# 16th Chhattisgarh Young Scientist Congress, 2018

## 27-28 February, 2018

# SOUVENIR

Organized by

Durg University, Durg (C.G.)

Govt.V.Y.T.PG. Auto. College, Durg(C.G.)

Bhilai Institute of Technology, Durg(C.G.)

Sponsored by

Chhattisgarh Council of Science & Technology

# 16th CHHATTISGARH YOUNG SCIENTISTCONGRESS 2018

**Organized By**

**Durg University, Durg**

**Sponsored By**

**Chhattisgarh Council of Science & Technology, Raipur**

**Venue**

**Bhilai Institute of Technology (BIT), G.E. Road, Durg**

**&**

**Govt. V.Y.T. PG. Autonomous College, Durg (C.G.)**

**Patron**

**Dr. N.P. Dixit**
**Vice Chancellor, Durg University, Durg**

**&**

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**Director General, CG COST, Raipur**

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**Registrar, Durg University, Durg**

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**Principal, Govt. V.Y.T. PG. Autonomous College, Durg**
**Dr. Arun Arora**
**Principal, Bhilai Institute of Technology (BIT), G.E. Road, Durg**

**Co-Coordinators**

**Dr. Anil Kumar, Professor of Zoology**
**Govt. V.Y.T. PG. Autonomous College, Durg (C.G.)**
**Dr. Prashant Shrivastava, Assistant Professor of Geology**
**Govt. V.Y.T. PG. Autonomous College, Durg (C.G.)**
**Dr. Santosh Sar, Professor of Chemistry**
**Bhilai Institute of Technology (BIT), G.E. Road, Durg**

**Organizing Secretary/Nodal Officer**

**Dr. A.K. Singh,**
**Professor of Chemistry**
**Govt. V.Y.T. PG. Autonomous College, Durg (C.G.)**

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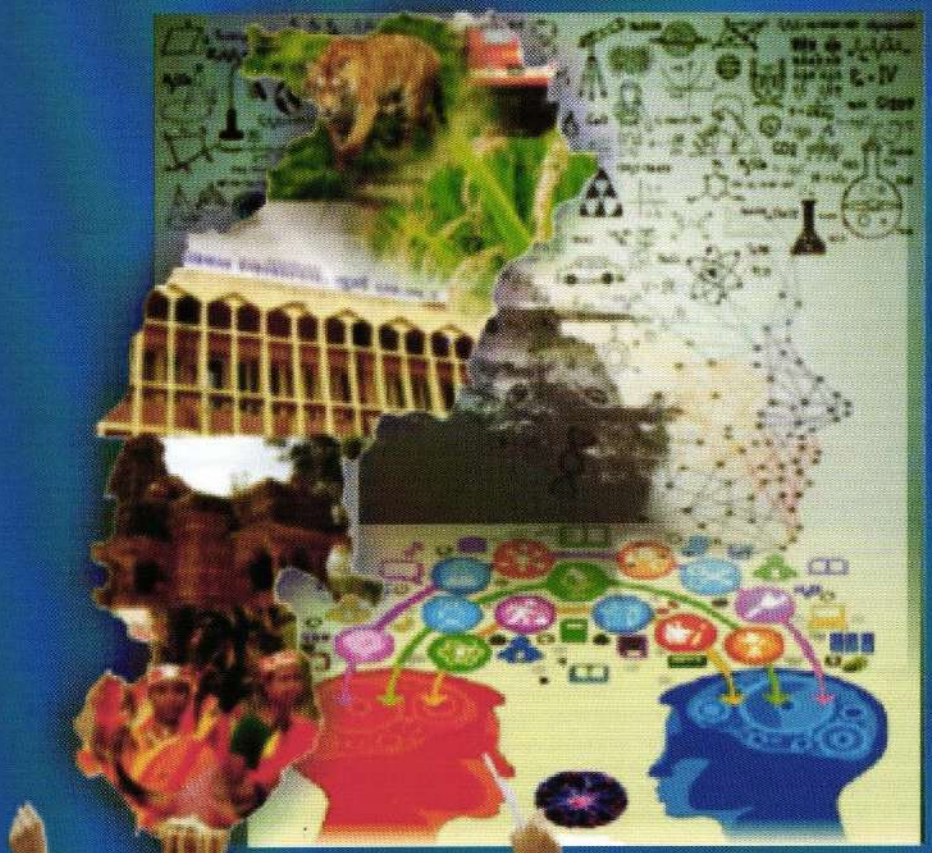

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Bhilai Institute of Technology, Durg(C.G.)

Sponsored by

Chhattisgarh Council of Science & Technology

बलरामजी दास टंडन
राज्यपाल छत्तीसगढ़

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क्र./ 32 /पीआरओ/रास/18
रायपुर, दिनांक 24 फरवरी 2018

## संदेश–प्रारूप

मुझे यह जानकर प्रसन्नता हुई कि 16 वीं **'युवा वैज्ञानिक कांग्रेस–2018'** का आयोजन दुर्ग जिले स्थित शासकीय विश्वनाथ तामस्कर स्नातकोत्तर स्वशासी महाविद्यालय एवं भिलाई इंस्टीट्यूट ऑफ टेक्नोलॉजी द्वारा संयुक्त रूप से किया जा रहा है। इस अवसर पर शोध पत्रों पर आधारित स्मारिका का प्रकाशन भी किया जा रहा है।

मेरा मानना है कि युवा वैज्ञानिकों पर देश को एक विकसित और सक्षम देश बनाने की महती जिम्मेदारी है। विश्व में ऐसे कई देश हैं जो अपनी वैज्ञानिक सोच के जरिए बहुत तेजी से विकसित देशों की श्रेणी में पहुंचे हैं। मुझे खुशी है कि उच्च शिक्षा के क्षेत्र में शोध को बढ़ावा देने के लिए केन्द्र सरकार द्वारा अनेक सकारात्मक कदम उठाए जा रहे हैं, जिससे युवा शोधार्थियों को आगे बढ़ने का मौका मिलेगा।

युवा वैज्ञानिक कांग्रेस के सफल आयोजन एवं स्मारिका के प्रकाशन के लिए मेरी हार्दिक शुभकामनाएं।

(बलरामजी दास टंडन)

**डॉ. रमन सिंह**
**मुख्यमंत्री**
Dr. RAMAN SINGH
CHIEF MINISTER

Do. No126/JS/UMVIP/20.....
Date ....24/02/2018.....
महानदी भवन, मंत्रालय
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Mahanadi Bhawan, Mantralaya
Naya Raipur, Chhattisgarh

# संदेश

मुझे यह जानकर हार्दिक प्रसन्नता हुई कि छत्तीसगढ़ विज्ञान एवं प्रौद्योगिकी संस्थान के सहयोग से शासकीय विश्वनाथ यादव तामस्कर स्नातकोत्तर स्वशासी महाविद्यालय, दुर्ग तथा बीआईटी, दुर्ग के संयुक्त तत्वावधान में 16वीं 'युवा वैज्ञानिक कांग्रेस' का आयोजन 27 एवं 28 फरवरी 2018 को किया जा रहा है। नियमित अध्ययन–अध्यापन के साथ विशिष्ट विषयों पर विशेषज्ञों के साथ विचार–विमर्श का अवसर मिलना, छात्र–छात्राओं के साथ ही प्राध्यापकगण के लिए भी उपयोगी होता है। किसी विषय की गहराई में उतरने के लिए ऐसे आयोजन आवश्यक होते हैं। युवा शोधार्थियों तथा वैज्ञानिकों को यथा समय मान्यता व सराहना मिलने से उन्हें बड़े लक्ष्य तय करने एवं उस दिशा में तेजी से आगे बढ़ने की प्रेरणा मिलेगी।

आयोजन एवं प्रकाशन अपने उद्देश्यों में सफल हो, इसके मेरी शुभकामनाएं।

**(डॉ. रमन सिंह)**

**Prem Prakash Pandey**
**Minister**
Revenue & Disaster Management, Rehabilitation, Higher Education, Skill Development, Technical Education, Employment, Science & Technology Department, Govt. of Chhattisgarh

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No./ 815 /Minister/Rev, HE, SD, TE./2018 Raipur, Dated 17/02/2018

## MESSAGE

I am pleased that 16th Young Scientists Congress – 2018 sponsored by Chhattisgarh council of science and Technology, Raipur is being organized by Durg University, Durg with coordination of Govt. V.Y.T.PG. Autonomous College, Durg and Bhilai Institute of Technology, Durg on 27th and 28th February, 2018.

It is predicted that the global human population will reach nearly 10 billion by 2050 and that the food production will have to be increased by 70 percent over the same time frame. The 21st century therefore, faces the ever increasing and persistent challenges to produce adequate and nutritious food for such a large population as well as to fulfill the demands on health and economic security arising thereupon.

In this context, the congress is very apt and timely as the global challenges ahead point to the need of scientific research that not only improves the integration among its disciplinary components but also focuses on different disciplines of science with which these various challenges overlap.

I am confident that the deliberation by young researchers of Chhattisgarh will provide a number of ideas to help law makers for betterment of not only state but whole nation.

I compliment the organizers for the initiative and welcome the dignitaries and participants, delegates to the event.

**( PREM PRAKASH PANDEY)**

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Facebook- www.facebook.com/premprakashpandeyofficial

एक कदम स्वच्छता की ओर

# छत्तीसगढ़ विज्ञान एवं प्रौद्योगिकी परिषद
**Chhattisgarh Council of Science & Technology**
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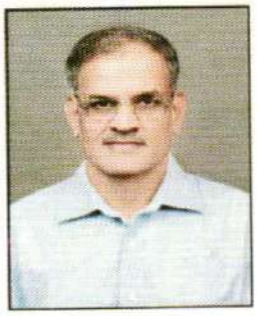
**Dr. K. Subramaniam** I.F.S.
Director General & PCCF


No. 8026 /CCOST/2018
Date : 15.02.2018

## संदेश



यह अत्यंत हर्ष का विषय है कि, दुर्ग विश्वविद्यालय, दुर्ग द्वारा 16 वीं युवा वैज्ञानिक कांग्रेस का आयोजन शासकीय विश्वनाथ यादव तामस्कर स्वशासी महाविद्यालय, दुर्ग एवं भिलाई इंस्टीट्यूट ऑफ टेक्नालॉजी द्वारा संयुक्त रूप से किया जा रहा है। इस आयोजन से विज्ञान की विभिन्न धाराओं से जुड़े युवा शोधार्थियों को अपने शोध कार्यो का प्रस्तुतिकरण विषय विशेषज्ञों के समक्ष करने का अवसर प्राप्त होगा और इससे आगे की उनकी शोध परियोजनाओं को नई राह मिल सकेगी। शोध कार्य जो स्थानीय समस्याओं/चुनौतियों के समाधान के रूप में आशा जगाते है, को प्रोत्साहित करने का दायित्व शैक्षणिक संस्थानों का है। छत्तीसगढ़ राज्य में विज्ञान एवं प्रौद्योगिकी के क्षेत्र में ऐसे नवीन कार्य हो रहे है जिससे प्रदेश को नई पहचान मिल सकी है।

छ0ग0 विज्ञान एवं प्रौद्योगिकी परिषद ऐसे कार्यक्रम की उपादेयता को देखते हुए इसे प्रायोजित कर गौरव का अनुभव कर रहा है। दुर्ग विश्वविद्यालय के इस आयोजन की सफलता की कामना करता हूँ।

(डॉ. के. सुब्रमणियम)

# DURG VISHWAVIDYALAYA,DURG (C.G.)

Raipur Naka, Durg (C.G.)

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## Vice Chancellors Message

It is a matter of great honour and pride that Durg University has been given the responsibility of organizing Chhattisgarh Young Scientist Congress-2018 by Chhattisgarh Council of Science and Technology.

The issues of accessibility and relevance are of critical concern in scientific research today.The advancements in modern technologies have opened up a plethora of sophisticated tools and techniques that can potentially replace the old and outdated methods. The discovery and development of alternatives and the newer, realistic approaches and ideas have changed the very face ofscientific research.We have the responsibility to encourage our young researchers to make their research advantageous to society and the nation. Let us make it our concern to move the focus from scholastic research to valuable research for nation building.

I convey my best wishes and blessings for the congress to become the source of inspiration for the academic fraternity.

Dixit

**(Dr. N.P. Dixit)**
**Vice Chancellor**
**Durg Vishwavidyalaya**
**Durg (C.G.)**

**OFFICE OF THE PRINCIPAL**
**GOVT. V.Y.T.P.G. AUTONOMOUS COLLEGE, DURG 491001(C.G.)**
**(Former Name Govt. Arts & Science College, Durg)**
**NAAC Grade-A+, CPE Phase-III, DBT-Star College**
**Ph.: 0788-2359688, Fax: 0788-2359688**
**Website:** www.govtsciencecollegedurg.ac.in

## Principal's Message

It is a matter of pleasure for us to organize 16th Young Scientist Congress 2018 at our college. In today's knowledge based society, Science & Technology is the only path for survival and conservation of modern civilized society. Today, our country is facing several problems viz. increasing population, climatic alterations, insect pest infestations, social turmoil and nuclear threat besides unemployment and health problems. But we are proud that our youth are paying their potential attention towards every aspect of societal need and resolving the problems by the tool of science and technology.

Its our duty to provide them opportunity, platform, facilities and guidance for optimum exploration of brain of our youth. This 16th Chhattisgarh Young Scientists Congress is one of the major event to provide opportunity and platform to the youth of Chhattisgarh state. I am hopeful that the event will prove a major step towards shaping of mindset of our youth for scientific exploration.

We are extremely thankful to Chhattisgarh Council of Science and Technology, Raipur and Durg University, Durg for giving us opportunity to organize this congress.

**( Dr. S.K. Rajput)**
**Principal**
**Govt. V.Y.T.PG. Auto. College Durg**

# Bhilai Institute of Technology, Durg

ASPIRE TO EXCEL

Dr Arun Arora
Principal

## MESSAGE

It is a matter of great pleasure for Bhilai Institute of Technology, Durg to play a significant role in 16th Young Scientist Congress organized by Durg University and sponsored by Chhattisgarh Council of Science and Technology to promote creative young researchers of the Chhattisgarh state. It shall provide a platform to promote the ideals of co-operation, the interchange of knowledge & ideas and the application of science.

On this occasion, I urge the creative young minds, to go as far as they can in the path of research. Creativity is in our genes. It does not always need a previous knowledge. One only needs to start looking for simple solutions, be more playful and inquisitive, flexible and versatile and most importantly think clearly and logically.

We at Bhilai Institute of technology, Durg firmly believe that the key to the future is to enable young talent to have a genuine share in science where their imagination and their contributions are truly valued and all that they need is a platform to nourish that. We believe that this program will serve that mission and will help to show and enhance the scientific creativity and communication skills to inspire them to reach their full potential and to be role model for the next generation.

My best wishes will always be there with the young talent in their endeavor during the journey of research.

(Dr. Arun Arora)
Principal
Bhilai Institute of Technology, Durg

# DURG VISHWAVIDYALAYA,DURG (C.G.)

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## University Registrar's Message

It has been a real honour and privilege to organise an event of this magnitude, while this University is still in its infancy.

It has been a great show of confidence from Chhattisgarh Council of Science and Technology to have passed the baton this year in the hands of this University.

The Organizing Committee has worked hard to produce a successful event.

On behalf of all of us I welcome you all to Durg University andhope that you enjoy the hospitality and are rewarded by the scientific deliberations.

Being the convener of the congress, I extend my gratitude to the patrons of CGYSC-2018, Dr. K. Subramaniam, (IFS), Director General CG COST and Prof. N. P. Dixit, Vice Chancellor, as without their guidance and hand holding, this event could not have been possible.

I would like to thank technical program committee, local organizing committee, volunteers and the staff members of the Govt. VYT PG College, Durg and BIT Durg, for their dedicated support.

Finally I would like to thank all the researchers, volunteers and persons who directly or indirectly contributed to the congress. Without their cooperation and full support, we could not have organized this programme.

I would like to specially appreciateDr. Ajay Singh, organizing secretary of this event, for his day and night efforts for the success of CGYSC-2018.

I express my gratitude to the members of Organizing Committee for their enthusiasm and hard work towards making this congress a success.

I look forward to exciting and insightful presentations, discussions, and sharing of scientific ideas withcolleagues from all parts of the state. I thank you for attending CGYSC-2018 and hope that you enjoy your visit to Durg.

I am sure that this congress will give significant contribution to the achievements of scientific knowledge in various areas of scientific research. I expect the endeavour to be a grand success.

Dr. S. K. Tripathi
Registrar and Convener
Durg University, Durg.

# FOREWORD

**Dr. Ajaya Kumar Singh**
**Professor**
**Department of Chemistry**

It is a matter of proud privilege for me to greet you all at the 16th Chhattisgarh Young Scientist Congress-2018 jointly organized by Govt. V. Y. T. PG Autonomous College Durg and Bhilai Institute of Technology, Durg under the banner of Durg University, Durg and sponsorship of Chhattisgarh Council of Science and Technology, Raipur.

Durg University, Durg, under the very able, enthusiastic and proficient leadership of our honorable Vice-Chancellor, Prof. N. P. Dixit, is instrumental in creating a conducive environment for scholastic discourse deliberation and research activities. This event is an endeavour in the direction to bring together the experienced intellectuals and researchers as well as the young inquisitive minds to develop new ideas and strategies to combat the challenges for the incessantly changing world.

I extend warm welcome to all the delegates, eminent jury scientists, academicians from across the country and young researchers of Chhattisgarh state. I hope that the two days scientific deliberation of this august congregation will add valuable contribution to the Science and Technology scenario of Chhattisgarh state.

I wish all the members of the gathering, a wonderful and memorable experience

Dr. A. K. Singh
Nodal Officer/Organizing
Secretary
16th Chhattisgarh Young Scientist
Congress 2018

# KEY NOTE

## "ADVANCES IN ELECTRONIC WARFARE: INDIAN SCENARIO"

Dr. Anil Kumar Singh
OS & Director
Defence Electronics Research Laboratory
Chandrayangutta Lines, Hyderabad-500 005

**ABSTRACT**

Modern military warfare relies heavily on a variety of advance, complex technology, electronic offensive and defensive capabilities. The Electronic warfare (EW) is the element of military warfare that is related to the exploitation and protection of electromagnetic (EM) spectrum. The technologies used in implementing EW are defined in terms of Electronic Support (ES), Electronic Attack (EA) and Electronic Protection (EP). ES technologies provide tactical sensing to inform battlefield situational awareness. EA technologies are used to degrade, disrupt, deceive, and deny adversary electromagnetic system functions. EP technologies are meant to protect against electromagnetic interference; EM interference may arise from friendly or non-friendly sources.

The electromagnetic spectrum today it is much more agile and complicated than what it used to be earlier and the pace of changes is accelerating. The EW systems have grown from self-protection (protecting own platform) to mission-protection (protecting the platform so it can reach its operational goals) to mission-support (contribution to the success of the mission). The advance technologies developed in India for contemporary EW have successfully addressed battlefield situational awareness of the targeted radars and RF communications with Low Probability of Intercept (LPI), Low Probability of Exploitation (LPE), and finally Anti jam (AJ) characteristics. The unique and state-of-the-art features provided by the advance EW system have revolutionized the processing of electromagnetic spectrum and dissemination of intelligence with unprecedented speed and efficiency. EW is a dynamically changing field, which by necessity should respond to continuously changing threat scenario. Hence, long term focused research in realization of enabling and emerging technologies is drawn in to order to meet the objective of futuristic EW with optimal size, weight, power and cost (SWaPC) system requirements.

Military architectures are transitioning from federated systems to wideband multifunction systems which integrate radar, weapon, electronic warfare (EW), and communications through a common aperture. With this development, the EW global market is expected to reach $24.25 billion by 2020. In India, the main players in design, development and production of EW system are DRDO, Defence Public Sector Undertakings (DPSUs), and a small but growing number of private enterprises and Academic Institutions. With the synergetic effort of these organisations & institutions several advance EW technologies have been developed in the field of Antennas, Receivers, Direction Finders, Signal Analysers, Power amplifiers, Embedded Systems and Data fusion. The keynote address will cover comprehensive EW technological developments that influenced the way EW systems are evolved particularly in Indian scenario with the participation of all resources from the country where young researchers / scientists have always played a vital role.

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AGT-1

# STUDIES ON DROUGHT IN KHARUN SUB BASIN OF CHHATTISGARH STATE FOR SUPPLEMENTAL IRRIGATION PLANNING OF *KHARIF* CROPS

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## ABSTRACT

The present study was aimed to investigating meteorological, hydrological aspects of droughts, analysis of critical dry spells (CDS) and supplemental irrigation (SI) planning for CDS duration for *kharif*crops on the basis of period from 1981 to 2015 ofKharun sub basin of Mahanadi river system. It was found that Durg, Raipur and Dhamdha RG stations of study basin are more susceptible to meteorological drought situation basin with average frequency of once in 5 years to once in 8 years. The Kharun sub basin has sufficient length of wet season (on average about 104 days). The estimated crop water requirement for paddy (*Oryza sativa*), maize (*Zea mays*), Soybean and Cauliflower were found to be the 401.6, 266.7, 329.9 and276.2 mm respectively. A bad monsoon year is intervening CDSs and these dry spells often cause most crop loss and seasonal water scarcity conditions. The estimates of crop water requirement and effective rainfall for CDS may provide useful information for the planning of SIR to cope up with intervening prolonged dry spells periods. In hydrological drought index, it was observed that the stream flow drought events follow the meteorological droughts/CDS. The ground water drought analysis indicates that the all wells of basin experienced drought mostly in year 2009, 2010 with declined water significantly in pre monsoon season. Reservoir storage index analysis of RavishankarSagar and TandulaJalashaya indicates that the reservoir storage reduced in summer months and highest extreme drought events occurred in year 2000 and 2001 at both the reservoirs. It is believed that this study provide clarity in understanding regional drought problems and can be helpful in basin water planning to cope with dry spells and drought in Kharun basin.

**Key words:** Critical Dry Spell Supplemental Irrigation, Hydrological Drought, Ground water Drought Index, Reservoir storage Drought Index, Storage flow Drought Index, KharunBasin.

AGT-2

# DEVELOPMENT AND PERFORMANCE EVALUATION OF MANUALLY OPERATED TAMARIND BRIQUETTING MACHINE

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## ABSTRACT

The tamarind briquetting machine consisted of a mainframe, upper die, pulp box, base plate, shaft and pedal. The prototype was tested with tamarind pulp, having different moisture content in the range of 16.30 to 27.50% (wb). The test results indicated a satisfactory working of the prototype and fulfilling the objectives of the study. The average density of briquettes varied from 0.94 to 1.05 g/cm$^3$. The average pressure applied by the male and female operators was found to be 26.02 kPa and 23.38 kPa, respectively. It was possible to obtain a final density (1.05 g/cm$^3$) of briquette at a constant pressure of 24.76 kPa at each stroke. There was no appreciable difference in the density of the briquettes made by male and female operators. This indicates that both the operators can perform the job efficiently through this machine under similar working condition. It was also observed that the tamarind pulp, having moisture content 19.8 to 27.5% (wb) was suitable for briquetting. The capacity of prototype of tamarind briquetting machine was found to be 40 briquettes/h for 500 g briquette and 30 briquettes/h for 1 kg briquette. The cost of briquetting was calculated to be Rs.1.42/kg for 500 g briquette and Rs.0.95/kg for 1 kg briquette. The break even point was estimated to be 225 briquettes/year for 1 kg briquettes and 392 briquettes/year for 500 g briquettes. The payback period is estimated to be 0.31 year for 1 kg briquettes and 0.41 year for 500 g briquettes.

AGT-3

# A STUDY ON AGRICULTURAL DROUGHT ASSESSMENT USING GIS TECHNIQUE FOR UPPER SEONATH SUB BASIN

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## ABSTRACT

Drought is hydrological extreme characterized by consistent dry spells. Implicitly drought is also termed as a creeping phenomenon, which can be attributed to its protracted developments accompanied by prolonged effects. The definition of drought is contextual and through literature certain categories of drought has been identified namely meteorological, agricultural, hydrologic, and socioeconomic. To minimize the significant effect of drought at early stages, predictions pertaining to short- and long-term droughts are necessary which will help the decision makers in framing efficient strategies. A study has been conducted to assess the agricultural drought wherein the impact on vegetation stress during drought period is given paramount importance. The study region is Upper Seonath sub basin of Chhattisgarh state, which encompasses an area of 7292 sq.km out of which 62.12% is dominated by agriculture. Normalized Difference Vegetation Index (NDVI) composites which are generated from AVHRR of NOAA i.e., NOAA-AVHRR-NDVI is used for the calculation of Vegetation Condition Index (VCI) as well as the yield productivity of major rain-fed crops. The combination of VCI and Yield productivity provided useful insights on agricultural drought detection. The outcome of this study could be a worthwhile attempt towards addressing the issue of drought vulnerability and can be used as a guide for framing planning policies for the reservoirs in the Upper Seonath basin, further, drought adaptation and mitigation measures are necessary for combating the droughts which can be ascertained through proper drought modeling.

**Keywords:** NOAA-AVHRR NDVI; Vegetation Condition Index (VCI); Upper Seonath; Agricultural Drought

AGT-4

# DETERMINATION AND DEMARCATION OF SUITABLE WATERSHED FOR ARTIFICIAL RECHARGE AND RAINWATER HARVESTING IN DURG DISTRICT

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## ABSTRACT

The scope for installation of large and medium irrigation projects is limited due to lack of availability of proper sites, paucity of funds, equity issues and other social factors in many regions of the country. Therefore the installation of 'determination and demarcation of suitable through watershed area for artificial recharge and rainwater harvesting' for ground water recharge and water harvesting has a great potential in the times to come and the objectives like harvesting every drop of rainwater for purposes of irrigation to create sustainable sources of income for the village community as well as for drinking water supplies. The study of project area i.e. Patan Block, Gundrdehi and Durg block their rainfall, temperature, humidity and also the recommended for artificial recharge and rainwater harvesting with harvesting structures. With the results of the project i.e. the changes in crop production, ground water level and human community improvement is positively. The essential and overall view of the project to development of ground water level, production of crop and also reduced in soil erosion and also the concluded. Harvesting every drop of rain water for purposes of irrigation, plantations including horticulture and floriculture, pasture development, fisheries etc. to create sustainable sources of income for the village community as well as for drinking water supplies.

**key word:-** watershed area, artificial recharge, rainwater harvesting, ground water level, rainfall, runoff and erosion.

AGT-5

# USE OF DOMESTIC SEWAGE FOR MINERALIZABLE PHOSPHORUS RETENTION IN LATERITIC SOIL (BARREN LAND) WITH CONSTRUCTED WETLAND

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## ABSTRACT

The phosphorus (P) retention in laterite soil-based lab scale Constructed wetland systems (CWs), for treatment of domestic wastewater, was monitored over year. Special focus was on the lateritic soil due to of lack of major nutrient phosphorus. Lab scale CWs of 2.5m x 1m x 0.35 m of two numbers (R1 and R2) were used with a density of 4-5 plants/$m^2$ in R2 and 10-11 plants/$m^2$ in R1. Plants of six different species - *Typha latifolia, Colocasia esculenta, Althernanthera sessilis Polygonu, Canna indicia, Ocimum americanum: L, Pistia stratoites* were used. R1 reactor removed 81.72% and R2 removed 79.62% of soluble reactive phosphate. Mineralizable phosphorus retention in lateritic soil was 32.23 g/$m^2$/year(45.11 %) and 37.50 g/$m^2$/year(52.49%) in R1 and R2 respectively. While macrophytes consume 21.24(29.73%) g/$m^2$/year and 18.39 g/$m^2$/year(25.74%) Phosphorus. Rest of P was lost due to harvesting of plants. The higher density of plants removes more nutrients.

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AGT-6

# VIRTUAL PROTOTYPE DESIGN AND EXPERIMENTS OF INCLINED METERING MECHANISM FOR PADDY SEEDS

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## ABSTRACT

Metering mechanism of inclined plate planter was modeled and simulated by solidworks software. A test setup was also designed to mount the inclined metering plate and vary the peripheral speed of seed plate. The drawing of various components and assemblies were prepared utilizing solid-works facility and fabrication of components was done in the NAE-FMIR workshop of Department of Farm Machinery and Engineering, IGKV, Raipur. In solid – works simulation the metering device has better performance for picking optimum seed per cell at an inclination of 45° and at all forward speed of lab set-up planter. The simulation results show that seed to seed spacing, seed rate have been obtained through simulation are the same as theoretical analysis and the peripheral speed of the metering plate has influence on the performance parameters of the metering device. The created metering mechanism, parts and assembly will be models for subsequent simulation and analysis is necessary. The study provides theoretical foundations and methodological references for the application of virtual prototype technology on the development of new agricultural machinery.

**Key words:** Direct seeding; Inclined plate; Simulation; Seed rate; Virtual prototype.

AGT-7

# MODELLING OF DAILY REFERENCE EVAPOTRANSPIRATION USING FUZZY LOGIC FOR RAIPUR REGION

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## ABSTRACT

Evapotranspiration is one of the major components of the hydrologic cycle and its accurate estimation is of paramount importance for many studies such as hydrologic water balance, design of irrigation system and irrigation scheduling. The FAO Penman Monteith method has been accepted as standard method to estimate reference evapotranspiration ($ET_0$), but it requires several weather parameters. This study is an attempt to estimate $ET_0$ using Fuzzy Logic Models with fewer weather parameters for Raipur resion. Different Fuzzy sets have been formed using the parameters viz. maximum temperature ($T_{max}$), relative humidity (RH-I) and wind speed (WS). The $ET_0$ estimated by Fuzzy Logic Model was found to be comparable with the $ET_0$ estimated by FAO Penman-Monteith method. The Performance evaluation of developed models was carried out using correlation coefficient (CC), Root mean square Error (RMSE), mean absolute deviation (MAD), and coefficient of efficiency (CE). During testing of model the values were found as correlation coefficient (CC= 90.60), Root mean square Error (RMSE= 0.73), mean absolute deviation (MAD= 0.56) and coefficient of efficiency (CE= 82.3) for Raipur region. Developed fuzzy logic models require lesser input variable than input required by different empirical methods. Hence, developed fuzzy model may be used to estimate $ET_0$ with fewer weather parameters.

AGT-8

# DESIGN, DEVELOPMENT AND EVELUATION OF MULTICROP PLANTER FOR INTERCROPPING

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## ABSTRACT

A intercrop planter was designed and developed to intercropping of soybean and pigeon pea in kharif season and chick pea in Rabi season by same machine in same piece of land in IGKV Raipur. Width of machine was 4.3m out of which 1.5 m of soybean planter with 30cm of five row spacing and two detachable planters attached both side 90 cm from soybean. From the study it was found that seed requirement was 35-40% less requirement in planter which 44kg/ha, 6kg/ha and 42kg/ha than broad bed seed drill which 75kg/ha, 12kg/ha and 65kg/ha for soybean, pigeon pea and chick pea respectively .There were plant to plant spacing 3-5cm, 30cm, 8-10cm for soybean pigeon pea and chick pea respectively. Field capacity was found 0.52ha/hr with 85% field efficiency which required 4-5lit/ha fuel. It was observed that yield of soybean was 15-20% more than broad bed seed drill. It was concluded that intercropping planter precise sowing for soybean, pigeon pea and chick pea maintain seed rate and plant to plant spacing.

