

ABSTRACT BOOK

of the

National Conference

On

"Advances in Basic
& Applied Sciences"

(ABAS-2014)

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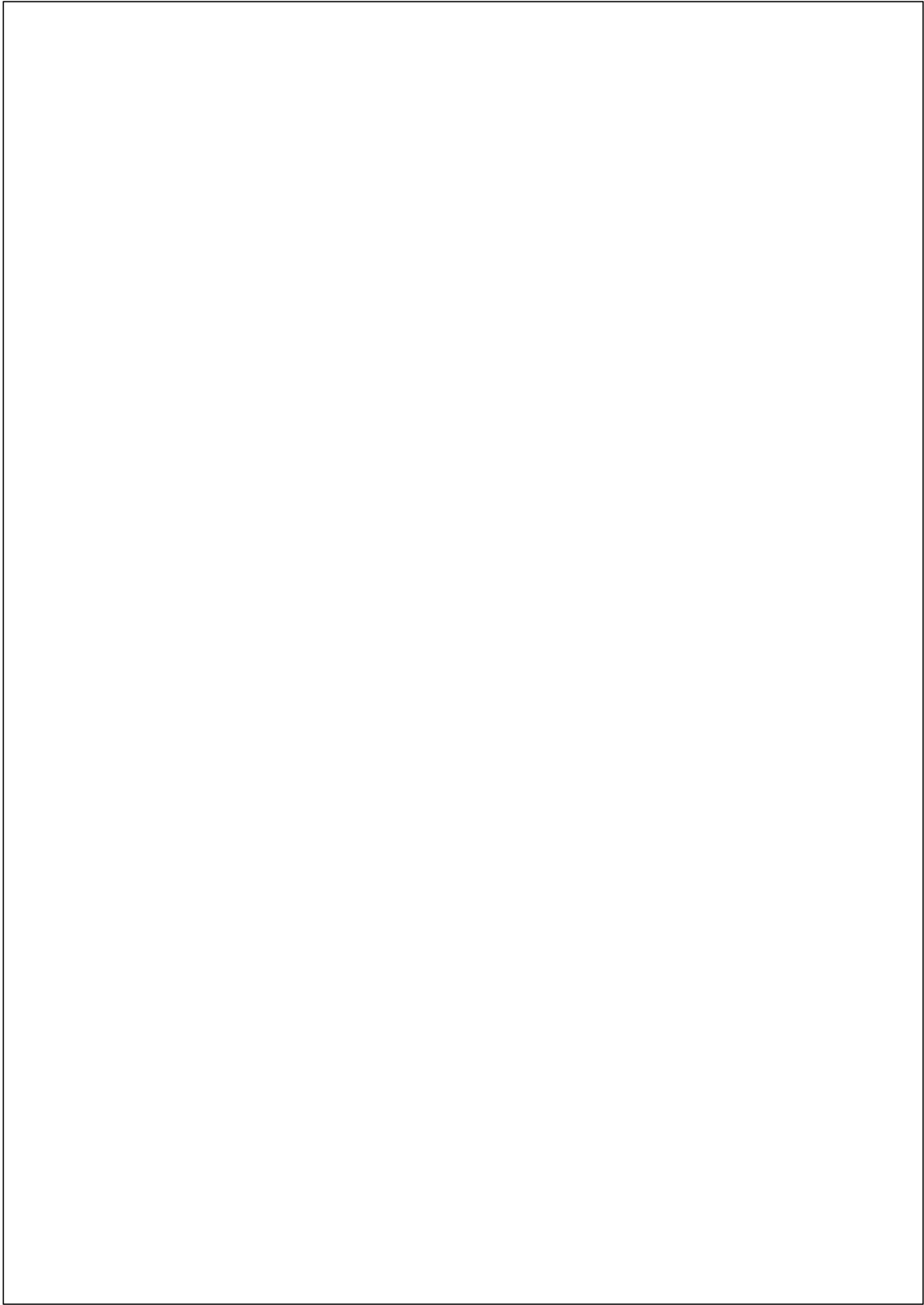
Organised By:-

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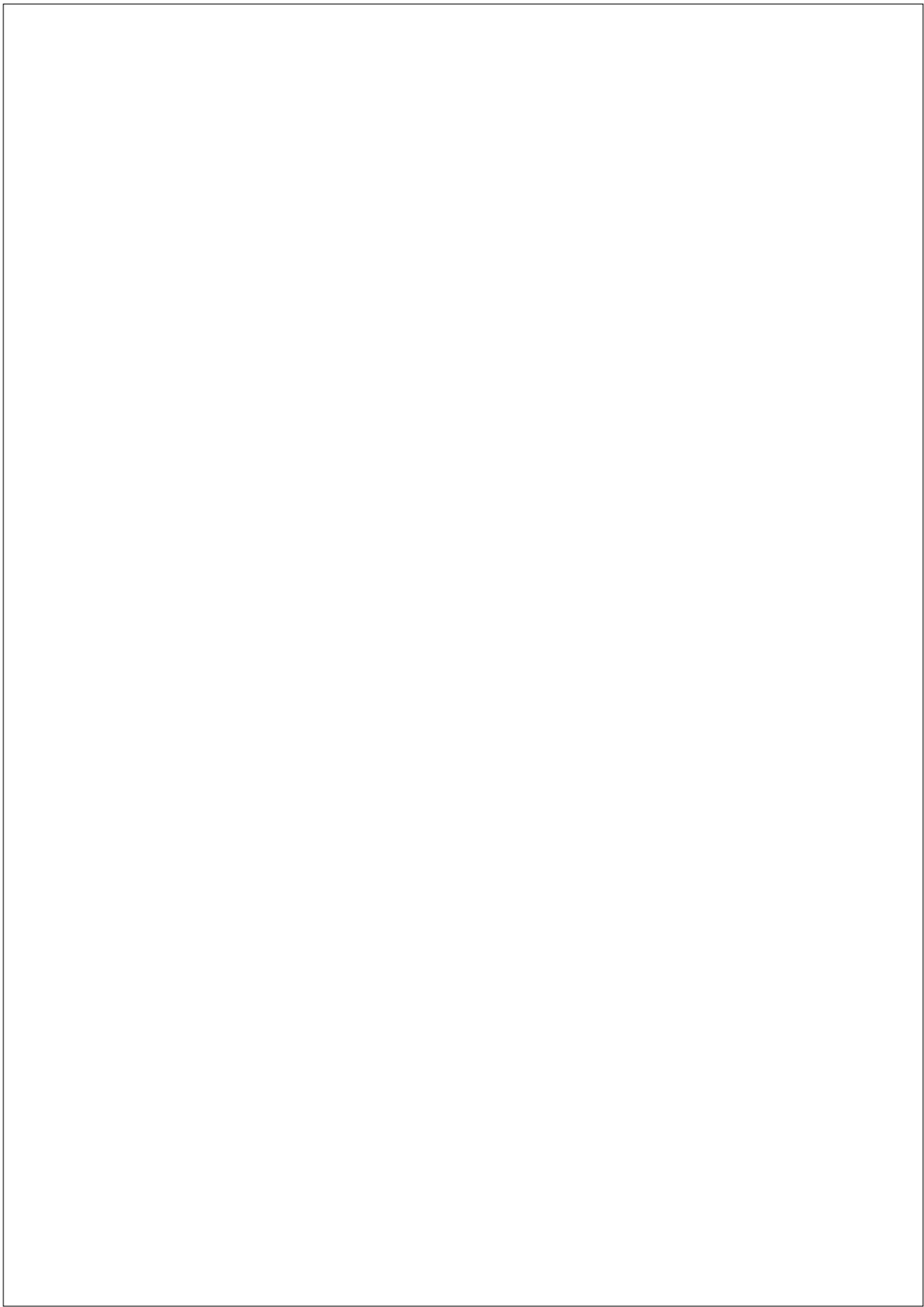
Science in its original sense is a word for a type of knowledge, rather than a specialized word for the pursuit of such knowledge. In particular, it is one of the types of knowledge which people can communicate to each other and share. In modern usage, “**science**” most often refers branches of study that seek to explain the phenomena of the material universe. The “**science**” has also continued to be used in a broad sense to denote reliable and teachable knowledge about a topic. Like library science or computer science or social or political sciences discoveries in science have made tremendous contributions in changing the world and the present day human beings have become heavily dependent on the fruits on science and technology. The changes in science and technologies are so swift, fast and mind boggling, necessitating regular interface for exchange of knowledge, technologies and findings.

It is heartening to note that School of BAS of this University is organizing the National Conference on Advances in Basic and Applied Sciences. The event will provide a platform to the budding academicians to benefit from the experiences of the leading experts in sciences expected to deliver keynote address.

I congratulate the organizers and wish the conference a grand success. I also take this opportunity to convey my best wishes to the participants from different institutions and faculty members of this university for fruitful deliberations.

A handwritten signature in blue ink, appearing to read 'P.L. Gautam', with a stylized flourish at the end.

(P.L. Gautam)



The word "science" probably brings to mind many different pictures: a fat textbook, white lab coats and microscopes, an astronomer peering through a telescope, a naturalist in the rainforest, Einstein's equations scribbled on a chalkboard, the launch of the space shuttle, bubbling beakers All of these images reflect some aspect of science, but none of them provides a full picture because science has so many facets. Science is a way of discovering what's in the universe and how those things work today, how they worked in the past, and how they are likely to work in the future. Scientists are motivated by the thrill of seeing or figuring out something that no one has before. Science is continually refining and expanding our knowledge of the universe, and as it does, it leads to new questions for future investigation.

Science is powerful. It has generated the knowledge that allows us to call a friend halfway around the world with a cell phone, vaccinate a baby against polio, build a skyscraper, and drive a car. And science helps us answer important questions like which areas might be hit by a tsunami after an earthquake, how did the hole in the ozone layer form, how can we protect our crops from pests, and who were our evolutionary ancestors? With such breadth, the reach of science might seem to be endless, but it is not. Science has definite limits.

