. To America he was not in any way attached: "It is much too sterilized for me. Much too clean and optimistic and empty".[5] Sindi is not only isolated from the human world, in religion too, he faces the same music "Anyway I can't really be called a Hindu. My mother was English and my father, I am told, a sceptic." (Joshi: 1968, p 33). His responses to life are coloured by his childhood deprivation of love from his parents. Being brought up in a loveless world, he harbours in him a deep sense of insecurity.

After the death of his parents in an air crash near Cairo, he was brought up by his uncle gets his school education in Kenya, higher education in engineering in England and finally he lands up in Boston for his doctorate degree. But wherever he is, he is an alien. His having been brought up in a multicultural milieu gives him a sense of detachment, which he seems to relish throughout his life. Completely rootless, he becomes alienated from his world. Consequently he could not consider himself belonging to any country in particular. This feeling is more poignantly experienced by him when he, like other foreign students in United States, could not consider himself an ambassador of his country. But the sense of foreignness that afflicts him and makes him alienated, from the world is not only geographical, but also spiritual. This sense of alienation haunts him wherever he goes, alienation and foreignness is very obvious to anyone who meets him. Sheila, Babu's sister says to Sindi; "you are still a foreigner. You don't belong here." (ibid). In her very first meeting with Sindi, June, with whom Sindi fell in love later on, also feels it.

A person so alienated and rootless is bound to become cynical, misogamist and detached. Babu Rao Khemka, Sindi's friend , a student at Boston, writes to his sister Shiela about Sindi that he is "terribly cynical" and June's mother tells Sindi " you are just a cynic my boy". Even as a boy he was tired of living and had contemplated suicide. . Sindi himself confesses: "I was cynical and exhausted, grown old before my time, weary with my own loneliness." (ibid). It is a part of his cynicism and sense of alienation that he is utterly

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Multi Media Resources for ELT

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Technologically mediated communication as multimedia teaching method has become popular in universities as there are ample opportunities for the learners to enhance their knowledge in learning of English. Higher Education is not confined only with 'talk and chalk' method of teaching. United Nations Educational, Scientific, and Cultural Organization (UNESCO) has brought forward the system of education in the 21st century by emphasizing new methods of learning. Learning of English as a foreign language needs the mastery over four skills: Listening, speaking, reading and writing as the basic capabilities of a learner. It helps one to improve one's intercommunicative ability to achieve his goal of employability thereby improving his country's economic development and global exchanges as well. Multimedia teaching method with the functions of the net working system of the computers brings forth a lot many advantages in teaching method. It makes even mute English learners to have interesting interaction and it triggers their intelligence as they can communicate with the virtual characters set by the programme and it aids them to correct their own mistakes. The teachers are made more active and they can carry out quality education effectively through Computer aided instruction (CAI). With the blend of conventional teaching method and multimedia teaching method the process of teaching and learning English becomes an enjoyable experience.

English language skills are developed when multimedia resources are provided in the process of teaching and learning as it is a foreign language. With the mainstream of the University courses the multimedia classroom enables the students to interact with various texts thereby getting the strong foundation of improving their professional skills with language ability and having the advantages in using the multimedia course in teaching and learning. Learners can be more expressive with the visual media and it enables the slow learners to be very active. Speech is one of the highest manifestations of human intelligence. These multimedia resources make most of the students to be very active in spoken English especially the slow learners.

As English language is globalised, in every nook and corner of the world the number of students learning English is increasing day by day. For higher studies they need to develop communicational skills along with the professional skills. Research in various fields, reading of various Literature and Scientific theories need quite a standard in understanding of English. Here Multimedia resources give a solid foundation in the modern age to students to get knowledge from different sources to improve their skills. The proficiency of students has increased in developing language skills in English Electronic resources are useful for students in English learning process. Using of internet, computer, video, film and online procedures will certainly improve the skills of learning English language.

Worldwide Multimedia Resources: There are ample resources for teachers to use Multi media for their teaching. The following videos are the helping hands for the teachers: Teachers' domain Digital Learning Library PBS Learning Media; Next Vista ;Teacher Tube; iTunes U ; Teachers.tv; Science Multimedia resources; Simple Science video on Vimeo ; 125 Great Science Videos; podcasts and videos; History Animated; Snag Films; Snag Learning Documentary Addict; School Tube; The Wild Classroom; Blossoms; Science Magazine's Video Portal : Neo K-12; Media Literacy Clearinghouse; The Media Spot; American University's Center for Social Media Free Documentary TV ; YouTube Teachers; Utubersity; YouTube EDU ; Youtube.com/schools; YouTube Teachers ; Flip Your Minds before Flipping Your Classrooms.

Multimedia Classroom: *Vaughan*, Tay says "Multimedia finds its application in various areas including, but not limited to, advertisements, art, education, entertainment, engineering, medicine, mathematics, business, scientific research and spatial temporal applications" [1]

Traditionally classroom situation of teachers using "talk and chalk" method should be slightly modified with modern technology. In the classroom the use of multimedia is accepted everywhere. This brings happiness to the teacher and the taught and makes the learning practice more enjoyable. The smart classroom makes the students adjust their seats according to their needs as the required equipments are available to them. The English language class will be very active with enthusiastic students who are activated by the use of multimedia aids like videos, film and internet to enhance their linguistics and literary knowledge.

The Internet: In this computer age most of the Institutions of Higher Education have organized computerized courses on spoken and writing lessons using internet thereby making the students to go beyond the limits of traditional teaching. Resources on Visual and print are in abundance for the use of the learners in Electronic media. A nice collection of authentic texts in English language and Literature as print texts with visual effects as slide shows are quickly available which boost the confidence level of students. The reading and writing skills of the learners are highly activated automatically. They get expertise to understand networked connections of communication. It of course triggers the thought process and their creativity is stimulated.

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R.W. EMERSON HAS MADE *THE BHAGAVAD GITA* AND VEDIC THOUGHT AN INTEGRAL PART AND FOUNDATION OF WESTERN PHILOSOPHY AND HOW BRAZIL STANDS AS AN ASSET TO THE WORLD

Shiva Durga[1]
Kundan Singh[2]

ABSTRACT: R.W. Emerson was heavily influenced by The Bhagavad Gita. The highest in Western civilization is moving on the path delineated by the Great philosopher, RW Emerson. Thus it is important for all to understand his thoughts for success not only in the Western Civilization but also throughout the world. In fact R.W. Emerson has made *the Bhagavad Gita* and Vedic thought an integral part and foundation of Western philosophy. A prominent problem of Brazil today is the high, unequal distribution of wealth and income, one of the most extreme in the world and also a high level of poverty, these are due to history of colonialism and these are rightly public issues which are being addressed. Amerindians and Africans as slaves faced inhuman, harsh, cruel work conditions at many times. Slavery was abolished in Brazil due to internal developments and also due to developments in the Western world. The Whites in Brazil made great contribution to art, business, science, academics, sport, entrepreneurship and all other fields creating jobs for all. Upliftment of Blacks and Amerindians is done by Brazilian Government. Brazil is an asset to the world and to developing countries in particular.
KEY WORDS: Western civilization; impact of *the Bhagavad Gita;* discrimination; Swadharm and Jati Dharm; Karm Yog; Colonialism; Slavery.

INTRODUCTION

In my research paper 'On the impact of *the Bhagavad Gita* on RW Emerson' I have brought forth that R.W. Emerson was heavily influenced by The Bhagavad Gita. The highest in Western civilization is moving on the path delineated by the Great philosopher Emerson. Thus it is important for all to understand his thoughts

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EAST INDIA COMPANY, *BABOOS,* AND THE RISE OF INDIAN ENGLISH

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ABSTRACT

English had relatively few users in India until the end of the 18th century. But before the end of the next century, millions knew and used this language here. This growth seems to have been spurred substantially by the policy of the East India Company (EIC) to hire clerks, or "Baboos", in India, rather than bring them from home. The English that the Baboos wrote came to be called Baboo English (BE). BE was marked by a distinctive vocabulary, syntax and style. So far BE has been noticed only for its hyperboles, over the top deference, unusual and quaint words, a literal translation of idioms from the Indian languages, and long and winding sentences. That BE mostly had standard grammar, vocabulary, spelling and punctuation has gone generally unnoticed; this paper seeks to fill in this gap. It has three sections. Section I offers a genesis of the policy if EIC to hire clerks in India. The next section presents examples of BE. The last section shows how BE led to the growth of standard Written English in India.

Keywords: Baboo English, East India Company

Introduction

There have been few studies of "Baboo English" (BE) and of the beginnings of Indian English (IE)[1]. There, however, appears to be a link between them. Until the end of the 18th century, English had relatively few users in India. The total number of British themselves was under 1,500[2], and they mostly used Persian, Portuguese, or an Indian language with the "Natives"[3]. But by the end of the 19th century, there were millions in India who knew and used this language. This growth seems to have been spurred by the policy of the East India Company (EIC) to hire clerks, or "Baboos", in India, rather than bring them from United Kingdom. English written by these Baboos was marked by a certain kind of vocabulary and syntax, and, came to be known as "Baboo English" (BE).

This paper mainly argues that BE may have been "quaint", "funny" and "amusing" for some people[4], but it played a seminal role in the growth of English in India. BE was a product of a combination of some factors in the cultural and economic history of the British India of the 19th century. So far it has been noticed only for its hyperboles, over the top deference, unusual and quaint words, a literal translation of idioms from the Indian languages, and long and winding sentences. The fact that BE mostly had standard grammar, vocabulary, spelling and punctuation has gone generally unnoticed, careful investigation, however, shows that the beginning and spread of standard variety of at least written English in India can be traced in part to the BE.

Even today Baboo is generally a respectable word of address in North and East India for upper caste men of middle classes[5]. Appended to individual names, it means something like esquire in English. By about the end of the 18th century, many Baboos joined EIC as clerks or "*Baboo*"[6]. In course of time, "Baboo" also became a synonym for an "office clerk", and English written by them became known as "BE". Oxford English Dictionary defines "Baboo English" as

Anita Desai: Reading the Other Way

***Dr. Shyam Ji**

Anita Desai's distinct narrative technique is explicit in all her novels. Her deviation from the previously accepted norms of novel writing in English in India and experimentation with the non-traditional themes, form, structure and language and at the same time, her effort of retaining the original flavor of traditional techniques of narration and "point of view" of novel writing in English makes her a pre-eminent figure among all Indian novelists writing in English. Anita Desai's caliber of narration lies in the exploration of the interior world of her characters. In this regard, M. Charkranarayan, quoting Ralph Freedman, says:

> At the turn of century it was realized by many writers, prominent among whom are Andre Gide, Conrad, Herman Hesse, James Joyce, Virginia Woolf and Henry James that the traditional technique of novel writing, such as "point of view and narrative plot can be utilized not only to produce a likely world of action but to find formal analogues for a private world". (qtd. in Chakranarayan 82)

Undoubtedly, Anita Desai's power of analyzing the interior or the private world makes her modern. To Irwing Howe, modernity in fiction refers to "sensibility and style" (12) and it can be analyzed in terms of "critical placement and judgment" (13). Meena Belliappa's evaluative comment on the modern narrative technique that Anita Desai uses in her fiction deserves our attention:

> The focus of interest lies in the portrayal of states of mind rather than holding up the mirror to society. The fiction tends to be structured vertically. The effort is to capture the atmosphere of the mind and directly involve the reader in the flow of a particular consciousness. A marked learning towards such introversion is seen in Anita Desai's writing. (52)

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Thinking beyond the World: An Eco-post humanist Approach to Atwood's Oryx and Crake

*Yogeshwar Dwivedi

The term Posthumanism, despite having a layered of meanings, basically emphasises a change in human's understanding of self and their relationship to other non-human world and artifacts. The term post-humanism in ecocritical context concerns the very survival of human beings in the age of unregulated technological experiments. Atwood's novel *Oryx and Crake,* a depiction of the dystopian world, responds to such an issue. The text is a pertinent portrayal of Crake's post-apocalyptic wasteland as the inhabitant is the hybrid animals produced by genetic-engineering. In this regard, Dunlap writes, "Crake 'seeks [...] to move beyond human-dominated hierarchy and its associated suffering; to achieve this goal he creates the Crakers, thus enacting his ecotopian dream" (10). Crake's attempt to replace the existing human order turns the utopian vision offered by scientific exploration and provokes the researcher to study *Oryx and Crake* from a combined approach of ecocriticism and post-humanism.

Atwood's world in *Oryx and Crake,* though it is different in certain aspects of the real world at the same time shares many features of the contemporary world. The desire for sex and divided community living at different places in the novel, make the readers identify the world with their real world. Keenan, one of the keen observers of Atwood fiction, in the *Sydney Morning Herold* writes that Atwood "sees the book as a kind of warning, in the tradition of Orwell's 1984 or Aldous Huxley's *Brave New World,* in that it extrapolates from the present to show how the future could be". Further, Keenan explaining the vision of Atwood as our near future writes "much closer than (she) thought when (she started the book).....Jimmy is born. In fact, he's probably about four right now. And next year he'll be eight because it's growing exponentially" (Keenan). Atwood being a serious social thinker is well aware how quickly and efficiently human beings are devastating the ecological system. She believes that the unlimited scientific explorations at the cost of the ecosystem will

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Linguistic diversity and biodiversity

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Abstract

The paper provides a detailed description of the relationship between linguistic diversity and biological diversity (biodiversity henceforth). For the sake of ease of the presentation the paper has been organized into sections. Each section begins with a question. In Section 2 that follows the Introduction, diversity and its various types have been described. The third section deals with attitude, in general, toward diversity. Section 4 compares linguistic diversity with biodiversity, while Section 5 compares the pace of extinction *between* language and living organism. Sections 6 and 7 discuss linguistic diversity across the world and in India, respectively. Linguistic landscape in India has been discussed with reference to diversity in language and script and features of Indian multilingualism. The next three Sections 8–10 attempt to answer the questions, such as – why linguistic diversity occurs, how is it assessed and how languages are lost? Consequences of language loss and concern for language revitalization have been discussed in the last two Sections 11 and 12 of the paper.

Keywords: Linguistic diversity; Biodiversity; Language loss; Endangered; Linguistic landscape; Language revitalization

> Just as the 'information age' has commenced, two of the world's great stores of information, the diversity of biological organisms and of human languages are imperiled.
>
> (Brush, 2001:517, cited in Skutnabb-Kangas, 2002:7)

1. Introduction

In the age of globalized world and open market, more of the human issues like – the issues of language endangerment, language loss and language extinction got pushed further to the margins, which already were on the periphery. Very few, even among linguists, raised their concern and expressed their anxiety over the loss of language and erosion of linguistic diversity. The books like *When Languages Die: The Extinction of the World's Languages and the Erosion of Human Knowledge* by K. David Harrison (OUP, 2008), *Saving Languages: An Introduction to Language Revitalization* Lenore A. Grenoble & Lindsay J. Whaley (CUP, 2006), *Endangered Languages of the Andaman Islands* by Anvita Abbi (Munchen, Germany, 2006), *Language Death* by David Crystal (CUP, 2000) and *Vanishing Voices: The Extinction of the World's Languages* by Daniel Nettle and Suzanne Romaine (OUP, 2000) and many others not only reflect a positive change, but these publications also have helped a great deal in creating awareness about this very pertinent issue of language

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Premchand's Thakur's Well: An Impersonal Observation

Abstract

Premchand was eminent men of letters in Hindi and Urdu Literature. He was the foundling member of Progressive Writers' Movement. He has had given number of works in the form of novel and story. His works are notable for depiction of lives of downtrodden castes in traditional Indian social set up. His works got international readership for its perceptive insight into the lives of oppressed; and their analyses of impoverishment, exploitation and misfortune. His works exhibit "cultural curiosity". He has exposed layers of colonialism within Indian society in the name of religion and tradition. In spite of great contribution he became victim of severe criticism and remarked as an *insensitive* writer because he never gave any solution of depicted issues and problems either it may in *Godan*, *Gaban*, *Nirmala* or *Thakur ka* Kuan. My paper is a rejoinder on such criticism. Instead of insensitiveness Premchand applied the approach of Negative Capability in his select subjects; it may be social, cultural, ethical or scriptural. His work Thakur Ka Kuan (Thakur's Well) is an instance of such approach on gender and untouchability through the protagonist Gangi and Jokhu.

Keywords: Negative Capability, rejoinder, Thakur's Well, Criticism.

