

Research Publications
of
Central University of Punjab, Bathinda

Annotated Bibliography

2009-2013



Central University of Punjab, Bathinda
(Established vide an Act of Parliament in 2009)

Forging ahead in Research





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Message From The **Vice Chancellor**



The soul of any university is research and its quality indicates the academic status of that institution and capabilities of its researchers and faculty. The best measure to ascertain the caliber of research is the evaluation of publications, which also reflects the inherent potential and talent available in the institution.

The Central University of Punjab, since its inception in 2009, has laid emphasis and given priority to establish a sound research base. The university, being one of fourteen new central universities established by the Government of India, confronted myriad of problems and numerous hurdles during its inception and infancy. In spite of these, the university has made firm and steady progress and earned itself a rightful place in the list of respected educational and research institutions. The university has equipped itself with the state of art infrastructure, academic facilities and has developed expertise for in-depth learning and cutting edge research. It is now offering some prudent innovative academic programmes designed in tune with the challenges of present and future times. These achievements have made the university, in a very short time, a beacon of higher education in Punjab.

The university has attracted exceptionally qualified, highly motivated and dedicated young teachers and researchers in its various schools in this educationally backward 'Malwa' region of Punjab. In just four years, the faculty of university has demonstrated its commitment towards research, by publishing an impressive number of research papers having high impact factor in several peer reviewed national and international journals in diverse areas of science, engineering and humanities.

I am pleased that a document compiling the abstracts of research papers published by the faculty and research scholars of the university has been prepared. The documentation of research output of the university will provide stimulus to the young researchers and reinforce our commitment to carry out cutting edge research to be the pioneers in all areas. The university fraternity is committed to strive hard for finding solutions to the unresolved scientific and engineering riddles and to the wider issues of society involving languages, humanities, etc. Our endeavor and resolution is to make the Central University of Punjab, a global destination for higher learning. The suggestions and constructive criticisms to achieve our mission are always welcome.

A handwritten signature in black ink, which appears to read 'Jai Rup Singh'.

Prof. Dr. Jai Rup Singh

Foreword

Research is pivotal for the progress of modern society. Particularly excellent research work is essential for breakthroughs in our knowledge of the world. Central University of Punjab, Bathinda (CUPB) is committed to research and its thrust area of research is health and environment with a special reference to the local area. The university encourages interdisciplinary approach. Interdisciplinary cross-roads of basic and applied research in different fields with social responsibility are the basis of discovery and technological innovation.

From the day of its inception, the University is making an all out effort to provide an ecosystem to carry out research and to inculcate the habit of creative & critical thinking and communication amongst its researchers. Communication, i.e., exchange of results, is the driving force in research. Work of high quality provokes reactions of peers. As a result of these efforts, University could publish 169 publications (139 papers and 30 books & book chapters) during the last four years i.e. since its inception and an attempt is made to compile all the abstracts of these papers in a booklet form. The most crucial parameter in the assessment of research performance is international scientific influence. A cursory glance of these abstracts indicate that as many as 67 papers are from sciences and published in the high impact fact journals. These papers are having 493 citations and an average citation index is 7.35 and having a cumulative impact factor of 159.27 (avg. 2.37).

In this booklet, the abstracts of the research papers of the faculty and research scholars are compiled for the benefit of fellow researchers and to acquaint the reader with the nature of the research work being carried out at CUPB. Further, the Centres of Study and Schools existing and to be created in future and the infrastructure in the university to carry out the research are also given. The entire compilation of the abstracts is done by Mr. Bhupinder Singh, Professional Assistant, University Library. I appreciate Mr. Bhupinder Singh's efforts. I am highly thankful to our Honourable Vice Chancellor Prof. Dr. Jai Rup Singh for his keen interest in research and constant inspiration and critical observations in preparing this compilation. I record my appreciation to all my fellow researchers who carried out research and published it.



(P. Ramarao)

Dean Academic Affairs
Central University of Punjab, Bathinda

About The University

The Central University of Punjab, established by an Act of Parliament in 2009 at Bathinda, is amongst the fastest growing newly established central universities of the country and is situated in an educationally backward region of Punjab. It offers some of the most innovative non-conventional academic programmes designed in tune with the challenges of 21 century. Within a short span of nearly four years of existence, the university has demonstrated its commitment to excellence and it is emerging as a hub of advanced learning through its unique interactive and experiential approaches. The university at present is functioning from its 37 acre transit campus called “City Campus”, located just 5 kms away from the heart of Bathinda city. The campus has lush green lawns, beautiful trees, enchanting landscape and has state of the art air-conditioned lecture rooms furnished with latest audio-visual devices, well equipped science laboratories, a conference room with video-conferencing facilities, a 100-seater seminar hall and a 300-seater air-conditioned auditorium to support academic activities. Semi furnished transit faculty hostels accommodate the newly appointed faculty free of cost for first three months of their joining the university. It has a guest house, and separate hostels for boys and girls. The banking facilities including an ATM are available at the campus.

The science laboratories are equipped with facilities like 96 capillary DNA sequencer, RT-PCR, several DNA thermocyclers, Gel Documentation System, Ultra Low Deep Freezers, High Speed Cooling Centrifuges, CO₂ Incubators, Milli Q Water Purification System, Automated Karyotyping System, Fluorescence Microscope, Vacuum Concentrators, Accelerated Solvent Extractor, Muffle furnace, Trace Metal Analyser, Fourier Transform Infra Red Spectrometer, Atomic Absorption Spectrometer, UPLC system, Gas Chromatographic Mass Spectrometer etc. for training students and conducting research in the disciplines of Biosciences, Chemical and Pharmaceutical Sciences, Environmental Science and Technology, Genetics and Molecular Medicine.

Excellent facilities for plant tissue culture, culturing and genetic transformation of animal and human cell lines have been created in addition to the availability of cold rooms for long term storage of experimental materials.

The air-conditioned Computer Centre is equipped with 170 Dell and 15 Apple Macintosh desktop computers and six high end computing machines with graphic card, 8GB RAM and 42" LCD monitors for academic pursuits of faculty and students. All the laboratories, class rooms, offices, guest houses, residences have 1 GB connectivity. The entire campus is Wi-Fi enabled.

The air-conditioned University Library is equipped with elegant modular furniture, Radio Frequency Identification (RFID) and electromagnetic security systems to facilitate self-issue, return and renewal. A security arrangement comprising of 20 CCTV cameras has been provided in the library. The library has over over 15,000 book titles on its racks and subscribes to 85 national and international peer-reviewed print journals. Apart from these, over 9000 full text online journals are available under several bibliographic databases and full text resources, including ‘UGC INFONET’ programme, Science Direct, Springer, J-STOR, Wiley-Blackwell, Sage, Taylor & Francis, Project Muse, Science Online, IEEE/IEL online, ACS, Cambridge university press, Oxford university press, Indiasat.com and PROWESS. Library is providing access to periodical collections of 22 university libraries in India through, JCCC UGC INFONET, World Bank E-Library and has institutional membership of DELNET. A reprographic service, with latest photocopying machines and sophisticated scanners like V-cradle planetary scanner for automated scanning is available to readers. The library has its entire bibliographic collection in online electronic database (OPAC).

The university has established its sixteen Centers of Studies under ten schools, offering sixteen unique and innovative M.A./M.Sc./M.Tech./M.Pharm./M.Phil. and M.Phil.-Ph.D. integrated programmes. This publication is an attempt to introduce the research initiatives of the faculty of its different Centres of Studies so that the students choose their area of research for dissertation work which is compulsory for all students pursuing post graduate and research programmes.

Admission to all the academic programmes offered by the university is carried out through National Level Online entrance examination that is held every year at selected examination centers located in important cities across the country. The students are provided with excellent study environment and world class education by enthusiastic faculty having wide international experience. Consequently of the nearly 400 students, 51 have qualified NET or JRF conducted by UGC/CSIR/ICMR etc.

The main campus of the university is coming up on a 500 acre site located at village Ghudda on Bhatinda-Badal road and construction of boundary wall has been completed.

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Section - I

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Section - II

Abstracts of Publications

(Alphabetic)

February 2009 – October 2013

1

ABSTRACT

Alex, J. M. and **Kumar, R.** (2013). 4, 5-dihydro-1H-pyrazole: An Indispensable Scaffold. *Journal of Enzyme Inhibition and Medicinal Chemistry*, DOI:10.3109/4756366.2013.795956.

Pyrazoles, categorized as nitrogen-containing heterocycles, are well known for their interminable participation in the field of perpetual research and development of therapeutical active agents. As a consequence pyrazoles became an inevitable core of numerous drugs having diverse activities. The broad spectrum of activities portrayed by the pyrazoles instigated the researchers to modify the pyrazole ring as 4,5-dihydro-1H-pyrazoles commonly known as 2-pyrazolines. The present review is a concerted effort to retrace compounds covered from 2009-till date which owe diverse biological activities to the 2-pyrazoline scaffold and also condenses the retro-synthetic approaches employed for their synthesis. This endeavour culminated in revelation that inhibitory potential varied when the substituents in particular N-substituents of 2-pyrazolines were altered.

Keywords: 4,5-Dihydro-1H-pyrazole, Biological activities, Synthesis.

2

ABSTRACT

Anamika and **Yogalakshmi, K. N.** (2013). Enzyme assisted biodegradation of chlorpyrifos pesticide: A mini review. *International Journal of Environmental Research and Development* 3 (2), 9-13.

Over a long period of time or since two decades the chemically synthesized organic compounds were released in the environment at a tremendous rate polluting groundwater, river and soil. The list of compounds includes pesticides, fuels, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), chlorophenols, and dyes. Pesticides are the class of compounds or substance used for the killing, repelling or controlling plants and animals considered as pests. In India, Punjab alone uses 6972 MT of various pesticides. Organophosphates are the most highly used pesticides accounting for 38% of the total pesticides used annually in the world, mainly monocrotophos, acephate and chlorpyrifos. They are highly toxic in nature and their usage pollutes the ground water and soil ultimately affecting the human health directly or indirectly. Chlorpyrifos is applied on a large scale to rice fields for the control of foliar insects. Microbial degradation is the best solution to detoxify and degrade these pesticides. Enzymatic degradation of pesticides has also been studied and it is reported to be more effective than the microbial degradation due to its multiple advantages such as high degradation rate, effectiveness at even low pesticide concentration, resistance to inhibitors of microbial metabolism, usage at wide range of environmental conditions etc. Some of the researchers have also studied the degradation of chlorpyrifos by immobilizing microbial enzymes, reporting 69.4% degradation after three repeated use of immobilized enzyme. It has been reported that immobilized enzyme is more efficient than the free enzyme for chlorpyrifos degradation as they can be used repeatedly. This paper is an attempt to review the current status of research in enzyme assisted degradation of chlorpyrifos.

Keywords: Chlorpyrifos, Enzyme, Biodegradation, Immobilization, Organophosphate pesticides.

3

ABSTRACT

Anamika and **Yogalakshmi, K. N.** (2013). Laccase enzyme and its role in degradation of pesticide- a mini review. *International Journal of Engineering Research and Technology* 6 (3), 21-25.

Pesticides are the compounds which are being used against pests. Due to their indiscriminate usage they cause considerable amount of adverse effects on human health, different life forms and also to the ecosystems. Toxicity of pesticides and sensitivity of organisms plays an important role in causing adverse effects. Keeping in mind the various ill effects of pesticides there is a need for pesticide degradation. Though there are various methods of pesticide degradation, degradation using microbes are

more popular as they are eco-friendly and cost effective. Both bacteria and fungus plays a role in pesticide degradation. White rot fungus has reported to have a wide range of application in cleaning up of the environmental pollutants through their various oxidative enzymes. Laccase, a blue copper containing oxidase (EC 1.10.3.2), is one such oxidative enzyme. It is an extracellular lignocellulytic enzyme mainly produced by white-rot fungus. It is a key enzyme in lignin degradation however it can also target a wider range of organic compounds due to its non-specificity. Laccase has been extensively studied for the degradation of dyes and compounds containing phenol. The enzyme decolorized and degraded 70%-90% azo dyes within 24 h. Likewise, dymron pesticide also showed 90% degradation. This paper is an attempt to review about the potentials of laccase enzyme in degradation of pesticides.

Keywords: Laccase, Pesticide, Enzyme, White-rot fungus, Degradation

4

ABSTRACT

Arora, H. R. (2012). Out of Fears, Out of Tears. In: Gill, R. S. (Eds.) Human Rights: Issues and Dimensions, pp. 113-129. Abhishek Publications Chandigarh.

'Human Rights' is a great idea, and a distinct discipline, of the modern era though such basic rights had been recognized and honoured well, in the traditional Indian society, since the dawn of civilization itself. Even the aliens used to be given certain rights, earlier than 7th century BC. The Liberation of Hebrew Slaves by Moses is the best instance worth quoting as a pioneer work in this field which is supplemented, further, by the Magna Carta of England, the Rights of Man in France and by the Bill of Rights of USA etc.

Human Rights are inherently associated rights with each human entity, male or female, of any parentage, high or low, rich or poor, of any caste, creed, colour, religion, race and/ or nationality etc. These are individualistic as well as universalistic and are in- alienable and in- separable from the human being concerned which can, broadly, be categorized into:-

- (i) Rights against the State action;
- (ii) Rights against other individuals; and
- (iii) Rights against both the State and other individuals.

The never- to- forget sufferings, inflicted by the two world wars, awakened the International Community to take up the blazing tangle of Human Rights afresh for its long- standing and stable resolution to save our posterity from the scourge of any more such war. Under the League of Nations, the Slavery Convention 1926, Convention on Forced Labour 1930 and other such congre-gations did strengthen Hersch Lauterpacht to further an International Bill on the Rights of Man with a motive to prevent the recurrence of any more catastrophe associated with the Fascist Policies as to protect the fundamental freedoms and the human rights legally as well as socially.

The Universal Declaration of Human Rights 1948 (UDHRs), the forecourt of general principles of liberty, equality, non- discrimination and of fraternity is vested with the following four columns:-

- (i) Personal Rights;
- (ii) Rights of individual in his relationship to the outside World Community;
- (iii) Political Rights; and
- (iv) Social and Cultural Rights.

In spite of several world- level endeavours to maintain the global order and peace, we have, still, to face a challenge of racism, racial discriminations, xenophobia and of mutual- intolerances etc. Drug-

trafficking is another serious trans- border ailment which deteriorate our youth, and hence, destroys the human rights, fundamental freedoms as also our democratic set- ups besides de- stabilizing the legitimately constituted governments. It is quite pitiable to note that more than 29000 people had lost their precious lives, between 1994 till 2009, during the terrorist attacks in India while some of our political leaders are there to recommend for clemency to the perpetrators thereof.

Economic inequality, perhaps, is the root- cause of all the wide- spread unrest and of such a fatal disturbance. Amid a train of vices, generated by such in- equalities that cling to us, the bare human rights are of little help of any sort. Let's hope that the well- framed International Notes together with the Domestic Legal Mandates would, soon, bear the fruit of Love and Peace, sweeter enough for every human- being, on this Mother Earth, to share, taste and relish.

Keywords: Rights of man, In- alienable, Individualistic, Universalistic, Blazing- tangle, Racism, Posterity, Catastrophe, Non- discrimination, Xenophobia, Clemency, Mutual- intolerances, Terrorist attacks, Congregations, Train of vices, Scourge, Drug- trafficking, Trans- border, Economic inequality, International notes, Domestic legal mandates, Aliens

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ABSTRACT

Arora, H. R. and Dhamir, A. (2012). Shamlat/Bachat Land: Use and Occupation. *Punjabi University Law Journal* 6: 190-197.

Section 48 of the Punjab Laws Act, 1872 was re- fashioned, during post-independence era, in the Punjab Village Common Lands (Regulation) Act 1953 and in the PEPSU Village Common Lands (Regulation) Act 1954, each for the respective areas, but, sooner, both were unified into a single enactment, called the Punjab Village Common Lands (Regulation) Act (XVIII of) 1961, on the merger of the relevant States together since 1956. The sole aim was to enable the Panchayats for using and utilizing the shamlat land for the welfare and benefits of the village community concerned. The Panchayats were, thus, given the powers and authority to function as a self-governing unit each, per Constitutional directives, under Article 40 thereof. The said Law of 1961 is applicable on the shamlat/ bachat lands that comprise, generally, the uncultivated (banzar), pastures, vacant spaces reserved for extension of village dwellings, gora deh, and the inhabited village site i.e. abadi deh besides the land adjoining the inhabited village site itself. This Act is quite a smaller one covering merely 16 original sections. This Law was amended time to time by inserting few more sections, as were found urgent as to make the total mass of 21 sections, in all. Though amended, recently, yet all the provisions of this law have got retrospective effect as had been held in several revenue matters, earlier, subject, however, to any contrary provisions so made in any other law, for the time being in force, or in any agreement, instrument, custom or usage, or else by any decree or order of any Court or other authority.

Section 5 of the Act provides, expressly, that all shamlat lands that vest, or deemed so to vest, in the Panchayats each, shall be utilized or disposed of only for the common benefit of the inhabitants of the village concerned and in the prescribed manner only. The Panchayats are also entitled to make use of the respective shamlat lands, either by themselves alone, or through another, as to take up any one or more of the purposes specified under Rule 3 (2) of the Punjab Village Common Lands (Regulation) Rules, 1964. The Panchayats are, thus, competent to sell the shamlat deh, by a public auction, for using the funds so received to construct the school building but this power can only be exercised with the prior approval therefor, from the relevant State Government. The Panchayat is quite competent to utilize the shamlat land in any manner for the beneficial interest of the residents of the village concerned.

Keywords: Village common land, Shamlat/ bachat land, Banzar land, Gora deh, Abadi deh, Retrospective effect, Agreement, Instrument, Custom or usage, Panchayats, Shamlat deh, Public auction, Beneficial interest

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ABSTRACT

Bast, F. (2011). *Monostroma: The Jeweled Seaweed for Future*. Lap Lambert Academic Publishing, Germany.

Monostroma species, an important edible green algae in Japan, are ubiquitous and abundant in marine and estuarine intertidal zones where they provide habitats and nutrients to the fauna. By a novel, polyphasic strategy that involved classical culture-based methods such as mating tests and microscopic investigations of life cycle and ontogeny, as well as modern genome-based techniques such as DNA barcoding, mRNA secondary structure analysis and multi-local phylogeny reconstruction, my investigations presented herein has lead to the following principal conclusions: 1. Natural and cultivated sexually reproducing environmental samples, as well as sexually reproducing and serendipitously discovered asexually reproducing ecotypes of monostromatic green alga from Tosa Bay, Japan are conspecific and is identified as *Monostroma latissimum* (Kützing) Wittrock (= *Monostroma kuroshiensis* (Yendo) Bast et al. nom nov.); 2. Patterns of seasonal fluctuations in its thallus lengths were habitat specific and recur annually; 3. Both appearance and decay of thalli were earlier at high saline habitats, suggesting that salinity positively influences either maturation of sporophytes or senescence of gametophytes; 4. Gametogenesis in this alga occurs in discontinuous patches along the frondal apex and the gametes release synchronously in a posterior faced linear fashion by the dehiscence of gametangial sheath, leading to the thallic disintegration; 5. The overall primary sex ratio of this alga was about 1:1 which is likely to reflect Fisherian selection; 6. Results from life cycle, thallus ontogeny, gametangial ontogeny and phylogenetic analyses suggest that this alga is evolutionarily more close to *M. oxyspermum* than other green algae; 7. Type of life cycle is not a valid diagnostic character for the species circumscription in Monostromataceae; 8. Biogeographic isolates of *Monostroma* sp. distributed along Kuroshio Coast of Japan were panmictic and had similar sequences for the conserved nucleoribosomal DNA (nrDNA) 18S gene, however, a substantial variance was observed in the highly variable first internal transcribed spacer (ITS1) sequences that are suggestive of an emerging sympatric speciation; 9. Genus *Ulvopsis* is strongly recognized in our phylogenetic analyses and it should be placed in the family Gomontiaceae, not Monostromataceae; 10. Differential ordinal treatment of Ulotrichales and Ulvales in Ulvophyceae is artificial; and, 11. nrDNA 5.8S gene can be used for algal phylogeny reconstruction at higher taxonomic levels.

Keywords: Systematics, Taxonomy, Identification Key, Monostromataceae, Monostroma, Green algae

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ABSTRACT

Bast, F. (2012). Cancer Phylogenetics: Computational Modeling of Tumor Evolution. In: Tuteja, R. (Eds.), *Bioinformatics: Genome Bioinformatics and Computational Biology*, pp. 211-230. Nova Publishers, New York.

The field of phylogenetics is one of the core areas of Bioinformatics which deals with computational methods to infer evolutionary heritage of organisms and genes. While phylogenetics has been extensively utilized in taxonomy and systematics of organisms, it is only very recently that the system started expanding to other fields- most importantly in cancer biology where it profoundly transformed our understanding of clonal evolution. Many of our findings in cancer phylogenetics credit to the fact that the tumor is not merely a collection of transformed cells with random mutation events; rather it is an evolving population. Many of the facets underpinning modern evolutionary synthesis can be applied to classify cancers and track its progression from initiating somatic mutation to symptomatic neoplasm. It is now widely accepted that all sub-clones within cancer are phylogenetically related and probability of a particular sub-clone progressing into neoplasm depending upon its time of initiation and evolutionary fitness. Computational models of tumor evolution have also contributed in identifying common clades- "cancer sub-types"- associated with particular cancers in different patients that in turn helped in translating our understanding of oncogeny to the development of "targeted therapeutics"- rationally

designed drugs that are molecularly targeted to particular sub-types. Advent of next generation ultra-deep genome sequencing technologies has been rapidly transforming the very landscape of cancer phylogenetics. This chapter introduces the concept of cancer phylogenetics and reviews some of the recent advances in this field. This chapter also summarizes various phylogenetic approaches including distance matrix methods, parsimony, maximum likelihood, Bayesian methods and probabilistic inference that have potential applications in cancer research.

Keywords: Cancer, Clonal Evolution, Phylogeny, Phylogenetic Reconstruction, Bayesian Inference

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ABSTRACT

Bast, F. (2012). Systematics and Taxonomic Keys for the Marine Green Algal Family Monostromataceae. In: Krueger, D. and Meyer, H. (Eds.), *Ecology, Economic Uses and Environmental Impact*, pp. 105-120. Nova Publishers, New York.

Marine green algal family Monostromataceae consists of single cell-layered green seaweeds distributed throughout the world, yet identification of it being one of the most challenging. Taxonomic keys for the monostromatic green algae do not exist, further complicating the identification. Monostromatic green seaweeds are all edible and are commercially cultivated in Japan for centuries. A thorough understanding of its systematics is indeed a necessity for any empirical investigation. Working dichotomous taxonomic key for this family is presented for the first time for the ready benefit of field phycologists. Recent advances in the systematics of this family are also presented.

Keywords: Systematics, Taxonomy, Identification Key, Monostromataceae, Monostroma, Green algae

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ABSTRACT

Bast, F. (2013). Sequence Similarity Search, Multiple Sequence Alignment, Model Selection, Distance Matrix and Phylogeny Reconstruction. *Nature Protocol Exchange*, DOI:10.1038/protex.2013.065.

This is a generic sequence analysis protocol suitable for plant and algal phylogeographic studies. Generated sequences from bidirectional Sanger sequencers are first assembled using Geneious. Sequence assembly is then trimmed and similarity search is conducted using BLASTn within Geneious. BLAST hits and other target taxa are selected and multiple sequence alignment is constructed. The alignment is then refined by checking using eye and exported as .fasta. Using MEGA, best-fitting nucleic acid substitution models will be calculated in MLModelTest. Model with lowest BIC score is selected and used for further phylogenetic analysis using MEGA or Geneious, which include distance matrix construction, phylogeny reconstruction using ML and BI.

Keywords: Sequence similarity search; Multiple Sequence Alignment; Model Selection; Distance Matrix; Phylogeny Reconstruction

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ABSTRACT

Bast, F. and Okuda, K. (2010). Gametangial Ontogeny in Intertidal Green Alga: *Monostroma latissimum* (Kützinger) Wittrock. *The International Journal of Plant Reproductive Biology* **2** (1), 11-15.

The gametangial ontogeny in dioecious green alga *Monostroma latissimum* as studied by light-microscopy has been described for the first time. Mature gametophytes were collected from the Pacific coast of Japan. Two morphotypes were observed and both were confirmed to be of one panmictic population. Gametangial maturation occurred in discontinuous patches along the frondal apex. During

maturation, each gametangial mother cell (GMC) was transformed into one gametangium. The gametangial plastids divided and cell volume increased. Fully mature GMCs were large, loosely arranged and numerous gametes with chromatic eyespots present in them. Gametes were released by the dehiscence of gametangial sheath in a posterior faced linear fashion by disintegration of thalli. This was brought about by providing an intense illumination at the end of dark period. The release was synchronous within each mature patch.

Keywords: Gametangial dehiscence, Gametophyte, GMC, Morphotype, Plastid, Seaweed

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ABSTRACT

Baviskar, A. T. Banerjee, U. C. Gupta, M. Singh, R. **Kumar, S. Gupta, M. K. Singh, S. and Kumar, R.** (2013). Synthesis of imine-pyrazolopyrimidinones and their mechanistic interventions on anticancer activity. *Bioorganic & Medicinal Chemistry* **21**: 5782–5793.

Design, synthesis and anticancer activity of a series of imine pyrazolopyrimidinones is reported for the first time. Compounds 9d, 9n and 9o in the series show encouraging in vitro anticancer activity with low micromolar IC₅₀ values against prostate (PC3) and breast (MCF7) cancer cell lines. Some notions about structure–activity relationships and plausible mechanism of biological activity are presented.

Keywords: Synthesis, Imine-pyrazolopyrimidinones, Anticancer agents, Effects on G2/M phase of the cell cycle, Catalytic topoisomerase inhibitors

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ABSTRACT

Been, L. F. Nath, S. K. Ralhan, S. K. Wander, G. S. Mehra, N. K. **Singh, J. R.** Mulvihill, J. J. and Sanghera, D. K. (2010). Replication of association between a common variant near melanocortin-4 receptor gene and obesity-related traits in Asian Sikhs. *Obesity (Silver Spring)* **18** (2), 425-429.

Recent genome-wide association studies (GWAS) in Asian Indians reported strong associations of variants near melanocortin-4 receptor (MC4R) and MLX interacting protein-like (MLXIPL) genes with insulin resistance and several obesity-related quantitative traits (QTs). Here, we evaluated the association of two variants (rs12970134 and rs4450508) near MC4R and a nonsynonymous (Gln241His) variant (rs3812316) in MLXIPL gene with type 2 diabetes (T2D) and obesity-related QTs in our case-control cohort (n = 1,528; 745 T2D cases and 783 controls) from a Sikh population from North India. We have successfully replicated the association of MC4R (rs12970134) with BMI (P = 0.0005), total weight (WT) (P = 0.001), and waist circumference (WC) (P = 0.001). These associations remained significant after controlling for multiple testing by applying Bonferroni's correction. However, our data did not confirm the association of rs3812316 in the MLXIPL gene with triglyceride (TG) levels. These observations demonstrate that the genetic variation in MC4R locus can have a moderate contribution in the regional fat deposition and development of central obesity in Asian Indians.

Keywords: Obesity, Genome-wide association studies, GWAS, Melanocortin-4 receptor, MC4R, MLX, Type 2 diabetes, T2D, Rs 3812316, Asian Indians

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ABSTRACT

Been, L. F. Ralhan, S. K. Wander, G. S. Mehra, N. K. **Singh, J. R.** Mulvihill, J. J. Aston, C. E. and , D. K. (2011). Variants in KCNQ1 increase type II diabetes susceptibility in South Asians: A study of 3,310 subjects from India and the US. *BMC Medical Genetics* **12**:18.

Polymorphisms in intron 15 of potassium voltage-gated channel, KQT-like subfamily member 1 (KCNQ1) gene have been associated with type II diabetes (T2D) in Japanese genome-wide association studies (GWAS). More recently a meta-analysis of European GWAS has detected a new independent signal associated with T2D in intron 11 of the KCNQ1 gene. The purpose of this investigation is to examine the role of these variants with T2D in populations of Asian Indian descent from India and the US. The association between four variants in the KCNQ1 gene with T2D and related quantitative traits in a total of 3,310 Asian Indian participants from two different cohorts comprising 2,431 individuals of the Punjabi case-control cohort from the Sikh Diabetes Study and 879 migrant Asian Indians living in the US were examined.

Our data confirmed the association of a new signal at the KCNQ1 locus (rs231362) with T2D showing an allelic odds ratio (OR) of 1.24 95%CI [1.08-1.43], $p = 0.002$ in the Punjabi cohort. A moderate association with T2D was also seen for rs2237895 in the Punjabi (OR 1.14; $p = 0.036$) and combined cohorts (meta-analysis OR 1.14; $p = 0.018$). Three-site haplotype analysis of rs231362, rs2237892, rs2237895 exhibited considerably stronger evidence of association of the GCC haplotype with T2D showing OR of 1.24 95%CI [1.00-1.53], $p = 0.001$, permutation $p = 8 \times 10^{-4}$ in combined cohorts. The 'C' risk allele carriers of rs2237895 had significantly reduced measures of HOMA-B in the US cohort ($p = 0.008$) as well as in combined cohort in meta-analysis ($p = 0.009$).

Our investigation has confirmed that the variation within the KCNQ1 locus confers a significant risk to T2D among Asian Indians. Haplotype analysis further suggested that the T2D risk associated with KCNQ1 SNPs may be derived from 'G' allele of rs231362 and 'C' allele of rs2237895 and this appears to be mediated through β cell function.

Keywords: Type 2 diabetes, Polymorphism, KCNQ1, GWAS, Genome wide association studies, Sikh diabetes study, T2D, Haplotype analysis, Asian Indians.

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ABSTRACT

Beena, L. F. Hatfield, J. L. Shankar, A. Astona, C. E. Ralhan, S. Wander, G. S. Mehra, N. K. **Singh, J. R.** Mulvihill, J. J. and Sanghera, D. K. (2012). A low frequency variant within the GWAS locus of MTNR1B affects fasting glucose concentrations: Genetic risk is modulated by obesity. *Nutrition, Metabolism and Cardiovascular Diseases* **22** (11), 944-951.

Two common variants (rs1387153, rs10830963) in MTNR1B have been reported to have independent effects on fasting blood glucose (FBG) levels with increased risk to type 2 diabetes (T2D) in recent genome-wide association studies (GWAS). In this investigation, we report the association of these two variants, and an additional variant (rs1374645) within the GWAS locus of MTNR1B with FBG, 2h glucose, insulin resistance (HOMA IR), β -cell function (HOMA B), and T2D in our sample of Asian Sikhs from India. Our cohort comprised 2222 subjects [1201 T2D, 1021 controls]. None of these SNPs was associated with T2D in this cohort. Our data also could not confirm association of rs1387153 and rs10830963 with FBG phenotype. However, upon stratifying data according to body mass index (BMI) (low ≤ 25 kg/m² and high > 25 kg/m²) in normoglycemic subjects ($n = 1021$), the rs1374645 revealed a strong association with low FBG levels in low BMI group ($\beta = -0.073$, $p = 0.002$, Bonferroni $p = 0.01$) compared to the high BMI group ($\beta = 0.015$, $p = 0.50$). We also detected a strong evidence of interaction between rs1374645 and BMI with respect to FBG levels ($p = 0.002$). Our data provide new information

about the significant impact of another MTNR1B variant on FBG levels that appears to be modulated by BMI. Future confirmation on independent datasets and functional studies will be required to define the role of this variant in fasting glucose variation.

Keywords: MTNR1B, Fasting blood glucose, SNP-obesity interaction, Asian Indians

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ABSTRACT

Berger, J. D. **Kumar**, S. Nayyar, H. Street, K. A. Sandhu, J. S. Henzell, J. M. and Clarke, H. C. (2012). Temperature- stratified screening of chickpea (*Cicer arietinum* L.) genetic resource collection reveals very limited reproductive chilling tolerance compared to its annual wild relatives. *Field Crops Research* **126**: 119-129.

Low reproductive chilling tolerance in chickpea impairs ovule fertilization, delaying pod set, exposing the crop to terminal drought throughout much of its distribution range. Despite this realization, little progress has been made because of the limited genetic variation available to breeders. To address this issue a wide range of domesticated (n = 1762) and wild Cicer (n = 200) germplasm collected from sites stratified by flowering phase temperature was extensively field evaluated, and compared with *Lupinus angustifolius*, a well-adapted Mediterranean winter annual. Chilling tolerance was estimated by regressing the time interval between pod set and first flower against mean post-anthesis temperature. Field screening was augmented by smaller scale experiments evaluating the effects of contrasting post-anthesis temperature regimes on plant growth and productivity, pollen function and subsequent pod set in temperature-controlled cabinets. Chickpea was less chilling tolerant than its wild relatives, the flower-pod interval increasing curvi-linearly as sites became cooler, with a strong effects between 11 and 16°C, tailing off after 17.5°C, but remaining statistically significant. There is little useful variation for chilling tolerance within domesticated chickpea. Small, albeit statistically significant differences in pod set delay in chickpea collected from contrasting flowering phase habitats, were marginal compared to more tolerant species such as *Cicer bijugum*, *Cicer judaicum* and *L. angustifolius*, and to a lesser extent *Cicer reticulatum*, *Cicer pinnatifidum*, and *Cicer echinospermum*. No differences were observed between desi and kabuli types. Field screening identified robust chilling tolerance in a *C. echinospermum* accession that commenced podding earlier, at lower temperatures (10.0°C), and yielded 5 times more than Rupali, the most productive chickpea. Controlled temperature experiments confirmed that in contrast to chickpea, pollen germination, viability, frequency on the stigma surface and subsequent pod set were unaffected by low post-anthesis temperatures (13/7°C) in *C. echinospermum* and *L. angustifolius*. Our results indicate that chickpea is even more chilling sensitive than previously thought. Because *C. echinospermum* is inter-fertile with chickpea, it has considerable potential both as a donor of robust chilling tolerance and as an agent for investigating resistance mechanisms.

Keywords: Chickpea, Wild cicer, Chilling tolerance, Adaptation, Ecogeography, Focused identification of germplasm strategy (FIGS)

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ABSTRACT

Bhalla, Y. Gupta, V. K. and **Jaitak, V.** (2013). Anticancer activity of essential oils: a review. *Journal of the Science of Food and Agriculture* **93** (15), 3643-3653.

Natural essential oil constituents play an important role in cancer prevention and treatment. Essential oil constituents from aromatic herbs and dietary plants include monoterpenes, sesquiterpenes, oxygenated monoterpenes, oxygenated sesquiterpenes, phenolics and others. Various mechanisms like antioxidant, antimutagenic, anti-proliferative, enhancement of immune functions and surveillance, enzyme induction and enhancing detoxification, modulation of multi-drug resistance and synergistic mechanism of volatile constituents are responsible for their chemo preventive properties. This review covers the most recent literature to summarize structural categories and molecular anticancer mechanisms of constituents from aromatic herbs and dietary plants.

Keywords: Anticancer mechanisms, Essential oils, Synergism, Terpenes

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ABSTRACT

Chauhan, M. and **Kumar, R.** (2013). Medicinal attributes of pyrazolo [3, 4-d]pyrimidines: A review. *Bioorganic & Medicinal Chemistry* **21** (2013), 5657–5668.

Pyrazolopyrimidines are the fused heterocyclic ring systems which structurally resemble purines which prompted biological investigations to assess their potential therapeutic significance. They are known to play a crucial role in numerous disease conditions. The advent of their first bioactivity as adenosine antagonistic property divulged their medicinal potential. Radioactivity test on mice cells, morphometric and serological tests on rat hepatocytes, antitumor testing against L1210 and P388 leukemias in mice threw light on their biophysical aspects of significance. Biochemical properties were explored via xanthine oxidase assay, antioxidant enzyme assays, Western blot analysis, mRNA expression of apoptotic genes, receptor binding assays, and trypan blue exclusion cytotoxicity evaluation. The collective results of biochemical and biophysical properties foregrounded their medicinal significance in central nervous system, cardiovascular system, cancer, inflammation etc. The present manuscript to the best of our knowledge is the first compilation on synthesis and medicinal aspects including structure–activity relationships of pyrazolo[3,4-*d*]pyrimidines reported to date.

Keywords: Pyrazolo[3,4-*d*]pyrimidine, Activities, SAR, IC50.

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ABSTRACT

Dadhania, V. P. Tripathi, D. N. Vikram, A. **Ramarao, P.** and Jena, G. B. (2010). Intervention of alpha-lipoic acid ameliorates methotrexate-induced oxidative stress and genotoxicity: A study in rat intestine. *Chemico-Biological Interactions* **183** (1), 85-97.

Methotrexate (MTX) is an anti-metabolite, widely used in the cancer chemotherapy and rheumatoid arthritis. However, its long-term clinical use is restricted on account of its severe intestinal toxicity. The present study was aimed to investigate the intestinal toxicity of MTX and the possible protective effect of alpha-lipoic acid (LA) on Sprague-Dawley rats. MTX-induced intestinal toxicity was evaluated at the dose of 2.5mg/kg for short-term (5 days treatment) and 1mg/kg for long-term (5 days in a week for four consecutive weeks treatment) study. The possible protective effect of LA was evaluated in both short- as well as long-term study in a dose-dependent manner. MTX treatment induced diarrhoea and mortality in rats, indicating its severe toxicity in the target organ of investigation, i.e., intestine. Further, the intestinal toxicity of MTX was assessed by evaluating different parameters of oxidative stress, DNA damage, cytotoxicity as well as histological changes. Immunostaining for p53 revealed higher genotoxic assault

in the intestinal cells due to MTX treatment. Pretreatment of rats with LA led to significant decrease in the oxidative stress, DNA damage, cellular damage, inflammatory changes and apoptosis as determined by malondialdehyde level, glutathione level, comet assay parameters, histological evaluation, immunostaining and terminal deoxynucleotidyl transferase-mediated dUTP nick end labeling (TUNEL) assay. In the present investigation, we report that LA pretreatment ameliorates MTX-induced intestinal toxicity in rat as evident from the protection against oxidative stress, decrease in DNA damage and protection of cellular morphology as well as improvement in the stool consistency and animal survival rate

Keywords: Methotrexate, α -Lipoic acid, Oxidative stress, Comet assay, Intestine, Rat

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ABSTRACT

Devika, J. and **Varghese, V. J.** (2011). To survive or flourish? Minority rights and Syrian Christian community assertions in the 20th Century Travancore/Kerala. *History and Sociology of South Asia* **5** (2), 103-128.