**Key words:** Intercrop Planter, Broadbed furrow Seed Rate, Field Capacity, Fuel Consumption.

AGT-9

# ENGINEERING PROPERTIES AND DRYING KINETICS OF *KARAYA* GUM (*STERCULIA URENS ROXB.*)

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## ABSTRACT

The present study was undertaken to investigate the drying kinetics of gum *karaya* (*Stericulia urens Roxb)* under hot air drying. Physico-chemical and rheological properties of any material are important from industrial point of view in order to understand the requirement of different process operations for its value addition as well as for its commercial utilization. The exudates of *karaya* gum samples were obtained fresh from fields and converted into grits. The geometric mean diameter of the grits varied in the range of 4.52 to 9.93 mm. Values of ash content, pH, refractive Index, water activity, water holding capacity (per 100 ml), nitrogen (%) and protein (%) were determined to be 4.62%, 4.26, 1.336, 0.651, 84.76, 0.16 and 1.06, respectively. *Karaya* Gum is soluble in hot and cold water but insoluble in acetone, chloroform and ethanol. The viscosity of 1% *Karaya* gum solution was found to be varied from 619 to 1286 cp in the spindle rotational speed range of 20 to 100 revolutions per minute at room temperature of 24 -26°C. A hot air dryer without recirculation facility was used in the study to dry the samples. Drying of gum *Karaya* samples was done at five different temperatures in the range 40-80°C at constant air flow rate of 1.5 m/s. Higher the drying air temperature lower was the drying time and also the final moisture content. In all the cases, initially the evaporation of moisture was at a very faster rate followed by gradual decrease which quickly attains the unappreciable rate of evaporation unlike other common biological materials.

Keywords: Physico-chemical properties; rheological properties; gum Karaya; Drying rate.

AGT-10

# EFFECT OF DIFFERENT DRAINAGE CONFIGURATIONS AND CROPPING SYSTEM ON RUNOFF, SOIL LOSS AND CROP YIELD IN VERTISOLS

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## ABSTRACT

A field experiment was carried out at BRSM College of Agricultural Engineering and Technology & Research Station, Mungeli, in *kharif* season to study the effect of drainage configurations on performance of cop yield, runoff and soil loss. The specific objectives was to find out which drainage configurations works the best in reclamation of temporary water stagnation in vertisols and to find out the impact of selected crops (Soybean, Pigeon Pea and its intercropping) and different drainage configuration on runoff and soil loss. Field drainage channel of three size 20 cm, 30 cm and 40 cm depth with drain spacing of 10 m were laid out for the study. 40 cm drainage depth was found to be more effective in regulation of excess water from the field and lowering the groundwater table than the other two. At 40 cm drainage depth, the grain yield of soybean was maximum (18.66 q $ha^{-1}$) with highest water productivity.The soybean equivalent yield was higher under soybean/pigeon pea as an intercrop (54.98 q $ha^{-1}$) which is provided 40 cm drain depth and lowest in sole soybean crop (13.36 q $ha^{-1}$) with 20 cm drain depth. The maximum runoff and soil loss were recorded 47.5 mm and 1322 kg $ha^{-1}$ respectively in soybean field which is provided 20 cm drain depth and the minimum runoff and soil loss were recorded 28.5 mm and 950 kg $ha^{-1}$ respectively in pigeon pea field which is provided 40 cm drain depth.

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AGT-11

# DEVELOPMENT OF WEB BASED SPATIAL DECISION SUPPORT SYSTEM FOR SOIL AND WATER CONSERVATION MEASURES IN PAIRI WATERSHEDS, CHHATTISGARH

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## ABSTRACT

In present study web-GIS based Spatial Decision Support System (SDSS) developed for Soil and Water Conservation Measure (SWCM) for the demarcation of suitable site such as check dam, contour bund, percolation tank contour trench, boulder check dam, gabion, brushwood check dams etc. in easy way and fast dissemination, sharing, displaying and processing of spatial information to extend help in decision making for user such as officer, farmer and researcher etc.

Different datasets such as land use land cover, soil texture, slope, drainage, satellite image Sentinel – 2 with spatial resolution 10 meter, and rainfall were used in this s

AS-1

# MOLECULAR DIVERSITY AND GENETIC ANALYSIS OF PIGEONPEA [*Cajanus cajan* (L.) Millsp.] GENOTYPES FOR THEIR SUITABILITY IN CHHATTISGARH

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## ABSTRACT

The experiment aimed to study the genetic analysis of seed yield and its components in pigeonpea under different dates of sowing. The study material comprised of 50 germplasm and selected line were crossed in Line x Testers resulting in a total of 35 cross combinations. Genetic diversity at molecular level in 24 genotypes using SSR revealed that two genotypes *viz.*, RPS-2007-105 and RPS2010-16-5 were having least similarity coefficient 0.55. The results of non segregating population (Parents and $F_{1s}$) revealed that the crosses showed positive heterosis over mid parent and better parent for seed yield per plant except ICP7004 x JKM-189 and over batter parent for number of pod clusters per plant except ICP7004 x JKM-189 in environment I and II. Finding of GCA and SCA analysis is summarized for the traits exhibited with seed yield per plant over all the environments. All the parents positive GCA for plant height except ICP7004 and UPAS-120. Moreover all cross combinations showed positive SCA for seed yield per plant except ICP7004 x JKM-189 and ICP7373 x ICPL 87119. For number of pods per plant all the parent showed positive GCA except UPAS-120 and JKM-189. The crosses ICP7406 x JKM-189, ICP7406 x UPAS-120 and parents UPAS-120, JKM-189, ICPL-87 showed stable performance for seed yield per plant over different environments. Looking to the study of genetics parameters, combining ability, heterosis and stability study for seed yield and its components along with content protein, this was first framework for improvement of Pigeonpea in Chhattisgarh State.

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AS-2

# PATHOGENIC VARIABILITY OF *XANTHOMONAS ORYZAE* PV. *ORYZAE* ISOLATES FROM CHHATTISGARH

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## ABSTRACT

Chhattisgarh state is popularly known as "rice bowl" as rice is the major crop of the state. The productivity of rice in Chhattisgarh is comparatively lower than the national average, which is due to a considerable number of biotic pest and diseases. Among them, Bacterial leaf blight (BLB) caused by *Xanthomonas oryzae* pv. *oryzae* (*Xoo*) (Swings *et al.*, 1990) is one of the most devastating diseases affecting entire rice acreages. The rice-*Xoo* pathosystem has become the genetic model for understanding host-pathogen interactions and co evolution for cereals. Since, an effective and reliable chemical control method of the disease is not available, enhancement of host resistance is considered as the most effective, economical, and environmentally safe strategy to achieve disease resistance in rice. In this host pathogen system, race-specific resistance shows the gene for gene relationship. A clear understanding of the molecular mechanisms in the host resistance to pathogens is essential for prerequisite for the better design of control strategies for method of breeding. It becomes very useful to know the performance of different resistant genes under the Chhattisgarh condition for better planning of the strategies for gene deployment and resistant breeding against this important disease. During the present investigation on inoculation of eight different isolates to twenty four NILs / Pyramids, it was observed that the isolates had specific interactions with some of these lines and as a consequence incompatible interaction were observed. Responses that are induced in such near-isogenic lines are clearly the result of the molecular cross talk between avirulence gene product(s) and corresponding R gene product(s). Except *Xa4* and *Xa21* gene, entire Nil's expressed susceptible reaction against all the 8 isolates of *Xoo* when tested for virulence on rice varieties. Pyramid line IRBB 65 (*Xa4+Xa7+xa13+Xa21)* expressed HR against 5 out of 8 *Xoo* isolates followed by IRBB 60 and 66 containing *Xa4+xa5+Xa7+xa13+Xa2* and *Xa4+xa5 +xa13+Xa21*gene combination respectively. Highly resistant physiological responses in IRBB 65, IRBB 60, IRBB 66 indicated a consequence of positive function encoded by avirulence gene in the pathogen, which prompted us to speculate *avr* gene(s) in the surviving *Xoo* population.

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AS-3

# COMPARATIVE STUDIES ON DRIP IRRIGATED SUMMER RICE

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## ABSTRACT

The field experiment was conducted during summer season for two consecutive year of 2012-13 at the Research cum Instructional Farm IGKV, Raipur Chhattisgarh. This experiment was conducted in strip plot design with three replications. The treatments comprised of three establishment methods (direct seeding-DSR, wet seeding-broadcasting sprouted seed on puddled soil –WSR and transplanting-TPR) as main plot and four irrigation methods (conventional irrigation-conv. Irrig., recommended irrigation-3 days after disappearance of flooding water- rec. practice, drip irrigation-Drip and Sprinkler irrigation-sprinkler) as sub plot in experiment. Through this study one can determine the effects of irrigation scheduling on water balance and land and water productivity of direct seeded rice (DSR) relative to the current practice of transplanted rice (TPR) and puddle wet seeded rice. Drip irrigated TPR gave statistically highest yields 52.76 q $ha^{-1}$ during 2013. Grain yield was statistically similar in drip, conventional irrigation, recommended practice of irrigation applied to direct and wet seeded rice during both the years. In summer rice cultivation, energy input was significantly reduced by using DSR (10700 MJ $ha^{-1}$) method and maximum energy input was consumed by TPR (13800 MJ $ha^{-1}$) during both the years. On an average about 60 per cent energy by drip irrigation and 58.4 per cent energy will be saved by sprinkler irrigation and 31.5 per cent electric energy will be saved by recommended practice over the conventional irrigation during both the years. With respect to method of irrigation, energy input was significantly reduced by using drip irrigation followed by sprinkler irrigation during both the years. However, significantly higher energy input was recorded under conventional irrigation followed by recommended practice during 2012 and 2013. On an average, 60 per cent energy will be saved due to drip irrigation over conventional irrigation.

**Keywords:** Productivity, summer rice, energy use efficiency, drip, sprinkler, irrigation.

AS-4

# DNA SEQUENCING (NGS) BASED DEVELOPMENT OF UNIQUE IDENTIFICATION BARCODES FOR RICE GENOTYPES OF CHHATTISGARH

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## ABSTRACT

Conservation and cataloguing of biodiversity is important not only for crop improvement programs but also for protecting IPR. Recent NGS (next generation sequencing) platforms have led to development of DNA sequence-based tool; DNA Barcoding as potential means to identify and catalog living organisms. Like mitochondrial genome loci (CO-I) used in animal system for barcoding, the chloroplast genome loci (*rbcl, matK and trnl* etc.) are recommended for plants. Chhattisgarh is rich in rice biodiversity thus with an aim to develop unique DNA barcodes of rice 27 chloroplast and 4 nuclear genome loci were analyzed in this study.

Out of 31 candidate loci that were used for genotyping of 231 rice genotypes only 7 chloroplast genome loci (*atpH-atpI, petA-psbJ, trnK, rbcL ,matK, trnlc-trnld , psbA-trnH* ) were found suitable for generation of DNA sequence data, based on amplification efficiency (>65%), reproducibility (100 %) and amplicon size (> 500bp). Multiple Sequence alignment analysis of DNA sequences obtained for these 7 loci in 24 genotypes (representative of each diverse group) showed average of 62.06 % *transition* and 17.12% *transversion* with maximum 305 parsimony informative sites in *matK loci* and minimum 264 in *rbcl* loci, indicating sufficient nucleotide variation among the 24 genotypes. Maximum nucleotide diversity per site ($\pi$ = 0.21613) was observed in *rbcl* while maximum haplotype groups (17) were found for *psbA-trnH* loci, suggesting these two loci as most suitable for DNA barcoding in rice.

DNA sequence obtained for 7 loci in all 24 genotypes were used to generate "unique identification barcode" in Barcoding of Life Database (BOLD) under (Consortium for Barcode of Life) CBOL for each of the genotype. Our study indicated that *psbA-trnH , trnk* loci can be used in combination with *matk* and *rbcl* loci for generation of DNA barcodes of rice at intra species level.

**Key words**: DNA barcoding; Rice, chloroplast loci *rbcl; matK* phylogenetic

AS-5

# EFFECT OF PINCHING AND GROWTH REGULATORS ON GROWTH, FLOWERING AND YIELD OF AFRICAN MARIGOLD (*TAGETES ERECTA* L.) CV. PUSA NARANGI GAINDA

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## ABSTRACT

To study the effect of pinching and growth regulators on growth, flowering and yield of African marigold an experiment was conducted. The result indicated that the important growth characters were significantly influenced by different plant growth regulator and pinching treatments tried under this investigation. The application of $GA_3$ (200 ppm) recorded significantly higher plant height, plant spread, stem diameter, number of primary and secondary branches, chlorophyll content of leaves, fresh and dry weight of plant at harvest. The results revealed that among the pinching treatments, double pinching recorded significantly higher plant spread, stem diameter, number of primary and secondary branches, chlorophyll content of leaves, fresh and dry weight of plant at harvest, whereas plant height and flower size was found maximum with no pinching. As far as flowering characters are concerned, length of days to bud appearance, days to first flowering and 50 per cent flowering was significantly reduced by the application of $GA_3$ at 200 ppm. Period of bloom, flower diameter, fresh and dry weight of flower per plant and flower yield was also improved with the application of 200 ppm $GA_3$. Among the pinching treatments, double pinching recorded maximum period of bloom, number of flowers, shelf life of loose flower, fresh and dry weight of flower per plant and flower yield followed by single pinching. However, maximum flower diameter was noticed with no pinching. Seed yield characters *viz.*, 1000 seed weight and seed yield per plant, per plot and per ha were increased considerably with $GA_3$ at 200 ppm. Among the pinching treatments, maximum 1000 seed weight and seed yield per plant, per plot and per ha were obtained under double pinching.

**Keywords** Marigold, $GA_3$, NAA, Ethrel, growth, flower yield

AS-6

# POPULATION STRUCTURE AND GENOME WIDE ASSOCIATION MAPPING FOR GRAIN NUTRITIONAL AND QUALITY TRAITS IN LANDRACES OF RICE (*Oryza sativa* L.)

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## ABSTRACT

Chhattisgarh state is extremely rich in rice biodiversity. Rice landraces found in the state have broader genetic base and they are the store house of several desirable and rare alleles. Malnutrition becomes one of the severe problems in India and especially in Chhattisgarh state. Many people and children died every year due to malnutrition. Looking to the nutritional security of poor peoples and children, present investigation was carried out with diverse rice landraces of Chhattisgarh to identify and develop nutritional rich rice varieties and to discover new genes/alleles for grain nutritional and quality traits using genome wide association studies. Landraces, Karhani, Ramshree, Kareni Dhan were identified for high iron (Fe) and zinc (Zn) contents. Highest oleic acid (omega-3) was observed in Kadamphool, Bathrash and Badshabhog Selection-1 whereas Chhindmauri, Asam Chudi, Lokti Musi were identified for superior grain quality. Population structure indicated that 190 rice landraces belongs to three sub-populations based on their genetic structure. Genotypes of SG-3 have short fine grains whereas genotypes of SG-1 and SG-2 have bold, slender grain type. Results of population structure was further confirmed by analysis of molecular variance, neighbour joining tree based genetic diversity and principal component analysis. By genome wide association studies, total of 68 significant marker-trait associations for 23 traits during first season whereas 30 significant marker-trait associations for 8 different traits during second season were identified. Five markers for grain yield, one marker for oleic acid, one marker for linoleic acid, four markers for iron content and five markers for zinc contents were showed consistent association during both seasons. These marker-trait associations could be further validated and used in marker assisted breeding for development of nutritional rich rice varieties. Identified superior landraces could be release as bio-fortified rice variety and also used as donors to develop nutritional rich rice variety.

**Keywords:** Rice landraces, bio-fortification, malnutrition, diversity, association mapping, MAS

AS-7

# INFLUENCE OF DIFFERENT ORGANIC AND INORGANIC SOURCES ON GROWTH, YIELD AND BENEFIT COST RATIO OF GUAVA [*Psidium guajava* (L.)]

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## ABSTRACT

A field experiment was carried out during the year 2013-14 for Mrig bahar crop of guava at Horticulture Research Farm of Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.) to studies on Influence of different organic and inorganic sources on growth, yield and benefit cost ratio of guava [*Psidium guajava* (L.)] under Chhattisgarh plains". The experiment was laid out in Randomized Block Design (RBD) with four replications and twelve treatments. Results revealed significant differences amongst various growth attributes, fruit yield and quality of guava due to chemical fertilizers, organic manures and biofertilizers. The application of 75% RDF + Cowdung Slurry ($T_2$) produced the highest tree height, trunk girth, tree canopy spread, length of shoot (92.18cm), diameter of shoot (1.01cm), Number of branches (10.00), Fruit weight (205.4g), Pulp weight (198.17 g), fruit diameter (9.54cm), number of fruits per tree (250.57), Fruit yield per tree (54. 66 kg/tree) and Fruit yield per hectare (14.31 $tha^{-1}$).The application of 75% RDF + Vermiwash 10 litre/tree ($T_8$) and 75% RDF + *Azospirillum* + PSB ($T_{10}$) was equally good for producing higher growth and yield. Gross returns (286200.00 Rs. $ha^{-1}$), net returns (251425.60 Rs. $ha^{-1}$) and highest B: C ratio (7.23), were maximum under 75% RDF + Cowdung slurry 10 litre/tree.

Key words: Guava, organics, inorganic, growth, fruit yield and B: C ratio.

AS-8

# A REPORT ON BIOMORTALITY FACTORS OF TAMARIND FRUIT BORER, *CRYPTOPHLEBIA OMBRODELTA* (LOWER) FROM BASTAR TRIBAL BELT OF CHHATTISGARH

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## ABSTRACT

For the study of natural enemies of tamarind fruit borer, *Cryptophlebia ombrodelta,* observations on mortality of tamarind fruit borer were recorded. It was seen that *C. ombrodelta* was attacked by natural enemies included three late larval parasitoids *viz. Charops* sp, *Brachymeria* sp and *Xanthopimpla* sp and one larval parasite *viz. Cotesia* sp. On the basis of per cent mean mortality, Braconid wasp, *Cotesia* sp recorded as leading bio agent in which maximum mean mortality of 12.50 per cent was observed in the third week of October with an overall mean mortality of 4.55 per cent followed by bio agents, *Charops* sp, *Brachymeria* sp and *Xanthopimpla* sp with 7.00, 1.5 and 3.00 per cent mean mortality with the overall seasonal mortality of 3.35, 0.6 and 0.98 per cent. As far as larval mortality in villages were concerned, the present investigation indicated key mortality factors included one larval parasite *viz. Cotesia* sp and three late larval parasitoids *viz. Charops* sp, *Brachymeria* sp and *Xanthopimpla* sp which parasitized the larval and late larval stage of fruit borer. Stage specific mortality showed maximum mortality in early larval stage (22 per cent in village Dharmaur) followed by late larval stage (16 per cent in village Dharmaur and Biringpal, 4 per cent in village Dharmaur, Biringpal and Tekameta and 8 per cent in village Kumhrawand, respectively).

**Sponsored by:** Chhattisgarh council of science & Technology, Raipur

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AS-9

# MAPPING QTLS FOR $NH_4^+$ AND $NO_3^-$ USE EFFICIENCY UNDER WATER STRESS AND NON-STRESS CONDITIONS AND EXPRESSION ANALYSIS OF GLUTAMINE SYNTHETASE AND NITRATE REDUCTASE IN RICE *(ORYZA SATIVA* L.)

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## ABSTRACT

Nitrogen (N) is one of the most critical inputs and the current average nitrogen use efficiency (NUE) in the rice field is approximately 33%, poorest among cereals. Predominant form of N in aerobic soils is nitrate ($NO_3^-$) while ammonium ($NH_4^+$) exists in anaerobic soils. Development of cultivars with improved $NH_4^+$ or $NO_3^-$ use efficiency by harnessing inherent significant variability for NUE can be an important approach. Considering these facts, the present study was established with one hundred twenty two and selected thirty two recombinant inbred lines (RILs) of two indica genotypes, Danteshwari × Dagad deshi under three nitrogen forms and three environments. The trend analysis of $NH_4^+$-N & $NO_3^-$-N dynamics revealed that $NH_4^+$-N concentration persisted more under anaerobic condition and $NO_3^-$-N concentration under aerobic conditions. Three way-ANOVA showed high level of significance for variance components (G, N, E) and their interactions effects (GXN, GXE, NXE, EXNXG) for yield & NUE and their component traits. Mean performance of genotypes depicted higher values for agronomically important traits *i.e.* yield and NUE under $NH_4^+$ as compared to $NO_3^-$-N and $N^0$. The phenotypic and genotypic data was statistically analyzed for QTLs identification for yield & NUE traits. A total of 58 QTLs conferring the corresponding five traits were detected under three N forms and two environments. We also investigated the different members of AMT (Ammonium transporters), NRT (Nitrate transporters), GS (Glutamine Synthetase) & GOGAT (Glutamate Synthase) genes, involved in NUE and analyzed the expression pattern of each gene using gene-specific primer in young rice seedlings. Collectively, Os*Gln1;1*, Os*Gln1;2*, Os*Gln1;3* , Os*Gln2*, Os*Glt1* and Os*Glt2* manifested different and reciprocal responses to nitrate and ammonium supply. The activity of enzymes NR, NiR, GS & GOGAT was significantly affected by $NH_4^+$ and $NO_3^-$ treatment. These results assist us to identify $NH_4^+$ & $NO_3^-$ responsive cultivars which could be used for cultivation and/or used as parent's in future breeding program to produce better nitrogen use efficiency varieties under water stress and non-stress conditions.

**Sponsored by:** Chhattisgarh council of science & Technology, Raipur

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AS-10

# INHERITANCE OF FERTILITY RESTORATION AND IDENTIFICATION OF PUTATIVE MARKERS LINKED TO *RF* GENE IN RICE (*ORYZA SATIVA* L.)

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## ABSTRACT

Three CMS lines and 20 diverse testers were crossed in line × tester fashion to generate 60 hybrids. Nine parents exhibited more than 80 % pollen/spikelet fertility with heterotic morphological attributes identified as restorers. Inheritance of fertility restoration in four restorer lines. It were found that fertility restoration evaluation of the plants in $F_2$ among the four crosses viz., IR58025A x TOX981-11-2-3, IR58025A x IR72164-352-2-5-5 showed monogenic 3fertile:1sterile segregation ratio and CRMS31A x IR72164-352-2-5-5 showed a segregating ratio of 9fertile:7 sterile indicated digenic inheritance with complementary gene action. Mapping of fertility restorer gene in $F_{2:3}$ population of IR58025A x IR72164-352-2-5-5 with the help of micro satellite markers. Among $F_{2:3}$ population, line number 52 had high pollen and spikelet fertility, while line number 3 (0.25) showed lowest pollen and spikelet fertility, these lines may be considered as suitable for restorer and maintainer lines respectively. Four DNA markers, across 2 chromosomes (Chr1 and 10) reported to be closely linked with *Rf* genes. RM490 linked with $Rf_3$ gene was located on short arm of chr1 with map distance of 2.8cM; RM6100 and RM1108 were located on Chr10 with map distance of 1.2cM and 1.5cM, respectively from $Rf_4$ gene. *Rf* genes of the SSR markers reported in this study might be useful for the identification of CMS lines and restorer lines of rice through marker-assisted selection with reasonable accuracy.

**Keywords:** Soil and Water Conservation Measures, Watershed management, WebGIS, Decision Support System, Web Map Service (WMS,) Geographic Information System (GIS).

BIO-1

# EST SSR BASED GENETIC DIVERSITY STUDY OF WILD, CULTIVATED AND ENDANGERED SPECIESOF *CURCUMA* COLLECTED FROM RAJNANDGAON DISTRICT.

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## ABSTRACT

Genus *Curcuma*belonging to family Zingiberaceae is well known for its extensive medicinal properties derived from a chemical constituent called curcumin. Curcumin is known as a wonder drug because of its pharmaceutical importance. Curcumin content could vary based on different species and its genetic makeup and environmental factors. So in the present study we had tried to investigate gene expression of different species of *Curcuma* from Chattisgarh based on EST based molecular fingerprinting. Genetic fingerprints of *Curcuma caesia, Curcuma longa* and *Curcuma aromatica* by using 17 EST- SSR (Expressed sequence tag Simple Sequence Repeats) were used to elucidate the genetic diversity for their utilization, genotypic conservation and large scale production of curcumin derived from these species. The primer combinations had amplified 127 loci among which 102 were found to be polymorphic in nature and the rest were monomorphic. And polymorphism percent is 81%. These markers were used to estimate genetic similarity and distance between the *Curcuma* species. Various data scoring methods were to analyze the similarities and relationships between species of *Curcuma*. Data analysis revealed distinct genetic identity between species of *Curcuma* at the genomic level. In the present study provides a baseline data for optimization of conservation and breeding program of this medicinally important rhizome on the basis of their documented genetic diversity which would be an important step towards optimizing industry level production of curcumin.

**Keywords:** EST-SSR, Genetic diversity,*Curcuma aromatica, Curcuma caesia, Curcuma longa.*

BIO-2

# ADSORPTION AND AMELIORATION OF HEAVY METALS AND STUDIES ON TOXIC EFFECTS IN GRAM AND PADDY THROUGH *SYNECHOCYSTIS AQUATILIS*

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## ABSTRACT

Cyanobacteria are the excellent indicators to study the toxic metabolic levels of heavy metals. In the present study, abundantly growing single celled cyanobacterial species *Synechocystis aquatilis* was studied for adsorption on selected heavy metals and amelioration possibilities of toxic effects of these heavy metals from water and its effect on Gram and Paddy plants. The study was planned as selection of best growth conditions, screening for heavy metal tolerance, determination of chlorophyll a, total carbohydrate and total protein contents in test cyanobacterial isolate, determination of MIC of heavy metals, adsorption studies on heavy metals and its potential for bioremediation in terms of seed germination and shoot length of Gram and Paddy, under experimental conditions. The test cyanobacterial species have ability to grow in mass quantity under natural growing conditions which provides usable biomass at minimum efforts. This isolate was then examined for its ability to tolerate selected four heavy metals (As, Cu, Hg and Pb) by the dilution method. The test cyanobacterial isolate showed various degree of tolerance at different concentrations of different heavy metals. Adsorbed heavy metals were analyzed by ECIL – AAS. During this experiment 97.56% of As and 99.5% of Cu was removed from the experimental system by the *S. aquatilis*. Growth of Paddy and Gram seeds with heavy metals in hydroponic medium was completely supported by the addition of heavy metal soaked *S. aquatilis* cells as well as fresh biomass. From this experiment, *S. aquatilis* showed high efficiency to remove the heavy metals from its surrounding and results indicated that this isolate is potentially useful for bioremediation of heavy metals by preventing environmental circulation.

BIO-3

# HISTOCHEMICAL ALTERATION IN THE REPRODUCTIVE ORGANS OF FRESH WATER CRAB (BARYTELHUSA CUNICULARIS, Westwood 1836): EXPOSED TO MALATHION

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## ABSTRACT

Crabs are particularly useful in aquatic environment and play a very important role in the ecosystem processes and good indicator for polluted condition. The terrestrial crab plays a significant modal and also beneficial for human activities. The present study deals with the histology and histochemical changes of malathion in the freshwater crab *Barytelphusa cunicularis*. Live specimens were collected from local wet areas of Maroda-sector, Bhilai, (C.G). Average weight of crabs varies from (45-50 gms), the carapace length and carapace width varies from 3.20-4.50mm and 4.25-5.80mm respectively. The crabs were acclimatized in the laboratory condition, and kept in two groups the control group set free from Malathion and the experimental group was exposed to malathion for $LC_{50}$ at different concentration 0.45ppm, 0.30ppm, 0.26ppm and 0.25ppm for 24hrs, 48hrs, 72hrs and 96hrs respectively. The sections of 5µm were taken for the histochemical examination of protein, carbohydrates and lipids. The testis show different changes in their structure, the testicular follicular cells intestitials cells and nutritive cells were decreased and distracted number of sperm cells also affected due to the impact of malathion. Ovaries exhibited irregular arrangement of nucleus, epithelial layer destruction, degeneration of oocytes, Shrinkage in ooplasm, vacuolization and reduction in cytoplasmic material. The result suggests that there is much decrease in the level of proteins as compare to lipid and carbohydrate after exposure, may be due to its rapid utilization to meet the energy demands under the impact of malathion.

**Key words**: Freshwater crab, Reproductive organs, Histology, Histochemical, Pesticides, Malathion

BIO-4

# BIOACCUMULATION AND GENOTOXIC EFFECTS OF FLUORIDE AND ARSENIC ON ASIAN CATFISH, *CLARIAS BATRACHUS*

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## ABSTRACT

Comet assay acts as a biomarker of genetic toxicity in fish and other aquatic species. The present study aimed to evaluate Genetic Damage Index of arsenic and fluoride individually and in combination on the piscine model *Clarias batrachus* using comet assay in peripheral blood erythrocyte. On the basis of 96 hour $LC_{50}$ values of sodium fluoride and arsenic trioxide, fishes were exposed to different concentrations of sodium fluoride and arsenic either individually or in combination for 28 days. DNA damage was determined by single cell gel electrophoresis (comet assay). Additionally the concentration of both toxicants in blood of catfish and in external milieu (exposed water) was also determined. Significant increase ($p<0.05$) in frequency of DNA strand breaks in erythrocytes were observed in the exposed groups. Also the Genetic Damage Index declined in combined fluoride and arsenic exposed groups compared to those treated with fluoride and arsenic alone. In co-exposure groups of arsenic and fluoride, the concentration of fluoride and arsenic in fish blood increased with increasing water fluoride and arsenic concentration in the test aquaria with significant differences ($P<0.001$) between different groups. However during co-exposure, concentration of arsenic and fluoride was less pronounced as compared from their individual exposure counterparts. Arsenic being more toxic than fluoride, interaction of fluoride to arsenic decreased the toxicity of arsenic. Hence, genotoxic potential of Arsenic was more pronounced when exposed singly.