English is the mother tongue, has resulted in the catering of this mode even from *Big Bang Theory* belonging to the Hollywood domain. This dubious standard is oscillating the Indian English form between acceptance and negligence under the mnemonic pressures of suppressed and repressed memory of language globally. This paper attempts to explore the legitimation process of standardization of English and search the hurdles that keep Indian English from acceptance. It also aims to investigate the reasons hidden behind the norms of standardisation of Indian English in spite of the Indian's mastery over the language, thanks to the colonial oppression of 200 years; and, an additional 60 years of economic power game. It yet remains an exotic demonstration while, an impending half a billion of Indian English speakers are being churned to undergo the pangs of the purgatory signified by agents of torture like accent/voice training and likewise. English language has followed the worlds travelled by the dollar and the pound investments. So this language in its standard form is behaving as a non-static target.

Indian English is finding a global platform through Hollywood with Indian artists increasingly participating in movies and television series like *City of Joy*, *The League of Extraordinary Gentlemen*, *Slumdog Millionaire*, *Life of Pi*, *Big Bang Theory*, *Quantico*, and so on. The English spoken by these actors resemble the pure Indian English accent and the selection of such actors is made on this pre-requisite only. As Naseeruddin Shah confirmed in his interview, that the director of *The League of Extraordinary Gentlemen* required from him the Indian accent rather than the British or American one, it reflects the demand of Indian English as a verbal medium only for entertainment and display. The reasons are diabolically affecting the growth of the identity of Indian English speakers. Acceptance of the accent is bought in the employment sector at a fairly high price including a systematic cleansing of non-native speakers of English. But Indian English is yet to be legitimized in spite of its high demand as an exotic product.

The demand of meaning encased within words alters from time to time and cartographically too. Our mnemonic way of remembering history, digresses us from the words and their meanings. It often drops us from the chained links of memory, either suppressing or repressing them. That is why the change of era altered the understanding of Macduff's description of Macbeth as "unkind". Shakespeare's choice of words bears its fruits from the orchard of the Greek theology. In Greek theology, Macbeth's 'unkind' would mean 'unlike his kind – *humanitas*,' or the human kind (the other two kinds being *divinitus* and *feritus* – the divine kind and the animal kind respectively). So with the change of weather from an Elizabethan Britain to a Jacobean one, the perception or response to one word shifted from a serious 'unlike his

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Pinak Sankar Bhattacharya, **Avishek Deb**

'The Star Apple Kingdom'
Pinak Sankar Bhattacharya & Avishek Deb

The Dystopian Freedom: An Analysis of Derek Walcott's "The Star Apple Kingdom"

We are the hollow men
We are the stuffed men
Leaning together
Headpiece filled with straw. Alas!
Our dried voices, when
We whisper together
Are quite and meaningless
As wind in dry grass
Or rat's feet over broken glass
In our dry cellar (Eliot, n. pag.)

Darker grew the cloud as the storm brewed in the dying days of the worlds, rift apart between the wars – a subsequent loss of trust, humanity and integrity took place. Once the apocalyptic memory began to subside, it brought through TS Eliot, a sudden gush of the Indian Upanishadic dictate: the famous story of the birds in the *Manduka*. What Eliot sought to explain through the Indian text was man was at the same moment, filled with negativity and bereft of desire. The desire of the ideal state was fast regressing while there came, a growth of mutual hatred in each other's ideals. It was imminent to convey through this stream that modern era was set to fall short of the fulfilment of harmony. Since the advent of postmodern era, most of the nations lost their yearning of the ideal state that modern age was concerned about. The loss of order, integrity and faith should have actually ushered in an idea – the idea of vendetta, as resonated in through the 1605, Guy Fawkes episode of The House of Lords blow-up conspiracy:

"Remember, remember the fifth of November of gunpowder treason and plot. I know of no reason why the gun powder treason should ever be forgot." (McTeigue)

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Revisionist Fiction and Religious Dogma

The Hidden Undercurrents

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Abstract

The reinterpretation of religious ideas and beliefs through literary works has become an established literary genre. While some of these works seek to challenge religious authority on historical grounds, others question the relevance of traditional religious beliefs in providing solutions to our existential problems. Two works in this genre, the well-known thriller *The Da Vinci Code* by Dan Brown and the critically acclaimed book *The Gospel According to Jesus Christ* by Nobel Prize winning Portuguese author José Saramago, exemplify these diverse tendencies in employing fiction to probe religion. In the former, the authenticity of religious facts is questioned while the latter utilizes fiction to show the inadequacy of religious beliefs in answering our deepest problems. This paper contends that the confrontation with religious dogma in these two works is an expression of intellectual movements and ideologies, *The Da Vinci Code* relying on New Age ideology while *The Gospel According to Jesus Christ* drawing on existentialist themes. It also shows how these ideologies themselves are driven by the underlying religious polarities of the sacred and the profane.

Keywords: sacred, profane, mysticism, new age, existentialism

Introduction

Literature and religion make strange bedfellows; mostly, they get along well but there are times when the relationship is marred with bitterness. None other than T. S. Eliot believed that religion and literature have much to gain from each other. Lamenting the secularization of literature, Eliot remarked that modern man ". . . is simply unaware of, simply cannot understand the meaning of, the primacy of the supernatural over natural life" (352). Talking specifically about the relationship between literature and Christianity, he says that the

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INDIA UDAY: THE DIALECTICS OF GLOBALIZATION AND INDIAN LITERATURE

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In the matrix that preceded the two great wars, the world bought the view of 'I am Sir Oracle, /And when I ope my lips let no dog bark!'.[1] Here Sir Oracle represents that particular nation who supposedly enjoyed the most out of the fruits of industrialization. In the post World War situation, there was a shift in the political nexus where two dogs began to bark and Sir Oracle kept silent. In a war of political interests, the public view can often go against the view of the state policies. At that point of imminent emergency, the state secretly reforms its policies in such a manner where the spot light of its political foe is shifted towards something else making the original dumb temporarily. It was this policy that Uncle Sam embraced by shifting its spot light from Sir Oracle to the Bolshevik Russia. Then started a mammoth cold war that lasted for nearly four decades, till the great revelation of open market economy through Perestroika and Glasnost. Before Russia could clearly understand this pleasure of stealing the spot light, Uncle Sam shifted to the third world countries to shower the manna of globalization. What happens in this constant shifting of gaze is that the receiving ends do not get ample time to comprehend the basic flaw of the 'imported' theory.

In the knuckle based comprehension of history, the crevice-like space between two knuckles generally passes unstated. Psychoanalysts term these as 'repressed memory' and 'suppressed memory'.[2] In the medieval India, there were infinite amount of translated discourses exported out into the globe. This factual revelation was relocated by Harish Trivedi who opines that: The earliest recorded transaction between Indian literature and Western literature was perhaps the translation of the Panchatantra, a collection of fables compiled around the 5th century A.D., successively from Sanskrit through Middle Persian, Arabic, Greek, Hebrew and Latin into a number of modern European languages, including into Czech, for example, in 1528, and through Italian into English in 1570 by Sir Thomas North as The Moral Philosophy of Doni; the text proved to be "the source of much European folklore". (122-23). In this regard, what Trivedi tries to serve in context to this paper is that the play of power politics and gaze shifting acts in

the form of imparting knowledge to the world was way earlier than the others could even think of. It was hamartia perhaps which later reduced India to an exotic object of representation. At that point of time India used to serve as the intellectual source of enlightenment. The unique aspect of this phase was India was not suffering a dearth of knowledge discourse in any field as there was hardly any inflow of global academic current. It was the world that was searching for an *Uday*.

Much later, when the tide started to flow in the alternative direction, it was seen that India had dreamt a nightmare in the form of colonization. This vacuum was created due to several socio-economic and political conditions. Chronologically speaking, the death of Sanskrit in academic practices due to a flourishing Mughal Period came first and it was followed by the disinterestedness in the propensity of Persian language with a dying Mughal Empire and the advent of English through colonialism along with the printing press. It was not that there was a lack in the number of good Persian and Urdu writers; rather it was the snobbery of the newly English educated readers who began to create a huge demand of the Western literature that the booksellers tried to fulfill with instant readiness. Due to the impact of European literature, there was a subsequent response in the Indian literature where multiple genres were created. The relation between the literature and society, culture and economy being interdependent on each other, Indian society and culture gained a lot through the modernity and advancement seen in the European literature, when it came to addressing and, at times, erasing social issues and malpractices. A closer look at such abolitions and absolutions offers us the realization that behind every literary idea, there will always be a wave in the base (social movements) that has caused a ripple on the superstructure (in this case literature). So, relatively speaking, the darkness that persisted in Indian society was illuminated by the Enlightenment of the West now through an import of knowledge. Various European literary and social movements have inspired the Indian writers of different linguistic backgrounds. They used and pruned that enlightenment according to their own suited interests and socio-economic and political ambience. This phase continued upto the 1980s.

After the departure of the English in 1947, the newly found intellectual market of Indian literature attracted the gluttony of the American global empire. This stimulus was responded and carried out quickly as Soviet Russia had already tolled its death knell post Perestroika and Glasnost. Unfortunately, India both in its pre-colonial and post-colonial time has experienced the status of being an exotic object. The only difference is the spot light was provided by globalization instead of colonialism. Along with the departure of the Nehruvian economic policy, there was a surge of a new generation of

The Bhagavad-Gita: An Excellent Guide to Humanity

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The Bhagavad-Gita among other books on true happiness, morality and knowledge is like the **Sun in our Solar System**. Its effulgence and shining requires no evidence, it is self evident and also incomparable to any other source of light required for life in the solar system. *The Bhagavad-Gita* is capable of imparting life force, discipline, grace and Sanatan outlook into those who approach it with Bhakti, devotion as per BG 14.17, .20, .26 and.27. *The Bhagavad-Gita* is really an excellent guide to the whole humanity in the world. In fact R.W. Emerson has made the Bhagavad-Gita and Vedic thought an integral part and foundation of Western philosophy. Being an ardent follower RW Emerson said, "I owed a magnificent day to *the Bhagavad-Gita*. It was as if an empire spoke to us, nothing small or unworthy, but large, serene, consistent, the voice of an old intelligence which in another age and climate had pondered and thus disposed of the same questions which exercise us." "Those who meditate on the Gita will derive fresh joy and new meanings from it every day" said Mahatma Gandhi. *The Bhagavad-Gita* does not guide only Arjun it is meant for all of us irrespective of caste, creed and religion. The one who understands the philosophy between the soul, material nature and modes of nature (also called constitution of thought, this includes virtue and vice) attains liberation from the material world as per BG 13.24.

In *the Bhagavad-Gita* we see the inevitability and occurrence of War made Arjun and many others heroes. The importance of soldier was established in society. This is an aspect of Dharm". R.W. Emerson states, "The frost which kills the harvest of a year, saves the harvests of a century, by destroying the weevil or the locust." Some evil action is necessary for greater good. "Though the War in Mahabharata caused destruction of life, it caused destruction of Adharm and establishment of Dharm which is required for successful life of mankind. One retains peace even in injury and death in War due to the concept of Dharm. We in the future life times are benefitting from this. In this context the evil of War is a 'better doctor' than the good of peace. So R. W. Emerson states, "Without war, no soldier; without enemies, no hero". Evil action accompanies the good. The Bhagavad-Gita teaches us the science of humanity which is matching to all irrespective of caste, creed an religion. It is the best teacher to the whole humanity on Earth.

The Bhagavad-Gita is a crest jewel work of Vedic culture. Its objective and specific slokas (verses) are supported by the entire works of Vedic philosophy such as the Vedas, Puranas and the Epic Mahabharat. Its concepts are for all time and also timeless. RW Emerson has expressed these 'old ideas in a new age' as seen in his '*Transcendentalism*'. He has implanted Vedic concepts in western culture and benefitted the entire western culture and also non western nations influenced by western culture.

A work like *the Bhagavad-Gita* is capable of imparting life force, discipline, grace and Sanatan outlook into those who approach it with Bhakti, devotion as per BG 14.17, .20, .26 and.27. What an individual imbibes depends upon his capacity, capability and intuition. Other religions have started at some point in time; they depend on some persons who started them. Their relevance reduces with changing situation and passage of time. However Sanatan Vedic Dharm as explained by *the Bhagavad-Gita* transcends time. In fact Time itself is an aspect of God. Sanatan Dharm is also relevant for all times. The Vedic concept of *the Bhagavad-Gita* waits for those who approach it, within whom it lives brighter as they are on the path to Brahman. This is as per BG 11.55 "He who is doing my work, he who is engrossed in my Bhakti, (Devotion) free from the contamination of fruitive activities, considers me the supreme goal of his life, is without enmity and friendly to all, he certainly comes to me". In fact this shlok is widely considered to be of utmost importance.

Swami Vivekanands said to Americans;

"I would advice those of you who have not read that book (the Bhagavad-Gita) to read it. If you only knew how much it has influenced your own country even! If you want to know the source of Emerson's inspiration, it is this book, the Gita. He (Emerson) went to see Carlyle, and Carlyle made him a present of the Gita (Bhagavad-Gita); and that little book is responsible for the Concord Movement. All the broad movements in America in one way or the other, are indebted to the Concord Party. The central figure of the Gita is Krishna." 1

The Bhagavad-Gita has influenced the following foreign authors and philosophers; American Poet Emma Lazarus, Max Muller, Immanuel Kant, Henry David Thoreau, Plato, Rabbi Nahmanides of 13th Century of Catalonia, French philosopher Victor Cousin, James-I of Aragon, John Chapman, Rudolph Steiner, Mahatma Gandhi, Albert Einstein, Madiba of South Africa, George Holyoake, Theodore Parker, Walt Whitman, John Brown, Abraham Lincoln, Richardson, Robert Frost, Wallace Stevens and Hartcrane, T.S. Eliot, Cardinal Dulles, Harold Bloom, Carl Jung, Dr. Albert Schweitzer and Theodore Parker and the Indian saints, philosophers like Sri Ramakrishna, Swami Vivekananda, Rishi Valmiki, Kalidas, Sri Adi Shankaracharya, Chandra Gupta Maurya, Vyasa, Sri Ramanuja and Sri Chaitanya.

"R.W. Emerson considered himself a Brahmin. He was made so by Nature herself. Brahmin is understood in the Bhagavad-Gita as knower of Brahman. This is as per the Bhagavad-Gita Chapter18 Shloka 42. I have shown that R.W. Emerson was a Brahmin due to his views in his essays 'Self Reliance' and 'Circles' which are the effects of reading the Bhagavad-Gita". 2

As per Swami Vivekandanda; "So far as the Bible and scriptures of other Nations agree with the Vedas, they are perfectly good, but when they do not, they are no more to be accepted. So with, the Koran" 2 "Everything is bounded by that book (Vedas) - nothing (can go) beyond that, because the knowledge

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The Bhagavad-Gita Turns a Teacher into the Best Teacher

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Lord Krishna, the Jagat Guru-the teacher of the Universe, gives the Nectar, the Bhagavad-Gita to the world through Arjuna, as we are all confused and grief stricken like him. The Gita is a shastra, given to clear our confusion about various aspects of life and to direct us to perform our duties as our Dharm. It is absolutely important to each one of us. Gita is the conversation between Arjuna and Sri Krishna in the battle field of Kurukshetra. Gita teaches us the essence of Upanishads and it is also called "Gitopanishad". This event took place in Dvapara Yuga, the third of the four great epochs of time. We are now in Kali Yuga, the fourth epoch. It is almost 5,150 years since the Gita was born. It is the great teacher to all ages from Dvapara Yuga onwards. All 18 Chapters are the fruitful lessons to all mankind hence it is an excellent guide to humanity.

Some of the great writers of the intellectual world have stated about the Bhagavad-Gita proves that the Bhagavad-Gita turns a teacher into the best teacher which are given below:

"The Bhagavad-Gita has a profound influence on the spirit of mankind by its devotion to God which is manifested by actions". - Dr. Albert Schweitzer.

"The Bhagavad-Gita is the most systematic statement of spiritual evolution of endowing value to mankind. It is one of the most clear and comprehensive summaries of perennial philosophy ever revealed; hence its enduring value is subject not only to India but to all of humanity". -Aldous Huxley.

"When I read the Bhagavad-Gita and reflect about how God created this universe everything else seems so superfluous". -Albert Einstein[1]

"In the morning I bathe my intellect in the stupendous and cosmogonal philosophy of the Bhagavad-Gita, in comparison with which our modern world and its literature seem puny and trivial". - Henry David Thoreau.