The arrival of modernity not only constituted communities but also impelled them in competition against each other in Kerala. Modern politics of the state as a result is inextricably linked with intense community politics. The success of community politics for rights and resources varied across communities, so also strategies of assertion. This paper will focus on different instances of community assertions by the Syrian Christians in twentieth century Travancore/Kerala. The confrontation of the community with the Hindu state and the then Dewan in the 1930s, the 'Liberation Struggle' against the Communists during late 1950s and the anti-eviction movements of 1960s testifies to its lack of primordial adherences and openness to heterogeneous strategies as required by different historical circumstances. It moves freely from secular to non-secular, minoritarian to majoritarian and lawful to unlawful, with claims to a greater citizenship. The hegemonic developmentalist ideology to which the community subscribes, along with reiteration of a righteous and industrious citizenship, ensured the transformation of the 'unlawful' into 'lawful'. Using even 'state secularism' in Travancore of the 1940s as a route of sectarianism, Syrian Christian politics resorted to no permanent self-representation, resulting in unfixed community constellations. The paper also suggests that the recent recourse of the community to minority rights may hint at an internal crisis and a loss of moral weight it possessed earlier.

Keywords: Syrian Christian, Community, Minority, Secularism, Communalism, Communitarianism, Citizenship, Developmentalism.

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ABSTRACT

Dhamir, A. Dua, M. & **Arora, H. R.** (2012). *Land Laws of Punjab and Chandigarh*. Twenty-First Century Publications, Patiala

The book deals with four significant land laws of the State of Punjab besides the Punjab New Capital (Periphery) Control Act 1952 (I of 1953) and the Capital of Punjab (Development & Regulations) Act 1952 relating to the regulations on the planned-urbanized city beautiful of Chandigarh, the development of land outside its Sectoral Grid as also on control of haphazard growth around it. An ample case-law is cited where found necessary.

Various issues pertaining to the ownership and occupation of the agricultural land, both as the land-owner, owner of the land and as the tenant thereof, are analyzed with relevant case-law. Partition of land

among different co- parceners, assessment, enhancement or remission of land revenue as also the prevalent modes of recovery of the revenue or its arrears etc. are dealt in details per provisions of the Punjab Land Revenue Act (XVII of) 1887. The latest amendment therein (vide Act 15 of 2011) is also incorporated and duly commented over in this book.

The significant issues of the determination of rent, continuation of tenancies, types of the tenants and their respective rights regarding their ejection/ wrongful dispossession are specified in the Punjab Tenancy Act (XVI of) 1887. The regulation of each kind of rent, its enhancement or remission, at times, is provided under a distinct chapter in the said Tenancy Law itself. Many of the land reforms were introduced in the land- tenorial system in favour of both the smaller land- owners and the landless agrolabourers which make the subject- matter of study under the Punjab Security of Land Tenures Act (10 of) 1953 and under the corresponding PEPSU Law (13 of) 1955. Both these laws were merged, later, and replaced by the Punjab Land Reforms Act of 1972 (40 of 1973).

Land acquisition is a much resisted matter governed, still, by the same age- old British- modeled Central Law known as the Land Acquisition Act (1 of) 1894. Fool- proof procedure of preliminary and final notifications, hearing of objections, if any and of taking of possession as also of the payment of compensation due is provided in this law per specifications of certain statutory time- limits, binding both on the public authorities as also on the persons interested in the parcels of land earmarked to be so acquired, for some visible public purpose. The relevant law is under controversy and needs an urgent amendment therein, giving security of the livelihood of the landholders concerned which, otherwise, is bound to be dried-up, for ever to come.

Keywords: Land, Land- revenue, Rent, Landlord, Tenant, Land- owner, Hadbast, Khasra, Girdawri, Khewat, Acquisition, Revenue Officer, Revenue court, Zaildar, Jagirdar, Tenancy, Land- holding, Parcel, Patwari, Kanoongo, Ceiling, Cess, Malba, Fragmentation, Murabbabandi, Occupancy, Compensation, Common land, Banjar, Gora deh, Abadi deh, Agreement, Instrument, Custom or usage, Panchayats, Public auction, Beneficial interest, Partition, Co- Parcener, Rent restriction, Colonization assessment And re- assessment of land- revenue, Collector's award, Reference to court, Hearing of objections, Preliminary & final notification, Public purpose, Lambardar, Patti, Taraf, Mouja, Nazrana, Mahal or estate, Ejection, Wrongful dispossession, Haphazard development, Sharing of produce .

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ABSTRACT

Dhiman, M. Zago, P. M. Nunez, S. Nunez-Burgio, F. and Garg, N. J. (2012). Cardiac-oxidized Antigens Are Targets of Immune Recognition by Antibodies and Potential Molecular Determinants in Chagas Disease Pathogenesis. *PLoS One* 7(1).

<<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0028449>>

Trypanosoma cruzi elicits reactive oxygen species (ROS) of inflammatory and mitochondrial origin in infected hosts. In this study, we examined ROS-induced oxidative modifications in the heart and determined whether the resultant oxidized cardiac proteins are targets of immune response and of pathological significance in Chagas disease. Heart biopsies from chagasic mice, rats and human patients exhibited, when compared to those from normal controls, a substantial increase in protein 4-hydroxynonenal (4-HNE), malondialdehyde (MDA), carbonyl, and 3-nitrotyrosine (3-NT) adducts. To evaluate whether oxidized proteins gain antigenic properties, heart homogenates or isolated cardiomyocytes were oxidized in vitro and one- or two-dimensional gel electrophoresis (2D-GE)/Western blotting (WB) was performed to investigate the proteomic oxidative changes and recognition of oxidized proteins by sera antibodies in chagasic rodents (mice, rats) and human patients.

Human cardiomyocytes exhibited LD50 sensitivity to 30 mM 4-HNE and 100 mM H₂O₂ at 6 h and 12 h, respectively. In vitro oxidation with 4-HNE or H₂O₂ resulted in a substantial increase in 4-HNE- and carbonyl-modified proteins that correlated with increased recognition of cardiac (cardiomyocytes) proteins by sera antibodies of chagasic rodents and human patients. 2D-GE/Western blotting followed by MALDI-TOF-MS/MS analysis to identify cardiac proteins that were oxidized and recognized by human chagasic sera yielded 82 unique proteins. We validated the 2D-GE results by enzyme-linked immunosorbent assay (ELISA) and WB and demonstrated that oxidation of recombinant titin enhanced its immunogenicity and recognition by sera antibodies from chagasic hosts (rats and humans). Treatment of infected rats with phenyl- α -tert-butyl nitron (PBN, antioxidant) resulted in normalized immune detection of cardiac proteins associated with control of cardiac pathology and preservation of heart contractile function in chagasic rats. We conclude that ROS-induced, cardiac-oxidized antigens are targets of immune recognition by antibodies and molecular determinants for pathogenesis during Chagas disease.

Keywords: Trypanosoma cruzi, Oxidative stress, Antioxidants, 4-hydroxynonenal, 2D-GE/Western blotting, Enzyme-linked immunosorbent assay.

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ABSTRACT

Dhiman, M. Zago, M. P. Nunez, S. Spratt, H. Coronado, A. Nunez-Burgio, F. and Garg, N. J. (2013). Innate Immune Responses and Antioxidant/oxidant Imbalance are Major Determinants of Human Chagas Disease. *PLoS Neglected Tropical Diseases* 7 (8). <<http://plosntds.org/article/info%3Adoi%2F10.1371%2Fjournal.pntd.0002364>>

We investigated the pathological and diagnostic role of selected markers of inflammation, oxidant/antioxidant status, and cellular injury in human Chagas disease. Seropositive/chagasic subjects characterized as clinically-symptomatic or clinically-asymptomatic (n=116), seronegative/cardiac subjects (n=102), and seronegative/healthy subjects (n=45) were analyzed for peripheral blood biomarkers. Chagasic subjects exhibited an increase in sera or plasma levels of myeloperoxidase (MPO, 2.8-fold), advanced oxidation protein products (AOPP, 56%), nitrite (5.7-fold), lipid peroxides (LPO, 12-17-fold) and malondialdehyde (MDA, 4-6-fold); and a decline in superoxide dismutase (SOD, 52%) and glutathione (GSH, 75%) contents. A strong correlation was identified between clinical disease and LPO (r=0.841) or MPO (r=0.664) levels, between inflammatory markers (AOPP/nitrite: r=0.877), inflammation and antioxidant/oxidant status (AOPP/glutathione peroxidase (GPX): r=0.902, AOPP/GSH: r=0.806, Nitrite/GPX: 0.773, Nitrite/LPO: 0.805, MDA/MPO: 0.718) and antioxidant/oxidant status (GPX/MDA: r=0.768) in chagasic individuals. Seronegative/cardiac subjects exhibited 77% decline in SOD, 3-fold increase in glutamate pyruvate transaminase (GPT), and statistically insignificant change in MPO, AOPP, LPO, MDA, GPX, GSH, and creatine kinase (CK) levels. The interlinked effects of innate immune responses and antioxidant/oxidant imbalance are major determinants of human Chagas disease. LPO and MPO are excellent biomarkers for identifying clinical severity of Chagas disease, and have a potential to be used in clinical setting.

Keywords: Antioxidants, Clinical biomarkers, Chagas disease, Innate immune response, Oxidants, Trypanosoma cruzi

Dholakia, B. B. Rajwade, A. V. Hosmani, P. Khan, R. R. Chavan, S. Reddy, D. M. R. Lagu, M. D. Bansal, U. K. **Saini, R. G.** and Gupta, V. S. (2013). Molecular mapping of leaf rust resistance gene Lrl5 in hexaploid wheat. *Molecular Breeding* **31** (3), 743-747.

Leaf rust is a widespread and commonly occurring rust disease of wheat. Genetic resistance is the most economical method of reducing losses due to leaf rust. Lrl5 has been shown to be present on wheat chromosome 2D and is reported to be a seedling resistance gene. However, tightly linked markers associated with Lrl5 have not been reported to date. To identify molecular markers linked to Lrl5, an F2 mapping population of Thatcher x Thatcher-Lrl5 was generated. Available wheat simple sequence repeat markers were utilized in parental screening and polymorphic markers were used to analyze the entire population of 221 plants. Phenotypic evaluations of the F2-derived F3 progenies with *Puccinia triticina* Eriks. pathotype 162A (93R15) confirmed the mono-genic inheritance of Lrl5. The linkage group representing chromosome 2DS was constructed at LOD 4.0 which revealed the closest flanking markers Xgwm4562 and Xgwm102 at a distance of 3.1 and 9.3 cM, respectively. Furthermore, utilization of these flanking markers in combination has successfully identified wheat lines with or without Lrl5. These markers could potentially be useful in gene pyramiding with other genes to enhance rust resistance in wheat.

Keywords: Disease resistance, Leaf rust, Simple sequence repeat, Marker-assisted selection, Wheat

Eaves-Pyles, T. Patel, J. Arigi, E. Cong, Y. Cao, A. Garg, N. J. **Dhiman, M.** Pyles, R. B. Arulanandam, B. Miller, A. L. Popov, V. L. Soong, L. Carlsen, E. D. Coletta, C. Szabo, C. and Almeida, I. C. (2013). Immunomodulatory and Antibacterial Effects of Cystatin 9 against *Francisella tularensis*. *Molecular Medicine* **19** (1), 263-275.

Cystatin 9 (CST9) is a member of the type 2 cysteine protease inhibitor family, which has been shown to have immunomodulatory effects that restrain inflammation, but its functions against bacterial infections are unknown. Here, we report that purified human recombinant (r)CST9 protects against the deadly bacterium *Francisella tularensis* (Ft) *in vitro* and *in vivo*. Macrophages infected with the Ft human pathogen Schu 4 (S4), then given 50 pg of rCST9 exhibited significantly decreased intracellular bacterial replication and increased killing via preventing the escape of S4 from the phagosome. Further, rCST9 induced autophagy in macrophages via the regulation of the mammalian target of rapamycin (mTOR) signaling pathways. rCST9 promoted the upregulation of macrophage proteins involved in anti-inflammation and anti-apoptosis, while restraining pro-inflammatory-associated proteins. Interestingly, the viability and virulence of S4 also was decreased directly by rCST9. In a mouse model of Ft inhalation, rCST9 significantly decreased organ bacterial burden and improved survival, which was not accompanied by excessive cytokine secretion or subsequent immune cell migration. The current report is the first to show the immunomodulatory and antimicrobial functions of rCST9 against Ft. We hypothesize that the attenuation of inflammation by rCST9 may be exploited for therapeutic purposes during infection.

Keywords: Inflammation, Immunomodulatory effects, Phagosome, Autophagy

Guleria, S. Saini, R. **Jaitak**, V. Kaul, V. K. Lai, B. Babu, G. D. and Singh, R. D. (2011). Comparative studies of volatile oil composition of *Rhododendron anthopogon* by hydrodistillation, supercritical carbon dioxide extraction and head space analysis. *Natural Product Research* **25** (13), 1271 -1277.

Volatile oil composition of the leaves of *Rhododendron anthopogon* (Ericaceae) growing wild in alpine Western Himalaya was studied using different extraction techniques including SC-CO₂ extraction and hydrodistillation (HD). Results from different extraction methodologies were compared with headspace analysis (HS) and evaluated for the effectiveness of techniques in characterisation of various terpene categories and to assess their influence on the yield and composition of volatiles. Variability in constituents and in quantitative yields was observed. The results varied with different extraction methods. A total of 27 constituents in SC-CO₂ extraction, 31 in HD and 17 in HS analysis were identified. Constituents in SC-CO₂ and HD oils were identified by gas chromatography mass spectrometry analysis. SC-CO₂ extraction was carried out at 40 °C and 140 bar pressure and the oil represented by major constituents as β-caryophyllene (5.96%), α-humulene (4.06%) and p-menthadiene-2,9-diol (7.28%); in HD, oil limonene (11.26%), β-caryophyllene (11.62%), α-humulene (7.22%), and E-nerolidol (5.83%) dominated the oil and in HS analysis, limonene (24.14%), γ-terpinene (40.73%), α-terpinene (4.92%), β-phellandrene (3.44%) and β-ocimene (7.15%) were present as major constituents.

Keywords: *Rhododendron anthopogon*, Ericaceae, volatile oil, SC-CO₂, Hydrodistillation, GC-MS, Headspace analysis, Comparison

Guleria, S. Saini, R. **Jaitak**, V. Kaul, V. K. Lai, B. Rahi, R. Gulati, A. and Singh, B. (2011). Volatile oil composition and antimicrobial activity of the essential oil of *Heracleum thomsonii* (Clarke) from cold desert western Himalaya. *Natural Product Research* **25** (13), 1250-1260.

Essential oil of freshly collected aerial parts of *Heracleum thomsonii* (Umbeliferae) from the western Himalayas was studied by GC-FID and GC-MS. Results revealed qualitative and quantitative dissimilarity in the composition of hydro-distilled and SC-CO₂ extracted oils. Nineteen constituents, which accounted for 89.32% of total constituents in HD oil, represented by limonene (4.31%), (Z)-β-ocimene (3.69%), terpinolene (22.24%), neryl acetate (36.19%), nerol (9.51%) and p-cymene-8-ol (2.61%) were identified. In SC-CO₂ extracted oil, 24 constituents representing 89.95% of total constituents were identified. Terpinolene (5.08%), germacrene D (2.17%), neryl acetate (51.62%), nerol (9.78%), geranyl acetate (2.06%), α-bisabolol (2.48%) and 1-nonadecanol (4.96%) were the dominating constituents. In vitro antimicrobial activity of hydro-distilled oil was conducted against microbial strains including two Gram-positive (*Staphylococcus aureus* and *Bacillus subtilis*) and five Gram-negative (*Burkholderia cepacia*, *Escherichia coli*, *Enterobacter cloacae*, *Klebsiella pneumoniae* and *Pseudomonas aeruginosa*) bacteria as well as seven fungi (*Candida albicans*, *Issatchenkia orientalis*, *Aspergillus flavus*, *Aspergillus niger*, *Aspergillus parasiticus*, *Aspergillus sydowii* and *Trichophyton rubrum*) using broth microdilution method. The results of bioassay showed that the oil exhibited moderate to high antimicrobial activity against fungi *C. albicans* (MIC 625 mgml⁻¹), *A. parasiticus* (MIC 312.5 mgml⁻¹), *A. sydowii* (MIC 312.5 mgml⁻¹), *T. rubrum* (MIC 625 mgml⁻¹), Gram-positive bacteria *B. subtilis* (MIC 625 mgml⁻¹) and Gram-negative bacteria *P. aeruginosa* (MIC 312.5 mgml⁻¹).

Keywords: *Heracleum thomsonii*, Essential oil, GC-MS; hydro-distillation, SC-CO₂ extraction, Antimicrobial activity

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ABSTRACT

Gupta, C. Vikram, A. Tripathi, D. N. **Ramarao, P.** and Jena, G. B. (2010). Antioxidant and antimutagenic effect of quercetin against DEN induced hepatotoxicity in rat. *Phytotherapy Research* **24** (1), 119-128.

Diethylnitrosamine (DEN), a potent hepatocarcinogen, is found in tobacco smoke, processed meat as well as in different food products. Quercetin (QC), a naturally occurring flavonoid has excellent antioxidant properties. The present study was aimed to investigate the chemoprotective potential of QC against DEN induced hepatotoxicity in Sprague-Dawley (SD) rats. Quercetin was administered (10, 30 and 100 mg/kg) for 5 consecutive days after DEN (200 mg/kg) treatment. The animals were killed 24 h after the last dose of QC/saline treatment. The DEN induced hepatotoxicity was evident by elevated malondialdehyde (MDA) and decreased glutathione (GSH) levels in the liver. A significant increase in the levels of plasma aspartate transaminase (AST) and plasma alanine transaminase (ALT) was observed in the DEN treated group. The DEN induced DNA damage was evaluated using a single cell gel electrophoresis (SCGE) assay. A significant increase in the number of TUNEL positive cells was observed in the DEN treated group. Quercetin restored AST, ALT and GSH levels at all the tested doses. Restoration of the MDA level and cellular morphology was observed at doses of 10 and 30 mg/kg of QC. Further, DEN induced DNA damage and apoptosis was ameliorated by QC. The results indicate that QC ameliorates the DEN induced hepatotoxicity in rats and can be a candidate for a good chemoprotectant.

Keywords: Diethylnitrosamine, Quercetin, Hepatotoxicity, Comet assay, Apoptosis, Rat

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ABSTRACT

Gupta, C. Vikram, A. Tripathi, D. N. **Ramarao, P.** and Jena, G. B. (2011). Quercetin inhibits Diethyl nitrosamine induced hepatic preneoplastic lesion in rat. *Nutrition and Cancer* **63** (2), 234-241.

Quercetin is an antioxidant flavonoid, found ubiquitously in nature and extensively used in herbal medicines and food additives. This study aimed to investigate the effect of quercetin on diethylnitrosamine-induced preneoplastic lesions, using the medium-term rat liver bioassay. The γ -benzene hexachloride was used as promoter at the doses of 0.1, 1.0, and 10.0 mg/kg against a single dose of diethylnitrosamine (200 mg/kg) in male Sprague-Dawley rats. All the rats were subjected to 70% partial hepatectomy at Week 4. The protective effect of quercetin (5 and 25 mg/kg) was examined against the highest dose of γ -benzene hexachloride (10 mg/kg). A significant increase in the number as well as the mean area of glutathione S-transferase placental form (GST-P) positive foci, p53 positive hepatocytes, and the percentage of apoptotic cells were observed in the diethylnitrosamine-treated group. In the present investigation, both doses of QC (5 and 25 mg/kg) led to a significant decrease in the number as well as the mean area of GST-P positive foci, TUNEL positive apoptotic cells, p53 positive hepatocytes, and restoration of cellular morphology. These results clearly indicate that quercetin inhibits diethylnitrosamine-induced hepatic preneoplastic lesions in medium-term rat liver bioassay.

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ABSTRACT

Gupta, S. Wan, X. Zago, M. P. Martinez, Sellers, V. Silva, T. S. Assiah, D. **Dhiman, M.** Nuñez, S. Petersen, J. R. Vázquez-Chagoyán, J. Estrada-Franco, J. G. and Garg, N. J. (2012). Antigenicity and Diagnostic Potential of Vaccine Candidates in Human Chagas disease. *PLoS Neglected Tropical Diseases* **7** (1). <<http://www.plosntds.org/article/info%3Adoi%2F10.1371%2Fjournal.pntd.0002018>>

Chagas disease, caused by *Trypanosoma cruzi*, is endemic in Latin America and an emerging infectious disease in the US and Europe. We have shown TcG1, TcG2, and TcG4 antigens elicit protective immunity to *T. cruzi* in mice and dogs. Herein, we investigated antigenicity of the recombinant proteins in humans to determine their potential utility for the development of next

generation diagnostics for screening of *T. cruzi* infection and Chagas disease. Sera samples from inhabitants of the endemic areas of Argentina-Bolivia and Mexico-Guatemala were analyzed in 1st-phase for anti-*T. cruzi* antibody response by traditional serology tests; and in 2nd-phase for antibody response to the recombinant antigens (individually or mixed) by an ELISA. We noted similar antibody response to candidate antigens in sera samples from inhabitants of Argentina and Mexico (n = 175). The IgG antibodies to TcG1, TcG2, and TcG4 (individually) and TcGmix were present in 62–71%, 65–78% and 72–82%, and 89–93% of the subjects, respectively, identified to be seropositive by traditional serology. Recombinant TcG1- (93.6%), TcG2- (96%), TcG4- (94.6%) and TcGmix- (98%) based ELISA exhibited significantly higher specificity compared to that noted for *T. cruzi* trypomastigote-based ELISA (77.8%) in diagnosing *T. cruzi*-infection and avoiding cross-reactivity to *Leishmania* spp. No significant correlation was noted in the sera levels of antibody response and clinical severity of Chagas disease in seropositive subjects. Three candidate antigens were recognized by antibody response in chagasic patients from two distinct study sites and expressed in diverse strains of the circulating parasites. A multiplex ELISA detecting antibody response to three antigens was highly sensitive and specific in diagnosing *T. cruzi* infection in humans, suggesting that a diagnostic kit based on TcG1, TcG2 and TcG4 recombinant proteins will be useful in diverse situations.

Keywords: Trypanosoma cruzi, Antibody response, Antigens, Recombinant proteins

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ABSTRACT

Gupta, V. K. Bhalla, Y. and Jaitak, V. (2013). Impact of ABC transporters, glutathione conjugates in MDR and their modulation by flavonoids: an overview. *Medicinal Chemistry Research* **10**.1007/s00044-013-0612-6.

Over expression of ATP binding cassette (ABC) transporter and glutathione conjugates results in efflux of cytotoxic agent from tumor cells leading to multi-drug resistance (MDR). Many MDR inhibitors have been identified but none of them have been proven clinically valuable without side effects. Efforts are continue in order to develop an ideal MDR inhibitor. Recently herbal modulation of ABC transporter and glutathione conjugates by flavonoids is emerging as popular therapy in MDR. In this review we have covered structure, function of different ABC transporters and glutathione mediated MRP overexpression. This review also focuses on the problems with existing MDR inhibitors, modulation of ABC transporter and glutathione-s-transferase (GSTs) by flavonoids.

Keywords: ABC transporters, Anticancer, Glutathione conjugated transporter, Flavonoids, MDR inhibitors

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ABSTRACT

Holla, H. Jenkins, I. D. Neve, J. E. Pouwer, R. H. Pham, N. Teague, S. J. and Quinn, R. J. (2012). Synthesis of Melicodenine C, D and E. *Tetrahedron Letters* **53** (52), 7101-7103.

Oyama et al. recently reported the isolation of a series of novel quinolinone alkaloids, the melicodenines C–F, from the leaves of *Melicope denhamii*, a rutaceous shrub found in Borneo and the Solomon Islands that has been used in indigenous medicine. The structures of these alkaloids are unusual in that they contain a cyclobutane ring that appears to have been formed by a [2+2] cycloaddition reaction between two different natural products, N-methylflindersine and a cinnamyl derivative. A synthesis of the unusual cyclobutane-quinolinone alkaloids melicodenines C, D and E by intermolecular [2+2] cycloaddition is described here for the first time.

Keywords: Quinolinone, Cyclobutane, Melicodenine, Intermolecular [2+2] cycloaddition

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ABSTRACT

Hwang, H. Ham, J. Ko, J. Cho, S. J. **Holla**, H. Banerjee, J. Kim, S. Yang, I. Nam, S-J. Choi, H. Lee, W. Seok, C. Chin, J. and Kang, H. (2012). Discovery, design and synthesis of Y-shaped peroxisome proliferator-activated δ receptor agonists as potent anti-obesity agents in vivo. *European Journal of Medicinal Chemistry* **53**: 190-202.

We have discovered and demonstrated the in vitro and in vivo PPAR δ -selective activity of novel Y-shaped agonists. These compounds activated hPPAR δ with EC₅₀ values between 1 and 523 nM. Surprisingly, compounds 10a, 11d, 11e and 11f were the most potent and most selective hPPAR δ agonists with 104-fold selectivity over the other two subtypes, namely, hPPAR α and hPPAR γ . The PPAR δ ligands 10a, 11e and 11f showed good bioavailability and in vivo efficacy.

Keywords: PPAR δ , Nuclear receptors, Marine natural products, Anti-obesity, GW501516

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ABSTRACT

Jadhav, V. B. **Holla**, H. V. Tekale, S. U. and Pawar, R. P. (2012). Bioactive dihydropyrimidines: An overview. *Der Chimica Sinica* **3** (5), 1213-1228.

The Biginelli reaction, which is a three-component reaction for the synthesis of dihydropyrimidinone and corresponding dihydropyrimidinethiones (DHPMs) is known for more than a century. A large number researchers have shown consistent attention towards the study of Biginelli reaction, leading towards structurally diversified molecular libraries of DHPMs and its analogues, having significant biological and pharmaceutical importance. Thus, this chapter account for the Biginelli reaction giving novel DHPMs products, leading towards new drug discovery and drug like molecules.

Keywords: Biginelli reaction, Dihydropyrimidinone, Drug discovery.

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ABSTRACT

Jain, A. K. Swarnakar, N. K. Das, M. Godugu, C. Singh, R. P. **Ramarao**, P. and Jain, S. (2011). Augmented anticancer efficacy of doxorubicin-loaded polymeric nanoparticles after oral administration in a breast cancer induced animal model. *Molecular Pharmaceutics* **8** (4), 1140-1151.

The present investigation reports an extensive evaluation of in vitro and in vivo anticancer efficacy of orally administered doxorubicin-loaded poly(lactic-co-glycolic acid) (PLGA) nanoparticles (Dox-NPs) in a breast cancer induced animal model. Spherically shaped Dox-NPs were prepared with an entrapment efficiency and particle size of $55.40 \pm 2.30\%$ and 160.20 ± 0.99 nm, respectively, and freeze-dried with 5% trehalose using stepwise freeze-drying. Cytotoxicity, as investigated on C127I cell line, revealed insignificant differences between the IC(50) of free Dox and Dox-NPs treated cells in the first 24 h, while higher cytotoxicity was demonstrated by Dox-NPs, following 72 h of incubation. Confocal laser scanning microscopy (CLSM) imaging corroborated that nanoparticles were efficiently localized into the nuclear region of C127I cells. The cellular uptake profile of Dox-NPs revealed both time and concentration dependent increases in the Caco-2 cell uptake as compared to the free Dox solution. Further, Dox-NPs significantly suppressed the growth of breast tumor in female Sprague-Dawley (SD) rats upon oral administration. Finally, orally administered Dox-NPs showed a marked reduction in cardiotoxicity when compared with intravenously injected free Dox as also evident by the increased level of malondialdehyde (MDA), lactate dehydrogenase (LDH), and creatine phosphokinase (CK-MB) and reduced levels of glutathione (GSH) and superoxide dismutase (SOD). The reduced cardiotoxicity of orally administered Dox-NPs was also confirmed by the major histopathological changes in the heart tissue after the treatments of intravenously injected free Dox and orally delivered Dox-NPs.

Keywords: Doxorubicin, PLGA nanoparticles, Nuclear localization, Oral Delivery

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ABSTRACT

Jaitak, V. Bandna Kaul, V. K. Das, P. Kumar, N. and Singh, B. (2011). One pot multicomponent Michael-Thorpe Ziegler reaction of aryl methyl ketone. *Synthetic Communication* **41** (8), 2727-2737.

A regioselective base-promoted Michael and Thorpe–Ziegler reaction between aryl methyl ketones and α, β -unsaturated nitrile was carried out in a single step. Different functional groups in addition to active positions were tolerated under this condition. Results indicated that the reaction proceeds in a consecutive manner as double Michael, triple Michael, and Thorpe–Ziegler condensation. By applying click chemistry, double Michael adducts were converted to bis-tetrazoles, which have broad applications in coordination and medicinal chemistry.

Keywords: Aryl methyl ketone, Tetrazoles, Thorpe–Ziegler condensation, Triple Michael reaction

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ABSTRACT

Jaitak, V. Kaul, K. Kaul, V. K. Singh, V. and Singh, B. (2011). Stevia rebaudiana - a natural substitute for sugar. In: Singh, R. J. (Ed.) Genetic Resources, Chromosome Engineering, and Crop Improvement, Medicinal Plants, pp. 885-910. CRC Press, USA.

Stevia rebaudiana (Bertoni) family Asteraceae is an herbaceous perennial plant indigenous to Paraguay and Brazil where its leaves are used by local Guarani Indians as natural sweetener for hundreds of years. 150 species of genus *Stevia* are known. Among them only *S. rebaudiana* has sweet tasting properties. This plant is of worldwide importance today because its leaves are used as non-nutritive high potency natural sweetener in Japan, Korea, China and in South America. It is now cultivated in some parts of Asia, Canada, China, Brazil and Paraguay. In India, it is cultivated in Himachal Pradesh, Punjab, Haryana, Uttar Pradesh, Madhya Pradesh, West Bengal, Karnataka and Tamilnadu. Consumption of stevia extract in Japan and Korea is around 200 and 115 tons/year respectively. Its water extract has beneficial effects on human health, having hypoglycemic, hypotensive effects and as a source of natural antioxidant. Leaves of *S. rebaudiana* are useful for diabetes as natural substitute for sugar, used in baking, inhibits the formation of cavities and plaque in teeth, non-toxic, cardiogenic and is effective against microbes *Streptococcus mutans*, *Pseudomonas aeruginosa*, and *Proteus vulgaris*. Its leaves contain nine entkaurene diterpene glycosides which belong to steviol skeleton (ent-13-hydroxy kaur-16-en-19-oic acid) and exhibit characteristic organoleptic properties. Collectively all the nine are known as steviol glycosides. *S. rebaudiana* leaves generally contain 6-10% (stevioside), 2-4% (rebaudioside-A) and other minor glycosides present upto 1-2%. Unlike synthetic sweeteners like aspartame, saccharine, cyclamate and sucralose, steviol glycosides are safe without any side effects.

Keywords: Stevia rebaudiana, Stevioside, Rebaudioside-A, Diabetes, Low-calorie, Sweeteners

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ABSTRACT

Jaitak, V. Kaul, V. K. and Das, P. (2013). Environmentally benign Michael and Claisen Schmidt reaction of aryl carbonyl compounds by alkali polyionic resin. *Indian Journal of Chemistry* **52B**: 1137-1145.

A regioselective Michael reaction between aryl methyl ketones and α, β -unsaturated compounds has been carried out using basic polyionic resin as a reusable reagent. Results indicate that the reaction proceeds in consecutive manner as double Michael (27-65%) and triple Michael (40-45%) products with overall yields of 55-80%. Moreover, A-2XMP resin has also been applied on Claisen Schmidt condensations of aromatic aldehydes and ketones (acyclic as well as cyclic) under different reaction conditions yielding dehydrated products in 82-94% yield. The reactions give an opportunity for easy

separation, reusability of polyionic resin and easy purification of products in continuous or multiple processing of organic compounds.

Keywords: Aromatic aldehydes, Aryl methyl ketones, Claisen-Schmidt condensation, Michael reaction, Resin

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ABSTRACT

Jena, G. Vikram, A. Tripathi, D. N. and **Ramarao, P.** (2010). Use of chemoprotectants in chemotherapy and radiation therapy: the challenges of selecting an appropriate agent. *Integrative Cancer Therapies* **9** (3), 253-258.

Chemoprotection refers to the protection from the toxicity of one chemical by the intervention of another. Conflicting preclinical and clinical reports make it difficult to either ignore or accept the use of chemoprotectants during cancer chemotherapy or radiotherapy. The selection of anticancer drugs depends on the type and stage of cancer development. However, very little attention has been paid to the selection of chemoprotectants. The answer to the use of chemoprotectants during cancer therapy lies in their appropriate selection in a case-specific and/or issue-specific manner. The need of the hour is to find better answers on the rationality of chemoprotectants selection during cancer therapy using cutting-edge science. In this commentary, we have presented few examples to justify our view-points.

Keywords: Antioxidants, Cancer, Chemotherapy, Dietary supplements, Nutraceuticals

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ABSTRACT

Karpe, P. A. Gupta, J. Marthong, R. F. **Ramarao, P.** and Tikoo, K. (2012). Insulin resistance induces a segmental difference in thoracic and abdominal aorta: differential expression of AT1 and AT2 receptors. *Journal of Hypertension* **30** (1), 132-146.

Objectives: The study was pursued to understand and compare the vascular reactivity to angiotensin II (Ang II) and its receptor expression in thoracic and abdominal aorta under insulin resistance.

Methods: Vascular reactivity to Ang II was recorded isometrically, AT1/AT2 receptor gene and protein expression was checked by RT-PCR and western blotting, respectively, and abundance of phospho (serine-10 Ph) H3 on promoter regions of Agtr1/Agtr2 genes was done by chromatin immunoprecipitation assay in aortic rings isolated from high fat diet (HFD)-fed rats.

Results: Our functional studies showed an increased (E_{max} in mg/mm: Con: 319 ± 29 and HFD: 1095 ± 72 , $P < 0.001$) and unaltered (E_{max} in mg/mm: Con: 299 ± 29 and HFD: 350 ± 20 , mean \pm SEM, $n = 6$) Ang II-induced contractile responses in thoracic and abdominal aorta of HFD rats, respectively, as compared to control rats. Interestingly, AT2R-mediated relaxation was increased in abdominal aorta (% relaxation: Con: 25 ± 5.3 and HFD: 76.4 ± 8.9 , $P < 0.001$) of HFD rats but not in thoracic aorta (% relaxation: Con: 25 ± 5.2 and HFD: 32 ± 5.2 , mean \pm SEM, $n = 6$). At the molecular level, increased mRNA (~ 14 -folds) and protein expression (~ 2.5 -folds) of AT2R in abdominal aorta of HFD rats was found as compared to control rats. However, AT1R mRNA and protein expression did not show any change. Chromatin immunoprecipitation with phospho H3 showed increased abundance of ser-10 phosphorylation on Agtr1 and Agtr2 gene promoter regions in thoracic and abdominal segments, respectively. But it got decreased on Agtr2 and Agtr1 genes promoter regions in thoracic and abdominal segments, respectively.

Conclusion: We provide first evidence that insulin resistance induces segmental difference in thoracic and abdominal aorta and this may provide reason of heterogeneity for incidence of aneurysms

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ABSTRACT

Kaul, K. **Jaitak, V.** and Kaul, V. K. (2011). Review on pharmaceutical properties and conservation measures of *Potentilla fulgens* Wall. Ex Hook. A medicinal endangered herb of higher Himalaya. *Indian Journal of Natural Products and Resources* **2** (3), 298-306.

Plenteous ethno therapeutic properties and pharmacological actions have been attributed to *Potentilla fulgens* Wall. Ex Hook (Family-Rosaceae). It is one of the highly valued indigenous medicinal herbs of higher Himalaya. Biomedical reports have indicated presence of medicinally important chemical constituents represented by polyphenols, tannins, flavonoids and terpenoids in the genus. Pharmacological studies report that *P. fulgens* possesses anti-hyperglycemic, hypoglycemic, anti-hyperlipidemic, antitumour, antioxidant, anti-inflammatory and antiulcerogenic properties thus supporting its ethnotherapeutic use. In view of immense medicinal importance of the plant, this review aims to coherently discuss the results obtained from several studies on its chemical constituents, pharmacological use, cultivation and conservation strategies.

Keywords: *Potentilla fulgens*, Alpine, Antioxidant, Antitumor, Hypoglycaemic, Polyphenols, Conservation

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ABSTRACT

Kaur, A. and **Singh, J. R.** (2010). Chromosome abnormalities: Genetic disease burden in India. *International Journal of Human Genetics* **10** (1-2-3), 1-14.

Chromosomal abnormalities are frequent events. Globally, at least 7.6 million children are born annually with severe genetic or congenital malformations. Precise prevalence data are difficult to collect, especially in India, owing to great diversity of conditions and also because many cases remain undiagnosed. Genetic and congenital abnormality is the second most common cause of infant and childhood mortality and occurs with a prevalence of 25-60 per 1000 births. The higher prevalence of genetic diseases in a particular community may, however, be due to some social or cultural factors.

Keywords: Chromosome abnormalities, Genetic disease burden, Congenital malformation, Genetic disease, Childhood mortality

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ABSTRACT

Kaur, A. Kaur, S. P. Singh, A. and **Singh, J. R.** (2012). Karyotypic findings in chronic myeloid cases undergoing treatment. *Indian Journal of Human Genetics* **18** (1), 66-70.

Chronic myeloid leukemia (CML) is a clonal myeloproliferative expansion of primitive hematopoietic progenitor cells. In the present study, CML samples were collected from various hospitals in Amritsar, Jalandhar and Ludhiana. The Chromosomal alterations seen in peripheral blood lymphocytes of these treated and untreated cases of CML were satellite associations, double minutes, random loss, gain of C group chromosomes and presence of marker chromosome. No aberrations were observed in control samples. Karyotypic abnormalities have also been noted in the Ph-negative cells of some patients in disease remission. This is a novel phenomenon whose prognostic implications require thorough and systematic evaluation

Keywords: Imatinib, Myeloid leukemia, Philadelphia chromosome

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ABSTRACT

Kaur, G. **Kumar**, S. Thakur, P. Malik, J. A. Bhandhari, K. Sharma, K. D. and Nayyar, H. (2011). Involvement of proline in response of chickpea (*Cicerorietinum* L.) to chilling stress at reproductive stage. *Scientia Horticulturae* **128** (3), 174-181.