**Key words:** Genotoxic effects, Genetic Damage Index, LC50, Arsenic Fluoride combined toxicity.

BIO-5

# GENOMIC ASSOCIATION AMONG SICKLING, G-6-PD DEFICIENCYAND MALARIAL INCIDENCES IN POPULATION OF CHHATTISGARH.

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## ABSTRACT

Sickle cell disease is a blood disorder resulting from inheritance of abnormal gene from parents. Present study was undertaken to study the genomic association among Sickling, G-6-PD deficiency and malarial incidences from population of Durg and Rajnandgaon district of Chhattisgarh. A random sampling of 1749 people was done to test sickling problem. By slide test method total 143 samples were found to be sickle positive and then the samples are subjected to analyse GSTM1 and GSTT1 gene polymorphism, variance in G-6-PD gene and mutation in *Pfcrt* gene. Oxidative stress and DNA damage by comet assay was also analysed. Maximum oxidative stress and extent of DNA damage was observed in HbSS, G-6-PD + Sickle individuals and Sickle + Malaria infected individuals. Results of GST gene polymorphism revealed that frequency of individuals carrying the GSTM1 gene was found higher in Control (93.33%) and lower in HbSS (41.67%), whereas the GSTM1 null mutation was higher in HbAS (60%). The frequency of individual carrying the GSSTT1 gene was found higher in Control (86.6%) and lower in HbSS (33.33%), whereas the GSTT1 null mutation was higher in HbSS (66.67%). Out of 143 sickled patients 66 (46.15%) were observed to be G-6-PD deficient and G-6-PD variant was determined by PCR-RFLP method. Out of 1749 samples 78 patients was found infected with *P. falciparum, Pfcrt* K76T mutant was reported among all variants of hemoglobin but was found higher in HbSS in comparison to HbAA/HbAS detected by PCR-RFLP. Thus present finding indicates genomic association among Sickle cell, G-6-PD Deficiency and malarial incidences.

BIO-6

# METAL COMPLEX POSSESSING HYDROXAMIC ACID AS LIGANDS: DNA BINDING AND *IN-VITRO* ANTITUMOR ACTIVITY

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## ABSTRACT

Deoxyribonucleic acid (DNA) is a basic structural and hereditary unit of all biological process. Chemical biologist and biochemists are designing and synthesizing small molecule which have binding efficacy with DNA. This small molecule can emerge as a lead compound which play a key role in drug design process. Blocking the growth of tumor cells by small molecules is currently of great interest for the design of new antitumor drugs. Hydroxamic acids are a class of organic compounds containing the functional group -C(O)-N(R)-OH. Their *N*-hydroxy and carbonyl groups are capable of coordinating metals in a bi-dentate fashion, forming the complexes of biological importance. The hydroxamic acid functionality plays an important role as a pharmacophore in a variety of biologically active agents.The focus of the present work is to determine *in-vitro* binding interaction of Copper, Molybdenu and Oxo-Vanadium hydroxamic acid complexes with ct-DNA. The investigation of hydroxamic acids as ligand complexed to Copper and Vanadium as metal binding interactions with ct-DNA is determine by spectrophotometric, flourometric, viscometric methods. *In-silico,* computational assessments were done by using AutoDock4.0 as molecular docking software and an insight of exact position of binding of hydroxamic metal complexes with ct-DNA was also rule out. Molecular Dynamics studies carried out to understand the exact conformational mechanism of DNA binding. Cytotoxicity experiments were performed by using MTT assay against MCF-7 cancer cell line. All the four complexes showed as anti-cancer activity. The best complex, N-p-TBHA-Cu(II) with inhibitory concentration ($IC_{50}$) value 48.12μM will be further experimented for in-vivo studies.

**Keywords:** ct-DNA, p-TBHA-Cu(II), p-TBHA-V(V), Cytotoxicity

BIO-7

# PHENOTYPIC MARKER FOR IDENTIFICATION OF POWDERY MILDEW IN LINSEED (*LINUM USITATISIMUM* L.)GERMPLASM AND SEGREGATING POPULATION

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## ABSTRACT

A set of one hundred fifty linseed germplasm accessions and twenty $F_2$ segregating populations were evaluated for powdery mildew tolerance which was taken from AICRP on Linseed, Department of Genetics and Plant Breeding IGKV, Raipur (C.G.) during *Rabi* 2014-15 *and* 2015-16. In India and Chhattisgarh it has been observed that major limiting factors for higher production is powdery mildew. Particularly in Chhattisgarh the yield losses due to powdery mildew may be more than 60% when the disease is severe. Powdery mildew is the major cause in the linseed production during *utera* cultivation, fourteen morphological characters were used as phenotypic marker for identification of powdery mildew. Out of which large flower plant found susceptible for the powdery mildew disease as compare to small flower plant,which indicate the small flower is used as resistant donor for powdery mildew disease. The assessment of the disease per plant was obtained by observing the intensity of lesions present on the leaves. Keeping in this view, disease screening studies were made to understand the development of powdery mildew diseases. So, we need a high yielding linseed variety for late sown conditions with resistance to powdery mildew. With this objective, field screening of linseed genotypes for resistance to powdery mildew was initiated. Powdery mildew score ranged from 0 (free) to 5 (highly susceptible), Despite being high susceptible, some test entries produced good yield and showed tolerance to powdery mildew disease. Highly resistant genotype could be utilized as donor parent for powdery mildew resistance breeding programme.

**Key words:** Linseed, germplasm, powdery mildew, ALA, SDG

BIO-8

# PRELIMNARY PHYTOCHEMICAL SCREENING AND BIOEFFICACY OF *VACHELLIA NILOTICA* AGAINST INSECT CELL LINE OF ASIAN ARMY WORM *SPODOPTERA LITURA* FAB. (LEPIDOPTERA: NOCTUDAE): A NOVEL APPROACH TO STUDY PESTICIDAL POTENTIAL OF PLANTS.

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## ABSTRACT

Chhattisgarh is known as a "rice bowl of central India" rice, maize ,and other little millets and beats ; oilseeds, for example, groundnuts (peanuts), soybeans and sunflowers are the main crops of the state Chhattisgarh. Natural insecticides have been used for pest control, offering an effective alternative to synthetic pesticides. The *Vachellia nilotica* belonging to family fabaceae were screened for secondary metabolite constituents and insecticidal activity against *Spodoptera litura*. The phytochemical screening of the extracts revealed the presence of alkaloids, flavonoids, phenolics, saponins, steroids, tannins and terpenoids in the plant investigated. The aqueous extracts of *Vachellia nilotica* obtained by boiling the plant material in water were evaluated for their insecticidal action against cell suspension culture of *Spodoptera litura* Fabricius. The aqueous extract with 500 ppm and 1000 ppm concentration were used for screening the insecticidal acitivity of *Vachellia nilotica*. The aqueous extract with 1000 ppm concentration depicted the significant decrease in the number of cells compared with that of control. This is an ideal eco-friendly approach for the control of agricultural pest, *Spodoptera litura*. Hence, this plant could be used to isolate active principle and develop a new botanical formulation in pest management programme.

**Key words-***Spodoptera litura, Vachellia nilotica,* Insecticidal activity, Botanical pesticides, Synthetic pesticides.

BIO-9

# ANTIBACTERIAL AND SYNERGISTIC EFFECT OF *TINOSPORA CORDIFOLIA* EXTRACTS AGAINST *PSEUDOMONAS GENICULATA*

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## ABSTRACT

*Tinospora cordifolia* is considered as magical herb in Ayurveda but still there is a little knowledge documented about their antibacterial activity. In present study, synergistic effect between thirty two *T. cordifolia* extracts and seven antibiotics were assessed against *Pseudomonas geniculata* (MCC3141). Highest antibacterial activity was observed with hot ethanol leaf extract. Combination of cold ethanol stem extract and gentamicin showed most promising synergistic effect against *P. geniculata*. After phytochemical analysis maximum phytochemicals were observed in cold ethanol stem extract which may be the cause of their maximum synergistic efficacy.

BIO-10

# *IN VITRO* APPROACHES FOR CONSERVATION AND ENHANCEMENT OF SECONDARY METABOLITE OF *CHLOROPHYTUM BORIVILIANUM* SANT ET FERNAND

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## ABSTRACT

Diosgenin, one of the steroidal sapogenin is commercially known for its pharmaceutical application to treat sexual dysfunction. The biosynthesis of plant secondary metabolites *in vitro* cultures is usually manipulated by different elicitors that lead to higher production than non-elicited cultures. In the present investigation, *in vitro* tubers of *Chlorophytum borivilianum* were produced on semisolid and stationary liquid Murashige and Skoog (MS) medium supplemented with various concentrations of sucrose. To elicit diosgenin contents, these micro-tubers were exposed *in vitro* to different concentrations of jasmonic acid (JA) and salicylic acid (SA) for 1-month. Exposure to the lower doses of JA and SA individually induced the improved production of diosgenin in the micro-tubers of *C. borivilianum*. The results suggest that JA and SA have the considerable ability to stimulate the production of valuable diosgenin in the micro-tubers of *C. borivilianum*. This article also reports the cryopreservation of meristematic tips of *C. borivilianum*, a tropical and IUCN red-listed species. The preculture of meristematic tips excised from pre-adapted *in vitro* shoots on 12% (w/v) sucrose containing MS medium with 50 mg/L abscisic acid (ABA) for 48 h, followed by treatment of loading solution (LS) and plant vitrification solution (PVS2) was found crucial for recovery following cryostorage. Thereafter, durations of exposure to the LS and PVS2 were manipulated to enhance the regeneration efficiency of meristematic tips.

**Keywords**

Abscisic acid; Cryopreservation; Elicitation; *In vitro* tuberization; Vitrification

BIO-11

# BIOCHEMICAL CHARACTRIZATION OF CYANOBACTERIA ISOLATED FROM PLAIN REGIONS AND NORTH HILLS OF CHHATTISGARH, INDIA

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## ABSTRACT

Chhattisgarh state is blessed with rich biodiversity of plant as well as microbial biota such as cyanobacteria. Forty cyanobacterial species were isolated and characterized from the different paddy fields of Plain regions as well as North hills of Chhattisgarh, India. These cyanobacterial species were characterized on the basis of morphological as well as using lipidomics (FAME) and proteomic (SDS-PAGE) attributes. Results revealed that all the forty species showed plasticity regarding their morphological attributes. Furthermore, we considered biochemical markers to investigate both diversity and evolutionary relationships. FAME profiling revealed that total twenty different types of fatty acids were present in the cyanobacterial species isolated from plain regions whereas thirty seven different fatty acids were found in those cyanobacterial species which were isolated from the North hills. The percentage of MUFAs, PUFAs and SAFAs showed significant variations in fatty acid composition. Each and every cyanobacterial species also showed the variations in the protein bands of with higher molecular weight while considerable similarities were found among the bands of the lower molecular weight. Some unique protein bands were also observed in certain cyanobacterial species. Overall, it was concluded that the cyanobacterial diversity richness was maximum in the North hills area of Chhattisgarh as compared to that of the Plain regions. Both the Chemotaxonomic markers delineated the isolated cyanobacterial species both at the intergeneric and the interspecies level. An acquisition of such knowledge would be useful for potential use of cyanobacteria as the biofertilizers for the specific site and restoration of the soil health.

**Key words**: Cyanobacteria, biochemical, Chemotaxonomy, MUFAs, PUFAs and SAFAs, Intergeneric and the Interspecies

BIO-12

# FRACTIONATION, CHARACTERIZATION AND *IN VITRO* ANTIOXIDANT AND ANTICANCER ACTIVITY OF ISOLATED FRACTIONS FROM *EMBLICA OFFICINALIS* HYDRO- ETHANOLIC LEAVE EXTRACT.

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## ABSTRACT

Therapeutic drugs from natural products either as crude extracts or pure compounds provide unlimited opportunities for new drug discovery. In the present study, hydro-ethanolic leave extract of Emblica officinalis was fractionated via silica gel column chromatography and the various fractions were characterized via UV-Vis spectroscopy, FTIR, 1H NMR and GC-HRMS and their in vitro antioxidant potential was evaluated via DPPH assay and anticancer activity was evaluated by SRB assay against three cancer cell lines SK-OV-3, A498 and T-24. UV-Vis spectroscopy showed two fractions (F3 and F7) among seven fractions have double and single peaks respectively. GC-HRMS characterization of F3 and F7 showed fraction 3 contained Phenol,2,4-bis[1,1-dimethyl ethyl] and di-α-Tocopherol (Vitamin E) and Fraction 7 contained 1,2- Benzenedicarboxylic acid, diisooctyl ester (Pthalic acid). Evaluation of In vitro antioxidant activity showed highest antioxidant activity in fraction 7. Also, fraction 3 and 7 dose not showed any significant anticancer activity against the above cell lines. The study concluded that among the isolated compound the compounds obtained in fraction 7 was majorly responsible for antioxidant properties of leaves of the plant and may have other pharmacological benefits in degenerative diseases.

BIO-13

# SHARAPUNKHA ENCOURAGES BODY TO FIGHT AGAINST EXPERIMENTALLY INDUCED HEPATITIS IN RATS: BIOCHEMICAL, MOLECULAR AND HISTOLOGICAL EVIDENCES

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## ABSTRACT

In spite of the availability of modern medicines in many developing countries a large proportion relies heavily on traditional practitioners and medicinal plants to meet primary health care needs. *Tephrosiapurpurea* (L) pers. or commonly known as "Sharapunkha" or "Sarwawranvishapaka" in Ayurveda due to the belief that it can cure all types of wounds. Acute hepatic failure induced by co-injection of lipopolysaccharide (LPS) and D-galactosamine (D-GalN) mimics the scenario occurred during viral hepatitis-C. Pretreatment of *Tephrosiapurpurea*(50, 100 and 200 mg/kg p.o.) was given for 6 days followed by LPS (50 µg/kg) and D-GalN (300 mg/kg) for intoxication. Liver function test and serum biochemistry i.e. aspartate aminotransferase, alanine aminotransferase, urea, uric acid and creatinine were increased significantly whereas albumin and glucose decreased significantly. Activity of superoxide dismutase, catalase and glutathione level were decreased and lipid peroxidation was increased. *Tephrosiapurpurea*potentially reversed biochemical changes towards control in dose dependent manner and 200 mg/kg dose provided better protection in biochemical endpoints. Activity of GR, $GP_X$, G6PDH, GST andCYP2E1 enzymes decreased after LPS and D-GalN administration. *Tephrosiapurpurea*at 200 mg/kg dose improved all variables toward control. Marker of RBC cycle and DNA damage studies also confirmed protective role of *Tephrosiapurpurea*extract. Histological studies and ultrastructural observations substantiated recovery pattern as observed biochemically. Thus, results of the present study concluded that *Tephrosiapurpurea*at 200 mg/kg dose can attenuate complications due to hepatitis.

**Keywords:***Tephrosiapurpurea*, Hepatitis,Acute hepatic failure, Lipopolysaccharide, D-Galactosamine

BIO-14

# EVALUATION OF TOXIC LEVELS OF FLY ASH IN TWO OF THE FRESH WATER FISHES, MAJOR CARPS

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## ABSTRACT

Present investigation deals with the assessment of toxic levels effects of fly ash for fishes, Channa punctatus and Puntius sophore which were determined under controlled laboratory conditions with pH maintained at 7.25 and temperature 25-30$^0$C. During this study fishes were exposed to different concentrations by dissolving fly ash in mg/L of water. Fishes were exposed to different concentrations of fly ash for 96 hrs for LC50 determination but fish mortalities were recorded and monitored simultaneously for 24hrs, 48hrs, 72hrs and ultimately at 96hrs of exposure with three replicates for both species per concentration. The toxic levels and 96hrs LC50 values for both fishes were calculated using finney's probit analysis method using 95% confidence interval. 96hrs LC50 for Channa punctatus recorded 27.48 mg/L and Puntius sophore was found to be 42.08 mg/L .Puntius sophore were found to be more tolerant to fly ash in comparison to Channa punctatus.

**Key words:** Fly ash, 96hrs, LC50, toxic levels, Channa punctatus, Puntius sophore,

BIO-15

# COMBINED THERAPEUTIC POTENTIAL OF EXOGENOUS MELATONIN AND INSULIN AGAINST DIABETIC INDUCED HEPATORENAL ALTERATIONS: BIOCHEMICAL, HISTOLOGICAL AND MOLECULAR MECHANISTIC APPROACH

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## ABSTRACT

Diabetes is a silent killer because of the glucotoxicity induced oxidative stress which is a key contributor to the onset of diabetes and its associated complications. Present study was done in streptozotocin (15mg/kg b. wt) induced diabetes rat. Rats showing blood glucose level above 250-300 mg/dl without reversal were considered as diabetic. Experiment was performed with fifty four rats divided into nine groups containing six in each for four weeks. Diabetic rats revealed significant increase in blood glucose and serum sugar, lipid peroxidation (LPO), liver function tests (ALT, AST, ALP, bilirubin), kidney function tests (Creatinine, urea, uric acid), electrolytes ($Na^+$ and $K^+$), lipid profile (TG, Cholesterol, LDL,VLDL) and decrease in HDL. Significant decrement in antioxidative enzymatic system (GSH, SOD, CAT, GR, GPx, G6PDH and GST), total tissue and serum protein content and glycogen content with significant alterations in hematological variables was noted in diabetic rats. Diabetic resulted hepatocytes central vein damage and kidney glomerular vacuolization indicating cellular damages, upregulation in kidney cortex MT1 and MT2 protein and down regulation of IR expression in hepatocytes. Melatonin and insulin treatment alone and in combination resulted in significant restoration of all impaired parameters. However, the combined therapy showed significant recovery and restoration in biochemical, cellular architecture and molecular parameters in terms of molecular receptor expression pattern of MT1, MT2 and IR. Finding confirms the regulatory and protective effect of melatonin and insulin during gluotoxic induced damages and impairment these two therapies therefore may be suggested as of therapeutic potential drug in diabetic patients.

BT-1

# ANTIFUNGAL EFFICACY AND MULTIPLE TARGETING POTENTIAL OF SODIUM LIGNOSULFONATE AGAINST HUMAN PATHOGENIC FUNGI *CANDIDA ALBICANS*

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## ABSTRACT

*Candida albicans* is a dimorphic commensal of human host, but being opportunistic in nature it is the one of the most common fungal pathogen in the world. *Candida* infections range from being moderately superficial to systemic life threatening infections. Already available antifungal drugs have proven to be ineffective due to Multidrug resistance. The severity of infection and inability of current treatment regime has led to discovery of new drugs with novel antifungal action. Chhattisgarh being rich in herbs has a vast repertoire of natural phenolic compound based flora. Sodium lignosulfonate (LIG) is a lignin derivative phenolic compound whose antifungal potential has been unexplored. The objective of this study was to evaluate the antifungal activity and plausible mechanism(s) of LIG against *C. albicans* strains. Initially, LIG was shortlisted after screening of lignin derivatives, then subjected to vigorous in silico analysis that includes molecular docking interaction, drug likeness, bioactivity and ADMET predictions. Subsequently LIG showed in vitro antifungal potential against not only *C. albicans* but also against *C.glabrata*, *C.parasilopsis*, *C.tropicalis*,*C.dubliniensis* and their minimum inhibitory concentration (MIC) value was found to be 64-128µg/ml. We investigated its putative antifungal activity with time-kill curve. Time-dependent kill curve assay demonstrated that the fungicidal activity started at 4 h for the SCF5314 strain. To understand its potential mechanism of action, we confirmed its in vitro effect on ROS production, chitin and cell wall depletion as well. This study contributes to the development of new antifungal drugs, especially against *Candida* albicans. In the race of antifungal pharmacology and therapy, this study reveals LIG as a potent and persuasive natural compounds based antifungal agent. This revelation might impact and diversify the discovery and development of novel antifungal agent.

**Keywords**: *Candida albicans*, Natural phenolics, Sodium Lignosulfonate, Multi-target drugs, Antifungal infection,.

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BT-2

# SYNTHESIS, CHARACTERIZATION AND EVALUATION OF ENCAPSULATION EFFICIENCY, IN-VITRO BLOOD COMPATIBILITY OF CHITOSAN-CO-LACTIC ACID NANOPARTICLES

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## ABSTRACT

In the present study Chitosan-co-lactic acid nanoparticles are synthesized and characterized by transmission electron microscope (TEM) analysis, scanning electron microscope (SEM) and Fourier transform infrared spectroscopy (FTIR). The particles were allowed to swell in phosphate buffer saline (PBS) and the swelling response of these nanoparticles was studied as a function of chemical composition, pH and temperature of swelling medium. Equilibrium swelling was observed to be dependent on both composition of nanoparticles and the swelling environment. The application of chitosan-co-lactic acid nanoparticles as carriers of anticancer drug was evaluated by measuring its drug content, encapsulation rate. The assessment of biocompatibility has been made by in-vitro test which is BSA adsorption test. These observations and assessment are indicating that these nanoparticles are suitable for biomedical application.

**Keywords**: Nanoparticles; Encapsulation; Drug delivery devices; protein adsorption

BT-3

# RHIZOGENESIS : AN EFFICIENT CONSERVATIVE PROCESS FOR ENHANCED SECONDARY METABOLITE PRODUCTION IN KALMEGH

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## ABSTRACT

Medicinal plants forms a critical component of 'modern' healthcare practices due to secondary metabolites with significant pharmaceutical values. Increasing demand of these compounds are fulfilled by wild collections which make plant species vulnerable. So, conservation of species is very essential along with the harvesting of medicinal plants. Here, rhizogenesis of medicinal plants under *in vitro* condition may provide a source of secondary metabolite without affecting the natural population. The rhizogenesis accompanied with the agroinfection with *Agrobacterium rhizogenes* may provide a cost effective way to produce roots for secondary metabolite production. Kalmegh is a source of andrographolide which have several medicinal properties. This research targeted towards the development of a conservative process for commercial production of andrographolide with the development of hairy root cultures in large scale and elicitation of andrographolide along with the isolation of pure andrographolide from hairy root cultures. The results of the work included highest 62.83±1.69% hairy root induction percentage in 10.2 induction days when apical meristem co-cultivated with *Agrobacterium rhizogenes* (MTCC 532) in half strength MS supplemented with acetosyringone 400µM. The best media for mass multiplication was found to be semi solid media with 40.8 fold increase in total biomass yield (fresh weight) after six weeks of culturing. Among different elicitation treatments given, highest andrographolide content (4695.9 µg/gm DW) with 3.0 fold increase compared to control was obtained when hairy root cultures were exposed to $50^0$C temperature for one hour. This technique will give biomass yield of 6.81 gm/L (dry weight) which will produce 32000 µg/6.81 gm DW andrographolide.The isolation of pure andrographolide crystals from hairy root cultures have been done which can be used further for screening and utilization in pharmaceutical industries after screening in animal models.

BT-4

# ALTERATIONS IN ANTIOXIDANT GENE EXPRESSION AND INDUCTION OF OXIDATIVE STRESS IN *CAJANUS CAJAN* L. UNDER FLUORIDE STRESS

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## ABSTRACT

Melatonin (Mel) is a pleiotropic signal molecule, has been shown to play imperative roles in the regulation of plant growth, development and stress tolerance. To examine the potential roles of Mel in fluoride (F) tolerance, we investigated the effects of exogenous Mel (100 μM) on growth and antioxidant system in *Cajanus cajan* L. under F stress (75 ppm). Results unveiled that F stress suppressed the growth, membrane stability and increased the accumulation of reactive oxygen species in radicles of *C. cajan* L. However, application of Mel notably alleviated F-induced growth suppression and membrane damage in radicles of *C. cajan* L. Furthermore, F-toxicity elevated the level of cell death, malondialdehyde content, lipoxygenase activity, concentrations of proline and ascorbic acid significantly. The exogenous application of Mel significantly reduced the accumulation of malondialdehyde content, lipoxygenase activity and markedly enhanced the concentrations of proline and ascorbic acid and altered the isozymes profiles and levels of gene encoding antioxidant enzymes viz; superoxide dismutase, catalase and ascorbate peroxidase. The results indicate that exogenous application of Mel alleviates the detrimental effects of F stress and accelerates the recovery mainly by enhancing antioxidant capacity in *C. cajan* L. This study provides, the evidence that support the protective roles of exogenous Mel in *C. cajan* L. against F stress.

**Keywords**: *Cajanus cajan* L., Fluoride, Gene expression, Melatonin, Reactive oxygen species.

BT-5

# CAPABLE DEVICE FOR SUSTAINED RELEASE DELIVERY OF METHOTREXATE

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## ABSTRACT

Methotrexate (MTX) is used ailment antirheumatic drugs (DMARDs) in the management of patients through rheumatoid arthritis (RA).MTX loaded bovine serum albumin (BSA) were organized by emulsion method. The signify diameter of the microspheres was pretentious by the sort of emulsion stabilizer, polymer attentiveness, aqueous and organic phase amount and rousing haste. The equipped microspheres were subjected to a range of physicochemical assessment and in vitro release studies. The results indicated that the microspheres scheme studied well be a capable device.

BT-6

# AUTOMATED BREAST CANCER RISK STRATIFICATION SYSTEM USING HISTOPATHOLOGY IMAGES IN MACHINE LEARNING FRAMEWORK

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## ABSTRACT

One of the most common types of cancer amongst women in India and worldwide is breast cancer. This research focuses on development of a risk assessment system for automatic classification of breast lesions in histopathological images. The open source BreaKHis dataset is used in this study consisting of 7909 images including both benign and malignant tumors. It consists of the images with magnification of 40X, 100X, 200X & 400X of each type. For this work, 40X images are used. The tissues in breast can be characterized by various types of features depending upon the shape and texture. In this work, 93 shape and texture features are extracted.

Back-propagation artificial neural networks (BPANN) & Support vector machine (SVM) classifiers are used for classification. Accuracy, sensitivity, specificity, receiver operating characteristic curve (AUC) and Mathew's correlation coefficient (MCC) are used to determine the performance of these classifiers using the various data division protocols.

The results shows that the BPANN classifier outperformed by achieving a classification accuracy of 98.96% when all 93 features were used for classification using the 10-fold data division protocol.

The results for SVM are not satisfactory as compared to ANN. Hence, it needs further improvements. For this, various feature selection techniques can be used to improve the accuracy and performance of SVM classifier.

BT-7

# ANTI-SICKLING AND MEMBRANE STABILIZING EFFECTS OF N-ARYLHYDROXAMIC ACIDS

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## ABSTRACT

Sickle cell disease (SCD) is a genetic blood disorder that affects the shape and transportation of red blood cells (RBCs) in blood vessels, leading to various clinical complications. The N-arylhydroxamic acid (RC(O)NHOH, HA) exhibit diverse biological activity, including hypotensive and antisickling properties associated with formation of nitroxyl (HNO) or nitric oxide (NO). N-Phenylbenzohydroxamic acid (PBHA) and N-p-chlorophenyl-o-chlorobenzohydroxamic acid (N-p-C-o-CBHA) that contain an N-hydroxy group react with oxyhemoglobin to form methemoglobin and variable amounts of nitrite/nitrate. Antisickling activity and the minimum concentration of extract required to normalize sickled cells was determined by gel electrophoresis test. The potential of Hydroxamic Acids in sickle cell disease management was investigated in vitro using freshly prepared 2% sodium metabisulfite for sickling induction. Treatment of sickling cells with extracts at different concentrations showed that a decrease of the percentage of sickling cells formation was found in both induced and non induced sickling cells. The results indicated that the percentage of sickled cells, which was reduced to 29.3%, 32.8%, in the presence of PBHA and N-p-C-o-CBHA, respectively, where the rate of polymerization inhibition was 5.9 and 6.6 ($\times 10^{-2}$) accordingly. These results suggest that the PBHA and N-p-C-o-CBHA demonstrated the most significant antisickling effect with a potential for use in the clinical management of SCD.

**Keywords**: Hydroxamic Acids, Sickling cells, Spectroscopy.

BT-8

# DEVELOPMENT OF TRIGLYCERIDE DETECTION KIT FOR ESTIMATION IN BIOLOGICAL SAMPLE USING LIPASE ENZYME.

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## ABSTRACT

An enzymatic procedure to determine serum triglycerides is developed and described in the presented report. Serum triglycerides are hydrolyzed completely into free fatty acids and glycerol by lipase isolated from a *Bacillus* sp. The released fatty acid is estimated by colorimetric assay using palmitic acid as standard and methyl red as indicator. The absorbance corresponding to the colour changes is measured at 520nm using nano drop spectrophotometer. The triglyceride present in the sample was quantitatively estimated from the standard curve developed from the hydrolysis of known amount of TGA and estimating the free fatty acids using methyl red as an indicator at 520nm. This method requires only 400 µL of serum and 30 min incubation at 45°C. The enzymatic system consists of a single enzyme i.e. lipase in form of nanoparticle-enzyme bio-conjugate which makes the developed kit cost effective, simple and easy to use. Lipase-nanoparticle system showed higher stability and activity as compare to soluble counterpart and can be recycled four times retaining 90% of the activity. The results obtained by this method show that the immobilized lipase system was capable enough to hydrolyze the serum triglycerides. Therefore it can be proposed that the developed kit can be used for the detection of triglycerides in biological samples.

**Sponsored by:** Chhattisgarh council of science & Technology, Raipur

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BT-9

# FLUORESCENT ASSAY FOR THE DETECTION OF ACETYLCHOLINESTERASE ACTIVITY BASED ON CARBON QUANTUM DOTS AND ITS INHIBITOR SCREENING

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## ABSTRACT

Fluorescent carbon nanodots have received increasing attention in a wide variety of analytical and biomedical applications owing to their outstanding properties. Herein a simple, rapid and reproducible sensing approach for determination of organophosphate pesticide based on the use of carbon dots (CDs) and acetylcholinesterase (AChE) enzyme as biorecognition element. (1) the aggregation of CQDs by copper (II) ions results in its fluorescence quenching due to strong coordination of copper ions to carboxyl groups of CQDs; (2) AChE can catalyze the hydrolysis of acetylthiocholine into thiocholine which can induce fluorescence recovery owing to stronger affinity between thiocholine and copper ions; (3) when added the inhibitor organophasphate pesticides (OPs) (Paraoxon and chlorpyrifos) thus the fluorescence remains quenched. The developed protocol strategy broadens the sensing application of fluorescent CQDs with excellent biocompatibility.

**Keywords:** Carbon dots, acetylcholinesterase, inhibitor screening, fluorometric assay.

BT-10

# FORMULATION, CHARACTERIZATION AND *IN–VITRO* EVALUATION OF MICROSPHERES LOADED ISOLATED ANDROGRAPHOLIDE FROM *ANDROGRAPHIS PANICULATA*

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## ABSTRACT

The basic purpose of this study was to fabricate, characterize and evaluate microspheres loaded with extract of *Andrographis paniculata* Nees and to overcome the issues of poor solubility and bioavailability of the extract. The active compound (andrographolide) present in extract of *Andrographis paniculata* Nees was isolated. The maximum absorbance ($\lambda_{max}$) of the active compound was found to be 254 nm. Microspheres of active isolated compound were prepared by solvent evaporation method using ethyl cellulose as a polymer. The prepared microspheres were evaluated for their micromeritic properties, drug content and encapsulation efficiency and characterized by Fourier transform infrared spectroscopy (FTIR), and scanning electron microscopy (SEM). The microsphere was spherical in shape with smooth surface. The mean particle sizes of the microspheres were found in the range of 154 to 232 μm. The entrapment efficiency was found to be 75.4 and 68.6% respectively. Scanning electron microscopy study revealed that the microsphere were spherical and porous in nature. It can be concluded from the data obtained that the microsphere loaded extract of *Andrographis paniculata* Nees could be considered as a potential biodegradable carrier for controlled delivery of *Andrographis paniculata* Nees.