The Chapterization of the Bhagavad-Gita gives the clear picture of Lord Krishna's teachings in an orderly way to understand which are given below: The Bhagavad-Gita Chapter One deals with the observing the Armies on the Battlefield of Kurukshetra. Chapter Two deals with the contents of the Gita summarized. Chapter Three deals with the Karma-yoga. Chapter Four deals with the transcendental knowledge. Chapter Five deals with the Karma-yoga - Action in Krishna Consciousness. Chapter Six deals with the Dhyana-yoga, Ashtanga-yoga, a mechanical meditative practice. Chapter Seven deals with the Knowledge of the Absolute. Chapter Eight deals with the attaining the Supreme. Chapter Nine deals with the most confidential knowledge. Chapter Ten deals with the Opulence of the Absolute. Chapter Eleven deals with the Universal Form. Chapter Twelve deals with the Devotional Service (Bhakti-yoga). Chapter Thirteen deals with Nature, the Enjoyer and Consciousness. Chapter Fourteen deals with the Three Modes of Material Nature. Chapter Fifteen deals with the Yoga of the Supreme Person. Chapter Sixteen deals with the Divine and Demoniac Natures. Chapter Seventeen deals with the Divisions of Faith and Chapter Eighteen concludes with the Perfection of Renunciation. In a very systematic that everyone could understand Lord Krishna teaches the humanity through Arjun.

Bhagavad-Gita and the teachings of Lord Krishna and its effect on Human Life: It is clearly explained in the Bhagavad-Gita the difference between materialistic and spiritualistic ways of living. Spiritual aims are far better than materialistic aims. "Material creation is subject to permanent circle of creation and destruction. This is as per the Vedic concept of cycle of Yugas which leads to destruction and renewal. Voices for improvement in Material creation may achieve improvement, but ultimately this too is destroyed in 'forever renewed and forever destroyed' cycles. This is as per BG 9.7, 10.39. Hence such voices are a part of "The downward tendency and proneness of things". This is as per BG Chapter 13 and 14 which explain the aims for material to be below aims for spiritual. Principles of marketability belong to 'Arth' and are lower than the stage of Brahman realization".[2] Karm as a subject of the Bhagavad Gita teaches - Killing a man though objective has different subjective contexts, whether it was committed in burglary, dispute, murder, manslaughter, in war etc. Accordingly the law of karm will carry different effects to the doer.

We shall now understand the Vedic concept of Dharma. Swadharm actually means own dharma, as per Swami Vivekananda. Each one has to do his Dharma in whatever field he is. Swadharm or own work is worship. If he does it by sacrificing the fruit of it to the Creator he becomes a liberated soul. Brahmin, Kshatriya, Vaishya and Sudhra are not the caste our of birth but out of the duties or services done by human beings.

"All living beings are unexpressed Brahman. Expression of the Brahman already within oneself is the aim of life. This is mukti (Eternal freedom). It can be achieved through Karm, knowledge, control of the mind, and Bhakti Yogas.

"Arjun is addressed by Krishna at various places in the Bhagavad-Gita as "Bharat" so the teaching to Arjun is actually to the entire country. At that time it constituted the entire world so it was for the entire world. Arjun was a Brahmin since he was given the knowledge of Brahman. Arjun was a Kshatriya as per his 'nature' which means his qualities and not birth. As per his birth Arjun was of mixed parentage and therefore not a Kshatriya as per the concept of heredity. Since he was also engaged in cow protection, farming and tilling the land, along with his brothers in various episodes of Mahabharat, he was also a Vaishya. Since he was serving and obeying the

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ORIGINAL ARTICLE

Analytical study of effective biodegradation of *p*-cresol using *Serratia marcescens* ABHI001: application in bioremediation

Tripti Singh[1,2] · **Neha Srivastava**[2] · **A. K. Bhatiya**[1] · **P. K. Mishra**[2]

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Abstract This study evaluated the capability of *Serratia marcescens* ABHI001 to effectively degrade *p*-cresol through different techniques. The molecular identity of the laboratory isolate *S. marcescens* ABHI001 was confirmed through the 16S ribosomal DNA gene pattern, and its morphological features were investigated through field-emission scanning electron microscopy. In addition, the degradation behavior of the isolate for cresol was verified using several techniques, including UV–visible spectroscopy, followed by high-performance liquid chromatography (HPLC), gas chromatography, and Fourier transform infrared spectroscopy. The maximum degradation percentage of 85% for *p*-cresol could be achieved after 18 h of incubation with *S. marcescens* ABHI001. The formation of *p*-hydroxybenzaldehyde, *p*-hydroxybenzoate, and protocatechuate metabolites was confirmed through HPLC. The study results indicate that *S. marcescens* ABHI001 may have applications in the bioremediation of organic pollutants, such as *p*-cresol.

Keywords Organic pollutants · *p*-Cresol · Biodegradation · *Serratia marcescens*

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Introduction

Industrial effluents in the form of wastewater contain several toxic pollutants, among which phenolic compounds, such as cresols, are well-known pollutants (Ansari et al. 2016). A molecule of cresol has a methyl group substituted onto the phenol ring (Michałowicz and Duda 2007). Cresol is produced by the methylation of phenol or by the hydrolysis of chlorotoluenes (Choquette-Labbé et al. 2014). Based on the position of the methyl group on the carbon–carbon bond, cresols are characterized as *ortho*-, *meta*-, and *para*-cresol (*o*-, *m*-, and *p*-cresol, respectively). Among these isoforms, *p*-cresol is a highly toxic pollutant and a carcinogen; thus, exposure to even a low concentration of *p*-cresol results in adverse effects on the central nervous system, cardiovascular system, lungs, and the kidneys (Basheer and Farooqi 2012; ATSDR 2008). Moreover, *p*-cresol is often used in disinfectants, fumigants, and explosives and for manufacturing synthetic resins (Balarak and Mahdavi 2016; Berge-Lefranc et al. 2012). The Environmental Protection Agency (EPA) has classified *p*-cresol as a group C pollutant (ATSDR 1990). Moreover, the World Health Organization recommends that the acceptable concentration of *p*-cresol in portable water is 0.001 mg/L (WHO 1963). Because of its potentially toxic nature, there is an urgent need to reduce *p*-cresol levels in wastewater before it is discharged into the environment (Fang and Zhou 2000).

The shortcomings of physical and chemical treatment methods have long been argued, including the production of toxic intermediates, high cost of disposing final effluents, and partial mineralization of compounds (Saxena et al. 2013; Lim et al. 2014). By contrast, the biodegradation method has several advantages, including relatively low cost, no chemical use, and high public acceptance.

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RESEARCH ARTICLE

System Level Meta-analysis of Microarray Datasets for Elucidation of Diabetes Mellitus Pathobiology

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Abstract: ***Background:*** Type 2 diabetes (T2D) is a common multi-factorial disease that is primarily accounted to ineffective insulin action in lowering blood glucose level and later escalates to impaired insulin secretion by pancreatic β cells. Deregulation in insulin signaling to its target organs is attributed to this disease phenotype. Various genome-wide microarray studies from multiple insulin responsive tissues have been conducted in past but due to inherent noise in microarray data and heterogeneity in disease etiology; reproduction of prioritized pathways/genes is very low across various studies.

Objective: In this study, we aim to identify consensus signaling and metabolic pathways through system level meta-analysis of multiple expression-sets to elucidate T2D pathobiology.

Method: We used 'R', an open source statistical environment, which is routinely used for Microarray data analysis particularly using special sets of packages available at Bioconductor. We primarily focused on gene-set analysis methods to elucidate various aspects of T2D.

Result: Literature-based evidences have shown the success of our approach in exploring various known aspects of diabetes pathophysiology.

Conclusion: Our study stressed the need to develop novel bioinformatics workflows to advance our understanding further in insulin signaling.

Keywords: Type 2 Diabetes, Insulin-signaling, Microarray, Meta-analysis, Bioconductor, Gene-set analysis.

1. INTRODUCTION

Diabetes has been considered a serious health problem; World Health Organization (WHO) has placed it among one of the four priority non-communicable diseases (NCD) and called for action on World Health Day 2016 [1]. There are an estimated 422 million adults with diabetes [1]. This complex metabolic condition depends on various factors such as high-calorie intake, sedentary lifestyle, obesity, and stress, as well as aging. Though global estimates of diabetes prevalence for type 1 and type 2 do not exist, the majority of people with diabetes are affected by type 2 diabetes which is generally attributed to insulin resistance in target organs and tissues; liver, skeletal, adipose and peripheral blood cells. T2D progresses through different disease phenotypes *viz*. Normal Glucose Tolerance (NGT) to Impaired Glucose Tolerance (IGT), Hyperinsulinemia (HI) and Insulin Resistance (IR) and eventually leads to overt diabetes. Different cultural settings clearly implicate the prevalence of T2D. There is definitely a pressing need to elucidate the mechanism underlying diabetes pathogenesis through the identification of disease-implicated signaling, and metabolic pathways at genome-wide level in order to design effective treatment.

Various genome-wide microarray studies pertaining to different disease phenotypes (IGT, IR, and T2D) have been conducted in past by various research groups and data is available at public repositories like Gene Expression Omnibus (GEO) [2] and Array Express [3] *etc*. However, due to inherent noise in microarray data as well as genetic differences in study population, disease heterogeneity, and non-uniform physiologic condition at the time of sampling and method of sampling, replication of most of the genes in different studies was very poor [4].

This situation clearly demands a need for robust bioinformatics meta-analysis of these microarray datasets, independent of geographical or other variables. In this study, we described a novel approach of the meta-analysis of microarray datasets to elucidate common signaling and metabolic pathways in an attempt to shed light on diabetes pathobiology.

2. MATERIALS AND METHODS

2.1. Microarray Data & Analysis Tools

We have downloaded twelve microarray datasets pertaining to various case-control diabetic studies from GEO. Those

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ORIGINAL ARTICLE

Biodegradation of thermally treated low density polyethylene by fungus *Rhizopus oryzae* NS 5

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Abstract Polythene is considered as one of the important object used in daily life. Being versatile in nature and resistant to microbial attack, they effectively cause environmental pollution. In the present study, biodegradation of low-density polyethylene (LDPE) have been performed using fungal lab isolate *Rhizopus oryzae* NS5. Lab isolate fungal strain capable of adhering to LDPE surface was used for the biodegradation of LDPE. This strain was identified as *Rhizopus oryzae* NS5 (Accession No. KT160362). Fungal growth was observed on the surface of the polyethylene when cultured in potato dextrose broth at 30 °C and 120 rpm, for 1 month. LDPE film was characterized before and after incubation by Fourier transform infrared spectroscopy, scanning electron microscopy, atomic force microscopy and universal tensile machine. About 8.4 ± 3% decrease (gravimetrically) in weight and 60% reduction in tensile strength of polyethylene was observed. Scanning electron microscope analysis showed hyphal penetration and degradation on the surface of polyethylene. Atomic force microscope analysis showed increased surface roughness after treatment with fungal isolate. A thick network of fungal hyphae forming a biofilm was also observed on the surface of the polyethylene pieces. Present study shows the potential of *Rhizopus oryzae* NS5 in polyethylene degradation in eco friendly and sustainable manner.

Keywords Low density polyethylene · *Rhizopus oryzae* · Biodegradation · Biofilm · Fungal hyphae · Environment

Introduction

Plastics are synthetic long chain polymer molecules (Scott 1999) and its consumption is increasing at a rate of 12% per annum globally and approximately 0.15 billion tones of synthetic polymers are generated worldwide annually (Premraj and Doble 2005; Leja and Lewandowicz 2010; Das and Kumar 2014). Aggregation rate of plastic waste in the environment is 25 million tons/year (Orhan and Buyukgungor 2000; Nayak and Tiwari 2011; Baruah 2011; Kaseem et al. 2012) and consequently causes a serious environmental peril (Sivan et al. 2006; Thompson et al. 2004). Currently used polyethylene thin plastic films and sheets used in product packaging are Polyolefin-derived plastics. Further out of these LDPE constitutes, ≃60% of the aggregate plastics production of plastic bags and most prevalent solid waste (Harper 2006). LDPE is characterized by good strength, resistance to chemicals, plasticity, and limpidity. Hydrophobicity interferes its availability to microorganisms (Albertsson and Karlsson 1993). These are characteristically inert their degradation rate is very slow approximated in decades and, therefore, they persist in the nature (Potts 1978). Its recalcitrant nature is due to its high molecular weight, complex three-dimensional structure (Contat-Rodrigo and Ribes Greus 2002; Nanda et al. 2010).

Disclaimer The article is not in consideration under any other journal in full or in part. No data or figures have been fabricated or manipulated.

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Comparison of IS*900* PCR with 'Taqman probe PCR' and 'SYBR green Real time PCR' assays in patients suffering with thyroid disorder and sero-positive for *Mycobacterium avium* subspecies *paratuberculosis*

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Mycobacterium avium subspecies *paratuberculosis* (MAP) is the cause of chronic incurable granulomatous enteritis in domestic livestock and has been associated with number of human autoimmune disorders like thyroiditis. Indigenous ELISA kit was used to monitor the sero-status of MAP infection in the patients of thyroiditis confirmed by pathology laboratories using 3rd generation chemi-luminescent assays. Sero-positive patients for MAP infection were further investigated using traditional PCR and newer (Taqman probe PCR & SYBR green Real time PCR) assays targeting IS*900* gene. Screening of 76 patients suffering with thyroid disorders, 36.8% (n=28) were sero-positive for MAP infection. Further screening of blood samples of 28 sero-positive patients by IS*900* PCR, Taqman probe and SYBR green Real time based IS*900* PCR, 25.0, 32.1 and 35.7% were positive for MAP infection, respectively. Molecular assays targeting IS*900* gene revealed 'good agreement' in the tests. Taqman probe and SYBR green Real time based IS*900* PCR assays were 100.0 and 85.7% sensitive, respectively and highly specific as compared to IS*900* PCR for the detecting MAP infection. Study indicated the need for investigating the role of MAP in initiation and progression of thyroid disorders and on the genetic susceptibility of thyroid patients to MAP infection. In the absence of control programmes in the domestic livestock population, there is large scale exposure of human population to MAP infection.

Keywords: *Mycobacterium avium* subspecies *paratuberculosis* (MAP), thyroid disorders, indigenous ELISA kit, Taqman probe PCR, Real time IS*900* PCR

Introduction

Mycobacterium avium subspecies *paratuberculosis* (MAP) is the cause of chronic and incurable Johne's disease (JD) in domestic ruminants leading to granulomatous inflammation of intestines. Infected lactating cows, buffaloes and goats[1] excrete MAP in their milk. Thus, bacilli are continuously entering human population through milk and milk products[2,3]. Pasteurized milk and dairy products like cheese may not be always free of MAP infection[4]. Epidemiological evidences correlated exposure of MAP with incidence of a number of human autoimmune disorders like Crohn's disease, Rheumatoid arthritis, Type 1 diabetes melitus (T1DM), Hashimoto's thyroiditis (Hypothyroidism), Autoimmune arthritis, Multiple sclerosis *etc*[5-10]. Clinical symptoms of Crohn's disease closely mimic those found in animals suffering with Johne's disease[11]. Similarly contaminated baby milk powder exposes children and immuno-compromised people (at high risk) to MAP infection[12]. Consumption of raw milk has been recognized as major risk factor in the development of autoimmune diseases like Hashimoto's thyroiditis. Environmental microorganisms including MAP have been thought to trigger autoimmune responses in genetically susceptible individuals[13]. In the absence of cost effective indigenous diagnostic kits and high cost of imported kits, there is lack of information on the bioload and biotype profiles of MAP infecting both animals and human population in the country. Despite

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Influence of exogenous supplementation of IGF-I, cysteamine and their combination on *in vitro* caprine blastocyst development.

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Abstract : The present study was carried out to investigate the putative beneficial effects of insulin-like growth factor-I (IGF-I) and cysteamine supplementation alone or their combination on *in vitro* embryo development competence of fertilized goat oocytes. Presumptive zygotes (18 h post insemination) were randomly assigned for *in vitro* embryo development in embryo development medium (EDM) supplemented with IGF-I (Gr. 1), Cysteamine (Gr. 2), IGF-I+Cysteamine (Gr. 3) and Control containing only EDM (Gr. 4). Statistically non-significant difference was observed in cleavage rate among all the treated groups. Morula formation rate was significantly higher in IGF-I supplemented group compared to IGF-I+cysteamine supplemented and non-supplemented (control) groups. Furthermore, supplementation of IGF-I, cysteamine and IGF-I+cysteamine in embryo culture medium significantly improved blastocyst formation rate compared to control. However, a nonsignificant difference in blastocyst formation was observed among the supplemented groups. These findings lead to the conclusion that under *in vitro* conditions, supplementation of IGF-I and cysteamine alone or combination in IVC media were equally effective in embryo development and blastocyst production, however, this effect was significantly higher as compared to non-supplemented group (control).