Chickpea is sensitive to chilling stress, especially at its reproductive stage and experiences abortion of flowers and poor pod set at temperatures below 10 °C. The metabolic controls governing chilling-sensitivity in chickpea, particularly involving proline are not known. Hence, in the present study we explored the role of proline in this regard. A set of chickpea plants (cv. GPF2) growing under warm conditions of the glass house (temperature – 28/14 °C as average maximum and minimum till early flowering stage) was exposed to low temperature conditions of the field (8.3–9.6/2.8–5.3 °C; average maximum and minimum temperature, respectively) during the onset of reproductive phase while another set of plants continued to grow under warm conditions. In case of chilling-stressed plants, one set of the plants was treated with 10 µM proline while the other set not treated with proline served as control under low temperature conditions. In untreated chilling-stressed plants, the endogenous proline increased to 230 µmol g⁻¹ dry weight (DW) on 4th day of stress and decreased thereafter to reach 28 µmol on 7th day. In plants treated with 10 µM proline, its endogenous content reached 310 µmol g⁻¹ DW on 4th day and stayed significantly higher than untreated chilling-stressed plants. The proline-treated plants showed significant improvement in retention of flowers and pods leading to better seed yield compared to the untreated ones. The proline-applied plants also had greater pollen viability, pollen germination, pollen tube growth and ovule viability. The stress injury measured as oxidative stress, electrolyte leakage, loss of chlorophyll and decrease in leaf water content was mitigated significantly in proline-treated plants. Additionally, proline application increased the level of sucrose and trehalose (cryoprotectants) in chilling-stressed plants. The studies revealed that proline application was significantly effective in reducing the impact of chilling injury on reproductive growth in chickpea.

Keywords: Chilling, Chickpea, Reproductive failure, Proline

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ABSTRACT

Kaur, J. and **Yogalakshmi**, K. N. (2013). Impact of treated industrial wastewater on crop productivity: A Mini Review. *International Journal of Environmental Research and Development* **3** (6), 42-46.

Water, the elixir of life is continuously contaminated by increasing population, industrialization and urbanization. Expanding population demands water resulting in water crisis situation across the globe. Industrialization though initiates economic advancement; its impact on our environment is extremely pathetic and alarming. The huge amount of wastewater generated by industries, discharged out after minimal treatment can be potentially used for irrigation purposes, as agriculture demands more water. This paper provides an insight on the impact of treated wastewater on soil and crop productivity. The wastewaters have both constructive as well as harmful impacts on the crops. The crop productivity depends upon the nature and chemical composition of the wastewater. Application of wastewater significantly alters the soil cation exchange capacity, micro - macronutrients and heavy metal content. The crops cultivated with the wastewater would respond differently to different types of wastewater depending upon the chemical constituents in the wastewater. Increase in plant height, leaf area, fresh and dry weight, crop growth rate, burning of leaf tips, decrease in leaf size are some of the effects of wastewater irrigation.

Keywords: Industrial wastewater, Crop productivity, Wastewater reuse, Irrigation, Soil quality

Kaur, S. (2011). Determinants of export services of USA with its Asian partners. *Eurasian Journal of Business and Economics* 4: 101 -117.

Trade in services has accounted for 20 per cent of global trade. Despite the increasing importance of services trade in global economy, there has been limited research on service trade which uses determinants driving such trade. The present paper has examined the export potential in service sector of USA with its Asian trade partners (Japan, China, India, Singapore, South Korea and Hong Kong) by taking into account geographic, economic and other features. The approach is based on gravity model, widely used to analyze trade in goods and has more recently been applied to service sector. Being a nature of study is of panel data i.e. for 9 years (2000-2008) and six cross sections, the study used panel data methodology. The study revealed that USA has export potential in services for India and Japan. Regarding the convergent and divergent economies, USA had convergence in exports with three Asian countries (Hong Kong, India and Korea) and divergence with three Asian countries (Japan, China and Singapore). There is a large scope for export expansion for Hong Kong, India and Korea.

Keywords: Services, International trade, Gravity model

Kaur, S. (2011). *Indo - SAARC Trade: Emerging trends and potential 2011*. Deep & Deep Publishers, New Delhi.

The dramatic surge in regional integration schemes over the past two decades has been one of the most important developments in world politics. Virtually all countries are now members of at least one regional grouping. South Asia is no exception to this trend. In December 1985, seven South Asian countries came together to establish South Asian Association for Regional Cooperation (SAARC) to address issues of peace and development in the region. The share of SAARC in world exports is minimum as compared to other regional trade blocks. In this context, this book has examined issues relating to 'Regionalism Versus Multilateralism'; static and dynamic effects of SAARC; competitiveness on complementarities in production and trade among SAARC nations, patterns of intra-regional trade in SAARC; and India's trade trends and potentials with other SAARC nations . These issues have been examined by testing various hypothesis i.e. (existence of complementarities in production and trade among SAARC nations; geographical diversification of trade of SAARC nations ; high trade intensity of India with all other SAARC nations, existence of India's export potential with other SAARC nations and existence of other static and dynamic effects leading to rapid rate of growth of SAARC nations). All these hypotheses have been tested with the help of data for different variables for the whole period 1985-2005 and two sub-periods i.e. Pre-WTO period (1985-94) and Post-WTO period (1995-2004). Empirical findings of the book reveal that there exist lack of complementarities in production and trade among SAARC nations. Further, the dynamic effects of SAARC integration could not explain the rapid rates of growth experienced by members of regional integration. SAARC did not affect the growth of their member countries directly but it had a significant positive influence on investment. There is large room for export expansion for Maldives, Bhutan, Pakistan and Nepal. In the chapter on India's trade with SAARC, the author points out that there was no structural shift in direction of India's exports as well imports from SAARC. There was no stable partnership in India's trade with SAARC. Further, India has not exploited all the export potential in trading with SAARC members. But India's exports to SAARC countries converged towards the estimated export potential .Based on the findings of the study; very useful policy implications have been derived. The book suggests that regional countries should develop technological capacity to produce different product varieties at declining average costs to achieve

increased level of intra-industry trade. Trade complementarities can be developed within region, if countries achieve vertical specialization through product sharing arrangements. India can be as a source of potential investment and technology and a major market for products from all other SAARC members.

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ABSTRACT

Kaur, S. and Deepika (2010). Complementarities in production between ASEAN and India. *Journal of Global Economy* 6 (5), 383-386.

The share of India's export to WANA (West Asia and North Africa) is 22.5 percent, followed by EU (European Union) 21.2 percent and North America 15.5 Percent, ASEAN (Association of South East Asian Nations) 10.3 percent, South Asia 4.6 percent and Latin America 3.3 percent (Government of India, Economic survey 2010-11). As compared to other blocs (WANA, North America and EU) the share of India's exports to ASEAN is low. Thus there is need to examine the reasons for low trade of India with ASEAN nations. In the light of this, the present paper has been undertaken to study competitiveness or complementarities in production and trade among India and ASEAN nations and to study the pattern of intra -regional trade of ASEAN nations. There is substantial range of existing complementarities between ASEAN and India. As most of the ASEAN countries are heavily dependent on imported drugs and health care equipments, therefore India could also cooperate with ASEAN in pharmaceutical and health care service sectors. India shares sea boundaries with three ASEAN countries namely Indonesia, Myanmar and Thailand. Thus in terms of transport cost, India has benefit to trade with ASEAN. So, India should look at expanding sea transport linkages to promote trade, tourism and other economic activities.

Keywords: Indian economy, International trade, ASEAN, Production, Trade

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ABSTRACT

Kaur, S. and Kaur, J. (2013). India's Trade with Central Asia with special reference to Kazakhstan in post cold war era. In: Malhotra, R. Gill, S. S. and Gaur, N. (eds.), *Perspectives on Bilateral and Regional Cooperation*, pp. 161 – 168. CRRID, Chandigarh.

India has a trade knot with Central Asian republics since Silk Road era. Today, nearly 80 percent of India's total trade (exports and imports combined) with region is captured by two countries, viz Kazakhstan and Uzbekistan. Energy exporter Kazakhstan is the largest trade partner of India in region. In this context, the present article has been structured to analyze the trade trends of India with Central Asia with special reference to Kazakhstan economy during post cold war era. Since 1995, both countries have a little share (nearly less than 1 percent) in each others' trade basket. But this share has tendency to increase exhibiting increasing role of the republic in India's trade. However, the declining values of trade intensity index suggest low trade concentration among themselves as well as continuing barriers to bilateral trade. Also, Indo-Kazakhstan terms of trade has always been remaining unfavourable to India due to relatively high imports price index which may be due to the import of oil and other energy products. Further, trade complementarity index results indicate that Indian export pattern is becoming more compatible with Kazakhstan's import pattern. Based on this compatibility, India and Kazakhstan both can develop their bilateral trade ties. It is necessary to overcome the political and geographical barriers.

Keywords: Exports, Imports, Trade Intensity, Terms of Trade, Trade Complementarity

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ABSTRACT

Kaur, S. and Nanda, P. (2010). Education, human development and economic growth in Punjab: A casual analysis. *Arth Vijnana* **52** (3), 197-211.

This paper has evaluated the relative performance of 12 major districts of Punjab in terms of Human Development and Economic Growth and examined the two-way link between them during 1981-2001. Expectation of life at birth positively but non-significantly affected inter-district variations in EG. For EG induced HD, per capita NDP negatively and significantly affected inter-district variations in literacy rate and positively and non-significantly affected inter-district variations of life expectancy. Classification of districts based on their performance on HD and EG reveals that out of 12 districts, only four districts were in the category of lopsided HD and six districts were in the category of virtuous cycle as per the indicators of HD (HDI, literacy rate and expectation of life at birth) in 2001. The results suggest that the policy should be such that HD induced growth process is strengthened for lifting the districts to the virtuous cycle category.

Keywords: Education, Human development, Economic growth

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ABSTRACT

Kaur, S. and Nanda, P. (2010). Export and import potentials of Pakistan to other SAARC countries in gravity O panel data models, 1981 -2005. *Applied Econometrics and International Development* **11**:179-196.

Pakistan's export and import potential to other SAARC nations has been calculated with the help of gravity model using panel data methodology (pooled model, fixed effect model and random effect model) by taking the time period 1981-2005. The study revealed that there was presence of convergence in Pakistan's exports as well as imports with SAARC countries and in the other words, actual Pakistan's exports and imports to SAARC countries converged towards the estimated export and import potential. Pakistan had convergence in exports with four SAARC members (Bhutan, India, Maldives and Nepal) and divergence with two SAARC members (Bangladesh and Sri Lanka). Regarding imports, Pakistan had convergence in imports with two SAARC members (Bangladesh and India) and divergence with two SAARC members (Nepal and Sri Lanka). The study suggested that greater stability in the international exchange system would also help to increase prospects for trade and investments of SAARC countries.

Keywords: Exports, Imports, SAARC, Trade, Exchange rate

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ABSTRACT

Kaur, S. and Nanda, P. (2010). India's export potential to SAARC countries: A gravity model analysis. *Journal of Global Economy* **6** (3), 163-184.

India's export potential to other SAARC nations (Bangladesh, Bhutan, Maldives, Nepal, Pakistan and Sri Lanka) was calculated with the help of gravity model of exports using panel data methodology (pooled model, fixed effect model and random effect model) by taking the time period 1981-2005. To find out the convergence and divergence of India's exports to SAARC members, speed of convergence was used. Moreover, study has also tried to find whether there is convergence of the actual data towards the estimated equilibrium. The study reveals that there was presence of convergence in India exports with SAARC countries and in the other words, actual India's exports to SAARC countries converged towards the estimated export potential. Among SAARC countries, India's export potential exists for Maldives, Bhutan, Pakistan and Nepal. India is the only SAARC member that shares land border with four members and sea border with two. No other SAARC country shares a common border with each other. In terms of trade, commerce, investments etc., India is a source of potential investment and

technology and a major market for products from all other SAARC members. Therefore, it is essentially in India's interest to put her weight behind SAARC.

Keywords: International trade, Gravity model, Distance, SAARC

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ABSTRACT

Kaur, S. and Nanda, P. (2010). India's trade with Central Asia: Trends and prospects. *International Journal of Central Asian Studies* **15**: 251-276.

Although the countries of Central Asia have been integrated in the global economy, their economic relations with India have been declined significantly. India's BOT with all Central Asian countries (except Uzbekistan) had been favourable during 1993-2009. Indian exports as well as imports from Central Asia are highly concentrated around few commodities during same period. Moreover, the Central Asia's role in selected Indian exports as well as imports was not so strong and in fact negligible. There has been found very low trade of India with Central Asian countries. This is due to many reasons but lack of economic and financial sector reforms in some of these countries is one of the basic reasons. The other factors of this low trade are lack of direct transport links, poor infrastructure, inadequate banking facilities and tax structure, competition by Russia, China and USA etc. India can increase trade relations with Central Asia and also can play a multi-dimensional role in the development of these former Soviet Republics. Recently these economies have grown up; therefore good economic relations of India with Central Asia can boost their trade.

Keywords: Trade, Exports, Imports, International trade

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ABSTRACT

Kaur, S. and Nanda, P. (2010). The dynamic effects of SAARC: a panel analysis. *International Journal of Economics* **4**(2), 345-355.

The dynamic effects of SAARC integration have been quantified in terms of investment and total factor productivity as suggested by Brada and Mendez (1988). Integration has positively and non-significantly affected the gross capital formation of SAARC nations Integration had a positive impact for many SAARC nations (Bhutan, India, Nepal and Pakistan) on technological progress but its role is not significant. After the formation of SAPTA, integration positively and non-significantly affected the growth rate of GDP in Bangladesh, Bhutan, India and Nepal. There is a need to strengthen the static effects firstly, and then dynamic effects will automatically be generated and powerful. But for this, growth of intra-regional trade is a necessary requirement. It has been expecting that SAFTA will generate this growth; then dynamic effects will come out in SAARC.

Keywords: SAARC, Trade, Investment

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ABSTRACT

Kaur, S. Singh, H. P. Mittal, S. Batish, D. R. and Kohli, R. K. (2010). Phytotoxic effects of volatile oil from *Artemisia scoparia* against weeds and its possible use as a bioherbicide. *Industrial Crops and Products* **32** (1), 54-61.

A study was conducted to assess the bioherbicidal activity of volatile oil hydrodistilled from *Artemisia scoparia* Waldst et Kit. (red stem wormwood; Asteraceae) against five weed species, viz. *Achyranthes aspera*, *Cassia occidentalis*, *Parthenium hysterophorus*, *Echinochloa crus-galli*, and *Ageratum conyzoides*. Emergence and seedling growth (in terms of root and shoot length) were

significantly reduced in a dose–response bioassay conducted in sand impregnated with *Artemisia* oil (at $\geq 10, 25, \text{ and } 50 \mu\text{g Artemisia oil/g sand}$). In general, the root length was inhibited more as compared to the shoot length and the inhibitory effect was greatest in *P. hysterophorus* followed by *A. conyzoides* and least in *C. occidentalis*. Post-emergence application of *Artemisia* oil (2%, 4%, and 6%, v/v) on 6-week-old weed plants caused visible injury (1- and 7-days after spray) ranging from chlorosis to necrosis to complete wilting of plants. Among the sprayed test weeds, the effect was greatest on *E. crus-galli* and *P. hysterophorus*. *Artemisia* oil treatment resulted in a loss of chlorophyll content and cellular respiration in test weeds thereby implying interference/impairment with photosynthetic and respiratory metabolism. *Artemisia* oil caused a severe electrolyte leakage from *E. crus-galli* (a monocot) and *C. occidentalis* (a dicot) indicating membrane disruption and loss of integrity. The study concludes that *Artemisia* oil has bioherbicidal properties as it causes severe phytotoxicity and interferes with the growth and physiological processes of some weed species.

Keywords: *Artemisia scoparia*, Essential oil, Growth inhibition, Visible injury, Relative ion leakage, Bioherbicidal activity

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ABSTRACT

Kaur, Z. (2009). Punjabi Alochna de khetar vich Bharti Kaav-shastri Alochna da Armabh te Vikas. *Khoj Patrika* 70: 240-246.

ਸਾਰ: ਹੁਣ ਤੱਕ ਦੀ ਸਮੁੱਚੀ ਪੰਜਾਬੀ ਆਲੋਚਨਾ ਮੁੱਖ ਤੌਰ ਤੇ ਪੱਛਮੀ ਕਾਵਿ-ਸ਼ਾਸਤਰੀ ਸਿਧਾਂਤਾਂ ਨੂੰ ਹੀ ਅਧਾਰ ਸ਼ਿਲਾ ਵਜੋਂ ਅਪਣਾਉਣ ਪ੍ਰਤਿ ਰੁਚਿਤ ਰਹੀ ਹੈ। ਜਿਥੋਂ ਤੱਕ ਭਾਰਤੀ ਸੰਸਕ੍ਰਿਤ ਕਾਵਿ ਸਿਧਾਂਤਾਂ ਨੂੰ ਸਮੀਖਿਆ ਵਿਧੀ ਦੇ ਤੌਰ ਤੇ ਅਪਣਾਏ ਜਾਣ ਦਾ ਸਵਾਲ ਹੈ, ਪੰਜਾਬੀ ਆਲੋਚਨਾ ਦੇ ਖੇਤਰ ਵਿਚ ਇਹ ਕਾਵਿ-ਚਿੰਤਨ ਜਾਂ ਤਾਂ ਲਗਪਗ ਅਣਗੌਲਿਆ ਹੀ ਹੈ, ਜਾਂ ਇੱਕ-ਪੱਖੀ ਅਤੇ ਅੰਸ਼ਿਕ ਪਹੁੰਚ ਦਾ ਸ਼ਿਕਾਰ ਰਿਹਾ ਹੈ। ਸਮੱਗਰ ਰੂਪ ਵਿੱਚ ਇਹਨਾਂ ਪ੍ਰਣਾਲੀਆਂ ਦੇ ਸਿਧਾਂਤਕ ਪੱਖ ਨੂੰ ਪੜਚੋਲਣ ਅਤੇ ਵਿਹਾਰਕ ਤੌਰ ਤੇ ਲਾਗੂ ਕਰਨ ਦਾ ਅਮਲ ਅਜੇ ਤੱਕ ਆਪਣੀਆਂ ਨਿੱਗਰ ਸੰਭਾਵਨਾਵਾਂ ਨੂੰ ਪ੍ਰਾਪਤ ਕਰਨ ਤੋਂ ਵਿਰਵਾ ਹੀ ਕਿਹਾ ਜਾ ਸਕਦਾ ਹੈ।

ਇਸ ਖੋਜ ਪੱਤਰ ਦਾ ਪ੍ਰਯੋਜਨ ਪੰਜਾਬੀ ਆਲੋਚਨਾ ਪਰੰਪਰਾ ਦੇ ਅੰਤਰਗਤ ਉਪਰੋਕਤ ਆਲੋਚਨਾ ਵਿਧੀਆਂ ਦੀ ਵਿਕਲੋਤਰੇ ਰੂਪ ਵਿੱਚ ਪ੍ਰਵਾਨਗੀ, ਆਲੋਚਨਾਤਮਕ ਅਮਲ ਦੇ ਪੱਧਰ ਅਤੇ ਵਿਸ਼ੇਸ਼ਤਾ ਦਾ ਲੇਖਾ-ਜੋਖਾ ਕਰਨਾ ਹੈ। ਇਸ ਸੰਦਰਭ ਵਿੱਚ ਪੰਜਾਬੀ ਆਲੋਚਨਾ ਪਰੰਪਰਾ ਦੇ ਅੰਤਰਗਤ ਪ੍ਰਾਪਤ ਕੁੱਝ ਪ੍ਰਮੁੱਖ ਆਲੋਚਨਾ ਪੁਸਤਕਾਂ ਅਤੇ ਖੋਜ ਪੱਤਰਾਂ ਦਾ ਲੇਖਾ-ਜੋਖਾ ਕੀਤਾ ਗਿਆ ਹੈ।

ਪੰਜਾਬੀ ਵਿੱਚ ਪ੍ਰਾਪਤ ਅਜਿਹੇ ਆਲੋਚਨਾਤਮਕ ਅਮਲ ਦੇ ਅੰਤਰਗਤ ਬੇਸ਼ੱਕ ਭਾਰਤੀ ਕਾਵਿ ਸ਼ਾਸਤਰੀ ਆਲੋਚਨਾ ਪ੍ਰਣਾਲੀਆਂ ਸਬੰਧੀ ਸਿਧਾਂਤ ਅਤੇ ਵਿਹਾਰ ਦੋਹਾਂ ਪੱਧਰਾਂ ਤੇ ਹੋਇਆ ਕੰਮ ਉਪਲਬਧ ਹੈ, ਪ੍ਰੰਤੂ ਸਾਹਿਤ ਸ਼ਾਸਤਰ ਦੇ ਇਹਨਾਂ ਬੁਨਿਆਦੀ ਅਸੂਲਾਂ ਦਾ ਵਰਤਮਾਨ ਸੰਦਰਭ ਵਿੱਚ ਗਹਿਨ ਅਧਿਐਨ ਅਤੇ ਪੁਨਰ-ਮੁਲਾਂਕਣ ਕਰਦੇ ਹੋਏ ਸਾਰਥਿਕ ਸੰਭਾਵਨਾਵਾਂ ਨਾਲ ਜੋੜਿਆ ਜਾਣਾ ਬੇਹੱਦ ਜ਼ਰੂਰੀ ਹੈ।

Bharti Kaav Shastar by Dr. Premprakash Singh is an important and primary book in the field of Punjabi criticism which introduces the readers with Indian poetic principles. In this book, for the first time, Dr. Premprakash Singh presents Sanskrit literary perusal systems in detail for Punjabi readers. In this book, Sanskrit literary principles like *Rasa*, *Alamkaar*, *Riti*, *Vakrokti*, *Auchitya* etc. are discussed in detail, thereby giving examples from Punjabi literature.

In this book, Premprakash Singh has also tried to analyse Sanskrit literary principles by

comparing them with western critical theories. Sanskrit scholars' creative thoughts about Sanskrit literary principles along with contemporary literary critics' thoughts are also included in this book. This book tries to find out some combining points of Indian and western critical theories. The paper is based on the discussion pertaining to the entire contribution of Dr. Premprakash Singh's book of *Bharti Kaav Shastar*, in the field of Punjabi criticism.

Keywords: Indian poetics, Literary criticism, Punjabi criticism, Sanskrit literary theories.

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ABSTRACT

Kaur, Z. (2010). Bharti Kaav-Shatar: Servekhan te Mulaankan. *Khoj Patrika*, 71: 154-169.

ਸਾਰ: ਡਾ. ਪ੍ਰੇਮਪ੍ਰਕਾਸ਼ ਸਿੰਘ ਦੁਆਰਾ ਰਚਿਤ ਪੁਸਤਕ ਭਾਰਤੀ ਕਾਵਿ-ਸ਼ਾਸਤਰ ਪੰਜਾਬੀ ਆਲੋਚਨਾ ਦੇ ਖੇਤਰ ਵਿੱਚ ਭਾਰਤੀ ਕਾਵਿ-ਸਿਧਾਂਤਾਂ ਨਾਲ ਜਾਣ-ਪਛਾਣ ਕਰਵਾਉਣ ਵਾਲੀ ਸਭ ਤੋਂ ਮਹੱਤਵਪੂਰਨ ਅਤੇ ਮੁੱਢਲੀ ਪੁਸਤਕ ਮੰਨੀ ਜਾਂਦੀ ਹੈ। ਇਸ ਪੁਸਤਕ ਵਿੱਚ ਡਾ. ਪ੍ਰੇਮ ਪ੍ਰਕਾਸ਼ ਸਿੰਘ ਨੇ ਪਹਿਲੀ ਵਾਰ ਸੰਸਕ੍ਰਿਤ ਸਾਹਿਤ ਅਧਿਐਨ ਪ੍ਰਣਾਲੀਆਂ ਨੂੰ ਵਿਸਥਾਰ ਸਾਹਿਤ ਪੰਜਾਬੀ ਪਾਠਕਾਂ ਦੇ ਰੂ-ਬ-ਰੂ ਕਰਵਾਇਆ। ਇਸ ਪੁਸਤਕ ਵਿੱਚ ਸੰਸਕ੍ਰਿਤ ਸਾਹਿਤ ਸਿਧਾਂਤਾਂ ਦੇ ਅੰਤਰਗਤ ਜਿਥੇ ਰਸ, ਅਲੰਕਾਰ, ਧੁਨੀ, ਰੀਤੀ, ਵਕ੍ਰੋਕਤੀ, ਔਚਿਤਯ ਆਦਿ ਬਾਰੇ ਵਿਸਤ੍ਰੁਤ ਚਰਚਾ ਕੀਤੀ ਗਈ ਹੈ, ਉਥੇ ਵਿਸ਼ੇਸ਼ ਤੌਰ ਤੇ ਪੰਜਾਬੀ ਸਾਹਿਤ ਵਿੱਚ ਉਦਾਹਰਨ ਦਿੰਦੇ ਹੋਏ ਵਿਹਾਰਕ ਅਧਿਐਨ ਵੀ ਪ੍ਰਸਤੁਤ ਕੀਤਾ ਗਿਆ ਹੈ।

ਇਸ ਪੁਸਤਕ ਦੇ ਅੰਤਰਗਤ ਡਾ. ਪ੍ਰੇਮ ਪ੍ਰਕਾਸ਼ ਸਿੰਘ ਨੇ ਸੰਸਕ੍ਰਿਤ ਸਾਹਿਤ ਅਧਿਐਨ ਪ੍ਰਣਾਲੀਆਂ ਨੂੰ ਕਾਫੀ ਹੱਦ ਤੱਕ ਪੱਛਮੀ ਆਲੋਚਨਾ ਪ੍ਰਣਾਲੀਆਂ ਦੀ ਤੁਲਨਾ ਵਿੱਚ ਪੜਚੋਲਣ ਦੀ ਕੋਸ਼ਿਸ਼ ਵੀ ਕੀਤੀ ਹੈ। ਸੰਸਕ੍ਰਿਤ ਸਾਹਿਤ ਸਿਧਾਂਤਾਂ ਬਾਰੇ ਸੰਸਕ੍ਰਿਤ ਵਿਦਵਾਨਾਂ ਦੇ ਮੌਲਿਕ ਵਿਚਾਰਾਂ ਦੇ ਨਾਲ-ਨਾਲ ਆਧੁਨਿਕ ਸਾਹਿਤ ਆਲੋਚਕਾਂ ਦੇ ਵਿਚਾਰਾਂ ਨੂੰ ਵੀ ਸ਼ਾਮਿਲ ਕੀਤਾ ਗਿਆ ਹੈ। ਸਮੁੱਚੇ ਤੌਰ ਤੇ ਇਹ ਪੁਸਤਕ ਭਾਰਤੀ ਸੰਸਕ੍ਰਿਤ ਸਿਧਾਂਤਾਂ ਦੀ ਪੰਜਾਬੀ ਸਾਹਿਤ ਵਿਵੇਚਨ ਪ੍ਰਤਿ ਵਰਤਮਾਨ ਯੁੱਗ ਵਿੱਚ ਪ੍ਰਸੰਗਿਕਤਾ ਅਤੇ ਭਾਰਤੀ ਤੇ ਪੱਛਮੀ ਚਿੰਤਨ ਪ੍ਰਕ੍ਰਿਆ ਵਿਚਲੀਆਂ ਸਾਂਝਾਂ ਅਤੇ ਸਮਾਨਤਾਵਾਂ ਨੂੰ ਨਿਖੇੜ ਕੇ ਕੋਈ ਨਿਵੇਕਲਾ ਮਿਲਾਣ-ਬਿੰਦੂ ਖੋਜਣ ਦਾ ਉਪਰਾਲਾ ਕਰਦੀ ਹੈ। ਹੱਥਲੇ ਪੇਪਰ ਦੌਰਾਨ ਡਾ. ਪ੍ਰੇਮ ਪ੍ਰਕਾਸ਼ ਸਿੰਘ ਦੀ ਪੁਸਤਕ ਭਾਰਤੀ ਕਾਵਿ-ਸ਼ਾਸਤਰ ਦੇ ਅਧਿਐਨ, ਵਿਸ਼ਲੇਸ਼ਣ ਤੋਂ ਇਲਾਵਾ ਪੰਜਾਬੀ ਆਲੋਚਨਾ ਦੇ ਖੇਤਰ ਵਿੱਚ ਇਸ ਪੁਸਤਕ ਦੇ ਸਮੁੱਚੇ ਯੋਗਦਾਨ ਬਾਰੇ ਵੀ ਚਰਚਾ ਕੀਤੀ ਗਈ ਹੈ।

It is an amazing fact that entire Punjabi criticism till now is mainly based on western literary principles. Where there is a question of accepting Indian poetics as the fundamental methodology, Indian literary criticism in the field of Punjabi criticism is mostly either neglected or partially accepted. The purpose of this research paper is an assessment of Punjabi literary criticism tradition with respect to the theory and application of Indian Sanskrit literary criticism. The assessment of some prominent Punjabi critical books and research papers has also been included in this context.

Keywords: Punjabi criticism, Indian literary theories, Practical criticism.

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ABSTRACT

Kaur, Z. (2010). Sahit Shastar: Servekhan te Mulankan. *Khoj Patrika* 71: 289-296.

ਸਾਰ: ਡਾ. ਰੋਸ਼ਨ ਲਾਲ ਅਹੂਜਾ ਦੁਆਰਾ ਰਚਿਤ ਪੁਸਤਕ ਸਾਹਿਤ ਸ਼ਾਸਤਰ, ਪੰਜਾਬੀ ਆਲੋਚਨਾ ਦੇ ਖੇਤਰ ਵਿੱਚ ਡਾ. ਪ੍ਰੇਮ ਪ੍ਰਕਾਸ਼ ਸਿੰਘ ਦੁਆਰਾ ਰਚਿਤ ਪੁਸਤਕ ਭਾਰਤੀ ਕਾਵਿ-ਸ਼ਾਸਤਰ ਤੋਂ ਪਿੱਛੋਂ, ਸੰਸਕ੍ਰਿਤ ਸਾਹਿਤ ਅਧਿਐਨ ਪ੍ਰਣਾਲੀਆਂ ਨਾਲ ਸਬੰਧ ਰੱਖਣ ਵਾਲੀ ਦੂਜੀ ਪ੍ਰਮੁੱਖ ਪੁਸਤਕ ਹੈ। ਡਾ. ਰੋਸ਼ਨ ਲਾਲ ਅਹੂਜਾ ਦੁਆਰਾ ਰਚਿਤ ਲਗਪਗ ਦਰਜਨ ਦੇ ਕਰੀਬ ਪੁਸਤਕਾਂ ਵਿੱਚੋਂ ਵੀ ਸਾਹਿਤ ਸ਼ਾਸਤਰ ਇੱਕ ਮਹੱਤਵਪੂਰਨ ਪੁਸਤਕ ਵਜੋਂ ਜਾਣੀ ਜਾਂਦੀ ਹੈ। ਇਸ ਪੁਸਤਕ ਵਿੱਚ ਸੰਸਕ੍ਰਿਤ ਸਾਹਿਤ ਸਿਧਾਂਤਾਂ ਦੇ ਅੰਤਰਗਤ ਜਿਥੇ ਰਸ, ਅਲੰਕਾਰ, ਧੁਨੀ, ਰੀਤੀ, ਵਕ੍ਰੋਕਤੀ, ਔਚਿਤਯ ਆਦਿ ਦੇ ਮੂਲ ਸੰਕਲਪਾਂ ਬਾਰੇ ਕੀਤੀ ਗਈ ਚਰਚਾ, ਨਿਰਸੰਦੇਹ ਪੰਜਾਬੀ ਪਾਠਕਾਂ ਦੀ ਸੰਸਕ੍ਰਿਤ ਸਾਹਿਤ ਸਿਧਾਂਤਾਂ ਸਬੰਧੀ ਜਾਣਕਾਰੀ ਵਿੱਚ ਵਾਧਾ ਕਰਦੀ ਹੈ।

ਇਸ ਪੁਸਤਕ ਦੇ ਅੰਤਰਗਤ ਸੰਸਕ੍ਰਿਤ ਸਾਹਿਤ ਅਧਿਐਨ ਪ੍ਰਣਾਲੀਆਂ ਨੂੰ ਪੱਛਮੀ ਆਲੋਚਨਾ ਪ੍ਰਣਾਲੀਆਂ ਦੀ ਤੁਲਨਾ ਵਿੱਚ ਵਿਚਾਰਦੇ ਹੋਏ ਸਾਹਿਤ ਦੀਆਂ ਪ੍ਰਮੁੱਖ ਪ੍ਰਵਿਰਤੀਆਂ ਅਤੇ ਬੁਕਾਵਾਂ ਆਦਿ ਬਾਰੇ ਵੀ ਜਾਣਕਾਰੀ ਸ਼ਾਮਲ ਕੀਤੀ ਗਈ ਹੈ। ਸੰਸਕ੍ਰਿਤ ਸਾਹਿਤ ਸਿਧਾਂਤਾਂ ਬਾਰੇ ਸੰਸਕ੍ਰਿਤ ਵਿਦਵਾਨਾਂ ਦੇ ਮੌਲਿਕ ਵਿਚਾਰਾਂ ਦੇ ਨਾਲ-ਨਾਲ ਆਧੁਨਿਕ ਸਾਹਿਤ ਆਲੋਚਕਾਂ ਦੇ ਵਿਚਾਰਾਂ ਨੂੰ ਵੀ ਸ਼ਾਮਲ ਕੀਤਾ ਗਿਆ ਹੈ। ਇਸ ਪੁਸਤਕ ਦੀ ਵਿਸ਼ੇਸ਼ਤਾ ਕਾਵਿ-ਸ਼ਾਸਤਰ ਦੇ ਗਹਿਨ ਗੰਭੀਰ ਵਿਸ਼ਿਆਂ ਨੂੰ ਸੌਖੀ ਅਤੇ ਸਰਲ ਭਾਸ਼ਾ ਵਿੱਚ ਸਪੱਸ਼ਟ ਕਰਨ ਵਿੱਚ ਵੀ ਹੈ। ਹੱਥਲੇ ਪੇਪਰ ਦੌਰਾਨ ਡਾ. ਰੋਸ਼ਨ ਲਾਲ ਅਹੂਜਾ ਦੁਆਰਾ ਰਚਿਤ ਪੁਸਤਕ ਸਾਹਿਤ ਸ਼ਾਸਤਰ ਦੇ ਅਧਿਐਨ, ਵਿਸ਼ਲੇਸ਼ਣ ਤੋਂ ਇਲਾਵਾ ਪੰਜਾਬੀ ਆਲੋਚਨਾ ਦੇ ਖੇਤਰ ਵਿੱਚ ਇਸ ਪੁਸਤਕ ਦੇ ਸਮੁੱਚੇ ਯੋਗਦਾਨ ਬਾਰੇ ਵੀ ਚਰਚਾ ਕੀਤੀ ਗਈ ਹੈ।

In the field of Punjabi criticism based on *Indian literary theories*, *Sahit Shastar* is the second important book by Dr. Roshan Lal Ahuja after *Bharti Kaav Shaster* written by Dr. Premprakash Singh. *Sahit Shastar* is one of the most important books among almost a dozen of other books by Dr. Roshan Lal Ahuja. In this book the discussion about basic concepts of Sanskrit literary principles are included under *Rasa, Alamkaar, Riti, Vakrokti, Auchitya* schools, which undoubtedly increases the knowledge of Punjabi readers.

In this book, a comparison of Sanskrit literary theories with western critical theories has been done, the knowledge about prominent literary tendencies and inclinations has also been included. Along with thoughts of Sanskrit literary scholars and their fundamental principles; the thoughts of contemporary literary critics are also included. A very easy and simple usage of language for the complex matters of literary criticism is the specialty of this book. The paper is based on the discussion pertaining to the entire contribution of Dr. Roshan Lal Ahuja's book of *Sahit Shastar*, in the field of Punjabi criticism.

Keywords: Indian poetics, Literary criticism, Punjabi criticism, Sanskrit literary theories

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ABSTRACT

Kaur, Z. (2012). Contribution of Punjabi Sufi poets to Punjabi literature. *Maulana Azad Journal of the English Language and Literature* 4: 62-73.

Indian Sufism had a long tradition of borrowing both ideas and practices from other non-Islamic mystical systems as well as originally from Islamic thought too. Poetic work of Sufi fakirs (saints) makes a major portion of medieval Punjabi literature.

Sheikh Farid (1173 A.D. -1276 A.D.) was the first poet of Punjabi literature. To convey his spiritual message of high order he draws images, similes and metaphors from rural Punjabi life, culture and society. Nature, ecology, landscape and house-hold customs of the Punjab correspond with his inner vision and come in a very realistic way. Popular love-legends of Punjab (Heer-Ranjha, Sassi-Punnu, Sohni-Mahiwal) are also presented in Sufi verses by utilizing their persons, places, motifs and incidents as images, metaphors and allegories to convey the spiritual message of high order.

Punjab was greatly disturbed during 1710A.D.-1750A.D. During this the time an enlightened and revolutionary Sufi saint belonging to Qadiri order of Sufism, Bulleh Shah's (1680A.D.-1758.A.D.) composition comes into existence on the scene of Punjabi Sufi literature by acquiring a notable popularity among common public of the time. Bulleh Shah, as a poet emerged as protagonist of communal amity in Punjab. He was a major voice against injustice.

There is no denying that literature of all the times and all the languages reflects the contemporary life, culture and society and addresses all contemporary issues with a humanitarian, aesthetic appeal. This paper will be based on an analysis of portrayal of rural Punjab (from 12th to 18th century) by addressing its all major concerns in the verses of medieval Punjabi Sufi literature.

Keywords: Medieval Punjabi Literature, Punjabi Sufi Literature, Sheikh Farid, Shah Hussain, Bulleh Shah

Kaushal, N. Gupta, K. Bhandhari, K. **Kumar**, S. Thakur, P. and Nayyar, H. (2011). Proline induces heat tolerance in chickpea (*Cicer arietinum L.*) plants by protecting vital enzymes of carbon and antioxidative metabolism. *Physiology and Molecular Biology of Plants* **17** (3), 203-213.