**Keywords:** *Andrographis paniculata* Nees, Microsphere, Solvent evaporation method, Ethyl cellulose

BT-11

# FORMULATION, CHARACTERIZATION AND EVALUATION OF BERBERINE LOADED NANOLIPID CARRIER AGAINST OVARIAN CANCER

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## ABSTRACT

Ovarian cancer is the most life threatening disorder prevailing at a higher rate among the females in India. The drug regimen available is not sufficient enough to combat the disease. Traditionally, herbal drugs have shown promising effects in treating severe complications of this disease. Therefore, the objective of the present study was to formulate and characterize nanolipid carrier of selected phytoconstitutent and investigate their potential against ovarian cancer. to develop the nanostructured lipid carrier containing Berberine sulphate with having antioxidant and anticancer properties against ovarian cancer and evaluate the cellular uptake ability of these delivery system aganist cancer cells. The prepared nanostructured lipid carrier were characterize for Particle size, Zeta potential , Suface analysis (TEM),Drug loading and efficiency ,*in-vitro* drug release , *in-vitro* cellular uptake release and stability studies. The prepared nanostructured lipid carrier were evaluated for *in-vitro* cellular uptake release using against (SKVO-3 and healthy cell (HOMEC) lines by fluorescence method) Human ovarian cancer cells. The result showed that Berberine loaded nanostructured lipid carrier exhibited particle size of average 274±1.0 and exhibited zeta potential of -26.9±0.7 mV and good stability .The *in-vitro* cellular uptake release was performed against two different cell lines, to measure their anticancer potentials and their targeting ability.

**Keywords:** Ovarian cancer, nanostructured, ellagic acid, phytoconstituents, drug loading

BT-12

# *IN VITRO* AND *IN VIVO* ANTI-DIABETIC ACTIVITY OF FRACTIONS OBTAINED FROM THE *HEDHYCHIUM CORONARIUM* RHIZOME

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## ABSTRACT

*Hedychiumcoronarium* Koen. Commonly known as ginger lily is considered as an endemic medicinal plant. In the present study the anti-diabetic action of its rhizomes was investigated by α- amylase and α- glucosidase inhibition assay and the active compounds were identified through bioactivity guided isolation technique.The sub-fraction showing highest inhibition was investigated for its chemical composition by HRLC-MS/MS.For *in vivo* study the streptozotocin (STZ) induced diabetic rats were treated with different concentration of most active fraction and results were compared with the standard drug insulin. The blood glucose level and body weight of the rats were monitored at regular intervals. The serum, biochemical and histological parameters related to liver and kidney were also estimated.

CHE-1

# A SIMPLE APPROCH TO SYNTHESIS OF GRAPHENE OXIDE NANOMATERIAL BY TRICOMPOSITE OF AGRO WASTE BY OXIDATION UNDER MUFFLE ATMOSPHERE

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## ABSTRACT

Graphene has a shining star in the field of nano-materials. It has mesmerize prominent interest for its very good mechanical, thermal, optical and electronic properties. The basic chemical reaction involved in the Hummer's method was the oxidation of graphite. During the synthesis harmful toxic gases are emitted. Now a days green chemistry is blossoming in the field of nano-material. Synthesis of graphene oxide (GO) achieved through agricultural waste (i.e. sweet lime, rice bran and orange peel.) all these three wastes were mixed with ferrocene which gave electron transfer reaction to synthesise GO. The sharp and crystalline diffraction peak was obtained at $2\theta = 12.705^{\circ}$ corresponding to the carbon plane. Size of the GO was obtained around 2.046 nm and interlayer distance is 0.696nm. This green strategies are biocompatible and cost effective too. Characterization of GO was done by X-ray diffraction (XRD) (for crystal structure), Scanning electron microscopy (SEM) (Morphological study), TEM (transmission electron spectroscopy) Fourier transform infra-red (FTIR) spectroscopy (for functional group detection), UV-Vis spectroscopy, Thermogravametric analysis (TGA) (for determine thermal stability of GO) etc.

**Keywords:** Graphene oxide, green route, Agro wastes, characterization.

CHE-2

# SYNTHESIS AND CHARACTERIZATION OF NICOTINIC ACID CAPPED $Mn^{2+}$ -DOPED ZnS QUANTUM DOT

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## ABSTRACT

In this study, nicotinic acid capped Mn-doped ZnS quantum dot has been synthesized through a simple soft chemical route, namely the chemical precipitation method and morphological and optical parameters of the quantum dot has been studied. Morphological properties have been investigated through X-ray diffraction (XRD), transmission electron microscopy (TEM) and scanning electron microscopy (SEM). XRD measurements showed that the ZnS quantum dot possessed a zinc blende structure and the crystal structure is not changed with the capping and $Mn^{2+}$ doping. The optical properties have been studied using absorption spectra. FTIR spectra gave the direct evidence that nicotinic acid has been successfully coated on the ZnS:$Mn^{2+}$ quantum dot. In Fluorescence spectra, yellow-orange emission centred at 624 nm associated with the $^4T_1$–$^6A_1$ transition has been observed. Synthesized highly fluorescent quantum dots are very important for biological applications.

**Keywords:** $Mn^{2+}$-doped ZnS, Semiconductors, Nanostructures, Chemical synthesis, Optical properties, Luminescence.

CHE-3

# ELECTROCHEMICAL INVESTIGATION OF THE CORROSION INHIBITION MECHANISM OF TAGETES ERECTA LEAF EXTRACT FOR MILD STEEL IN NITRIC ACID

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## ABSTRACT

The extract of Tagetes erecta (marigold flower) was used as a green corrosion inhibitor for mild steel (MS) in nitric acid medium. The weight loss measurements and electrochemical studies were performed to understand the inhibition mechanism. Inhibition efficiency increases with increase in the inhibitor concentration. The maximum inhibition efficiency of 89% was obtained at 1500 ppm inhibitor concentration. The effect of temperature on the behaviour of mild steel corrosion without and with inhibitor was studied. The temperature studies revealed that the activation energy was increased from 12 kJ/ mol to 28.8 kJ/ mol with the addition of 500 ppm inhibitor concentration. The thermodynamic analysis and the adsorption isotherm studies revealed that the molecules of inhibitor show physical adsorption on the surface of mild steel. Based on weight loss, Tafel and EIS measurements, adsorption of the inhibitor on the surface of mild steel follows Langmuir isotherm.

**Keywords**: Corrosion inhibitor, mild steel, Tagetes erecta, nitric acid

CHE-4

# ADSORPTION OF Cu(II) IONS BY USING LYSINE FUNCTIONALIZED MAGNETIC NANOPARTICLES ENTRAPPED CALCIUM ALGINATE BEADS

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## ABSTRACT

A new economically adsorbent lysine functionalized magnetic nanoparticles entrapped calcium alginate beads (LFMNPECABs) were synthesized and used for adsorption of Cu(II) ions. The synthesized adsorbent was characterized by FTIR, TEM, SEM, VSM, DLS and TGA. The results showed that functionalized nanoparticles increase the adsorption capacity towards Cu(II) ions due to the presence of amino group in lysine, which act as chelating agent for Cu(II) ion. The experimental data is interpreted in the different adsorption isotherms and kinetics models. The removal percentage of Cu(II) ions was observed to be 96% at optimized conditions. The adsorption process is best described by the Langmuir model. The kinetic studies followed the following trends: pseudo second>pseudo first order>intraparticle diffusion models which indicates that the adsorption behavior describes both physical-chemical sorption and intra-particle diffusion is the rate controlling process. The adsorption process was feasible, spontaneous and exothermic in nature as indicated in thermodynamic studies. The reusability of LFMNPECABs was achieved at four cycles without significant loss of activity.

**Key words**: Lysine functionalized, Adsorption, Chelating, Langmuir, Kinetic studies, Reusability.

CHE-5

# CHICKEN FEATHERS CHARACTERIZATION AND UTILIZATION FOR CHROMIUM REMOVAL FROM AQUEOUS SOLUTION: KINETICS, ISOTHERM AND REGENERATION STUDIES

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## ABSTRACT

In this study, waste material (chicken feathers), has been used as an adsorbent for the removal of hazardous Cr(VI) ion from aqueous solution. Fourier-transform infrared spectrophotometer (FTIR) and scanning electron microscopic analysis (SEM) were used to characterize the adsorbent. The effects of different parameters i.e., pH, adsorbent dose, initial chromium concentrations and contact time on adsorption process were studied. Results were analyzed by the Langmuir and Freundlich equation at room temperature and the experimental data were well explained by the Langmuir adsorption model. The maximum monolayer capacity ($q_{max}$) of chicken feather was found to be 11.11 mg/g at pH 2.5 in 180 minutes. The kinetics of Cr(VI) ion was explained by using three kinetic models, the pseudo-first order, pseudo-second order and intraparticle diffusion models and observed that pseudo-second order chemisorption model was of higher degree of coefficient. Desorption analysis was carried out with 0.5 M concentration of NaOH solution which was used as a desorbing agent. The desorption efficiency and reusability of chicken feathers were performed for three adsorption-desorption cycles. The results showed that chicken feathers (CFs) are an effective adsorbent for the removal of Cr(VI) ion from aqueous solution.

**Keywords**: Chromium(VI); Chicken feathers; Adsorption isotherm; Kinetics; Desorption.

CHE-6

# DEGRADATION OF TEXTILE DYE RR3BN BY NATURAL HEMATITE AND A COMPARATIVE STUDY ON DIFFERENT TYPE OF FENTON PROCESS

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## ABSTRACT

Present work shows the decolorization of mono-azo Rifafix Red-3BN (RR3BN) by environmentally friendly advanced oxidation processes (AOPs) using natural hematite. Our main focus is on the utilization of naturally occurring hematite for the treatment of wastewater released from textile industries. The experimental variables were initial concentration of dye, catalyst concentration (hematite), oxidant concentration ($H_2O_2$) and reaction temperature. The optimum conditions were obtained as: catalyst dose 2 g/L, $H_2O_2$ concentration 20 mM, pH 3 and temperature 25°C at a reaction time of 60 min for the decolorization of RR3BN dye. The % decolorization was increased from 55.91% to 93.89% using optimum conditions with initial 100 ppm dye. The activation energy was also studied between the temperature ranges of 25°C to 80°C. Decolorization kinetics of RR3BN dye follows pseudo first order type of reaction kinetics. To assess the competence of different types of AOPs, the organic mono-azo dye was subjected to oxidize using UV treatment, photo-Fenton ($UV/FeSO_4/H_2O_2$), homogeneous Fenton, heterogeneous photo-Fenton ($UV/hematite/H_2O_2$) and Fenton-like processes ($H_2O_2$/ hematite). This research also proposes a hypothetical representation for the decolorization of RR3BN dye with advanced oxidation processes to check the reaction order with respect to $H_2O_2$ concentration and catalyst hematite.

**Keywords:** Fenton-like process; photochemical advanced oxidation processes; kinetics; natural hematite; Rifafix Red 3BN.

CHS-1

# UPCONVERSION BEHAVIOUR OF $ER^{3+}/YB^{3+}$ ACTIVATED $GD_2O_3$NANO – ROD FOR MAGNETIC RESONANCE AND DRUG DELIVERY APPLICATIONS

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## ABSTRACT

The present research work is focussed on the new aspects of $Gd_2O_3:Er^{3+}/Yb^{3+}$ as a suitable candidate for magnetic resonance (MR) and drug delivery applications. The as-prepared samples were synthesized by sol-gel synthesis method. The structuralparameters and confirmation of phase formation was determined by X- ray diffraction analysis technique and Rietveld refinement. The morphological studies were done by scanning electron microscopy (SEM) and transmission electron microscopy (TEM) techniques. Photoluminescence analysis of as-prepared phosphor for variable concentration of $Er^{3+}/Yb^{3+}$ (for fixed concentration of $Yb^{3+}$ behaves like sensitizer and variable concentration of $Er^{3+}$ behaves like activator) ion were studied. Herein by doping of $Er^{3+}$ and $Yb^{3+}$ in to host ($Gd_2O_3$) nano-rod emitted intense green emission and some associated peaks at red emission under 980 nm NIR laser excitation. Prepared nano-particle may be useful for optical imaging system and the nano-rod formation can be used as a drug delivery host carrier. The upconversion behaviour of particular phosphor shows drug delivery capabilities could be potentially employed for MR/fluorescent imaging and therapeutic applications.The cross-relation and quenching phenomenon explain in details.

**Keywords:** rare earth activated phosphors; magnetic resonance; drug delivery

CHS-2

# *IN-VITRO* REACTIVATION KINETIC AND DOCKING STUDY OF BIS-OXIMES WITH NUCLEOPHILIC ACTIVITY AGAINST ORGANOPHOSPHATE POISONED ACETYLCHOLINESTERASE

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## ABSTRACT

Organophosphorus compounds (OPCs) are generally applied as agricultural chemicals, flame retardants, plasticizers and other fuel additives. OPCs is toxic which are commonly found in pesticides and chemical warfare agent cause irreversible phosphorylation and inhibition of acetylcholinesterase (AChE), leading to various disorders (respiratory arrest, neuromuscular disorder) via accumulation of acetylcholine in the body. Consequently, the physiological function of enzyme is discontinued which leads to a central cholinergic crisis with symptoms of salivation and miosis but additionally, neuromuscular and breathing difficulties occur; death arises from suffocation. Oxime is only compounds which have strong ability to reactivate OP inhibited AChE. Several reactivators have been designed and synthesised, but only few are in clinical use, as 2-PAM and obidoxime.

Till now no oxime is available as a broad spectrum reactivator. In search of a universal reactivator several modifications have been introduced. In the present investigation efficacy of bis-oximes, bearing different functional group in second pyridinium ring is studied against different OP-inhibitors. The results of the present study may provide further insight into structural modification for oxime reactivators.

**Keywords:** Acetylcholinesterase, Chemical Warfare Agent, Oximes.

CHS-3

# A SENSITIVE FLUORESCENCE SENSOR FOR ORGANOPHOSPHATE PESTICIDES DETECTION BY CONTROLLING THE SURFACE PASSIVATION OF CARBON QUANTUM DOT

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## ABSTRACT

Carbon quantum dots (CQDs) obtained from natural organics attract significant attention due to the abundance of carbon sources, varieties of heteroatom doping (such as N, S, P) and good biocompatibility of precursor. The organophosphorus pesticides (OP) induced inhibition of acetylcholinesterase (AChE) was monitored using carbon quantum dots (CQD). Tunable fluorescence CQDs originated from citric acid were synthesized and characterized. The fluorescence emission was quenched by gold nanoparticles (Au NPs) via fluorescence resonance energy transfer (FRET). Thiocholine, produced from acetylthiocholine hydrolysis by the of AChE, could cause the aggregation of Au NPs and the corresponding recovery of FRET-quenched fluorescence emission. The catalytic activity of AChE could be irreversibly inhibited by OPs, thus, the recovery effect was reduced. By evaluating the fluorescence emission intensity of CQDs, a FRET-based sensing platform for OPs determination of paraoxon was established. The sensing platform showed linear relationship with the paraoxon concentrations in the nM range and the limit of detection (LOD) was very low. Real sample study revealed the applicability of this sensing platform. The results show that the OP sensor is promising for applications in food safety and environmental monitoring.

**Keywords :** Carbon dots, FRET, acetylcholinesterase, organophosphorus, paraoxon.

CHS-4

# HOST-GUEST COMPLEXATION OF IONIC LIQUID WITH A-AND B-CYCLODEXTRIN: A COMPARATIVE STUDY BY NMR SPECTROSCOPY

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## ABSTRACT

Host-guest inclusion complexation of an ionic liquid (IL) 1-butyl-3-methlimdazolium octylsulphate [Bmim][OS] within α- and β-cyclodextrin (CD) has been explored by $^{1}H$ NMR, $^{13}C$ NMR and 2D $^{1}H$-$^{1}H$ COSY methods. The hydrophobic effect, structural effect, electrostatic force and H-bonding interactions, molecular interactions and the hydrophobic part of [Bmim][OS] were integrated into the cavity of CD have been explained and critically discussed with the help of $^{1}H$ NMR spectroscopic studies. The formation mechanism of the host:guest CD-[Bmim][OS] was also discussed. It was suggested that hydrophobicity played a crucial role in supporting the formation of CD-[Bmim][OS] ICs and hydrogen bonding was expendable on the spectra of 2D $^{1}H$-$^{1}H$ COSY possible inclusion structures were speculated. The electrostatic interactions constitute the main contribution to the stability.

**Keywords:** Ionic Liquid, Cyclodextrins, Inclusion Complex, NMR

CHS-5

# INVESTIGATION AND STUDY OF ANNUAL EFFECTIVE DOSE AND RISK ASSESSMENT BY GAMMA DOSE RATE IN AREAS OF DURG DISTRICT, CHHATTISGARH

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## ABSTRACT

Human beings are exposed to natural radiation which is present outside and inside the houses. This investigation has been carried out the gamma dose rate of 32 areas of Durg district, Chhattisgarh India. The mean value of indoor and outdoor gamma dose rates observed were 203.31±6.10 nSv/hr and 154.09±4.62 nSv/hr respectively with an indoor to outdoor dose ratio of 1.33±0.04. Total average annual effective dose due to indoor and outdoor gamma radiation for study area was estimated as 1.19±0.04mSv/y. This is slightly higher than the world population weighted average value of 0.87mSv/y, reported by UNSCEAR. This study will be a baseline for Durg District to assessment of Gamma dose rate. Lifetime Cancer Risk (ELCR) was found to be $4.88 \times 10^{-3}$ to $5.03 \times 10^{-3}$.

**Keywords:** Gamma dose rate; Indoor and outdoor gamma dose rate; Annual Effective Dose Equivalent (AEDE); Excessive Lifetime Cancer Risk (ELCR); Durg District.

CHS-6

# INCORPORATION OF SILVER INTO THE $CU_2ZNSNSE_4$ NANOCRYSTALLINE FILM: SYNTHESIS AND CHARACTERISATION

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## ABSTRACT

Quaternary chalcogenide material of $Cu_2ZnSnSe_4$ (CZTSe) and silver incorporated CZTSe film was deposited onto a glass substrate by successive ionic layer adsorption and reaction (SILAR) method. CZTSe is one of the cheapest and most promising quaternary chalcogenide absorber material used in thin film solar cell. In the above study we have observed that incorporation of silver into the CZTSe film does not alter the crystal structure while it enhances the quality of the CZTSe film. XRD analysis showed that both the film had kesterite structure and also showed improvement in the crystallinity, crystalline size of CZTSe film while slight reduction in the crystalline strain on incorporation of silver. Raman analysis confirmed the formation of phase pure quaternary compound and have $Cu_2Se$ secondary phase in undoped CZTSe film. The presence of all the elemental constituent in the synthesised film was confirmed by EDX analysis. SEM analysis showed densely packed arrangement of particle in both the synthesised film.

**Keywords:** CZTSe, thin film, SILAR, silver, XRD, SEM, EDX, Raman analysis

CHS-7

# OXIDATIVE DEGRADATION OF NORFLOXACIN BY WATER SOLUBLE COLLOIDAL $MNO_2$ IN THE PRESENCE OF ANIONIC SURFACTANT

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## ABSTRACT

The kinetics of the oxidative degradation of norfloxacin (NOR) by water soluble colloidal $MnO_2$ in the presence of anionic surfactant, sodium dodecyl sulphate (SDS) in alkaline medium has been investigated spectrophotometrically at 298 K. The reaction showed pseudo- first order with respect to [$MnO_2$] and fractional order were observed with respect to [NOR] and [NaOH]. The rate constant increased with decreasing dielectric constant of the medium. SDS enhanced the reaction rate i.e., with a progressive increase in [SDS] rate of reaction increased. The catalytic effect of SDS has been explained by mathematical model developed by Tuncay et al. (1999). Applying the Arrhenius equation, thermodynamic activation parameters have also been evaluated in both the media. On the basis of experimental results a suitable mechanism and rate law has been derived.

**Keywords:** Kinetics, Colloidal $MnO_2$, Norfloxacin, Oxidative degradation, Sodium dodecyl sulphate (SDS).

CHS-8

# EFFICACY OF SYNTHESIZED NANOSIZE WATER SOLUBLE COLLOIDAL $MnO_2$ FOR DEGRADATION OF METRONIDAZOLE

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## ABSTRACT

The researchers aroused great concern for the removal of unrestricted drugs from the aquatic environment. The present work is to focus on the synthesis of highly stable nanosize water soluble colloidal $MnO_2$ and its application in the degradation of pharmaceuticals wastewater from aquatic environment. The as-synthesized nanosize colloidal $MnO_2$ is characterized by UV-Vis., TEM, XRD, DLS, Zeta potential and FTIR. The pseudo first order reaction condition is maintained for the oxidative degradation of MTZ by colloidal $MnO_2$ in presence of iridium (III) catalyst and studied spectrophotometrically in acidic medium. Our results showed that nanosized colloidal $MnO_2$ is an excellent and cost effective oxidant for the degradation of drugs.The main oxidation product, 5-nitro-1-(2-oxoethyl)-1H-imidazole-2-carboxylic acid was confirmed by GC-MS analysis and also by a plausible mechanism.

**Keywords:** Degradation, colloidal nanosize $MnO_2$, iridium (III), metronidazole.

CAE-1

# IDENTIFICATION OF FLOOD VULNERABLE AREA FOR KHARUN RIVER BASIN BY GIS TECHNIQUES

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## ABSTRACT

Floods are one of the natural disasters which cause the loss of human life and property. Flood plain mapping is the important tool to identify the flood zone of any area and their management. Flood plain mapping is needed to aware the people who are living in floodplain areas about their risk and to discourage new settlements and developments. The advantages of this flood inundation mapping of any flood area that the users can easily access the information and able to make some special arrangement to reduce the loss due to flood i.e. flood management by using advanced technologies such as GIS and remote sensing. This research work gives a basic approach for identification of flood vulnerable areas of Kharun River basin by using HEC-RAS and GIS techniques. For flood modeling peak discharge released from both gauge and discharge site of Kharun river basin has been taken. Resulted modeling facilitates the identification of flood vulnerable area and the extent of flood through the flood maps for different flow conditions.

CAE-2

# INVESTIGATING TRAFFIC DELAYS AND SIGNAL TIMININGS: A CASE STUDY

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## ABSTRACT

Despite the construction of many state and national highways in India, the problem of traffic delays remains same. Traffic management is a big problem for India because Indian population is second largest in the world and everyday thousands of new vehicles are include on Indian roads, thereby increasing traffic density and traffic delays. This paper presents a case study conducted on express highway (NH-6) section between Durg and Raipur in Chhattisgarh. In this paper, it is proposed that apart from creating new infrastructure, some signal changes may also ease the traffic flow. It is observed in the case study that the majority of the signal use the same type of signaling options with similar timings, whereas minor changes in signaling option and timing would result in less traffic delay. Therefore, it is recommend that instead of following the same model for every signal, signaling options should be adopted based on the study of local conditions.

***Keywords:*** Traffic Delay, Signal, Four-phase

CAE-3

# PERFORMANCE EVALUATION OF VARIOUS GEOMETRIES OF SHEAR WALL IN BUILDINGS

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## ABSTRACT

In the present era, tall buildings are very much prominent, therefore its safety against earthquake forces is of vital importance. Shear wall provides an excellent means of resisting the earthquake forces by resisting the lateral force occurring on the building. In symmetrical buildings the centre of gravity and centre of rigidity coincide, so that the placement of shear walls is symmetric along the outer edges or inner edges of building. Therefore, it is necessary to find the most ideal and efficient location of shear wall to minimise the effect of torsion. The work presented in this paper focuses on the performance of various geometries of shear wall namely: C -shaped, L-shaped, I-shaped, Rectangular-shaped. In this study G+6, G+16 and G+25 storeyed building is modelled and analysed for lateral displacement, storey stiffness, storey drift using ETABS-2016 software. The analysis of the building is done by using equivalent static method and the results obtained from this method are plotted graphically.

CAE-4

# ANALYSIS OF SHORT TERM AND LONG TERM DEPENDENCE OF STREAM FLOW PHENOMENON IN SEONATH RIVER BASIN, CHHATTISGARH

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## ABSTRACT

In this paper to investigate long rang phenomena ( Hurst effect) of river flows which characterizes hydrological time series is studied, especially in connection with various climate-related factors, is important to improve stochastic models for long-range phenomena and in order to understand the deterministic and stochastic variability in long-range dependence of stream flow. Long rang dependence represented by the Hurst coefficient H is estimated for 5 mean monthly discharge time series of Chhattisgarh state for a period of 32 years from 1980-2012.long memory analyzed for both monthly and seasonally stream flow time series of the Seonath River Basin at Chhattisgarh State by using Hurst exponent and testing specifically the null hypothesis of short-term memory in the monthly and seasonal time series by (Von Neumann ratio test, Kendall's rank correlation test, Median crossing test, Run above and below the median for general randomness, Turning point test, Rank difference test). The number of time scale studies have been analyzing for the long-term behaviour of streamflow has increase adequately in the accomplished duration with exceptional quality and data availability with increasing interest of influence of climate change and climate-related factors on stream flow processes (Bloschl and Montanari, 2010), [1] the extent and complexity of such a consideration have increased. The necessity of such research lies in the need for incorporate long-range dependence and to developed speculative models, which can be used for illustration in the management of water resources or reservoir action. Another property characterizing time series from a long-range perspective is the long-term dependence (Hurst phenomenon (Hurst, 1951). [2] The phenomena of long-range persistence have a long history and have been authenticated appropriately in hydrology, meteorology and geophysics. Present day studies have led to reawakening and to add analyze long-term persistence in temporal time series of hydrologic data and also to developed applicable methods for estimating and modelling the intensity of long-term persistence in time series, as well as providing the reason for the Hurst phenomena. Based on the consideration of long-term persistence, a stationary process $x_t$ processes long memory if there be present in a real number H $\varepsilon$ (0.5, 1), called the Hurst exponent (Montanari et al., 2000).[3]

**Keywords**: Hurst Phenomena, Stochastic, Streamflow Processes, Long Memory Time Series.

CAE-5

# STUDY ON FIBRE REINFORCED CONCRETE USING GLASS FIBRE AND BASALT FIBRE FOR ENHANCEMENT OF COMPRESSIVE STRENGTH

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## ABSTRACT

Basalt fiber (BF) is a novel kind of inorganic fiber which is created from the ejection of condensed basalt shake and is modernly available. This study also gives the utilization of basalt and glass strands as fiber bolster in concrete. This paper additionally gives a compact depiction of effect basalt and glass fiber on workability and compressive strength of concrete. The strands were included concrete haphazardly by (0.25%, 0.5%, and 0.75%) of the volume of cement. For every percentage of fiber, a total of three cubes were cast to obtain average results. Accumulation of strands into concrete enormously enhances the engineering properties of concrete. In any case, the compressive strength of concrete is still under prudent talk by the expansion of strands in concrete. There is no significant change in the compressive quality of cement by the expansion strands. Discoveries of this examination demonstrated the impact of included strands in concrete which is very noteworthy for enhancing the compressive strength of concrete. Also, the addition of basalt fiber has better workability than glass fiber.

**Key Words:**Compressive Strength, Workability, Basalt Fiber, Glass Fiber.

CAE-6

# GROUND WATER POTENTIAL ZONE MAPPING OF ARPA RIVER BASIN USING RS & GIS

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## ABSTRACT

Groundwater being one of the important sources of water should be sustainably developed, consumed and managed, and for that quantitative assessment of ground water is essential. In the present study, ground water potential zones were delineated for Arpa river basin, Chhattisgarh India, using remote sensing and Geographic Information System (GIS) and AHP techniques. Suitable weights were assigned to various parameters using Saaty's scale based on their relative importance in ground water occurrence, and their classes were assigned rank based on their potentiality for groundwater storage. The analytical hierarchy process is used to determine the normalized weights of various themes. Seven parameters viz. Geology, Slope, Land use land cover, Drainage density, Rainfall, Soil, Lineament density were considered and their thematic maps were prepared and integrated in GIS environment. The overlay analysis was performed to obtain five different potential zones viz. very poor, poor, moderate, high and very high and the area covered by these classes are 600.6 $km^2$(18.64%), 908.06 $km^2$(28.18%),621.11$km^2$(19.28%), 714.89$km^2$(22.2%), 376.58$km^2$(11.7%) respectively. The final map was validated with the yield data from pumping test of 22 stations of the basin, out of which 16 stations were in favor giving an accuracy of 73%.

**Keywords**: groundwater potential zones, remote sensing, geographic information system, Arpa River.

CS-1

# SINGLE IMAGE FOG REMOVAL TECHNIQUES USING IMAGE PROCESSING

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## ABSTRACT

Fog is a big reason of road accidents, flight delays, late arrival of trains, etc. Contrast and color of the captured pictures are degraded under foggy weather conditions. To reduce the number of road accidents, an efficient fog removal technique plays a vital role as fog greatly reduces the visibility and hence affects the computer vision algorithms such as surveillance, tracking, etc. For improving the visibility level of an image and reducing fog, various image enhancement methods are used. In this paper, a novel and effective algorithm is proposed for single image fog removal that is capable of handling gray and color channels. This paper involves Image Restoration and Image Enhancement technique which will be used for restoring the clear image from a fog degraded image. The method involves estimation of depth of an image based on blur estimation. Measure of blur can be used for segmentation of an image in terms of depth. The advantage of the proposed algorithm is its capability to preserve sharp details whereas maintaining the color quality.

**Keywords:** Contrast Enhancement, Image defogging, Image restoration, Image enhancement.

CS-2

# A SINGLE TRIAL CHARACTER DETECTION IN DEVANAGARI SCRIPT INPUT BASED P300 SPELLER USING DEEP CONVOLUTION NEURAL NETWORK.

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## ABSTRACT

The P300 based brain-computer interfaces (BCI) systems acts as a direct communication medium to those persons who are suffering from chronic neuromuscular disorders without using any muscular activities. In such speller systems, the poor information transfer rate (ITR) is still the hurdle for its adaptation at clinical level. The performance of an existing DS based P300 speller using conventional machine learning techniques suffers while reducing the number of trials to spell the charter due to its RC paradigm which consist of 8 x 8 matrix of Devanagari letters and other characters which arises several problems such as crowding effect, fatigue, task difficulty. In such cases, the deep learning algorithms have been reported the state of art performance as compared to the conventional machine learning approaches. Hence, the main aim of this work is to develop a deep learning algorithm which can able to detect the target character in single trial which will improves the ITR by reducing the time to spell the character. In this work we have implemented a deep convolution neural network on a self-generated dataset using 16 channel actCAP Xpress EEG recorder to detect targeted and non-targeted P300 components in a single trial. The experimental results illustrated that the proposed DCNN model is able to detect 76.37 % correct target in a single trial without any channel selection techniques. Moreover, it provides ITR of 18.92 bits per minutes which is significantly higher than existing techniques.