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REVIEW

Mycobacterium avium subspecies *paratuberculosis* – an important food borne pathogen of high public health significance with special reference to India: an update

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ABSTRACT

This review underlines the public health significance of 'Indian Bison Type' of *Mycobacterium avium* subspecies *paratuberculosis* (MAP) and also its potential as 'zoonotic infection'. In the absence of control programs, bio-load of MAP is increasing and if we take total population of animals (500 million plus) and human beings (1.23 billion plus) into account, the number of infected animals and human beings will run into millions in India. Our research on screening of over 26,000 domestic livestock for MAP infection using 4 different diagnostic tests (microscopy, culture, ELISA and PCR), during last 31 years has shown that the average bio-load of MAP in the livestock population of India is very high (cattle 43%, buffaloes 36%, goats 23% and sheep 41%). 'Mass screening' of 28,291 human samples between 2008–2016 revealed also high bio-load of MAP. It has been proved that MAP is not in-activated during pasteurization and therefore live bacilli are continuously reaching human population by consumption of even pasteurized milk and other milk products. Live bacilli have also been recovered from meat products and the environment thus illustrating the potential of MAP as pathogen of public health concern. However, at present, there is inadequate scientific evidence to confirm a conclusive link between MAP infection and Johne's disease in ruminants and some cases of Crohn's disease in human beings.

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KEYWORDS
Johne's disease; *Mycobacterium avium* subsp. *paratuberculosis*; food; public health; zoonotic; pathogen; disease; review

1. Introduction

Mycobacterium avium subspecies *paratuberculosis* (MAP) is a major animal pathogen which has inflicted huge losses to the livestock industry in India and globally (Vinodhkumar et al. 2013; Rawat et al. 2014; Bauman et al. 2016). Johne's disease (JD) caused by MAP is endemic in domestic livestock population wherever investigated (Singh et al. 2014a). In a population suffering from sub-clinical to clinical disease animals continue to shed MAP bacilli in their milk and feces (Streeter et al. 1995; Shankar et al. 2010). Contamination in the milking parlor is one of the commonest sources of contaminating milk with MAP (Nacy and Buckley 2008). MAP is a major food borne pathogen and has been reported to spread to young animals born to infected mothers of each of domestic livestock species as well as human beings (Waddell et al. 2008; Naser et al. 2009; Kumar et al. 2010; KuKanich et al. 2013; Hussain et al. 2015), through consumption of milk and milk products. It is very difficult to diagnose the MAP infection in the early stage of the disease (sub-clinical). MAP may colonize in the intestines of infected animals for years without exhibiting overt symptoms (clinical disease). However, sub-clinically infected animals continue to shed MAP bacilli in their milk (Shankar et al. 2010) and feces, thereby contaminating pastures, environment and food chain for long time (Singh et al; 2012b). Of note, live MAP bacilli have also been recovered from pasteurized milk (Ellingson et al. 2005, Shankar et al. 2010), infant formulation made from pasteurized milk products (Hruska et al. 2011, Acharya et al. 2017), surface water and soil samples (Singh et al. 2012b), cow manure "lagoons" that leach into surface water and municipal / tap water (Collins 2003), thus providing MAP multiple routes of transmission to infect human population.

Cow manure in solid and liquid forms is applied as fertilizer in agricultural land (Grewal et al. 2006; Gill et al. 2011), plants (upper greens, roots) and soil (surface and depth of 80 cm from plant roots) of agricultural and grazing areas hold MAP for longer period of time (Kaevska et al. 2014). MAP being thermotolerant

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Revisited immune reactivity between native semi-purified protoplasmic (caprine) versus commercial purified protoplasmic (bovine) antigens for the screening of goat herds endemic for Johne's disease

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The present study compared the immune-reactivity of 3 antigens of *Mycobacterium avium* subspecies *paratuberculosis* (MAP) sourced from different geographical regions and livestock species for the diagnosis of Johne's disease (JD) in goats. Screening of 360 faecal and serum samples of goats by microscopy, i-ELISA, b-ELISA and r-ELISA gave 56.9, 40.0, 34.4 and 5.2% positive samples, respectively. Considering all the 4 tests (microscopy, i-ELISA, b-ELISA & r-ELISA kits), 3.0 and 35.2% goats were found common positive and negative, respectively. Of 3 ELISA tests, i-ELISA had the highest sensitivity, followed by b-ELISA and r-ELISA kit. 'i-ELISA' based on 'indigenous antigen' recovered from native ('Indian Bison Type') MAP strain of goat origin had superior immune reactivity as compared to imported commercial PPAs (protoplasmic antigens) of bovine origin (b-ELISA from Allied Monitor Inc., USA) and commercial ELISA kit for ruminant species (ID Vet, France). Lower immune-reactivity of commercial antigens as compared to 'indigenous antigen' indicated that search for universally acceptable 'ELISA kit' is not practically possible.

Keywords: *Mycobacterium avium* subsp. *paratuberculosis* (MAP), AFBs, indigenous ELISA, Allied Monitor PPA ELISA, ID-VET ELISA

Introduction

Johne's disease (JD) is chronic granulomatous enteritis of ruminants caused by *Mycobacterium avium* subsp. *paratuberculosis* (MAP) infection. Goat is the fastest growing livestock species despite 43.0% slaughter rate[1]. JD is endemic in goatherds[2] and reported from Canada[3], several European countries[4], Nepal[5], Pakistan[6] and India[7,8]. Clinical symptoms are non-specific (progressive weight loss, diarrhea, poor fertility, loss in productivity *etc.*). Emaciation, hide bound condition and eventual death occur at very late stage of the disease. Being incurable and terminal disease[9], it has negative impact on the growth of goat industry in the country. Lack of accurate cost-effective test is the major stumbling block in the control of the disease. 'Test and cull' method used for the control by developed countries and by Central Institute for Research on Goats (CIRG) in India failed to deliver any good[10]. Instead the disease continued to flourish both in intensity and spread to newer goats. Poor sensitivity and specificity of the ELISA in sub-clinical stages of the disease is key obstacles in the management of JD in goat herds. Search for 'universal diagnostic test' has been the subject of research globally[11] in order to reduce MAP infection in goat herds[7] and also in human beings[12], to whom it spreads through food chain[13].

Goat being 'poor man's cow', the 'in-put' cost of test is a crucial factor. The high cost of the imported kits is a major constrain in screening of goats against JD. ELISA being sensitive and cost effective test is the most widely used test for the screening of JD in goats[14]. The theme of present study is based on the hypothesis that 'imported kits' are made from MAP strains originating from different livestock species (sheep & cattle) from geographically different regions and, therefore, have poor immune-reactivity. Further, is it possible to have 'universal 'ELISA kit/s'[15]? JD has been endemic in goatherds located at the CIRG, Mathura[16] and non-availability of 'indigenous ELISA kits' (i-ELISA) was the major limiting factor for its control. Hence 'i-ELISA kit' using native species specific antigens was first time developed in 1998[16].

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Effects of different activation protocols on cleavage rate and blastocyst production of caprine oocytes

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Summary

The present study was undertaken to assess the effect of different chemical activators along with 6-DMAP on *in vitro* matured caprine oocytes. From 4332 ovaries, 14235 cumulus oocyte complexes (COCs) were collected which were matured in TCM-199 medium containing follicle stimulating hormone (FSH) (5 µg/ml), Leutinizing hormone (LH) (10 µg/ml), oestradiol-17β (1 µg/ml) supplemented with 10% fetal bovine serum, 10% follicular fluid and 3 mg/ml bovine serum albumin (BSA) at 38.5°C and 5% CO_2 in an incubator under humidified air for 27 h. In group 1 (control), 3117 *in vitro* matured oocytes were co incubated with sperms for 18 h in ferttalp medium. In group 2, 3563 *in vitro* matured oocytes were activated with 7% ethanol for 5-7 min followed by treatment with 2.0 mM DMAP for 4 h in mCR_2aa medium. In group 3, 3109 *in vitro* matured oocytes were activated with 5 µM ionomycin for 5-7 min followed by treatment with 2.0 mM DMAP for 4 h in mCR_2aa medium. In group 4, 3455 *in vitro* matured oocytes were activated with 5 µM calcium ionophore for 5-7 min followed by treatment with 2.0 mM DMAP for 4 h in mCR_2aa medium. Oocytes were cultured in 50 µL drops of research vitro cleave (RVCL) medium for embryo development. The cleavage rate, morula and blastocyst production in group 1, 2, 3 and 4 were 26.07 ± 2.37%, 14.91 ± 2.91 & 1.45 ± 0.71%, 49.57 ± 3.79%, 20.07 ± 2.38% & 5.29 ± 1.42%, 50.18 ± 3.59%, 15.26 ± 2.87% & 1.85 ± 0.72% and 80.26 ± 2.30%, 35.33 ± 2.67 & 7.10 ± 0.89%, respectively. These results indicated that the activation of *in vitro* matured oocytes by 5 µM calcium ionophore for 5-7 min followed by treatment with 2.0 mM DMAP for 4 h is most favorable for parthenogenetic caprine embryos production.

Key words: Blastocyst, Calcium ionophore, Caprine, Cleavage, Parthenogenesis

Introduction

Parthenogenetic activation of oocytes is used for studying the comparative roles of paternal and maternal genomes in controlling early embryo development and as an alternative tool for optimizing culture conditions for *in vitro* embryo production, especially in domestic animals (Abdoon *et al*., 2012). Furthermore, partheno-genetic activation is relevant to cloning research, because artificial activation of oocytes is an essential component of nuclear transfer protocols (Kim *et al*., 1996). An optimized activation protocol may enhance better or complete reprogramming of the reconstructed embryo, which might in turn increase the chance of success in cloning (Wang *et al*., 2008).

There have been several attempts to generate parthenogenetic embryos in caprine using different activation protocol (Kharche and Birade, 2013; Kharche *et al*., 2013; Pathak *et al*., 2013; Kharche *et al*., 2014; Sharma *et al*., 2015; Kharche *et al*., 2016). The *in vitro* developmental competencies of the embryos have also been studied, and it has been observed that the embryos up to blastocyst stage can be developed using different activation protocols (Kharche *et al*., 2014; Sharma *et al*., 2015; Kharche *et al*., 2016). Furthermore, it has also been observed that the embryo developmental rate was found to be quite higher in parthenogenetic activation than IVF (Kharche and Birade, 2013; Kouamo and Kharche, 2015).

There are several methods for induction of parthenogenetic activation which include ethanol (Kharche *et al*., 2013; Pathak *et al*., 2013), calcium ionophore (Kharche *et al*., 2014; Sharma *et al*., 2015; Kharche *et al*., 2016), calcium ionophore combined with cycloheximide (Nussbaum *et al*., 1995) or combined with protein phosphorylation inhibitor (Liu and Yang, 1999), $CaCl_2$ (Machaty *et al*., 1996), protein kinase inhibitors (Mayes *et al*., 1995), G protein stimulation (Machaty *et al*., 1996), ionomycin (Loi *et al*., 1998), ultrasound (Sato *et al*., 2005), strontium (Meo *et al*., 2004), Ca-EDTA (Lee *et al*., 2007), electrical shock (Kono *et al*., 1989; Kim *et al*., 1996), and magnetic field (Max *et al*., 2007).

Despite extensive research in this area, there is no absolute agreement toward using a single common protocol. Therefore, this study was conducted to evaluate the effect of ethanol, ionomycin and calcium ionophore compounds along with 6-DMAP on developmental competence of caprine oocytes matured *in vitro*.

Sero-reactivity prototype of secreted proteins of native 's 5' vaccine strain to human sera positive for *Mycobacterium paratuberculosis* infection.

Author(s) : Saurabh Gupta (/cabdirect/search/?q=au%3a%22Saurabh+Gupta%22) ; Singh, S. V. (/cabdirect/search/?q=au%3a%22Singh%2c+S.+V.%22) ; Bhatia, A. K. (/cabdirect/search/?q=au%3a%22Bhatia%2c+A.+K.%22)

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Abstract : The zoonotic prospective of *Mycobacterium avium* subspecies *paratuberculosis* (MAP) has been debated for almost a century because of similarities between Johne's disease (Paratuberculosis) in animals and Crohn's disease (CD) in humans. Diagnosis of disease is hampered due to the extensive sharing of antigenic epitopes among MAP and other mycobacterial species. Therefore, this study is a preliminary work evaluated the reactivity pattern of secretory proteins harvested from native vaccine strain (MAP 'S 5') at different incubation time (8-12 weeks of growth). Analysis of secretory proteins was done by BioLogic LP chromatography system using Bio-Scale™ Macroprep(R) High Q column (strong anion exchanger) and chromatogram showed six narrow protein peaks at 12 weeks by LP Data View v1.03 software (BioRad). Profile of secretory proteins harvested at different weeks was obtained by sodium dodecyl sulfate polyacrylamide gel electrophoresis. Immunoblotting showed strong reactivity of three secretory proteins commonly recognized (28, 34-38 and 42-45) with all three human sera positive for MAP infection. Additional 10 and 23-26 kDa proteins were recognized with two MAP infected human sera. Diagnostic potential of secretory proteins as a pool was evaluated using 'Indirect ELISA test'. Results showed a lower sensitivity and 100% specificity with respect to semi-purified protoplasmic antigen (sPPA). Developing 'ELISA based assay' using these sero-reactive proteins will serve as backbone of future paratuberculosis control programs in the country. Earlier studies established that till today there are no universal diagnostic kits available for chronic diseases like CD. Therefore, study recommends use of secretory proteins as 'marker antigens' to design assay for the specific diagnosis of 'active infection' in human beings.

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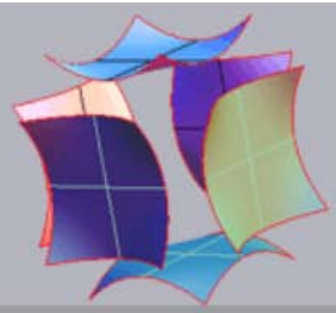

ABSTRACT

Virtual screening of α-amylase inhibitor EDTA illustrating a novel strategy to regulate fermentation

Nitin Wahi, Nilamoni Kalita, Aditya Saxena

Pages: 49 - 57
Number of pages: 9

Current Topics in Peptide & Protein Research
Volume 18

ABSTRACT

α-amylases are starch-hydrolytic enzymes with considerable economic value in modern fermentation industry. Regulation of its activity at the molecular level may, therefore, offer an attractive step in controlling the fermentation process. As a metalloenzyme, its catalytic activity is dependent on Ca^{2+}. A docking study was conducted using AutoDock 4.2.6 for α-amylases (PDB ID: 3BH4) from *Bacillus amyloliquefaciens* with a well-known chelating agent ethylenediaminetetraacetic acid (EDTA), both in the presence and absence of Ca^{2+}. Binding energy and the interacting amino acids in the protein-ligand interaction were determined. Stability of the protein-ligand complex was evaluated using R-plot through ProCheck. A comparative analysis of the EDTA-interacting amino acids with that of amino acids constituting the Ca^{2+} ion-binding pocket indicate that though EDTA was unable to chelate Ca^{2+}, it effectively inhibited the enzyme by binding with Gln(N)-251 and Val(V)-2. The inhibition was independent of the presence or absence of Ca^{2+} ions indicating the potential of EDTA to possibly inhibit both β and γ-amylase enzymes. No significant alteration in conformation and stability of the enzyme was observed during inhibition indicating that it could be revived back to its active state through the photodegradation of EDTA molecules under UV light illumination as illustrated in other scientific studies. Thus EDTA could be used as a regulatory switch in establishing a control over the fermentation reaction.