Chickpea is a heat sensitive crop hence its potential yield is considerably reduced under high temperatures exceeding 35 °C. In the present study, we evaluated the efficacy of proline in countering the damage caused by heat stress to growth and to enzymes of carbon and antioxidative metabolism in chickpea. The chickpea seeds were raised without (control) and with proline (10 µM) at temperatures of 30/25 °C, 35/30 °C, 40/35 °C and 45/40 °C as day/ night (12 h/12 h) in a growth chamber. The shoot and root length at 40/35 °C decreased by 46 and 37 %, respectively over control while at 45/40 °C, a decrease of 63 and 47 %, respectively over control was observed. In the plants growing in the presence of 10 µM proline at 40/35°C and 45/40°C, the shoot length showed improvement of 32 and 53 %, respectively over untreated plants, while the root growth was improved by 22 and 26 %, respectively. The stress injury (as membrane damage) increased with elevation of temperatures while cellular respiration, chlorophyll content and relative leaf water content reduced as the temperature increased to 45/40 °C. The endogenous proline was elevated to 46 µmol g⁻¹ dw at 40/35 °C but declined to 19 µmol g dw in plants growing at 45/40 °C that was associated with considerable inhibition of growth at this temperature. The oxidative damage measured as malondialdehyde and hydrogen peroxide content increased manifolds in heat stressed plants coupled with inhibition in the activities of enzymatic (superoxide dismutase, catalase, ascorbate peroxidase, -l glutathione reductase) and levels of non-enzymatic (ascorbic acid, glutathione, proline) antioxidants. The enzymes associated with carbon fixation (RUBISCO), sucrose synthesis (sucrose phosphate synthase) and sucrose hydrolysis (invertase) were strongly inhibited at 45/40 °C. The plants growing in the presence of proline accumulated proline up to 63 µmol g⁻¹ dw and showed less injury to membranes, had improved content of chlorophyll and water, especially at 45/40 °C. Additionally, the oxidative injury was significantly reduced coupled with elevated levels of enzymatic and non-enzymatic antioxidants. A significant improvement was also noticed in the activities of enzymes of carbon metabolism in proline-treated plants. We report here that proline imparts partial heat tolerance to chickpea's growth by reducing the cellular injury and protection of some vital enzymes related to carbon and oxidative metabolism and exogenous application of proline appears to have a countering effect against elevated high temperatures on chickpea.

Keywords: Chickpea, Carbon fixation, Oxidative stress.

Kaushiki, N. (2013). India's Foreign Policy for South and Central Asia Post 9/11: Embracing Strategic Realism. *Humanities Circle* **1** (1), 09- 26.

11 September 2001 ushered in a new world order. Dominance of security issues and its linkages with economics and politics became its major characteristic thereby changing the discipline of international relations. India like other countries was forced to adopt the changes that have been brought about in the discipline of international relations. This article is a modest attempt to bring to the surface the recent changes in the Indian foreign policy for the South and Central Asian region in accordance with the changed discipline. The first part of the article outlines India's strategic environment and how the Indo-US relations have strengthened overtime. The second part highlights how the practice of international relations has undergone transformations in the South and Central Asian countries that have favoured countries like Pakistan and Russia strategically. The analysis leads to the conclusion that possibility of India being marginalized in the regional affairs has grown manifold as the regional balance of these two regions is now marked by the presence of numerous countries that seek interest maximization and link their security policies with international economics and international politics.

Keywords: South & central asia, New world order, Strategic realism, International politics, Indian foreign policy

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ABSTRACT

Khan, M. A. Kamaluddin and **Saini, R. G.** (2012). Chromosomal location of non-hypersensitive leaf rust resistance genes in bread wheat cultivar PBW65 using microsatellite markers. *Indian Journal of Biotechnology* **11** (4), 412-415.

Microsatellite or simple sequence repeat (SSRs) markers have been powerful tool for genetic mapping in wheat. Indian bread wheat (*Triticum aestivum* L.) cultivar PBW65 has shown significant level of resistance to most virulent race 77-5 of leaf rust (*Puccinia triticina*). It has been indicated that PBW65 expresses non-hypersensitive type of resistance against race 77-5. F2 and F3 crossing of PBW65 with WL711, a leaf rust susceptible wheat cultivar, and allelic tests with such already known genes (present in cultivars RL 6058 and HD 2009) revealed that cultivar PBW65 could be a potential source of novel non-hypersensitive leaf rust resistance genes. So far, only non-hypersensitive leaf rust resistance gene Lr34 was found to be effective under Indian conditions. Attempts to locate such durable leaf rust resistance genes in PBW65 through microsatellite markers showed 2B, 2D and 3D as critical chromosomes for PBW65. The primer Xgwm341 (3D) was found located 41.5 cM away from gene LrPBW1 in PBW65.

Keywords: Bread wheat, Leaf rust, Microsatellite markers, Non-hypersensitive resistance, Cv. BW65, *Puccinia triticina*, *Triticum aestivum*

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ABSTRACT

Khan, M. A. Zargar, S. M. and **Saini, R. G.** (2011). A novel hypersensitive stripe rust (*Puccinia striiformis* Westland, f. sp. *tritici*) resistance gene in bread wheat cultivar Cook effective in India. *Journal of Phytology* **3** (7), 44-46.

An Australian wheat cultivar Cook was studied for the stripe rust resistance both under glass house and field conditions against the most virulent race 46S119 of stripe rust. The inheritance studies showed that stripe rust resistance in cultivar Cook is conditioned by one hypersensitive and one non-hypersensitive genes. Apart from a known non-hypersensitive resistance gene Yr18, the cultivar cook also contains a hypersensitive stripe rust resistance gene effective against race 46S119. This gene could be novel and efficiently be utilized across wheat germplasm in building durable resistance against stripe rust in India.

Keywords: Stripe rust, *Triticum aestivum*, Non-hypersensitive resistance

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ABSTRACT

Kodoth, P. & **Varghese, V. J.** (2011). *Emigration of female domestic workers from Kerala: Gender, state policy and the politics of movement*. CDS working paper, Centre for Development Studies, Trivandrum.

Restrictions imposed by the Government of India on the emigration of women in 'unskilled' categories such as domestic work are framed as measures intended to protect women from exploitation. Special protection for certain categories of emigrant women workers makes way for gendered conceptions of citizenship and sovereignty through the use of gender to assert control over space in ways that curtail women's access to mobility and emigrant work opportunities. However, restrictions have directed potential migrants to the use of informal / illegal processes in connivance with state agencies. Whereas, intermediaries, including recruiting agents and government officials, profit from the use of informal / illegal processes by prospective emigrants and hence they have an interest in rendering these more effective than formal processes established by the state, we argue that the gender politics around movement provides an enabling condition for both state restrictions and the burgeoning of informal / illegal processes. To spell out the implications of state policy on emigrant women domestic workers, the paper compares their position and experience of migration with that of emigrant nurses on the one hand

and outmigrant fish processing workers on the other. It also explores the nature of women's agency involved when domestic workers resist state policy and social norms to emigrate through informal / illegal means.

Keywords: International Migration, Gender, Citizenship, State Policy, Domestic Workers.

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ABSTRACT

Kodoth, P. and **Varghese, V. J.** (2012). Emigration of Female Domestic Workers from Kerala: Gender, State Policy and Politics of Movement. In: Kalir, B. and Sur, M. (eds.), *Transnational Flows and Permissive Polities. Ethnographies of Human Mobilities in Asia*, Amsterdam, pp. 169-188. Amsterdam University Press, Amsterdam

The paper discusses the case of emigrant women domestic workers from Kerala and connects the same with the 'Illicit but licit' framework. On the one hand it draws attention to the critical failure of the social science scholarship to address the question of poor women migrants, and on the other state policy driven by an overarching patriarchal commonsense. It underlines its complicity of state policies in generating regulatory gaps which push women to illegal networks. The paper engages with the gendering of citizenship and sovereignty through a comparison of the state policy on migrant women workers and the experience of three segments of this workforce – emigrant nurses, domestic workers and outmigrant fish processing workers. It then considers the question of agency in the context of women workers who are thrust into the position of breadwinners for their families. It calls for responsible state intervention that could ensure orderly migration within a framework of equal opportunity.

Keywords: Emigration, Gender, Citizenship, State Policy, Domestic Workers, protection.

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ABSTRACT

Kodoth, P. and **Varghese, V. J.** (2012). Protecting Women or Endangering the Emigration Process: Emigrant Women Domestic Workers, Gender and State Policy. *Economic and Political Weekly* **47**(43), 56-66.

The paper discusses the case of emigrant women domestic workers from Kerala, a state which has had a long history of migration of workers in this segment. It draws attention to the critical failure of the social science scholarship to address the question of poor women migrants. It also provides an overview of state policy on migration and underlines its complicity in generating regulatory gaps. The paper engages with the gendering of citizenship and sovereignty through a comparison of the state policy on migrant women workers and the experience of three segments of this workforce – emigrant nurses, domestic workers and outmigrant fish processing workers. It then considers the question of agency in the context of women workers who are thrust into the position of breadwinners for their families and, finally, the question of responsible state intervention.

Keywords: Emigration, Gender, Citizenship, State policy, Domestic workers, Protection.

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ABSTRACT

Kondaskar, A. Kondaskar, S. **Kumar, R.** Fishbein, J. Muvarak, N. Lapidus, R. Sadowska, M. Edelman, M. Bol, G. Vesuna, F. Raman, V. and Hosmane, R. (2011). Novel, broad spectrum anti-cancer agents containing the tricyclic 5:7:5-fused diimidazodiazepine ring system. *ACS Medicinal Chemistry Letter* **2** (3), 252-256.

Synthesis of a series of novel, broad spectrum anticancer agents containing the tricyclic 5:7:5-fused diimidazo[4,5-d:40,50-f][1,3]diazepine ring system is reported. Compounds 1, 2, 8, 11, and 12 in the series show promising in vitro antitumor activity with low micromolar IC₅₀ values against prostate,

lung, breast, and ovarian cancer cell lines. Some notions about structure-activity relationships and a possible mechanism of biological activity are presented. Also presented are preliminary in vivo toxicity studies of 1 using SCID mice.

Keywords: Synthesis, 5:7:5-fused tricycles, Diimidazo[4,5-d:40,50- f][1,3]diazepine ring system, In vitro screening, Broad spectrum anticancer activity, Prostate, Lung, Breast and ovarian cancers, Preliminary mechanistic studies, Effects on G1 and S phases of the cell cycle

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ABSTRACT

Kumar, D. (2012). Environmental Human Rights and Public Trust Doctrine: An Indian Experiences. In: Malik, L. (Ed.), Rule of Law and Human Rights, pp. 190-209. Universal Law Publication, New Delhi.

Introduction - The relationship between human rights and the environment is not a modern phenomenon. It existed from the beginning of humanity itself. According to Protargoras (c. 485-c. 411 B.C.), "Man is the measure of all things". Man loves nature in the turn nourishes him. Man serves society and society in turn preserves him. Nature and society thus inter-dependent and the duty of man to them are inherent. These basic percepts envisage the protection of environment and preservation of humanity. But "For the greatest of environmentalists, humans are of lesser importance than the abundant and diverse flora and fauna of the planet. Humans are defined as a recent addition to the livestock and are considered to have been a wholly disruptive influence on the world which was paradise before their arrival. But globalization of economic development as a result of constant endeavor of humans cannot be whittled down or destroyed for the sake of environment and preservation of ecology. Therefore when we say 'love of nature' it is love for ecology, it is love for environment and above all it is a love for human beings .

It is important to recognize our dependence on the earth's natural resources. Natural resources such as air, water, and land are fundamental to all life forms; they are, much more than money and all types of infrastructure (including economic infrastructure), the base of our survival. To large numbers of humanity, especially communities that have been termed 'ecosystem people' (people depending on the natural environments of their own locality to meet most of their material needs), natural resources are the base of survival and livelihoods. Their material and economic sustenance largely depends on these. In India alone, around seventy percent of the population directly depends on land based occupations, forests, wetlands and marine habitats, for basic subsistence requirements with regard to water, food, fuel, housing, fodder and medicine as also for ecological livelihoods cultural sustenance. Given this close interdependence of humans and their environment, it is not surprising that the culture of societies is so greatly influenced by their environment. They seek inspiration, knowledge, spirituality and aesthetics within their natural surroundings. But it is not only 'ecosystem people' who are dependent on the natural environment. It is all humans, even the rich urban resident in Paris or Washington who may be under the delusion that s/he is buffered by the props of modern technology. In the growing cities of the industrializing world, millions of residents of all classes are now prone to lung and skin diseases, water-borne illnesses, and congenital abnormalities from toxics in their food and water, some of which may have originated hundreds of kilometers away.

The Public Trust Doctrine perseveres as a value system and an ethic as its expression in law mutates and evolves. More recently, scholars, activists, and lawyers have begun discussing the rights of people to access and enjoy various essential resources and service the Earth so generously yields. The spreading notion of "Environmental Human Rights" expresses the same persistent notion that sometimes, for some resources and in some places, it is immoral and illegal for private parties to arrogate what the Earth provides freely and what is necessary for human health and happiness.

Keywords: Environment, Human, Nature, Public Trust, Rights,

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ABSTRACT

Kumar, D. (2012). Green Economy: An Action Oriented Agenda for Sustainable Development. In: Singh, P. (Ed.) Environment and Sustainable Development: Issues and Challenges, pp. 38-53. Keshav Publication, Ghaziabad.

World has taken action orientated steps to incorporate green economic policies to attain sustainable development and this integration is termed as green economy. In this regard the role of international community is quite path breaking and deliberative one. The active initiatives were adopted by the soft law mechanism since Stockholm Declaration of 1972. Later on a series of conferences on Environment and Development from 1991 to 2012 focused on the goal of sustainable development and outcomes like Rio Declaration, Agenda 21 and the Future we want, also contains the conditionality's of green growth (economy). Various subsequent agreements and soft law principles like Johannesburg Plan of Action, Millennium Development Goals etc. also reaffirmed the relevancy of green economy. It has become a key organizing theme for the United Nations Conference on Sustainable Development (Rio+20) in Brazil, June 2012.

Therefore, there is the need, to consider carefully if, where and how policies aimed at encouraging a greener economy can better take account of the full range of justice impacts and prospects such a transition would generate. This paper is addressing the green economy as an action oriented agenda for the future to attain the goal of sustainable development. Analytical research method has been applied to complete this work.

Keywords: Action, Environment, Green Economy, Sustainable Development

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ABSTRACT

Kumar, D. (2013). Empowerment of Women for Sustainable Development. In: Tiwana, A. S. (Ed.), Declining Sex Ratio, pp.423-430. Mata Gujri College Press, Sri Fatehgarh Sahib, Punjab.

Women and environment are linked very closely through unseen bonds. Women play a significant and pivotal role in the daily interaction with ecological and natural resources. However, in spite of performing such vital responsibilities, they are often excluded intentionally or non-intentionally from taking important and leading roles in the community decisions pertaining to resource use, due to several impending factors including socio-legal, economical, cultural and religious blockades. Women's role and participation of decision making in management of environment is crucial to achieve without empowering them. Around the world, women are dependent on natural environment for their basic needs and hence are the worst surfers when the environment is degraded and deterioration of natural resources. The world community recognizes the role and importance of women community in the protection of environment and sustainable development. Here is the need to rethink and reframe the scene and unseen bonds of relationship of women with nature. The Women empowerment is required to achieve the goal of sustainability for the benefit of present and future generations.

This paper highlights the relationship of women with the nature and the role of this group in environmental protection and conservation of natural resources. The discussion revolves around the issues such as women's perspectives on the environment; the nature of their participation and their motivations to engage in environmental protection to achieve to goal of sustainable development; challenges encountered; approaches employed to address the challenging issues and the directions towards a successful way.

Keywords: Women, Environment, Empowerment, Sustainable development

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ABSTRACT

Kumar, D. and Kumar, K. (2012). Environmental Religious and Ethical Consciences. In: Ubha, D, S. (Ed.), Environmental Issues: Spiritual Solutions, pp. 78-89. GSSDGS Khalsa College Publication, Patiala.

Degradation of environment and deterioration of natural resources have added various serious problems at International, Regional and National level. These problem are not new for the human beings but as old as is human civilisation. The references available for the management of environment in old holy religious scriptures show the evidences of these problems were also in old time. The Hindu religion is an ancient living religion has a very good system to solve the problem of environment pollution in a very systematic way and work on the principle of ethics. Ethical values have been used as a vital source and as tools for the management and regulate human behaviour towards environment. Being a wise and social animal human has achieved the growth on one hand with the help of science and technology and created various problems for him. The above affairs, leads to the directions and necessity of environmental ethics for environment management is reduplicated. The following paper has been focused on role of Hindu religious and ethical conscience in environmental management.

Keywords:- Environment, Ethics, Hindu Religion, Management, Sustainability

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ABSTRACT

Kumar, D. Kommi, N. D. Chebolu, R. Garg, S. K. **Kumar, R.** and Chakraborti, A. K. (2013). Selectivity control during the synthesis of 1,2-disubstituted benzimidazoles and mechanistic insight to rationalize selectivity. *RSC Advances* **3** (1), 91-98.

Selectivity control during the formation of 1,2-disubstituted benzimidazoles has been achieved for the reaction of o-phenylenediamine with aldehydes in the presence of solid supported protic acids as catalysts and choosing an appropriate reaction medium. Perchloric acid adsorbed on silica-gel (HClO₄-SiO₂) was found to be the most effective catalyst system for the synthesis of 1,2-disubstituted benzimidazoles in EtOH at rt. Apart from the catalyst and solvent, the electronic and steric factors of the aldehyde and the electronic factor of the o-phenylenediamine are also significant contributory factors in dictating the selectivity. An understanding of the mechanistic course of the formation of the 1,2-disubstituted benzimidazoles has been outlined that would rationalise the origin of selectivity control under the set experimental parameters.

Keywords: Synthesis, Benzimidazoles, Selectivity

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ABSTRACT

Kumar, N. Nepali, K. Sapra, S. Bijjem, K. R. V. **Kumar, R.** Suri, O. P. and Dhar, K. L. (2011). Effect of nitrogen insertion on the antitussive properties of menthol and camphor. *Medicinal Chemistry Research* **21** (4), 531-537.

Aromatic vapours of monoterpenoids such as menthol and camphor are known to possess antitussive effects for the symptomatic relief of upper respiratory tract. The lactams 10 and 11 of menthol and camphor respectively, have been synthesised and evaluated first time for their antitussive activity in citric acid induced cough in guinea pig model. The effect of nitrogen insertion in the chemical architecture of menthol and camphor on the antitussive activity was reflected by the significant decrease of the cough frequency and increase in the cough latency exhibited by aerosolised 10 and 11. Prior exposure of aerolsolised 10 for 5 minutes at different concentrations (15 µg/L, 30 µg/L and 60 µg/L) significantly reduced cough response induced by citric acid and also increased latency to initial cough response. Similarly 11 has showed greater inhibitory cough response in comparison to camphor at

concentrations such as 125 µg/L, 250 µg/L and 500 µg/L. However latency to initial cough response was only increased at the concentrations of 250 µg/L and 500 µg/L.

Keywords: Antitussive agents, Menthol, Camphor, Lactams

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ABSTRACT

Kumar, R. (2011). Bhagat sain ki vani mein guru avem satsang ka mahatav. *Shabad Sarokar* 3: 48-50.

सारांश : गुरु का स्थान कबीर ने ईश्वर से भी ऊँचा माना जो ईश्वर के मिलन में सर्वाधिक महत्त्वपूर्ण भूमिका निभाता है, वह अनेक मार्गों से अनेक रूपों में ईश्वर का साक्षात् करवाता है। निर्गुण और सगुण सभी ने गुरु को किसी न किसी रूप में अपने साहित्य में स्थान दिया है। जहां ज्ञानमार्गी संतों एवं भक्तों ने गुरु के रूप में इन्सान को स्थान दिया वहीं प्रेममार्गी कवियों के लिए गुरु का इन्सान होना कोई आवश्यक बाधा नहीं था वह कोई पक्षी भी हो सकता है जो व्यक्ति को अपने लक्ष्य की ओर आगे बढ़ने के लिए प्रेरित करता है। इस संबंध में यह स्पष्टतः कहा जा सकता है कि भक्त सैन रामानंद के शिष्य थे। रामानंद अपने समय के सबसे प्रसिद्ध संत थे और उनकी शिष्य मंडली की चर्चा भी विद्वानों द्वारा की जाती है। अतः सैन पर अपने गुरु के व्यक्तित्व और उनके सत्संग दोनों का ही प्रभाव पड़ा जिसकी अभिव्यक्ति उनके साहित्य में होती है। सैन का मानना है कि सत्संग में जाकर ही वास्तविक स्थिति का बोध होता है। सैन की वाणी गुरु महिमा और सत्संग महिमा की वाणी है। अंधकारपूर्ण युग को सच्चा मार्ग सच्चे गुरु द्वारा ही दिखाया जा सकता है और सत्संग के द्वारा ही जन मानस को सामाजिक रूढ़ियों और आडंबरों से मुक्त करवाया जा सकता है। सैन ने अपना संपूर्ण जीवन जन कल्याण को अर्पित कर दिया। उनके व्यक्तित्व और वाणी से प्रभावित होकर ही पंचम गुरु श्री गुरु अर्जुन देव ने भक्त सैन की वाणी को 'आदि ग्रंथ' (श्री गुरु ग्रंथ साहिब) में संकलित कर उन्हें गौरान्वित किया।

सूचितशब्द: भक्त सैन, वाणी, गुरु, सत्संग, ईश्वर, भक्ति, सामाजिक बुराइयां, सुधार

Kabir has placed Guru on a high pedestal because he plays an important role to meet God. He reveals the actual image of God through various ways. Sagun and Nirgun both have accepted the importance of Guru in various forms. While preachers personify Guru in man but romantic poets personify Guru not only in man but in nature like birds. They assume that anything can be termed as Guru which encourages man towards his goals. In this context, it can be said the Bhagat Sain is the disciple of Ramanada. Ramanada is the one of prominent saints of his time and his disciples were also acknowledged by the eminent scholars. Sain has been influenced by his Guru's conduct and discourse which have been reflected in his literature. Sain asserts that one can attain real knowledge by attending religious discourses. His teachings describe the importance of Guru and religious lectures. True path can be revealed to a gloomy conscience only by a Guru and with the help of religious lectures society can be liberated from social evils and superstitions. Sen has devoted his whole life for the upliftment of society. Fifth Guru Shri Arjun Dev ji, influenced by Sain's persona and ethical discourse, has incorporated his Bani into "Adi Granth" (Shri Guru Granth Sahib).

Keywords: Bhagat Sain, Vani, Guru, Satsang, God, Bhakti, Social Evils, Reforms

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ABSTRACT

Kumar, R. (2011). Bhagat sain: Jiwan va sahitya ka mulyankan. *Shabad Sarokar* 31: 31-35.

सारांश : कबीर, गुरु नानक, रविदास, नामदेव आदि अनेक संतों और भक्तों ने भारतीय समाज और साहित्य पर अपनी अमिट छाप अंकित की है। इन संतों और भक्तों की प्रसिद्धि का आधार भक्ति था, भक्ति की धारा जिसकी उत्पत्ति दक्षिण भारत से मानी जाती है, के महाराष्ट्र पड़ाव के उपरान्त अगला पड़ाव उत्तर भारत था। उत्तर भारत में भक्ति की यह धारा अत्यंत व्यापक रूप में फैली। सगुण और निर्गुण दोनों ही रूपों में इसका विकास और प्रसार हुआ। उत्तर भारत में इसके विस्तार का श्रेय रामानंद के 12 शिष्यों को दिया जाता है। हिंदी साहित्य में इन 12 शिष्यों का नामोल्लेख भी किया जाता है। इन्हीं बारह शिष्यों में भक्त सैन भी थे। भक्त सैन की प्रमाणिकता का आधार श्री

गुरु ग्रंथ साहिब में उपलब्ध उनकी वाणी है। पंचम गुरु श्री गुरु अर्जुन देव जी ने जिन महान संतों और भक्तों की वाणी को आदि ग्रंथ में संकलित किया उनमें भक्त सैन को स्थान देकर उन्होंने भक्त सैन के महत्त्व को स्वतः सिद्ध कर दिया। परंतु खेद का विषय है कि साहित्य के मर्मज्ञों की दृष्टि से इस महान भक्त का जीवन और साहित्य ओझल रहा। उचित शोध के अभाव के परिणामस्वरूप सैन साहित्यिक दृष्टि से एक प्रकार से उपेक्षित भक्तों की कोटि में शामिल हो गये।

सूक्तिशब्द: संत, भक्ति, साहित्य, गुरु, सैन, रामानंद, आंदोलन, सगुण, निर्गुण

Saints and mystics like Kabir, Guru Nanak, Ravidas, Namdev have an imperishable impact on Indian society and Literature. They have carved a niche for themselves in the social order due to their Bhakti (spiritual nature) which was at first initiated in South India and then moved to North India via Maharashtra. This Bhakti movement in both its forms Sagun and Nirgun, spread very widely in North India. The credit for this development goes to twelve disciples of Ramananda. All these disciples are greatly recognized in Hindi Literature. Bhagat Sain was one of these disciples. The basis of the authenticity of Bhagat Sain is his literature included in Sri Guru Granth Sahib. His significance has been acclaimed by fifth guru Shri Guru Arjun Dev Ji by including his name in the category of those eminent saints who have given their bani in the eternal Granth. But it's a matter of profound sorrow that Sain's life and literary works have not been recognized by literary scholars. This becomes the reason that he has been included in the category of abandoned saints.

Keywords: Saint, Bhakti, Literature, Guru, Sain, Ramanand, Movement, Sagun, Nirgun

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ABSTRACT

Kumar, R. (2011). Hindi ke Anchalik Upnyas : Dharmik suptata se chetanta tak. *Chintan Srijan 3*: 56-63.

सारांश : धर्म का मनुष्य से चिरंतन संबंध रहा है। भारतीय संदर्भ में प्राचीन गुफाओं की चित्रकारी में देवी देवताओं के चित्र इसी परिकल्पना की आदिम अभिव्यक्ति है। हड़प्पा सभ्यता में मात देवी और पशुपति नाथ की पूजा का साक्ष्य यह सिद्ध करता है कि मानव ने उस समय तक दैवीय संकल्पनाओं को पूर्णतः अपना लिया था। वैदिक युग की कबिलाई व्यवस्था में इहलौकिक जीवन को समृद्ध करने वाले देवी देवताओं की पूजा होने लगी। संभवतः यही कारण है कि इहलोक के देवता इन्द्र की सर्वाधिक स्तुति हुई। उत्तरवैदिक काल तक आते आते कबिलायी अर्थ व्यवस्था का रूपांतरण कृषि अर्थ व्यवस्था में होने लगा, उत्पादन अधिशेष ने धार्मिक संस्थाओं का मार्ग प्रशस्त किया, यज्ञादि में कर्मकाण्ड की भूमिका बढ़ती गयी परिणामतः ब्राह्मण वर्ग का समाज पर वर्चस्व कायम होने लगा। हिन्दी के आंचलिक उपन्यासों में भारतीय ग्रामीण अंचलों में प्रचलित धर्म संबंधी विश्वासों, आस्थाओं, मान्यताओं अंधविश्वासों एवं विविध धर्मों तथा उनके पारस्परिक संबंधों का चित्रण मिलता है। आंचलिक उपन्यास जनमानस की उस सोयी हुई चेतना की अभिव्यक्ति है जो उन्हें धार्मिक अंधविश्वास से बाहर निकलने का मार्ग दिखाती है। उन्हें सच और झूठ का अंतर स्पष्ट करवाती है जिसके परिणामस्वरूप उन्हें धर्म और आडम्बर दोनों में विभाजक रेखा स्पष्ट दिखायी देने लगी है। मेरीगंज से चली यह चेतना अभी तक अपने मार्ग में ही है और इसका ध्येय संपूर्ण भारतीय जनमानस को धार्मिक शोषण चक्र से मुक्त करवाकर समाज में मानवीय मूल्यों की स्थापना करना है।

सूक्तिशब्द: धर्म, उपन्यास, पिछड़ापन, चेतना, शिक्षा, विकास, अंधविश्वास, नैतिक मूल्यए

Religion has a primordial relation with man. The pictures of deities in the ancient caves are the perfect illustration of this relation. In Haddapa civilization, the reference to goddess Devi and Pashupati Nath proves that man had completely accepted the imaginary existence of deities at that time. In the Vedic period, those supernatural powers were worshipped by people who were responsible for the nourishment of community. This becomes the major reason for the esteemed position of Indra. In the post Vedic period, the tribal economy has been transferred into rural economy, production sources have exposed ways to the institutions of religion, and religious sacrifices have been increased. As a result of these elements, Brahmanic rituals got prominent place in society. Hindi regional novels have portrayed the popular rural religious beliefs, customs, and superstitions. Regional novels demonstrate the right way to people blind folded by religious superstitions. These novels portray the difference between right and

wrong which is helpful for them to see the divergence between religious convictions and false notions. This conscious movement which begins from Mariganj is still in the process and the main objective of this movement is to develop moral values in society by demolishing fake religious convictions.

Keywords: Religion, Novel, Backwardness, Consciousness, Education, Development, Superstitions, Moral values

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ABSTRACT

Kumar, R. (2011). Hindi ke anchalik upnyaso mein nari jivan se sambandhit samsyayen. *Punjab Sorabh, Bhasha Vibhag* 3: 48-55.

सारांश : भारतीय समाज में नारी की स्थिति एक अत्यंत चर्चित और वैचारिक मुद्दे के रूप में यदा कदा सामने आती रहती है। एक विचारधारा के लोग जहां नारी शोषण और मुक्ति के नाम पर अपने अस्तित्व को बनाए रखने के लिए प्रयासरत हैं वहीं दूसरी ओर नारी के आदर्शिकरण की आड़ में उसका शोषण कर अपने स्वार्थों की पूर्ति करने वाली विचारधारा के पोषक के रूप में अपने दायित्व का निर्वहन कर रहे हैं। दूसरी विचारधारा वाले लोग जहां पुरातन भारतीय साहित्य का संदर्भ देकर नारी को देवी सिद्ध करने पर आमादा हैं वहीं पहली विचारधारा के समर्थक भारतीय साहित्य का संदर्भ देकर नारी की प्रताड़ित और दीनहीन स्थिति सिद्ध करना अपनी सार्थकता समझते हैं। नारी को किसी ने भी मानवीय रूप में समझने का प्रयास नहीं किया। एक ने उसके अब तक पशुवत व्यतीत हुए जीवन को दिखाया है वहीं दूसरे ने उसके देवत्व की आड़ में उसके शोषण को छिपाने का प्रयास किया। ऐसे ही अनेक बिन्दुओं से स्त्री विमर्श लगातार मंथन करते हुए रत्न प्राप्त करने का प्रयास कर रहा है। आंचलिक उपन्यासों के माध्यम से देश के विभिन्न अंचलों से नारी के शोषण को प्रकट किया गया है। नारी के इस शोषण के पीछे प्रमुख रूप से दो कारण सक्रिय रहे हैं। पहला कारण है कि समाज का दबाव। नारी पर ऐसे सामाजिक प्रतिबंध लगाए गए जिनसे उसकी स्थिति अत्यंत कमजोर होती गयी। दूसरा कारण स्वयं नारी ही है जिसने अपने धार्मिक विश्वासों के चलते स्वयं को कमजोर और पुरुष पर आश्रित मान लिया। पुरुष ने नारी की इस मानसिकता का भरपूर लाभ उठाया और निरंतर उस पर अपना प्रभाव बढ़ाता रहा। जिसकारण अपनी वर्तमान स्थिति को नारी ने अपनी नियति मानकर उससे समझौता कर लिया।

सूचितशब्द: स्त्री, समाज, पितृसत्ता, उपन्यास, समस्याएं, सामाजिक, पराधीनता

The place of women has always been discussed as a burning topic in Indian society. On one hand, some people of similar ideology try to formulate their existence by involving themselves in the discussions about the exploitation and freedom for women but on the other hand, others are engaged to satisfy their own egocentric motives by idealising women in terms of idyllic personalities. While the persons of second category, by giving illustrations from ancient Indian literature, pay heed to prove women as idols (Devis), persons of first category feel themselves superior by proving females as the weaker, marginalised sections of the society. Actually no one tries to understand woman as a human being. One has portrayed her deprived life and other has tried to hide her sufferings by depicting her as a divine figure. With these illustrations, discourses on women's issues have been trying to get better insights. With the help of regional novels, the subordinate position of women has been portrayed all over the country. There are two main reasons which are responsible for this subordination. The first one is the patriarchal ideology which has imposed so many taboos, restrictions on women which has resulted in making their situations wretched in society. The other one is the female herself who regards herself inferior to male and this ideology has been used by males to impose their will on them. As a result of this, women compromise with this present pathetic condition by regarding it as their fate.

Keywords: Women, Society, Patriarchy, Novel, Problems, Social, Subordination

Kumar, R. (2012). Anchalik upnyas aur daWtv'unarsh. *Hashiye ki Awaz* 2: 28-31

सारांश : हिन्दी उपन्यास में आज विविध विमर्श का बाज़ार अपने चरम पर है। अर्थ व्यवस्था की मांग और पूर्ति के नियम के अनुसार ही अब साहित्यकार भी इन विमर्शों से संबद्ध लिखना ही अधिक उपयोगी समझते हैं। समीक्षक और आलोचक भी अपनी पहचान बनाने के लिए किसी न किसी विमर्श के साथ संबद्ध होकर लिख रहे हैं। सहानुभूति और स्वानुभूति दोनों आधारों पर इन विमर्शों की चर्चा होती है। दलित विमर्श इनमें महत्वपूर्ण होने के साथ साथ विवादों से घिरा हुआ भी है। हिन्दी के आंचलिक उपन्यास दलित विमर्श के प्रमुख मुद्दों से संबद्ध हैं। ये मुद्दे हैं— जाति के नाम पर होने वाला भेदभाव और पशुवत व्यवहार, सामाजिक व आर्थिक शोषण, दलित स्त्रियों का यौन शोषण और दलितों पर होने वाला अमानवीय अत्याचार। आंचलिक उपन्यासों में इन मुद्दों को लेकर गंभीर चर्चा देखने को मिलती है। आंचलिक उपन्यास दलितों के साथ होने वाले सामाजिक भेदभाव, आर्थिक शोषण, अमानवीय अत्याचार और उनमें उत्पन्न हुई चेतना को प्रकट करते हैं। निःसंदेह दलित विमर्श के अध्ययन के लिए आंचलिक उपन्यास एक विस्तृत पटल प्रस्तुत करते हैं जो लेखक, पाठक और समीक्षक तीनों वर्गों के लिए नवीन विचार और चर्चा का आधार उपलब्ध करवाते हैं।

सूक्तिशब्द: दलित, आंचलिक उपन्यास, सामाजिक भेदभाव, आर्थिक शोषण, उत्पीड़न, मुद्दा, चर्चा

In the novels of Hindi Language, various discourses are discussed now a day. According to the economic law of demand and supply, the scholars of contemporary age regard it worthwhile to write on prevalent discourses. Analysts and critics, in an endeavor to create their own space and identity, try to write by taking the side of these discourses. These discourses are argued in both sympathetic and empathetic manner. Dalit discourse is not only important among these discourses but also hemmed in so many controversies. The regional novels of Hindi language give voice to various issues of dalits such as discriminatory and beast-like behaviour on the basis of caste, socio-economic exploitation, sexual exploitation of dalit women and atrocities done to dalits. A serious discussion on these issues is represented in the regional novels of Hindi language. There is no doubt that regional novels give birth to various new discussions on burning issue of dalit discrimination for author, reader and critics.

Keywords: Dalit, Regional Novel, Social Discrimination, Economic Exploitation, Harashment, Issues, Discussion

Kumar, R. (2012). Bhagat sain ki vani mein Ishwar ki samkalpna. *Shabad Sarokar* 34: 28-30.

सारांश : रामानंद के शिष्य निर्गुण भक्ति का प्रसार कर रहे थे, वहीं भक्त सैन कृष्ण भक्ति धारा का प्रसार कर रहे थे। सैन के आराध्य साकार कृष्ण थे अथवा निराकार कृष्ण, इस संबंध में कुछ भी कहना संभव नहीं है। क्योंकि अनेक स्थानों पर भक्त सैन निराकार रहस्यवाद प्रकट करने लगते हैं वहीं अनेक स्थानों पर स्पष्टतः कृष्ण भक्ति के अवलंब को भी प्रकट करते हैं। परंतु भक्त सैन की भक्ति भावना को किसी एक विचारधारा के साथ बांधकर प्रस्तुत करना स्वयं भक्त सैन और उनकी भक्ति के साथ अन्याय होगा। अतः उनकी वाणी में ईश्वर के सभी पक्षों पर विचार करना ही अधिक संगत प्रतीत होता है। भक्त सैन का परमसत्ता में अगाध विश्वास था। वे ईश्वर को सभी रूपों में स्वीकार करते थे। उनका ईश्वर प्रेम निर्गुण अथवा सगुण किसी एक विचारधारा से बंधा हुआ नहीं था। वे जहां एक ओर निराकार ईश्वर विराट सत्ता का आनंद के साथ वर्णन करते हैं वहीं सगुण ईश्वर की भक्त वत्सलता को भी मुखरता के साथ अभिव्यक्त करते हैं। स्वयं अपने पर ईश्वर की अनंत कृपा को सैन ने महसूस किया था और उसकी निकटता को निरंतर प्राप्त करने के लिए प्रयत्नशील रहे। सैन की वाणी में ईश्वर के प्रति अथाह विश्वास, प्रेम और उसकी भक्त वत्सलता का भाव मिलता है। सैन ने अपनी वाणी के द्वारा ऐसे परम दयालु ईश्वर की प्राप्ति का उचित एवं सरल मार्ग जन सामान्य को दिखाया है। संसार में रहते हुए अपने गृहस्थ धर्म का पालन करते हुए अपने पारिवारिक और सामाजिक दायित्वों का निर्वहन करने के साथ साथ ईश्वर की भक्ति का एक उत्तम उदाहरण भक्त सैन ने अपने जीवन एवं वाणी के द्वारा प्रदान किया है।

सूक्तिशब्द: भक्त, ईश्वर, रामानंद, सैन, सगुण, निर्गुण, वाणी, समर्पण, गुरु

On one hand, disciples of Ramanada were propagating Nirgun Bhakti, on the other hand, Krishna Bhakti was spearheaded by Bhagat Sain. Sain was devoted to Lord Krishna but nothing can be properly said about this because at some places he talked about formless mysticism and at other places, he portrayed the image of Lord Krishna. This is the main reason that no one can bind his devotion to God in one particular ideology. His Bani incorporated all aspects of God as he had a firm faith on supernatural being. His devotion for God could not be attached with some ideology like Sagun or Nirgun. While on

one side, he talked about formless supernatural power; on other side he also revealed the everlasting love of Sagun God towards devotee. Sen himself had realized the blessings of God on himself. That's why his Bani reflected a lot of love, regard, faith towards God. Sain, through his Bani has shown an easy, simple and perfect way to common man to meet with God. He, through his Bani, gave a perfect example that one can meet with God while performing his familial and social responsibilities.