Although scientists often care deeply about how their discoveries are used, science itself doesn't indicate what should be done with scientific knowledge. Science, for example, can tell you *how* to recombine DNA in new ways, but it doesn't specify whether you should use that knowledge to correct a genetic disease, develop a bruise-resistant apple, or construct a new bacterium. For almost any important scientific advance, one can imagine both positive and negative ways that knowledge could be used. Again, science helps us describe how the world *is*, and then *we* have to decide how to use that knowledge. We are all influenced by the cultures in which we grew up and the societies in which we live. These cultures shape our expectations, values, beliefs, and goals. Scientists, too, are shaped by their cultures and societies, which in turn, influence their work. For example, a scientist may refuse to participate in certain sorts of research because it conflicts with his or her beliefs or values, as in the case of Joseph Rotblat, a Polish-born physicist, whose personal convictions profoundly influenced the research he undertook.

In 1939, Joseph Rotblat became one of the first scientists to grasp the implications of splitting atoms — that the energy they release could be used to start a chain reaction, culminating in a massive release of energy — in other words, an atomic bomb. However, instead of being excited by the possibility, Rotblat worried about the enormous cost to human life such weapons would have and avoided following up on the idea. Then, in the same year, Rotblat narrowly made it out of Poland before the Nazi invasion and eventually lost his wife to the German occupation there. He was now fearful that Germany would develop their own atomic bomb. Reasoning that a competing power with a similar weapon could deter Hitler from using such a bomb, Rotblat began working on the idea in earnest and came to the United States to help the Manhattan Project develop an atomic bomb. But then came another turning point. In 1944, Rotblat learned that German scientists had abandoned their research into atomic weapons. It no longer seemed likely that the bomb which Rotblat was helping to develop would be used merely for deterrent purposes. In 1944, Rotblat became the only scientist to resign from the Manhattan Project — because he found its probable application unethical. After World War II, Rotblat channeled his physics towards medical applications and in 1995 won the Nobel Peace Prize for his efforts towards nuclear nonproliferation.

The words science and technology can and often are used interchangeably. Science focuses more on analysis, generalizations and the creation of theories while with technology, it focuses more on analysis and synthesis of design. Science is controlled by experimentation, while technology also involves design, invention and production. If science is all about theories, technology is all about processes. Over the past few years, India has seen some tremendous overall improvement. If progress can be quantified, then the burgeoning middle class, the prevalence of automobiles, the growth of telecommunication networks, and the increase in foreign trade all stand as clear indicators of a positive trend. Indian children, who ten years ago barely recognized a telephone, today speak of computers. The present scenario is such that we have more technologists than scientists. Science is about change and young people are the ones that bring about change. There needs to be a paradigm shift, which gives more power and autonomy to young scientists.

The future of scientific research in India is also very promising. India is the Promised Land of scientific research. India's research and development in many areas such as genetic modification, bio-energy sources, biochemistry, atomic energy, organ donation, biomedical science, and many other issues will determine much of the way these issues are viewed by the world in the near future. Industrial research and development competitiveness must be encouraged more, as most of the effort goes into the field of space, defense, oceanography, and atomic energy. However, India is strong in Software technology and computer science.

There is a decline in the number of students interested in science. The decrease in the number of students pursuing science is a global trend. Future earning potential has a major role in attracting a student to a particular discipline. We need to do science that will create more and better jobs. There may be an additional factor that is unique to India that is causing most of us to work at less competitive spirit. In Western culture, society has much less influence over one's life than in India where one is always concerned about the effects of one's actions on 'what will the society do or think of me'. Considering that one cannot separate life at office from that at home, numerous Indian scientists operate with less clear mind. Such pressures do not exist, for the most part, in the West. Whose lifestyle is better is not an issue to be addressed here, but it is observed that the Western views and values in science make it more conducive to scientific research. Controversy about India not producing enough PhD's in the science arena is one that have been going on recently. It is the opinion of Professor CNR Rao - a leading Indian scientist - that if India wants to keep and surpass its place in the scientific world, it must contribute more in that area, as right now it is not producing enough professionals to compete. This is viewed as one of the biggest obstacles for India. India is not producing the required number to meet the demand of the students in universities and colleges.

The economy of the planet is going towards globalization and a knowledge-driven economy in the fields of science and technology. The need for a shift to encourage this position in India's education system is key to how the country's future will emerge. The world is looking at India and hoping it continues to develop in the right direction so it can make the best use of some of the brightest talent in the world.

People all over the world participate in the process of science. And you can too!

That's why we are here today.

Preface

It gives us immense pleasure in bringing out the Abstract Book of the National Conference on Advances in Basic & Applied Sciences (ABAS 2014) being held at Career Point University Hamirpur (H.P.) on 10th May, 2014. This book highlights the important advances recently made in different fields of science. In the organization of ABAS 2014, we have tried to arrange special invited lectures on various scientific aspects. We take the opportunity to thank all the authors for contributing their papers to this conference which will benefit the readers in enhancing their understanding of area of science and technology. All the papers went through a preliminary review and will be published in International journal of repute “Asian Journal of Advanced Basic Sciences”. The views expressed in these papers are exclusively that of authors and editors are not responsible for any type of conflict or contradiction on this account. We are thankful to all the members of technical programme committee for their efforts in putting together an excellent programme. Organizing such a conference always need motivation and blessings of distinguished personalities. We are grateful to Professor P. L. Gautam, Honourable Vice – Chancellor, CPU Hamirpur for his blessings and constant continuous encouragement, motivation and moral support in organizing this conference. We are also thankful to the registrar, Dr. Sanjeev Sharma and Professor M. R. Sharma for putting faith in us to organize this conference. We are also thankful to all the faculty members of School of Basic and Applied Sciences and staff of CPU Hamirpur for making facilities available for this conference. We very much appreciate the efforts put in by post graduate students of the school for various activities to make this event successful and memorable.

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DIVERSITY AND SEASONAL VARIATION IN POPULATION OF A PHYTOPHAGOUS AND PREDATORY MITES ASSOCIATED WITH APPLE TREES IN DISTRICT KULLU (H.P.)

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Studies on population dynamics of some mites found associated with apple plants were conducted in orchards located at Nirmand (1450 m) in Kullu area. *Panonychus ulmi* Koch, a phytophagous mite and *Amblyseius (Euseius) pruni* Gupta, a predatory mite were investigated during March, 2005 to February, 2006 in the leaf samples collected from Nirmand area of Kullu hills. Studies on seasonal variations in population dynamics of *Panonychus ulmi* and *Amblyseius (Euseius) pruni* revealed that both these species appeared in the month of March on apple crop. Thereafter, their population started increasing till it attained a maximum during the month of June (27.83% and 26.93% respectively). Afterwards, there was a considerable decline till the month of August. A minor peak was again observed during the month of September (0.71% and 0.43% respectively) and then there was a constant decline in population of both *Panonychus ulmi* and *Amblyseius (Euseius) pruni* till December (0.71% and 0.43% respectively) and afterwards no infestation was observed. These variations in mite populations may be due to the fluctuations in temperature, relative humidity and sunshine hours.

Keywords: Mite, Phytophagous, Predatory, Seasonal Variation, Population.

ENVIRONMENT ISSUES AND POLICY IN INDIA

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The environmental issues in India is becoming more serious every day because of industrialization, urbanization, little or no environmental education, rapidly dropping water tables, mass deforestation, land

degradation or river contamination, vehicular pollution and poor environmental management practices. Urbanization without proper infrastructure and poor environment planning combined with high rate of population growth to cause major environment deterioration. The attitude of people disposing of their rubbish on the floor, every day and there are no bins.

The scope of the problem is almost unimaginable and it takes generations to change a habit like that but no one is starting. The need here is education and which is seriously missing. With regards to environmental issues in India, India appears to be digging its own grave deeper and quicker. Nearly 30% of India's gross agricultural output is lost every year due to soil degradation and poor land management. The main problem is improper disposal of industrial waste like chemicals etc. Like any other social, economic and political problems, environmental problem has caught the attention of policy-makers, intellectuals, social activists and researchers.

The environmental governance by which we take decisions, implement them by involving people, at present has become an increasingly important concern both at the national and international levels. Realizing the trend of pollution in various environmental media like air and water, soil etc., Ministry adopted policy for abatement of pollution, which provides multi-pronged strategies in the form of regulations, legislations, agreements, fiscal incentives and other measures to prevent and abate pollution. In India liability system is fails to improve the environmental quality due to informational disadvantages legal delays, poor monitoring, lack of comprehensive environment policy and poor environment awareness. Citizens should play a role in informing and shaping environmental policy, environmental management procedures have to be developed and environmental governance in India should be done through a combination of command principles.

Through the paper we will be throwing light on various environmental issues in India and Practical difficulties in the implementation of government environment policies and the measures for better environmental governance.

PRIVACY & SECURITY OF MOBILE CLOUD COMPUTING

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The Indian government, like governments elsewhere in the world, has chosen mobile device as preferred platform to engage with citizens while offering various e-Governance services. Likewise there is huge market for mobile based e-Commerce applications across the globe. However uptake of these services is challenged by the security and privacy concerns of the end user. The limited processing power and memory of a mobile device dependent on inherently unreliable wireless channel for communication and battery for power leaves little scope for a reliable security layer. Thus there is a need for a lightweight secure framework that provides security with minimum communication and processing overhead on mobile devices. The security and privacy protection services can be achieved with the help of secure mobile-cloud application services. Taking support from a proximate cloud a security service could be devised for a mobile device which works as an interface and adaptively provides optimum security solutions based on communication channel capacity, available system resources both hardware and software and user-defined parameters. We plan to explore and experiment with available options to recommend security and privacy enhancing approaches that may meet the security need for mobile application using automated sensing of the context.

Keywords: Mobile Security, Adaptive Security, m-governance, m-commerce, Privacy and Security.