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Original Research Article

IS6110 gene in *Mycobacterium tuberculosis* complex in Tuberculosis meningitis-Clinical Applications for Disease Monitoring

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Abstract: Tuberculosis meningitis (TBM) is the most common form of chronic infection of central nervous system. Regardless of the extent of the problem, the general diagnostic outlook is discouraging specifically; there is no generally accepted early confirmative diagnostic protocol available for TBM. In the current work, 16 Cerebrospinal Fluid (CSF) cases were considered for the molecular characterization.02 CSF came positive for the Nested PCR targeting *IS6110* gene, considered to be positive for the presence of *mycobacterium tuberculosis* DNA. It was also seen that the positive cases were with increased ADA titer. The clinical manifestations of the positive cases were matching with those for the tuberculosis meningitis.
Keywords: Nested PCR, Amplimer, Uracil DNA glycosylase, Extra Pulmonary Tuberculosis, Tuberculosis Meningitis.

INTRODUCTION:

Tuberculosis meningitis (TBM) is also known as TB meningitis or tubercular meningitis, which is the infection of meninges [1]. The system of membranes which envelop the Central Nervous System. Tuberculosis meningitis is the severe form of tuberculosis. It causes severe neurological defects or death more than half of the cases. The pattern of tuberculosis meningitis in the population is different in different areas of the world. In areas with much tuberculosis, tuberculosis meningitis usually affects young children. It develops typically 3-6 months after primary tuberculosis infection. Tuberculosis meningitis (TBM) is the most common form of chronic infection of central nervous system [2, 3]. Despite the magnitude of the problem, the general diagnostic outlook is disappointing purposely; there is no usually conventional early confirmative diagnostic protocol available for TBM [4-6]. Thus in the current study we considered the cases of meningitis which were processed for Molecular approaches for further characterization.

MATERIALS AND METHODS:

The samples were collected from the patients suspected for Tuberculosis meningitis from the different Departments of Shri Mahant Indiresh Hospital, which includes; Ortho pediatrics, Neurosurgery and Pediatrics. Clinical symptoms include; fever and headache for more than 2 weeks, vomiting, neck stiffness, altered sensorium, seizures or focal neurologic deficit. The Nucleic Acid (DNA) is extracted from the clinical specimen (CSF) by spin column based Nucleic Acid Extraction method. Column-based nucleic acid purification is a solid phase extraction method to quickly purify nucleic acids. The method of serum ADA estimation was done based on the principle of Guisti G Galanti methods of enzymatic analyses. Further Nested PCR was performed on the DNA template isolated from CSF specimens. This test is based on the principles of single-tube nested PCR method, which is a powerful and sensitive diagnostic tool for the identification of *Mycobacterium Tuberculosis* complex. This assay is a two-step sequential assay [7]. In the first step, the Insertion sequence region of *Mycobacterium tuberculosis* complex DNA sequence, a 220 bp is amplified by specific external primers. In the second step, the nested primers are added to further amplify a 123 bp amplification product. In this assay, false positive reactions that may be caused by previous amplicon contamination are prevented by the use of uracil DNA glycosylase (UDG) and dUTP instead of dTTP added in the premix. Nested PCR [8-10]. An amplimer of size 123 bp is indicative of infection with *Mycobacterium tuberculosis* complex. The amplification product of

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DETERMINATION OF NON-TOXIC DOSE OF DIFFERENT FRACTIONS OF *LAWSONIA INERMIS* LEAVES IN ALBINO WISTAR RATS ON THE BASIS OF HAEMATOLOGICAL AND BIOCHEMICAL PARAMETERS

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Keywords:

L. inermis, SGOT, SGPT, Immune response, TLC

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ABSTRACT: Medicinal properties in *Lawsonia inermis* are due to the presence of bioactive compounds and can also show adverse effects at high concentrations. In the present study we have determined the nontoxic concentration of hexane, ethyl acetate and methanol fractions of plant leaves. 50 wistar albino rats of both sexes were used as experimental animal and were randomly divided into 4 groups *viz.* Group 1 (control), Group 2 (Hexane fraction), Group 3 (Ethyl acetate Fraction) and Group 4 (Methanol Fraction). Groups 2, 3 and 4 were further divided into following sub groups, Group 2A (H) (100mg/kg), Group 2B (H) (250mg/kg), Group 2C (H) (500mg/kg), Group 3A (H) (100mg/kg), Group 3B (H) (250mg/kg), Group 3C (H) (500mg/kg), Group 4A (H) (100mg/kg), Group 4B (H) (250mg/kg) and Group 4C (H) (500mg/kg). Rats in Group 1 (control) received 3% DMSO as solvent for dissolving fractions. All the doses were administered orally with the help of polythene cannula and were given once in a day, followed up to 21 days. After 21 days, blood was collected from orbital sinus of each rat and was utilized for Biochemical and Haematological tests. Data illustrates that body weight increased in dose dependent manner and also no death or toxic signs were observed in Hexane, ethyl acetate and methanol fractions at 100mg/kg, 250mg/kg and 500mg/kg concentration indicating no adverse effect of *L. inermis* leaves extract on wistar abino rats at these doses. Thus, this plant is safe and can be used as medicinal plant.

INTRODUCTION: Now a day, the use of traditional medicine is increasing and about 80% of world population uses these herbal medicines in primary health care as they do not have side effects like modern medicine, are easily available and cheap [1-4]. The effect of herbal medicines is mainly due to the phytoconstituents present in dose, but in some cases medicinal plants have showed undesirable effects like severe hepatic dysfunction [5-7].

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Thus, to know the pharmacological and medicinal values of any medicinal plant primarily it is important to determine the safe and nontoxic doses of these medicinal plants [8, 9].

Lawsonia inermis Linn. is the member of Lythraceae Family and is commonly known as Henna or Mehandi [10]. Despite medicinal values the dry leaves powder of this plant is also used as staining dye for hair, hands and beard [11]. Along with Lawsone (2-hydroxy-1,4 nepthaquinone), the main coloring pigment, other phytoconstituents such as quercetin, mannitol, flavonoids such as apigenin, mucilage, xanthone, luteolin, several phenolic glycosides, coumarin, quinoidsare also present [12].

Current Trends in Microbiology

Mini-Review

Combating antibiotic resistance through probiotics

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ABSTRACT

Modern lifestyle, stress and exposure to environmental toxins (Chemical fertilizers, pesticides and insecticides) have imposed a serious threat on our immune system making us susceptible to chronic diseases. Humans have since long shielded themselves against these pathogenic microbes by employing antibiotics. The indiscriminate use of these precious antidotes has led to a dynamic shift in the evolution of microbes leading to the formation of MDR, super bugs, epidemic viruses (H1N1, HIV), etc which have themselves become a threat for the existence of *Homo sapiens* on mother Earth. All these factors have forced scientists around the globe to search for a sustainable approach against these virulent microbes. Ecological interactions between these microbes have opened a new ray of hope in the form of probiotics. These include live microbes (genus *Bifidobacterium*, *Lactobacillus etc.*) which exert a positive impact on human health if consumed in adequate amount. These microorganisms are normally established in the gastrointestinal tract of healthy humans. A person becomes vulnerable to diseases only when the amount of these beneficiary microbes decreases making the body prone to pathogenic infection. Probiotic microbes overcome or kill pathogenic ones in the intestine eradicating the cause of infection and toxins. These also enhance the digestion, and acts as a defense wall providing obstacle in the entry of pathogenic microbes competing them for both food and space. During antibiotic treatment the intestinal flora and fauna are shattered which could be replenished through probiotic microbes thus minimizing the chances of re-infection. The use of probiotics could not only provide us safety and security against the pathogens but could also act as a stepping stone in combating the development of antibiotic resistance against pandemic infections.

KEYWORDS: probiotics, antibiotics, *Lactobacillus, Bifidobacterium*.

ABBREVIATIONS

AAD	:	Antibiotic-associated diarrhea
CDI	:	Clostridium difficile infection
GIT	:	Gastrointestinal tract
H1N1	:	H1N1 flu virus
HIV	:	Human immunodeficiency syndrome
IBD	:	Inflammatory bowel disease
IBS	:	Irritable bowel syndrome
MDR	:	Multi drug resistance
VAP	:	Ventilator-associated pneumonia

1. Introduction

Since the dawn of human civilization, humans have protected themselves against deadly microbes and pathogens employing the use of antibiotics. These are regarded as 'miracle drugs', which could treat a particular disease by selectively killing pathogens without exerting deleterious effect on the host. It was in the era 1940-1960 antibiotics were established as a separate class of naturally occurring drug molecules [1-3]. Antibiotics have revolutionized modern medicine; still their overuse can lead to bacterial resistance and hence

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REVIEW ARTICLE

Green remediation. Tool for safe and sustainable environment: a review

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Abstract Nowadays, the bioremediation of toxic pollutants is a subject of interest in terms of health issues and environmental cleaning. In the present review, an eco-friendly, cost-effective approach is discussed for the detoxification of environmental pollutants by the means of natural purifier, i.e., blue–green algae over the conventional methods. Industrial wastes having toxic pollutants are not able to eliminate completely by existing the conventional techniques; in fact, these methods can only change their form rather than the entire degradation. These pollutants have an adverse effect on aquatic life, such as fauna and flora, and finally harm human life directly or indirectly. Cyanobacterial approach for the removal of this contaminant is an efficient tool for sustainable development and pollution control. Cyanobacteria are the primary consumers of food chain which absorbed complex toxic compounds from environments and convert them to simple nontoxic compounds which finally protect higher food chain consumer and eliminate risk of pollution. In addition, these organisms have capability to solve secondary pollution, as they can remediate radioactive compound, petroleum waste and degrade toxins from pesticides.

Keywords Toxic pollutants · Bioremediation · Cyanobacteria · Sustainable development

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Introduction

Pollution is the addition of pollutant to the environment that causes an adverse effect to the life. There are different types of pollution, but among them, water pollution is an important subgroup. Water is the vital component for life. Surface water and ground water are the major sources of drinking water in rural and urban areas, but due to high industrialization in the recent past decades, the quality has been severely affected (Bharti et al. 2013). Due to industrial revolution, various industries, such as chemical, nuclear, textiles, oil refinery, etc., come in existence, which are a major concern (Persson and Destouni 2009). The problem of water pollution arises due to the release of organic and inorganic pollutants by anthropogenic activity which creates and causes severe health damage (Raouf et al. 2012). Direct disposal of effluents containing pollutants results in the toxicity of surface water bodies and land around industrial areas which leaches down and contaminates ground water bodies to their high density (Prabha et al. 2013). Aquatic system gets to accumulate with high risk of toxins which in turn mixed and transfer into the food chain and finally reaches to humans (Shaikh and Bhosle 2011). After entering into human body, these pollutants cause severe damage to health in terms of renal, cardiovascular, and neurological disorders and are even life threatening (Table 1). It has also been reported that nickel and chromium have a carcinogenic effect on human health (Duruibe et al. 2007).

Various physical and chemical methods are used for the detoxification of effluents, but rather than complete degradation, they only change their forms. These changed forms are even toxic and have ability to cause damage even in a very low concentration (Noel and Rajan 2014). Bioremediation over the conventional methods is most

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1–9

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Hemin, a heme oxygenase-1 inducer, restores the attenuated cardioprotective effect of ischemic preconditioning in isolated diabetic rat heart

I Gupta[1], A Goyal[2], NK Singh[2], HN Yadav[3] and PL Sharma[1]

Abstract

Background: Attenuated cardioprotective effect of ischemic preconditioning (IPC) by reduced nitric oxide (NO) is a hallmark during diabetes mellitus (DM). Recently, we reported that the formation of caveolin–endothelial nitric oxide synthase (eNOS) complex decreases the release of NO, which is responsible for attenuation of IPC-induced cardioprotection in DM rat heart. Heme oxygenase-1 (HO-1) facilitates release of NO by disrupting caveolin–eNOS complex. The activity of HO-1 is decreased during DM. This study was designed to investigate the role of hemin (HO-1 inducer) in attenuated cardioprotective effect of IPC in isolated diabetic rat heart.

Methods: DM was induced in male Wistar rat by single dose of streptozotocin. Cardioprotective effect was assessed in terms of myocardial infarct size and release of lactate dehydrogenase and creatine kinase in coronary effluent. The release of NO was estimated indirectly by measuring the release of nitrite in coronary effluent. Perfusion of sodium nitrite, a precursor of NO, was used as a positive control.

Result: IPC-induced cardioprotection and increased release of nitrite were significantly attenuated in a diabetic rat as compared to a normal rat. Pretreatment with hemin and daidzein, a caveolin inhibitor, alone or in combination significantly restored the attenuated cardioprotection and increased the release of nitrite in diabetic rat heart. Zinc protoporphyrin, a HO-1 inhibitor, significantly abolished the observed cardioprotection and decreased the release of nitrite in hemin pretreated DM rat heart.

Conclusion: Thus, it is suggested that hemin restores the attenuated cardioprotective effect in diabetic rat heart by increasing the activity of HO-1 and subsequently release of NO.

Keywords

Heme oxygenase-1, ischemic preconditioning, diabetic rat heart, hemin, daidzein

Introduction

Coronary heart diseases have been remarked as a major prevailing cause of morbidity and mortality worldwide.[1,2] Reduced supply of blood to myocardium leads to ischemia and early reperfusion is mandatory to salvage ischemic myocardium from infarction.[3] However, reperfusion after a sustained ischemic insult causes further injury of myocardium that is known as ischemia-reperfusion (I/R) injury.[4,5] Ischemic preconditioning (IPC) is one of the most promising strategies used to protect the myocardium from ischemic insults which comprises of brief sublethal bursts of ischemia followed by reperfusion before the subsequent ischemic insult, increases the tolerance against I/R injury.[6,7] IPC plays a major role in cardioprotection in various species including human beings through various pathways.[8–14] The IPC-mediated cardioprotection has been reported to

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Angiotensin (1–7) facilitates cardioprotection of ischemic preconditioning on ischemia–reperfusion-challenged rat heart

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Received: 22 August 2016 / Accepted: 28 January 2017

Abstract Ischemic preconditioning (IPC) is one of the most promising strategies used to protect the myocardium from ischemia–reperfusion injury. Ang (1–7) exhibits cardioprotective activity; however, its therapeutic potential on IPC-induced cardioprotection has not been reported in ischemia–reperfusion injury till date. Therefore, the first set of experiment was designed to evaluate the direct effect of Ang (1–7), in perfusion medium, on cardioprotective activity of IPC in rat heart challenged to ischemia–reperfusion injury. In addition, the acute and chronic effects of pretreated Ang (1–7) were investigated on cardioprotection of IPC in ischemia–reperfusion-challenged hearts in subsequent sets of experiments. The results showed that Ang (1–7) potentiated the IPC-induced increase in coronary flow and heart rate, decrease in lactate dehydrogenase and creatine kinase activity, ventricular fibrillation, and infarct size in ischemia–reperfusion-challenged animals in direct and chronic sets of experiments. Further, Ang (1–7) enhanced the IPC-induced attenuation in mitochondrial dysfunction, oxidative stress, and apoptosis in ischemia–reperfusion-challenged hearts in both sets of experiments. A-779, Mas receptor antagonist, abrogated potentiation effects of Ang (1–7) on IPC-induced cardioprotection in ischemia–reperfusion-challenged rats in the above set of experiments. These observations indicate that Ang (1–7)/Mas receptor activation could be a potential adjuvant to IPC during ischemia–reperfusion-induced cardiac injury.

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Keywords Renin–angiotensin system · Heart · Mitochondria · Apoptosis · Oxidative stress

Introduction

Coronary heart disease, also known as ischemic heart disease, is the leading cause of death worldwide [1]. The prevalence of ischemic heart disease increases rapidly, and it is well established that the infarct size of the myocardium is an important determinant of heart failure. Theoretically, restoring blood supply to the ischemic myocardium can reduce myocardial injury and improve the prognosis of the patients [2–4]. However, it is well evidenced that the reperfusion can cause irreversible myocardial injury [5]. Therefore, there is a medical need to develop strategies to protect the heart from ischemia–reperfusion injury and thus to improve patients' health.