Keywords: Bhagat, God, Ramanand, Sain, Sagun, Nirgun, Vani, Devotion, Guru

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ABSTRACT

Kumar, R. (2012). *Bhaktikaleen dalit santan mein bhakt sain ka sathan. Hashiye ki Awaz* 8: 32-34.

सारांश : मध्यकालीन भारतीय जनमानस को आह्लादित करने और समाज में मानवीय मूल्यों को स्थापित करने के लिए संतों और भक्तों ने महत्त्वपूर्ण योगदान दिया। दक्षिण की भक्ति धारा और सूफियों की प्रेम धारा का मिलन स्थल उत्तर भारत बना। उत्तर भारत में भक्ति धारा का प्रचार प्रसार करने का श्रेय रामानंद एवं उनके 12 शिष्यों को दिया जाता है। रामानंद ने अपनी शिष्य परंपरा में अनंतनंद, भावनंद, धन्ना, कबीर, नाभा, नरहरयंदा, पीपा, रविदास, सैन, सुखानंद, रनका तथा तुलसीदास (यह रामचरित मानस लिखने वाले तुलसीदास नहीं हैं) आदि गैर ब्राह्मणों को दीक्षा प्रदान की। इनमें से कुछ संत और भक्त दलित समाज से संबंधित थे जिनमें से भक्त सैन एक विशेष नाम है। भक्तिकालीन साहित्य में दलित भक्तों का अपना विशेष स्थान रहा है। दलित भक्तों एवं संतों ने तत्कालीन परिवेश को अपने साहित्य एवं जीवन दोनों से ही प्रभावित किया। तथापि भारतीय वर्ण व्यवस्था ने इन दलित संतों एवं भक्तों के जीवन एवं साहित्य दोनों को ही उपेक्षित करने का प्रयास किया। परंतु उत्तरमध्यकालीन सिख गुरुओं ने और विशेषकर पंचम गुरु श्री गुरु अर्जुन देव ने इन दलित भक्तों एवं संतों के साहित्य के महत्त्व को समझते हुए इनकी वाणी को आदि ग्रंथ में शामिल किया। इस का लाभ यह हुआ कि इन संतों एवं भक्तों को प्रमाणिकता प्राप्त हो गयी और आधुनिक काल में इन दलित संतों के साहित्य को मुख्य धारा स्थान प्राप्त हुआ। परंतु भक्त सैन का साहित्य अभी भी प्रकाश में नहीं आ सका है। इस दिशा में कार्य जारी है। यह उम्मीद की जाती है कि भक्त सैन की वाणी पर भविष्य में होने वाली शोध से अनेक नवीन तथ्य सामने आएंगे जो समाज के लिए कल्याणपरक होंगे।

सूक्तिशब्द: दलित, संत, भक्ति, सैन, आंदोलन, भेदभाव, आवाज़, जागृति

Saints and mystics have played an important role to create moral values in society. North India happened to be the center place of Bhakti movement of South and Romantic movement of Sufis. The credit for the development of Bhakti movement in North India goes to Ramananda and his twelve disciples. He took a very radical approach to teaching and preaching through the inclusion of the poor and the people of low castes like Bhavananda, Dhanna, kabir, Nabha, Narharyanda, Peepa, Ravidas, Sen, Sukhananda, Ranka, Tulsidas (not the writer of Ramcharit Mans). Some of these devotees and saints belonged to dalit class. Bhagat Sen is also one of these dalits. Dalit saints have carved a niche in Bhakti Literature. Dalit saints, through their ethical life-style and literary works, have spawned a significant impact on the contemporary socio-cultural set-up. But at the same time, the prevalent Varna system of Indian society tried to neglect the efforts of these saints. But post medieval Sikh Guru, especially Fifth Guru Shri Arjun Dev ji, influenced by the persona and ethical discourses of these dalit saints, has incorporated their Bani into "Adi Granth". As a result of this, these saints have been recognized all over the world even in the modern age. But the literature, produced by Bhagat Sain has still not been acquainted. The process is still going on for this. It can be assumed that the researches on Bhagat Sain's Bani would be helpful to create new insights which would be beneficial for the society.

Keywords: Dalit, Saint, Bhakti, Sain, Movement, Discrimination, Voice, Awareness

Kumar, R. (2012). Dalit Vimarsha ke aaine mein jeenkathi tatha anye kahaniyan. *Himprastha 1*: 54-56.

सारांश : पर्वतीय जीवन को केन्द्र में रखकर रचना करने वाले लेखकों में श्री एस.आर. हरनोट का प्रमुख स्थान है। श्री हरनोट उन लेखकों में से एक हैं जो किसी एक धारा से बंधकर नहीं लिखते। उनके लेखन में पर्वतीय जीवन की संस्कृति विविध रूपों में झलकती है। भूमण्डलीकरण के कारण पर्वतीय जीवन के बदलते समीकरण, दलित चेतना, स्त्री चेतना, सांस्कृतिक चित्रण आदि उनके रचना के महत्वपूर्ण बिन्दु हैं। श्री हरनोट का लेखन दलित चेतना को भी प्रखर अभिव्यक्ति प्रदान करता है। उनका कहानी संग्रह 'जीनकाठी तथा अन्य कहानियां' इस दृष्टि से अत्यंत महत्वपूर्ण है। इस कहानी संग्रह में कुल 9 कहानियां हैं यथा – जीनकाठी, मोबाइल, एम.डॉट.काम, रोबो, मां पढ़ती है, सवर्ण देवता दलित देवता, चश्मदीद, कालिख तथा देवताओं के बहाने। इन कहानियों में पर्वतीय जीवन की झांकी विविध रूपों में दिखाई पड़ती है। सांस्कृतिक जीवन की सुंदर अभिव्यक्ति, विविध लोक परंपराओं के विशद वर्णन, सामाजिक व्यवहार के व्यापक एवं हृदयग्राही चित्र, बदलते परिप्रेक्ष्य में बदलता सामाजिक तानाबाना आदि इन रचनाओं के मूल बिन्दु हैं। वहीं दलित लेखन में भी श्री हरनोट अपना एक विशेष स्थान रखते हैं। 'जीनकाठी तथा अन्य कहानियां' संग्रह में जीनकाठी, एम.डॉट.काम., सवर्ण देवता दलित देवता, चश्मदीद, देवताओं के बहाने आदि में लेखक ने दलित विमर्श के बुनियादी मुद्दों को बड़े करीब से स्पर्श किया है जो एक मार्मिक स्वानुभूति का प्रखर उदाहरण है। अतः विवेच्य कहानी संग्रह में इन कहानियों का दलित विमर्श के अंतर्गत मुल्यांकन इन बुनियादी मुद्दों के आलोक अधिक सारगर्भित सिद्ध हो सकता है।

सूक्तिशब्द: दलित विमर्श, कहानी, जीनकाठी, एस.आर.हरनोट, परंपरा, शोषण, भेदभाव, मुद्दे

Shri S. R. Harnote occupies an important place among those writers who compose their works by focusing on the lives of mountain people. Shri Harnote is among those writers who do not carve their works by confining themselves into single ideology. His creations reflect various cultural dimensions of the life of hilly people. Changing patterns of life of mountain people due to globalization, dalit awareness, woman enlightenment, cultural reflections are the predominant themes of his works. The works of Shri Harnote represent dalit consciousness. From this aspect, his collection of short stories Jeenkathi tatha anye Kahaniyan is very significant. This collection consists of nine stories that are "Jeenkathi," "Mobile," "M. Dot. Com," "Robo," "Maa Padhti Hain," "Swarn Devta Dalit Devta," "Chashmadeed," "Kalikh," "Devtaon ke Bahane." These stories reflect vivid picture of mountain life. Beautiful expression of cultural life, vivid description of diverse traditions, broad and touching portraits of social behavior, changing social patterns in altering situations are the prime aspects of these creations. Shri Harnot has also established himself as a significant writer in dalit writings. In stories, like "Jeenkathi," "M. Dot. Com," "Maa Padhti Hain," "Swarn Devta Dalit Devta," "Chashmadeed," "Devtaon ke Bahane" from his short story collection Jeenkathi tatha anye Kahaniya, Harnot has poignantly dealt with the crucial issues of dalit discourse which is a noteworthy example of his emotional sympathy with dalits. Thus the analysis and inclusion of dalit discourse in these stories of this collection would be significant for intense conclusions regarding these fundamental issues of dalits.

Keywords: Dalit discourse, Story, Jeenkathi, S. R. Harnot, Tradition, Exploitation, Discrimination, Issues

Kumar, R. (2012). Hindi ke Anchalik Upnyas Aur Andh Vishvas ki samkalpna. *Punjab Saurab 5*: 15-20.

सारांश : मानव की प्रकृति में भय किसी न किसी रूप में विद्यमान रहा है और मानव उस भय से त्राण पाने के लिए अनेक प्रकार के प्रयत्न भी समय समय पर करता रहा है। आदि मानव को पशुओं के अतिरिक्त प्राकृतिक शक्तियों यथा अग्नि, वर्षा, वायु, भूकम्प आदि का भय भी था। धीरे धीरे उसने पशुओं पर तो नियंत्रण प्राप्त कर लिया परंतु प्राकृतिक शक्तियों पर वह नियंत्रण पाने में उसे हजारों वर्ष लग गए। इसी समयांतराल में मानव ने अनेक दैवीय कल्पनाएं की जो समय के बीतने के साथ अंध विश्वास में परिगणित हो गयी। इस संबंध में डॉ. रामनिवास शर्मा का कथन विचारणीय है—“भावी और अदृश्य के प्रति उसके 'आदिम' मन में भय की प्रवृत्ति प्रखर होती है। आंचलिक उपन्यासों में अधिकांशतः लोक का तत्त्व विद्यमान है और लोकजीवन में अंधविश्वासों का पुट होने के कारण आंचलिक उपन्यासों में अंधविश्वास का उल्लेख मिलता है आंचलिक उपन्यासों में भारतीय जन मानस के उस पक्ष का चित्रण हुआ है जो सदियों से एक बीमार मानसिकता को ढोने को मजबूर था परंतु शिक्षा और चेतना के प्रसार ने उस जनमानस को सोचने के लिए विवश किया और वे रूढ़िवादिता की कंचुली को उतारकर फेंकने के लिए तत्पर दिखाई दिए।

सूक्तिशब्द: अंधविश्वास, धर्म, अज्ञानता, निर्क्षरता, पिछड़ापन, अंचल, उपन्यास

The existence of fear always remains in human mind in various forms and man keeps on trying to adopt numerous ways to remain aloof from it. Not only animals but natural disasters like fire, rain, wind, and earthquake also became a source of fear to tribal people. Gradually they have overpowered animals but it takes thousands of years to control natural disasters. During this period man has envisioned various divine imaginations which were converted into superstitions by the passing time. Dr. Ramniwas Sharma's statement is highly noteworthy regarding this theme, "Fear emerges from emotions and invisible instances in his unconscious mind." Regional novels mostly represent reality of life. The regional novels portray superstitions because of their utmost presence in the life of layman. Regional novels depict those aspects of Indian human nature which from centuries bear the burden of orthodox thinking but education and awareness have forced people to ponder over this issue and with this they are eager to throw their orthodox thoughts.

Keywords: Superstition, Religion, Ignorance, Illiteracy, Backwardness, Region, Novel

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ABSTRACT

Kumar, R. (2012). Hindi ke Anchalik Upnyas aur Punjab ka Yogdan. In: Rai, S. K. (Ed.) Ahindi Pradeshon mein rachit Hindi Sahitye Punjab ke vishesh sandarbh mein, pp. 209-219. Deepak Publishers, Jalandhar.

सारांश : हिंदी उपन्यास का वास्तविक आरंभ पंजाब की धरती से हुआ। आगे चलकर हिंदी उपन्यास अपने विविध पड़ावों को पार करता हुआ वर्तमान स्थिति में पहुँचा है। हिंदी उपन्यास की इस यात्रा में श्रद्धाराम फिल्लौरी, उपेन्द्रनाथ अशक, यशपाल, भीष्मसाहनी, देवेन्द्र सत्यार्थी, कृष्णा सोबती, जगदीश चंद्र, मोहन राकेश तथा मनमोहन सहगल आदि पंजाब की प्रमुख विभूतियों का अविस्मरणीय योगदान रहा है। स्वातंत्र्योत्तर हिंदी उपन्यास में 'मैला आंचल' के आगमन द्वारा फणीश्वरनाथ रेणु ने आंचलिक उपन्यास लेखन की परंपरा का श्री गणेश किया। पंजाब के लेखकों ने हिंदी उपन्यास की विविध धाराओं में उपन्यास लिखकर हिंदी जगत को अमूल्य साहित्यिक निधियां प्रदान की। आंचलिक परंपरा में भी पंजाब के लेखकों ने अपना नाम स्थापित किया। आंचलिक उपन्यास लेखन की दृष्टि से पंजाब के जगदीश चंद्र का 'धरती धन न अपना' अत्यंत महत्वपूर्ण आंचलिक उपन्यास है। हिंदी के विशुद्ध आंचलिक लेखन के सिद्धांत के अनुरूप 'धरती धन न अपना' एक बेजोड़ उपन्यास प्रमाणित होता है। पंजाब के होशियारपुर अंचल के सामाजिक सांस्कृतिक संदर्भ की विशुद्ध झांकी इस उपन्यास में देखने को मिलती है। इस अंचल की सामाजिक संस्थाओं, मान्यताओं, सामाजिक संबंधों, लोक जीवन, लोक विश्वासों, आर्थिक संबंधों, आर्थिक व्यवस्थाओं, लोक गीतों, लोक मुहावरों आदि का विशद चित्रण देखने को मिलता है। बदलते संदर्भों में बदलते संबंधों, आपसी टकराहट से आपसी सहयोग, शोषण से जागृति आदि सभी पक्षों का इस उपन्यास में बखूबी चित्रण देखने को मिलता है। यदि विशुद्ध आंचलिक उपन्यास परंपरा में कुछ चुनिन्दा उपन्यासों का नामोल्लेख करना हो तो उस में 'धरती धन न अपना' आगे की पंक्ति के उपन्यासों में गिना जाएगा।

सूचितशब्द: हिंदी उपन्यास, पंजाब का योगदान, आंचलिक, जगदीशचन्द्र, धरती धन न अपना

The novels of Hindi language have acquired their exact emergence from the land of Punjab. After crossing various phases Hindi novels have reached at its present stature. In this journey of Hindi novels eminent personalities of Punjab like, Sharda Ram Phillauri, Upendranath Ashk, Yeshpal, Bisham Sahni, Devendra Satyarthi, Krishna Sobti, Jagdish Chander, Mohan Rakesh and Manmohan etc. have made remarkable contribution. After independence, Phanishwar Nath Renu's *Maila Anchal* was accountable for the tradition of regional novel. Punjabi writers have also established their names in the regional novel's tradition. From the regional novel's point of view *Dharti Dhan Na Apna* by Jagdish Chander of Punjab is a very significant regional novel. According to pure regional writing principle of Hindi *Dharti Dhan Na Apna* has established itself as a matchless novel. This novel depicts the picture of socio-cultural context of Hoshiarpur region of Punjab. The novel is a vivid portrayal of the social institutions of this region, customs, social relations, life of layman, beliefs of people, economic relations, economic set ups, folk songs, folk idioms etc. Changing relations with changing situations, personal conflicts to personal bonding, awareness due to exploitation etc. are themes which are prominent in this novel. If we want to acknowledge some selected novels from the tradition of pure regional novel then *Dharti Dhan Na Apna* would be regarded among the foremost novels.

Keywords: Hindi Novel, Contribution of Punjab, Regional, Jagdish Chandra, Dharti Dhan Na Apna

Kumar, R. (2013). Sahitye mein hashiye ka samaj aur aadivasi vimarsha. *Hashiye ki Awaz* 3: 14-17.

सारांश : साहित्य में हाशिया शब्द उस समूह के लिए प्रयोग किया जाता है जो समूह स्वतंत्र रूप से शक्ति एवं संसाधनों का प्रयोग करने से वंचित है। संसाधनों के प्रयोग की दृष्टि से सामान्यतः दो समूह बनते हैं, एक है मुख्य धारा का वर्ग और इस वर्ग के लोग संसाधनों का स्वतंत्र रूप से प्रयोग करते हुए विकसित होते हैं, वहीं दूसरा वर्ग हाशिए का वर्ग है, जो संसाधनों एवं शक्ति से वंचित है। साहित्य में हाशिये के समाज की अभिव्यक्ति विविध विमर्शों के रूप में होती रहती है। हिंदी साहित्य में विविध विमर्शों का उद्भव और विकास इसी श्रृंखला की कड़ी है। साहित्य में दलित, स्त्री, आदिवासी, किसान आदि विविध रूपों से हाशिये के समाज के रूप में चित्रित होते रहे हैं। आदिवासी लेखन एवं आदिवासी आलोचना भी पिछले कुछ समय से आदिवासी जनजीवन की समस्याओं को चित्रित करने में सक्रिय भूमिका का निर्वहन कर रहे हैं। इस प्रकार के लेखन एवं आलोचना के द्वारा आदिवासी जनजीवन की बुनियादी समस्याओं को सामान्य पाठक वर्ग तक पहुँचाकर जहाँ एक ओर सामान्य जन को आदिवासियों की समस्याओं से अवगत करवाया जा रहा है वहीं दूसरी ओर आदिवासियों में चेतना का संचार कर उन्हें हर प्रकार के शोषण के विरुद्ध लामबद्ध होने के लिए भी प्रेरित किया जा रहा है। अतः साहित्य में हाशिये के समाज के रूप में आदिवासी विमर्श अत्यंत महत्वपूर्ण है। आदिवासी विमर्श साहित्य में हाशिये के समाज के रूप में आदिवासियों की पीड़ा की अभिव्यक्ति है। विकास के नाम पर आदिवासियों का विस्थापन एक गंभीर समस्या एवं चुनौती है।

सूक्तिशब्द: साहित्य, हाशिया, दलित, स्त्री, जनजाति, विकास, संसाधन, शोषण, चेतना

In literature the word margin is used for that group which is prohibited to use power and resources in an independent manner. Generally on the basis of use of resources there are two classes, the first is the high class and people of this class develop themselves by independently using resources on the other hand second class is of marginalized people who remain aloof from power and resources. Different discourses of literature cover various expressions of marginalized society. The origin and development of different discourses in Hindi literature are also a part of this chain. Dalit, woman, peasant and tribals reflect marginalized society in literature. From a long period tribal writings and tribal criticism play an active role in depicting problems of tribals' lives. These writings and criticism on fundamental problems of tribals not only help in introducing the tribulations of tribals to common readers but also help in awakening the tribals and preparing them for revolt against their exploitation. Thus tribal discourse of marginalized society is very significant in literature. The relocation of tribals in the name of development is a serious problem and a challenge.

Keywords: Literature, Margin, Dalit, Female, Tribes, Development, Resources, Exploitation, Counciousness

Kumar, R. (ed.) (2011). *Hindi upnyas ka naya daur*. Lokgeet Parkashan, Chandigarh.

सारांश : प्रेमचंद के लेखन ने हिन्दी उपन्यास में विमर्श का नया युग आरंभ किया। प्रेमचंद ने निम्न मध्यवर्गीय पात्रों को अपने उपन्यास में नायक और नायिका के रूप में स्थान देकर अनेक नए प्रश्न साहित्यिक जगत् के समक्ष प्रस्तुत कर दिए। उनके पात्र सामाजिक और आर्थिक विषमताओं से घिरे होने के साथ साथ राजनीतिक उपेक्षा से भी ग्रस्त दिखाई पड़े। कहानियों की भांति प्रेमचंद ने उपन्यास में भी दलित, स्त्री और ग्रामीण परिवेश की समस्याओं को बखूबी प्रकट किया। उनके पश्चात् हिन्दी उपन्यास में यही प्रश्न अलग अलग विचारधाराओं और विमर्श के रूप में सामने आये। प्रेमचंदोत्तर हिन्दी उपन्यास में अनेक विमर्श चर्चा का विषय बने और अनेक नवीन स्थापनाओं का आधार तैयार हुआ। विवेच्य पुस्तक में इसी श्रृंखला से जुड़े हुए विमर्शों पर चर्चा करने का प्रयास किया गया है जो हिन्दी उपन्यास के इस दौर को अलग अलग रूपों में प्रतिनिधित्व प्रदान करने का सराहनीय प्रयास करते हैं। 20वीं शताब्दी का अंतिम दशक हिन्दी उपन्यास लेखन के लिए सर्वाधिक महत्वपूर्ण माना जाता है क्योंकि इस दशक में हिन्दी उपन्यास का नया दौर आरंभ हुआ। यह दौर था, स्त्री विमर्श और दलित विमर्श पर चर्चा का। इन विमर्शों ने जहाँ एक ओर साहित्य में नवीन चर्चा का माहौल गर्म किया वहीं दूसरी ओर नवीन मुद्दे भी पाठक जगत के समक्ष आए। इन विमर्शों की परंपरा और पृष्ठभूमि को उपन्यासों में खोजने का कार्य करने के साथ साथ कुछ अनुत्तरित प्रश्न पाठकों के समक्ष रखे गये हैं।

सूक्तिशब्द: उपन्यास, दौर, विविध विमर्श, स्त्री, दलित, चर्चा

Writings of Premchand has created a new era in the discourse of Hindi novels. Premchand, through his fictional writings, has raised various new questions for literary world by presenting the characters of

middle class as major protagonists of his novels. Despite social and economic differences, his characters also face a lot of political denigration. Like his short story writings, Premchand in his novels, has also depicted the problems of Dalits, women and rural people. In the aftermath, this question has been talked about by various authors in different discourses. The themes of his creations became a major area of discourse which also became a base for new dimensions in Hindi literary world. This book tries to discuss these discourses of Hindi novels which represent the world of Hindi literature in different forms and this work has been critically appreciated by many critics. The last decade of twentieth century is regarded as the most important period of Hindi literature because this period became the base of beginning of modern period of Hindi literature. In this period, the major issues of discourses are feminism and Dalits. On the one hand, these discourses create an environment of new discussion in Hindi literary world and on the other new areas are also revealed to readers. Along with the tradition of the discussion of these discourses, new queries also arise before the readers.

Keywords: Novel, Era, Different Discourses, Gender, Dalits, Discussion

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ABSTRACT

Kumar, R. Darpan, Sharma, S. and Singh, R. (2011). Xanthine oxidase inhibitors: A patent survey. *Expert Opinion on Therapeutic Patatents* **21** (7), 1071-1108.

Xanthine oxidase inhibitors are currently under scrutiny as attractive targets for therapeutics including hyperuricaemia, gout, ulcer, cancer, ischemia, hypertension and oxidative damage. The fewer side effects of non-purine xanthine oxidase inhibitors, as compared to purine analogues, made them suitable for further research which is evidenced by the fact that many articles and patents are now being published on them in the research domain.

Keywords: Xanthine oxidase inhibitors, Gout, Febuxostat, Allopurinol, Patent survey

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ABSTRACT

Kumar, S. Bhanwara, R. K. Upadhyaya, H. D. and Nayyar, H. (2010). Chilling stress effects on reproductive growth in Chickpea. *Journal of SAT Agriculture Research* **8**. <http://ejournal.icrisat.org/Volume8/Chickpea_pigeonpea/Chilling_stress.pdf>

Chickpea is sensitive to chilling temperatures (<10°C), especially at its reproductive phase leading to floral abortion. The exact causes of reproductive failures are not fully understood. In the present study, we assessed the cold-induced damage to development and functioning of male and female components by growing an early flowering chickpea genotype ICCV 96029 under warm conditions of the glasshouse (control; average maximum and minimum temperature 28/15°C) as well as under cold conditions of the field (average maximum and minimum temperature 20/10°C during reproductive phase). Low temperature of the field environment restricted the vegetative growth and delayed all the phenological stages in comparison to control plants. Apart from this, it led to some vegetative aberrations like chlorosis, necrosis of leaf tips and curling of whole leaf. The damage to reproductive stage involved abscission of juvenile buds and flowers and abortion of pods. On the whole, pollen development at young microspore stage appeared to be severely affected in stressed conditions compared to the control conditions. Pollen viability was suppressed during stressed conditions (60%) compared to normal plants (95%). Stigma receptivity, in vivo pollen germination and pollen tube growth were inhibited in the stressed plants. Fluorescent studies showed that the stigma either did not show any pollen load or pollen

grains did not germinate on its surface in stressed plants. Even when the pollen grains germinated, the pollen tubes rarely grew beyond the proximal region of the style; mostly the pollen tubes were impaired in their growth and did not reach the ovules leading to failure in fertilization. The egg and secondary nucleus in such ovules ultimately disintegrated without fertilizing and hence no seed formation occurred.

Keywords: Chilling stress, Reproductive, Abortion chickpea

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ABSTRACT

Kumar, S. Gupta, D. and Nayyar, H. (2011). Comparative response of maize and rice genotypes to heat stress: status of oxidative stress and antioxidants. *Acta Physiologiae Plantarum* **34** (1), 75-86.

Abstract In the present study, two genotypes each of maize and rice were compared for their response to varying degrees of temperature stress (35/30, 40/35, 45/40°C) with controls growing at 30/25°C. At elevated temperatures of 40/35 and 45/40°C, the rice genotypes were inhibited to a significantly higher extent, especially for their shoot growth compared to maize genotypes. The stress injury measured as damage to membranes, loss of chlorophyll and reduction in leaf water status was significantly higher in rice plants, especially at 45/40°C. The components of oxidative stress particularly the level of malondialdehyde was significantly greater in rice plants while the differences for hydrogen peroxide concentrations were small at 40/35 and 45/40°C. The expression of enzymatic antioxidants like catalase, ascorbate peroxidase and glutathione reductase was found to be higher in maize plants compared to rice plants while no variations existed for superoxide dismutase at 45/40°C. In addition, the non-enzymatic antioxidants like ascorbic acid, glutathione and proline were maintained at significantly greater levels at 45/40°C in maize than in rice genotypes. These findings suggested that maize genotypes were able to retain their growth under high-temperature conditions partly due to their superior ability to cope up with oxidative damage by heat stress compared to rice genotypes. Since, maize and rice belong to C₄ and C₃ plant groups, respectively, these observations may also reflect the relative sensitivity of these plant groups to heat stress.

Keywords: High temperature, Maize, Oxidative stress, Rice.

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ABSTRACT

Kumar, S. Kaur, R. Kaur, N. Bhandhari, K. Kaushal, N. Gupta, K. Bains, T. S. and Nayyar, N. (2011). Heat-stress induced inhibition in growth and chlorosis in Mungbean (*Phaseolus aureus* Roxb.) is partly mitigated by ascorbic acid application and is related to reduction in oxidative stress. *Acta Physiologiae Plantarum* **33** (6), 2091-2101.

The rising temperatures ([35°C) are proving detrimental to summer-sown mungbean genotypes that experience inhibition of vegetative and reproductive growth. In the present study, the mungbean plants growing hydroponically at varying temperatures of 30/20°C (control), 35/25, 40/30, and 45/35°C (as day/night 12 h/12 h) with (50 µM) or without ascorbic acid (ASC) were investigated for effects on growth, membrane damage, chlorophyll loss, leaf water status, components of oxidative stress, and antioxidants. The ASC-treated plants showed significant improvement in germination and seedling growth especially at 40/30 and 45/35°C. The damage to membranes, loss of water, decrease in cellular respiration, and chlorophyll were significantly prevented by ASC treatment to plants growing at these temperatures. The oxidative stress measured as malondialdehyde and hydrogen peroxide content was observed to be significantly lower at high temperatures with ASC application. The activities of superoxide dismutase, catalase, ascorbate peroxidase, and glutathione reductase increased at 40/30°C but decreased at 45/35°C in the absence of ASC while with its application, the activities of these enzymes

were appreciably resorted. Among all the antioxidants, the endogenous ASC content decreased to the greatest extent at 45/35°C grown plants indicating its vital role in affecting the response of mungbean to heat stress. Exogenously applied ASC raised its endogenous content along with that of glutathione and proline at 45/35°C. The findings indicated that heat stress-induced inhibition in growth and chlorosis was associated with decrease in leaf water status and elevation of oxidative stress, which could partly be prevented by exogenous application of ASC. Its role in imparting protection against heat stress is discussed.

Keywords: Ascorbic acid, High temperature, Mungbean, Oxidative stress

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ABSTRACT

Kumar, S. Kaushal, N. Malik, J. A. Gaur, P. and Nayyar, H. (2013). Effect of varying high temperatures during reproductive growth on reproductive function, oxidative stress and seed yield in chickpea genotypes differing in heat sensitivity. *Archives of Agronomy and Soil Science* **59** (6), 823-843.

The mechanisms affecting the heat sensitivity of chickpea are largely unknown. Heat-tolerant (ICCV07110, ICCV92944) and heat-sensitive (ICC14183, ICC5912) chickpea genotypes were sown in February in the soil-filled pots. At the time of flowering, these were subjected to varying day/night temperatures of 30/20, 35/25, 40/30 and 45/35°C in the growth chambers (12 h light/12 h dark; light intensity, 250 $\mu\text{mol m}^{-2} \text{s}^{-1}$, 80% relative humidity). The pollen viability, pollen germination, tube growth, pollen load and stigma receptivity decreased with increases in temperatures to 45/35°C. The heat-tolerant genotypes experienced significantly less damage to pollen and stigma function. Membrane integrity, chlorophyll content, photochemical efficiency and cellular oxidizing ability were inhibited by the increase in temperature, with greater impacts on the sensitive genotypes. Oxidative injury as lipid peroxidation and hydrogen peroxide content was significantly greater in sensitive genotypes at 40/30 and 45/35°C. Enzymatic and non-enzymatic antioxidants showed increased levels at 40/30°C, but decreased considerably at 45/35°C. Heat-tolerant genotypes possessed greater activity of ascorbate peroxidase and glutathione reductase, along with higher levels of ascorbate and reduced glutathione at 40/30 and 45/35°C. Biomass, pod set and yield were not affected significantly at 35/25°C, but began to decrease at 40/30°C and were lowest at 45/35°C. The sensitive genotypes were not able to set any pods at 45/35°C, whereas the tolerant genotypes produced only few fertile pods at this temperature. It was concluded that heat stress leads to loss of pollen as well as stigma function and induces oxidative stress in the leaves that cause failure of fertilization and damage to the leaves, respectively.

Keywords: Chickpea, Heat stress, Reproductive function

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ABSTRACT

Kumar, S. Kaushal, N. Nayyar, H. and Gaur, P. (2012). Abscisic acid induces heat tolerance in chickpea (*Cicer arietinum* L.) seedlings by facilitated accumulation of osmoprotectants. *Acta Physiologiae Plantarum* **34** (5), 1651-1658.

The gradual rise of global temperature is of major concern for growth and development of crops. Chickpea (*Cicer arietinum* L.) is a heat-sensitive crop and hence experiences damage at its vegetative and reproductive stages. Abscisic acid (ABA), a stress-related hormone, is reported to confer heat tolerance, but its mechanism is not fully known, especially whether it involves osmolytes (such as proline, glycine betaine and trehalose) in its action or not. Osmolytes too have a vital role in saving the

plants from injurious effects of heat stress by multiple mechanisms. In the present study, we examined the interactive effects of ABA and osmolytes in chickpea plants grown hydroponically at varying temperatures of 30/25°C (control), 35/30, 40/35 and 45/40°C (as day/night (12 h/12 h)): (a) in the absence of ABA; (b) with ABA; and (c) in the presence of its biosynthetic inhibitor fluridone (FLU). The findings indicated severe growth inhibition at 45/40°C that was associated with drastic reduction in endogenous ABA and osmolytes compared to the unstressed plants suggesting a possible relationship between them. Exogenous application of ABA (2.5 µM) significantly mitigated the seedling growth at 40/35 and 45/40°C, while FLU application intensified the inhibition. The increase in growth by ABA at stressful temperature was associated with enhancement of endogenous levels of ABA and osmolytes, while this was suppressed by FLU. ABA-treated plants experienced much less oxidative damage measured as malondialdehyde and hydrogen peroxide contents. Exogenous application of proline, glycine betaine and trehalose (10 µM) also promoted the growth in heat-stressed plants and their action was not significantly affected with FLU application, suggesting that these osmolytes function downstream of ABA, mediating partially the protective effect of this hormone.

Keywords: Abscisic acid, High temperature, Chickpea, Osmolytes

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ABSTRACT

Kumar, S. Malik, J. Thakur, P. Kaistha, S. Sharma, K. D. Berger, J. D. and Nayyar, H. (2010). Growth and metabolic responses of contrasting chickpea (*Cicerarietinum* L.) genotypes to chilling stress at reproductive phase. *Acta Physiologiae Plantarum* **33** (3), 779-787.

Chilling stress (10°C) at reproductive phase of chickpea results in abortion of flowers and pods leading to poor yield. The metabolic causes associated with cold sensitivity of chickpea are not well understood. Hence, in the present study, we evaluated four chickpea genotypes (ICC 16348, ICC 16349, PBG1 and GPF2) having contrasting cold sensitivity for their reproductive growth and metabolism subjected to cold stress (average day temperature: 17.6°C; average night temperature: 4.9°C). Genotypes ICC 16348 and ICC 16349 showed flowering and set pods, while PBG1 and GPF2 failed to do so during the stress conditions indicating the former to be cold tolerant. The stress injury in the leaves such as increase in electrolyte leakage, decrease in chlorophyll content and relative leaf water content was significantly less in ICC 16348 and ICC 16349 genotypes. The analysis of carbohydrates indicated total sugars and starch to be present in greater content in ICC 16348 and ICC 16349 relative to PBG1 and GPF2 genotypes. The enzymes related to carbohydrate metabolism such as α -amylase, invertase and sucrose synthase showed significantly higher activity in the leaves of ICC 16348 and ICC 16349 compared to the other two genotypes. PBG1 and GPF2 genotypes experienced greater oxidative stress measured as malondialdehyde and hydrogen peroxide. ICCV 16348 and ICC 16349 possessed significantly higher levels of enzymatic (superoxide dismutase, catalase, ascorbate peroxidase) and non-enzymatic antioxidants (proline and ascorbic acid) relative to PBG1 and GPF2. Particularly, proline and ascorbic acid were markedly higher in cold-tolerant genotypes compared to the sensitive ones suggesting their deciding role in governing the cold tolerance.

Keywords: Chickpea, Chilling, Reproductive growth, Enzymes, Proline, Yield

Kumar, S. Singh, R. and Nayyar, H. (2013). α -Tocopherol Application Modulates the Response of Wheat (*Triticum aestivum* L.) Seedlings to Elevated Temperatures by Mitigation of Stress Injury and Enhancement of Antioxidants. *Journal of Plant Growth Regulation* **32** (2), 307-314.

Wheat seedlings (4 days old) were subjected to varying temperatures of 25, 30, and 35 °C for 7 days in a growth chamber under hydroponic conditions in the absence or presence of α -tocopherol (5 μ M). The growth of shoots and roots was inhibited severely at 35 °C. The endogenous α -tocopherol increased in the shoots at 30°C over the controls but decreased significantly at 35°C over the previous temperature. The exogenous application of α -tocopherol elevated the endogenous levels in the heat stressed plants, which were consequently able to maintain significantly greater growth associated with reduction in damage to membranes, cellular oxidizing ability, chlorophyll content, and photochemical efficiency in shoots. The relative leaf water content and stomatal conductance was not affected significantly with the application of tocopherol. The oxidative stress induced by high temperature (35°C) in terms of malondialdehyde and hydrogen peroxide contents was significantly lower in the presence of α -tocopherol. The enzymatic antioxidants such as superoxide dismutase, catalase, ascorbate peroxidase, and glutathione reductase showed considerable reduction in their activities at 35°C compared to those at 30°C, with greater effects on APX and GR. The nonenzymatic antioxidants like ascorbate, glutathione, and proline increased at 30°C but decreased appreciably at 35 °C, suggesting impairment in their synthesis at stressful temperatures. α -Tocopherol treated plants, especially those growing at 35°C, had improved levels of enzymatic and nonenzymatic antioxidants. These observations provided evidence about the involvement of α -tocopherol in governing heat sensitivity in wheat and suggested manipulation of its endogenous levels to induce heat tolerance in this crop.

Keywords: Heat stress, α -Tocopherol, Oxidative damage, Wheat

Kushwaha, S. Tripathi, D. N. Vikram, A. Ramarao, P. and Jena, G. B. (2010). Evaluation of multi-organ DNA damage by comet assay from 28 days repeated dose oral toxicity test in mice: a practical approach for test integration in regulatory toxicity testing. *Regulatory Toxicology and Pharmacology* **58** (1), 145-154.

The use of comet assay is not new in the evaluation of genotoxic potential of different agents; however, its broad use in product safety for regulatory testing is a relatively new approach. The present study was aimed to integrate genotoxicity tests (micronucleus and comet assay) in 28 days repeated dose oral toxicity of methotrexate (MTX) in mice. MTX was administered at the dose of 0.5, 1 and 2mg/kg per oral repeatedly for 28 days in mice. The endpoints of evaluation for routine toxicity testing included body weight, organ weight, food intake, water intake, hematology and histology, while for the genotoxicity testing micronucleus and comet assay were used. There were no significant changes in food intake, water intake and organ weight; however, the body weight significantly decreased at the highest dose of MTX treatment as compared to control group. Histological data revealed the morphological alterations in the liver and lung cells at the highest dose of MTX treatment. Micronucleus assay results indicated that the highest dose of MTX led to significant increase in MNERTs/1000ERTs ($P < 0.001$) as compared to control group. Further, percentage of reticulocytes (% RETs) was significantly decreased at the highest dose of MTX as compared to control group. Comet assay results indicate significant DNA damage in different organs induced by MTX as compared to control group. The results of the present study successfully demonstrates the integration of genotoxicity tests using comet and micronucleus assay in 28 days repeated dose oral toxicity test. Integration of genotoxicity test with routine toxicity test would reduce the cost of additional animals, test item and provide further information at an early stage of product development.

Keywords: Test integration, DNA damage, Comet assay, Micronucleus assay, Methotrexate, Mice

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ABSTRACT

Mahajan, S. Kaur, A. and **Singh, J. R.** (2011). Cytogenetic investigations in mentally challenged individuals. *International Journal of Human Genetics* **11** (2), 93-98.