CONSERVATION STRATEGIES AND FOREST MANAGEMENT IN HIMACHAL PRADESH

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Forest resources of Himachal Pradesh play an important role in the development of the economy and preserving environment. Population growth has caused increasing pressure on the limited land available for

agriculture and the forests remain the principle source of grazing, fuel wood and fodder. Deforestation and forest degradation cumulatively, result in the adverse ecological and livelihood consequences. Through the Forest Policy (1988) the management approach gave way to participatory facilitation. The Participatory Joint Forest Management approach assumes the greater involvement of community at all stages of the project cycle. The significant experimentation with participatory planning has been done by Forest Department in the form of different schemes and projects. The government has attempted to slow losses to its forests and increase tree cover through assistance from external donor agencies and a series of programmes and schemes, including social forestry joint forest management and recently linking forest development with its rural development and poverty reduction strategies. Now the stress has shifted from exploitation to conservation and management of forests. Participatory approach to forest management in Himachal Pradesh has been introduced by village level institutions VDCs (village development committees), VFDCs (village forest development committees) and VFDSs(village forest development schemes).

The primary responsibility of these institutions is to develop and implement a micro - plan for forest areas around the villages and these are also active in forest protection, controlling forest fires and grazing. In the light of increasing demand placed on the forest sector was its diminished capacity to meet the forest needs of the people, management of forests and sustainability has become a challenge. This study makes use of data which is collected from various governmental reports. Therefore, through this study an attempt has been made to highlight the role of H.P. Government to conserve and manage forests in such a way that our future may be secured.

Keywords: Deforestation, Forest degradation, participatory planning, Sustainability, Conservation.

SIGNIFICANCE OF WATER FOOTPRINT OF A NATION IN WATER RESOURCES MANAGEMENT

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Water is a scarce resource and needs to be treated economically. There is an urgent need to develop appropriate concepts and tools to tackle the

problem of water shortage. A bridge is required to be built between the water management practices and economic thinking. The available water has to be allocated in an efficient way. At local level the water use plays a key role. Local water use efficiency can be increased by creating awareness, charging price based on full or marginal cost and the use of water saving technology.

The paper highlights the concept of Water footprint of a nation, average water footprint per capita per country and comparison of water footprints of different nations. It suggests various measures to reduce the water footprints and the relevance of the concept.

Keywords: Water footprint, Water shortage, virtual water.

RENAL DAMAGE: A POSSIBLE ROLE OF DICLOFENAC INDUCED INJURY ASSOCIATED WITH ALTERED ACID PHOSPHATASE AND COLLAGEN CONTENT IN BALB/C MICE

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Nonsteroidal anti-inflammatory drugs (NSAIDs) are one of the most popular classes of drugs with anti-inflammatory, analgesic and antipyretic effects. NSAIDs interfere with certain metabolic pathways which are involved in formation of prostaglandins. The prostaglandins have been assigned many physiological roles including renal metabolism. Diclofenac, a NSAID, is prescribed for its anti-inflammatory and analgesic actions during different type of bone and muscle injuries. We hypothesized that other than treating different ailments, the drug can have some detrimental effects on kidney by possibly suppressing renal prostaglandins. To test this, Balb/c male mice were exposed to diclofenac sodium at dose rate of 10 mg/ kg/ body wt from 10-30 days. Collagen content of kidney was analyzed by estimating hydroxyproline content. Acid phosphatase was localized in renal tissue histochemically. Further, acid phosphatase was also assayed biochemically. A noteworthy hike in collagen concentration was noticed in diclofenac treated kidney throughout the study period ($p < 0.05$).

Histochemical sections revealed initial decrease in acid phosphatase content with some localized areas of enzyme activity. Change in acid phosphatase content was accompanied by many pathological abnormalities. These findings were corroborated by biochemical results too.

Keywords: Diclofenac, kidney, Acid phosphatase, Hydroxyproline.

DETERMINATION OF METHYLISOTHIOCYANATE IN ITS COMMERCIAL FORMULATION AND DIFFERENT SOILS BY A SIMPLE SPECTROPHOTOMETRIC METHOD

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Methylisothiocyanate (MITC), CH₃CNS, marketed as Di-trapex is used as soil fumigant for nematodes, fungi etc. It is also released from fumigants such as metam-sodium, metam-potassium and dazomet which undergo decomposition to MITC in moist soils. MITC is volatile, contaminate the nontarget areas by diffusion and its exposure can cause various adverse effects to other organisms including human beings. In the present work a simple spectrophotometric method for the determination of methylisothiocyanate in soil is described. The isothiocyanate is treated in acetonitrile medium with an excess of n-butylamine to convert it into a substituted thiourea and the surplus amine can be smoothly quantitatively transformed into bright yellow copper(I) n-butylidithiocarbamate through reaction with carbon disulphide and copper(I) perchlorate. The yellow colour which develops immediately is stable for at least 120 min and is measured at 360nm. It may be mentioned here that the pesticide is not directly involved in its determination but is stiochiometrically related to the concentration of n-butylamine as dithiocarbamate. The method has been successfully applied to the analysis of a commercial insecticide formulation based on methylisothiocynate - ditrapex and for its soil adsorption studies on four soils of different soil characteristics. The adsorption isotherms have been evaluated by Freundlich's adsorption

equation and have been found to be S-type. Various adsorption parameters such as (K_d), (K_{oc}), (G^0) and (GUS) have also been calculated. The very low values of K_{oc} suggest that methylisothiocyanate is very weakly adsorbed and is highly mobile in soil. The leaching potential of methylisothiocyanate has been evaluated in terms of ground water ubiquity score (GUS) and has been found in the range 1.84-2.02, classifying it as a transient pesticide.

**A STUDY OF ACTIVATION PARAMETERS
FOR VISCOUS FLOW PROCESS
OF
ELECTROLYTES IN BINARY MIXTURES OF
DIMETHYLSULFOXIDE AND WATER.**

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The densities, viscosities and relative viscosities of solutions of univalent electrolytes like Lithium bromide (LiBr), Sodium bromide (NaBr), Potassium bromide (KBr), Rubidium bromide (RbBr), Cesium bromide (CsBr) and reference salts tetra butyl ammonium tetraphenyl borate (Bu_4NBPh_4), tetrabutylammonium bromide (Bu_4NBr) and potassium chloride (KCl) were measured over the entire range of concentration at 25, 35 and 45°C in pure DMSO, pure water and DMSO – H₂O binary mixtures.

The viscosity data have been analysed in terms of A and B viscosity coefficients of the Jones Dole equation. Both A and B coefficients have been found to be positive over the entire solvent composition range at all temperatures. The partial molal volumes have also been calculated which have been used along with B- values to calculate the activation parameters for viscous flow process electrolytic solution. The activation parameters have been examined as a function of solvent composition to interpret the solution behaviour of electrolytes in DMSO - water mixtures.

GEOLOGICAL SIGNIFICANCE OF RADON GAS IN SOIL AND UNDERGROUND WATER: A CASE STUDY OF NURPUR AREA, DISTRICT KANGRA, HIMACHAL PRADESH, INDIA

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Remote sensing satellite data have been used to recognize structures having tectonic significance. Based on satellite data, lineament map of Nurpur and its adjoining area of Kangra district, Himachal Pradesh, has been generated. LR-115 solid state nuclear track detectors have been used for the measurement of soil gas radon at 71 different locations of the study area. Radon monitoring in underground water at 26 different locations of the study area has been carried by scintillometry. The results indicate zones of lineament density and tectonically induced radon in soil and underground water. The results are co-relatable with regional geology of the area.

IPv6 TRANSITION AND SCENARIO IN INDIA

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This paper reviews the government policy approaches regarding the transition from IPv4 to IPv6. IPv4 is limited to 4.2 billion possible addresses which is not sufficient so another version of internet protocol was developed with 128 bit addresses providing 340 trillion addresses. However the transition process between IPv4 and IPv6 is quite complex. As per the data available, a centre of innovation for IPv6 is planned which refers to a substantial transition to IPv6 by 2020 with the vision to provide an environment of end to end IPv6 Services under a single umbrella with objectives like implementing IPv6 based pilot projects, to develop model Experimental IPv6 Network, Technical support to Central and State Government units Conducting certified training programs R& D in

collaboration with premier institutes for new RFC/New applications, IPRs etc. Also Consultancy support at National / International level is to be provided. Auditing of the networks & its certification is another objective of this policy. The document also tracks the sites where this transition has already taken place successfully and different complex mechanisms that this transition has to deal with for its desired working.

Keywords: Policy, Transition, Government, Objectives.

HARNESSING ECONOMIC POTENTIAL OF METHYLCELLULOSE FROM WHEAT STRAW: A REVIEW

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Wheat Straw is the agricultural by-product obtained from different parts of wheat plant like stem, leaves etc. Wheat Straw is rich in cellulosic fibers, hemicelluloses, proteins, lignin and ash. All these elements together make wheat straw as most important and balanced substrate for microbial cultures for its diverse applications in fermentation, food, feed, medicine industries and in fields to increase soil fertility. It is the cheapest or low cost source of natural substrate.

Methylcelluloses is prepared and characterized from wheat straw. Alpha-Cellulose of wheat straw is used to prepare methylcellulose. Total chloride free (TCF) method is used to bleach the pulps with hydrogen peroxide. Iodomethane is used to synthesize methylcelluloses from TCF bleached pulps. Methylation is carried out in isopropanol with iodomethane at 60 degree Celsius for 22 h and after that the TCF bleached pulps is mercerized in 40% NaOH solution for one hour.

Fourier transform infrared (FTIR) spectra of the synthesized methylcelluloses showed the existence of methoxyl groups on methylcellulose. The degrees of substitution of the synthesized methylcelluloses is measured by ^{13}C nuclear magnetic resonance (NMR) spectroscopy. The molecular weights of the water-soluble methylcelluloses is determined by size exclusion chromatography (SEC). Intrinsic viscosities of the synthesized methylcelluloses was measured in distilled water, 4%

NaOH or dimethyl sulfoxide(DMSO). Methylcelluloses with better properties, such as greater degrees of substitution, molecular weights, viscosities, and intrinsic viscosities, were prepared from the pulps with higher accessibilities and reactivities. Water-soluble and alkali-soluble methylcellulose yields is determined by solvent extraction. Pulping severity is key factor influencing the properties of the methylcellulose prepared.

Keywords: wheat straw, alpha cellulose, methylcellulose, mercerization, intrinsic viscosity, FTIR, NMR, SEC.