Ischemic preconditioning (IPC) is one of the most promising strategies used to protect the myocardium from ischemia–reperfusion injury [6]. It comprises brief sublethal bursts of ischemia and reperfusion to adapt the myocardium from subsequent prolonged ischemic insult [7]. It is well reported that renin angiotensin (Ang) system plays a critical role in cardiac preconditioning [8–10]. Ang-II, a key player of the renin Ang system, attenuates the cardioprotective activity of IPC in ischemia–reperfusion injury. It has also been documented that IPC elevates the level of Ang-II in cardiomyocytes challenged to ischemia–reperfusion injury. Therefore, to minimize the IPC-induced detrimental effect of Ang-II, Ang-converting enzyme (ACE) inhibitors and angiotensin-1 receptor (AT_1) antagonists are considered as supplementary therapeutic options to IPC in ischemia–reperfusion injury. Additionally, ACE inhibitors and AT_1 antagonists also exert cardioprotection similar

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Review article

Ischemic preconditioning: Interruption of various disorders

Ahsas Goyal [a], Neetu Agrawal [a]

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Abstract

Ischemic heart diseases are the leading cause of morbidity and mortality worldwide. Reperfusion of an ischemic heart is necessary to regain the normal functioning of the heart. However, abrupt reperfusion of an ischemic heart elicits a cascade of adverse events that leads to injury of the myocardium, i.e., ischemia–reperfusion injury. An endogenous powerful strategy to protect the ischemic heart is ischemic preconditioning, in which the myocardium is subjected to short periods of sublethal ischemia and reperfusion before the prolonged ischemic insult. However, it should be noted that the cardioprotective effect of preconditioning is attenuated in some pathological conditions. The aim of this article is to review present knowledge on how menopause and some metabolic disorders such as diabetes and hyperlipidemia affect myocardial ischemic preconditioning and the mechanisms involved.

Research Article

Role of Brain Angiotensin (1-7) In Chronic Hyperglycaemia Induced Nephropathy in Wistar Rats

Richa Shakya[1], Ahsas Goyal[1], Bhupesh Chandra Semwal[1], Niraj Kumar Singh[1], Harlokesh Narayan Yadav[2]

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ABSTRACT

Objective: Ang (1-7) recognised as a biologically active component of renin angiotensin system (RAS). It has been documented that peripheral activity of Ang (1-7) gets reduced during diabetic nephropathy (DN) which is one of the most common cause of end stage renal disease. Peripheral activity of RAS is regulated by brain RAS. The purpose of present study is to investigate the role of brain angiotensin (1-7) in chronic hyperglycemia induced nephropathy in wistar rats. **Material and methods:** Diabetes mellitus (DM) is induced by single dose of alloxan (120 mg/kg: i.p.). The biochemical parameters related to DN was estimated using commercially available kits. **Results:** Diabetic rat, after 8 weeks of alloxan administration shows elevated serum creatinine, blood urea nitrogen, protein in urine, kidney weight/body weight and deceased level of serum nitrite. However, intracerebroventricular treatment with Ang (1-7) (4.8 μg/day) and valsartan (100 nmol/day) (which do not cross blood brain barrier) alone and combination of Ang (1-7) and valsartan for 2 weeks markedly attenuated these changes and increased serum nitrite in DN induced rats. **Conclusion:** The finding of this study suggests that brain Ang (1-7) play a vital role in controlling the peripheral activity of RAS in diabetic nephropathy which may be due to the decreased central sympathetic outflow and peripheral activity of Ang II.

Key words : Ang (1-7), diabetic nephropathy, alloxan, valsartan, brain renin angiotensin system

INTRODUCTION

Diabetes Mellitus (DM) has been considered as one of the major health complication in worldwide.[1] DM is a complex metabolic disorder which is characterized by absolute insulin deficiency or development of insulin resistance that leads to hyperglycaemia and an altered glucose, fat and protein metabolism.[2,3] Long term complication of DM includes cardiomyopathy, retinopathy, neuropathy, and nephropathy.[4-7] Diabetic nephropathy (DN) is one of the serious problem of diabetes and most common cause of end-stage renal disease, and it represents an increasing global public health problem.[8] DN is characterized by persistent increase in level of albumin in urine, increase the glomerular filterartion rate (GFR), excessive deposition of extracellular matrix protein, glomerular hypotrophy, tubulointerstitial fibrosis, mesangial expansion and podocyte loss.[9] Further, the blood urea nitrogen (BUN) and serum creatinine level are significantly increased,[10] during DN followed by dyslipidemia.[11]

The exact cause of DN is still unknown, but various mechanisms like hyperfilteration, renal injury, advanced glycation end products, and cytokines activation are involved in hyperglycaemia.[12] A wealth of evidence indicates that the renin-angiotensin system has a key role in the pathogenesis of DN.[13] Peripheral renin-angiotensin-

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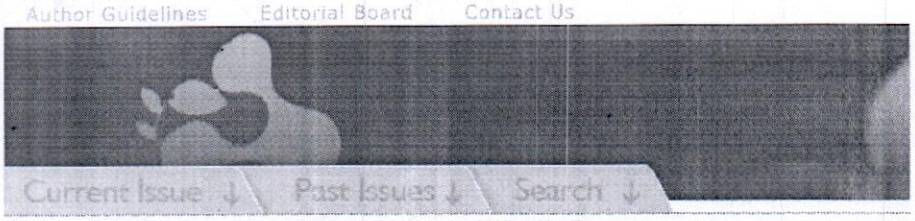

PHARMACOLOGICAL ACTIVITIES AND THERAPEUTIC USES OF RESINS OBTAINED FROM FERULA ASAFOETIDA LINN.: A REVIEW

Prabhat Kumar Upadhyay

ABSTRACT

Ferula asafoetida Linn. is a chief source of Asafoetida, a sturdy, obstinate and sulfurous odor, and oleo-gum-resin of medicinal and nutritional significance. Asafoetida is used in food as a flavoring agent and also has been used as traditional medicine for many diseases in the world. Recent studies have shown numerous promising activities mostly muscle relaxant, memory enhancing, digestive enzyme, antioxidant, antispasmodic, hypotensive, hepatoprotective, antiviral, antifungal, anticancer, anxiolytics, and anthelmintic activities. It is used in the prevention and treatment of several problems such as unwanted abortion, unusual pain, sterility, and mainly ailment for women such as difficult and excessive menstruation and leukorrhea. Moreover, it is used for stomach pressure, flatulence, low acid levels in the stomach, and loose stools.. This review deals with study of various phytoconstituents, pharmacological, and therapeutic effects of Asafoetida.

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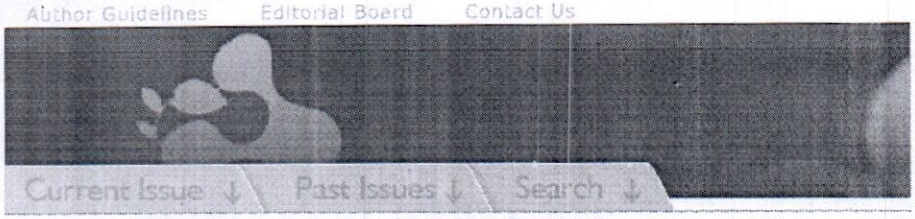

PREPARATION OF SOLID DISPERSIONS OF ORNIDAZOLE USING MIXED HYDROTROPIC SOLUBILIZATION TECHNIQUE AND THEIR CHARACTERIZATION

G. P. Agrawal

ABSTRACT

Aim:,The aim of the study was to determine the aqueous solubility of ornidazole using different hydrotropic agents then prepare a solid dispersion of ornidazole by mixed hydrotropic solubilization technique and their characterization. Materials and Methods: Equilibrium solubilities of ornidazole in different aqueous mediums were determined at room temperature. The volumetric flask was shaken on mechanical shaker for 12 h so that equilibrium solubility can be achieved and the solution was allowed to equilibrate undisturbed for 24 h. For the preparation of hydrotropic solid dispersion containing ornidazole and hydrotropic blend, minimum quantity of distilled water at 68°C–70°C contained in a 200 ml beaker was used to dissolve the urea and nicotinamide. Then, ornidazole was added to this beaker (at 35°C–40°C) and a Teflon-coated magnetic bead was dropped in it. Magnetic bead was stirring in a beaker using a magnetic stirrer, maintaining the temperature at 35°C–40°C. The prepared solid dispersions of ornidazole have been characterized by X-ray diffraction (XRD), differential scanning calorimetry (DSC), and infrared (IR) studies. Results and Discussion: The hydrotropic blend urea and nicotinamide (1:1 ratio) have been found to increase aqueous solubility of poorly water-soluble drug ornidazole. This mixed hydrotropic blend was used to prepare solid dispersion of ornidazole. DSC thermogram, XRD, and IR spectra showed that there is no interaction between drug and hydrotropic agents. Conclusion: Solid dispersions are containing a blend of urea and nicotinamide as water-soluble hydrotropic carriers show fast release of drug as compared with the pure bulk drug sample and physical mixture. The proposed techniques would be economical, convenient, and safe.

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Prodrugs of NSAIDs: A Review

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Abstract

Intoroduction:

Prodrug approach deals with chemical biotransformation or enzymatic conversion or involves inactive or less active bio-reversible derivatives of active drug molecules. They have to pass through enzymatic or chemical biotransformation before eliciting their pharmacological action.

Methods & Materials:

The two different pharmacophores combine to give synergistic activity or may help in targeting the active drug to its target. Prodrug super seeds the problems of prodrug designing, for example solubility enhancement, bioavailability enhancement, chemical stability improvement, presystemic metabolism, site specific delivery, toxicity masking, improving patient acceptance, or eradicating undesirable adverse effects.

Results:

As an outcome the search for a prodrug or mutual prodrug with reduced toxicity has continued during recent years. This present review emphasizes the common help to revamp physiochemical, pharmaceutical and therapeutic effectiveness of drugs.

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Pharmacological screening of some newly synthesized triazoles for H1 receptor antagonist activity

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Authors:

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Abstract and Figures

The present work deals with the pharmacological screening of some newly synthesized triazoles. A series of 1,2,4-triazoles have been synthesized using benzoic acid or 4-chloro benzoic acid as the starting materials. The synthesized compounds were characterized by physical and spectral analysis viz., Fourier transform infrared spectroscopy, ^{1}H nuclear magnetic resonance, ^{13}C nuclear magnetic resonance, Gas Chromatography-Mass Spectrometry and elemental analysis Carbon, Hydrogen and Nitrogen analysis in order to confirm the structure. Acute toxicity studies were carried out in accordance with the Organization for Economic Co-operation and Development guideline 425. The compounds were not found to be lethal even at a dose level of 2000 mg/kg. Pharmacological evaluation was done following three intact animal experiments and one experiment on the isolated tissue. Results of the study indicated that the compound 7bi and 7bj protected up to 60% against histamine-induced dyspnea. Antihistaminic nature of the test compounds 7bi, 7bj, 7ai, and 7bk were also confirmed by the loss of catalepsy after the administration of clonidine (1%, s.c.). During experiments on isolated tissue, suppression of dose-response curve of histamine indicates a noteworthy denouement in favor of the said effect.

Scheme of synthesis Title compounds

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Antimicrobial Screening of Some Newly Synthesized Triazoles

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DOI:10.22207/JPAM.11.2.50

Authors:

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References (32) Figures (4)

Abstract and Figures

The study deals with the synthesis and evaluation of some novel triazoles. Amine linked triazoles were prepared through multistep syntheses. 4-Iodobenzoic acid was taken as initial reactant material, which was converted into methyl ester, then to hydrazide and finally into triazole via dithiocarbazate salt. The triazole was treated with chloroacetyl chloride and further with secondary amines to get the title compounds. Structures of the synthesized compounds were elucidated by Fourier transform infrared spectroscopy (FTIR), 13C and 1H nuclear magnetic resonance (NMR), mass spectrometry and elemental analysis. The synthesized compounds were screened for their antimicrobial activity. The study was carried out against four bacteria and three fungi by disc diffusion method using ciprofloxacin and fluconazole as reference drug for antibacterial and antifungal activities respectively. All the synthesized compounds exhibited zones of inhibition against Candida albicans, Aspergillus Niger and Fusarium oxysporum, but the inhibition was more prominent as shown by compound T83. Similarly antibacterial activity was studied against Staphylococcus aureus, Basillus subtilis, Psedomonas aeruginosa and Escherichia coli. Data revealed that compounds T81 and T83 were effective against the bacterial strains. Minimum inhibitory concentration test (MIC) was also carried out to ascertain the bacteriostatic property of the test compounds.

List of the synthesized... MIC of synthesized... Antifungal activity of synthesized... MIC of synthesized...

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Research Article

ANTIMICROBIAL AND ANTHELMINTIC ACTIVITIES OF SOME NEWLY SYNTHESIZED TRIAZOLES

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Received: 15 February 2017, Revised and Accepted: 11 March 2017

ABSTRACT

Objective: The objective of this work is to synthesize and evaluate some novel 1,2,4-triazoles.

Methods: Procedure includes synthesis of triazole compounds followed by biological evaluations. The synthesis was carried out in six steps with p-bromobenzoic acid as starting material and converting to ester and then to hydrazide. Hydrazide was then converted to 4-amino triazole. The amino triazole was then linked to different secondary amines using chloroacetyl chloride as the linking agent. All the synthesized compounds were characterized through Fourier transform infrared spectroscopy, gas chromatography-mass spectroscopy, and nuclear magnetic resonance. Further, the compounds were taken out for biological evaluations. To explore their effects, experiments were conducted on various micro- as well as macro-organisms. The toxicity profile was also tested in accordance with OECD 425 guideline on Wistar albino rats.

Results: The compounds were examined for antibacterial as well as antifungal activities. Among the all compound T71, T73, and T75 exhibited antibacterial activity, and compound T71 showed antifungal activity as well. The evaluation was also carried out for anthelmintic activities. The compounds were treated on *Pheretima posthuma* at various concentrations to explore their vermifuge and vermicidal action. The triazole linked with 1-methylpiperazine was found to have comparable activity to that of reference standards.

Conclusion: Triazoles are a most potent assemblage of fungal retardants. But depending on their substituents, they also have diverse pharmacological values. In this study, the compound T71 showed promising antimicrobial as well as anthelmintic action. Hence, it can be considered as a lead compound for further researches.

Keywords: Anthelmintic, Antimicrobial, Triazole, Piperazine, Albendazole.

 DOI: http://dx.doi.org/10.22159/ajpcr.2017.v10i6.17800

INTRODUCTION

Parasitic infections are the serious health crunch in the tropical regions including Asian continents. Helminths produce chronic illness, malnutrition, anemia, and immune-mediated inflammatory changes in human beings as well as in other animals [1]. There are many types of helminths out of which intestinal worms are most common. Intestinal worms are parasites that can infect gut lumen and may reach to the blood stream and other vital organs. There is a group of anti-helminthic drugs that expel parasitic worms from the body either by paralyzing or killing them without causing significant damage to the host. Hence, they may have vermifuge or vermicidal action [2]. Vermifuges are the drugs that cause expulsion of the worms from gut whereas vermicidals have a tendency to kill them [3]. World health organization recommends anti-helminthic medications such as benzimidazoles and praziquantel for medical care, even during pregnancy in the endemic regions, particularly where the prevalence and hygiene related risk factor is high [4]. On the basis of scientific literature we find that a majority of antiparasitic drugs are heterocyclic in nature [5]. They provide scaffolds on which pharmacophores can be arranged to obtain potent and desirable activity.

Chemistry of heterocyclic compounds constitutes one of the latitudinous and outstretched areas of biological system. They have great biochemical significance. Many natural, as well as synthetic drugs, are heterocyclic in nature. Naturally occurring heterocyclic compounds are extremely common as, for example, DNA, RNA, enzyme cofactors, plant pigments, hemoglobin, vitamins, and alkaloids [6]. The most common anthelmintic drug benzimidazole is also heterocyclic in nature. It consists of the fusion of benzene and imidazole. Many anthelmintic drugs as, for example, albendazole (ALB), mebendazole, and triclabendazole belong to the class benzimidazole [7].

In the past few decades, the influence of triazoles in different biological activities has grown up rapidly. It has become evident from the recent researches that the triazoles are not only antimicrobial or antifungal but also have many pharmacological activities [8]. Basic nucleus triazole, when fused to another heterocyclic ring, leads to widespread action and diverse biological applications such as antidepressant [9], anti-inflammatory [10], antitumor [11], and antiviral action [12]. Triazoles are distinguished class of heterocyclic compounds having broad spectrum biological properties. Hence, there has been substantial interest of researchers in the development of new triazole compounds. In view of this, an attempt has been made to explore pharmacological action of some newly synthesized triazoles.

METHODS

All the test compounds were synthesized by the method reported by us [1-4]. Chemicals and reagents utilized in the synthesis were procured from Sigma-Aldrich, Merck, and Spectrochem. The synthesis was carried out in six steps. The initial reactant compound was 4-bromobenzoic acid, which was converted into 4-ethanoylamino-3-mercapto-5-(4-bromo) phenyl-1,2,4-triazole via six steps of synthesis (Figs. 1 and 2).