Mental retardation means persistently slow learning of basic motor and language skills during childhood, and a significantly below-normal global intellectual capacity as an adult. Its incidence is found to be 2-3% worldwide. Chromosomal aberrations account for 15% of mentally retarded individuals. In the present report, 183 mentally challenged individuals were cytogenetically analyzed. Peripheral lymphocytes were cultured using standard methods with modifications and metaphases were analyzed using automated karyotyping programme. The chromosomal aberrations were seen in 32 cases of which 22 were males and 10 were females. Some of the chromosomal aberrations were, Yqh+, del Xq28, ring chromosomes, marker chromosomes, translocations, fragile sites on autosomes and X chromosome etc. Chromosomal anomalies were found in 15.8% cases and most of these were in microcephalic individuals. Thus cytogenetic investigations are important to screen cases with mental disability before proceeding to molecular/FISH analyses in these cases.

Keywords: Mental retardation, Chromosomal aberrations, Cytogenetic investigations, Chromosomal anomalies.

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ABSTRACT

Mahajan, S. Kaur, A. and **Singh, J. R.** (2012). Ring chromosome 22: A review of the literature and first report from India. *Balkan Journal of Medical Genetics* **15** (1), 55-60.

Ring chromosome 22 [r(22)], a rare cytogenetic finding, has been described in nearly 70 cases to date. Cytogenetic investigations were carried out on a 5-year-old male child with microcephaly and intellectual disability. Cytogenetic investigations re-vealed his karyotype to be 46,XY,r(22). To the best of our knowledge, this is the first report of an r(22) anomaly from India.

Keywords: Ring chromosome 22 [r(22)], Syndactyly, Intellectual disability

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ABSTRACT

Mantha, A. K. (2013). APE1: A Molecule of Focus with Neuroprotective and Anti-Cancer Properties. *Journal of Biotechnology Biomaterials* **3** (3), 1-4.

Apurinic/Apyrimidinic endonuclease (APE1) is a multi-functional, central enzyme of base excision repair (BER) pathway that takes care of oxidized base damage (AP sites and strand breaks) caused by both endogenous and exogenous oxidative DNA damaging agents. In repair function, APE1 exhibits majorly abasic (AP) endonuclease activity and stable interaction(s) with BER-pathway participant proteins. Second function of APE1 is redox activation of various transcription factors (TFs e.g., c-jun, NF-kB, p53 and HIF1 α) and also named as redox effector factor 1 (Ref-1). In redox function, APE1 reductively activates TFs involved in regulation of gene expression for cell survival mechanisms through stable pair-wise interaction(s). Recent studies have indicated that APE1 also possesses other distinct functions such as RNA metabolism, riboendonuclease activity and protein-protein interaction for maintaining cellular homeostasis. Altered APE1 expression has been reported in various cancers and neurodegenerative diseases. Taken together such findings advocates the necessity to delineate the underlying molecular mechanism(s) for understanding its role in various biological functions, that could be translated to its application in therapeutics against human diseases like cancer, neurodegenerative diseases and other pathologies such as cardiovascular diseases.

Keywords: DNA damage repair, Base Excision Repair, APE1, Ref-1, Anti-cancer, Alzheimer's disease, Neuro-protection.

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ABSTRACT

Mantha, A. K. Dhiman, M. Taglialatela, G. Perez-Polo, R. J. and Mitra, S. (2012). Proteomic Study of Amyloid beta (25-35) Peptide Exposure to Neuronal Cells: Impact on APE1/Ref-1's Protein-Protein Interaction. *Journal of Neuroscience Research* **90** (6), 1230-1239.

The genotoxic, extracellular accumulation of amyloid β ($A\beta$) protein and subsequent neuronal cell death are associated with Alzheimer's disease (AD). APE1/Ref-1, the predominant apurinic/aprimidinic (AP) endonuclease and essential in eukaryotic cells, plays a central role in the base excision repair (BER) pathway for repairing oxidized and alkylated bases and single-strand breaks (SSBs) in DNA. APE1/Ref-1 is also involved in the redox activation of several trans-acting factors (TFs) in various cell types, but little is known about its role in neuronal functions. There is emerging evidence for APE1/Ref-1's role in neuronal cells vulnerable in AD and other neurodegenerative disorders, as reflected in its nuclear accumulation in AD brains. An increase in APE1/Ref-1 has been shown to enhance neuronal survival after oxidative stress. To address whether APE1/Ref-1 level or its association with other proteins is responsible for this protective effect, we used 2-D proteomic analyses and identified cytoskeleton elements (i.e., tropomodulin 3, tropomyosin alpha-3 chain), enzymes involved in energy metabolism (i.e., pyruvate kinase M2, N-acetyl transferase, sulfotransferase 1c), proteins involved in stress response (i.e., leucine-rich and death domain, anti-NGF30), and heterogeneous nuclear ribonucleoprotein-H (hnRNP-H) as being associated with APE1/Ref-1 in $A\beta$ (25-35)-treated rat pheochromocytoma PC12 and human neuroblastoma SH-SY5Y cell lines, two common neuronal precursor lines used in $A\beta$ neurotoxicity studies. Because the levels of some of these proteins are affected in the brains of AD patients, our study suggests a neuroprotective role for APE1/Ref-1 via its association with those proteins and modulating their cellular functions during $A\beta$ -mediated neurotoxicity.

Keywords: Alzheimer's disease, $A\beta$ neurotoxicity, APE1/Ref-1, AP endonuclease 1, β amyloid, Neuroprotection, Base excision repair, Neurodegeneration, Oxidative DNA damage.

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ABSTRACT

Marino, T. Ramus, M. D. Cibis, W. G. Rowsey, J. J. Roy, (Sr.) H. Singh, D. **Singh, J. R.** Talevera, F. and Vanita, V. (2012). *Prenatal diagnosis for congenital malformations and genetic disorders*. <http://emedicine.medscape.com/article/1200683-overview>.

Congenital abnormalities account for 20-25% of perinatal deaths. Many genetic disorders can be detected early in pregnancy using various non-invasive and invasive techniques like, ultrasound, fetal echocardiography, MRI, radiography, embryoscopy, fetoscopy, amniocenters, CVS, RFLPs, SNPs, DASH, etc.

Keywords: Congenital abnormalities, Prenatal diagnosis, Genetic disorders, Amniocentesis, CVS, FISH, RFLP, SNP.

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ABSTRACT

Mishra, D. and **Dhanya, M. S.** (2012). Biofertilizers: As bioprotecting agents. *International Journal of Environmental Engineering and Management* **3** (5), 298-302.

The dependency of modern agriculture on the repeated usage of chemical fertilizers, insecticides, fungicides are leading towards the deterioration of soil health and environment. Biofertilizers are nothing but preparation containing beneficial microorganisms that helps in increasing availability of nutrients for crops thereby increasing soil fertility. Along this they can also act as antagonists and helps in

suppressing the incidence of soil borne plant pathogens and thus, help in the bio-control of various diseases. The rhizospheric microbial community is found as potential biological control agent due to its ability to colonize rhizosphere and protect plants against a wide range of important agronomic diseases such as black root-rot of tobacco, root-rot of pea, root-rot of wheat, damping-off of sugar beet and there is the prospects of genetically manipulating of the producer organisms to improve the efficacy of these biocontrol agents. The increased production and activity of phenolic and phytoalexin compounds due to Arbuscular Mycorrhizal (AM) inoculation considerably increases the defense mechanism, there by imparts the resistance to plants. A wide range of microbial community helps in control of various plant pathogens and degradation of various xenobiotics. They are capable of producing a diversity of different types of antibiotics compounds such as pyrrolnitrin, pyoluteorin, tropolone, pyocyanin, phenazines, 2,4-diacetylphloroglucinol and siderophores, hydrogen cyanide which helps in killing of pathogens and maintaining soil health. The plant growth promoting rhizobacteria (PGPR) strains may act as inducer of systemic resistance in the host plant leading to the control of several pathogens. The mycorrhizal association with some trees helps in the development of resistance against insect attacks. Few endophytes also have biocontrol properties to inhibit pathogen infection within the host via antibiosis, competition, mycoparasitism, inducing resistance to the host plant or by producing bioactive secondary metabolites. Thus the paper focuses on the usage and exploration of biofertilizers as bioprotectants for controlling of soil borne pathogens and xenobiotics for sustainable agriculture.

Keywords: Biofertilizers, Biocontrol, Bioprotectants, Soil fertility, Plant pathogen

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ABSTRACT

Mittal, S. Kaur, G. and Vishwakarma, G. S. (2013). Effects of Environmental Pesticides on the Health of Rural Communities in the Malwa Region of Punjab (India): A Review. *Human and Ecological Risk Assessment*, DOI: 10.1080/10807039.2013.788972.

The Malwa, India, is facing an unprecedented crisis of environmental health linked to indiscriminate, excessive, and unsafe use of pesticides, fertilizers, and poor groundwater quality. The region has been described as India's 'cancer capital' due to abnormally high number of cancer cases, which have increased 3-fold in the last 10 years. Studies of this region have also highlighted a sharp increase in many other pesticide-related diseases, such as mental retardation and reproductive disorders. The most affected individuals are the agricultural workers who are directly exposed to pesticides. The Malwa region of Punjab, India, is less than 15% of the total area of Punjab (only 0.5% of the total geographical area of India), but it consumes nearly 75% of the total pesticides used in Punjab. The high use of pesticides, along with environmental and social factors, is responsible for the high concentration of pesticide residues in the food chain of this region. Moreover, many banned and restricted pesticides are still in use in this region, warranting strict periodical health checkups and other interventions. The present review describes occupational, environmental, and social factors associated with pesticide use in the Malwa region of Punjab, India, and proposes some risk reduction interventions.

Keywords: Malwa region of Punjab, Pesticides, Cotton, Reproductive disorders, Cancer, Neurological disorders.

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ABSTRACT

Mondal, S. C. Tripathi, D. N. Vikram, A. **Ramarao, P.** and Jena, G. B. (2012). Furosemide-induced genotoxicity and cytotoxicity in the hepatocytes, but weak genotoxicity in the bone marrow cells of mice. *Fundamental & Clinical Pharmacology* **26** (3), 383–392.

Furosemide (FS) is a potent loop diuretic widely used in the management of fluid retention associated with cardiac, renal, and hepatic failure as well as for the treatment of hypertension. FS is a well-characterized and known hepatotoxin in both human and animal test systems. In this study, an attempt has been made to investigate the in vivo genotoxicity of FS at the hepatotoxic equivalent doses using the chromosomal aberration and the comet assay in the bone marrow cells of mice as the endpoints of evaluation. The animals were treated with FS at the doses of 2.5, 5, 10, 20, 40, and 80 mg/kg/body weight (bw) intraperitoneal (ip) for both single (24 h) and repeated dose (seven consecutive days) toxicity studies. FS toxicity in the hepatocytes was evaluated using the parameters, such as, alanine-/aspartate-aminotransferase (ALT/AST), single cell gel electrophoresis (comet), tissue histology, DNA fragmentation, and TUNEL assay as the endpoints. The results clearly demonstrate that FS produced toxic responses in the hepatocytes as evident from increased ALT/AST level, DNA damage, TUNEL positive cells and increased DNA fragmentation in mice in vivo. However, it is interesting that in bone marrow cells, FS did not induced structural chromosomal aberrations, but produced mild DNA strand breaks as observed by the comet assay. So it is considered as weak genotoxic toward the bone marrow cells when compared to the hepatocytes of mice.

Keywords: Bone marrow, Cytotoxicity, Furosemide, Genotoxicity, Liver, Mice, Oxidative stress

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ABSTRACT

Mughal, A. Vikram, A. **Ramarao P.** and Jena G. B. (2010). Micronucleus and comet assay in the peripheral blood of juvenile rat: establishment of assay feasibility, time of sampling and the induction of DNA damage. *Mutation Research* **700** (1-2), 86-94.

Micronucleus (MN) and comet assay can successfully detect the genetic damage in two different cell population of peripheral blood i.e. erythrocytes and lymphocytes. The present study was aimed to investigate the kinetics of MN formation as well as to identify the time of maximum MN induction in the peripheral blood erythrocytes in juvenile rats and thereafter to examine its relationship with the observed DNA damage in the lymphocytes as determined by comet assay. The rat peripheral blood micronucleus (PBMN) assay is generally not preferred owing to the selective elimination of micronucleated cells from the circulation by spleen. However, inefficient splenic removal of micronucleated cells in the juvenile Sprague-Dawley (SD, 26 days) rats conferred advantage to be a suitable model for PBMN assay. The kinetics of MN formation and DNA damage in the peripheral blood were determined with cyclophosphamide (50mg/kg), chlorambucil (30mg/kg), methotrexate (20mg/kg), cisplatin (5mg/kg) and paclitaxel (0.5 and 1mg/kg). All the tested chemicals with different mechanisms of action have induced time-dependant changes in the MN frequency in the peripheral blood erythrocytes. Comet assay in the peripheral blood lymphocytes also revealed similar pattern of rise and fall in the DNA damage. MN frequency and the different comet assay parameters exhibited significant positive correlation with all the tested chemicals and in both of the assays the peak was observed in between 36 and 48h post-treatment. Results of the present study clearly demonstrates that MN frequency in the peripheral blood erythrocytes exhibits positive correlation with the DNA damage in the peripheral blood lymphocytes as evident from different comet assay parameters. Further, the study highlights the detection of DNA damage in two different cell population and establishes the complementary nature of these two bioassays for the genotoxicity testing by combining a conventional technique to the smarter one.

Keywords: Micronucleus, Comet, Correlation, Peripheral blood, DNA damage

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ABSTRACT

Nanda, P. and **Kaur, S.** (2011). Globalization of finance: India's experience of capital flows. *Journal of Global Economy* 7 (2), 121 -137.

Globalization of finance measured in terms of capital account liberalization has been viewed by many economists as an important component of the overall opening up of global trade and financial markets especially in recent years. It is in this context, papers seek to analyse issue of CAC in India. Study reveals that capital account surplus is mainly accounted for by non-debt creating foreign investment inflows. Foreign investment and banking balance accounted 80 percent of surplus in capital account. All the components of capital account (except banking capital) witnessed decrease in inflows to outflows ratio during post-CAC period. Banking capital experienced rapid increase in inflows/outflows ratio due to rapid increase in NRIs deposits. Regarding impact of capital account balance on Indian economy, on the positive side, capital account balance significantly reduced inflation and external debt to GDP ratio but on the negative side failed to reduce fiscal deficit and increase in industrial production. RBI should direct more calibrated distribution of bank credit in favour of all productive sectors to increase overall investment in the country. So that capital account surplus can be managed.

Keywords: Foreign Investment, Globalization, Current account deficit

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ABSTRACT

Negi, A. Bhushan, S. Gupta, P. Garg, P. and **Kumar, R.** (2013). Cystathionine-Lyase-Like Protein with Pyridoxal Binding Domain Characterized in *Leishmania major* by Comparative Sequence Analysis and Homology Modelling. *ISRN Computational Biology* 1-9.

Cystathionine -lyase-like protein (CBLP), one of the key enzymes involved in methionine biosynthesis utilising pyridoxal phosphate (PLP) as a cofactor, has recently been reported in *Leishmania major*. Its presence in the parasite and absence in humans warrant its full characterisation and fruition as a potent, selective, and inevitable druggable target. Due to the unavailability of X-ray 3D structure of CBLP, a homology model for this protein was developed for the first time. The model was evaluated for PLP binding site and various conserved domain residues of the protein recommended by comparative sequence analyses by different protein analysis tools. The model was validated and discovered to be robust and statistically significant. The final model was superimposed on template of *Arabidopsis thaliana* (PDB ID: 1IBJ) and RMSD was found to be 0.486. The PLP binding site residues of both the proteins were ensured to be highly conserved indicated by Gly71, Met72, Tyr95, Asp169, and Ser193 as well as formation of aldimine bond with Lys194. This was further verified through molecular simulation of PLP into the cofactor binding site of the modelled protein. The present study may therefore play a directing role in the designing of novel, potential, and selective antileishmanial agents.

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ABSTRACT

Negi, A. **Ramarao, P.** and **Kumar, R.** (2013). Recent Advancements on Small Molecule Inhibitors of Insulin-like Growth Factor-1 Receptor (IGF-1R) Tyrosine Kinase as Anticancer agents. *Mini Reviews in Medicinal Chemistry* 13 (5), 653-681.

Advancements in understanding of the genetics, genomics, biochemistry and the pharmacology of cancer in human, have driven the current cancer chemotherapy to intently focus on development of target-based approaches rather than conventional approaches. From among the various targets identified, validated and inhibited at different hallmarks of cancer, protein tyrosine kinases (PTKs) have been exploited the most. Insulin receptors (IRs), insulin like growth factor receptors (IGF-1R) and their

hybrid receptors belong to tyrosine kinase receptor (TKR) family, constitute a structural homology among them and generate a growth promoting IGF system on binding with either insulin, IGF-1 or IGF-2. The system induces the mitogenic effects through a torrent of cell signals produced as a result of cross talk with other growth promoting peptides and steroidal hormones, ultimately resulting in hijacking apoptosis and increasing cell proliferation and cell survival in cancer cells. Various strategies such as anti-IGF-1R antibodies, IGF-1 mimetic peptides, antisense strategies, IGF-1R specific peptide aptamers, targeted degradation of IGF-1R and expression of dominant negative IGF-1R mutants have been explored to inhibit the IGF-1R signaling. However, targeting IGF-1R with small molecules has gained considerable attention in last few years due to their ease of synthesis, ease of optimization of absorption, distribution, metabolism, excretion and toxicity (ADMET) parameters, oral route of administration, lesser side effects and cost effectiveness. The present review provides a broad overview and discusses the highlights on discoveries, SAR studies and binding interactions of small molecules with either IGF-1R active or allosteric sites reported till date.

Keywords: Cancer, IGF-1R, IGF-1R inhibitors, IR, SAR, Tyrosine Kinases.

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ABSTRACT

Nepali, K. Agarwal, A. Sapra, S. Mittal, V. **Kumar, R.** Banerjee, U. C. Gupta, M. K. Satti, N. K. Suri, O. P. and Dhar, K. L. (2011). N-(1,3-diaryl-3-oxopropyl) amides as a new template for xanthine oxidase inhibitors. *Bioorganic & Medical Chemistry* **19** (18), 5569-5576.

A series of forty two N-(1,3-diaryl-3-oxopropyl)amides were synthesized via an efficient, modified Dakin-West reaction and were evaluated for in vitro xanthine oxidase inhibitory activity for the first time. Structure activity relationship analyses have been presented. Selected active xanthine oxidase inhibitors (3r, 3s and 3zh) were assessed in vivo to study their anti-hyperuricemic effect in potassium oxonate induced hyperuricemic mice model. Compound 3s emerged as the most potent xanthine oxidase inhibitor ($IC_{50} = 2.45 \mu M$) as well as the most potent anti-hyperuricemic agent. The basis of significant inhibition of xanthine oxidase by 3s was rationalized by its molecular docking into catalytic site of xanthine oxidase.

Keywords: N-(1, 3-diaryl-3-oxopropyl) amides, Xanthine oxidase, Non-purine xanthine oxidase inhibitors, Molecular docking

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ABSTRACT

Nepali, K. Singh, G. Turan, A. Agarwal, A. Sapra, S. **Kumar, R.** Banerjee, U. C. Satti, N. K. Gupta, M. K. Suri, O. P. and Dhar, K. L. (2011). A rational approach for the design and synthesis of 1-acetyl-3,5-diaryl-4,5-dihydro(1H) pyrazoles as a new class of potential non-purine xanthine oxidase inhibitors. *Bioorganic & Medicinal Chemistry* **19** (6), 1950-1958.

Xanthine oxidase is a complex molybdoflavoprotein that catalyses the hydroxylation of xanthine to uric acid. Fifty three analogues of 1-acetyl-3,5-diaryl-4,5-dihydro(1H)pyrazoles were rationally designed and synthesized and evaluated for in vitro xanthine oxidase inhibitory activity for the first time. Some notions about structure activity relationships are presented. Six compounds 41, 42, 44, 46, 55 and 59 were found to be most active against XO with IC_{50} ranging from $5.3 \mu M$ to $15.2 \mu M$. The compound 59 emerged as the most potent XO inhibitor ($IC_{50} = 5.3 \mu M$). Some of the important interactions of 59 with the amino acid residues of active site of XO have been figured out by molecular modeling.

Keywords: 1-Acetyl-3,5-diaryl-4,5-dihydro(1H)pyrazoles, Xanthine oxidase, Non-purine xanthine oxidase inhibitors, Molecular docking

Pandey, P. (2012). Application of Geographical Information Systems (GIS) and Remote Sensing for assessing changes in Land use and Land cover. *International Journal of Applied Agricultural Research* 7 (2), 71-74.

Land is one of the most important natural resource that forms the basis for most biological and human activities on the earth, such as agriculture, forestry, industries, transport, housing and various other services. Land, an important environmental matrix, is an integral part of ecosystems and plays a crucial role in sustaining biodiversity and biogeochemical cycles. As such, it is pertinent to mention two interlinked concepts of land that go hand-in-hand, viz. land use and land cover. While land cover refers to the bio-physical coverage of land; land use indicates the actual human activity for which the land is used. Land use/land cover mapping serve as a basic inventory of land resources throughout the world. The distribution of land use and land cover over space and time is crucial in understanding a wide variety of phenomena at global, regional as well as local level. This increasing importance has been attributed to the fact that various environmental problems such as deteriorating environmental quality, loss of biodiversity, forest and agricultural lands; as well as destruction of wetlands can be understood only if there is an adequate understanding of land use land cover.

Whether regional or local in scope, remote sensing offers a means of acquiring and presenting land cover data in timely manner. While land cover can be determined by analyzing satellite imagery; the same does not hold for land use. Data from remote sensing helps us to monitor such changes but future estimates of change are hard to tell. As such, it is necessary to have reliable information on the land use/cover and an understanding of the changes that occur within them. GIS (Geographical Information System) aids in analyzing the environmental data from a spatial context. GIS involves mapping data and interpreting the relationships among that data and making inferences. These inferences will help decision-makers best understand the current landscape, critically evaluate decisions made in the past, as well as gain an insight into the possible effects of the current decisions; so that adequate control measures might be taken before they are implemented. Therefore, the present paper aims at understanding the role of GIS in detecting and analyzing the changes that occur due to alteration in land use and land cover of a region.

Keywords: Land use, Land cover, Remote sensing, GIS

Pandey, P. (2013). A Micro-review of the role of GIS in Watershed Management. *International Journal of Information and Computation Technology* 3 (7), 571-574.

In recent years there has been a growing concern regarding the environment as a result of the exploitation of earth's resources, particularly due to industrialization and ever-rising population. This has led to adverse impact on various segments of biosphere, particularly the lithosphere and hydrosphere. One such section which needs constant attention is watershed management. Watershed refers to the geographic boundaries and the ecosystem including groundwater aquifers of a water body along with the land that drains into it. Sustainable development through watershed management has become a thrust area in both developed and developing nations, as it helps in maintaining the ecological balance of the region. This involves planning and implementing environmentally and economically sound practices for soil and water conservation in the watershed, judicious use of land, crop and livestock production, and social and cultural concern for optimum utilization of natural resources in an area.

GIS has proved to be an invaluable tool in watershed management since it provides a consistent method for watershed analysis using DEMs (Digital Elevation Model) for watershed delineation,

calculations for watershed characteristics, flow statistics, debris flow probability and standardized datasets such as land cover, soil properties and climate variables. Besides, GIS allows for the modeling and simulation of missing data, while preserving the accuracy and functionality of the analysis. The Spatial Analyst tool of ArcGIS software is widely used for hydrological analysis such as calculating flow across an elevation surface and creating stream networks and watersheds. The present paper describes the applications GIS for the management of watershed, along with its limitations and advantages.

Keywords: Watershed management, GIS, DEM, ArcGIS, Hydrology

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ABSTRACT

Pandey, P. (2013). Algal Biofuels: A potential source of renewable energy. *International Journal of Mechanical Engineering Research* 3 (6), 467-470.

With the ever increasing prices of petroleum to meet the rising energy demands; there have been numerous researches all over the world focusing on alternative sources of energy. Most of these alternate sources of energy are biomass based; since it serves as a promising resource. The biomass- based fuels are gaining further importance in the context of global warming which is related to combustion of fossil fuels. Although the concept of using algae as a source of biofuel is not a recent one, it has been gaining importance in the last few decades as a promising option for mitigating greenhouse gas emissions as well as alternative fuel for meeting transportation demands. The process involves cultivation of algae by natural processes such as photoautotrophic, heterotrophic and mixotrophic production; followed by harvesting of algal biomass. This biomass is then utilized for the extraction of biofuels such as biodiesel, bioethanol and biobutanol. The present paper explores the possibility of using algal biomass as an alternative source of energy along with its future implications in minimizing climatic change scenario.

Keywords: Algal biomass, Biofuel, Biodiesel, Bioethanol, Global warming, Climate change

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ABSTRACT

Pandey, P. Khillare, P. S. and Kumar, K. (2011). Assessment of Organochlorine Pesticide Residues in the Surface Sediments of River Yamuna in Delhi, India. *Journal of Environmental Protection* 2: 511-524.

The present study reports the concentration levels and distribution patterns of the organochlorine pesticide residues in the surface sediments of river Yamuna in the Indian capital state, Delhi. Analytical measurements were carried out for twenty organochlorine pesticides (OCPs) in the Pre-monsoon, Monsoon and Post-monsoon seasons, at six different sampling locations along the 22 km stretch of the river Yamuna in Delhi. The results revealed contamination of the surface sediments with several persistent organochlorine pesticides. Endrin aldehyde, Endosulfan sulfate and DDT showed the highest percentage composition of OCP at all the sampling sites in all the three seasons. The total organochlorine pesticides level ranged from 157.71 - 307.66 ng/g in Pre-monsoon to 195.86 - 577.74 ng/g in Monsoon and 306.9 - 844.45 ng/g in the Post-monsoon season. This not only demonstrates the pollution of the river with pesticide residues, but also the necessity of a continuous long-term monitoring of the affected environment.

Keywords: Persistent Organic Pollutants (POPs), Organochlorine Pesticides (OCPs), Yamuna River, Sediments

Pandey, P. Kumar, K. and Kumar, D. S. (2012). Assessment of Aerosol Optical Depth (AOD) over Delhi using Geospatial Technology. *International Journal of Electronics and Engineering* **3** (4), 297-300.

Aerosols are airborne solid or liquid particles that play a crucial role in the Earth's radiation budget, since they both reflect and absorb the incoming solar radiation. They are responsible for having an impact on cloud formation process and restricting the warming effect of greenhouse gases, besides lowering of land surface temperature. Developing countries, in particular, India, have experienced elevated concentrations of air pollution in the recent years. Thus, developing effective strategies for the management of air quality is a key environmental challenge facing society today. The remote sensing studies of the atmosphere provide the unique opportunity to compute indirect estimates of air quality. One of the key parameters determining the air quality is the aerosol concentration in the ambient air of a given place, of which, AOD is a good measure. Higher values of AOD indicate more aerosol load in the atmosphere. The aim of the present study is to estimate the aerosol optical depth over the Indian capital city, Delhi, by using remote sensing and GIS (Geographical Information System). The least- clouded MODIS scenes at 10km spatial resolution were acquired for the period 2007 to 2009 for all the months. The satellite imageries were processed in Digital Image Processing software (ERDAS Imagine) and maps generated in ArcGIS software. The results of the study revealed that parts of the Central Delhi experienced high AOD levels (0.69-0.83) than the outskirts of Delhi (0.36-0.61) during the month of May, in all the consecutive years, whereas, the central and south- eastern parts of Delhi experienced higher AOD levels during the month of December. This can be attributed to the fact that Central Delhi experiences elevated aerosol load due to high vehicular and anthropogenic activities, in comparison to the regions on the outskirts of Delhi. Moreover, the AOD levels were found to be influenced by the wind regime. It was observed that the winds blowing from West direction led to the accumulation of pollutants in the Central and south-eastern parts of Delhi.

Keywords: MODIS, Aerosol Optical Depth (AOD), Air quality, Delhi, Remote sensing, GIS

Pathak, P. (2012) Access to Internet as a Human Right. *The Legal Analyst* **2** (1), 94-98.

The Internet has created a profound impact on human lifestyle. With the advent of Web 2.0 which includes social networking sites, blogs, wikis, video sharing sites, hosted services, web applications and folksonomies individuals are no longer passive recipients, but also active publishers of information. The unique characteristics such as its speed, worldwide reach and relative anonymity made it an enabler of not only the right to freedom of opinion and expression but also a range of civil, political, economic, social and cultural rights including right to education. The article engages with the theoretical debate that access to internet as a human right in reference to the report of the special Repporteur on the promotion and protection of the right to freedom of opinion and expression.

Keywords: Internet, Human rights, Freedom of opinion, Expression

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ABSTRACT

Prasad, S. & Dhanya, M. S. (2012). *Biofuels*. Narendra Publishing House, Delhi.

With growing concerns for environmental pollution, energy security, and uncertainties in the future oil supplies, the global community is seeking non-petroleum-based alternative fuels, along with more advanced energy technologies, to increase energy use efficiency. Biofuels offer a tremendous opportunity to enhance national energy security, balance trade, increase rural employment opportunities and improve environmental quality thereby solving most of the problems related to fossil fuel based economy. Many researchers, scientists, engineers, policy makers, energy consultants around the world have dealt with sustainability, policy issues and technical subject aspects related to biofuels. In a way, this book provides insight into a comprehensive thought of biofuels, its production technologies, related issues and present scenario and limitations. We tried to compile all the relevant information on biofuels, thereby contribute to the understanding of this important topic. The book explores all the important areas in the science of biofuels and is designed particularly for: a) students of advanced courses in biofuels; b) professional, researchers and practitioners of many related research areas. The book chapters are organized as, an introduction of biofuels; a brief description of the biofuels scenario, and overview of key policies behind biofuel development; analysis on relevant aspects of biomass resources; overview of leading biomass pretreatment and saccharification technologies with main barriers and relevant techniques to combat those problems; bioethanol production process technologies; biodiesel production technologies from conventional oilseed crops, TBOs and algal biomass; biohydrogen production and fuel cell technologies; potential of biogas technologies; role of biofuels in air quality improvement and other environmental benefits, particularly on its impact on human health; food security; climate change mitigation and adaptation strategies; sustainable development and special emphasis was been given to Indian energy scenario.

Keywords: Biofuel, Biodiesel, Bioethanol, Biohydrogen, Biogas

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ABSTRACT

Prasad, S. Dhanya, M. S. Gupta, N. and Kumar, A. (2012). Biofuels from Biomass: A sustainable alternative to energy and environment. *Biochemical and Cellular Archives* **12** (2), 255-260.

The aim of this paper is to extend scientific overview about the potential and perspectives of biomass conversion to biofuels as a sustainable alternative option for energy and environment. The feasibility as well as suitability of the various categories of biofuels, potential conversion routes have been discussed with their possible and existing scope in Indian context. Biofuel production from the inexpensive and abundantly available cellulosic biomass, non-edible oilseed plant species and algal biomass, processes seemed to be most attractive as an alternative to a portion of the fossil fuels used today.

Keywords: Biofuel, Biomass conversion, Sustainable, Energy, environment

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ABSTRACT

Puneeta, P. Dinesh, K. Prakash, A. Masih, Singh, M. Kumar, S. Jain, V. K. and Kumar, K. (2012). A study of urban heat island and its association with particulate matter during winter months over Delhi. *The Science of Total Environment* **414**: 494-507.

Day and night time thermal mapping of Delhi has been done with MODIS satellite data for the months of November and December for years 2007, 2008, 2009 and 2010. The study reveals the formation of day

time “cool island” over central parts of Delhi which are found to be cooler by a maximum of 4–6 °C than the surrounding rural areas. During the night time, however, the central parts of Delhi are found to be warmer by a maximum of 4–7 °C or even more than the surrounding rural areas thus confirming the formation of nocturnal urban heat island over Delhi. Measurements of solar spectral irradiance over Delhi reveal significantly lower values as compared to a rural site located south-west of Delhi, during the low wind conditions in the months of November and December. Analysis of average monthly temporal data of surface wind speed and particulate matter concentration over Delhi reveals a strong anti-correlation between wind speed and particulate matter concentration. High values of particulate matter during low wind conditions seem to favor the so called “cool island” over Delhi. Analysis of radiosonde data of 975 hPa and 850 hPa temperatures over Delhi during November and December from 1973 to 2010 reveals a warming trend at the 850 hPa level and an overall declining trend of ΔT between 975 hPa temperatures and 850 hPa temperatures, thus indicating a weakening of vertical thermal gradients over Delhi during these months. The study suggests that urban areas behave more like moderators of diurnal temperature variation in low wind conditions.

Keywords: Urban heat island, Particulate matter, Solar irradiance

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ABSTRACT

Quershi, K. **Varghese, V. J.** Osella, F. and Rajan, S. I. (2011). Transnationalism and ambivalence: the Punjab UK linkage. In: Pitkanen, P. Icduygu, A. and D. Sert (eds.), *Migration and Transformation: Multi-Level Analysis of Migrant Transnationalism*, pp. 13-62. Springer, Dordrecht/London.

This chapter brings together the main findings of the studies conducted in India and Britain under the research project 'Transnationalisation, Migration and Transformation: Multi-Level Analysis of Migrant Transnationalism (TRANS-NET) conducted in 2008-11. The analysis points to systematic differences in how the transnational processes are viewed from the perspectives of Punjab/India and the UK. It suggests that attempts to 'manage' migration must engage simultaneously with the sending, intermediary and receiving contexts. It is argued that the wider social space of migrant transnationalism is produced through diverse processes, players and places. It calls for a re-centering of state the study of migrant transnationalism as against the post-nation literatures. At the same time transnationalism is not free from diverse forms of ambivalences from the sending, receiving and transit locations, apart from a simultaneous production of social licitness and criminalization of migrations.

Keywords: Transnationalism, Migration, Ambivalence, Punjab, United Kingdom, Licitness, Networks, Space

Qureshi, K. **Varghese, V. J.** and Filippo, O. (2013). Indian Punjabi skilled migrants in Britain: of brain drain and under-employment. *Journal of Management Development* **32** (2), 182-192.

Purpose – The purpose of this paper is to examine the careers of skilled migrants from Indian Punjab. This study complicates the normalization of skilled migration as a “win-win” situation by examining the career trajectories of skilled migrants from the Indian Punjab who are trying to establish themselves in Britain.

Design/methodology/approach – The paper examines 20 life history interviews undertaken with skilled migrants from the Indian Punjab to Britain, in IT, media, law and hospitality industries, health and welfare professionals, and student migrants.

Findings – Skilled migrants were able to migrate on their own auspices through migration economies in Punjab. Once in Britain, however, they were directed to universities and labour markets in which they were not able to use their skills. They experienced under-employment, devaluation of their qualifications and downward mobility, which forced them into ethnic and gendered markets within their home networks and created ambivalence about migrant success and issues of return.

Research limitations/implications – The study emphasizes the need to take a transnational lens when looking at skilled migration, address how migrants' career trajectories are limited by racism, anti-immigration sentiment and gender inequality, and consider temporality and uncertainty.

Originality/value – The paper raises questions concerning the ways in which rapidly changing “managed migration” policies in Britain have burdened individual migrants.

Keywords: United Kingdom, Migrants, Skilled workers, Education, Migrant workers, Ethnic minorities, Gender, India

Raina, S. N. Ahuja, P. S. Sharma, R. K. Das, S. C. **Bhardwaj, P.** Negi, R. Sharma, V. Singh, S. S. Sud, R. K. Kalia, R. K. Pandey, V. Banik, J. Razdan, V. Sehgal, D. Dar, T. H. Kumar, A. Bali, S. Bhat, V. Sharma, S. Prasanna, B. M. Goel, S. Negi, M. S. Vijayan, P. Tripathi, S. B. Bera, B. Hazarika, M. Mandal, A. K. A. Kumar, R. R. Vijayan, D. Ramkumar, S. Chowdhury, B. R. and Mandi, S. S. (2012). Genetic structure and diversity of India hybrid tea. *Genetic Resource and Crop Evolution* **59**: 1527-1541.

The most important evolutionary event in the success of commercial tea cultivation outside China in 30 countries came about by the origin of India hybrid tea in India, derived from the extensive spontaneous hybridization that took place between the Assam type tea growing in the forest regions of Assam, North-East India and China type tea introduced from China in 1875 to many regions of North-East India. The release of an enormous pool of vigorous and highly variable plants of India hybrid tea in North-East India was a significant step forward for the origin and evolution of tea as a highly successful crop plant. The 1,644 accessions and clones of India hybrid tea, representatives of known 15 morphotypes, were screened by 412 AFLP markers amplified by 7 AFLP primer pair combinations. All the 412 genetic loci were polymorphic across the 1,644 accessions and clones. The analysis was done with distance (PCoA and NJ) methods, and the STRUCTURE (Bayesian) model. Both PCoA and NJ analysis clustered 1,644 tea accessions and clones into six major groups with one group in each, constituted mostly by China hybrid, Assam China hybrid and Assam hybrid morphotypes, of distinct genetic identity. No group was exclusive for any particular morphotype. The accessions and clones belonging to morphotypes, Assam type, Assam hybrid, China hybrid and China Cambod were

distributed in all the groups. It is the Assam type/ Assam hybrid morphotypes which exhibit much broader genetic variability than in China type/China hybrid, China hybrid and China Cambod were distributed in all the groups. It is the Assam type/ Assam hybrid morphotypes which exhibit much broader genetic variability than in China type/China hybrid/Cambod type/Cambod hybrid morphotypes. The STRUCTURE analysis inferred 16 populations ($K = 16$), for which the greatest values of probability were obtained. Nine of the 16 clusters were constituted by the tea accessions and clones of 'pure' ancestry. The remaining clusters were of 'mixed' ancestry. This analysis provides evidence that the accessions and clones of the same morphotype are not always of same genetic ancestry structure. The tea accessions and clones obtained from outside North-East India shared the same groups (distance method) and clusters (STRUCTURE model) which were constituted by North-East India accessions. The present study also demonstrates very narrow genetic diversity in the commercial tea clones vis-a-vis the profound genetic diversity existing in the tea accessions. These clones were distributed in hardly two of the six groups in NJ tree. The identified 105 core accessions and clones, capturing 98% diversity, have their origin from almost all groups/subgroups of NJ tree.

Keywords: AFLP, Gene pool, Genetic diversity, India hybrid tea, Morphotypes, STRUCTURE.

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ABSTRACT

Rajan, S. L. **Varghese, V. J.** and Jayakumar, M. S. (2011). *Dreaming mobility and buying vulnerability: Overseas £ recruitment practices in India*. Routledge, New Delhi.