BIOMETRICS AND FINGERPRINT MATCHING

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“The future is in the palm of your hand.” With the proliferation of biometric technology, it has never been truer. The future really is in the palm of your hand, but did you know it's also in the pattern of your iris, the minutiae of your fingerprint, and the structure of your face? Biometric recognition, or simply biometrics or life metrics, are base for a plethora of highly secure identification and personal verification solutions . A biometric system is fundamentally a pattern recognition system that recognizes a person by determining the authentication by using his different biological features i.e. Fingerprint, retina-scan, iris scan, hand geometry, and face recognition are leading physiological biometrics and behavioral characteristic are Voice recognition, keystroke-scan, and signature-scan. By using biometrics, iris possible to confirm or establish an individual's identity based on “who he/she is,” rather than by “what he/she possesses” (e.g., an ID card) or “what he/she remembers” (e.g., a password). Fingerprint matching has been successfully used by law enforcement for more than a century. The technology is now finding many other applications such as identity management and access control. The paper gives a brief overview of the field of biometrics, describes an automated fingerprint recognition system and identifies key challenges in the field.

Keywords: Biometrics, biometric techniques, identification, verification, fingerprints recognition.

**DIVERSITY ANALYSIS, INDIGENOUS USES
AND CURRENT STATUS
OF MEDICINAL PLANTS IN MOHALKHAD
WATERSHED OF HIMACHAL PRADESH,
NORTH WESTERN HIMALAYA**

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The importance of indigenous medicinal plants in traditional healthcare systems is well known. In spite of that the documentation on traditional knowledge and practices of medicinal plants is very poor particularly from remote areas in the Himalaya. Therefore, the present study was conducted to assess the diversity, distribution pattern, indigenous uses and current status of medicinal plants in Mohalkhad Watershed of Himachal Pradesh, North Western Himalaya. Total 278 species of belonging to 92 families and 210 genera were recorded which included 33 trees, 192 herbs, 47 shrubs, 3 species each of climbers and ferns and were used by the inhabitants of the area in curing various diseases/ailments. These species were also analysed to assess their nativity, endemism, rarity and prioritized for cultivation. Of the total species, 124 were native to the Himalayan Region, 3 endemic, 27 near-endemic and remaining species were non-natives. Following IUCN criteria, 8 species were identified as critically endangered, 9 as endangered, 23 as vulnerable, 10 species as near threatened and 228 as of least concern categories.

The unsustainable harvesting techniques, habitat degradation, high anthropogenic pressure and changing environmental conditions may lead to the extinction of species within a few years. Therefore, monitoring of habitats with high conservation and socio-economic values; stabilization of degraded habitats; development of conventional and in-vitro propagation protocols for the RET (Rare, Endangered and Threatened) species; capacity building of the stakeholders; and ensuring participation of the stakeholders in biodiversity conservation and management have been suggested. Moreover, formation of Biodiversity Management

Committees (BMCs) at Panchayat, Block and District level has also been recommended.

Keywords: Biodiversity Management Committees (BMCs), conservation prioritization, diversity, endemism, indigenous uses, nativity, Mohalkhad Watershed.

DIVERSITY, DISTRIBUTION AND ECONOMIC POTENTIAL OF WILD EDIBLE PLANTS IN HIRB AND SHOJA CATCHMENTS OF KULLU, HIMACHAL PRADESH

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The dependence of humans on biological resources for their sustenance is since time immemorial. Humans depend on biological resources for food, shelter, clothing, medicine, fibre, energy, construction, inspiration and much else besides. Both have had a close and supportive relationship since long. Many wild plants are used as food by local people living in and around the forest areas. In the Indian Himalayan Region (IHR) the inhabitants use a large number of species as food or supplementary food. In general, in the IHR, studies on wild edibles are available. However, at catchment level the studies are meagre. Therefore the present study has been conducted in Hirb & Shoja Catchments of Saraj Forest Division in Kullu District, Himachal Pradesh to assess the diversity, endemism and economic potential of wild edibles. A total of 126 wild edible vascular plants belonging to 78 genera and 50 families were recorded. The families Rosaceae (16 spp.), Apiaceae and Polygonaceae (09 spp. each) and Polygonaceae (08 spp.) were species rich. These species were distributed between 2000-3650m. Of the total species, 59% species were native to the Himalayan Region; four (04) species endemic and twenty nine (29) species were near endemic. Various parts such as fruits, rhizomes, roots, tubers, aerial parts, Seed, whole plant, aerial part, leaves, flowers, frond, tender shoots, etc. are either used raw, roasted, fried or cooked, pickled.

These species have been analysed for the economic potential i.e., nutritional, medicinal, oil seeds, multipurpose utility, commercial/trade value and wild relatives of crop plants. Appropriate strategy for the conservation and sustainable utilization of wild edible plants has been suggested.

Keywords: Diversity, nativity, endemism, economic potential, wild edibles, Hirb & Shoja Catchments.

POTENTIAL OF DOMESTIC ROOFTOP WATER HARVESTING IN CHAMBA AREA IN HIMACHAL PRADESH

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Water is finite resource. Though India receives a good amount of rain but due to growing population and over exploitation water is becoming a scarce resource. Water is very scarce resource in Shiwalik hills of Himachal Pradesh. It is very important for the survival of every human being but little attention is being paid for its conservation. Due to indiscriminate use of groundwater the water table is going down abnormally. Rainwater is the main source of water and if rainwater is harvested properly the water shortage problem can be eliminated to a large extent. Rainwater is free from organic matter and soft in nature. It is also bacteriologically pure. This is an ideal solution for a water problem, especially related to hilly areas where the ground water table is low and the surface sources are few and that too are found at a very low elevation in the valleys. The water has to be pumped to a high elevation where the habitations are situated. The rainwater harvested from rooftops can be stored in a tank and can be used directly. It can be used indirectly by diverting it to recharge the aquifer. Though Himachal Government has provided piped drinking water facilities to all of its population in state yet there are areas which face acute shortage of water during dry months. The paper aims toward the development of the framework for domestic rooftop harvesting for household use. The paper is based on the analysis of survey record of 50 houses of different roof areas of Chamba district in

Himachal Pradesh in India. The estimation of the appropriate size of the water tanks to fulfill the annual drinking water demand through Domestic Rooftop Harvesting has been done. The domestic rainwater Harvesting (DWRH) has been designed considering the existing rainwater outlets and types of roof prevailing in the area.

Keywords: Rooftop Rainwater harvesting, Shiwalik hills, Water shortage, Chamba district.

STEM CELL ITS POTENTIAL AND CONTROVERSIES: A REVIEW

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Stem cells are undifferentiated biological cells that can differentiate into specialized cells and can divide (through mitosis) to produce more stem cells. Commonly, stem cells come from two main sources: Embryos formed during the blastocyst phase of embryological development (embryonic stem cells) and Adult tissue (adult stem cells). In adult organisms, stem cells and progenitor cells act as a repair system for the body, replenishing adult tissues. A progenitor cell is a biological cell that, like a stem cell, has a tendency to differentiate into a specific type of cell, but is already more specific than a stem cell and is pushed to differentiate into its "target" cell. Adult or somatic stem cells exist throughout the body after embryonic development and are found inside of different types of tissue. These stem cells have been found in tissues such as the brain, bone marrow, blood, blood vessels, skeletal muscles, skin, and the liver. They remain in a quiescent or non-dividing state for years until activated by disease or tissue injury. Embryonic stem cells are derived from a four- or five-day-old human embryo that is in the blastocyst phase of development. *Potency* specifies the differentiation potential (the potential to differentiate into different cell types) of the stem cell. Totipotent stem cells can differentiate into embryonic and extraembryonic cell types. Such cells can construct a complete, viable organism. These cells are produced from the fusion of an egg and sperm cell. Cells produced by the

first few divisions of the fertilized egg are also totipotent. Pluripotent stem cells are the descendants of totipotent cells and can differentiate into nearly all cells, i.e. cells derived from any of the three germ layers. Multipotent stem cells can differentiate into a number of cell types, but only those of a closely related family of cells. Oligopotent stem cells can differentiate into only a few cell types, such as lymphoid or myeloid stem cells. Unipotent cells can produce only one cell type, their own, but have the property of self-renewal, which distinguishes them from non-stem cells (e.g. progenitor cells, muscle stem cells). Embryonic stem cells are considered pluripotent instead of totipotent because they do not have the ability to become part of the extra-embryonic membranes or the placenta. Stem cell research is also useful for learning about human development. Undifferentiated stem cells eventually differentiate partly because a particular gene is turned on or off. Stem cell researchers may help to clarify the role that genes play in determining what genetic traits or mutations we receive. Cancer and other birth defects are also affected by abnormal cell division and differentiation. New therapies for diseases may be developed if we better understand how these agents attack the human body. Tissue regeneration is probably the most important possible application of stem cell research. Currently, organs must be donated and transplanted, but the demand for organs far exceeds supply. Stem cells could potentially be used to grow a particular type of tissue or organ if directed to differentiate in a certain way. The debates surrounding stem cell research primarily are driven by methods concerning embryonic stem cell research. It was only in 1998 that researchers from the University of Wisconsin-Madison extracted the first human embryonic stem cells that were able to be kept alive in the laboratory. The main critique of this research is that it required the destruction of a human blastocyst. That is, a fertilized egg was not given the chance to develop into a fully-developed human. The stem cell debate has risen to the highest level of courts in several countries. Production of embryonic stem cell lines is illegal in Austria, France, Germany, and Ireland, but permitted in Finland, Greece, the Netherlands, Sweden, and the UK. In the United States, it is not illegal to work with or create embryonic stem cell lines.

Keywords: Stem cell, Therapy, Embryonic cell, Totipotent.

POTENTIAL OF DRIP AND SPRINKLER IRRIGATION IN HIMACHAL PRADESH

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Irrigation plays an important role in increasing the yield, intensity and productivity of the crops. It benefits the farmers and help to increase employment opportunities and wage rate of landless labour. However water is becoming scarce worldwide due to various reasons. The water use efficiency of irrigation under the flood method is very low due to various losses. Recognizing the fast decline in irrigation water potential and increasing demand for water from different sectors, a number of demand management strategies have been introduced to save water and increase the existing water use efficiency. One such method is use of drip and sprinkler method of irrigation.