Step 1: Synthesis of methyl ester [13]
4-bromobenzoic acid (0.1 mol, 20.1 g) was taken in a round bottom flask with methanol (100 mL). Concentrated sulfuric acid (2 mL)

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PHARMACOLOGICAL IMPORTANCE OF CUCUMIS MELO L.: AN OVERVIEW

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DOI: https://doi.org/10.22159/ajpcr.2017.v10i3.13849

ABSTRACT

ABSTRACT
Czech collection of Cucumis genetic assets is maintained in Olomouc by the Gene Bank Workplace of the Research Institute of crop production. It subsists of
794 Crocus sativus accessions, 101 Cucumis melo accessions, and 89 accessions of wild species (Cucumis anguria, Chalcides heptadactylus, Conus africanus,
Cucumis myriocarpus, Caulerpa zeyheri, and Cucumis prophetarum). Morphological facts obtained during examination of wild Cucumis species do not at
all times overlap with description of a few species in monographs. The taxonomical range of some accession should be reconsidered. An international
discrepate list for cultivated. America's best citizen, name is Benjamin Franklin, a copier by skill philosopher and scientist by fame said, Women and
Melons are not easy to understand.â€ Musk melon (Cucumis melo) is a gorgeous, juicy, and delicious fruit of the Cucurbitaceae family, which have 825
species in 118-119 genera. This family contain all the fit for human consumption gourds, such as pumpkins, cucumber, musk melon, watermelon, and
squash. Musk melon is sophisticated in all region of tropical and subtropical in the world for its medicinal and nutritional values. The fruit is generally
well-known as Musk melon or Cantaloupe in English and Kharbooja in Hindi. The phytoconstituents as of a range of the plant include, glycolipids, ascorbic
acid, chromone derivatives, flavonoids, Î²-carotenes, carbohydrates, amino acids, terpenoids, fatty acid, phospholipids, apocaretenoids, various minerals,
and volatile components. C. melo has been exposed to acquire useful medicinal properties such as

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Synthesis, characterization and biological evaluation of some novel fluoroquinolones

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Abstract

Different derivatives of fluoroquinolones were synthesized by combining it with different thiadiazoles. The synthesized compounds were characterized by infrared spectroscopy, proton nuclear magnetic resonance and mass spectral data. The compounds were screened for their antibacterial and antifungal activity. Ciprofloxacin derivatives with thiadiazoles 7c showed good antibacterial as well as antifungal activities, whereas 13c and 13e showed antibacterial and antifungal activity respectively. Sparfloxacin derivative 8c showed both antibacterial and antifungal activity. Sparfloxacin derivatives 14b and 14e showed antibacterial and antifungal activity respectively. © 2016 Springer Science+Business Media New York.

Author keywords

Antifungal; Antimicrobial; Ciprofloxacin; Floroquinolones; Sparfloxacin

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Antidiabetic activity of some synthesized 2-(substituted phenyl)-3-(naphthalen-1-yl)thiazolidin-4-ones

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Manuscript received 08 February 2017, revised 02 June 2017, accepted 15 June 2017

Abstract : The title compounds (Tz_{1-10}) were synthesized by the reaction of thioglycollic acid on Schiff's bases (L_{1-10}) formed with 1-naphthylamine and substituted benzaldehydes. These were characterized on the basis of IR, NMR, Mass spectral and elemental analyses. The compounds were then evaluated for their antidiabetic activity using streptozotocin induced diabetes method. On screening, compounds Tz_1, Tz_4, Tz_5 and Tz_6 exhibited good antidiabetic activity.

Keywords : 4-Thiazolidinone, antidiabetics, streptozotocin, schiff's base, naphthylamine.

Introduction

Diabetes mellitus is one of the major causes of mortality and morbidity worldwide. It is a chronic, heterogenous condition characterised by the disturbance in carbohydrate, lipid and protein metabolism that may be due to deficiency of insulin or resistance to the action of insulin at cellular level[1]. At present, the treatment of diabetes mellitus includes drugs like biguanides, sulfonylureas, meglitinides, thiazolidinediones, α-glucosidase inhibitors in addition to insulin. Well established drugs like Rosiglitazone, Pioglitazone are a class of antidiabetic agents which have thiazolidinedione ring in them. These acts through peroxisome proliferator activated receptor γ (PPARγ), which enhances the transcription of several responsive genes and tend to reverse insulin resistance by stimulating GLUT4 expression and translocation that improves the entry of glucose into muscle and fat[2]. There is always a need for new antidiabetic agents due to untoward side effects of most of the effective agents.

Thiazolidinone, the nucleus of the present work possesses structural resemblance with thiazolidinedione antidiabetics, with only the absence of one ketonic group. Out of 2-, 3- and 4-oxo, thiazolidinones with 4-oxo are associated with numerous biological activities which include antidiabetic[3,4], anticonvulsant[5–7], analgesic and anti-inflammatory[8–10], antioxidant[11], hypnotic[12,13], antitubercular[14], anti-HIV[15,16], antiparkinsonian[17], anti-arthritic[18], antimicrobial[19–21], antiamoebic[22], antitumour[23,24] activities. Due to these biological roles of 4-thiazolidinone analogs cited, it was planned to synthesize a few substituted thiazolidinones and to evaluate them for antidiabetic effects.

Out of the positions available for substitution in 4 thiazolidinone i.e. 2, 3 and 5, the positions 2 and 3 are important as evidenced by the numerous studies[24–26]. This led us to substitute carbon at position 2 and nitrogen at position 3 of thiazolidin-4-one ring. Thus it was worthwhile thought to synthesize title compounds which have naphthyl substituent at 3 and substituted phenyl at 2 positions in order to find new potent antidiabetic agents.

Results and discussion

In this study ten novel thiazolidin-4-ones containing substituted phenyl ring at 2nd position and naphthalenyl moiety at 3rd position were synthesized and evaluated for antidiabetic activity.

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SYNTHESIS, ANTIMICROBIAL AND ANTICANCER ACTIVITIES OF 5-(4-SUBSTITUTED-PHENYL)-1,3,4-THIADIAZOLE-2-AMINES

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ABSTRACT

A series of 5-(4-substituted phenyl)-1,3,4-thiadiazole-2-amines **(4a-h)** were prepared from dehydrocyclization of 4-substituted benzoyl thiosemicarbazides **(3a-h)** using concentrated sulphuric acid. The chemical structures of compounds were elucidated by Infra-red, NMR, Mass spectral and elemental analyses. Antibacterial activities of these compounds against *Staphylococcus aureus, Bacillus substilis, Eschereria coli* and *Pseudomonas aeruginosa* using Ciprofloxacin while antifungal activities against *Aspergillus niger* and *Candida albicans* using Fluconazole as standard drugs were performed. Minimum inhibitory concentrations and anticancer activity of potent compounds was determined.

The results indicate that compounds **4(a), 4(b)** and **4(c)** possess significant antibacterial activity whereas compounds **4(f)** and **4(g)** possess significant antifungal activity among the series of synthesized thiadiazoles comparing with standard drugs. Further, the results of anticancer studies on breast cancer cell line suggested that some potent antimicrobials i.e. **4(c), 4(f)** and **4(g)** associated with moderate to good anticancer activity. Thus, it may be found that synthesized compounds have good antibacterial activity and moderate antifungal activity. However, these compounds could be further screened for the antibacterial activities against a battery of bacteria to achieve their broad spectrum profile and also used to screen cytotoxic effect against other cancer cell lines.

Keywords: Synthesis, thiadiazole, antimicrobial, cytotoxic, cancer cell line.

INTRODUCTION

Mankind has been invaded by infectious diseases since ages. To counteract these infections, a large number of antimicrobial drugs have been invented by scientists. However, the change in the lifecycle of microbes and the resistance developed thereafter has become a serious issue[1]. There is always a necessity to search better antimicrobial agents and the inventions of such drugs have an important role in medicinal chemistry[2]. Sulfur containing heterocyclic compounds 1,3,4-thiadiazoles are the valuable structural part of bioactive compounds[3]. 5-Phenyl-1,3,4-thiadiazole is familiar group of bioactive compounds with numerous pharmacological activities[4].

Various pharmacological activities reported for 1,3,4-thiadiazole analogues are anticancer[5-7] antimicrobial[8-10], antitubercular[11, 12], anti-inflammatory[13], analgesic[14], anticonvulsant[15], antihypertensive[16], diuretic[17], local anesthetic[18] and antioxidant activities[19].Hence, it is envisaged to synthesize 1,3,4-thiadiazole analogs and screened them for antimicrobial and anticancer activities.

EXPERIMENTAL

All chemicals and solvents were procured from Merck Chemicals, Spectrochem (P) Ltd. and Qualigens Chemicals, Mumbai, India. Purity of these compounds was checked by thin layer chromatography (TLC) on silica gel G glass plates for which iodine vapors was the detecting agent. R_f values of synthesized compounds were found by taking different proportions of benzene and acetone (Table-1). The synthesized compounds were recrystallized from ethanol and water mixtures. Melting points of all the synthesized compounds were determined in open capillaries and are uncorrected. Structures of intermediates were established on the basis of melting point and various functional groups test. Infra-red spectra (in KBr)

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Original Article

Microscopic and Physicochemical Evaluation of Leaves of *Sphaeranthus indicus* Linn

Sonia Singh*[1], Bhupesh Chander Semwal[1], Gurulingappa S Neeli[2]

ABSTRACT

Objective: To study the pharmacognostic characters of a medicinally important crude drug, *Sphaeranthus indicus* Linn. **Methods:** Various pharmacognostic parameters involved in organoleptic, microscopic, physicochemical, phytochemical and fluorescence evaluation were carried out. **Results:** The macroscopy study showed that the leaves was observed as sessile, obovate-oblong apex, tapered base, dentate margin, simple, serrate lamina, surface glabrous. The leaf microscopy showed the presence of diacytic stomata, unicellular covering trichomes, arc shaped vascular bundle which contain lignified xylem and non lignified phloem, cortical parenchyma and a thin strip of collenchyma, micro rosette calcium oxalate crystals. The powder characteristics of leaf showed the presence of lignified fibers, medullary rays, bordered pitted xylem vessels, calcium oxalate crystals, stomata, epidermal cells and covering trichomes. Physicochemical parameters like total ash value was 9.21%, water soluble ash 1.56%, acid insoluble ash 1.35%, swelling index 4 mL, loss on drying 1.09% and foreign matter was 0.20%w/w respectively where as stomatal indexes of upper and lower surfaces were 33.2 and 23, respectively. The phytochemical screening revealed the presence of carbohydrates, flavonoids, alkaloids, volatile oil, fats and oils, tannins and phenolic compounds. **Conclusion:** The present study provides the scientific data for the proper authentification and establishment of quality control standards for the therapeutic use of *Sphaeranthus indicus*.

Key words: Histochemical evaluation, Organoleptic evaluation, Phytochemcial screening, *Sphaeranthus indiucs.*

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INTRODUCTION

Sphaeranthus indicus Linn. is commonly known as "Mundi" and "East Indian globe-thistle, belongs to the family Asteraceae. It is a spreading aromatic herb, occurring at Rater of Chhindwara District, M.P and in the moist damp places of tropical zones of Garhwal Himalaya.[1-3] It is a annual, aromatic herb having lanceolate, wing toothed leaves with semi-amplexicaul base, acutely serrate margin.[4] The herbs contain a deep cherry coloured essential oil , a bitter alkaloid Sphaeranthine.[5] It also contain eudesmenolide-7α-hydroxy eudesm-4-en-6, 12-olide, 2-hydroxycostic acid, β-eudesmol, ilicic acid, methy chavicol, α-ionone, d-cadinene, α-terpinene, citral, geraniol, geranyl acetate, sphaerene, indicusene and sphaeranthol.[6,7] A paste of the herb mixed with oil is good in painful swellings and pruritus.[1] The herb is used as a fish-poison and it is stuffed into holes of crabs to kill them.[8] The root is reported as acrid, bitter and sweet in taste and highly efficacious as diuretic, febrifuge, expectorant and stomachic. It is also useful in strangury, diabetes, leprosy, fever, cough, pectoralgia, cough, gastropathy, hernia, haemorrhoids, helminthiasis and dyspepsia. The oil prepared from root is useful in scrofula.[1] The root bark are grounded into powder and mixed with whey, is a valuable remedy in bleeding piles; also used as paste for local application.[5] The powdered leaves are good for skin diseases and are considered as a nervine tonic.[1]

The current literature revealed some pharmacognostical, physicochemical, phytochemical and pharmacological studies. The main objective of this study is to provide some valuable information with respect to its identification and standardization of *S. indicus* leaf which could be helpful in authenticity, purity and quality aspects.

MATERIALS AND METHODS

Plant collection

The fresh leaves of *S. indicus* Linn. were collected from the local areas of Hoshangabad, M.P and authenticated by Dr. R.S. Goudar, Dept. of Botany, R.L. Science Institute , Belgaum. A voucher specimen was preserved in the herbarium (RLI/Bot/06-07) for further reference. After authentication, the leaves of *S. indicus* Linn. were dried at room temperature

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Fabrication and characterization of nifedipine loaded β-cyclodextrin nanosponges: An *in vitro* and *in vivo* evaluation

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Abstract

Cyclodextrin based nanosponges are gaining much consideration due to their aptitude to augment oral solubility of poorly water-soluble medications such as nifedipine. Here in the contemporary research, diphenyl carbonate was employed for crosslinking the cyclodextrin successfully. DLS studies confirmed particle size in the range of 400–500 nm with monodisperse size distribution. TEM measurement established spherical shape and size range of the nanosuspension. SEM photomicrograph confirmed porous structure of placebo nanosponges while drug loaded nanosponge formulation NS3 revealed solid surface. FTIR studies established no drug-polymer interaction. DSC thermograms showed molecular level dispersion of drug in nanosponges. *In vitro* drug release exhibited a burst release for first fourth hour and delivered drug in sustained manner for subsequent 24 h. When encapsulated within nanosponges, oral bioavailability of nifedipine was enhanced in comparison to control formulation (C_{max} for test formulation was 0.2; 0.055 for control). The fabricated nanosponges displayed ad

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Piracetam Facilitates the Anti-Amnesic but not Anti-Diabetic Activity of Metformin in Experimentally Induced Type-2 Diabetic Encephalopathic Rats

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Abstract

Piracetam exhibits anti-amnesic activity in several animal models of dementia. However, its anti-amnesic potential has yet to be evaluated in type-2 diabetes mellitus (T2DM)-induced encephalopathy. Therefore, in the present study, piracetam (25, 50 and 100 mg/kg) was screened for anti-amnesic and anti-diabetic activity in T2DM-induced encephalopathic male rats. Subsequently, anti-amnesic and anti-diabetic activities were evaluated for piracetam, metformin and their combination in T2DM-induced encephalopathic animals. Rats received streptozotocin (45 mg/kg) and nicotinamide (110 mg/kg) injections on day-1 (D-1) of the experimental schedule and were kept undisturbed for 35 days to exhibit T2DM-induced encephalopathy. All drug treatments were continued from D-7 to D-35 in both experiments. Piracetam (100 mg/kg) attenuated loss in learning and memory in terms of increase in escape latency on D-4 (D-34) and decrease in time spent in the target quadrant on D-5 (D-35) of Morris water maze test protocol, and spatial memory in terms of reduced spontaneous alternation behavior in Y-maze test of encephalopathic rats. Additionally, piracetam attenuated altered levels of fasting plasma glucose and insulin, HOMA-IR and HOMA-B in encephalopathic animals, comparatively lesser than metformin. In the next experiment, combination of piracetam and metformin exhibited better anti-amnesic but not anti-diabetic activity than respective monotherapies in encephalopathic rats. Further, the combination attenuated reduced acetylcholine level and increased acetylcholinesterase activity, increased glycogen synthase kinase-3β level and decreased brain-derived neurotropic factor level in hippocampus and pre-frontal cortex of encephalopathic animals. Thus, piracetam could be used as an adjuvant to metformin in the management of dementia in T2DM-induced encephalopathy.

Keywords: Hippocampus; Memory; Metformin; Piracetam; Pre-frontal cortex; Type-2 diabetes mellitus.