CS-3

# TOMATO DISEASE DETECTION USING BACKPROPAGATION NEURAL NETWORK CLASSIFIER

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## ABSTRACT

Tomato is one of the most widely grown red berry type vegetable which is used in many different ways such as salads, drinks, sauces and dishes etc. As production of tomato is very delicate with temperature due to which they get easily affected through virus, fungus and bacteria. Black Mold disease in tomato is affected through the fungus named Alternaria Alternata. This disease is caused due to excess rainfall, watering or irrigation. The proposed research work is to detect the Black Mold disease in tomato by Backpropagation Neural Network. The dataset of infected tomato is taken from digital camera. After that Preprocessing is done for resizing the images, removal of noises and cropping. The preprocessed dataset applied for Region growing segmentation to achieve the set of pixels or subregions of the images through predefined criteria of the segmentation. From the segmented images, Color and Texture features is extracted .These extracted features is considered as input for the Backpropagation Neural Network classifier. The experimental result shows the detection accuracy of the classifier for Black Mold disease in tomato

CS-4

# IMPLEMENTATION OF DNA CRYPTOSYSTEM USING HYBRID APPROACH FOR SECURE COMMUNICATION

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## ABSTRACT

Data security is one of the important aspects of network security so we need encryption algorithm to increase data security like DNA Cryptography.DNA cryptography is a fusion of biotech and Computer Science field. This paper mainly focuses on implementation of the DNAcryptosystem with the use of AES and keys management using RSA algorithm and also for verification of data at other side message digest SHA-256 has been used to achieve Authentication, integrity, confidentiality, Non-repudiation, Access control, availability & signature. The system has been implemented in java using NETBEANS IDE 8.2.

CS-5

# OPTIMIZING THE PERFORMANCE OF DEVANAGARI SCRIPT-BASED P300 SPELLER SYSTEM USING BINARY PSO ALGORITHM

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## ABSTRACT

A P300 speller system enables a user to communicate to a computer without performing any physical movements. In this article, a P300 speller system for brain-computer interfacing (BCI) using Devanagari script (DS) input is presented. The visual stimulus paradigm consists of 8×8 matrix of 60 letters and digits from Devanagari script, and 4 special symbols. The larger size of Devanagari character set and similar appearance of letters in DS, increase the problems of crowding effect, fatigue and task difficulty, which ultimately deteriorate the speller performance. To effectively tackle these problems, the application of binary particle swarm optimization (BPSO)-based algorithm has been proposed for channel selection. The optimization algorithm was applied with three different objectives: to maximize the accuracy; to investigate the optimal trade-off between the numbers of channels used for data acquisition and the corresponding accuracy; and to achieve the maximum accuracy while selecting fixed number of channels in optimal channel subset. A modification in BPSO algorithm has also been proposed to achieve the third objective. The Gaussian-kernel Support Vector Machine (GSVM) classifier was applied for classification and character detection. The dataset was acquired from 10 subjects. The mean accuracy of 93.46% was achieved with BPSO algorithm, when maximizing the accuracy was the sole objective. Further, average accuracy of 90.62% was achieved while selecting an optimal subset of 8 channels.The offline results from 10 subjects show that the DS paradigm-based P300 speller can effectively communicate Devanagari characters.

CS-6

# FABRICATION OF GOLD NANOPARTICLE CLUSTER ARRAY FILMS FOR SENSING & ORGANIC SOLAR CELLS

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## ABSTRACT

Research on noble metal nanoparticles (MNP's) is drastically increasing because of their interesting optical properties. The MNP's exhibit unique optical response called surface plasmon resonance (LSPR) excited at a definite frequency when the oscillating electric field resonantly couples to free electrons oscillations in MNP's. This is also called as plasmonic effect. These MNP's exhibiting LSPR have found to be useful in many applications in various areas like sensing, photonics, photovoltaic, nanoelectronics, biology etc. Many researchers have presented the improved performance of organic solar cells by embedding gold nanoparticles (GNP's). GNP's help in improving the absorption of sunlight and even boosts the performance of solar cell due to photon-electron coupling. The key factors for the improved performance of the organic solar cells are the size, shape and geometry of the embedded nanoparticles. In this respect, synthesis of ordered gold nanoparticle films in a controlled manner is of prime interest. Lithography techniques have shown to be attractive for producing such nanostructures in large arrays with typical sizes on the order of 100 nm. If densely packed smaller nanostructures are required, self-assembly techniques have found to be attractive because they are highly parallel in nature and enable large-scale patterning at very low costs. In particular, block copolymers (BCMs) have been explored extensively as templates to pattern preformed nanoparticles and as nanoreactors to fabricate MNPs. In this study a novel ex-situ approach was used to fabricate gold nanoparticle cluster array films using pre-formed citrate stabilized GNPs on di-block copolymer templates. The work also presents the ideal conditions for fabricating highly ordered GNP cluster array films. The fabricated GNP cluster array films have immense applications in sensing and help in improving performance of organic solar cells

CS-7

# WEATHER ANALYTICS SYSTEM USING ARDUINO

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## ABSTRACT

The proposed system given in this paper provides advanced solution for analyzing the weather condition of any particular place this research replaces traditional weather system used in BITDurg and other information center in the country which provides information about environmental condition like temperature humidity wind direction wind speed rainfall in a traditional way the proposed system used in this paper replaces the traditional system fetching all this information using sensors IoT makes it advance smart and efficient to connect the system to the entire world the system analyses the information and sends it to the webpage and updated data can be accessible in the internet from anywhere in the world.

**keywords-** SMART world, arduinouno, esp 8266, iot.

CS-8

# LINEAR PROGRAMMING NETWORK MODEL FOR MPLS VPN TRAFFIC ENGINEERING

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## ABSTRACT

With the increase in demand of reliable and secure communications, many business networks adopted Virtual Private Network as a solution to virtually expand their private network over a large geographical area. This data securing functionality demands extension of internal network into intranets and extranets. Division of private networks into multiple subnetworks lead to a major concern for the uniform distribution of network traffic across the entire network pathways. The network expansion foregrounds Provider-Provisioned VPN providers to empower efficient network services to their customers. MPLS VPNs are employed as a standard which ensures provisioning of an optimal route for transiting the network traffic in PPVPNs. This paper proposes a Network model based on Linear Programming approach for Traffic Engineering in PPVPN network using Multi-Protocol Label Switching tunnels by formulation of network bandwidth demands and generalization of network traffic flows.

CS-9

# Cartoon Character Facial Recognition Using Fusion Method

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## ABSTRACT

In this paper animated character facial recognition using Local binary patterns grounded on fusion method is proposed. Thereby using this fusion method, we obtain the dimension reduction by principal component analysis (PCA) and after using dimension reduction technique we apply classification with support vector machines (SVM). Our experiment were completed by using by prevalent animated character face database. By applying the above method we obtained great recognition rate that is 97%. We compared our method with the existing methods. Our result is much better than other methods.

**Key words:** Fusion methods, Face recognition, support vector machines, dimension reduction, local binary pattern

EAS-1

# APPLICATION OF REMOTE SENSING AND GIS TECHNIQUES IN LAND USE-LAND COVER CHANGE STUDY OF DURG BLOCK, DISTRICT-DURG, CHHATTISGARH INDIA.

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## ABSTRACT

Durg block is the most populous block of the durg district of the Chhattisgarh state. Districts headquarter situated in durg block. According to the census 2001 and 2011 population of the durg district increased relatively 997848 and 1126731. (Statistical booklet 2013-14). The growing population and increasing socio-economic necessities creates a pressure on LULC. This pressure results in unplanned and uncontrolled changes in LULC. (Seto et al, 2002). With the time lots of changes in land cover take place in the area. Land use and land cover is an important component in understanding the interactions of the hum an activities with the environment and thus it is necessary to be able to simulate changes. (Prakas am,C. (2010)).The current studies aims to find out the changes during 1989-2014(25 years), for this land use land cover map of 1989 and 2014 of the study area are prepared with the help of remote sensing and Quantum GIS Techniques. It is found that in last 25 years lots of changes has been occurred in the durg block ,agriculture land increased by 24.89%,built up area increased by 4.82%,forest area increased by 0.3%,waste land decreased by 31.01%,while the area which is covered by the water bodies increased by 0.99% .It is found that the most of waste land converted in built up (settlement area) and agriculture land, most of agriculture land converted in to built-ups(settlements)and waste land ,with the time forest (vegetation)increases, no. of small water bodies decreases due to increment of built up area but total area which is covered by water bodies increases.

**Keywords:** change detection, land use, land cover, LULC (Land use Land cover), GIS, Remote sensing.

EAS-2

# ASSESSMENT OF URBAN HEAT ISLAND IN DURG -BHILAINAGAR URBAN AGGLOMERATION USING REMOTE SENSING AND GIS

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## ABSTRACT

Due to the rapid rate of industrialization and urbanization, the urban temperature is gradually rising in all cities in India. One of the possible causes is the drastic reduction in the greenery area in cities. The distinguished climatic condition termed as 'Urban Heat Island' (UHI). Durg-Bhilainagar urban agglomeration of Chhattisgarh is experiencing rapid urbanization that has resulted in remarkable UHI. Spatial variation of Land Surface Temperature (LST) will be helpful to decipher its mechanism and find out possible solution. Object ofstudy tries to identify the land use land coverwhich influences to the increase the surface temperature. Landsat 7 ETM+ images of 2002 and Landsat 8 TIRS image of 2017 was obtained from USGS and using bands 1- 4 and 7 of Landsat 7 and 2-5 and 10, 11 of Landsat 8 for processing LULC, Normalized Difference Vegetation Index (NDVI), and Land surface temperature (LST). Nine classes considered for the study are Built-up, mixed Built-up, Water bodies, Agricultural, Vegetation, Open land, Light and Heavy Industry, and industrial Dust. The digital number of thermal infrared band is converted in to spectral radiance using the equation supplied by the Landsat user's hand book. The surface emissivity based on NDVI classes is used to retrieve the final LST.The overall maximum LST values were detected from the industrial and built up, minimum LST values detected from water body, healthy vegetation. The surface temperature was computed as a range of 21.58 °C to 54.01 °C in 2002 and 27.64 °C to 58.06 °C in 2017. There was strong negative correlation between NDVI and LST. The study reveals that appropriate management is necessary for the sustainable Development of the urban area.

**Key words**: Land Surface Temperature, Land Use/Cover, NDVI, Urban Heat Island

EAS-3

# AQUIFER DELINEATION IN DUMARPANI STREAM WATERSHED USING ELECTRICAL RESISTIVITY SURVEY, KANKER DISTRICT, CHHATTISGARH

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## ABSTRACT

For groundwater geophysical exploration, electrical resistivity survey is commonly used. The main task of surface geophysical survey is to find out the hidden aquifer zone in the area. Geologically, Dumarpani stream watershed is granite area. Weathered, highly jointed, fractured granite forms aquifer in the area. Surface survey techniques helps in deciphering subsurface weather front of granite to locate shallow aquifers. For deep groundwater source, the fracture zone below the weather front has been investigated. In the present work, shallow aquifer and deep aquifer are delineated using electrical resistivity technique. The results of investigation indicate that shallow as well as deep weathered granite aquifers make most of the investigated area while deep fractured granite aquifers occur only in restricted part of the investigated area. Shallow weathered Granite Aquifer (SWGA) extends in depth up to 12 m, the Deep Weathered Granite Aquifer (DWGA) up to 120 m and Deep Fractured Granite Aquifer (DFGA) occurs between 30 and 100 m below ground level in investigated area.

**Key words:** Dumarpani Stream Watershed, Kanker district, Resistivity survey, Shallow aquifer, Deep aquifer

EAS-4

# SUBDUCTION INITIATION AND ARC MAGMATISM: A NEOARCHEAN VESTIGE FROM THE SONAKHAN GREENSTONE BELT, BASTAR CRATON

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## ABSTRACT

The southeastern part of Sonakhan greenstone belt (SGB) of Bastar craton mainly composed of High Mg basalts covering an area of about 35 sq.kms. and are designated as TH-1 and TH-2 on the basis of the geochemical parameters. The depletion of HFSE with reference to LILE and LREE, LREE/HFSE rations and negative Nb-Ta-Ti anomalies in the Primitive mantle normalized multi-element diagrams collectively indicate that subduction derived fluids were involved in the genesis of these rocks. The whole rock geochemistry and mineralogical characters attribute an Island Tholeiitic signature to the TH-1 and a boninitic signature to the TH-2. The Parental melt calculations in the chromites indicateits derivation from a boninitic magma in a supra-subduction zone environment. Trace element modelling with hydrous partition coefficients depict thatthe source depletion and slab-derived fluidscollectively controlled the trace element inventory of the mantle wedge. The LREE and LILE components exhibit higher mobility relative to the HREE and HFSE. The occurrence of lower basalt sequence followed by IAT and boninite related rocks in the SGB demonstrates subduction initiation prior to forearc rifting and supra-subduction zone magmatism. The subduction initiation in the intraoceanic lithosphere and the initial decompression melting followed by the forearc rifting and upwelling of the MORB related magmas attributedto the formation of the lower pillow basalts. The TH-1 basalts were derived from a subduction modified hydrous lherzolite mantle source, whereas adepleted harzburgite source with considerable subduction derived fluids collectively attributed to the formation of boninite related TH-2 basalts.

EAS-5

# DISPLACEMENT MONITORING USINGINTERFEROMETRY TECHNIQUE IN COALFIELD OF KORB, CHHATTSIGARH

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## ABSTRACT

Mining has become the major source for development of any country by producing various economical minerals. Due to extraction of assists, mine displacementis the collective phenomena in mines. It is a global problem, due to its adverse effect on land and its ecosystem. The interferometry synthetic aperture radar (InSAR) is a microwave remotes sensing technique used for detecting the millimeter accuracy for displacement (subsidence) monitoring. The study area was selected in the coal mine area located in coal field of Korba, Chhattisgarh. The Sentinel-1A SAR (synthetic aperture radar) were used for the InSAR techniques from 2015 to 2017.Using sentinel-1 imaginary with high resolution optical imaginary and ground investigation, the results area positive for Korba coal field. The result at a point if the point is vertically away or towards the SAR satellite predicted as deformation as a subsiding or uplift at that point. The interferometry techniques are competent tool for measuring the subsidence in coal mines.

EAS-6

# GEOCHEMICAL EVALUATION OF HIGH FLUORIDE GROUNDWATER AND IDENTIFYING SOURCE IN GRANULITE BELT AQUIFER IN A PART OF BHOPALPATNAM AREA, BIJAPUR DISTRICT, CHHATTISGARH, INDIA.

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## ABSTRACT

Fluoride is a chemical element that has been shown to cause significant effects on human health through drinking water. Different forms of fluoride exposure are of importance and have shown to affect the body's fluoride content and thus increasing the risks of fluoride-prone diseases. Fluoride can also be quite detrimental at higher concentrations at skeletal fluorosis. The Bijapur District is a hard rocks and alluvial plain marked as one of the fluoride-increase area in the southern Chhattisgarh due to occurrence of various rock types including fluoride-bearing minerals. Sixty two representative groundwater samples from Bhopalpatnam area were collected during two different seasons pre-monsoon and post-monsoon (2015) and analyzed for major cations and anions, with the help of standard methods of APHA (1995).Higher concentration of fluoride is observed during pre-monsoon (3.58 mg/l) compared to the post-monsoon (3.13 mg/l). Geochemical classification of groundwater shows that Ca-Mg-$HCO_3$, Ca-Mg-Cl, (Pre-Monsoon) and Ca-Mg-$HCO_3$, Ca-Mg-Cl (Post-Monsoon) are the dominant hydrochemical facies both seasons. Gibbs diagrams shows rock–water interaction dominance and evaporation dominance, which are responsible for the change in the quality of water in the hard rock aquifer of the study area. Spatial distribution of $F^-$ show that higher concentrations of $F^-$ are noted in the western and southern area. Petrographic studies have revealed that, biotite, apatite and fluorite ($CaF_2$) are, indeed, present as a significant fluoride-bearing minerals in the groundwaters of this study area.Thus, considering all the above findings this area needs special attention to ensure the supply of potable water to maintain sustainable life.

**Keywords**: Fluoride, Groundwater, Water-rock interaction, Bhopalpatnam, Geochemistry.

EAS-7

# STUDY OF INCREASING TEMPERATURE IN JANJGIR-CHAMPA BY USING REMOTE SENSING AND GIS TO FIND OUT THE PLANTATION ZONE

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## ABSTRACT

Chhattisgarh is the fast emerging state in the field of electricity generation sector on other hand the temperature of the surface increases in the surface, there is a bad effect on natural resources. The tendency to increase the surface temperature depends on many factors like industrial development, increasing population, land degradation *etc.* Remote sensing and GIS is right help full tool to identify the problem related with earth surface. The present study covers the entire Janjgir-Champa district because the temperature of Janjgir-Champa district is increasing in the last few years and due to the opening of the thermal plant (coal-based thermal power plant), natural features are also decreasing several research related to this has also been seen. Human penetration is also increasing in the work place where the temperature is increasing, in such cases it is necessary to locate the places where the plantation can be done. To get our objective LANDSAT 8 satellite images with TIRS band of the April month were used. Than with the help of ARC GIS software, conversion of the digital number into reflectance and radiance value were done. On the basis of NDVI, LST were calculated. During April 2013 to 2017, lower temperature increased from 17.240c to 31 560c and higher temperature increased from 35.980c to 50.100c. The concept of the present paper is to identify the plantation zone in study on the basis of land surface temperature and develop the appropriate strategy to control the increasing trend of temperature of the study area.

EAS-8

# बालोद जिले में गैरआदिवासी एवं आदिवासी ग्रामीण बाजारों का स्थानिक संगठन एवं आकारिकी संरचना

रीना

पं. रविशंकर शुक्ल वि. वि. रायपुर छ.ग.
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शोध सारांश

ग्रामीण बाजारों का स्थानिक संगठन के अन्तर्गत आकारिकी एवं कार्यात्मक संरचना का पदानुक्रम संरचना का विश्लेषण किया गया है। बालोद जिले में फूटकर व्यापार में संलग्न लोगों की संख्या केन्द्रीय सूचकांक के आधार पर क्रमशः गैरआदिवासी ग्रामीण बाजारों में मटिया बोड़की 103.56 प्रथम पद (बालोद) में प्राप्त हुआ और आदिवासी ग्रामीण बाजारों में अन्य गैरआदिवासी ग्रामीण बाजारों की तुलना में फूटकर व्यापार का केन्द्रियता सूचकांक कोड़ेकसा 39.78 प्रथम पद प्राप्त हुआ, बाजार सेवा केन्द्र के सुविधाओं के रूप में क्षेत्रीय विकास पर परिवहन मार्ग अपना महत्वपूर्ण भूमिका निभाते हैं, जिनमें सड़क (कच्चे–पक्के), रेल, परिवहन यातायात सुविधाओं के रूप छोटे–बड़े मोटर गाड़ीयों का महत्वपूर्ण स्थान है, वहीं व्यापारीयों की संख्या पर दूरी अन्तराल का प्रभाव भी महत्वपूर्ण स्थान रखता है। निवास स्थान से ग्राम बाजार तक विक्रेताओं द्वारा तय की गई दूरी का अधिक प्रतिशत क्रमशः 0से 5 कि.मी. में घोटिया ( डौण्डी ) से 29ः, 6से 10 कि.मी. में तारी (गुरूर) से 80ः ए 11से 15 कि.मी. में घोटिया ( डौण्डी ) से 60ः तथा 15 से अधिक कि.मी. की दूरी में पचेड़ा ग्रामीण बाजार ( डौण्डी ) से 66.7ः और आदिवासी ग्रामीण बाजार कोड़ेकसा में 50ः प्राप्त हुई ।

कुँजी शब्द :– ग्राम बाजार, बाजार स्थल, क्रेता–विक्रेता, वस्तुएँ।

EAS-9

# AGRICULTURAL CROP CONDITION ASSESSMENT USING SATELLITE BASED VEGETATION CONDITION INDEX AND RAINFALL ANOMALY INDEX OVER SELECTED TEHSIL IN CHHATTISGARH, INDIA

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## ABSTRACT

Indian agriculture is heavily dependent on the monsoon and a favorable southwest summer monsoon is critical in ensuring food availability to people of India. Crop condition is environmental phenomenon which can be depending upon its stage – rainfall deficit and/or level of impacts on hydrological cycle and agro-ecosystems. Agricultural crop condition is one of the most prominent affecting economies in Chhattisgarh. Agricultural crop condition has been a recurrent phenomenon in many part of India. Remote sensing plays an important role for near-real time monitoring of the agricultural crop condition over large area. In the present study LANDSAT-8 data from 2013 to 2016 were used for monitoring agricultural crop condition through NDVI based Vegetation condition index. VCI was calculated for whole Durg, Rajnandgaon Bemetara, Balod district in selected Tehsil using the NDVI variation. Rainfall Anomaly Index was computed from CPC NOAA South Asia observed rainfall data from2013 to 2016 for monitoring of meteorological condition of study area. VCI were compared with meteorological based Rainfall Anomaly index for monitoring Agricultural crop condition Raipur & Durg district in Chhattisgarh. Results revealed that VCI and RAI could capture spatial pattern of vegetation condition and dryness within seasons and across different years. A comparative study on kharifcrop conditions captured using VCI and RAI was made for different of year's viz., 2013 to 2016 as agricultural crop condition year, respectively. Crop condition severely affected which clearly discernable with both VCI and RAI of particular year. The results show that selected Tehsil in Chhattisgarh due to Agricultural crop condition.

**Keywords**: Agricultural crop condition, LANDSAT - 8, NDVI, VCI, RAI.

EAS-10

# कार्यशील महिलाओं की जीवन की गुणवत्ता : दुर्ग नगर के विशेष संदर्भ में एक अध्ययन

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## सारांश

प्रस्तुत अध्ययन का मुख्य उद्देश्य, दुर्ग नगर में कार्यशील महिलाओं की सामाजिक, आर्थिक दशा एवं स्तर का भौगोलिक विश्लेषण करना है। यह अध्ययन पूर्णतः प्राथमिक आँकडों पर आधारित है। अध्ययन हेतु सम्पूर्ण दुर्ग नगर को इकाई माना गया है, जो छत्तीसगढ़ का प्रमुख व्यापारिक, वाणिज्यिक तथा औद्योगिक नगर है। नगरों में कार्यशील महिलाओं की सामाजिक, आर्थिक दशा एवं स्तर का अध्ययन इसलिए महत्वपूर्ण है, क्योंकि इसके आधार पर नगरों के सामाजिक आर्थिक दशा में भी मात्रात्मक एवं गुणात्मक परिवर्तन परिलक्षित हो रहे हैं। दुर्ग नगर की चयनित कार्यशील महिलाओं की सामाजिक एवं आर्थिक स्तर को तीन स्तर उच्च, मध्यम एवं निम्न वर्ग में वर्गीकृत कर विश्लेषित किया गया है, जिसमे दुर्ग नगर में कुल चयनित कार्यशील महिलाओं में से 61.65 प्रतिशत कार्यशील महिलाएँ निम्न सामाजिक स्तर की, 30.46 प्रतिशत कार्यशील महिलाएँ मध्यम सामाजिक स्तर की एवं 7.89 प्रतिशत कार्यशील महिलाएँ उच्च सामाजिक स्तर की पाई गई। नगर में कुल चयनित कार्यशील महिलाओं में से, 73.03 प्रतिशत कार्यशील महिलाएँ निम्न आर्थिक स्तर की, 20.10 प्रतिशत कार्यशील महिलाएँ मध्यम आर्थिक स्तर की तथा 6.79 प्रतिशत कार्यशील महिलाएँ उच्च आर्थिक स्तर की प्राप्त हुई। कार्यशील महिलाओं में 39.08 प्रतिशत कार्यशील महिलाएँ निम्न आवासीय स्तर से, 35.23 प्रतिशत कार्यशील महिलाएँ मध्यम स्तर तथा 25.69 प्रतिशत कार्यशील महिलाओं का आवासीय स्तर उच्च प्राप्त हुआ। कार्यशील महिलाओं में 12.11 प्रतिशत कार्यशील महिलाएँ निम्न स्वास्थ्य स्तर से, 43.30 प्रतिशत कार्यशील महिलाएँ मध्यम स्तर तथा 44.59 प्रतिशत कार्यशील महिलाओं का स्वास्थ्य स्तर उच्च प्राप्त हुआ। नगर में कुल कार्यशील महिलाओं में से 64.95 प्रतिशत कार्यशील महिलाएँ निम्न जीवन की गुणवत्ता स्तर से, 29.61 प्रतिशत कार्यशील महिलाएँ मध्यम स्तर से तथा 8.44 प्रतिशत कार्यशील महिलाओं की जीवन की गुणवत्ता स्तर उच्च प्राप्त हुई। इस प्रकार चयनित कार्यशील महिलाओं में निम्न जीवन की गुणवत्ता स्तर की कार्यशील महिलाएँ अधिक पाई गई, जो दुर्ग नगर के सामाजिक, आर्थिक विकास के समक्ष चुनौती प्रस्तुत करता है।

**शब्द कुंजी** : सामाजिक स्तर, आर्थिक स्तर, आवासीय स्तर, स्वास्थ्य स्तर, जीवन की गुणवत्ता स्तर ।

EAS-11

# AUTOMATED EXTRACTION OF RABI RICE-SOWN AREA USING NORMALISED DIFFERENTIAL VEGETATION INDEX (NDVI) TIME SERIES MODIS 13A3 GLOBAL DATA: A CASE STUDY ON DHAMTARI DISTRICT OF CHHATTISGARH, INDIA.

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## ABSTRACT

Rice area mapping is important for food security, where demands often exceed production due to an ever increasing population. The advancement in Remote sensing technology in terms of spatial, temporal, spectral and radiometric resolutions helps to understand the agriculture cropping pattern and make a quick assessment of the ground reality. Using different satellite images, Remote Sensing and GIS techniques help in the field of crop forecasting, area assessment and other statistical data calculation. This study aims to develop a semi-automated approach using MODIS time series NDVI 13A3 data to extract rice sown area in Dhamtari district of Chhattisgarh. Overall, high correlation has been achieved between result of proposed technique and reference agriculture department statistics Earth and Atmospheric Sciences 2

EEE-1

# INVERTERLESS COUPLING OF PV ARRAYS WITH AC SYSTEM

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## ABSTRACT

Now a days renewable energy is one of the most concerned topic for research and especially in the Chhattisgarh solar energy is the main source of renewable energy which is being promoted by the government. In the solar system inverters are used to connect it with the conventional AC system. Inverters are very sensitive and most costly element of a solar photovoltaic system. The main objective of this research paper is to remove the inverters from the photovoltaic system and couple the PV arrays (which is DC system) with the conventional AC system directly.

A new scheme simultaneous AC-DC transmission is used in this paper to fulfil this objective. Zigzag transformer is the key component of this proposed scheme. Both AC and DC will travel simultaneously from source end to load end through the same transmission line. To validate the proposed scheme Simulink model has also been prepared in MATLAB@R2017a, merits and demerits of the scheme has also been discussed.

The results obtained in this paper verifies that the scheme is feasible and it is highly reliable. Besides of cost effectiveness the scheme is also helpful for the enhancement of the power transfer capacity of line as well as for improvement of transient stability of the AC system.

EEE-2

# A REVIEW ON OPERATION AND CONTROL OF DOUBLY FED INDUCTION GENERATOR (DFIG) FOR WIND ENERGY CONVERSION SYSTEM

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## ABSTRACT

In the present scenario DFIG is an enormous choice for more than one MW wind turbine. It accomplishes the aim to improve continuity of power output and to achieve optimal aerodynamic efficiency. It follows the variable speed constant frequency phenomenon in wind energy conversion system. Hence, doubly fed induction generator based wind energy conversion system deployed due to their variable speed features and influencing system dynamics.

In this paper, it is review that how the DFIG becoming significant and interest in developing suitable model for DFIG to integrated into power system studies.

The control strategies for improving the power quality, high power efficiency and controllability using power converters and pitch angle control for MPPT is also discussed in this paper.

EEE-3

# SOIL WATER LEVEL CONTROLLER FOR DIFFERENT CROPS IN A FIELD USING PLC

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## ABSTRACT

In a country like India, the agriculture plays an important role in the economy and development of the country. Agriculture is one of the fields where water is required in tremendous quantity. The water level required by each crop varies tremendously. The improper maintenance of water in agriculture leads to water scarcity. The farmers working in the farm lands are solely dependent on the rains and bore wells for irrigation of the land. Even if the farm land has a water-pump, manual intervention by farmers is required to turn the pump on/off whenever needed. It is observed that for the first time an automatic smart irrigation system for different crops in a field has been proposed. The main objective of this system is to make an wireless selection of field and it's corresponding crop species though Bluetooth module. Thereby monitoring agricultural parameters such as crop species, growth period, temperature, field area, and soil water level. The management system thus evaluates the water volume requirement during the vegetative cycle by comparing agricultural parameters and the specified crop parameters. The obtained result confirms that the irrigation demand is fulfilled and autonomy is provided during the vegetative season. The studies conducted a prototype of the system which can be implemented. The advantage of the system is that the process applied in this system is useful for managing water in real time for different crops in a fields.

**Keywords :** Automatic Irrigation, Water Requirement, Soil Water Sensor, Soil Moisture, PLC based System, Crop Type, Crop's Growth Period, Field area.

EEE-4

# DUAL INPUT CONVERTER FOR ELECTRIC AND HYBRID ELECTRIC VEHICLES

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## ABSTRACT

Electrification of vehicular system is seen to be promising technology for the future transportation system. In vehicle electrification, suitable integration of high energy density sources and high power density electric propulsion system plays crucial role for its sustainable development and advancement. Therefore, suitable power electronics converter for the integration of different energy sources and vehicle components is an essential requirement. In this paper, a dual input converter is proposed to interface battery and ultracapacitor as two input sources with electric propulsion system. It has ability to operate in Buck, Buck- Boost and Boost modes of operation to achieve desired voltage regulation. The converter structure, working states and operating modes of the proposed topology is explained and important mathematical formulations are derived. The proposed system offers flexibility in control, simplicity in structure and reliability in operation with reduced device count. The control strategy involves pulse width modulation scheme with constant switching frequency for generation of switching pulses. A detailed comparison of the proposed topology with existing work in the field has also been carried out. The proposed converter along with inverter-motor drive is investigated through MATLAB SIMULINK. A laboratory prototype has been developed by using dSPACE 1103 real time digital controller for experimental validation.

**Keyword** : Electric Vehicle, Hybrid Electric Vehicle, Dual Input Converter, Induction Motor Drive

EEE-5

# DESIGNING & IMPLEMENTATION OF BI-DIRECTIONAL DC-DC BOOST CONVERTER & INTERLEAVED CONVERTER FOR HYBRID VEHICULAR SYSTEM

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## ABSTRACT

With the depleting resources of fossil fuels on which our transportation is highly dependent, interest towards the alternatives of internal combustion engines is increasing. Battery driven electric vehicles and plug-in hybrid electric vehicles can be the promising alternative to the IC engine based vehicles in long run. Battery electric vehicles have battery as its only source whereas plug-in hybrid electric vehicles have more than one sources e.g. Fuel cells, PV panels, batteries, Ultra-capacitors etc. which provide it degree of freedom to supply power.