In Himachal Pradesh, a lot of irrigation potential has been created by the government but its utilization is very low. The paper discusses the benefit of drip and sprinkler irrigation in term on the water saving and productivity gains in comparison to same crops cultivated under food method of irrigation.

Keywords: Irrigation potential, Water use efficiency, Himachal Pradesh, Sprinkler irrigation.

PHOTONIC BAND STRUCTURE OF TiO₂ COATED SILICA MICROSPHERES

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In the present study TiO₂ coated silica microspheres have been synthesized using Rhodamine B (RB) dye as a dopant as well as stabilizer

by chemical method. The morphology of these microspheres has been characterized using transmission electron microscopy. Photonic crystal of these microspheres has been prepared by self-assembly vertical deposition technique. UV-visible spectroscopy was used to see the photonic band gap of photonic crystal. Moreover photonic band structure of this fabricated photonic crystal has been calculated using MPB software. This shows that photonic band gap appears from gamma (Γ) to L direction corresponding to (111) plane of the fcc lattice.

Keywords: microspheres, UV-visible spectroscopy, photonic band gap.

MEDICINAL PLANT DIVERSITY IN TUNGAL VALLEY OF DISTRICT MANDI, HIMACHAL PRADESH (INDIA)

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Medicinal plants constitute a major segment of the flora throughout the world, which provides raw materials for use in the pharmaceuticals, cosmetics, and drug industries. Himachal Pradesh, one of the pioneer Himalayan States is a rich repository of medicinal flora. People of the state inherit a wide range of traditions, dialects, beliefs and cultures. Indigenous communities living in the *state rely, to a large extent, on native plant species for curing various ailments. Tungal Valley in Mandi District of Himachal Pradesh is richly endowed with a large variety of plant species, many of which have medicinal properties. A large proportion of the rural population in the region depends on locally available medicinal plants to meet their health care requirements. The study aims at documenting medicinal plant diversity in Tungal Valley.*

IN FIELD APPLICATION OF ENDOPHYTIC MYCORRHIZA ON GROWTH OF *PLANTAGO OVATA*: AN IMPORTANT MEDICINAL PLANT

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The arbuscular mycorrhizal (AM) fungal associations have been reported to enhance the growth and productivity of medicinal plants at lower expense. In the present investigation, the efficacy of different indigenous AM fungi i.e. *Glomus mosseae* and *Acaulospora laevis* alone and in different combinations with Mycorrhizal Helper Organism (MHO) i.e. *Trichoderma viride* for enhancing growth of *Plantago ovate* under polyhouse as well as field conditions was determined. After observing the significant results in pots under poly-house conditions, the influence of AM fungi alone and in co-inoculation with *T.viride* was tested on growth, yield, seed characters as well as nutrient concentration of isabgol (*P.ovata*) in field conditions. Plants were harvested after 120 days of inoculation. Inoculation with AM fungi significantly escalated the biomass production, nutrient uptake and productivity of *P.ovata* plants. While control *P.ovata* contained only 182 mg of mucilage per gm of dry seeds, plants treated with *G.mosseae* + *A.laevis* had 53.30% more as much (279 mg). This treatment was the best treatment for qualitative and quantitative yield as it harboured highest % mucilage content (27.90 ± 0.40) as well as swelling factor of 1g dry seeds (18.36 ± 0.035) followed by *G.mosseae* + *T.viride* as the next best treatment. Biofertilization of isabgol plants with AM fungi alone and with *T.viride* significantly increased seed dry weight and consequently higher yields were attained as compared to the unfertilized ones (control). Treatment with mix consortium of *G.mosseae* and *A.laevis* resulted in maximal weight of 100 dry seeds (0.228 ± 0.003) as well as total yield of seeds per plot (109.62 ± 3.18). While, maximum values of harvest index (HI) were observed in the treatment of *A.laevis* plus *T.viride* (35.33 ± 5.50) followed by *G.mosseae* plus *T.viride* (33.00 ± 4.00) and *G.mosseae* alone (29.33 ± 4.51). Thus, current study may create the possibility of AM fungal application in the conservation programmes of these valuable medicinal plants in order to improve their cultivation and propagation under nursery as well as field conditions.

POTENTIAL OF ARBUSCULAR MYCORRHIZAL FUNGI AND *TRICHODERMA VIRIDE* ON PHYSIOLOGICAL PARAMETERS OF *MENTHA SPICATA* LINN

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The micro-organisms have posed influence in the social and economic structure of human civilization from time immortal. The mycorrhizal symbiosis represents a series of complex feedbacks between host and fungus that is governed by their physiology and nutrition. Utilization of arbuscular mycorrhizal (AM) biofertilizers in the cultivation of medicinal plants is of recent interest. The AM fungal associations have not only been reported to enhance the growth of medicinal plants but also improved the productivity of medicinal compounds at lower expense. A pot experiment was employed to examine the impact of Arbuscular Mycorrhizal (AM) fungi (*Glomus mosseae* and *Acaulospora laevis*) along with *Trichoderma viride* on *Mentha spicata* after 45 and 90 days of inoculation. Soil microbes' effect on different physiological parameters was determined. The maximum stomatal conductance (morning and evening) was observed in the plants inoculated with *G.mosseae* plus *T.viride* after 45 and 90 days (102.3 ± 0.45 , 114.0 ± 2.52 ; 134 ± 2.00 , 154.16 ± 0.95). Likewise, higher phosphorus content in root and shoot was reported in inoculated plants over control. The total chlorophyll content was also found to increase in the plants treated with *A.laevis* (1.628 ± 0.04) and *G.mosseae* (3.491 ± 0.06) after 45 and 90 days respectively. The results of the present study clearly brought out the beneficial effect of inoculation with *G.mosseae*, *A.laevis* and *T.viride*, alone and in different combinations on various physiological parameters of *M.spicata*. Thus, current study may create the possibility of AM fungal application in the conservation programmes of this valuable medicinal plant in order to improve their cultivation and propagation under nursery as well as field conditions.

WAVE PROPAGATION IN TWO-TEMPERATURE THEORY OF THERMOELASTICITY BY HOMOTOPY PERTURBATION METHOD

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The present paper is investigation of wave motion in homogenous isotropic, thermoelastic plate in the context of linear theory of two-temperature generalized thermoelasticity studied by using Homotopy perturbation method (HPM) and method of separating variables. The expressions for displacement components and temperature are derived. The effects of thermal relaxation parameter on the plane wave is analyzed by numerical results of the present work with the corresponding results in the context of classical two-temperature thermoelasticity theory as reported earlier. The dispersion curves of displacements with thickness are presented graphically for coupled theory of thermoelasticity.

SYNTHESIS OF POLYMETHYL METHACRYLATE MICROSPHERES BY COLLOIDAL CRYSTALLIZATION AND ITS CHARACTERIZATION

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The synthesis of the Polymethyl methyl methacrylate microspheres (PMMA) is done by the method of colloidal crystallization through which the microspheres of the size 250nm have been synthesized. The PMMA white powder produced by this method has been characterized by the state of art spectroscopy. X-ray diffraction of the sample confirms the amorphous nature of synthesized PMMA. Fourier transform infrared spectroscopy (FTIR) gives the nature of the functional groups attached to the sample. The band gap of polymer is estimated from the UV-Visible spectra. Scanning electron microscopy (SEM) gives us the cross sectional

area, which results into the average size of the microspheres. The signal of the luminescence is confirmed by the Photoluminescence spectra.

SIZE DEPENDENT INTERACTION OF GOLD NANOPARTICLES WITH PROTEIN

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Water dispersed gold nanoparticles (AuNPs) with different sizes were synthesized using two different stabilizers- Tetrakis(hydroxymethyl)-phosphonium chloride (THPC) and Tri-sodium citrate, using wet chemical method. Average particle sizes using Transmission electron microscopy (TEM) were found to be 2 nm and 17 nm for THPC- and citrate-stabilized particles respectively. Their interaction with Bovine gamma globulin (BGG) protein was investigated using UV-Visible spectroscopy. The binding constant for citrate-stabilized AuNPs ($4.04 \times 10^{10} \text{ M}^{-1}$) has been found to be higher in comparison to THPC-stabilized AuNPs ($3.21 \times 10^{10} \text{ M}^{-1}$). Results suggest a strong association of BGG with citrate-stabilized AuNPs relative to THPC-stabilized AuNPs, which in turn infers that THPC is stronger stabilizer compared to tri-sodium citrate.

DIVERSITY OF BUTTERFLIES (LEPIDOPTERA:INSECTA) FROM BALH VALLEY (DISTRICT MANDI IN HIMACHAL PRADESH), INDIA

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Butterflies are important bio indicators which should be protected to conserve the biodiversity and environment. Butterflies diversity in

Himachal Pradesh is very rich and diversified, primarily due to varied climatic conditions ranging from tropical in the foothill to arctic environment in the Trans-Himalayan region. The Balh Valley, also known as Sunder Nagar Valley, lies in Mandi district of Himachal Pradesh, situated in the lap of North Western Himalaya at an altitude of 800 m above sea level in lower Himalayan region of Himachal Pradesh has been explored during the course of present investigation. Different species of plants and habitats of Balh Valley attract wide variety of butterfly fauna, which play a vital role in pollination of various flowering plants besides a key component of food chain. Butterflies studies carried out in Balh valley, during different seasons of the year 2012-2013 revealed the presence of 40 butterfly species belonging to 31 genera and 8 families of order Lepidoptera viz., Nymphalidae, Pieridae, Satyridae, Papilionidae, Danaidae, Lycaenidae, Hesperidae and Erycinidae. . During the course of present studies it was observed that the family Pieridae represented by 9 species was the most dominant followed by Nymphalidae and Satyridae (8 species each), Papilionidae and Danaidae (5 species each), Lycaenidae (2 species), Hesperidae (1 species) and Erycinidae (1species) respectively. These findings have been based on one year of field work. Such studies on monitoring the species diversity of butterflies can give valuable information on their population dynamics.

Keywords: Butterfly diversity, seasonal variation, Balh Valley.