In the alarming contemporary context of widespread corruption and fraudulence in the overseas labour recruitment system in India, this book attempts to understand the institution of emigration governance and recruitment practices in the country with a focus on the unskilled and semi-skilled sectors. It brings together the results of research in the major emigration hubs of India with the aid of quantitative and qualitative tools, drawing from all the major stakeholders intending emigrants, recruiting agents, return emigrants, emigrant households, Protector of Emigrants, foreign employers, foreign recruiting agents, Indian missions and emigrant workers at the destination countries.

The book unravels the underlying discriminatory rationality of the existing system of emigration governance, its logical and structural incoherencies and the consequent inefficacy in protecting the most vulnerable sections of workers leaving India for overseas employment, resulting in unaffordable levels of transaction and social costs. By outlining the institutional failure, the volume outlines the fundamental principles of a new institution which would facilitate orderly, safe and secure emigration, economically sustainable beneficial expatriate life and social protection after the emigrants return. The book will be of interest to students and scholars of sociology, law, economics, demography, anthropology, history, gender studies, cultural studies, diaspora studies, migration studies and international relations, apart from policy-makers and administrators of transnational migration and NGOs working in the field of migration.

Keywords: Emigration, Overseas recruitment, Recruiting agents, Governance, Protection, Institutional failure, Social protection.

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ABSTRACT

Ramana, P. S. (2011). *Selected Short Stories of Waryam Singh Sandhu*. Trans. Punjabi University Publication Bureau, Patiala..

Waryam Singh Sandhu is undoubtedly one of the best Punjabi short story writers today. As an author deeply rooted in cultural ethos of rural Punjab, particularly the Jat farming community of Majha region, Sandhu artistically portrays in his short stories the lives, issues, problems and tragedies of the small and marginal farmers. The incidents and characters portrayed in his tales become symbolic of larger social and historical forces at work in Punjab in the second half of the twentieth century and the author is able to achieve a historical and socio-political verisimilitude without compromising in any way the aesthetic structure or readability of the narratives.

This translation contains seven of the best his short stories of the author. 'Sunehri Kinka' (1978), 'Wapsi' (1983), 'Mein Hun Thik Thak Han' (1991) and 'Nau Bara Dus' (1998), are available in this volume under the titles 'The Golden Speck', 'The Return', 'I am Alright Now' and 'Nine Twelve Ten' respectively. The other three stories in this volume 'Yours Forever', 'The Pond' and 'Everyone's Share' are translations of Ang Sang (1973), Dumh (1975) and Apna apna hisa (1980) respectively.

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ABSTRACT

Ramana, P. S. (2012). *Kartar Singh Duggal: A Reader*. Sahitya Akademi, New Delhi.

A Reader comprises the best and most representative work of one of the best known and most prolific of the twentieth century Punjabi writers. Kartar Singh Duggal was active as a creative writer and thinker for nearly seven decades and tried his hand successfully at various genres including short-stories, novels, poetry, essays and plays. This anthology consisting of ten of his best short-stories, twenty essays and non-fictional pieces, twenty-one poems, a novel and a poetic play has given a corporeality, availability and compactness to Duggal's work which is not available anywhere else, even in Punjabi and Hindi. The essays on diverse subjects ranging from faith and religion, history and problems facing Punjabi language, contemporary issues and personalities and theory of short-story despite being apparently prompted by specific socio-political and historical circumstances and events, retain a relevance and literary significance even today as a sensitive humanist's interventions in social and intellectual life to make the world a better place. His short stories included in this volume have the charm and artistic quality that appeals to all readers coming from different locations and backgrounds. "The Night of the Full Moon", "The Miracle" and "Agony and Ecstasy" are some of the short stories included in this anthology that are counted among the classics and have been appreciated by international audience.

The symbolic poetic play "To each a window" is remarkable attempt at adaptation and interpretation of the myth from a modern and psychoanalytical perspective. The novel *Twice Born, Twice Dead*, though one of the earliest works of Duggal, remains a very poignant and realistic representation of colossal human suffering at the time of Partition of India.

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ABSTRACT

Ramana, P. S. (2012). *Selected Short Stories of Mohan Bhandari*. Trans. Punjabi University Publication Bureau, Patiala.

Translated from original Punjabi, the volume contains 21 of the best and most representative short stories of Mohan Bhandari. Fundamentally a product of his time, Bhandari's work provides one of the best examples of catching the entire flavour of an age. Whether dealing with the village life in the fifties and sixties or that of the city during the next three decades, Bhandari has an inimitable intuitive skill for isolating some character or incident, an integral element of society and describing it with an incredible

economy and grace. Some of his best stories explore a small section of an individual's life, a vital aspect or a single event, but they all become symbolic of the larger social structures.

Almost all the best work of Bhandari including 'Tilchauli', 'Everything else is Fine', 'Gangajal', 'Ghotna', 'Make me Tagore, O Mother...!', 'Birth of a Thief 'The Wooden Leg', 'The Cracked Mirror', 'Woman made of Clay', 'Kalyug', 'The Progeny', 'The Home', 'Tarn Taran' and 'The Nose-ring' are included in this volume.

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ABSTRACT

Saini, A. (2011). Book review of *Performing Women/performing Womanhood: Theatre, politics and dissent in North India* by Nandi Bhatia. *South Asian Ensemble* 3: 131-134.

Nandi Bhatia in her book *Performing Women/ Performing Womanhood: Theatre, Politics and Dissent in North India* attempts a comprehensive analysis of the contribution of women actors, writers, dramatists, directors and activists who have been instrumental in preserving woman's point of view in theatre and other forms of art, especially literature and films. She not only analyses the portrayal of women in men's theatre but also studies women's theatre and their struggle for a place in the history of theatre.

Keywords: Nandi bhatia, Theatre, Women's theatre

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ABSTRACT

Saini, A. (2011). Book review of *Seven Plays on Sikh History* by Sant Singh Sekhon. *South Asian Ensemble* 3: 113-114.

Seven Plays on Sikh History by Sant Singh Sekhon comprises of plays that depict and analyse the history of Sikh struggle against various antagonists, beginning with the period of Guru Gobind Singh and culminating in the role of Sikhs in freedom struggle movement. The most comprehensive and ambitious of these plays, Baba Bohar presents hand-picked events from Sikh history while attempting to forge a chronological sequence of the struggle against invaders and colonizers. The play lacks in dramatic action as the events are not enacted but narrated by an old oak, which has been witness to the upheavals in Punjab, for the purpose of acquainting the youth of today with the glorious Sikh heritage which, actually, seems also to be the aim of the playwright. There is no dramatic conflict, no climax, no highs or lows, no drama indeed, but a monotonous narration by the old tree.

Keywords: Sant singh sekhon, Indian drama, Punjabi drama, Tejwant singh gill

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ABSTRACT

Saini, A. (2011). Film Review of Prakash Jha's *Aarakshan*. *South Asian Ensemble* 3:132-133.

Indian cinema has pondered on the Dalit question time and again, notably in the works of filmmakers like Shyam Benegal, Satyajit Ray, Govind Nihalani and Raj Kumar Santoshi. The question returns to the forefront with Prakash Jha's *Aarakshan*. The title of the film claims to debate and interrogate the seething controversy over caste-based reservation in India, but –disappointingly- the film turns out to be an amalgam of two films rolled into one. The first half deals with the issue of reservation system as the title promises and the second half is a take on the deteriorating in education system in view of the culture of coaching classes in India. The script of Jha's Dalit story is apparently inspired by Vijay Tendulkar's well-

known play Kanyadaan which foregrounds the suffering and exploitation endured by Dalits and looks at what it means to be treated as a lesser human being on account of one's so-called lower caste in contemporary Indian society. By rejecting a part of the society (in the form of Dalits), the upper castes probably feel comfortable and secure in their self-identity.

Keywords: Aarakshan, Prakash jha, Indian cinema, Reservation issue

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ABSTRACT

Saini, A. (2011). Recovering a Theory of Subjectivity: Some Explorations in Indian Philosophical Tradition. *South Asian Ensemble* 3: 90-95.

In the light of theories of subjectivity emerging in the west, it is today possible to reassess the Indian philosophical conceptualization of subjectivity and re-appropriate these for contemporary times. The concept of subjectivity, although usually considered to be a recent concept, has been there in Indian philosophies for long. An elaborate conceptualization of the kind we find in contemporary poststructuralist thought is, of course, not to be found in Indian philosophies, but these systems of thought approximate the poststructuralist insights in several ways and enable us to appropriate western post structuralism from a position grounded in the diversity of Indian tradition. Read together, Indian philosophies and western post structuralism supplement each other.

Keywords: Subjectivity, Indian philosophy

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ABSTRACT

Saini, A. (2012). Girish Karnad's Wedding Album: The Mythical Discourse of Culture. *Literary Voice* 1 (1), 42-46.

Wedding Album traces the culmination of the artistic genius of Girish Karnad where he explores a traditional Indian wedding with a view to exposing the strained relationships which come to the fore on the occasion of a wedding. In Wedding Album, Karnad moves from myth, folklore and history to cultural stereotypes and modernity. There is no direct allusion to either myth or history in it, yet the cultural stereotypes it showcases, are almost of mythical stature. In addition to this, Karnad uses the occasion to explore several contemporary issues related to relationships and society.

Keywords: Wedding album, Girish karnad, Subjectivity, Drama

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ABSTRACT

Saini, A. (2012). Scarred and Silenced Subjectivities: Mahesh Dattani's Thirty days in September. *The Vedic Path* 86 (1-2), 85-96.

Thirty Days in September successfully depicts the trauma of the victims of child abuse. The play explores the silence, the feelings of betrayal and the psychological instability that are characteristic of a victim of sexual abuse. On the other hand, the play offers no help by way of analyzing the subjectivity of the abuser. Questions such as what makes a person an abuser, what his psycho-social circumstances are, or how his actions affect his psyche remain unanswered. Yet the play continues Dattani's attempt to explore the hushed-up issues in Indian society.

Keywords: Mahesh dattani, Drama, Child abuse

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ABSTRACT

Saini, A. (2012). Sedimented Gender Norms in Women-Oriented Cinema: Mahesh Manjrekar's Astitva. *South Asian Ensemble* 4(4), 111-117.

The majority of roles of women in commercial Indian cinema have been drawn from a limited, myopic formula which either objectifies women or exalts them to the level of a goddess in order to create a discourse of propriety to be followed by women in the patriarchal set up. The films tend to treat women as sexual objects and codify their stature.

Keywords: Astitva, Male gaze, Gender norms, Film

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ABSTRACT

Saini, A. (2012). Subaltern Categories in Girish Karnad's Nagamandala. In: Bhim, S. D. and Resham S. (Eds.), *Voices from the Margins in World English Literature*, pp. 185-192. Shanti Prakashan, Mangalore.

Subaltern is a term that commonly refers to persons who are socially, politically, and geographically outside of the hegemonic power structure. Some critics use it to refer to marginalized groups or to persons rendered without agency by his or her social status. These subaltern groups can sometimes subvert the authority the hegemonic power. Like feminism, subaltern further qualifies itself with minority categories such as the female subaltern, queer subaltern, dalit subaltern and so on. In this paper I have attempted an analysis of Girish Karnad's Nagamandala with the perspective of locating gender based subaltern categories in the play.

Keywords: Girish karnad, Subaltern, Indian drama

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ABSTRACT

Saini, A. (2012). *Subjectivity as a locus of conflicts in Girish Karnad: a Discussion of his Plays*. Lambert Academic Publishing, Germany.

Girish Karnad, the great Indian playwright, poet, actor, director, critic and translator addresses the problematic of subjectivity in his plays in his own distinctive way. The issue is approached in his works from diverse but mutually complementary points of view, revealing the various facets of contemporary Indian subjectivity. The present book undertakes a study of five plays of Karnad in order to explore the emergence of a composite conception of contemporary Indian subjectivity. The book also examines the nature of this subjectivity and its cultural-political implications.

Keywords: Girish Karnad, Subjectivity, Indian Drama

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ABSTRACT

Saini, A. (2012). The Goa Diaries. *South Asian Ensemble* 4(2), 106-108.

What comes to your mind when I say the enchanted word "Goa": the sandy beaches, carefree hippies, women in bikinis and inexpensive liquor? Goa is a bit of all these; but yes, Goa is something more too. Goa is a phenomenon of unrestraint, of cosmopolitan spirit, of individuality. Goa greets you with open arms and does not care to hold you once you are there. You are expected to chuck your baggage and embrace the Goan air: so full of welcome, cheer and ultimately indifference. You are your own person. You are not Punjabi, Gujrati, Marathi or European, Russian, Arab; you are a part of the sweeping current that swarms the beaches, the churches and the insinuating nightclubs.

Keywords: Goa, Diary, Travelogue

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ABSTRACT

Saini, A. (2013). The Comic and the Surreal: an Analysis of Death and Destruction in Satish Alekar's *The Terrorist* and Mahesh Dattani's *Brief Candle*. In: Kaushik, A. S. (Ed.), *Indian Drama in English: Some Perspectives*, pp. 264-271. Atlantic Publishers, New Delhi.

The farcical/surreal/fantastical stance in Alekar's *The Terrorist* and Dattani's *Brief Candle* is not a device to provide comic relief as in Shakespeare and Marlowe who first broke from the Greek tradition of keeping the comic and the tragic separate and introduced comic interludes in their plays. But in Alekar and Dattani, this attitude is the very heart of these plays. It does not attempt to relieve the misery of death and destruction, but to analyse this misery in a new light and to come to terms with it in whichever way possible, although it may strike as bizarre to some.

Keywords: Humour, Farce, Satish alekar, Mahesh dattani

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ABSTRACT

Saini, R. **Jaitak, V.** Guleria, S. Kaul, V. K. Babu, G. D. K. Singh, B. Lal, B. and Singh, R. D. (2012). Comparison of headspace analysis of hydrodistilled and supercritical fluid extracted oil of *Capillipedium parviflorum*. *Journal of Essential Oil and Research* **24** (3), 315-320.

Volatile constituents of the aerial parts of *Capillipedium parviflorum* were studied by two different extraction procedures, hydrodistillation (HD), supercritical CO₂ extraction (Sc-CO₂) and compared with headspace analysis (HS). Sc-CO₂ extraction was carried out using nine differential optimization extractions (DOX) at different temperatures (°C) and pressures (MPa), i.e. 35/9, 60/9, 85/9, 35/17, 60/17, 85/17, 35/25, 60/25 and 85/25, to assess the influence on the yield and composition of volatile constituents. In DOX experiments, oil yields varied between 0.01–0.18% and maximum yield (0.18%) was obtained using temperatures and pressures 35/17 and 85/25. The oil is characterized by distinctive presence of very high content of non-terpenes (90.7%) identified in HD oil, 84.0% in Sc-CO₂ oil and 92.5% in HS analysis. Monoterpenes were represented in low concentrations in HD oil and were totally absent in Sc-CO₂ as well as in HS analysis. Very little variability was observed in the oxygenated monoterpenes in both Sc-CO₂ and HD oil representing a low percentage of constituents. Sesquiterpene hydrocarbons were represented between 1.5% and 3.1% in Sc-CO₂ extraction, which was higher in comparison with HD and HS techniques. Oxygenated sesquiterpenes were represented in higher percentage in Sc-CO₂ than in HD oil and HS analysis. Variability among the major constituents of 4-nonanone, 4-nonanol, 4-undecanone and 4-undecanol was observed in Sc-CO₂ extraction carried out under varied temperatures and pressures. Their percentage also varied in HD and HS analysis. 4-Nonanone (2.5%, 60/9 in Sc-CO₂; 6.4% in HD and 4.3% in HS), 4-nonanol (21.5% in Sc-CO₂, 31.7% in HD and 29.5% in HS), 4-undecanone (33.3%, 85/9 in Sc-CO₂; 35.3% in HD and 44.5% in HS) and 4-undecanol (16.5%, 84/17, 60/25 in Sc-CO₂; 14.6% in HD and 10.3% in HS) dominated the volatile constituents.

Keywords: *Capillipedium parviflorum*, Poaceae, Sc-CO₂, Hydrodistillation, Headspace analysis, Comparative evaluation

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ABSTRACT

Saini, S. Robinson, P. N. **Singh, J. R.** and Vanita, V. (2012). A novel 7 bp deletion in PRPF31 associated with autosomal dominant retinitis pigmentosa with incomplete penetrance in an Indian family. *Experimental Eye Research* **104**: 82-88.

To localize and identify the gene linked with non-syndromic autosomal dominant retinitis pigmentosa (adRP) with high but not complete penetrance in an Indian family, a detailed family history and clinical data were recorded. A genome-wide scan by 2-point linkage analysis using nearly 400 fluorescently labeled microsatellite markers in combination with multipoint lod score and haplotype analysis was carried out. Mutation screening was performed in the candidate gene by bidirectional sequence analysis of the amplified products. A maximum 2-point lod score of 3.553 at $\theta = 0.0$ was obtained with marker D19S572. Haplotype analysis placed the RP locus distal to marker D19S572, in close proximity to the gene for pre-mRNA processing factor 31 (PRPF31) at 19q13.42. Mutation screening in all 14 exonic regions and adjacent flanking intronic sequences of PRPF31 revealed a novel 7 bp deletion, c.59_65del7 (p.Gly20AlafsX43), in the first coding exon of PRPF31. This leads to a premature termination codon (PTC) in the next exon, 43 amino acids downstream. The observed 7 bp deletion in PRPF31 was identified in all the tested 10 affected members and in an unaffected individual, consistent with a high, but not the complete penetrance of c.59_65del7 (p.Gly20AlafsX43). This deletion was not observed in other tested six unaffected family members or in 100 ethnically matched control subjects. The present study describes mapping of a locus for non-syndromic adRP at 19q13.42 (RP11 locus) in a family of Indian origin and identifies a novel deletion, c.59_65del7, in PRPF31 within the mapped interval. Since the mutant PRPF31 is truncated relatively close to the N-terminus of the protein, haploinsufficiency rather than aberrant protein formation is likely to be the underlying mechanism of the disease. The present findings further substantiate the role of PRPF31 that encodes a component of the spliceosome complex in relation to adRP.

Keywords: Retinitis pigmentosa, adRP, PRPF31, Mutation screening, RP11 locus, Incomplete penetrance.

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ABSTRACT

Sanghera, D. K. Been, L. F. Ralhan, S. Wander, G. S. Mehra, N. K. **Singh, J. R.** Ferrell, R. E. Kamboh, M. I. and Aston, C. E. (2011). Genome-wide linkage scan to identify loci associated with type 2 diabetes and blood lipid phenotypes in the Sikh diabetes study. *PLoS ONE* **6**. <<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0021188>>

In this investigation, an autosomal genome-wide linkage analysis to map genes associated with type 2 diabetes (T2D) and five quantitative traits of blood lipids including total cholesterol, high-density lipoprotein (HDL) cholesterol, low-density lipoprotein (LDL) cholesterol, very low-density lipoprotein (VLDL) cholesterol, and triglycerides was carried out in a unique family-based cohort from the Sikh Diabetes Study (SDS). A total of 870 individuals (526 male/344 female) from 321 families were successfully genotyped using 398 polymorphic microsatellite markers with an average spacing of 9.26 cM on the autosomes. Results of non-parametric multipoint linkage analysis using Sall statistics (implemented in Merlin) did not reveal any chromosomal region to be significantly associated with T2D in this Sikh cohort. However, linkage analysis for lipid traits using QTL-ALL analysis revealed promising linkage signals with $p \leq 0.005$ for total cholesterol, LDL cholesterol, and HDL cholesterol at chromosomes 5p15, 9q21, 10p11, 10q21, and 22q13. The most significant signal ($p = 0.0011$) occurred at 10q21.2 for HDL cholesterol. We also observed linkage signals for total cholesterol at 22q13.32 ($p =$

0.0016) and 5p15.33 ($p = 0.0031$) and for LDL cholesterol at 10p11.23 ($p = 0.0045$). Interestingly, some of linkage regions identified in this Sikh population coincide with plausible candidate genes reported in recent genome-wide association and meta-analysis studies for lipid traits. Our study provides the first evidence of linkage for loci associated with quantitative lipid traits at four chromosomal regions in this Asian Indian population from Punjab. More detailed examination of these regions with more informative genotyping, sequencing, and functional studies should lead to rapid detection of novel targets of therapeutic importance.

Keywords: Type 2 diabetes, Genome wide linkage analysis, GWAS, polymorphism, T2D, blood lipid phenotypes, Asian Indian population, Linkage analysis, Sikh diabetes study.

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ABSTRACT

Sanghera, D. K. Demirci, F. Y. Been, L. Ortega, L. Ralhan, S. Wander, G. S. Mehra, N. K. Singh, J. Aston, C. E. Mulvihill, J. J. and Kamboh, I. M. (2010). PPARG and ADIPOQ gene polymorphisms increase type 2 diabetes mellitus risk in Asian Indian Sikhs: Pro12Ala still remains as the strongest predictor. *Metabolism* **59** (4), 492-501.

We have examined the association of 14 tagging single nucleotide polymorphisms (tagSNPs) in peroxisome proliferator activated receptor-gamma transcripts 1 and 2 (PPARG1 and 2) and 5 tagSNPs in adiponectin (ADIPOQ) genes for their effect on type 2 diabetes mellitus (T2D) risk in Asian Indian Sikhs. A total of 554 T2D cases and 527 normoglycemic controls were examined for association with T2D and other subphenotypes of T2D. With the exception of a strong association of PPARG2/Pro12Ala with T2D (odds ratio, 0.13; 95% confidence interval, 0.03-0.56; $P = .0007$), no other tagSNP in the PPARG locus revealed any significant association with T2D in this population. Similarly, none of the tagSNPs in the ADIPOQ gene was associated with T2D susceptibility in single-site analysis. However, haplotype analysis provided strong evidence of association of these loci with T2D. Three-site haplotype analysis in the PPARG locus using the 2 marginally associated SNPs (P/rs11715073 and P/rs3892175) in combination with Pro12 Ala (P/rs1801282) revealed a strong association of 1 "risk" (CGC) ($P = .003$, permutation $P = .015$) and 1 "protective" (CAC) ($P = .001$, permutation $P = .005$) haplotype associated with T2D. However, the major effect still appears to be driven by Pro12Ala, as the association of these haplotypes did not remain significant when analyzed conditional upon Pro12Ala ($P = .262$). In addition, 2-site haplotype analysis in the ADIPOQ locus using only 2 marginally associated SNPs (AD/rs182052 and AD/rs7649121) revealed a significant protective association of the GA haplotype with T2D ($P = .009$, permutation $P = .026$). Multiple linear regression analysis also revealed significant association of an ADIPOQ variant (AD/rs12495941) with total body weight ($P = .010$), waist ($P = .024$), and hip ($P = .021$), although these associations were not significant after adjusting for multiple testing. Our new findings strongly suggest that the genetic variation in PPARG and ADIPOQ loci could contribute to the risk for the development of T2D in Indian Sikhs. Identification of causal SNPs in these important biological and positional candidate genes would help determine the true physiologic significance of these loci in T2D and obesity.

Keywords: Type 2 diabetes, Gene polymorphism, PPARG, ADIPOQ, Asian Indian Sikhs, T2D susceptibility, Pro12Ala, Haplotype analysis.

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ABSTRACT

Saxena, R. Saleheen, D. Been, L. F. Garavito, M. L. Braun, T. Bjornes, A. Young, R. Ho, W. K. Rasheed, A. Frossard, P. Sim, X. Hassanali, N. Radha, V. Chidambaram, M. Liju, S. Rees, S. D. Ng, D. P. Wong, T. Y. Yamauchi, T. Hara, K. Tanaka, Y. Hirose, H. McCarthy, M. I. Morris, A. P. DIAGRAM; MuTHER; AGEN, Basit, A. Barnett, A. H. Katulanda, P. Matthews, D. Mohan, V. Wander, G. S. Singh, J. R. Mehra, N. K. Ralhan, S. Kamboh, M. I. Mulvihill, J. J. Maegawa, H. Tobe, K. Maeda, S. Cho, Y. S. Tai, E. S. Kelly, M. A. Chambers, J. C. Kooner, J. S. Kadowaki, T. Deloukas, P. Rader, D. J. Danesh, J. and Sanghera, D. K. (2013). Genome-wide association study identifies a novel locus contributing to type 2 diabetes susceptibility in Sikhs of Punjabi origin from India. *Diabetes Journal* 62 (5), 1746-1755.

A genome-wide association study (GWAS) and a multistage meta-analysis of type 2 diabetes (T2D) was performed in Punjabi Sikhs from India. Our discovery GWAS in 1,616 individuals (842 case subjects) was followed by in silico replication of the top 513 independent single nucleotide polymorphisms (SNPs) ($P < 10^{-3}$) in Punjabi Sikhs ($n = 2,819$; 801 case subjects). We further replicated 66 SNPs ($P < 10^{-4}$) through genotyping in a Punjabi Sikh sample ($n = 2,894$; 1,711 case subjects). On combined meta-analysis in Sikh populations ($n = 7,329$; 3,354 case subjects), we identified a novel locus in association with T2D at 13q12 represented by a directly genotyped intronic SNP (rs9552911, $P = 1.82 \times 10^{-8}$) in the SGCG gene. Next, we undertook in silico replication (stage 2b) of the top 513 signals ($P < 10^{-3}$) in 29,157 non-Sikh South Asians (10,971 case subjects) and de novo genotyping of up to 31 top signals ($P < 10^{-4}$) in 10,817 South Asians (5,157 case subjects) (stage 3b). In combined South Asian meta-analysis, we observed six suggestive associations ($P < 10^{-2}$ to $< 10^{-3}$), including SNPs at HMG1L1/CTCFL, PLXNA4, SCAP, and chr5p11. Further evaluation of 31 top SNPs in 33,707 East Asians (16,746 case subjects) (stage 3c) and 47,117 Europeans (8,130 case subjects) (stage 3d), and joint meta-analysis of 128,127 individuals (44,358 case subjects) from 27 multiethnic studies, did not reveal any additional loci nor was there any evidence of replication for the new variant. Our findings provide new evidence on the presence of a population-specific signal in relation to T2D, which may provide additional insights into T2D pathogenesis.

Keywords: Genome wide association study, GWAS, T2D, Type 2 diabetes, Punjabi sikhs, Multiethnic studies, SNP.

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ABSTRACT

Sharma, A. and Dhanya, M. S. (2012). *Biodegradable Bioplastics. Biologix- An illustrated text of biotechnological advancements ETBR- 2012*. National seminar on Emerging Trends in Biotechnological Research, pp. 63-67. Mewar Institute of Manangement, Ghaziabad.

The unavoidable and enormous uses of plastics and its negative impacts on environment and health paved the way to those are environmental friendly and lead to sustainability. Bioplastics are synthesized from renewable biomass like microorganisms or genetically modified plants in contrary to the production of petroplastic from non-renewable resources such as crude oil and petroleum. Bioplastics are biopolymers produced by microbes and accumulated as storage energy material in the form of lipid granules which metabolized under stress or when no other energy source is available. The different types of bioplastics are starch-based, cellulose-based, biopolyesters like poly hydroxyalkanoates (PHAs), etc. The production and degradation of bioplastics results in a net zero carbon emission and reduction in other greenhouse gas emissions, as most of it is biodegradable and broken down completely into CO₂ and H₂O in an active microbial environment naturally within five -six weeks thereby without contributing to global warming as well as pollution. It reduces much of the health hazards related to conventional plastic consumption and degradation. The major obstacle in the commercialization of bioplastics is the cost

factor, but the use of different inexpensive substrates as carbon sources; genetically modified plants which avoid the requirement of bioreactors, metabolically and genetically engineered microbial strains, etc. are helpful in improving yield and lowering the cost of production. This paper aimed at the natural degradation of bioplastics and its advantages over oil-based plastics which helps in achieving sustainable development.

Keywords: Bioplastics, petro plastics, environment friendly, biopolyesters, sustainable development

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ABSTRACT

Sharma, H. Kumar, R. Sharma, V. Kumar, V. **Bhardwaj, P.** Ahuja, P. S. and Sharma, R. K. (2011). Identification and cross-species transferability of 112 novel unigene-derived microsatellite markers in tea (*Camellia sinensis*)1. *American Journal of Botany* **98** (6), <<http://www.amjbot.org/content/98/6/e133.full>>

Premise of the study: Tea Unigene-derived MicroSatellite (TUGMS) markers were identified from the publicly available EST data in *Camellia sinensis* for characterization and future genome mapping studies in tea.

Methods and Results: One hundred twelve novel TUGMS markers were identified from 4356 unigenes derived by clustering of 12 788 random ESTs in *C. sinensis*. Amplification-based validation of the TUGMS loci proved them to be highly polymorphic [an average (av.) of 5.24 alleles], heterozygous (HE, av. 0.746; HO, av. 0.566) and informative (PIC, av. 0.392). TUGMS loci were 100% transferable in cultivated *C. assamica* and *C. assamica* subsp. *lasiocalyx* and highly cross-transferrable to the related species *C. japonica*, *C. rosiflora*, and *C. sasanqua*.

Keywords: *Camellia sinensis*, Cross-transferability, Tea unigene-derived MicroSatellite (TUGMS).

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ABSTRACT

Sharma, P. and **Saini, R. G.** (2011). Genetics of durable resistance to leaf rust in bread wheat cultivars Capelle Desprez and Pari 73. *Journal of Phytology* **3** (2), 78-81.

Bread wheat cultivars Capelle Desprez and Pari 73 have been showing adult plant leaf rust resistance in India since 20 years. To examine nature, number and mode of inheritance to leaf rust multipathotype tests were conducted on these cultivars along with reference line RL6058 and HD2009 and the susceptible cultivars WL711 and Agra Local at adult plant stages against the eight leaf rust races. F2 and F3 generations from crosses of Capelle Desprez and Pari 73 with susceptible cultivar WL711 were tested for percent disease severity against leaf rust race 77-5 which suggested the presence of three genes in Capelle Desprez and two genes in Pari 73 to leaf rust. Allelic tests using Capelle Desprez with RL6058 indicated the presence of linked genes Lr34/Yr18 however, presence of transgressive segregants in this cross indicated that the other two genes in Capelle Desprez are also involved in leaf rust resistance. The segregation for susceptible plants observed among all the crosses used for allelic tests of Pari 73 for leaf rust indicated that non-hypersensitive resistance genes in Pari 73 are different from those in RL6058, HD2009 and Capelle Desprez. Studies using 536 primers indicated that one of the three rust resistance gene(s) in cultivar Capelle Desprez is located on chromosome 1B, at a distance of 26.3cM from the primer Xgwm 268. Chromosome location of leaf rust resistance gene from cultivar Pari 73 could not be achieved.

Keywords: Durable resistance, Leaf rust, *Puccinia triticina*, Pari 73, Capelle Desprez

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ABSTRACT

Singh, A. (2011). Parvasi Punjabi Sabhyachar da Bhavikh: Bhashai Parsang. *Sirjana* 159: 74-80.

ਸ ਰ: ਪੰਜਾਬੀ ਸਭਿਆਚਾਰ ਦਾ ਵਿਦੇਸ਼ਾਂ ਵਿਚ ਭਵਿੱਖ ਕਿਸ ਤਰ੍ਹਾਂ ਦਾ ਹੋਵੇਗਾ, ਇਸਦੀ ਭਵਿੱਖਬਾਣੀ ਕਰਨਾ ਬੜਾ ਮੁਸ਼ਕਿਲ ਕੰਮ ਹੈ, ਕਿਉਂਕਿ ਪੰਜਾਬੀਆਂ ਦਾ ਪਰਵਾਸ ਬਹੁਤ ਸਾਰੇ ਦੇਸ਼ਾਂ ਵਿਚ ਵੱਖ ਵੱਖਰੇ ਢੰਗ ਨਾਲ ਫੈਲਿਆ ਹੋਇਆ ਹੈ, ਅਤੇ ਨਿਯਮਾਂ ਅਤੇ ਆਰਥਿਕ ਸਥਿਤੀਆਂ ਵਿਚ ਬਦਲਾਅ ਨਾਲ ਪ੍ਰਵਾਸ ਕਰਨ ਯੋਗ ਦੇਸ਼ ਵੀ ਲਗਾਤਾਰ ਬਦਲਦੇ ਰਹਿੰਦੇ ਹਨ। ਪੰਜਾਬੀ ਅਤੇ ਅੰਗਰੇਜੀ ਪਰਵਾਸੀ ਸਾਹਿਤ ਤੋਂ ਇਹ ਗੱਲ ਅਸਾਨੀ ਨਾਲ ਜਾਹਿਰ ਹੁੰਦੀ ਹੈ ਕਿ ਵਿਦੇਸ਼ਾਂ ਵਿਚ ਮੁੱਖ ਤੌਰ ਤੇ ਪਹਿਲੀ ਪੀੜ੍ਹੀ ਦੇ ਪਰਵਾਸੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨਾਲ ਜੁੜੇ ਹੋਏ ਹਨ, ਜਦੋਂਕਿ ਪੰਜਾਬੀ ਪਰਵਾਸੀਆਂ ਦੀਆਂ ਅਗਲੀਆਂ ਪੀੜ੍ਹੀਆਂ ਤੇਜ਼ੀ ਨਾਲ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਸਭਿਆਚਾਰ ਤੋਂ ਦੂਰ ਹੁੰਦੀਆਂ ਜਾ ਰਹੀਆਂ ਹਨ, ਪ੍ਰੰਤੂ ਨਾਲ ਹੀ ਭਾਸ਼ਾ ਮਨੁੱਖੀ ਪਛਾਣ ਵਿਚ ਮਹੱਤਵਪੂਰਨ ਭੂਮਿਕਾ ਨਿਭਾਉਂਦੀ ਹੈ ਅਤੇ ਆਪਣੇ ਮੂਲ ਨਾਲ ਜੁੜਨ ਵਿਚ ਸਹਾਈ ਹੁੰਦੀ ਹੈ। ਇਸ ਪਰਚੇ ਵਿਚ ਪੰਜਾਬੀ ਅਤੇ ਅੰਗਰੇਜੀ ਦੇ ਕੁਝ ਚੋਣਵੇਂ ਨਾਵਲਾਂ ਦੇ ਅਧਾਰ ਤੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਅਤੇ ਸਭਿਆਚਾਰ ਦੇ ਭਵਿੱਖ ਦੀ ਨਿਸ਼ਾਨਦੇਹੀ ਕਰਨ ਦੀ ਕੋਸ਼ਿਸ਼ ਕੀਤੀ ਗਈ ਹੈ।

ਕੀ-ਵਰਡ: ਪਰਵਾਸੀ ਨਾਵਲ, ਪੰਜਾਬੀ ਭਾਸ਼ਾ, ਕੰਜਕਾਂ, ਬੋਰਨ ਕਨਫਿਊਜ਼ਡ

Predicting the future of Punjabi culture in diaspora is quite a daunting task, because Punjabi dispora is widely scattered in different countries, and with the changes in immigration rules and economics, favourable countries of migration also keeps on changing. From the analysis of Punjabi and English diasporic literature, it becomes quite clear that first generation immigrants are deeply connected with Punjabi language, while next generations of Punjabi immigrants are rapidly drifting from Punjabi language and culture, but it is also true that language acts as an important identifier in human identity and facilitates connecting with the roots. This paper tries to understand the future directions of Punjabi language and culture on the basis of selected Punjabi and English novels.

Keywords: Diasporic fiction, Punjabi language, Kanjkan, Born confused

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ABSTRACT

Singh, B. (2013). India's Foreign Policy towards Southeast Asia: Issues Before and After the Cold War. *The IUP Journal of International Relations* 7 (2), 1-22.

India and Southeast Asia shared historical and civilizational relations since millennia. This multifaceted cordiality of relations remained intact between these two regions till the beginning of the Cold War era. The Indian leadership not only had a great sympathetic attitude but also supported the national movement of the Southeast Asian countries during the anti-colonial period. However, crescendo of cordiality witnessed for a very brief period during the Asian Relations Conference (1947) and Bandung Conference (1954) and lost its heyday with the beginning of the Cold War. These two regions drifted from each other due to many factors. This region lost its important place in Indian foreign policy and vice-versa having ideological differences. After the end of the Cold war, drastic changes took place in internal and external milieu which compelled India to redesign its foreign policy vis-a-vis with region. After the end of the Cold war, the Southeast Asia figured prominently in Indian foreign policy due to India's Look East Policy which was launched in 1991 by the then Narasihma Rao government. The main purpose of this paper is to explore the place of Southeast Asia in Indian foreign policy and what were factors responsible for drifting from each other and how external and internal dynamics brought together each other.

Keywords: Cold war, Look east policy, ASEAN, Non-alignment.

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ABSTRACT

Singh, H. P. Kaur, S. **Mittal**, S. Batish, D. R. and Kohli, R. K. (2010). In vitro screening of essential oil from young and mature leaves of *Artemisia scoparia* compared to its major constituents for free radical scavenging activity. *Food and Chemical Toxicology* **48** (4), 1040-1044.

The present study investigated the chemical characterization, and antioxidant activity of essential oil hydrodistilled from young and mature leaves of *Artemisia scoparia*. GC-MS analyses revealed a monoterpenoid nature (64–67%) with 44 and 31 constituents in young and mature leaves oil, respectively. The oil from young leaf contained greater amount of oxygenated compounds. β -Myrcene (24.13%) and *p*-cymene (27.06%) were the major constituents in young and mature leaves oil, respectively. *A. scoparia* leaf oils (25–200 μ g/ml) exhibited a strong 2,2-diphenyl-1-picrylhydrazyl radical scavenging capacity and antioxidant activity against hydroxyl radical and hydrogen peroxide. However, the activities of major constituent monoterpenes, β -myrcene and *p*-cymene, were less. In general, the DPPH radical scavenging and antioxidant activity was in the order: mature leaf oil > young leaf oil > β -myrcene > *p*-cymene.

Keywords: *Artemisia scoparia* (redstem wormwood); Leaf essential oil; GC-MS analyses; Monoterpenoids; DPPH scavenging activity; Antioxidant activity

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ABSTRACT

Singh, J. R. Singh, A. R. and Singh, A. R. (2010). Directory of Human Genetic Services in India - 2007. *International Journal of Human Genetics* 10 (1-3), 187-192.

On conservative estimates, more than 50 million individuals are affected with single gene (monogenic) genetic diseases in India. This number is going to swell many fold as the genetic predisposition in common diseases like diabetes, asthma, cancer, cardiovascular, and cerebro-vascular diseases, etc., is being established. The total number of individuals who are at higher risk of being afflicted with a genetic disease and consequently requiring diagnosis and counseling would thus be mind boggling. The sheer number of genetically ill individuals that are being added every year in our society should make health care planners feel greatly concerned, but unfortunately, the diagnosis and management of genetic diseases in India have remained largely neglected. The provision of basic health-care facilities and control of the infectious diseases are important, but equally if not more, is the timely and precise diagnosis of genetic diseases. The treatment of infectious diseases is relatively cheaper and is of shorter duration as compared to the life-long disabilities and the expensive treatments, where available, for the genetic diseases. Due to perpetual recurring nature of the genetic diseases, their economic burden on the society is much more than the infectious diseases. The predictive genetic testing, pre-natal diagnosis and timely genetic counseling can help to prevent the recurrence of genetic diseases. The early diagnosis of many genetic diseases, coupled with timely interventional therapy, can prevent several disease-associated disabilities. This directory summarizes the facilities and services available in India with respect to genetic disease.