Electric Vehicle (EVs) adopting batteries, ultra capacitor are used for hybrid electric vehicle which provides a promising solution reduces power loss and increases efficiency for upcoming automotive industry. Batteries are integrated with DC-DC interleaved Boost converter and ultra capacitors with DC-DC Bidirectional converter to stabilize the voltage. Physical explanation about when to produce, consume & store electric power during regenerative braking is also implemented.

The proposed converter is compared with other topologies, such as conventional boost converter (BC) and Bi-directional boost converter in order to examine its performance and simulated in this paper using MATLAB2017a/Simulink. Further a DC motor is considered as a load to demonstrate the performance of this strategy.

EEE-6

# STUDY ON CONTROL OF DC MOTOR USING MATLAB SIMULINK

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## ABSTRACT

We know that Direct Current (DC) motors are used extensively in adjustable speed drives and position control applications. So, the speed control of DC motor is an important task. There are many conventional control methods e.g. by using P, PI and PID as controller etc.

In this paper, the closed loop control system of separately excited DC motor is simulated by using MATLAB-2017. There are two models. One is complete modelling of DC motor speed control. Another one is the model with current control loop which is approximated as first order system.

The paper concludes with the speed response of DC motor and it is analysed in terms of peak overshoot and settling time. It also compares the condition of with approximation and without approximation of controller. This paper is useful in terms of analysis of designing constraints of DC motor controller (either speed controller or current controller).

EEE-7

# IMPLEMENTATION OF REAL-TIME ENERGY MANAGEMENT STRATEGY FOR HYBRID ELECTRIC VEHICLES

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## ABSTRACT

Several concepts of hybrid electric vehicles (HEV), combining operation of ICE and EV came into existence. Further advancement in vehicle technology results in form of Battery operated electric vehicles and Plug in hybrid electric vehicles (PHEV) which are pure electric vehicles powered by more than one sources and can have ICEs just to complement the electric motor and extend the range of the vehicle.

Electric Vehicles (EVs) can utilise a combination of batteries & ultra-capacitors to form a unique power-sharing technique that provides a promising solution to tackle the current power-loss issues. The new type of EV built with this combination is called Hybrid Electric Vehicle (HEV). The batteries in these EVs are integrated with DC-DC boost converter while the ultra-capacitors are integrated with DC-DC bi-directional converter to stabilise the voltage. The paper proposes Energy Management Strategy (EMS) to deal with fast load dynamics in electrical vehicles, optimise the internal power flow, and satisfy the vehicle's power demand.

The paper using MATLAB/Simulink 2017(a) results expounds when to produce, consume, and store electric power during regenerative braking. The paper also details the designing of a bidirectional boost converter that will act as an interface between the ultracapacitor and the load – feeding the load in motoring mode and charging the ultra-capacitor in regenerative braking mode. Further, the paper considers the DC motor as a load to demonstrate the performance of EMS for HEVs. This thesis on the HEV technology can be used to support future R&D and deployment activities.

EEE-8

# REAL TIME DATA LOGGING OF A STANDALONE SOLAR POWER PLANT THROUGH ADVANCED SOLAR POWER MANAGEMENT SYSTEM

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## ABSTRACT

In the present scenario the demand and dependency on sustainable energy sources is rapidly increasing so as to meet the energy requirements globally. India is the third largest producer of solar energy in the world and attempts are being made to enhance the figure by the government of India. The main objective of this paper is to design an Advanced Solar Power Management System for a Stand Alone type of PV system where grid integration is not possible due to frequent grid failures.

The present paper clearly describes how to make optimum use of generated power through stand alone PV module with the help of advanced Solar Power Management System. This efficient system is particularly designed so as to monitor the real time power generation from stand alone solar PV plant, and also the real time power consumption by different loads connected to it.

ASPMS is used and connected to the internet for online monitoring of the various status and parameters remotely. An optimization algorithm has been implemented to manage the run on solar utility.

**Key words:** photovoltaic, advanced solar power management system, wireless monitoring, solar power.

EEE-9

# DIRECT TORQUE CONTROL OF INDUCTION MOTOR

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## ABSTRACT

Induction motors are the eccentric choice for motor drives in industries because of their unadorned construction, repository operation, subdued initial cost and facile and indulgent maintenance added with competent efficiency. This conduciveness elevates its exercise in research of fleeting- behaviour of the machine.

The direct torque control is an archetype of potent high performance control strategy for the control of induction motor drives, manifesting agility in torque response with simple structure.

However, the control technique becomes deterrent by the use of hysteresis comparators and predefined switching table implicating large ripples in the torque and variable switching frequency. Presented in this paper through simulation and experimental results are the ripples in torque and speed along with errors in torque and stator- flux.

**Keywords:** Direct torque control, direct self control, induction motor drives

EEE-10

# DETECTION OF EPILEPTIC SEIZURE BY ANALYSIS OF EEG SIGNALS USING WAVELET BASED STATISTICAL FEATURES

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## ABSTRACT

One of the critical abnormalities of the brain is epilepsy which causes electrical distraction and constrains the neural system. Usually, epilepsy is diagnosed by the neurologist by analyzing the EEG signals acquired from the brain. It is a very challenging task for the neurologist to continuously examine and interpret the EEG signal of epileptic patient. Hence, development of efficient automatic systems is currently a bottom neck issue, which can identify the epileptic seizer attack and distinguish between normal and epileptic patient. Over the years, attempts have been made to establish an automatic system for accurate detection and classification of epileptic seizure. The latest accuracy of about 98% has been reported using weighted complex neural network in eight different combinational cases.

This paper proposed a new feature extraction technique to improve the classification accuracy of epileptic patient using wavelet domain statistical features like Mean, Variance, Entropy, Skewness, Kurtosis, and standard-deviation. Further, the proposed feature space is fed to the neural network and the k-nearest neighbor classifier to validate the classification accuracy of proposed technique. Meanwhile, during this validation the benchmark epileptic data set is utilized which is original developed by University of Bonn. This data set consists of different samples in condition such as normal, epileptic patient during seizer free conditions, and epileptic patient during epileptic seizure.

The outcomes of proposed work shows 99.53 % average accuracy along with neural network classifier for 10 fold cross validation during testing of system.

**Keywords:** EEG Classification, Epileptic Seizure, K nearest neighbor, Wavelet Transform, Neural Network, Statistical Features.

EEE-11

# Modelling of a Matrix Converter using Indirect Transfer Function Approach with input power factor correction

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## ABSTRACT

A matrix converter is an AC-AC power converter topology which seems to be an alternative to conventional AC-DC-AC converter. It is an array of bidirectional controlled switches that couples directly the three phase sources to three phase balanced load without the need of bulky and limited lifetime energy storage elements. This paper discuss the operating principle and space vector modulation scheme for indirect transfer function matrix converter. The simulation and experimental result are shown to prove the ability of the converter to generate three phase output voltage and current of different frequency with respect to input three phase voltage and current frequency. Also the input power factor is maintained to near unity irrespective of load

EEE-12

# A REVIEW ON AUTOMATION OF FLOODGATES OF WATER RESERVOIR BY PROGRAMMABLE LOGIC CONTROLLER (PLC)

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## ABSTRACT

This paper is intended as an overview of water reservoir automation. Water reservoir are crucial to country's economy as they are the resources of power generation, irrigation, water conservation and so on. This paper is focused on controlling the floodgates of reservoir and the process variable parameters like level and flow of water with real time implementation using programmable logic controller. In this paper, a programmable logic controller is act as an industrial computer, playing role of a control device and push buttons, level and flow sensors provide incoming signals to the control unit. The prototype model is provided with five levels and depending on the level sensor outputs, ladder logic is actuated. This work uses PLC of Semeins-Simatic S7300 with 32 digital I/O and 8 analog I/O.

**Keywords**: Automation, Ladder logic, PLC, Level Sensor, Reservoir Gate Control

EEE-13

# ANALYTIC HIERARCHY PROCESS BASED MODEL REDUCTION OF HIGHER ORDER CONTINUOUS SYSTEMS USING SINE COSINE ALGORITHM

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## ABSTRACT

The analysis of higher order systems is tedious and cumbersome task. This motivated analysts to reduce higher order systems into lower order models using mathematical approaches. In this paper, an analytic hierarchy process (AHP) based approximation of stable higher order systems to stable lower order models using sine cosine algorithm (SCA) is presented. The stable approximant is deduced by minimizing the relative errors in between time moments and Markov parameters of the system and its approximant. In order to match the steady states of the system and its approximant, the first time moment of the system is retained in the approximant. AHP is utilized to convert multi-objective problem of minimization of errors in between time moments and Markov parameters into a single objective problem by proper assignment of weights. To ensure the stability of the approximant, Hurwitz criterion is utilized. The systematic nature and efficacy of the proposed technique is validated by deriving approximants for three different test systems.

EEE-14

# HIGH POWER ION THRUSTER

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## ABSTRACT

The propulsion system include a 30 cm diameter ion thruster, a xenon feed system, power processing unit and a digital control and interface unit. A total of four engineering model ion thruster, three power processors and a controller have in built, integrated and tested. An extensive set of development tests have been completed along with thruster design verification test of along with thruster design verifications tests of 2000 h and 1000 h. An 8000 h life Demonstration test is ongoing and has successfully demonstrated more than 6000 h of operation. In situ measurements of accelerator grid wear are consistent with grid lifetimes will be excess of 12,000 h qualification test requirement. The ion thruster is described which operates on ions generated from the gas. Ions are light weighted particle so it is easy to handle. Ion can be stored in large amount and processing of it is very easy to get propulsion from it. Thruster has strong boundary ring-cusp magnetic fields. The performance of the cathode is defined by ability to ignite reliability and supply electrons to the main discharge with a relatively low voltage. How to use ion beam as ultimate source of propelling element in rocket propulsion in deep space movement is also described. Different types of ion thruster and different technique used to make an ion thruster were discussed. Flight hardware is now being is being assembled in preparation for integration functional and acceptance test.

ES-1

# EFFECTS OF CLIMATE ON ETHEPHON INDUCED GUM EXUDATION IN ACACIA NILOTICA IN CHHATTISGARH

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## ABSTRACT

Acacia nilotica is multipurpose nitrogen fixing leguminous tree commonly called as babul and is a source of Indian gum arabic. It is considered as a very important economic plant since early times as a source of tannins, gums, timber, fuel, fodder and medicine. Gum exudation is very essential process which plays a vital role in socioeconomic generations. Traditional method of tapping leads to unsustainable production of gum with health deterioration of babul tree. Therefore, using ethephon can enhance gummosis and maintain the health of trees. In this context, a study was carried out on the process of gummosis in babul by using ethephon under scientific tapping technique apart of traditional method of tapping which is dangerous to the health of tapped trees. The babul trees receiving 15.6 (2 ml of 0.78% ethephon) or 62.4 mg (4 ml of 1.56% ethephon) ethephon were compared to controls in field experiments during rainy, winter and summer seasons. Also, this is an attempt to compile and document information on impact of chemical (ethephon) and climate (temperature and relative humidity) on yield parameters of babul and quality parameters were also analyzed.

**Keywords:** Acacia nilotica, ethephon, Indian gum arabic, gums, resin and girth class etc.

ES-2

# ASSESSMENT OF FLUORIDE CONCENTRATION IN GROUNDWATER, SOIL AND PLANTS OF DONGARGARH AREA OF RAJNANDGAON

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## ABSTRACT

The present investigation was carried out with an objective to characterize the groundwater quality parameters, soil quality parameters and plants for their fluoride concentrations in different villages of Dongargarh, Rajnandgaon. For hydrochemical analysis, water samples were collected from surface and sub- surface during pre-monsoon (N = 99) and post-monsoon (N= 101). For analysis of soil and plants, the samples for both soil and plants were collected during post-monsoon season from Dongargarh (N= 101) with the help of hand held Global Positioning System (GPS).The fluoride concentration in groundwater varies from 0.08 – 2.40 mg/l in pre-monsoon and 0.03 – 2.30 mg/l in post-monsoon season. Nearly, 9.1 % samples were recorded above the permissible limit of fluoride content in groundwater samples described as per BIS and WHO (i.e. > 1.5 mg/l) during pre and post-monsoon seasons. The fluoride polluted villages (viz: Dundera, Makkatola, Rampur, Uraidabri, Pinkapar, Paniyajobe, Patpar and Chiddhu) which were reported to have above permissible limit (> 1.5 mg/l) of fluoride content in groundwater during pre and post monsoon season. The fluoride content in groundwater had significant positive relationship with pH, $HCO_3^-$ and $Na^+$, while the non significant negative relationship were obtained with $Ca^{2+}$ , $Mg^{2+}$ , TH and $K^+$ during both pre and post monsoon seasons. For hydrochemical analysis PCA, cluster and GIS mapping were performed. The pH of soil samples of Dongargarh were found neutral in reaction. All the analyzed soil samples were observed to have normal range of electrical conductivity. In the study area of Dongargarh block, all the collected soil samples were having low available fluoride content in soil stipulated as per the joint EPA, FAO and WHO standards (i.e. < 2.57 mg/kg). Fluoride content analyzed in samples of rice in which all the grain samples of rice were having below the permissible limit (< 4 mg/kg) of fluoride content in grain samples as per stipulated by the joint of EPA, FAO and WHO standards. However, fluoride content in rice plants follow the order of root > shoot > grain.

**Key words:** Fluoride, ArcGIS, PCA, cluster, EPA, WHO, BIS.

ES-3

# SYNTHESIS OF CERIUM OXIDE QUANTUM DOTS AND ITS APPLICATON AS HETEROGENEOUS CATALYST IN FENTON LIKE DEGRADATION OF THIAZINE DYE

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## ABSTRACT

Water pollution kills nearly 1.8 million people and cost trillions of dollar every year which continuously threatens the survival of human and animal. Textile industry is considered as a pollutants releasing industries in the world. In present research work, we firstly report synthesized $CeO_2$ nanoparticles in quantum dots range which behave as heterogeneous catalyst for the degradation of methylene blue (dye) by Fenton like degradation. Synthesized cerium oxide was assisted by three different surfactants, i.e., sodium dodecyl sulfate (SDS) (anionic), cetyltrimethylammonium bromide (CTAB) (cationic), and cetylpyridinium chloride (CPC) (cationic). Characterization technique is a method used for the complete study of synthesized quantam dots, which was further characterized by UV-Visible, X-ray diffractometer (XRD), scanning electron microscope (SEM), transmission electron microscope (TEM), fourier transform infrared spectroscopy (FTIR) etc. Particle size of $CeO_2$ is between 1.66-4.36 nm in all three surfactant assisted method and smallest particle size obtained through CPC. Later, the catalytic role of $CeO_2$ were successfully investigated in Fenton reaction for the removal of methylene blue (thiazine) dye.

**Keywords**: Cerium oxide synthesis, surfactants, Fenton reagent, thiazine dye.

ES-4

# EVALUATION OF A NATIVE TREE- *DALBERGIA SISSOO* ROXB. FOR DENDROREMEDIATION OF LEAD

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## ABSTRACT

*Dalbergia sissoo* is a tropical leguminous timber tree was screened for Lead tolerance and phytoaccumulation/phytostabilization abilities. *D. sissoo* mature trees were investigated at Lead contaminated site and it's seedlings were also screened *in vitro* under Lead stress. At contaminated site, *D. sissoo* mature trees were able to accumulate Lead in roots as hyperaccumulator. Further, Lead was also translocated from the root to above-ground parts. Similarly, *in vitro* grown seedlings could tolerate high Lead levels (150 mg/l) and were also able to accumulate it as hyperaccumulator in the roots, after 1-month of exposure. Lead accumulation was confirmed by Atomic Absorption Spectroscopy (AAS) and SEM-EDX analysis. Lipid peroxidation was increased in roots and shoots with the increased Pb levels. Maximum activities of antioxidant enzymes- superoxide dismutase, catalase and ascorbate peroxidases were also recorded in 150 mg/l Lead-exposed roots, shoots and leaves in order to tolerate oxidative damage by the toxicant that declined sharply at higher concentration. Random amplified polymorphic DNA profiling showed that genomic template stability was also not affected the optimum Lead level. Thus, due to the presence of an effective Lead tolerance mechanism and its retention ability as hyperaccumulator, *D. sissoo* is evident as a potential new candidate for Lead phytoextraction from contaminated sites.

**Key words:** Dendroremediation, Heavy metal, Field analysis, *In vitro* analysis, SEM-EDX

ES-5

# RAPID ANALYSIS OF PRETILACHLOR IN PADDY GRAIN, SOIL AND WATER SAMPLES

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## ABSTRACT

This article presents a new and sensitive spectrophotometric method for the determination of herbicide pretilachlor. The reported method is based on the alkaline hydrolysis of pretilachlor to its corresponding primary amine followed by diazotization and coupling with p-aminoazobenzene in alkaline medium. The Beer's law obeys the range from 0.5 - 5.0 $\mu g\ mL^{-1}$ of pretilachlor with a limit of detection of 0.045 $\mu g\ mL^{-1}$. In alkaline medium a reddish orange colored product exhibiting maximum absorption peak ($\lambda$ max) at 490 nm. The relative standard deviation was 0.478%. The molar absorptivity and sandell's sensitivity was $1.85\times10^{6}$ L $mol^{-1}$ $cm^{-1}$ and $8.0\times10^{-5}$ $\mu g\ cm^{-2}$ respectively. The interfering effect of various species was also investigated. The proposed method was successfully applied to determination of pretilachlor in various paddy grain, soil and water samples.

**Keywords:** Environmental samples; pretilachlor; p-aminoazobenzene;pesticide residue analysis; spectrophotometry.

ES-6

# SPECTROPHOTOMETRIC DETERMINATION OF CAPTAN FUNGICIDE BY THE PHENYL HYDRAZINE METHOD

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## ABSTRACT

Captan fungicide react with thiophenol in the presence of diethylene amine in ethanol and acetonitrile to synthesized bis(phenyl)trithiocarbonate, diketon derivative and thiol derivative, the formed trithiocarbonate reacts with phenyl hydrazine in the presence of ethanol and concentrated HCl as a results hydrazone is formed, which changed into yellow colour benzenoids (salt form) solution at pH 3 to 4, the reaction temperature was maintained 40 °C by heating solution mixture in water bath. The yellow colour benzenoids solution shows maximum absorbance ($\lambda_{max}$) at 473 nm. The colour system obeys Beer's law in the range of 1-13 µg/ml, accuracy of method was checked by standard addition method. The recovery range was found to be 95-99%. The method is free from interference of common ions and other fungicides, this shows that the method is applicable to analyse captan fungicide in various samples.

**Keywords:-**Spectrophotometric, captan fungicide, diphenyl hydrazine, thiophenol, diethylene amine in ethanol, acetonitrile, phenyl hydrazine.

ES-7

# STUDY OF URANIUM CONCENTRATION IN GROUND WATER SAMPLES OF DURG DISTRICT CHHATTISGARH STATE, INDIA BY FLUORIMETRIC TECHNIQUE AND ASSESSMENT OF HEALTH RISK

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## ABSTRACT

The uranium concentration in the ground water samples collected from different source of Durg district (Chhattisgarh) have been analysed by using LED Fluorimeter LF 2A. It wasobserved that uraniumconcentrationranges from0.638 µg/l (Sagani) to 45.7 µg/l (Auri) and 99% of the samples found under the safe limit of 30 µg/l prescribed by the World Health Organisation 2011.The excess lifetime carcinogenic risk and chemical risk due to ingestion of ground water were calculated using USEPA recommendations.

**Keyword:** -Uranium concentration, Ground water, LED Fluorimeter, Excess lifetime carcinogenic risk, Chemical risk,

ES-8

# MASS LOADING OF SIZE-RESOLVED ATMOSPHERIC AEROSOLS EMITTED DURING FIRE-CRACKERS BURNING IN URBAN AREA OF EASTERN CENTRAL INDIA

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## ABSTRACT

This study investigates, for the first time, aerosol size distribution during pre-and post periods of an extreme firework event, named Deepawali that is celebrated with zeal in an urban area of eastern central India. Fifteen sets of size-segregated aerosols samples (five samples for each event) were collected using Andersen cascade impactor before Deepawali period (BDP), throughout Deepawali period (TDP) and after Deepawali period (ADP) at Raipur. At TDP, bimodal distribution was observed in both modes, respectively, due to the enormous burning of fire-crackers. Percent contributions of $PM_1$ to $PM_{2.1}$ and $PM_1$ to $PM_{>9}$ ratios were higher at TDP. The concentrations of the above were five and four times higher than those of regulatory air norms, India. At TDP, the Particles with size <0.43 and 0.43-0.65 μm are strongly correlated with 1.1-2.1 and 4.7-5.8 μm. This correlation was not found in BDP and ADP, due to no firecrackers burning activity in these periods.

**Keywords** Deepawali festival, Pearson correlation, Size distribution, Percentage contribution

ES-9

# EFFECT OF CHEMICAL AND BIOLOGICAL PRE-TREATMENT ON BIO-HYDROGEN PRODUCING BACTERIA *Enterobacter ludwigii* STRAIN IF2SW-B4

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## ABSTRACT

Bio-hydrogen has potential to become a clean energy without contributing to greenhouse emission. It is inexhaustible and cheap source utilization for production of bio-hydrogen. Bio-hydrogen obtained from biomass and has potential to become an important sustainable transportation fuel in the near future. Biomass such as lignocellulosic material such as agricultural and industrial wastes which are available abundantly as well as environmental friendly is great source for production of bio-hydrogen. This research paper includes optimization of pH, temperature, static and stirred condition for bio-hydrogen production (BHP). By the optimization at pH 6 and temperature 35°C with agitation speed 400 rpm was suitable for maximize the production. Then, chemical and biological pre-treatment methods carried out for more and rapid production of bio-hydrogen. On comparing both acid and alkali pre-treatment ($H_2SO_4$, HCl, NaOH and $NH_4OH$) 1% NaOH pre-treatment was the most effective for BHP of 1080±66.01 ml $H_2$/L with SHPR0.15±0.009 ml $H_2$/g substrate/L. Biological pre-treatment by *Trichoderma reesei* for 2 days gives maximum BHP of 1062.5±7.2 ml $H_2$/L with specific hydrogen production rate (SHPR) 0.147±0.001 ml $H_2$/g substrate/L among all biological pre-treatment.

**Keywords:** Biomass; bio-hydrogen and SHPR.

ES-10

# ANALYSIS OF PHENANTHRENE BIODEGRADATION PATHWAY IN NOVEL BACTERIAL STRAIN *PSEUDOMONAS OTITIDIS* P4

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## ABSTRACT

A novel phenanthrene degrading bacterial strain was isolated from the Chirimiri coal mines in central India and was identified as *Pseudomonas otitidis* P4 on the basis of morphological, biochemical and 16S rRNA gene sequence analysis. This strain could degrade 98.3% of phenanthrene at a concentration of 1000 mg $l^{-1}$ after 10 days of incubation in the optimized conditions. In this investigation, the phenanthrene degradation metabolites and enzymes involved in phenanthrene degradation by *Pseudomonas otitidis* P4 was studied. Several key metabolites including 1, 2-benzenediol, benzoic acid, 1, 2-benzenedicarboxylic and phthalic acid were identified through gas chromatography-mass spectroscopy (GC-MS) analysis. Genes which encode for enzymes polycyclic aromatic hydrocarbon- ring hydroxylating dioxygenase (PAH-RHD), catechol 1, 2-dioxygenase, catechol 2, 3-dioxygenase and salicylate hydroxylase were amplified using gene specific primers. The isolate *P. otitidis* P4 degraded phenanthrene through the metabolic route which was initiated by ring hydroxylating dioxygenase, and further degradation was followed via either the o-phthalate pathway or the salicylate pathway in which phenanthrene was mineralized into tricarboxylic acid (TCA) cycle intermediates. Phytotoxicity and microbial toxicity assessment showed that the products/metabolites formed at the end of phenanthrene degradation by the isolate *P. otitidis* P4 were nontoxic for plants and microbes. The strain P4 was found to be potential petroleum hydrocarbon degrader and resistant towards many heavy metals which makes them suitable for bioremediation of environments co-contaminated with heavy metals and hydrocarbons.

ES-11

# CHEMICAL CHARACTERIZATION AND HEALTH RISK ASSESSMENT OF $PM_{2.5}$ IN THREE DIFFERENT ENVIRONMENTS IN CENTRAL INDIA (CHHATTISGARH)

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## ABSTRACT

Atmospheric $PM_{2.5}$ pollution is directly related to the human health problems, so strong efforts are needed to reduce health exposures from ambient $PM_{2.5}$ pollution. This study presents ambient $PM_{2.5}$ level, chemical species markers and associated health risks at three different sites (i.e. urban, rural and industrial) of Central India (Chhattisgarh) during the year 2015-16. Each ambient$PM_{2.5}$sampleswere analyzed for elements (Al,K, Ca, V, Cr,Mn,Fe, Co,Ni, Cu,Zn, As,Cd, Pb,Mo, Se, Sb, Na, Mg, Kand Hg),ions($Na^+$, $Mg^{2+}$,$K^+$,$Ca^{2+}$,$F^-$,$Cl^-$,$NH_4^+$,$NO_3^+$and $SO_4^{2+}$) andcarbon fraction(OCandEC) chemical species.Theannual average $PM_{2.5}$ concentrations werefoundtobe ~2 to 6 foldshigher than the nationalambientairquality standard(40$\mu gm^{-3}$)for all three different sites. Additionally,carcinogenic andnon-carcinogenichealthrisksassociated withambient$PM_{2.5}$exposures (viaingestion,inhalation and dermal), mass reconstruction and ion balance were also evaluated.

**Keywords:** Ambient $PM_{2.5}$, Mass closure, Ion Balance, Health risk

ES-12

# Surface Enhanced Infra-Red Spectroscopy for Determination of Quaternary Ammonium Cationic Surfactants using Silver Nanoparticles (AgNPs) as a Chemical Sensor

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## ABSTRACT

AgNPs are SE/ATR-FTIR-active for quantitative of total mixed quaternary ammonium cationic surfactants (QACS) detection using single drop microextraction (SDME) in low concentrations in aqueous media. To the best of our knowledge, this is the first report that describes the rapid quantitative determination of total mixed QACS using AgNP/ATR-FTIR. The infrared absorption band of AgNPs, which is tunable, is useful for SE/ATR-FTIR that was demonstrated using total mixed QACS as probe molecules with detection limits of 0.52 $\mu g\ L^{-1}$ much lower than that using regular AgNPs. The SE/ATR-FTIR signals of total mixed QACS using AgNPs are further enhanced with respect to AgNPs, which is attributed to the aggregation of the AgNPs and a stronger electrostatics interaction of positive charge of cationic surfactants and negative charge of citrate compound. The intense vibration peak of QACS was obtained at 3016 $cm^{-1}$ in ATR-FTIR spectra was used for optimization of all analytical parameters and for the determination of total mixed QACS. The advantages of the SE/ATR-FTIR using AgNPs method are its simplicity, selectivity and sensitivity towards the analysis of total mixed QACS in various household effluents.

**Keywords:** AgNPs, SE/ATR-FTIR, single drop microextraction, total mixed QACS, household effluents

ES-13

# A SHIFT TOWARD MORE RENEWABLE ENERGY SOURCES MITIGATING CLIMATE CHANGE AND LABOUR PRODUCTIVITY

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## ABSTRACT

Climate change is the most significant challenge to accomplishing sustainable development, not just on the grounds that it influences the global physical environment directly, yet in addition since it influences about all aspect of socio-economic development.The world has encountered structural changes in the labour market some time recently. Be that as it may, changes in the climate will enormously affect employment and the labour market by and large, particularly in developing nations.Despite the fact that the largest share of Green House Gases (GHG) affecting the climate is originating from developed nations and nations in transition, it is the developing world which will be the hardest hit – likewise effectively poor and financially weak as for what the measures they would have the capacity to take to handle climate change effects. Mitigating global climate change is presently at the top of the policy agenda in many industrial countries. Energy is a standout amongst the most essential contributions for economic growth and development, and, at the same time, it is the greatest source of GHG emissions. Many industrialized nations have committed themselves to contribute more toward mitigating climate change by significantly reducing emissions of greenhouse gases and ambient air pollutants. Presently majority of the country execute such environmental policies as air quality standards for industry. In addition, a range of countries aim to considerably reduce the use of energy from conventional fossil sources and expand the generation of energy from renewable sources. Such a political move toward a low carbon, green economy may make extra additional employment opportunities research and development, in production, and in the installing and maintaining of green advancements. Renewable energy would be a promising solution for promoting sustainable development, as well as for addressing climate change, by reducing environmental impacts, enhancing energy security, and providing various developmental co-benefits, such as job creation and capital investment in green industry. Renewable energy policies might affect employment in different ways. A policy shift toward a low-carbon green economy may create new and additional "green jobs" in renewable energy sources and energy-efficiency technologies. The purpose of this paper is to why we shifting more in renewable energy source and also briefly elaborating impacts of renewable energy source how to mitigate climate change. This paper also explaining with renewable energy sectors on labour market. The data for this paper was collected from secondary sources using a descriptive approach of previous researchers and analysis of scholars to gather empirical data.

ES-14

# HEALTH IMPLICATIONS DUE TO MOSQUITO COILS AND INCENSE STICKS EMISSIONS

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## ABSTRACT

Burning mosquito coils indoors generates smoke that can control mosquitoes effectively. This practice is currently used in numerous households in Asia, Africa, and South America. However, the smoke may contain pollutants of health concern. The indoor air pollution during household's combustion of solid fuels in developing countries causes several health problems. The health problems related to indoor aerosol increases the risk of tuberculosis, asthma, cataracts, low birth weight, peri-natal mortality, etc. The incense materials are widely used for the fuming in the ceremonial places. Upon fuming they emit harmful respirable particulate matters ($PM_{10}$). Hence, in this work, segregation of particulate matter in 8 modes i.e. $PM_{10.0-9.0}$, $PM_{9.0-5.8}$, $PM_{5.8-4.7}$, $PM_{4.7-3.3}$, $PM_{3.3-2.1}$, $PM_{2.1-1.1}$, $PM_{1.1-0.7}$ and $PM_{0.7-0.4}$.

The mean concentration of black carbon (BC), organic carbon (OC), total carbon (TC) and PAHs in the mosquito coils and incense sticks emission with the range of 16255±229, 142052±1684, 158307±1734, 22839±390 and 6602±262, 63902±1478, 70504±1674, 15196±105 respectively. The concentration of ions i.e. $F^-$, $Cl^-$, $SO_4^{2-}$, $NO_3^-$, $NH_4^+$, $Na^+$, $K^+$, $Mg^{2+}$, $Ca^{2+}$ was ranged from 75–190, 125–375, 210–475, 75–202, 25–90, 80–175 and 440–905,375–595, 975–1226 mg,$kg^{-1}$ with mean value of 954±25, 1680±59, 2778±59, 1019±25, 421±14,1034±22 and 5830±111, 3764±53, 8805±70 mg,$kg^{-1}$, respectively. The findings from the present study suggest that exposure to the smoke of mosquito coils and incense sticks similar to the tested ones can pose significant acute and chronic health risks. For example, burning one mosquito coil would release the same amount of $PM_{2.5}$ mass as burning 75–137 cigarettes.