STRUCTURAL AND OPTICAL PROPERTIES OF THE ZNO NANOPARTICLES

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Structural and optical properties of the ZnO nanoparticles with an average diameter 6 nm have been investigated. ZnO nanoparticles are synthesized by a sol–gel route using zinc acetate dihydrate and potassium hydroxide in methanol. Structural characterization are carried-out using XRD, FTIR where as the optical properties of the nanoparticles are done by UV–vis absorption spectroscopy and photoluminescence spectroscopy (PL) , the photoluminescence spectra are found to be

comprised of a near band edge ultra violet luminescence (UVL) and a broad green luminescence (GL) band.

MAGNETISM INDUCED IN CARBON NANOTUBES

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In this report we have reviewed the weak magnetism induced in the pristine and other materials attached carbon nanotubes (CNTs). Magnetism of pure carbon is an exciting research area, which can result in a breakthrough in spintronics and give unique biocompatible materials for biology and medicine. The advantage of carbon nanomaterials over classical semiconductors and metals comes from the combination of large electron velocity with long spin life time due to the small spin-orbit coupling of carbon. The CNTs are synthesized by using various techniques including arc discharge, laser ablation and chemical vapor deposition (CVD) methods. The synthesis of nanostructures produced greatly depends on various factors e.g. temperature, time, concentration, precursors used. Generally, the CNTs exhibit diamagnetic behavior in its purest form as exhibited by the carbon, but it has been proposed that magnetism can be induced in CNTs in two ways- first, by introducing defects in the CNTs and second, by inducing a magnetic material at the surface of CNTs.

ROOM TEMPERATURE STRUCTURAL AND MAGNETIC INVESTIGATIONS ON FE-DOPED ZNS NANOSTRUCTURES

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We have studied the magnetism induced in the undoped and Fe-doped ZnS nanostructures. The nanostructures are synthesized by using low

temperature solvothermal technique in the presence of ethylenediamine (en). The synthesis of nanostructures produced greatly depends on various factors e.g. temperature, time, concentration, ratio of en to water as solvent. The mixture of precursors in en was sealed in Teflon lined cylindrical steel chamber. The synthesized nanostructures are nano-plates and nanorods at temperature of 150 °C for 12h. Transmission electron microscopy (TEM) indicated high quality nano-plates and nanorods with excellent yield. Generally, the undoped ZnS exhibit diamagnetic behavior in its purest form but, as it is doped with ferromagnetic materials e.g., like Fe, it exhibits a ferromagnetic character. The semiconductor materials, when doped with appropriate transition metals, the resulting materials are known as dilute magnetic semiconductors (DMS). These DMS materials, at nanoscale, have applications in future spintronics based devices.

APPLICATIONS OF QUANTUM DOTS IN SOLAR CELLS

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In this report, we have reviewed the use of quantum dots (QDs) in solar cells for enhanced efficiency. QDs dots, which are 0-D nanostructures, are also known as artificial atoms. The QDs are synthesized by using various techniques including colloidal synthesis, epitaxial beam lithography etc. Due to tunable band gap properties quantum dots can be used in enhancing the efficiency of solar cells. The QDs act as excellent absorbing photovoltaic material, as compared to the conventionally used Silicon or CdTe materials. This sophisticated technology makes use of nanotechnology and quantum mechanics theory to enhance the efficiency of ordinary solar cells. Attempts are being made to apply QDs in practical applications in solar cells, however, the efficiency achieved by using QDs based solar cells is less but theoretical predictions and experimental studies have confirmed the potential for meeting the requirement for ultra-high conversion efficiency. When doped with suitable materials the efficiency of the QDs can be increased to a larger extent.

ORGANIC FIELD EFFECT TRANSISTOR: A REVIEW

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In recent years, semiconducting polymers have been the focus of intense research due to their flexible, light weight, low fabrication cost electronic devices such as organic light emitting diodes (OLEDs), organic solar cells and field effect transistors (OFETs). The improved physical understanding of transport and of structure-property relationships has supported the development of better organic semiconductor materials for organic field-effect transistor (OFET) applications. OFETs have witnessed impressive improvements in materials performance by 3–4 orders of magnitude. OFET-enabled flexible displays are currently finding their way into a wave of first generation applications. With the transistor performance that is readily available today, a wide range of applications can already be addressed, in particular, e-paper displays, simple circuits, and chemical and biological sensors. The field-effect mobility (μ), which is the main materials-related figure of merit of an OFET, has increased from low values $<10^{-3} \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$ 25 years ago to values $>1\text{--}10 \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$ that are now exceeding those of benchmark thin-film amorphous silicon devices ($0.5\text{--}1 \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$). In this article, OFETs are reviewed in light of requirements for demanding future applications. An overview is provided over both small molecule and conjugated polymer materials for which field-effect mobilities exceeding $> 1 \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$ have been reported.

SYNTHESIS AND STRUCTURAL PROPERTIES OF ZINC OXIDE NANO PARTICLES (ZnO NPs): A REVIEW

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ZnO (Zinc Oxide) is generally recognized as safe (GRAS) material by FDA (Food and Drug Administration, USA) that is why it is used as food

additive and in various medicine. The FESEM (Field Emission Scanning Electron Microscopy) of hydrothermally synthesized ZnO NPs showed that ZnO NPs are spherical in shape with a diameter of 20-30 nanometer. The XRD (X-rays Diffractometry) and TEM (Tunneling Electron Microscopy) studies of ZnO nanopowder synthesized by ultrasonic Spray pyrolysis (USP) technique showed that the crystalline size increased with an increase in the pyrolysis temperature and also exhibit direct band gap in the range 3.37 – 3.40 eV. Also the band energy gap of bulk ZnO crystals was approximately 3.3 eV. The SEM (Scanning Electron Microscopy) micrographs of ZnO NPS prepared by chemical method using PVP (Polyvinyl Pyrrolidone) as capping agent showed spherical shape of nanoparticles, having band gap energy of 3.4 eV and these nanoparticles also showed lattice contraction due to high electrostatic interaction between Zn^{2+} and O^{2-} ions. ZnO is an important member of semiconducting material of II-VI group. Due to unique properties, ZnO is the richest family of nano structures among all semiconducting materials and thus used in the number of application like gas sensor, varistors and low voltage phosphor. ZnO is only semiconductor material extensively investigated after Si/Ge. Also nano cluster of ZnO, which exists as nanoparticles, nanobelts, nanorods, nanotubes, nanowires, nanoflowers as well as colloid and bulk nanoparticles also have shown potential/excellent luminescence properties.

ANALYSIS OF WATER QUALITY USING PHYSICO-CHEMICAL PARAMETERS OF GOVIND SAGER LAKE H.P. (INDIA)

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The Himalaya form a shield of great importance right across the Northern facade of India from Jammu and Kashmir in west to Arunachal Pradesh in east. But it is only one state, Himachal Pradesh, to which given the honor to derive its name from the Himalayas. By virtue of its extensive geographical extent, varied terrain and climatic conditions, supports a rich diversity of inland wetland ecosystems. Wetlands are generally sandwiched between a terrestrial eco system and an open water system.

Regions generally referred to, as wetlands are lakes, marshes, swamps, temporary ponds, riverbanks, mangroves and paddy fields.

Water is the most important in shaping the land and regulating the climate. It is one of the most important compounds that profoundly influence life. The quality of water usually described according to its physical, chemical and biological characteristics. Rapid industrialization and indiscriminate use of chemical fertilizers and pesticides in agriculture are causing heavy and varied pollution in aquatic environment leading to deterioration of water quality and depletion of aquatic biota. Due to use of contaminated water, human population suffers from water born diseases. It is therefore to check the water quality at regular interval of time.

A STUDY ON MOLAR CONDUCTANCE OF OXALIC ACID AND ITS SALTS IN WATER AT DIFFERENT TEMPERATURES

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Molar conductance of oxalic acid and its salts viz. ammonium oxalate, sodium oxalate and potassium oxalate is measured at five different temperatures (298.15K, 303.15K, 308.15K, 313.15K, 318.15K).. The data have been analyzed using Onsager's equation and the relationship deduced by Arrhenius and Ostwald to obtain Λ_m^0 and K_A . The obtained parameters have been interpreted in terms of solute-solute and solute-solvent interactions. The structure making/breaking capacity is determined from the temperature coefficient of Walden product. The negative temperature coefficient of Walden product indicates that the oxalic acid and its salts act as structure breakers in water. The values of association constant K_A are used to obtain the standard thermodynamic quantities, such as G^0 , H^0 and S^0 , for the association process in the solution.

Keywords: Molar conductance, association constant, Walden product, structure breaker.

**EFFECT OF SEED STORAGE
ON SEED VIABILITY,
GERMINABILITY AND MORPHOLOGICAL
CHARACTERISTICS OF KARONDA
(*CARISSA CARANDAS*)
SEEDLINGS**

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The experiment was conducted to study the influence of period of seed storage on germination and morphological characteristics of karonda and comprised of seven treatments viz., zero days of extraction, 10 days of extraction, 20 days of extraction, 30 days of extraction, 40 days of extraction, 50 days of extraction and 60 days of extraction and replicated thrice. The results indicated that seeds sown at zero days of extraction recorded maximum germination percentage followed by seeds sown after 10 days of extraction. Also minimum days taken for initiation of germination, maximum shoot length, root length, number of roots and vigour index parameters were recorded in same treatment (T₁) followed by 10 days after extraction (T₂). The increase in period of storage after extraction of seed from fruit resulted in loss of viability and vigour parameters and after 60 days of extraction (T₇) only 20.33 % germination was recorded. However, seeds sown after 10 days of extraction (T₂) maintained good vigour than other treatments therefore karonda seeds could be stored at ambient condition for 10 days after extraction without much variation in growth parameters.

Keywords: germination, period of seed storage, seedling vigour.