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REVIEW ARTICLE

Vitamins for Cancer Prevention and Treatment: An Insight

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Abstract: Over a few decades a strong interlink between oxidative damage and cancer has been investigated by various scientists across the world on the basis of epidemiological observations of the effects of fruits and vegetables used in the diet for cancer patients. Primarily, Vitamin C, Vitamin D and Vitamin E are reported to be involved in the amelioration of side effects which occur in chemotherapy and radiation therapy of lungs, stomach, prostate, colorectal, gastric head and neck cancers. The vitamins acting as antioxidant adjuvants are found to have apoptotic and anti-angiogenesis potential as well as inhibitory effects against metastasis in cancer cells. This chapter explicitly discusses the key aspects concerned with the vitamins in relation to cancer prevention and treatment. It describes vitamins and their natural resources, role of vitamins in the body, and vitamins as prime ingredients in the diet and their effects on cancer biology with reference to recent research reports. Moreover, this paper also includes the emerging potential of pharmaceutical advances to enhance bioavailability of the vitamins to cancer patients with improved safety and efficacy. Clinicians and researchers must mull over the nutritional requirements of individual cancer patient so as to treat cancer and increase life expectancy.

Keywords: Vitamin, cancer, prevention, treatment, diet, metabolism, targeting.

1. INTRODUCTION

Vitamins are composed of two words; vital plus amine means compounds required for normal growth of body and maintenance of several body functions. Vitamins are organic molecules that are essential part of a regular diet. Vitamins or their derivatives act as coenzymes, cellular antioxidants, and/or regulators of gene expression. Vitamins are organic compounds which cannot be produced in human body therefore they must be provided through the diet [1]. Several types of vitamins are essentially required for the normal body functions. They are either of water soluble (folic acid, cobalamin, ascorbic acid, pyridoxine, thiamine, niacin, riboflavin, biotin, and pantothenic acid) or fat soluble (vitamins A, D, K, and E) in nature [2-4]. Different water soluble vitamins are precursors of many coenzymes which are required for several enzyme catalyzed metabolism. Fat soluble vitamins do not show coenzyme function except vitamin K. These essential vitamins are usually co-absorbed or transported by different mechanisms. After absorption, these vitamins normally are not excreted in urine and stored in liver and adipose tissues in definite amount. In case of hypervitaminosis, only water soluble vitamins (*i.e.* B complex and ascorbic acid) are eliminated from the body while fat soluble vitamins may create serious toxicological complications [5, 6]. Tables **1** and **2** summarize different water soluble and fat soluble vitamins, respectively.

2. VITAMINS AND THEIR ANALOGS FOR CANCER TREATMENT

Since vitamins cannot be made in body in an adequate amount; they need to be supplemented in trace amounts through diet. Certain vitamins like biotin may be synthesized by the intestinal microflora in order to meet the demands of the host body [37]. They are the essential components of a diet since the cells are incapable of synthesizing them in the required quantities and at adequate rates in order to meet the demands of the body because of the absence of the necessary enzymes [25]. Cancer is a serious disease in which mortality rates of patients have been increasing per year [38]. About one sixth of all deaths have been accounted due to cancer in the United States and many other developed countries [39]. Till date, various strategies have been developed by the scientists for its prevention and treatment. Different pattern antitumoral therapies like surgery, chemotherapy and radiotherapy have been improved, but there is an urge for the development of some innovative approaches for the effective treatment of cancer. Major proportion of cancer occurring in humans

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Application of fuzzy MCDM in supplier selection of fertiliser manufacturing industry

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Abstract: Supplier selection is an important strategic consideration for the manufacturing industries. Right selection is a process of identifying the right suppliers, who are able to provide the buyer right products/raw materials/ services, at the right price, right time, right place and right quantity. The selection decision is based on multiple criteria and this decision often is unstructured and complex. Multi criteria decision-making (MCDM) problem involves different conflicting criteria on which decision maker's knowledge is sometimes vague and imprecise. This decision is required to be taken in a fuzzy environment. In this paper, an attempt has been made to formulate and apply a fuzzy MCDM method to a supplier selection problem from the Indian fertiliser industry.

Keywords: supply chain management; procurement process; fuzzy MCDM; fertiliser industry; supplier selection.

Reference to this paper should be made as follows: Agrawal, V., Agrawal, A.M. and Mohanty, R.P. (2017) 'Application of fuzzy MCDM in supplier selection of fertiliser manufacturing industry', *Int. J. Business Performance and Supply Chain Modelling*, Vol. 9, No. 2, pp.133–159.

Biographical notes: Vivek Agrawal is an Assistant Professor in the Department of Management Studies at GLA University, Mathura, U.P., India. He has first class degree in MBA. He did his PhD in the area of e-service quality from Institute of Business Management, GLA University, Mathura, U.P., India. He has guided many Master level thesis in management and published more than five research papers in national/international journals/ conferences to his credit. He has more than six years of teaching experience and his specialisation includes e-service quality and operations management.

Discriminating market segments using preferential green shift: a conjoint approach

Kushagra Kulshreshtha, Vikas Tripathi, Naval Bajpai and Prince Dubey

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Abstract

Purpose – *This paper aims to explore surprising facets of consumer delight behavior. The study is the empirical juncture of three studies based on consumer survey on the Indian television market. Study 1 traces the existence of greenies in India among brownies prevailing around the globe by using the surprise-delight model. Study 2 is a pre-intervention research design confirming greenies preferences to television attributes such as screen technology, annual energy cost saving, screen resolution, screen size and free gifts. Study 3 signifies a price intervention design by allowing customers to include their preference by replacing the annual energy cost saving with price.*

Design/methodology/approach – *This paper is a harvest of studies based on discriminant analysis for identifying green and brown customers and a two-level conjoint analysis for identifying attributes contributing to green behavior.*

Findings – *The empirical generalization of a study comes out with unique findings of the greenies and brownies and their preference and attitude toward green attribution and substitution. A "preferential green shift" appeared as a vital output owing to knowledge–attitude–practice from these consecutive studies. This gap exists because of the price factor. The authors suggest the measures for improvement in product offering by targeting and positioning green products from the findings and the preferential green shift.*

Research limitations/implications – *Future research may focus on other segments of products such as automobiles, i.e. cars. Despite the availability of the non-probabilistic sampling technique, the probabilistic sampling technique can be used. Finally, a larger sample size could have given a better generalization of results.*

Originality/value – *The gap in knowledge–attitude–practice was evident. This gap was caused by the presence of "price" concern. The study revealed that heavy consumer durable buyers are aware of the benefit of green, but the reality of price cannot be ignored and finally make a purchasing decision on the basis of price criteria. Hence price is recommended as another criterion to be considered in the technology acceptance models.*

Keywords *Conjoint analysis, Green, Price, Discriminant analysis, Knowledge–attitude–practice*

Paper type *Research paper*

1. Introduction

Earth, a planet of life in the "Milky Way", is facing severe climatic changes, adversely affecting the environment and endangering species. Various activists, environmentalists and conservatives have voiced their concern from time to time alerting to this danger in the near future. Brooks (2015), an American conservative, political and cultural commentator in *The New York Times* editorial regarding green tech solution on December 1, 2015, said:

> [. . . . . ..] a vast majority of Republican politicians can't publicly say what they know about the truth of climate change because they're afraid the thought police will knock on their door and drag them off to an AM radio interrogation.

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Article

Impact of Brand Cues on Young Consumers' Preference for Mobile Phones: A Conjoint Analysis and Simulation Modelling

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Abstract

There are multiple attributes and product features which influence youth and impact their purchase decisions. The companies are assiduously trying to tap young consumers but are unable to sustain their high growth and market share. The attributes or brand cues influencing youth can be broadly classified as extrinsic cues and intrinsic cues. Extrinsic cues are peripheral or external to the product such as price, brand image, store image, whereas intrinsic cues are independent, inherent and constitute the product's physical characteristics such as mobile camera, size, colour etc. In the present study, extrinsic cues are brand name and price while camera, RAM, Android type and battery power are intrinsic cues. To recognize the role of brand cues, a sample of 417 respondents through judgement sampling is drawn. The impact of brand name, price and technology on brand equity is empirically examined by conjoint and simulation analysis to generate information regarding consumers' preferences towards mobile phone. The salience of study put forth the measures of enhancing mobile brand equity among young consumers. The originality of present study articulates brand equity diverge across different age groups and the young consumers obsession to spend more on consumer durable products like mobile with their desirable intrinsic and extrinsic cues.

Keywords

New product, youth, brand name, brand equity, price, technology, consumer preference, simulation, conjoint analysis

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Perception of employees toward e-learning service quality: exploratory factor analysis

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The authors want to extend their gratitude toward the Editor Dr David McGuire and the anonymous reviewers for their helpful and valuable suggestions and comments that improved the quality of this work significantly.

Abstract

Purpose – *The purpose of this paper is to evaluate the employee's perception toward e-learning programs or services and to explore the attribute for improvements.*
Design/methodology/approach – *For this study, 294 employees from four different types of banks in North India were selected as respondents. Four types of banks were considered – government bank, private bank, foreign bank, and cooperative bank. The respondents were asked to give their responses as per their perceptions toward e-learning on a five-point Likert scale.*
Findings – *Although e-learning has not been able to fulfill its promise in revolutionizing corporate training in India, there is little doubt that in future the mode of learning will play a major role in human resource development in India because the research carried out on the successful implementation of e-learning is mostly in the western part of world.*
Originality/value – *The present study provides a useful insight about employee perceptions on the effectiveness of e-learning, which ultimately improves the e-service quality and results in the improvement of satisfaction of customers in the online banking sector.*

Keywords *E-learning, Service quality, Bank, Employee perception*

Paper type *Research paper*

Introduction

> Education is what remains after one has forgotten what one has learned in school (Albert Einstein).

The definition of education given by Einstein deliberately reflects good humor, but the description aptly presents the fact that there is constant evolution in effective education. A sea change has been observed over the decades in the education system. In place of traditional education, it has changed to online and self-driven learning. There are incalculable milestone on the traversed path of education in India; the recent one is e-learning (Chatterjee, 2014).

According to the report of Ambient Insight, the growth rate of self-paced e-learning in Asia was recorded at 17.30 percent and the online learning market in Western Europe is expected to reach $885 million by 2017. According to the report of Association for Talent Development, the manufacturing companies spent $535 on providing 27 hours of training to each employee in 2014 in America.

According to the report of *Financial Express*, the market size of India's online education is set to grow to $40 billion by the end of 2017. India has become one of the largest education markets in the world with a strong network of approximately one million secondary or senior secondary schools and 18,000 higher educational institutions. Nearly 1.2 billion of the total population of India comes under the target market for education (Chatterjee, 2014).

The massive growth of the information technology has been accompanied by rapid growth in the e-services that leads to improvement in the electronic service quality of the service organizations. E-learning is one type of services of e-service and is one of the significant recent developmental

Role of women entrepreneurs and NGOs in promoting entrepreneurship: case studies from Uttarakhand, India

Usha Lenka and Sucheta Agarwal

Abstract

Purpose – *Women establish their enterprise for economic independence and empowerment. This study aims to identify the factors that promote women entrepreneurship in Uttarakhand, a state in India. Although, women have the potential to become entrepreneurs, they do not have the right opportunities to explore it. Therefore, the role of non-government organizations (NGOs) is imminent in supporting women's entrepreneurial cause.*

Design/methodology/approach – *The problems of women entrepreneurs during venture creation have been explored. Case studies of women entrepreneurs and NGOs operating in Uttarakhand have been developed through an in-depth interview method.*

Findings – *Entrepreneurial learning occurs because of certain personal, social and environmentally driven motivational factors. Entrepreneurial learning helps in the development of personal, social, managerial and entrepreneurial competencies. These competencies are essential for the performance of an enterprise.*

Practical implications – *This study provides directions to policymakers and researchers to focus on developmental programmes for women entrepreneurs.*

Originality/value – *This study explores a conceptual framework for the promotion of women entrepreneurship.*

Keywords *Competencies, Women entrepreneurs, NGOs, Entrepreneurial learning, Venture creation*

Paper type *Research paper*

Usha Lenka is an Associate Professor and Sucheta Agarwal is a Research Scholar, both at the Indian Institute of Technology, Roorkee, India.

Introduction

Entrepreneurship is the backbone of economic development of a nation, as it opens new job avenues. Globally, entrepreneurship has emerged as a developmental inspiration for the business world (LaVan and Murphy, 2007). Economic growth of the nation would be lopsided without the involvement of women in entrepreneurial activities who constitute approximately half of the population. Despite being almost equal in number, there is wide disparity in women's economic status. Therefore, there is a need to unearth reasons for economic disparity and identify measures to promote the status of women. Promotion of women as entrepreneurs is one such initiative geared up around the globe. A survey conducted in the 2015 by Dell Inc. has ranked countries on the basis of certain dimensions: business environment, gendered access to resources, women's leadership and legal rights, pipeline for entrepreneurship and potential women entrepreneurial leaders. The graph has been plotted on the basis of scores obtained by various countries (Figure 1). Australia, Canada, France, Germany, Sweden, the UK and the USA have dominated in women entrepreneurship space, while Bangladesh, India and Pakistan scored the lowest (Global Women Entrepreneur Leaders Scorecard, 2015). All these Asian countries, especially India, has the highest number of educated youth population. The Government of

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Underlying causes of poor socio-economic performance of Uttar Pradesh and Bihar-India

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Abstract

The article investigates the underlying causes of poor economic performance of Uttar Pradesh (UP) and Bihar , the two economically and socially underdeveloped states of India . More specifically, the article examines first, the level of development of UP and Bihar in certain indicators like poor governance, week institutional framework and low socioeconomic performance , second, it sets out the problem faced by these two states in number of social (it introduces the demographic characteristics of population, poverty, malnutrition and their skill) economic (agrarian structure and livelihood) and political factors (the governance and institutions, corruption, naxalism, castism and bureaucratic situation). The article concludes that poor performance of UP and Bihar in socio economic development is not due to a particular factor, but an outcome of a myriad of social, economic and political factors rooted in structural, historical and macro-economic policies. The poor performance of UP and Bihar may be attributed to low human capital, weak institutions and poor infrastructure coupled with political volatility and social clash rooted in sectarian politics based on caste, class and ethnic division. © Serials Publications.

Author keywords

Corruption and bureaucracy; Governance; Institutional framework; Socio-economic

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Wisdom of Yoga and Meditation: A Tight Rope to Walk

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Abstract

This paper focuses on studying and analyzing different aspects of yoga and meditation in one's life. For gaining the competitive advantage, these days yoga and meditation are being used as one of the key element in one's personal growth as well as professional life. In this cutthroat competition, everyone is so busy in their lives that it is tough and tight for an individual to spare time for yoga and meditation. This paper highlights some myths and parameters regarding yoga and meditation, which are essential to be safe from dreadful diseases and necessary from the point of view of healthcare. Most of the studies performed in the developed and developing countries reflecting that an individual is becoming more and more health conscious and therefore prefers to have different asana and exercises of yoga and meditation that are manageable and healthy for the individuals. Human being has examined the fact in order to meet the normal workouts it is necessary to concentrate on physical and mental functioning of the body. Studies and research have proved the fact that by following the principles of yoga and meditation-peaceful mind, alertness and concentration can improve. This paper goes on to highlight how one can benefit immensely by practicing the various concepts of yoga and meditation to come out of the changing paradigms in a way not known before also would acquaint to about the myths, whys, difference, benefits and mechanism of yoga and meditation.

Keywords: *Yoga and meditation, Competitive Advantage, Personal Growth, Health Conscious, Physical and Mental Functioning.*

Introduction

In terms of corporate advancement, the concept of yoga and meditation are often mistaken for employee well-being which neither do full justice nor present a comprehensive picture. Previously, workplace yoga and meditation were not given their due with regard to the overall well being of the employees as well as his job satisfaction index. However, of late, companies have come to realize that they cannot make themselves count without acknowledging the increasing role of yoga and meditation which could be found at every level in an organization and in every employee no matter what is her/his say in the organization.

It is but obvious that employees, while coming to make their contribution to their organization, also bring their set of sentiments such as admiration, dissatisfaction, insecurity, passion, and the similar concepts of the same ilk. Here, yoga and meditation play a crucial role in the happenings, to convert his/her overall temperament to the workplace to increase credibility of an organization by converting from negatives to positives.

Yoga and meditation count because they are the driving force to gauge an individual's performance and contribution towards the advancement of the organization. Without paying heed to the same, the organization cannot expect to grow exponentially unless they have some mechanism in place to