**Keywords:** Mosquito coils, Incense sticks, Particulate matters, PAHs, Smoke

ES-15

# Determination of borate in real samples using ion-pair single drop microextraction coupled with ATR-FTIR technique.

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## ABSTRACT

The ion-pair single drop microextraction method (SDME) was developed for the determination of boron as borate by Attenuated Total Reflectance (ATR)-Fourier Transform Infrared Spectroscopic (FTIR) technique. The method based was based on the ion-pair of borate with cetyltrimethylammonium bromide (CTAB) in microdrop of organic solvent by using single drop microextraction method. The influences of ion-pair SDME parameters such as extraction solvent and its volume, ion-pair reagent and its concentration, pH, extraction time and stirring rate were investigated. The linear range for calibration curve was 2-100 ng/mL. Under the optimized conditions, the limit of detection (LOD) and limit of quantification (LOQ) and RSD (%) were 0.20, 1.00 and 0.94-3.36, respectively. This method is rapid and reliable for the determination of boron in real water samples.

ES-16

# SEASONAL VARIATIONS OF ISOPRENE EMISSION FROM *EUCALYPTUS GLOBULUS* AND *TECTONA GRANDIS* IN CENTRAL INDIA

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## ABSTRACT

Plants emit broad array and significant quantities of isoprene, monoterpenes, sesquiterpenes and other oxygenated hydrocarbons (alcohols, aldehydes and ketones). Among them, isoprene is the most abundant or studied biogenic volatile organic compound (BVOC), which is emitted in large quantities from various plant species in different seasons. Their emission is temperature and light dependent. Therefore, we discuss here the variations in the emission rate of isoprene under different seasons along with environmental parameters such as temperature, $CO_2$, Relative humidity and photosynthetic active radiation (PAR). For this purpose, isoprene emission rates from two tropical tree species (*Eucalyptus globulus* and *Tectona grandis)* were measured across different seasons using a dynamic enclosure chamber. Significantly high seasonal variations in isoprene emission rates were observed in both the tree species. A clear seasonal cycle was detected with the highest emission rates in summer which decreases in winter. However, a gradual increase was again observed in rainy season.

**Keywords:** Isoprene; Seasonal variations; Tropical trees; Mean normalized emission rate.

HSBS-1

# STUDY ON REASON BEHIND SEED REPLACEMENT AMONG THE TRIBAL FARMERS OF SURGUJA AND SURAJPUR DISTRICT

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## ABSTRACT

The research was carried out at Surguja and Surajpur district in 2014-15. The objectives are; Study of socio-economic profile of tribal farmers, existing seed management practices, and analyze the reasons behind seed replacement of major crops among the farmers.

Total four blocks and eight villages were selected randomly. From each selected village 120 tribal farmers were considered as respondents for the study. Data were collected personally through pre-tested interview schedule.

The study revealed that majority of respondents belongs to middle age group, educated up to primary school level and had medium family size. Maximum respondents belongs to medium size (2 to 4 ha) of land holding. The average SRR of rice wheat maize crop was 52.80, 23.14, and 48.16 per cent respectively. Regarding reasons behind seed replacement of crops were categorized on four reasons in which increasing in the yield of crops was main reason in maize, rice and wheat i.e. 97.50, 95.83 and 91.66 percent respectively . In seed management practices both female and male had involved but females were dominant with maximum per cent.

Key words: Reason, Seed Replacement, Tribal, Chhattisgarh.

HSBS-2

# MARKETING BEHAVIOR OF NON-TIMBER FOREST PRODUCTS (NTFPs) COLLECTING TRIBES IN BILASPUR DISTRICT OF CHHATTISGARH

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## ABSTRACT

In this paper an attempt has been made to analyze the marketing behavior of NTFPs (Non-Timber Forest Products) collecting tribes in Bilaspur district of Chhattisgarh. This study was carried out in the year 2014-2015. The ex-post facto research design was employed in this investigation. Total 135 NTFPs collecting tribes were selected randomly as respondents from the three randomly selected blocks of the Bilaspur District. The data were collected from each respondent personally by using pretested interview schedule. The study revealed that in the study area the respondents were mainly collecting the NTFPs of plant origin. All the 135 respondents were given the first preference to Mahua collection. It was observed in the study area that the availability of various NTFPs was distributed throughout the year. But most of NTFPs (i.e. eleven NTFPs) were available to the tribes in the May month. With regard to behavior of the tribes towards marketing of NTFPs it was recorded that majority of the respondents were sold the NTFPs in their natural form in the weekly market and they had used bicycle as a transport medium for marketing of NTFPs. Low and varied market price and undeveloped market infrastructure for selling of NTFPs were major problems confronted by the tribes during the marketing of NTFPs. While development of market infrastructure for NTFPs and ensured procurement of all NTFPs by the government were some important suggestions given by the respondents to solve the problems confronted by them in the marketing of NTFPs.

HSBS-3

# CO-TREATMENT OF NARINGENIN WITH TRACE ELEMENT (Fe) MITIGATES BERYLLIUM INDUCED BEHAVIORAL ALTERATIONS AND NEUROTOXICITY IN RATS

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## ABSTRACT

Beryllium metal induced neurotoxicity and therapeutic potential of naringenin with iron trace elements had extensively been explored for the first time in rats in this study. 30 female rats were divided into five groups. Group 1st was control, 2nd was toxicant, groups 3rd to 5th were exposed to beryllium nitrate (1mg/kg, i.p.) daily for 28 days followed by oral administration of 20mg/kg dose of naringenin and 20mg/kg dose of naringenin with iron trace elements for 5 days for Group 3rd and 5th respectively as well as group 4th received iron trace element after beryllium intoxication. 24 hours of last dose administration, All the animals were subjected to physical assessment, behavioral models to check anxiety status than brain tissue were used to comet assay, beryllium body burden, histology and biochemical tests for lipid peroxidation and enzymatic activities. Determination of behavioral studies, body weight assessment and lipid peroxidation, enzyme activity, comet assay, beryllium body burden in brain tissues also indicated beryllium induced neurotoxicity. Beryllium administration altered histo-architecture of brain cortex. Naringenin and iron trace elements showed therapeutic potential and brought the studied variables more towards control. It can thus, be concluded that naringenin with iron trace element may be an agent of therapeutic choice in case of beryllium induced behavioral alteration and neurotoxicity.

**Key words:** Beryllium, Naringenin, Trace element (Fe), Behavior, Acetylcholine esterase.

HSBS-4

# EFFECT OF MOBILE PHONE USE ON STRESS PARAMETERS

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## ABSTRACT

Several types of Clinical studies have indicated that the various types of diseases such as insomnia, anxiety and stress all have close relationship with the physiological parameter of autonomic nervous system. The main objective of the paper is to see the effect of mobile phone use on Physiological parameters of autonomic nervous system. The Physiological parameters viz. GSR (Galvanic skin resistance) EMG (electromyography), RESP (Respiration monitors breath), PULSE Rate, and TEMP (Skin Temperature) can be measured with the help of computerized biofeedback equipment. Biofeedback is the technique of using monitoring devices to measure and feedback of autonomic activity; (e.g., Respiration rate, Mussels tense, Pulse rate, Galvanic skin Response (Silverthorn, 2009). or temperature), Incidental sampling method was adopted to select the sample. The total sample size for this study was 20 healthy college going students age group 18-26 years. These 20 participants were randomly divided in two groups, Experimental group n=10 and placebo group n=10. Pre post experimental design was used; baseline and wave value of GSR, EMG, RESP and PULSE was recorded before and after the 10 minutes of experimental group and control group through the Psychofeedback equipment. The results suggest that the value of Post measurement of Physiological status show increase in autonomic activity (Respiration rate, Mussels tense, and Pulse rate) of the experimental group.

**Key word**: Autonomic activity, Respiration rate, Mussels tense, Pulse rate, Galvanic skin Response, computerized biofeedback

HSBS-5

# TO STUDY THE EFFECT OF HEIGHT, WEIGHT AND BODY MASS INDEX ON THE ONSET OF MENOPAUSE

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## ABSTRACT

Menopause is a biological phenomenon; it is an important transitional period in women's life. Number of postmenopausal women is increasing every year due to increase in life expectancy and better health care facilities. The health of a lady is affected by the age at which she attains menopause. Women with earlier menopause are at greater risk of cardiovascular disease, Osteoporosis and Arthritis, whereas late menopause is a risk factor for breast and endometrial cancer. This study is an attempt to find out the effect of Height, Weight and Body Mass Index on the age of menopause. Menopausal women of Bhilai Township who attained natural menopause were selected for the study. The study denoted a positive correlation between BMI and the age of Menopause.

**Key words:** Body Mass Index, Menopause.

HSBS-6

# EFFICACY OF *JUSTICIA GENDARUSSA* AGAINST ALCOHOL-LPS INDUCED INJURY IN RATS

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## ABSTRACT

This study was performed to evaluate therapeutic potential of *Justicia gendarussa* against alcohol and LPS induced hepatitis in rats. Rats were administered with alcohol orally for 6 days followed by treatment with *Justicia gendarussa* extract at different doses (50, 100 and 200mg/kg, po). LPS was given on 6th day & after 24 hours animals were sacrifice. Serum AST, ALT, ALP, and bilirubin were increased after toxicity of alcohol & LPS. All these parameters were turned toward control after administration of *Justicia gendarussa* extract. Thus, it may be concluded that *Justicia gendarussa* has hepatoprotective effect against LPS & alcohol induced hepatitis in rats.

HSBS-7

# GENDER AND SELF CONCEPT AS PREDICTORS OF CAREER MATURITY

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## ABSTRACT

The objective of the present empirical piece of research work is to examine the prediction effect of gender and self-concept on career maturity. Following the stratified random sampling technique 1000 students were drawn from different institution at Durg city, to serve as participants in the present research work. Result of the study indicated that, gender and self concept are significant predictors of career maturity. It is concluded that there is sufficient empirical and statistical evidence of the prediction effect of gender and self concept on career maturity.

**Keywords:** Self-concept, Gender and Career maturity.

HSBS-8

# INSULIN TREATMENT –ETIOLOGICAL CAUSE FOR DEVELOPING CARDIAC DISEASES

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## ABSTRACT

Hyperinsulinaemia is a condition in which there are excess levels of insulin circulating in the blood than expected relative to the level of glucose. While it is often mistaken for diabetes or hyperglycaemia, hyperinsulinemia can result from a variety of metabolic diseases and conditions. While hyperinsulinemia is often seen in people with early stage type 2 diabetes mellitus, it is not the cause of the condition and is only one symptom of the disease. In type I Diabetes patients who are insulin dependent ,it was observed in this study that as those patients were not using auto injectors and often not taking enough calories after insulin supplementation, thus resultant Hyperinsulaenemia is commonly seen in their serum as measured. Type 2 diabetes only occurs when pancreatic beta-cell function is impaired. Hyperinsulinemia can be seen in a variety of conditions including diabetes mellitus type 2, in neonates and in drug induced hyperinsulinemia. Drug induced this very disease is very common among Indians, as having apple shaped obesity, we are prone to diabetes –II, that requires Insulin supplementation. Hyperinsulinemia is associated with hypertension, obesity, dyslipidemia,and glucose intolerance.http://en.wikipedia.org/wiki/Hyperinsulinemia - cite_note-Modan-1 These conditions are collectively known as Metabolic syndrome. This close association between hyperinsulinemia and conditions of metabolic syndrome suggest related or common mechanisms of pathogenicity. Hyperinsulinemia has been shown to "play a role in obese hypertension by increasing renal sodium retention". Insulin has a regulatory role in the transportation of cations across the cell membrane. Elevated circulating insulin levels, such as in the case of hyperinsulinemia, cause intracellular sodium concentrations to increase, and intracellular potassium concentrations to decrease. This alteration in cation concentrations both intracellularly and extracellularly contribute to hypertension. Since hypertension is related to all other conditions of metabolic syndrome it can then be extrapolated that cation transport is ubiquitously associated with obesity, dyslipidemia, and glucose intolerance as well. Furthermore, the alteration of cation transport across the membrane may serve as a marker for insulin resistance. In type 2 diabetes, the cells of the body become resistant to the effects of insulin as the receptors which bind to the hormone become less sensitive to insulin concentrations resulting in hyperinsulinemia and disturbances in insulin release. With a reduced response to insulin, the beta cells of the pancreas secrete increasing amounts of insulin in response to the continued high blood glucose levels resulting in hyperinsulinemia. In insulin resistant tissues, a threshold concentration of insulin is reached causing the cells to uptake glucose and therefore decreases blood glucose levels. Studies have shown that the high levels of insulin resulting from insulin resistance might enhance insulin resistance.

LS-1

# LIGNOCELLULOSIC BIOMASS PAVING THE WAY FOR COST EFFECTIVE PRODUCTION OF EMERGING ALTERNATE LIPID FEEDSTOCKS

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## ABSTRACT

One of the most abundant and sustainable form of energy reserve in our planet exists in the form lignocellulosic biomasses. Research sectors are intensely trying to channelize them towards microbial high value products, one of which is Single Cell Oil (SCO). Depleting reserves of non renewable fossil fuels and increasing demand of lipids and essential fatty acids encourages finding sustainable alternate sources. SCO form oleaginous microorganisms have emerged as one such powerful substitute in past decade in biodiesel and health and nutraceuticals sectors. However the high production cost, mainly due to bulk requirement of expensive synthetic carbon sources, is the major limitation towards complete acceptance of this technology. Utilization of lignocellulosic biomass as inexpensive carbon source for SCO can hugely offset the production cost. The present work is such an attempt towards economic and high value SCO production utilizing in-expensive lignocellulosic waste as fermentable substrate. Rice straw, a lignocellulosic biomass abundantly available in Chhattisgarh has been utilized here. Unique method of multiple saccharification of biomass (for reducing residual waste generation) was conducted in an extremely mild and environmentally safe approach resulting in a hydrolysate devoid of microbial inhibitory furfurals. Such hydrolysate, can be competent to be utilized in raw form and can eliminate the requirement of entire detoxification step leading to inexpensive production of microbial fermentable substrate. Thus, the final step was to test this prepared hydrolysate in non-detoxified form as a substrate, for various types of oleaginous species to explore the prospects in cost effective SCO production.

LS-2

# RECEPTOR CROSS TALK AND INTERPLAY BETWEEN MELATONIN AND OVARIAN THYROID AXIS IN A LETROZOLE INDUCED POLYCYSTIC (PCO) RAT

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## ABSTRACT

The objective of present study to establish the interrelationship between thyroid and melatonin during anovulatory / lertrozole induced polycystic ovarian condition on female Wister rats. Rats were procured and after acclimatization 20 rats were divided in 4 groups with 5 rats in each. They were divided as Control, Letrozole induced PCO rat (1mg/kg BW/day),and melatonin alone (200µg/100g BW/day). The experiment was conducted for the duration of 28 days. Assessment of gravimetric, hormonal profile and thyroid histology and relative expression of MT1, MT2, and ERα, (thyroid, ovary) Dio2, TRα (Ovary) done followed by standard protocol. Histological observation showed shrinkages in thyroidfollicles in PCO rats however exogenous melatonin maintained the cellular architecture and normal thyroid weight. PCO rats showed significantly high circulating testosterone but significant decreased in estrogen and progesterone level. Circulatory gonadotropins (LH FSH) were noted significantly high in PCO rats. Melatonin injection to the PCO rats however reversed to the control level and restored. Circulatory TSH level in PCO rats were noted suppressed where as T3 and T4 were non-significantly increased suggesting a reciprocal relation between melatonin and thyroxine. Thyroid tissue of PCO rats expressed MT1 and MT2 in way alternate and opposite way being MT1 as upregulted whereas downregulation of MT2. Ovarian tissue of PCO rats showed reverse receptor expression to that of thyroid tissue being MT1downregualted and MT2 was noted unregulated. Parallel relation was noted between ERα and TRα receptor expression in thyroid and ovarian tissue respectively. PCO rats resulted in upregulation of Dio2, receptor expression in a non-significant manner. Therefore, present finding suggests a fine interplay and cross talk via melatonin its two receptor MT1 , MT2 with ERα, TRα, and $Dio_2$ thyroid and ovarian tissue as the case between ovarian thyroid axis hence maintaining a physiological trade-offs between theses gland with a tonic regulation to maintain melatonin and thyroid homeostasis during polycystic pathogenicity.

**Key words:**Melatonin, Thyroid gland,MT1 and MT2 receptors, Letrozole, Polycystic Ovarian (PCO) Condition, $T_4$.

LS-3

# CHARACTERIZATION OF SILVER NANOPARTICLES (AgNPs) SYNTHESIZED USING *Aloe vera* GEL EXTRACT

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## ABSTRACT

Biosynthesis of nanoparticles by using plant extracts is presently under development. Plant extracts are very cost effective and environmental friendly so, accordingly can be an economic and efficient substitute for the large scale synthesis of nanoparticles. Present study reports the 'rapid and green' method for the synthesis of silver nanoparticles (AgNPs) using aqueous extract of *Aloe vera* gel. On mixing the extract with 1 mM silver nitrate and incubation at 80°C in hot air oven for 2 hours, the bioreduction takes place which leads to the formation of silver nanoparticles. The water soluble organic compounds present in the extract are considered to be responsible for the bioreduction of silver ions to nano sized silver particles. The synthesized AgNPs were initially noticed through visual colour change to yellowish brown and was further confirmed by using UV–Visible spectroscopy which showed surface plasmonic resonance (SPR) band at 440 nm. Dynamic Light scattering (DLS) method was used to characterize particle size of AgNPs and their biomolecular stability. Results showed that the AgNPs formed has an average particle size of 113.6 nm with zeta potential -16.8 mv and polydispersity index of 0.420. According to TEM measurements the size of AgNPs are in the range 52-151 nm. This work proved the capability of using biomaterial towards the synthesis of silver nanoparticle, by adopting the principles of green chemistry.

**Keywords:** Silver nanoparticle synthesis, bioreduction, *Aloe vera* gel, Particle size, Zeta potential.

LS-4

# DESICCATION PROMPTED ROS ACCUMULATION AND DETERIORATION OF RECALCITRANT *MADHUCA LATIFOLIA* SEEDS

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## ABSTRACT

Seed storage is an important tool for ex situ conservation, but a recalcitrant seed generally remains viable only for short periods. This study was aimed to investigate the desiccation-induced amendments in *Madhuca latifolia*, an economically important tropical recalcitrant species, exploited extensively in commercial sectors. Fresh seeds of *M. latifolia* consisting 0.59 g $g^{-1}$ fresh mass water content (WC), desiccated very rapidly and lost their viability within 35 days after harvest under ambient storage (Temperature 25±2°C, Relative humidity 50±2%). To untangle the possible mechanisms involved in deteriorative changes the levels of reactive oxygen species (ROS) and changes in content of malondialdehyde and protein, DNA polymorphism and telomere length were monitored. Conducted study revealed the desiccation-induced reduction in viability of *M. latifolia* seeds was related with significant (2.1-7.3 folds) upsurge in ROS levels that promoted lipid peroxidation associated loss of membrane integrity. In contrast, remarkable fall in protein content and telomere length was observed with increased period of storage and declined WC. Dendrogram of RAPD unveiled significant alterations in similarity coefficients of aged and non-aged seeds of *M. latifolia*. The overall results concluded that loss of viability of *M. latifolia* seeds was closely associated with desiccation related changes, thus an attempt has been made to store the seeds at or close to their shedding water content along with treatments of different ROS inhibitors. Hydrated storage extended to storability of *M. latifolia* seeds, from 35 days under ambient conditions to 120 days, but ROS inhibitors failed had no notable effects on storage longevity.

**Keywords:** Hydrated storage, Lipid peroxidation, Protein content, RAPD, Reactive oxygen species, Recalcitrance, Telomere, Water content.

LS-5

# ALLERGIC EFFECTS OF FUNGAL CONIDIA ON BALB/c MICE

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## ABSTRACT

Airborne fungal spores are one of the major causes of respiratory disorders in humans, causing allergies, asthma, and other infections of the respiratory tract. According to various health survey reports, about 30% of the total allergic patients suffer from allergy induced by inhalation of fungal spores as fungal conidia mediates first contact with human immune system. The allergic reaction is a systematic response of the immune system against an antigen. Determination of total and specific IgE levels in serum have been widely applied to diagnose allergic diseases. The present study has been carried out to assess the allergenicity of airborne fungal spores and its impact on the respiratory system. In this work, the allergic response of some dominant fungal strains has been evaluated. The BALB/c mice were sensitized intranasally with the conidial suspension of selected fungal strains. The infected mice and control mice were then examined for total serum IgE, cytokine level, blood leukocyte and histological parameters. A significant increase in the total serum IgE level was obtained in the serum of all infected mice as compared to the control. The results also reveal the elevation in the number of blood cells and showed tissue damage due to an allergic response. The identification of fungal allergen regulating the immune response of mammalian host may also be very rewarding area of research that may lead to more specific immunotherapies for allergic diseases.

LS-6

# EXTRACTION, SCREENING AND CHARACTERIZATION OF FUNGAL SECONDARY METABOLITES FOR THERAPEUTIC ACTIVITY

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## ABSTRACT

To explore the adaptability of fungi to antioxidant stress, we have isolated five rhizospheric fungus from Achanakmar Biosphere Reserve on the basis of DPPH, FRAP, ABTS, PMBDT assay as a marker assay for antioxidant activity and classified them as highly, moderate and least antioxidant activity.The highly antioxidant activity fungal sp. Showed good DPPH, ABTS, FRAP, PMBDT ASSAY and good antimicrobial activity in comparison to least antioxidant activity of fungal species indicating batter protection mechanism. From these primary screening, one fungal sp. That showed differential responses to antioxidants were selected to understand the biochemical and physiological basis of antimicrobial, mechanism. The above biochemical and physiological parameter were further validate through FTIR characterization, that showed functional and structural identification in selected fungal sp. Our study positively correlates the differences in the redox status and antioxidant defence system between highly and least antioxidant activity of fungus for the establishment of maximum protection of secondary metabolites by rhizospheric fungus in optimum nutrient media. If these secondary metabolites used as a drug for eukaryotic cells or human cancer cells then they may also work against progressive cancer metabolic pathways and remove the abnormalities

**Key words:** antioxidant, rhizospheric, fungus, therapeutic.

LS-7

# DECOLORIZATION AND DEGRADATION OF KRAFT LIGNIN DISCHARGED FROM PULP AND PAPER MILL INDUSTRY BY AXENIC AND CO-CULTURE OF *Bacillus* sp.

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## ABSTRACT

The aromatic 3-D polymer Lignin, one of the major plant/lignocellulosic biomass, is composed of potentially valuable phenolics monomers (Coumaryl, Guaicyl, Syringyl). Currently lignin and its colloidal solution in water, black liquor, obtained as by-products in many biomass treatment processes, e.g., pulping in paper industry, remain to be considered recalcitrant substrates of a limited commercial value. In developing countries, Kraft lignin (KL) containing Black liquor generated from pulp and paper mill waste water causes severe environmental pollution. This study presents the recent research on bacterial kraft lignin degradation. Kraft lignin degrading bacterium was isolated from the environment of a timber area and further identified by biochemical and 16s rRNA sequencing as *Bacillus subtilis*. Data of this study revealed that this bacterium reduced color 32% in axenic condition while in co-culture condition reduced color and lignin by 36.5%, 44.5% respectively . This strain can play key role in remediation of pulp and paper mill effluent as well as degrading material for chemical and biofuel production.

**Keywords**: Kraft lignin;*Bacillus* sp; Biodegradation; Pulp and Paper Mill

LS-8

# THERAPEUTIC POTENTIAL OF RESVERATROL AGAINST ACRYLAMIDE INDUCED HEPATO-RENAL DYSFUNCTION IN RATS

## DISCIPLINE: LIFE SCIENCES

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## ABSTRACT

In the present study, rats were administered acrylamide (6 mg/kg) for 3 months, followed by oral administration of resveratrol (10, 20 30 mg/kg). Animals of all groups were sacrificed after 24 h of last treatment. Cytokine analysis were performed (TNF-α, IL-6, IGF-1). Serum AST(aspartate aminotransferase), ALT(alkaline aminotransferase), urea, uric acid, creatinine and body weight parameters were performed. Treatment with curcumin ameliorated toxicity of ACR and studied parameters were reversed towards control level. Thus, it may be postulated that resveratrol possess excellent therapeutic potential against acrylamide induced hepatic and renal toxicity.

LS-9

# PHYTOCHEMICAL ANALYSIS OF ANTIMICROBIAL COMPOUNDS IN THE STEM OF *SENNA ALATA* FROM AMBIKAPUR CHATTISGARH AND ANTIBACTERIAL ACTIVITY AGAINST STANDARD MTCC STRAINS

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## ABSTRACT

The use of plant constituents to defend and treat contagious diseases is well known over the years. The antimicrobial property of the plant *Senna alata* has been the substance of many chemical pharmacological studies. Chhattisgarh is the 26th state of Indian union; it had 44% of its geographical area covered with forest. Weed flora which are one of the important part of the grassland and *S. alata* is also a weed plant therefore present investigation deals with the antibacterial activity of *Senna alata* from Ambikapur against standard MTCC isolates. Solvent extraction of stem of plant was sequentially done by using hexane, chloroform, ethyl acetate, acetone, methanol and aqueous and phytochemical screening of this plant was performed for constituents such as alkaloid, flavonoid, quinone, saponin and tannin. Amongst all ethyl acetate stem extract showed maximum zone of inhibition against the standard MTCC isolates. Extracts of *S. alata* in this study demonstrated a wide spectrum of activity against both gram positive and gram negative bacteria. The broad-spectrum antibacterial activity of the plant extracts can be attributed to the phyto constituents present in it. These potential phytochemical compounds from *S. alata* can therefore be employed in the formulation of antibacterial agents for the treatment of various bacterial infections.

LS-10

# GROWTH AND ANTIOXIDANT RESPONSES OF *TRIGONELLA FOENUM GRAECUM* SEEDLINGS UNDER COMBINED EFFECT OF LEAD AND SIMULATED ACID RAIN

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## ABSTRACT

Heavy metal pollution (lead) and acid rain (AR) pollution occur simultaneously in many regions, which resulted in a new environmental issue, the combined pollution of lead (Pb) and AR. The effects of the combined pollution on the chlorophyll content, electrolyte leakage, oxidative status and antioxidant enzyme system of *Trigonella foenum graecum* (fenugreek) have not been reported. In the present study, the result inferred that application of Pb (1200 ppm) and SAR (pH 3.5) alone, decreased the growth attributes, chlorophyll content and protein content and enhanced the accumulations of reactive oxygen species (ROS) and Malondialdehyde (MDA). In addition biochemical activities of superoxide dismutase, catalase and peroxidases were seen to enhance in all tissues. In the combined treatment of Pb and AR, the activities of superoxide dismutase, catalase and peroxidases were aggravated considerably which were inadequate to scavenge excess of superoxide radical and hydrogen peroxide, leading to the damage of cell membrane. The deleterious effects of the combined treatment of Pb and SAR were stronger than those of the single treatment of Pb and AR. The stronger deleterious effects on the fenugreek seedlings were due to the increased disturbances of absorption and utilization of mineral nutrients in roots.

**Keywords:** Antioxidant enzymes, Oxidative status, acid rain, Lead, *Trigonella foenum graecum*

LS-11

# VARIATIONS IN HANDWRITING PATTERNS AMONG URBAN AND NAXAL AFFECTED TRIBAL AREA (BASTAR REGION) OF CHHATTISGARH .

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## ABSTRACT

Hand writing is a complex action and highly developed skill having features which is unique to every individual Variations in handwriting is an important principle of document analysis. This paper consists of an offline handwriting analysis to see the variations in among urban and naxal affected areas of Chhattisgarh region. Main features of handwriting were obtained and then classified into Macro and micro features. These features were used to estimate the variability power of handwriting for people living in urban and naxal affected areas in Chhattisgarh In addition to this changes in handwriting it was also observed that there is effect of different factors like age, sex etc. On the basis of handwriting analysis This paper is helpful to identify the area of the person he /she may belongs to. In Chhattisgarh, many threat letters are exposed by naxalities to the police or general people, handwriting analysis act as a corroborative evidence to established the identity or to exclude a group of people and Assist the Forensic document examiner.

**KEYWORDS:** Forensic Science, Handwriting Analysis, Naxal affected areas, tribal handwriting, Handwriting Variations, DocumentExamination.

LS-12

# A SIMPLE AND RAPID DETECTION OF BANANA BUNCHY TOP VIRUS IN *Musa* spp.

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## ABSTRACT

An adequate and simple protocol for the rapid detection of plant viruses is the key to manage viral diseases. In the present study, a polymerase chain reaction (PCR) assay was developed for quick indexing of banana bunchy top virus (BBTV) and also evaluated the effect of different lyses buffers for the release of viral nucleic acid from leaf-midrib crude sap from banana plants. A thermal treatment (95°C for 10 minutes), enhanced pH and high salt in the lyses buffer were found efficient for the liberation of viral nucleic acid from the crude sap. Single oligonucleotide primer pairs were designed from the coat-protein gene sequences of BBTV for PCR. In order to determine the relative sensitivity of detection protocol dilution endpoint experiment was carried out. BBTV was detected directly from the crude sap dilutions at 10-6 and 10-7, which unveiled the sensitivity of PCR. Further, the positive BBTV infection was quickly detected in a single step by using SYBR green I stain by adding it to the PCR reaction mixture. Thus, BBTV was quickly detected without performing gel electrophoresis in PCR reaction closed-tubes due to a strong fluorescence emission from the amplicons under the UV trans-illumination.

**Keywords:** BBTV; DNA isolation; In vitro; *Musa* sp; PCR; SYBR green I

MSS-1

# DYNAMICS OF OBLATE TES PARTICLE UNDER THE INFLUENCE OF RADIATING PRIMARY AND THREE OBLATE BODIES IN ELLIPTIC RESTRICTED THREE BODY PROBLEM

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## ABSTRACT

This paper presents a generalized problem of the photogravitational restricted three body, where the biggest primary is radiating and all the three participating bodies are oblate, in the sense that the eccentricity of the orbits is greater than zero. The positions and stability of the triangular equilibrium points of this problem are studied. The stability condition for the triangular points is obtained. The model is then applied on two extra solar planetary system with planets in the habitable zone and the eccentricity of orbit of the primaries $0 << e < 1$.

2010 AMS Classification: 70F07, 70E50

**Keywords and phrases**: Elliptical Restricted Three Body Problem, Oblateness, binary system, Triangular equilibrium points.

MSS-2

# HYBRID ITERATION PROCESS FOR TOTAL ASYMPTOTICALLY NONEXPANSIVE MAPPINGS IN CAT(0) SPACES

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## ABSTRACT

In this paper, propose a new hybrid iteration process for total asymptotically nonexpansive mappings. Establish Δ-convergence and strong convergence theorems on a CAT(0) space which extend and improve many results in this literature and also provide numerical examples to illustrate the performance of proposed iteration.