PREPARATION OF FLAME-RETARDANT COTTON FABRIC THROUGH GRAFT COPOLYMERISATION

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In an attempt to impart flame-retarding properties to the cotton fabric, post-grafting phosphorylation reactions on grafted cotton fabric were carried out. Photochemical graft copolymerisation of 4-vinyl pyridine (4-VP) onto cotton fabric using benzophenone as photosensitiser was carried out. Maximum percentage of grafting P_g , (18.50 %) was obtained under optimum conditions; irradiation time 75 min, 0.5 ml of benzophenone, $[4\text{-VP}] = 748.71 \times 10^{-2}$ mole/l and 5 ml of water in the reaction mixture. Aliphatic alcohols of varying chain length decreased percentage of grafting. The pendant pyridine rings of the 4-VP grafted cotton fabric were converted to pyridinium chloride followed by the reaction with acrylamide to give 2-amidoethylpyridiniumchloride. This was subjected to phosphorylation reaction with PCl_3 /petroleum ether. The phosphorylated grafted cotton fabric burns only in the presence of flame with very slow propagation of the flame (only 3.8 cm²) was found to burn of the total area of 147 cm² with 0.12 g of the ash content. Characterisation of gray cotton fabric and modified cotton fabric was carried out by FTIR, thermogravimetric analysis, crease recovery, and moisture absorption studies.

Keywords: Cotton fabric, flame-retardant cotton, graft copolymerisation, 4-vinyl pyridine, phosphorylation, TGA, crease recovery

CONDUCTING POLYMERS: PREPARATION, CHARACTERIZATION AND APPLICATIONS: A REVIEW STUDY

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In recent years, conducting polymers have attracted great attention due to their electrochemical, optical and environmental stability. These

conducting polymers are the organic polymers, which have the potential of replacing expensive metals and conventional inorganic semiconductors. Among the organic conducting polymers, polyanilines, polypyrroles and polyparaphenylenes are the most important classes of conjugated polymers for the possible use in commercial applications such as schottky diodes, LED's, rechargeable batteries, electrochromic windows, solar cells and biosensors. Like the other polymers, these are severely limited by their intractable and non-processable nature. This is overcome by the substituted form of polymers. Conducting polymers are either made directly by electro-or oxidative polymerization or polymerized and then oxidized chemically or electro-chemically. Research areas in conducting polymers focus on making the conducting form of PANI, PPy and other polymers soluble, new structures, new substituents.

The syntheses of PPy and PANI by the in-situ doping method resulted in a maximizing yield of fine powdered products. The sulfonic acids and their sodium salts used as dopants during in-situ polymerization provide PPy and PANI with sufficiently high conductivity. Additionally, dodecylbenzene sulfonic ion imparts essential solubility in organic solvents to synthesized polymers. Thin film processability is a well-known advantage of polypyrrole and polyaniline. However, the stability of structural and conductive properties of these two polymers is much lower than that of PPP (polyparaphenylene). Like most other polymers, conducting polymers can be characterized by a variety of analytical techniques, some of which include: optical characterization of conducting polymers for electrochromic nature; nuclear magnetic resonance for structure confirmation and chain orientation; gel permeation chromatography for molecular weight; thermogravimetric analysis for evidence of glass and melting transitions and decomposition temperatures; electroluminescence to screen for potential use in light emitting diodes (LEDs);. During the last 5 years, polymers have gained tremendous recognition in the field of artificial sensor in the goal of mimicking natural sense organs.

The major challenge confronting the material scientists including chemists and physicists is how the properties of these electronic materials and devices differ from those of conventional

semiconductors. In this paper we will review the preparation, characterization and applications of conducting polymers and will present results of experimental studies on some devices made on conducting polymers in our laboratory.

Key words: Conducting polymer, Characterization, electrical properties.

EFFECT OF GIRDLING AND THINNING ON FRUIT MATURITY AND QUALITY OF SATLUJ PURPLE PLUM

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The effect of girdling and thinning on fruit maturity and quality of plum cv. Satluj Purple was investigated on twelve year old trees being grown on sandy loam soil planted at a distance of 6x6m. Uniform cultural practices were followed throughout the course of investigation. Limb girdling and thinning was done at full bloom and 7,14,21,28 and 35 days after full bloom. All the girdling and thinning treatments advanced fruit maturity as compared to control. Least number of days taken for maturity were recorded when limb girdling and thinning was done 14 days after full bloom. Yield was found to increase and fruit drop was reduced in all the treatments. Maximum yield, fruit weight and size, pulp/stone ratio, colour and better fruit quality in terms of higher TSS, TSS/acid ratio, -carotene with lower acidity and firmness were also observed when limb girdling and thinning was done 14 days after full bloom. Healing of the girdle was satisfactory and there was no detrimental effect noticed in any of the treatments. Leaf nitrogen and chlorophyll content were decreased and total carbohydrates were increased with girdling and thinning treatments.

Keywords: girdling, maturity, Satluj Purple plum, thinning.

EXPLORING THE OPPORTUNITIES THAT PARAGLIDING HAVE PROVIDED FOR THE GROWTH OF TOURISM INDUSTRY IN DHAULADHAR TOURISM CIRCUIT

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The aim of this paper is to explore the future scenario for paragliding in Himachal Pradesh. The existing regular sites for paragliding in Himachal Pradesh includes Bandla Dhar near Bilaspur, Solang Nala near famous tourist hub Manali, and the world famous paragliding site at Bir-Billing in district Kangra. The paper further aims to explore the opportunities which paragliding has provided to the growing tourism sector especially in the Dhauladhar mountain ranges through personal participatory observations and subsequent discussions with experts during Paragliding Pre-World Cup 2013 and frequent field visits to Bir-Billing. Implication of further development activities and the changing socio-economic conditions are also discussed.

Keywords: Paragliding, Dhauladhar Tourism Circuit, Kangra Valley, Himachal Tourism Bir-Billing (India), HPTDC.

POLLUTION AND ITS EFFECT ON ECOLOGICAL ENVIRONMENT WITH SPECIAL REFERENCE TO DISTRICT BILASPUR OF HIMACHAL PRADESH.

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India is a large and diverse country. Its land area includes regions with some of the world's highest rainfall to very dry deserts, coast line to alpine regions, river deltas to tropical islands. The variety and distribution of forest vegetation is large. India is one of the 12 mega biodiverse regions of

the world. Indian forests support a variety of ecosystems with diverse flora and fauna. A survey was conducted pertaining to the effect of pollution level and its effect on Ecological environment with special reference to district Bilaspur of Himachal Pradesh. Measures have been taken by the state government to overcome such problems. The HP High Court directed the state to impose a ban on the sale/stocking of 25 junk food items in plastic packaging in the state. The Himachal Pradesh State Pollution Control Board issued a notice to a Cement Company as their production should be stopped for violating the environmental laws. The results of the ambient air quality monitoring indicated that the pollution level of the industry were 250.07, 316.67, 140.97, 156.94 and 177.22 against the limit of 100 which is much higher and providing threat to ecological environment. The vehicular traffic, main part of which emanates from cement factories in and Bilaspur distt. also contributes to environment pollution and climatic changes. This could impact the livelihood of 1.4 million people, who are dependent on the water and natural resources. State government is implementing the National Action Plan On Climate Change to improve the effects of climate change due to the pollution so that the deglaciation could be controlled. Participation of every individual is important so that we can breathe in a fresh environment.

Keywords: Ecological, Pollution, Environment, Climate change

SPACE CHARGE LIMITED CONDUCTION IN POLYPYRROLE COMPOSITE FILMS

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In recent years, semiconducting polymers have been the focus of intense research due to their flexible, light weight, low fabrication cost electronic devices such as organic light emitting diodes (OLEDs), organic solar cells and field effect transistors (OFETs). In the organic electronic devices, metal-organic semiconductor interface plays a major role in determining the electrical transport. In low mobility organic materials, charges are likely to accumulate in bulk and the induced electric field due to accumulated charges influences the current transport. Thus the injected

charge carriers are more than the intrinsic carriers present in the bulk of sample. This creates a space charge limited region near the interface. Conduction mechanism taking place at metal-organic semiconductor interface is fascinating and still under debate. In this study the temperature dependent current density-voltage (J-V) characteristics of free standing polypyrrole composite film sandwiched between metal electrodes (Ag, Al) are investigated in the wide temperature range of 10-300K. It was revealed that at all temperatures and low bias voltage, charge transport is governed by bulk limited processes with a bias dependent crossover from Ohmic ($J \sim V$) to trap free space charge limited conduction ($J \sim V^2$). At high bias voltage ($>3V$) and low temperatures the conduction becomes space charge limited with exponential distribution of traps. Thus we present measurement and analysis of temperature and bias dependent current density-voltage characteristics to elucidate the nature and density of charge traps.

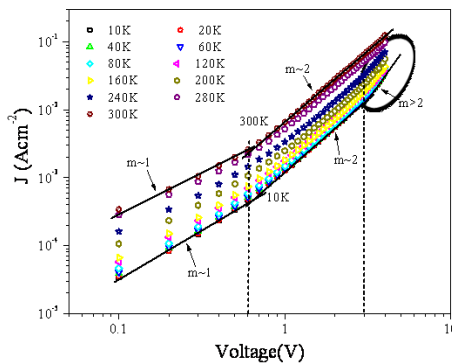
MANAGEMENT OF WASTEWATER IN HIMACHAL PRADESH

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The water demand for domestic use, irrigation and industrial use is increasing due to increase in population, urbanization and industrialization. The domestic wastewater consists of human waste, ablution water, kitchen wastewater and other waste of household activities in urban areas. In urban areas the wastewater treatment generally consists of a number of unit operations and unit processes. The wastewater after treatment is discharged into the river or stream passing nearby or is used for irrigation and fodder cultivation.

The paper examines the current status of wastewater generation in India and Himachal Pradesh. It highlights the urbanisation status of water



supply, status of wastewater treatment, mode of disposal of wastewater and its use for irrigation. Various recommendations for use of wastewater in Indian conditions have also been suggested.