Keywords: Human genetic services, Single gene disorders, Genetic pre-disposition, Genetic burden, Genetic diseases, Health care facilities, Genetic testing, Prenatal diagnosis.

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ABSTRACT

Singh, K. K. (2012). Re-designing geography through inter-linking of rivers: A feasibility study. *International Journal of Science, Environment and Technology* **1** (4), 358-362.

The long debated and beautifully fantasized mega project inter-basin linkages have prefigured the solutions of water shortage problem. But such plan has tremendous ecological and social ramifications for the country like India. This article brings out the sense about the feasibility and practicability of such project by exploring its geographical and social consequences. It suggests measures to conserve and augment water resources that are less damaging to the environment.

Keywords: River basin, River-linking, Diversion, Ecology, Water recharging.

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ABSTRACT

Singh, K. K. (2013). Land degradation in India: A quest for legal remedy. *International Journal of Advanced and Innovative Research* **2** (2), 94-109.

Sustenance of life on earth necessitates vital and productive quality of the land. The rapidly growing population, economic development and governmental policies are generating pressure over the land resource for the growing and competing demand of land for agriculture, forestry, pastures, settlements, and industries leading to deterioration in the quality of land. In the country like India, socio-political structure also plays an important role to drive land degradation and the land management processes are eclipsed by economic growth motive and need to produce food for expanding population level. It is widely recognized that land degradation management policies and strategies are essential to ensure sustainable land management. The present exercise attempts to highlight the dimension of land degradation problem and evaluate government programmes, policies and laws formulated and enacted to control such problem. Land and Soil conservation policies and programmes in other countries are also examined in context of their efficacy to address land degradation. In order to manage and conserve land the paper calls for the regular monitoring of degraded land using multi-dimensional approach and firm legal actions and plans to combat land degradation.

Keywords: Land degradation, Conservation, Policies, Laws, Regulation.

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ABSTRACT

Singh, M. Kumar, D. **Pandey, P.** Kumar, K. and Jain, V. K. (2011). Ambient noise levels due to dawn chorus at different habitats in Delhi. *Environment and We. An International Journal of Science and Technology* **6**: 123-134.

The characteristics that enable animals to live in urban environments are not well understood. A high level of ambient noise is a typical signature of an urban habitat, which makes vocal communication difficult for birds. The present study compares the noise levels due to dawn chorus of birds in semi-urban and forest habitats of Delhi region. The noise level measurements were carried out using Type I Sound Level Meter. Time series plots of noise levels at different 1/3 octave frequency indicates a significant increase in the noise levels in the frequency range of 1-4 kHz during the time of chorus as compared to background noise levels of the site. It is also observed that the dawn chorus of the birds at different sites in Delhi is mainly dominated by two generalist species, i.e., *Corvus splendens* (House Crow) and *Acridotheres tristis* (Common Myna). Spectrogram of typical calls by these two species also indicates the dominance of 1-2 kHz in their calls. Whereas the maximum noise levels during the dawn chorus reached up to 70dB levels and even more. Our results show that bird communities vary greatly along the different studied habitats. It is further observed that the urban sites are mainly dominated by a very few species like common myna, house crow, rock blue pigeon, while the species diversity at ridge forest sites

is found to be higher, and also includes bulbul, sunbirds and warblers etc. One of the reasons for significantly less number of species contributing to the dawn chorus could be harsh acoustic environments prevailing in the urban areas making the communication among the birds difficult. The results of this study would provide evidence for site dependent behavioral mechanism explaining noise dependent frequency use in bird chorus.

Keywords: Bird chorus, ambient noise, vocalization frequency, house crow, common myna

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ABSTRACT

Singh, P. and **Bast, F.** (2013). Multitargeted molecular docking study of plant-derived natural products on Phosphoinositide-3 Kinase pathway components. *Medicinal Chemistry Research*, DOI: 10.1007/s00044-013-0774-2.

Phosphoinositide-3 kinase (PI3K) signaling pathway comprises of a cornucopia of protein molecules capable of regulating numerous cellular events, including cell survival, cell cycle regulation, angiogenesis, and apoptosis. Deregulation of PI3K downstream signaling is a phenomenon commonly seen in various types of cancer and also held responsible for poor prognosis and resistance to chemotherapy. Targeting PI3K signaling pathway has become a new and promising strategy in combating cancer. In the present study, PI3K signaling components PI3K, PDK1, Akt, and mTOR were chosen and 51 natural compounds along with 17 reference compounds were selected as ligand with the aid of PubMed published literature search. Ligands were docked to protein molecules by using Maestro 9.3 (Schrodinger Inc.). It was discovered in this study that compounds myricetin, quercetin, morin, luteolin, and emodin yielded excellent dock score with the proteins concluded with the help of docking free energy. The remarkable feature of these compounds are their various pharmacodynamics and pharmacokinetic characteristics, many of which are in accordance with the "Lipinski's Rule of five". The docking study carried out is an endeavor to portray the docking of these compounds with the proteins, to summarize the various Gscore, hydrogen bond, electrostatic bond, and to chart out various factors that are decisive for and also govern the protein–ligand interactions

Keywords: Cancer, Phosphoinositide-3 kinase, Natural product compounds, Maestro 9.3

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ABSTRACT

Singh, R. K. Dhanaraj, E. and **Ramarao, P.** (2013). Inhibitory Effect of Calcium Channel Blockers on Development of Tolerance to Morphine Induced Analgesia. *Pharmacologia* 4 (1), 53-59.

The aim of this study was to investigate whether selective inhibition of neuronal nitric oxide synthase (nNOS) attenuated tolerance to morphine analgesia and whether does the dihydropyridines, the L-type Calcium Channel Blockers (CCB), have any effect on the inhibition of tolerance to morphine, when combined with 7-nitroindazole, a selective nNOS inhibitor.

Method: It has been hypothesized that in central nervous system, the augmented level of Excitatory Amino Acids (EAA), during chronic morphine treatment might activate N-methyl-D-aspartate (NMDA) receptor resulting in increased intracellular calcium. This further activates nNOS due to increased calcium-calmodulin complex formation.

Results: Thus, the nNOS level increased due to chronic morphine may increase the level of cyclic guanosine monophosphate (cGMP) leading to phosphorylation of some key proteins and finally inducing morphine tolerance. This study has demonstrated that the 7-nitroindazole and dihydropyridines can independently and dose-dependently was able to inhibit the development of morphine antinociceptive tolerance. Our results also suggested that dihydropyridine type calcium channel

blockers such as nimodipine and lercanidipine, when administered prior to 7-nitroindazole, were able to produce an additive effect on the inhibition of tolerance to morphine-induced analgesia as compared to either of the drugs alone.

Conclusion: These results suggested that increased intracellular calcium-induced activation of nNOS might be involved in the development of tolerance to morphine analgesia. Further we demonstrated for the first time that the dihydropyridines along with selective nNOS inhibitor produced an additive effect on attenuation of morphine antinociceptive tolerance.

Keyword: Morphine, Tolerance, Neuronal nNOS inhibitor, 7-nitroindazole, Dihydropyridines, Nimodipine, Lercanidipine

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ABSTRACT

Singh, R. P. and **Ramarao, P.** (2012). Cellular uptake, intracellular trafficking and cytotoxicity of silver nanoparticles. *Toxicology Letters* **213** (2), 249–259.

Silver nanoparticles (Ag NPs) are used in consumer products and wound dressings due to their antimicrobial properties. However, in addition to toxic effects on microbes, Ag NPs can also induce stress responses as well as cytotoxicity in mammalian cells. We observed that Ag NPs are efficiently internalized via scavenger receptor-mediated phagocytosis in murine macrophages. Confocal and electron microscopy analysis revealed that internalized Ag NPs localize in the cytoplasm. Ag NPs cause mitochondrial damage, induce apoptosis and cell death. These effects were abrogated in presence of Ag ion-reactive, thiol-containing compounds suggesting the central of Ag ions in Ag NP toxicity. Quantitative image analysis revealed that intracellular dissolution of Ag NPs occurs about 50 times faster than in water. In conclusion, we demonstrate for the first time that Ag NPs are internalized by scavenger receptors, trafficked to cytoplasm and induce toxicity by releasing Ag ions

Keywords: Silver nanoparticles, Silver ions, Mitochondria, Cellular uptake, Toxicity

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ABSTRACT

Singh, R. P. and **Ramarao, P.** (2013). Accumulated polymer degradation products as effector molecules in cytotoxicity of polymeric nanoparticles. *Toxicological Science*, DOI: 10.1093/toxsci/kft179.

Polymeric nanoparticles (PNPs) are a promising platform for drug, gene and vaccine delivery. Although generally regarded as safe, the toxicity of PNPs is not well documented. The present study investigated in vitro toxicity of PNPs and possible mechanism of toxicity. The concentration-dependent effect of PNPs on cell viability was determined in a macrophage (RAW 264.7), hepatocyte (Hep G2), lung epithelial (A549), kidney epithelial (A498) and neuronal (Neuro 2A) cell lines. PNPs show toxicity at high concentrations in all cell lines. PNPs were efficiently internalized by RAW 264.7 cells and stimulated reactive oxygen species and tumor necrosis factor – alpha production. However, reactive nitrogen species and Interleulin-6 production as well as lysosomal and mitochondrial stability remained unaffected. The intracellular degradation of PNPs was determined by monitoring changes in osmolarity of culture medium and a novel fluorescence recovery after quenching assay. Cell death showed a good correlation with osmolarity of culture medium suggesting the role of increased osmolarity in cell death

Keywords: Polymeric nanoparticles, In vitro toxicity, Nanoparticle degradation, Osmotic pressure, Intracellular degradation, Dye release

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ABSTRACT

Singh, R. P. Jain, S. and **Ramarao, P.** (2013). Surfactant-assisted dispersion of carbon nanotubes: mechanism of stabilization and biocompatibility of the surfactant. *Journal of Nanoparticle Research* **15**:1985.

Nanoparticles (NPs) are thermodynamically unstable system and tend to aggregate to reduce free energy. The aggregation property of NPs results in inhomogeneous exposure of cells to NPs resulting in variable cellular responses. Several types of surfactants are used to stabilize NP dispersions and obtain homogenous dispersions. However, the effects of these surfactants, per se, on cellular responses are not completely known. The present study investigated the application of Pluronic F68 (PF68) for obtaining stable dispersion of NPs using carbon nanotubes as model NPs. PF68-stabilized NP suspensions are stable for long durations and do not show signs of aggregation or settling during storage or after autoclaving. The polyethylene oxide blocks in PF68 provide steric hindrance between adjacent NPs leading to stable NP dispersions. Further, PF68 is biocompatible in nature and does not affect integrity of mitochondria, lysosomes, DNA, and nuclei. Also, PF68 neither induce free radical or cytokine production nor does it interfere with cellular uptake mechanisms. The results of the present study suggest that PF68-assisted dispersion of NPs produced suspensions, which are stable after autoclaving. Further, PF68 does not interfere with normal physiological functions suggesting its application in nanomedicine and nanotoxicity evaluation.

Keywords: Carbon nanotubes, Dispersion, Surfactant, Toxicity, Biocompatibility

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ABSTRACT

Singh, S. and **Singla, N.** (2012). Fresh Food Retail Chains and Traditional Fruit and Vegetable Retailers in India. *Productivity* **53**: 123-143.

There are growing concerns about the likely adverse impacts of recently permitted FDI in retail sector including food, on traditional retailers. This article profiles the traditional fruit and vegetable (F&V) retailers in India, their procurement operations, and analyses the impact of modern retail chains on them. It is found that modern retailing of fresh F&Vs has led to decline in the sales of traditional F&V retailers in India reflected in lower footfalls, lower turnover, and net incomes. Although, entire sales decline can not be attributed to the modern retail chains as other factors like reduced household income, high prices, and recession would have also impacted their sales, the article still finds that modern retail chains in well entrenched markets in India are impacting the small retailers adversely. The article highlights the strategies adopted by traditional retailers to tackle the modern retail chain impact and discusses policy measures to protect the interest of the traditional retailers.

Keywords: Retail chain, Vendors, Traditional retailers, FDI, Organised retail, Supermarkets

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ABSTRACT

Singh, S. Raina, V. Chavali, P. Dubash, T. Kadreppa, S. Parab, P. and Chattopadhyay, S. (2012). Regulation of GAD65 expression by SMAR1 and p53 upon Streptozotocin treatment. *BMC Molecular Biology* **13**:28.

Background: GAD65 (Glutamic acid decarboxylase 65 KDa isoform) is one of the most important auto-antigens involved in Type 1 diabetes induction. Although it serves as one of the first injury markers of β -islets, the mechanisms governing GAD65 expression remain poorly understood. Since the regulation of GAD65 is crucial for the proper functioning of insulin secreting cells, we investigated the stress induced regulation of GAD65 transcription.

Results: The present study shows that SMAR1 regulates GAD65 expression at the transcription level. Using a novel protein-DNA pull-down assay, we show that SMAR1 binding is very specific to GAD65 promoter but not to the other isoform, GAD67. We show that Streptozotocin (STZ) mediated DNA damage leads to upregulation of SMAR1 and p53 expression, resulting in elevated levels of GAD65, in both cell lines as well as mouse β -islets. SMAR1 and p53 act synergistically to up-regulate GAD65 expression upon STZ treatment.

Conclusion: We propose a novel mechanism of GAD65 regulation by synergistic activities of SMAR1 and p53.

Keywords: SMAR1, Diabetes, GAD65, p53, Streptozotocin

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ABSTRACT

Tsutakawa, S. E. Shin, D. S. Mol, C. D. Izumi, T. Arvai, A. S. **Mantha, A. K.** Szczesny, B. Ivanov, I. N. Hosfield, D. J. Maiti, B. Pique, M. E. Frankel, K. A. Hitomi, K. Cunningham, R. P. Mitra, S. and Tainer, J. A. (2013). Conserved Structural Chemistry for Incision Activity in Structurally Non-homologous Apurinic/Apyrimidinic Endonuclease APE1 and Endonuclease IV DNA Repair Enzymes. *Journal of Biological Chemistry* **288** (12), 8445-8455.

Non-coding apurinic/aprimidinic (AP) sites in DNA form spontaneously and as DNA base excision repair intermediates are the most common toxic and mutagenic in vivo DNA lesion. For repair, AP sites must be processed by 5' AP endonucleases in initial stages of base repair. Human APE1 and bacterial Nfo represent the two conserved 5' AP endonuclease families in the biosphere; they both recognize AP sites and incise the phosphodiester backbone 5' to the lesion, yet they lack similar structures and metal ion requirements. Here, we determined and analyzed crystal structures of a 2.4 Å resolution APE1-DNA product complex with Mg(2+) and a 0.92 Å Nfo with three metal ions. Structural and biochemical comparisons of these two evolutionarily distinct enzymes characterize key APE1 catalytic residues that are potentially functionally similar to Nfo active site components, as further tested and supported by computational analyses. We observe a magnesium-water cluster in the APE1 active site, with only Glu-96 forming the direct protein coordination to the Mg(2+). Despite differences in structure and metal requirements of APE1 and Nfo, comparison of their active site structures surprisingly reveals strong geometric conservation of the catalytic reaction, with APE1 catalytic side chains positioned analogously to Nfo metal positions, suggesting surprising functional equivalence between Nfo metal ions and APE1 residues. The finding that APE1 residues are positioned to substitute for Nfo metal ions is supported by the impact of mutations on activity. Collectively, the results illuminate the activities of residues, metal ions, and active site features for abasic site endonucleases.

Keywords: DNA repair, Base excision repair, Apurinic/aprimidinic endonuclease, APE1, Hap1, Ref-1, Endonuclease IV, EndoIV, Magnesium, zinc, Divalent metal

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ABSTRACT

Vaid, U. **Mittal, S.** and **Babu, J. N.** (2013). Removal of hexavalent chromium from aqueous solution using biomass derived fly ash from Waste-to-Energy power plant. *Desalination and Water Treatment*, DOI: 10.1080/19443994.2013.833554.

Fly ash from the agricultural waste-based Energy Power Plant has been studied for the adsorption of hexavalent chromium [Cr(VI)]. In order to maximize the Cr(VI) removal from simulated aqueous solutions, effects of various parameters i.e. adsorbent dose (10–40 g/L), contact time (5–90 min),

variation in pH (1–5), and initial metal ion concentration (10–80 mg/ L) on Cr(VI) adsorption were investigated by batch adsorption experiments. It was observed that adsorption of Cr(VI) on the selected adsorbent was dependent on pH. Before optimization of experimental conditions, the percent removal of Cr(VI) from the aqueous solution (10 mg Cr/L) was approximately 4%, which increased to approximately 99% after optimization of experimental conditions. Maximum adsorption was observed upon adding 10 g/L of adsorbent to a 60 mg Cr/L aqueous solution at pH 1.0 and contact time of 90 min at 200 rpm. Equilibrium adsorption data were well fitted in Langmuir isotherm model which substantiate monolayer adsorption of Cr(VI) on fly ash. Kinetics of Cr(VI) adsorption on fly ash follows pseudo-second-order reaction.

Keywords: Adsorption, Hexavalent chromium removal, Fly ash, Isotherms, Kinetics

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ABSTRACT

Vanita, V. Singh, J. R. Singh, D. Varon, R. and Sperling, K. (2009). Novel mutation in the gamma-S crystallin gene causing autosomal dominant cataract. *Molecular Vision* **15** (1), 476-481.

The underlying genetic defect in a north Indian family with seven members in three-generations affected with bilateral congenital cataract has been identified. Detailed family history and clinical data were recorded. Linkage analysis using fluorescently labeled microsatellite markers for the already known candidate gene loci was performed in combination with mutation screening by bidirectional sequencing.

Affected individuals had bilateral congenital cataract. Cataract was of opalescent type with the central nuclear region denser than the periphery. Linkage was excluded for the known cataract candidate gene loci at 1p34-36, 1q21-25 (gap junction protein, alpha 8 [GJA8]), 2q33-36 (crystallin, gamma A [CRYGA], crystallin, gamma B [CRYGB], crystallin, gamma C [CRYGC], crystallin, gamma D [CRYGD], crystallin, beta A2 [CRYBA2]), 3q21-22 (beaded filament structural protein 2, phakinin [BFSP2]), 12q12-14 (aquaporin 0 [AQP0]), 13q11-13 (gap junction protein, alpha 3 [GJA3]), 15q21-22, 16q22-23 (v-mafmusculoaponeuroticfibrosarcoma oncogene homolog [MAF], heat shock transcription factor 4 [HSF4]), 17q11-12 (crystallin, beta A1 [CRYBA1]), 17q24, 21q22.3 (crystallin, alpha A [CRYAA]), and 22q11.2 (crystallin, beta B1 [CRYBB1], crystallin, beta B2 [CRYBB2], crystallin, beta B3 [CRYBB3], crystallin, beta A4 [CRYBA4]). Crystallin, alpha B (CRYAB) at chromosome 11q23-24 was excluded by sequence analysis. However, sequencing the candidate gene, crystallin, gamma S (CRYGS), at chromosome 3q26.3-qter showed a heterozygous c.176G-->A change that resulted in the replacement of a structurally highly conserved valine by methionine at codon 42 (p.V42M). This sequence change was not observed in unaffected family members or in the 100 ethnically matched controls.

This paper reports a novel missense mutation, p.V42M, in CRYGS associated with bilateral congenital cataract in a family of Indian origin. This is the third report of a mutation in this exceptional member of the beta-/gamma-crystallin superfamily and further substantiates the genetic and clinical heterogeneity of autosomal dominant cataract.

Keywords: Congenital cataract, Linkage analysis, Crystalline, Gap junction protein, GJA8, CRYGB, CRYGC, CRYGD, CRYBA2, CRYBA1, CRYBB3, CRYBA4, CRYAB, CRYGS.

Vanita, V. Sperling, K. Sandhu, P. S. Sandhu, H. S. and **Singh, J. R.** (2009). Novel EXT1 and EXT2 Mutations in hereditary multiple exostoses families of Indian origin. *Genetic Testing and Molecular Biomarkers* **13** (1), 43-49.

Hereditary multiple exostosis (HME) is an autosomal dominant bone disorder, characterized by short stature and the presence of multiple benign tumors mainly at the ends of long bones. HME is genetically heterogeneous with two known genes on 8q24 (EXT1) and 11p11 (EXT2), and a third minor locus mapped to 19p (EXT3). The majority of EXT1 and EXT2 mutations result in premature protein truncation and loss of function.

Two autosomal dominant HME families of Indian origin were analyzed. Linkage analysis using fluorescently labeled microsatellite markers at the candidate gene regions was performed. Mutation analysis was carried out by bidirectional sequencing of purified PCR products.

Linkage was found in one family to EXT1 and in the other family to EXT2. Mutation screening in the EXT1 gene revealed a novel frameshift mutation, a single base deletion in exon 1 (c.142delC). This mutation segregated in all affected members and was absent in the unaffected family members and 60 unrelated controls. In the second family, a previously unreported stop mutation, the substitution c.817C>T, was observed in the EXT2 gene in all affected members and in none of the unaffected family members and 90 unrelated controls.

The findings of this paper expand the mutation spectrum of EXT1 and EXT2 and highlight the genetic and phenotypic heterogeneity of HME.

Keywords: Hereditary multiple exostoses, Genetic heterogeneity, EXT1, EXT2, EXT3, Mutations, Mutation screening, Autosomal dominant bone disorder.

Varghese, V. J. (2013). Possibilities of Reinventing Diasporic Connections with Central Asia: Reflections through History. In: Malhotra, R. Gill, S. S. and Gaur, N. (eds.), *Perspectives on Bilateral and Regional Cooperation South and Central Asia*, Chandigarh, pp. 345-358, CRRID, Chandigarh.

The paper attempts to explore the possibilities of re-linking India with Central Asia through new diasporic networks. It draws heavily from the history of India's escalating trade with Central Asia through the Indian merchant diaspora during the early modern period when Central Asia remained as an important conduit for overland Eurasian trade contrary to the widely held assumption that Central Asia was relegated into economic isolation ever since the European powers dominated the Indian Ocean trade. The paper relies much on the historical works of Stephen Dale, Sanjay Subrahmaniyam, Scott C. Levi, Claude Markovits and Muzaffar Alam to argue out a case for forging connections afresh through new diaspora – its potential as much as its limitations. It attempts to identify areas in which Indian diaspora and capital could reach out to its Central Asian locations in an increasingly globalising world.

Keywords: Central Asia, Diaspora, Trade, Migration.

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ABSTRACT

Varghese, V. J. and Rajan, S. I. (2011). Governmentality, social stigma and quazi citizenship: Gender 3 negotiations of migrant women domestic workers from Kerala. In: Rajan, S. I. and Percot, M. (eds.), *Dynamics of Indian migration: Historical and current perspectives*, pp. 224-248. Routledge, New Delhi.

This paper unravels the limits set by institutions on the citizenship of the unskilled Indian/Keralite women migrants (domestic workers) to the oil rich Middle East and South-east Asia, and the subtle manner in which these women negotiate with straddle such limiting structures in an attempt to find a niche for themselves. The first part of the paper focus on the emigration governance in India which is palpably configured in conformity with prevalent patriarchal norms. It is argued that female body is the primary focus of governmentality which disables women in their mobility options. It also elaborates how women confront the parallel economy of illegal migration to which they are 'pushed' to and how they tactfully oscillate between domains of illegality and legality. The second part of the paper is an analysis of a few personal narratives of Keralite women who have returned home after working as domestic workers abroad. The life stories herein underscore the primacy of the agency of women on the one hand and its embedded nature at multiple levels on the other.

Keywords: Migration, Gender, Middle East, Domestic workers, Governmentality.

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ABSTRACT

Varghese, V. J. and Rajan, S. I. (2012). Broadening Exchanges and Changing Institutions: Multiple Sites of Economic Transnationalism. In Rajan, S.I. (ed.), *India Migration Report 2012: Global Financial Crisis, Migration and Remittance*, pp. 322-346. Routledge, New Delhi.

Transnationalism is seen as something that runs against the state and driven primarily by the participating people and non-governmental agents, overlooking the role of the state in formalizing transnational spaces. Our paper, drawing from the Indian-Punjabi experience, argues that transnationalism has become a compelling economic imperative manufacturing institutional change at multiple levels with an active involvement of the state. It questions the dominant understanding of transnationalism as beyond and despite the state and as something that is weakening the nation state. The institutional changes at the national level are bolstered by a new discourse of 'state nationalism', at regional level an imagination of ethnic identity beyond the territorial confines of the sub-nation and a discourse original village at the local level. The institutional transformations in terms of alterations in administrative frameworks at all the three levels also reiterate the significance of the 'national', 'regional' and 'local' in an increasingly transnational world.

Keywords: State transnationalism, National regimes, Economic transnationalism, India, Punjab.

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ABSTRACT

Vikram, A. Jena, G. and **Ramarao, P.** (2010). Insulin-resistance and benign prostatic hyperplasia: the connection. *European Journal of Pharmacology* **641** (2-3), 75-81.

Benign prostatic hyperplasia (BPH) is a highly prevalent disease in the aged men population characterized by augmented cell proliferation and contractility of the prostate gland. Prior studies have demonstrated the relationship between BPH and insulin-resistance syndrome. During insulin-resistance, hyperinsulinemia develops to combat the decreased responsiveness of the body towards insulin. Although, the compensatory hyperinsulinemia prevents development of fasting hyperglycemia in

insulin-resistant individuals, the increased level of circulating insulin directly and/or indirectly affects different molecular signaling and can promote prostatic growth. Insulin-resistance syndrome includes group of disorders, such as obesity, dyslipidemia, sympathetic overactivity, hyperinsulinemia and each individually reported as risk factor for the development of BPH. The present review describes the inter-relationships between different insulin-resistance associated factors and their possible involvement in the pathogenesis of BPH.

Keywords: Insulin-resistance, Hyperinsulinemia, Prostate, Obesity, Diabetes, BPH, Hyperplasia

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ABSTRACT

Vikram, A. Jena, G. B. and **Ramarao, P.** (2010). Increased cell proliferation and contractility of prostate in insulin resistant rats: linking hyperinsulinemia with benignprostate hyperplasia. *The Prostate* **70** (1), 79-89.

Background: Obesity, dyslipidemia, Hyperinsulinemia, and insulin resistance (IR) are key features of metabolic syndrome and are considered as risk factors for benign prostatic hyperplasia (BPH) as well as type 2 diabetes. The present study was aimed to determine whether or not IR associated hyperinsulinemia contributes to the BPH.

Methods: Sprague-Dawley rats (9 weeks) were used in the study. Rats were kept on high fat diet (HFD) for the induction of hyperinsulinemia while hypoinsulinemia was induced by streptozotocin. Effect of HFD feeding on the testosterone-induced prostatic growth was evaluated. Pioglitazone (PG, 20 mg/kg) was used for the reversal of compensatory hyperinsulinemia and to examine the subsequent effect on the prostatic growth.

Results: Prostatic enlargement was observed in the HFD-fed rats. Significant increase in the cell proliferation markers confirmed the occurrence of cellular hyperplasia in the prostate of hyperinsulinemic rat. Enhanced alpha-adrenoceptor mediated contraction in the prostate of HFD-fed rats indicates augmented contractility of the gland. Higher level of phosphorylated-ERK suggests enhanced MEK/ERK signaling. HFD feeding has not led to change in the plasma testosterone level. However, testosterone treatment further augmented the prostatic growth in HFD-fed rats. PG treatment led to improved insulin sensitivity, decreased plasma insulin level and prostate weight, indicating the role of compensatory hyperinsulinemia in the prostate growth.

Conclusions: The present investigation reports that HFD-feeding induced hyperinsulinemic condition leads to increased cellular proliferation, enhanced alpha-adrenoceptor mediated contraction, and enlargement of the prostate in rats.

Keywords: High fat diet, Hyperinsulinemia, Prostate, Insulin resistance, Streptozotocin, Pioglitazone

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ABSTRACT

Vikram, A. Jena, G. B. and **Ramarao, P.** (2010). Pioglitazone attenuates prostatic enlargement in diet induced insulin-resistant rats by altering lipid distribution and reversing hyperinsulinemia. *British Journal of Pharmacology* **161** (8), 1708-1721.

Background and Purpose: Increased incidence of benign prostatic hyperplasia among insulin-resistant individuals suggests a role for hyperinsulinaemia in prostatic enlargement. We have already reported increased cell proliferation and enlargement of prostate gland in insulin-resistant rats. The present study aimed to elucidate the molecular mechanisms underlying the reversal of prostatic enlargement in insulin-resistant rats by the peroxisome proliferator-activated receptor γ agonist pioglitazone. **Experimental Approach:** Sprague-Dawley rats were fed a normal pellet or a high-fat diet for 12 weeks with or without pioglitazone (20 mg·kg⁻¹). Subgroups of animals fed different diets were castrated. Effects of dietary manipulation and pioglitazone were measured on insulin sensitivity, lipid distribution, cell proliferation and apoptosis.

Key Results: A high-fat diet led to the accumulation of fat in non-adipose tissues, insulin resistance, compensatory hyperinsulinaemia and prostatic enlargement in rats. Pioglitazone treatment altered fat distribution, improved insulin sensitivity and normalized lipid and insulin level in rats on the high-fat diet. The improved metabolic parameters led to decreased cellular proliferation and increased apoptosis in the prostate gland. High-fat diet feeding and pioglitazone treatment did not change plasma testosterone levels. However, significant prostatic atrophy was observed in castrated rats irrespective of dietary intervention.

Conclusions and Implications: Our results show a previously unexplored therapeutic potential of pioglitazone for prostatic enlargement under insulin-resistant condition and further suggest that targeting distribution of lipid from non-adipose tissue to adipose tissue and insulin signalling could be new strategies for the treatment of benign prostatic hyperplasia.

Keywords: Apoptosis, Diabetes, Free fatty acids, High-fat diet, Hyperinsulinaemia, Insulin-resistance, Testosterone, Lipid

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ABSTRACT

Vikram, A. Jena, G. B. and **Ramarao, P.** (2011). Insulin resistance reduces botulinum neurotoxin-type A induced prostatic atrophy apoptosis in rats. *European Journal of Pharmacology* **650** (1), 356-363.

Botulinum neurotoxin-type A (BoNTA) is an emerging therapeutic option for the treatment of benign prostatic hyperplasia. Recent reports indicate increased incidence of benign prostatic hyperplasia in the insulin-resistant individuals. Insulin-resistance is associated with the compensatory rise in the plasma insulin, which is known to have growth-promoting effects. The present study investigated the effect of insulin-resistance on the effectiveness of BoNTA in inducing prostatic atrophy in rats. Sprague-Dawley rats (200-220g), maintained on normal-pellet or high-fat diet, were injected in the ventral prostate with 200 μ l of saline or the same volume containing 5U BoNTA at the end of 9 weeks and were sacrificed 3 weeks later. Ventral prostate was carefully isolated, weighed, fixed and stained to examine the cellular morphology, cell death and proliferation. High-fat diet produced insulin-resistance, hyperinsulinemia and prostatic enlargement in rats. BoNTA caused prostatic atrophy and apoptosis in both insulin-resistant and insulin-sensitive rats. However, the effect of BoNTA was more prominent in insulin-sensitive rats (apoptosis-2 fold, prostatic atrophy-3 fold) as compared to the insulin-resistant rats. Significant increase in the phosphorylation of ERK-1/2 and expression of the proliferating cell nuclear antigen was observed in the prostate of insulin-resistant rats. In the present investigation we report that diet-induced insulin-resistance activates mitogenic signaling of insulin, increases cellular proliferation and reduces BoNTA-induced prostatic atrophy and apoptosis in rats. Results of the present study indicate that the insulin-resistance can affect the therapeutic outcome of BoNTA.

Keywords: Insulin-resistance; Botulinum neurotoxin-type A; Prostate; Apoptosis; Cell-proliferation

Vikram, A. **Ramarao, P.** and Jena, G. (2011). Insulin-resistance associated hyperinsulinemia activates MEK/ERK signaling and promotes prostatic growth: Reversal of effect with the intervention of PPAR {gamma} agonist pioglitazone. *FASEB Journal* **25**: 620-624.

Introduction: Obesity, dyslipidemia, hyperinsulinemia and insulin-resistance are the key features of metabolic syndrome and are considered as risk factors for prostatic hyperplasia and type 2 diabetes. The present study was aimed to determine whether or not insulin-resistance associated hyperinsulinemia contributes to the prostatic hyperplasia.

Methods: Spargue-dawley rats were kept on normal-pellet-diet/high-fat-diet (HFD) for 12 weeks with/without pioglitazone treatment. Effect of diet and pioglitazone was evaluated on the insulin-sensitivity, lipid-distribution, cell proliferation and apoptosis.

Results: Increased cell proliferation, MEK/ERK signaling and alpha-adrenoceptor mediated contractility was observed in the prostate of insulin-resistant rats. Pioglitazone treatment led to altered fat distribution, normalization of insulin level and resetting of the cellular equilibrium in the prostate of HFD-fed rats. The role of insulin in cellular proliferation was confirmed with insulin-receptor antagonist S961.

Conclusions: Diet-induced hyperinsulinemic condition leads to the increased cellular proliferation, enhanced contractility and enlargement of the prostate in rats. Further, our results suggest that targeting distribution of lipid and insulin signaling could be new objectives for the treatment of prostatic hyperplasia

Vishwakarma, G. S. and **Mittal, S.** (2012). Current status of alternative energy resources in Punjab, India: A review. Proceedings of *National Seminar on Emerging Trends in Civil Engineering*. pp 215-281 NITTTT, Chandigarh.

This paper is aimed to elaborate the current situation of alternative energy resources in Punjab, because, Punjab is the economic developed state, and behind this development Energy has played the most crucial role, but for energy Punjab is so much dependent on the non renewable energy resources like coal and oil, Punjab don't have its own natural resource and dependent on import from other states. These resources not only increasing the financial burden but also leads to environmental problems. So in order to sustainable meet of energy demand and environmental paces there is need to explore the use of alternative energy resources in Punjab. So in this context different govt. and privet organization are working for implementation of alternative energy resources. Currently Punjab using very limited amount of energy from various alternative energy resources like solar energy, biomass energy, hydro power, wind energy. Among them biomass and hydro power generation is higher as compare to solar and wind. Waste to energy generation and biomass energy generation plants already established in some industries, In case of solar power application of SPVs (Solar photovoltaic plates) are currently under exploration in various forms. In wind energy sector some privet companies are starting some new projects in Punjab. For enhancing energy efficiency the concept of Green buildings of Energy efficient building has been also adopted by various townships, govt organizations and Universities.

Keywords: Alternative energy resources, Punjab, Biomass Energy, Wind Energy, Solar energy

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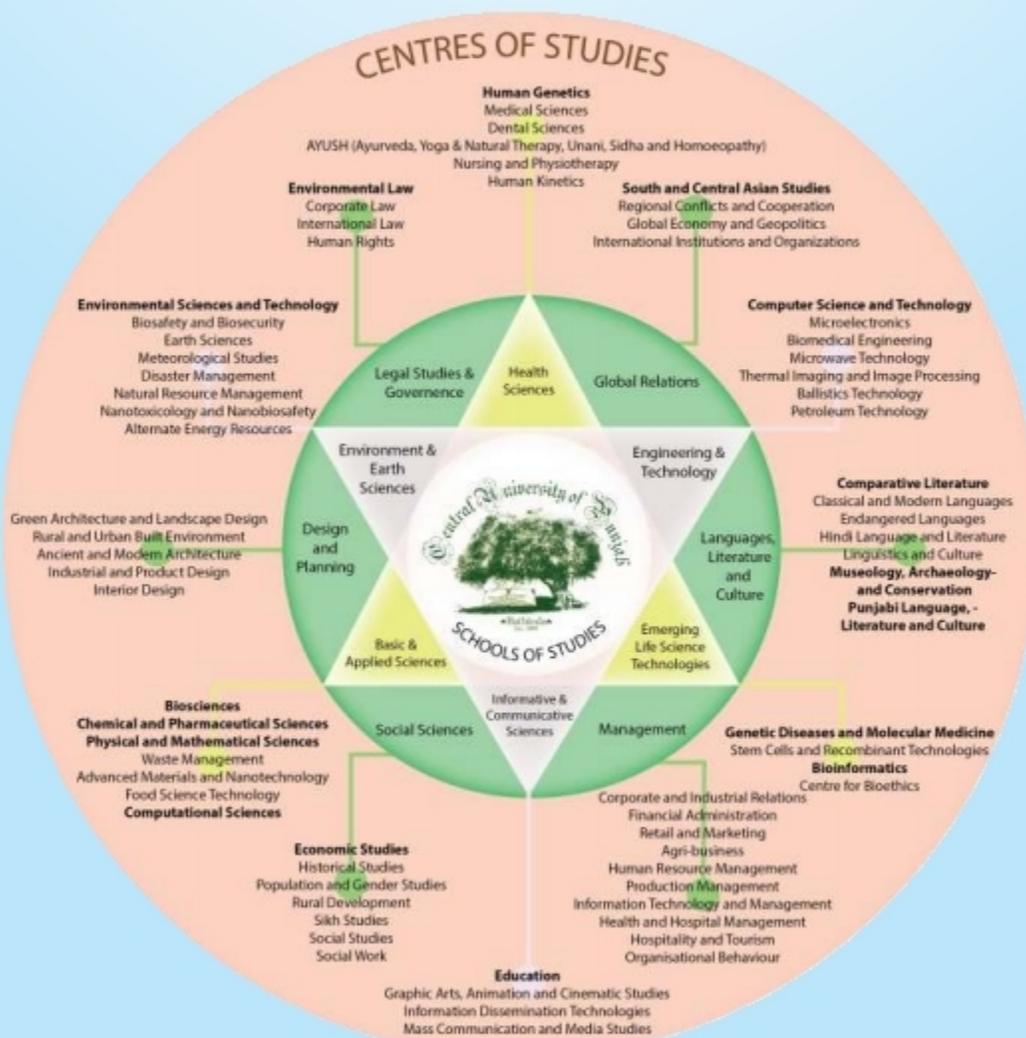
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