Key words: Wastewater, Himachal Pradesh, Stream Pollution

TO STUDY THE EFFECT OF FOREST DEGRADATION ON SOIL FERTILITY STATUS UNDER *QUERCUS LEUCOTRICHOPHORA*

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The present study highlights the analysis of physicochemical properties of soil under dense and open forests of *Quercus leucotrichophora* (Banj Oak) at Chakrata (Uttarakhand). Soil texture varied from red and black soils to brown soil. Soil moisture ranged from $28 \pm 0.57\%$ to $57 \pm 0.49\%$ and showed fixed seasonal pattern and maximum in rainy season (mid-September) followed by winter and summer. Water holding capacity was more or less similar in all the sites. Soil was acidic with pH ranging from 5.5-6.5 across the sites. Soil nutrient concentration also varied across the study sites. Average soil pore space for dense forest were 52.666, 57.734, 61.336 at depth 0-20, 20-40 and 40-60, while it were 50.096, 51.198 and 54.212 for open forest for the same depths. Decrement along the depth were a little more in dense forest as compared to open forest where there were very small variation. Average bulk density (g cm^{-3}) in dense forest were 0.957, 1.041 and 1.111 at depth 0-20, 20-40 and 40-60, while it is 0.932, 0.976, 0.988 for open forest for the above depths. Clearly depicts that there is a gradual decrement in bulk density with increase in depth as well as that the average for dense forest is higher than in open forest. Average pH for in dense forest were 5.386, 5.950, 6.358 at depth 0-20, 20-40 and 40-60, while it were 5.95, 6.138 and 6.63 for open forest for the same depths. pH values shows that soil under oak forest is slightly acidic in nature and the acidity were highest for the depth of 0-20 while it increased with depth showing that acidity decreases along the depth. Average values of organic carbon (%) in dense forest were seen to be 2.82, 1.82 and 1.084, while it were 2.116, 1.154 and 0.732.

HUMAN COMPUTER INTERACTION: REVIEW OF EXISTING TECHNOLOGIES AND A LOOK INTO RECENT ADVANCES

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This paper intends to provide an overview on the Human-Computer Interaction and tries to cover existing technologies and recent advances in this field. The overview includes the basic definitions and recent advances such as ubiquitous computing and ambient intelligence in the field. Though this paper tries to cover all the major and general aspects of HCI yet it may be noted that this paper is not an authenticated document which contains all the aspects of HCI, as this field is changing very abruptly and is spreading over a wide range.

Keywords: Human Computer Interaction, Ubiquitous computing, Ambient Intelligence, Adaptive HCI.

, -DIBROMOACETOPHENONES AS SYNTHETIC EQUIVALENT TO CORRESPONDING -KETO ALDEHYDES IN THEIR REACTIONS WITH PRIMARY AROMATIC AMINES

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The synthetic utility of α -haloketones is well known for more than a century. Despite the fact that α -haloketones are versatile intermediates in organic synthesis, there has been considerable interest in development of alternative approaches avoiding the use of α -haloketones because of highly lachrymatory properties associated with them. In an important development from our laboratory as well as from other research groups, it has been shown that α , β -dihaloketones behave as synthetic equivalents of their corresponding α -haloketones in their reactions with sulphur containing compounds. The advantageous feature of α , β -dihaloketones

(for example, , -dibromoacetophenones) is that they are not only devoid of lachrymatory property but also their reactions involve much milder conditions than that of -haloketones. In view of these observations, it was decided to investigate the reaction of , -dihaloketones with some nitrogen containing compounds. The present communication deals with the reaction of , -dibromoacetophenones with primary aromatic amines viz. anilines and *o*-phenylenediamine which leads to the conclusion that , -dibromoacetophenones behave as synthetic equivalent of corresponding -keto aldehydes in their reactions with primary aromatic amines.

POLLUTIONAL STATUS OF SWAN RIVER IN UNA DISTRICT OF HIMACHAL PRADESH IN LOWER HIMALAYAS

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Rivers and streams are one of the major sources of water in Himachal Pradesh. Rapid industrialization, expanding urbanization and intensive agricultural activities are responsible for high level of pollution in rivers and streams. The river Swan in district Una (HP) is receiving effluents discharges of industrial and wastewater from towns. Increase in number of residents, industries and agriculture activities are imposing environmental stress on the watershed. The main pollution sources of Swan River are domestic and municipal waste, agricultural, industrial wastewater and solid waste disposal into rivers through nallahs and drains. The catchment area of river is used for intensive agricultural activities accompanied by over doses of fertilizers and pesticides. All these activities are adding toxic substances, oxidized organics, inorganic, suspended solids, pathogens and sewage to river water disturbing river ecosystem. The present paper is aimed at studying the current status of water quality in river Swan.

Keywords: Swan River, wastewater, river pollution.

SIGNIFICANCE OF ARCHITECTURAL FEATURES AFFECTING BUILDING DURING EARTHQUAKE IN HIMACHAL PRADESH

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Earthquakes are natural phenomena which are not fully understood till date. Their occurrence is neither preventable nor it can be predicted. In fact their occurrence is beyond human control however their consequences are partly human made. Earthquakes do not kill people but these are structures built by human beings that do so. Earthquakes shake the foundation of building and cause their destruction.

The term earthquakes, when mentioned, generally create a sense of panic and calamity in the minds of the people. Earthquake refers to a phenomenon associated with shaking of the ground resulting from a sudden release of energy. An earthquake occurs, when the stress built up in rocks of earth's crust is released in a sudden jolt. The behavior of the building during earthquake depends upon the architectural features of building & other structures.

The present paper highlights the importance of architectural features of structures during earthquakes as the entire Himachal falls under high risk zone of earthquake

Key words: Earthquake, Buildings, High risk zone of earthquake

A SORPTION STUDY OF SOME METAL IONS ON HYDROGELS BASED ON APPLE PECTIN AND ACRYLAMIDE

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The apple processing units are likely to be expanded in Himachal Pradesh in future. The industrial by-product Pomace, a renewable resource plays an important role in pectin manufacture. The object of study is the extraction of pectin from apple pomace and to develop a new polymeric backbone. Conditions for optimum yield were evaluated as a function of temperature, concentration of

monomer, initiator, amount of water and reaction time for pectin with Acrylamide using KPS as initiator by chemical induced method. These hydro gels were used in sorption of Cu^{2+} , Fe^{2+} and Co^{2+} Metal ions. These results of ion sorption are reflected in high uptake value for Co^{2+} and Fe^{2+} .

Keywords: Apple pomace, pectin, optimum yield, hydro gels, uptake KPS.

TOBACCO USE AND AFTER EFFECTS, A REVIEW

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Tobacco use is a major cause of death from cancer, cardiovascular disease, and pulmonary disease. Cigarette smoking is also a risk factor for respiratory tract and other infections, Osteoporosis, reproductive disorders, adverse postoperative events and delayed wound healing, duodenal and gastric ulcers, and diabetes. In addition, smoking has a strong association with fire-related and trauma-related injuries. Smoking-caused disease is a consequence of exposure to toxins in tobacco smoke. Although nicotine plays a minor role, if any, in causing smoking-induced diseases, addiction to nicotine is the proximate cause of these diseases. Smoking is a highly efficient form of drug administration. Inhaled nicotine enters the circulation rapidly through the lungs and moves into the brain within seconds. Rapid rates of absorption and entry into the brain cause a strongly felt "rush" and reinforce the effects of the drug. This paper focuses on nicotine as a determinant of addiction to tobacco and the pharmacologic effects of nicotine that sustain cigarette smoking. Tobacco addiction (like all drug addictions) involves the interplay of pharmacology, learned or conditioned factors, social and environmental factors.

SUSTAINABILITY OF RURAL WATER SUPPLY SCHEME BANGANA IN DISTRICT UNA (HP)

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All 16997 villages in the Himachal Pradesh State as per census 1991 were provided with safe drinking water facility by March, 1994. Thereafter, the

focus shifted from village to habitation. As per the survey of 2003, which was finalized in March, 2005, 51,848 habitations were identified. Of these, 20,112 were categorized as fully covered (FC) and 31,736 habitations as non-covered and partially covered (9389 NC and 22347 PC). These 31,736 habitations have been categorized as slipped back habitations as per revised guidelines of the Central Government. The Bharat Nirman programme also includes drinking water supply as one of the component

With the coming up of National Rural Drinking Water Supply guidelines w.e.f. 1-04-2009, after realignment/mapping of habitations, there are 53205 habitations in the State. Out of these, 19473 habitations (7632 habitations with population coverage >0 and <100+11841 habitations with 0 population coverage) are having inadequate drinking water. The criteria of coverage of habitations has been changed to population coverage to ensure water security at household level. All these 19473 habitations will be covered in a phased. Most of Water supply schemes in Una area of Himachal Pradesh are facing water shortage problems. The present papers highlight the issues of water shortage of Water Supply Scheme Bangana and suggest measures to tackle the same.

Keywords: Bangana, slipped back habitations, water scarcity

STRUCTURAL AND OPTICAL PROPERTIES OF COPPER DOPED ZnO NANOPARTICLES AND THIN FILMS

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Un-doped ZnO-NPs and Zn_{1-x}Cu_xO NPs (x= 0.1, 0.2, 0.3, 0.4) were synthesized using hydrothermal method and characterized by powder XRD. The effect of concentration of the precursors, on the structure, grain size and band gap energy were investigated. The XRD analysis demonstrates that the nanoparticles have the hexagonal wurtzite structure and the particle size decreases with increasing concentration of copper.

From the results, the average crystallite sizes of the $Zn_{1-x}Cu_xO$ NPs obtained from the different methods were very different, implying that the inclusion of strain in various forms has an important effect. Investigating the plots, it appears that the result of the SSP model and was more accurate than that of the Scherrer method, as the strain was considered in the calculation of crystalline size and the data were fitted more accurately in this method. SSP method was used to study the individual contributions of crystallite size and lattice strain on the peak broadening of Cu doped ZnO nanoparticles. Optical studies indicated that the band gap decreased from 3.38 eV to 3.35 eV upon Cu doping at temperature 500°C.

Keywords: Doping, X-Ray, Optical band gap

DETERMINATION OF CRITICAL MICELLAR CONCENTRATION & STUDY MOLECULAR INTERACTIONS OF TERBIUM DECANOATE IN NON-AQUEOUS BINARY MIXTURE

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Viscosity and density measurements of terbium decanoate in non-aqueous binary mixture shows that there is marked change in the aggregation of the anionic species at critical micellar concentration (CMC) & CMC increase with increasing temperature. The values of various constants calculated from well known equations (Einstein, Vand, Moulik and Jones-Dole) indicate that there is a significant interaction between solute and solvent molecules.

Keywords: Critical micellar concentration; Solute-solvent interactions; terbium decanoate.