**Keywords:** Total asymptotically nonexpansive mappings,

Δ-convergence and strong convergence theorem, CAT(0)

space.

2010 AMS Subject Classification: 47H09, 47H10.

MSS-3

# A COMMON FIXED POINT THEOREM IN NEW IMPLICIT FUNCTION WITH WEAKLY BIASED MAPS GENERALIZED FOR MENGER SPACE

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## ABSTRACT

The aim of this paper is to be establish common ¯xed point theorems for two pairs of selfmapppings under implicit relation by using the common property(E.A) with weakly biased map in Menger space setting. Our result is extend and improve the results[1],[2],[3] .Some related results are also derived besides furnishing illustrative examples.

**Keywords:** Property(E.A),Common property(E.A), Biased maps and S-Biased maps, T-Biased maps, PM space, Common ¯xed point.
AMS Mathematics Classi¯cation : 47H10, 54H20.

MSS-4

# SIMILARITY SOLUTION OF MAGNETOGASDYNAMICS EXPONENTIAL SHOCK WAVES IN SELF-GRAVITATING AND ROTATING NON-IDEAL GAS WITH CONDUCTIVE AND RADIATIVE HEAT FLUXES

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## ABSTRACT

Using the self-similarity method, propagation of the unsteady flow of a self-gravitating magnetogasdynamic exponential shock wave under radiative and conductive heat fluxes is analyzed. In this paper, we present a class of similarity solution for a non-ideal cylindrical magneto-radiative gas dynamic shock wave. The system is supposed to be self-gravitating and rotating. It is necessary to consider a few simplifying idealisations such as constant initial density in order to tender the problem tractable. The components of fluid velocity be varying exponentially. The effects of variation the Cowling number, the non-idealness parameter, the heat conduction as well as radiation parameter and the gravitational parameter are worked out in detail. It is manifested that effects of heat conduction parameter are same as radiation transfer parameter.

**Keywords**: Heat Conduction and radiation, Rotating medium, Non-ideal gas, Magneto-radiative-gasdynamic, Shock wave, Gravitation.

MSS-5

# A STUDY ON FRAMES FOR OPERATOR SPACES WITH APPLICATIONS IN EIGENVALUE PROBLEMS

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## ABSTRACT

In this paper, we introduce and study □-Banach frames for the space of bounded linear operators. Illustrative examples are given to show the existence of various kind of □-Banach frames. In the sequel, some results regarding characterizations and construction of □-Banach frames are presented. We also define near exact □-Banach frame and obtain a sufficient condition for a □-Banach frame to be near exact. Moreover, perturbation of □-Banach frames has been studied. In addition, we deal with an application of □-Banach frames in eigenvalue problems.

**Keywords and phrases**: Banach frame, Retro Banach frame, □-Banach frames.

MSS-6

# STATIONARY ANALYSIS OF AN INFINITE-BUFFER DISCRETE-TIME QUEUEING SYSTEM

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## ABSTRACT

This paper deals with the analysis of an infinite-buffer single-server discrete-time queueing system. This queueing system can be analyzed by representing level-independent quasi-birth-and-death process in tridiagonal structure. We derive the stationary system-length distribution at outside observer's epoch by employing the matrix-geometric method in conjunction with the logarithimic reduction algorithm. The waiting-time distribution in the queue measured in slots of an arrival customer is also carried out. Additionally, we also conduct some numerical experiments to demonstrate the correctness of our analytical results. The model has potential applications in the various scenarios and models useful in practical applications such as computer networks, telecommunication systems, wireless local communications and complex multimedia traffic

**Keywords:** Discrete-time Markovian arrival process (D-MAP); Discrete-time phase-type distribution(D-PH); Infinite-buffer; Logarithimic reduction;Matrix-geometric method; Queue.

MSS-7

# NONLINEARITY OF QUINTIC BOOLEAN FUNCTION

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## ABSTRACT

The nonlinearity of a Boolean function plays a significant role regarding attacks on stream and block ciphers. The nonlinearity profile of a Boolean function seems to be very useful in coding theory, as it is correlated to the covering radii of Reed-Muller codes. Obtaining r-th order nonlinearity of a Boolean function is a very difficult task. In this article, we obtain lower bound on higher order nonlinearity of Boolean function of degree five..

**Keywords**: Boolean function, Walsh-Hadamard spectrum, Nonlinearity.

MMP-1

# EFFECT OF CUTTING TOOLS AND ENVIRONMENT ON MACHINED SURFACE INTEGRITY OF A NICKEL-BASED SUPER ALLOY

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## ABSTRACT

One of the major challenges during machining of nickel-based super alloy is to ensure acceptable surface integrity of the machined components since surface integrity directly affects their performance during intended applications. Although coated tools are recommended for machining these alloys, effect of environment and condition of tools on surface integrity received comparatively less research attention. The current study intends to investigate the role of advanced coated tool consisting of TiN/TiAlN multi-layer coating as well as cutting environment during machining of Incoloy 825. Condition of machining (roughing and finishing) and cutting tools (new and worn) have also been evaluated. The coated tool was utilised under environment-friendly dry machining, while uncoated tools were used under flood cooling and minimum quantity lubrication (MQL). Cutting temperature and various characteristics of surface integrity including surface roughness, surface morphology, formation of white layer, hardness depth profile and residual stress have been compared under different conditions of machining. Although maximum temperature was recorded with the PVD coated tool under dry environment, the same tool resulted in overall improvement in surface integrity compared to the uncoated tools used for wet machining. While worn tool caused formation of thicker white layer and hike in work hardening, surface roughness with the same worn tool was consistently less than the fresh tools. According to the general trend, flood cooling was more beneficial than MQL when overall machined surface integrity of nickel-based super alloys was considered.

**Keywords:**Incoloy825; coating;cutting;temperature; roughness; morphology; microstructure;layer; hardness; residual stress.

MMP-2

# FIRST PRINCIPLE STUDY OF STRENGTH OF KEVLAR-29-JUTE COMPOSITE

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## ABSTRACT

First principle calculations based on density functional theory is performed to analyze the mechanical strength of Kevlar-29-jute composite. The structure is optimized by the density functional theory implemented in SIESTA. The bond strength is investigated by the displacement of central nitrogen atom along X, Y and Z directions; respectively. Projected density of states and density of states explain s-p hybridization between orbitals. By applying strain; forbidden energy gap is reduced and becomes equal for all axes, which reveals the symmetric nature of the distribution of orbitals. For smaller values of strain; higher values of stress implies high tensile strength along Z-axis and weaker along Y-axis. For higher strain, stress/strength is higher along X-axis.

**Keywords:** SIESTA; Density functional theory; DOS; PDOS; Tensile stress

MMP-8

# EXPERIMENTAL INVESTIGATION OF EDM PROCESS PARAMETERS BY USING HYBRID METHOD

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## ABSTRACT

During the machining of electro discharged machining (EDM) process a high amount of heat is generated, which the surface features of metal are affected. This surface features are create a recast layer and crack formation of work surface. In the current study to analyze the formation of crack, recast layer and surface roughness on the work-piece surface as well as PCA and grey relation analysis-based hybrid optimization technique is utilized to determine the optimal setting of EDM process parameters. The selected EDM parameters are discharge current (Ip), pulse on time ($T_{on}$), duty cycle ($T_{au}$) and work-piece polarity. This optimal parameters setting is to improve surface integrity aspects after EDM of AISI P20 tool steel with graphite tool electrode material.

**Keywords:** Electro discharge machining (EDM); Surface integrity; AISI P20 tool steel; Principal component analysis (PCA); Grey relation analysis (GRA).

MMP-4

# DESIGN AND DEVELOPMENT OF LOW COST ARDUINOBOT FOR SMALL SCALE INDUSTRIES OF CHHATTISGARH

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## ABSTRACT

The main focus of this work to design, development and fabrication of intelligent robotic arm can accomplish predefined task accurately. The robot is designed to work in Arduino platform and actuated by servo drives. The striking feature of this robot are low cost, open source and easily programmable by non programmers and factory workers. The motivation behind designing of this robot is to provide school, colleges and small scale industries of Chhattisgarh to adopt robotics and automation for education and production. The robot was designed with 3-degree of freedom and well tested, further modification and improvements are being implemented to perform more complicated and precise task in all condition. Testing and validation of the Arduinobot was carried out and results shows that it work properly.

MPS-1

# COMPARISON OF HPMC K100M AND HPMC K 15 M FOR PREPARATION OF MUCOADHESIVE PATCH USING MONTELUKAST SODIUM AS MODEL DRUG

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## ABSTRACT

A comparative study of two polymers HPMC K100 M and HPMC K 15 M was performed by preparing mucoadhesive patch from the polymers. The study included use of the two polymers individually and in accurate proportion for mucoadhesive patch preparation. Montelukast sodium was used as model drug. Mucoadhesive patch was prepared by solvent evaporation method and all the formulations were evaluated for various tests. The *in vitro* release of montelukast sodium was studied in pH 6.8 media. Results of all the preparation demonstrate that the drug release was slow and steady in case of patch prepared with HPMC K 15M only. The study identified that the polymer HPMC K 15 M, alone could be satisfactorily used in dosage form design to develop a mucoadhesive patch, as needed.

**Keywords:** Mucoadhesive patch, Montelukast Sodium, Drug Release, HPMC K 100 M, HPMC K 15 M.

MPS-2

# COMPARATIVE STUDY BETWEEN ASPIRIN AND VANADIUM-ASPIRIN COMPLEX AGAINST NICOTINE EXACERBATED HYPERINSULINEMIC CATARACT.

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## ABSTRACT

Aspirin is one the most common NSAID used for management of various disorders. In various previous studies it was found out that aspirin had a positive correlation in management of diabetes as well as the cataract. Vanadium is well known metal complex that had an insulinomimetic property and had a significant anticataract action. Current work is done with rationale of evaluating the anti cataract efficacy of Vanadium-Aspirin metal complex (VASCOM) against insulinomimetic cataract against the aspirin alone. A pilot cross sectional observational study had been performed to analyze the feasibility of the experimental work to be performed next, the result of this study shows results which helps to conclude that need of a novel molecule for management of diabetic cataract exacerbated which has higher patient compliance as well as high therapeutic efficacy. Metal complex had been synthesized using Aspirin and VOSO4. The compound had been characterized using IR studies, NMR studies, Magnetic moment studies. Diabetes was induced using fructose and exacerbated by nicotine given subcutaneously. The study took 9 weeks. The Vanadium- NSAID metal complex had given orally in a dose of 20mg/kg body weight. Antioxidant parameters like MDA, GSH, GPx, and CAT, ions like calcium, polyols and HbA1c levels were evaluated to establish the therapeutic effectiveness of the synthesized complex in diabetic cataract which is exacerbated by nicotine. The hyperinsulinemic cataract had been induced by using fructose (20% solution dissolved in drinking water). The exacerbation of the cataract was done using nicotine hydrogen tartarate. The total time period of the study was 9 weeks. The current works helps us to solve the problem of cataract rationally and a novel system should be explored of the cataract.

**Keywords:** Diabetic cataract, Oxidative stress, oxidative stress.

MPS-3

# DEVELOPMENT, OPTIMIZATION AND CHARACTERIZATION OF NANOPARTICLES ENCAPSULATED WITH CHLORMETHINE FOR IMPROVEMENT IN PHARMACOKINETICS

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## ABSTRACT

Mechlorethamine is a nitrogen mustard derivative, anticancer alkylating agent. It exhibit hepatic first pass metabolism, and has low bioavailability. The aim of this work was to improve the bioavailability along with pharmacokinetic parameters of mechlorethamine through development of nanoparticles. The solid lipid nanoparticles were prepared by hot homogenization and ultrasonication method with slight modifications. The method was optimized using response surface plot and experimental factorial design approach. Both dependent and independent variables were selected and the percentage bias was calculated. Polynomial equations obtained revealed that the minimum particle size and maximum entrapment efficiency led to best optimized formula and further changes in concentration of surfactant and polymer affected the release behavior. The optimized nanoparticles were characterized by size, shape, drug content, DSC, XRD, entrapment efficiency and loading capacity. Results showed that optimized nanoparticles were having size of 103.4 nm with zeta potential of -31.9 mV. The particles were smooth, non-aggregated and spherical in shape. The drug release behavior was biphasic with initial burst followed by slow sustained releaseobeying Higuchi release model ($r^2 = 0.981$). The average $C_{max}$ value for the SLNs was 1.8 times higher as compared to pure drug. Also, there was a slight increase in the $t_{max}$ of the SLNs formulation but the extent of absorption was much higher. SLNs posses 3.55 times higher bioavailability compared to the pure drug. Also, the most crucial and important pharmacokinetic parameter $t_{1/2}$ [half-life]was prolonged (2.7 fold greater) with SLNs formulation than the pure drug suspension.

**Keywords** – solubility, mechlorethamine, nanoparticles, optimization.

MPS-4

# SYNTHESIS AND HEMOCOMPATIBILITY STUDIES OF A PEGYLATED CHEMOTHERAPEUTIC DRUG, L-PHENYLALANINE MUSTARD

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## ABSTARCT

Chemotherapeutics have high incidence of causing hematological side effects. Thirty to ninety percent of patients receiving chemotherapeutics suffer from anemia. It often occurs as a result of interaction of cytotoxic agents with erythrocytes which result into hemolysis. Other than hemolysis, some other hematological side effects include: low platelet count (thrombocytopenia) low level of white blood cells (granulocytopenia), apastic anemia etc. Although, these effects are often less produced than other common adverse responses, they are generally associated with high morbidity and mortality rates. Here, a novel polyethylene glycol (two molecular weight 2000 and 5000 Da) conjugate of L-phenylalanine mustard, was developed and characterized by comprehensive hemocompatibility tests including (blood count, hemolysis rate, platelet aggregation, and C3 complement activation). The results revealed that pegylated conjugates of L-phenylalanine mustard significantly reduced the percent hemolysis and overall toxicity depending on the molecular weight of polyethylene glycol molecules, as compared to pure drug. Moreover, it had no significant effects on platelet activation and C3 complement levels in blood. Hence, it can be impressed that pegylation and reduced exposure of erythrocytes can aid in controlling the hemotoxic reactions of chemotherapeutic drugs.

**Keywords**: Chemotherapeutic, hemocompatibility, hemolysis, polyethylene glycol.

MPS-5

# THYMOQUINONE: PROMISING ROLE TO COMBAT STRESS INDUCED DEPRESSION

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## ABSTARCT

Depression is a common illness among individuals of every age group. Among numerous factors held responsible for depression stress is most vital. Behind the specified disorder various hypothesis has been laid out where Nitric Oxide is emerging target to treat stress induced depression. In present study Antidepressant potential of thymoquinone in stressed and unstressed condition was evaluated using tail suspension test and forced swim test whereas locomotor activity was evaluated by actophotometer. Results of the present study indicate the potential of antidepressant effect of Thymoquinone in stress. Methylene blue potentiated the effect of sub-effective dose of thymoquinone and SB-203580 enhanced effect of thymoquinone in stressed mice with no array on locomotor activity with direct influence on Nitric oxide. thymoquinone produced significant changes in Nitric oxide level which is pathophysiologic mediator(s) of depression, which validate the action of thymoquinone on depression symptoms.

MPS-6

# CHARACTERIZATION OF *TEPHROSIA PURPUREA* LINN TO EXPLORE ITS PHARMACOLOGICAL INTERVENTION AGAINST ANTI-TUBERCULOSIS DRUGS INDUCED HEPATO-RENAL TOXICITY

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## ABSTRACT

Developing a novel therapy against tuberculosis remains a tough challenge for the scientific world from a long time. The available treatment although curing most of the tuberculosis cases is responsible for induction of many other side effects. So aim of present study was to characterize *Tephrosia purpurea* and analyze it for its conjoint effect against experimental chronic hepatoto-renal toxicity models induced by administration of ATDs. *Tephrosia* extract was analyzed by Spectrophotometric, hplc, mass spectrometric and antibacterial assays for its characterization. Then hepato-renal toxicity was induced by administrating ATDs on alternate days for 8 weeks. Sideways *Tephrosia* extract treatment was started along with ATDs for 8 weeks. To analyze potential effects of *Tephrosia* on experimental animals, serum parameters; Aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP), albumin, bilirubin, cholesterol, urea, uric acid and creatinine were measured.Lipid peroxidation (LPO), microsomal LPO, catalase (CAT), superoxide dismutase (SOD), tissue protein content, microsomal protein content and Glutathione (GSH) were determined in liver and kidney samples by spectroscopic methods. Triglycerides, cholesterol and glycogen levels were also measured.Cytochrome P450 2E1 (CYP 450 2E1) activity was determined as hydroxylation of aniline in liver microsomes. Histological analyses was performed in hepatic and renal tissues. Histo-chemical analysis of tissues for glycogen was also assessed. Spectroscopic analysis revealed a plentiful amount of flavonoids, HPLC analysis revealed gallic acid presence, Mass spectral analysis revealed individually the presence of various phytochemical bioactive components and antibacterial assays adds is antimicrobial action. Serum markers were altered by ATD administration, whereas co-treatment with *Tephrosia* reversed such changes. LPO, microsomal LPO, and cholesterol increased while as GSH, CAT, SOD glycogen, total protein content, microsomal protein and triglycerides in liver and kidney decreased by ATDs; co-administration of *Tephrosia* restored them to their normal levels. Cytochrome P450 2E1 (CYP 450 2E1) activity was declined in terms of aniline hydroxylase; while as co-administration with *Tephrosia* extract returned the values to normal. Biochemical determinations were corroborated by histological studies and histo-chemical observations. Hydroalcoholic extract of *Tephrosia* extract possess a significant protective activity against ATD induced hepatorenal toxicity. This may be attributed to the presence of various bioactive components present in the *Tephrosia* extract as found by its characterization.

MPS-7

# POLYCYSTIC OVARIAN PATHOGENICITY CAUSES ALTERATIONS IN HORMONAL, SERUM CYTOKINES AND RECEPTOR(S) EXPRESSION OF ER-α, IL-2R AND IL-6R: MOLECULAR MECHANISM OF MODULATION IN OVARIAN FUNCTION BY *TEPHROSIA PURPUREA* THERAPY

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## ABSTRACT

Present study is designed to comprehend the effect of *Tephrosia purpurea* (TP) in Letrozole induced (1mg/kg) PCO rat. Three different doses (100, 200, 300mg/kg) of alcoholic seed extract of TP were administered to PCO rats orally for thirty days. Biochemical, hormonal, histological and specific receptor expression were analyzed. PCOS rats revealed significant increase in ovarian weight, lipid peroxidation (LPO), decrease in reduced antioxidative enzyme (GSH, SOD) activities, with increment in the circulatory level of testosterone, LH and FSH. However circulatory level of estrogen, progesterone, and leptin, hormone showed a significant decrease. Histological observation showed presence of several cyst and atritic follicles. PCO rats resulted in downregulation in cytokine receptor (IL-6R, IL-2R) expression, significant elevation in circulatory serum cytokine level (IL-6, TNF-α) indicating tissue inflammation. ER-α receptor was weakly expressed in PCO rat. Treatment of TP reversed and restored all the biochemical, hormonal parameters in dose dependent manner being 300mg/kg as the most effective dose. 300mg/kg dose of TP resulted in restoration of receptor expression of ER-α, IL-2R, IL- 6R as well as serum cytokine level of IL-6 and TNF-α. Evidences therefore suggest that treatment of TP during the PCO endocrinopathy is mediating its effect via Era receptor and hence restoring estrogen, progesterone by down regulating circulatory testosterone hence recovery in the serum cytokines and cytokine receptor expression might have resulted. Therefore of alcoholic extract of TP may be suggested a clinical therapeutic potential herbal therapy for remedial effect during PCO pathogenicity in the field of medical sciences for human female.

MPS-8

# TRIGGERED AND PROLONGED RELEASE OF CURCUMIN BY NANOSIZED MULTIPARTICULATE DELIVERY SYSTEM FOR THE EFFECTIVE MANAGEMENT OF ULCERATIVE COLITIS

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## ABSTRACT

Curcumin (CN) has good anti-inflammatory activity but its use is limited due to poor pharmacokinetics. In the present investigation we have prepared and evaluated the chitosan nanoparticles (CS-NPs) of CN for colon specific drug delivery for treatment of ulcerative colitis. CS-NPs were prepared by ionic gelation using tripolyphosphate (TPP). CS-CN-NPs- were coated with Eudragit FS 30D (FS) by using solvent evaporation method in order to specify pH triggered delivery. Different process parameters were evaluated and optimized formulation was characterized for particle size, size distribution, zeta potential and encapsulation efficiency before subjecting to lyophilization. The lyophilized product was further subjected to FTIR, particles morphology and in vitro drug release in different dissolution media. In vitro drug release study revealed initial burst release followed by a sustained release. In vivo biodistribution study by gamma scintiography shows good accumulation of developed nanocarriers in colonic region thereby reducing inflammation.

**Keywords:** Chitosan nanoparticles, curcumin, colon, Eudragit, ulcerative colitis.

MPS-9

# DEVELOPMENT OF TASTE MASKED ORODISPERSIBLE FORMULATION OF SUMATRIPTAN

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## ABSTRACT

Migraine is a very common problem amongst people nowadays. With severe condition, the patient suffers majorly by headache in a specific area. Major limitation with conventional dosage forms is, they do not produce immediate relief for the headache. An orodispersible tablet may produce fast relief from the headache. Hence, the research work was carried out with the main objective of preparing orodispersible Tablets of drug, which can rapidly disintegrate into the sublingual cavity & produce a quick action.

The tablets were prepared using three different Superdisintegrants, Sodium Starch Glycolate, Crospovidone and Croscarmallose Sodium, along with a Taste Masking Polymer β-Cyclodextrin and Aspartame as a Sweetener. The taste masking of the drug was achieved by mixing the drug with β-cyclodextrin using Solvent Evaporation method and then mixing the optimized quantity of aspartame to it. The tablets were prepared by Direct Compression Technique. The effects of various Superdisintegrants in three different concentrations were studied.

The prepared tablets were subjected for wetting time, In-vitro Disintegration time, tablet strength and in-vitro Dissolution time. The formulation no F4 containing Crospovidone showed minimum disintegration time, wetting time compared to other formulation. Dissolution studies showed 88 % of the drug release from the formulation of F4 at the end of 25 minutes. Overall results suggest that Orodispersible tablets of Sumatriptan Succinate can be prepared by direct Compression method, using various superdisintegrants & the bitter drug could be masked effectively using beta-cyclodextrin as taste masking polymer and aspartame as a sweetener without affecting any parameters of the tablet.

MPS-10

# DEVELOPMENT OF SENSITIVE AND INNOVATIVE SOLVENT MINIMIZED MICROEXTRACTION TECHNIQUE COUPLED WITH GC-MS FOR THE PHARMACOKINETIC STUDIES OF ANTIDEPRESSANT DRUG

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## ABSTRACT

The aim of the study was to develop an innovative and sensitive method based on solvent minimization using dynamic drop-to drop microextraction technique coupled with GC-MS for the pharmacokinetic studies of drug Sertraline. The method involves the use of solvent minimized dynamic drop-to- drop solvent extraction method for the extraction of the drug from the small quantities of biological samples. The extracted drug was further separated and analyzed using GC-MS fitted with SPB-5 column in the selective ion monitoring (SIM) mode. Deuterated Setraline was used as a internal standard throughout the quantitation process. Calibration curve obtained for the drug was in the range of 100-1200 ng $mL^{-1}$ with coefficient of correlation ($R^2$) ≥ 0.98. The limit of detection (LOD) obtained for Setraline was obtained to be 16 ng $mL^{-1}$ with recoveries from the spiked blood samples greater than 90%. We believe that the method is novel and virtually solvent free and serves as a green alternative to the traditional Liquid-liquid extraction method. Finally the method can be easily applied for the determination of trace levels of the drugs of abuse in forensic and clinical applications.

MPS-11

# DESIGN, SYNTHESIS AND ANTICANCER EVALUATION OF NOVEL HYDROXAMIC ACID BASED ANALOGUES

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## ABSTRACT

Two series of N-hydroxy-4-((2-(2-(3-(4-substitutedphenyl) [1,2,4]triazolo[3,4-b][1,3,4]thiadiazol-6-yl)hydrazinyl)-2 oxoethyl)amino)butanamide (11 a-e) and N-hydroxy-4-((2-(2-(3-(4-substituted phenyl)-[1,2,4]triazolo[3,4-b][1,3,4]thiadiazol-6-yl)hydrazinyl)-2 oxoethyl)amino) benzamide (13 a-e) were designed and synthesized for investigation of their biological activities. The structures of these newly synthesized compounds are characterized by 1H NMR and mass spectroscopic studies. All synthesized compounds were screened for the cytotoxicity against selected human cancer cell line of leukaemia (K562), colon (HT-29) and prostate (PC-3). Some of the compounds exhibited promising anti-cancer activity against selected human cancer cell lines. In which, compound 13b exhibited the most potent inhibitory activity against a human cell lines K562, HT-29 and PC-3 with $GI_{50}$ of 43.2 µg/mL, 55.8 µg/mL, >80 µg/mL respectively. Further docking simulation study also supported the pharmacophoric hypothesis and suggested a common mode of interaction at the active binding sites of HDAC (Histone Deacetylase Protein). Therefore, our study suggested that compound **13b** would be useful as anticancer molecules for cancer therapy which deserve further research in upcoming cancer research scenario.

MPS-12

# PREPARATION AND OPTIMIZATION OF BIOACTIVE LOADED PLGA NANOCARRIER INCORPORATED INTO HYDROGEL

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## ABSTRACT

Aim of the study was to develop PLGA nanoparticle (PLGA-NP) of bioactive (mupirocin) (MP) and to optimize the formulation for effective delivery. Drug loaded PLGA-NP were successfully prepared and further incorporated into hydrogel. Optimized formulation were characterized by TEM, XRD and DSC study. Process variables like surfactant concentration, drug concentration, Polymer concentration etc. showed significant effect on the particle size, entrapment efficiency and drug loading. PLGA-NP exhibited prolonged drug release following Higuchi release kinetics (R2= 0.9909). *In vitro* study demonstrated systemic escape of drug from MP loaded PLGA-NP which might eliminate side effects associated with topical exposure through conventional treatment. Mupirocin loaded nanoparticle incorporated into hydrogel showed prolonged efficacy in mouse surgical wound model infected with S.aureus. These finding also supports the progression of antibiotic via hydrogel delivery system is a novel topical dosage form for the management of infected wound.

MPS-13

# CLINICAL MONITORING OF PATIENTS IN HOSPITAL UNDERGOING CHEMOTHERAPY

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## ABSTRACT

Cancer cells keep growing without control in the body. Chemotherapy is the principal drug therapy for cancer. It works by killing the cancer cells, stopping them from spreading, or slowing their growth. However, it can also harm healthy cells, which causes numerous side effects. The chemotherapy or chemo-hormonal therapy for cancer treatment involves careful consideration of both the potential benefits and possible risks of therapy. There are substantial short- and long-term side effects of chemotherapy. These side effects vary, depending on the specific agents used in the adjuvant regimen as well as on the dose used and the duration of treatment. The research (prospective observational) study will focus on the short- and long-term side effects associated with the most commonly used adjuvant chemotherapy and measures taken to monitor them. The intensive research study of 9 months was carried out at Sanjeevani cancer Care Hospital, Raipur. The patients undergoing chemotherapy cycles were the inclusion criteria and the patient's visiting outpatient department (OPD) were the exclusion criteria. The study was done on 200 patients with different cancer types and who were on different chemo cycle treatment based on the stage of cancer. The chemo regimens used mostly were of different combination of chemotherapeutic agents like CMF, CAF, AC, CEC, MF, FEC and FAC. Various side effects were reported by the patients such as nausea, fatigue, vomiting, nephrotoxicity, cognitive dysfunction, leukaemia, cardiac side effects, hair loss, sores in the throat, myelosuppression etc. Various other factors such as haematological parameters, blood pressure etc also fluctuated during chemotherapy cycles. All these par. meters were included in the study for monitoring.
Patient monitoring form was maintained for detail studying of patient history and the chemo drugs he/she was receiving which helped in monitoring them. The patient's health profile data were monitored by administering various drugs which can overcome the side effects and the findings reported were patient's experienced fewer problems during each chemo cycles. Patient counselling was done at every interval to increase patient compliance. Hence it was concluded by the findings that on continuous clinical monitoring of patients undergoing chemotherapy

**Keywords:** Cancer, chemotherapy, side effects, monitoring.

MPS-14

# DEVELOPMENT AND VALIDATION OF UV METHOD FOR QUERCETIN IN HOMEOPATHIC MOTHER TINCTURE *THUJA OCCIDENTALIS* LINN.

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## ABSTRACT

The present study aims to develop analytical method to isolated constituent methanolic extract of leaves of *Thuja occidentalis* Linn. The extracts of *Thuja occidentalis* L. were obtained by maceration process containing methanol as solvents as per in Homeopathic Pharmacopoeia of India. Extracts was further used for phytochemical analysis. Phytochemical screening showed presence of alkaloids, flavonoids, saponins, tannins, phytosterol. Flavonoids indicate the presence of quercetin. Estimation of quercetin by UV spectrophotometer can be used as one of the appropriate analytical method for standardization of certain plants which contains the same marker. A simple and reproducible UV spectrophotometric method for determination of Quercetin in methanolic extract of *Thuja occidentalis* L. was developed and validated. Methanol was selected as a suitable solvent. The absorbance maxima were found to be 255 nm. The method obeys Beer's and Lambert's law. The method was validated using parameters such as linearity, accuracy, precision, limit of detection, limit of quantification and recovery as per ICH guidelines. The linear equation in the range of 10-60 µg/ml with $y = 0.0455x - 0.0068$, and $R^2 = 0.9998$. The proposed method can be used for the reliable quantification of active marker compound in methanolic extract of *Thuja occidentalis* L.

**Keywords:** Quercetin, *Thuja occidentalis* L., UV spectrophotometer, Cupressaceae

MPS-15

# DEVELOPMENT OF INTERPENETRATING POLYMERIC NETWORK (IPN) OF CASSIA FISTULA AS DRUG LOADED CHITOSAN BEADS FOR CONTROLLED DRUG RELEASE

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## ABSTRACT

Chitosan is a natural heteropolysaccharide smart biodegradablepolymer. They exhibit significant biologicalproperties such as biocompatibility, biodegradability, and nontoxicity, bioactivity, non-immunogenic and non-carcinogenic. Chitosan is suitable for various biomedical applications such as Controlled drug delivery, tissue engineering and gene therapy.But its water insolubility hinders its wide application in medicinal field. Cassia fistula plant extract is containing important agentshaving antioxidant, anti-inflammatory, antitussive and antifungal properties. However, the potential of Cassia fistula and its extensive use was limited by its hydrophobicity and poor bioavailability. Hence, we are trying to modify the properties of both chitosan and cassia drug by combing their properties. The present study deals with the development of cassia drug loaded chitosaninterpenetrating polymer network beads. The drug loaded chitosan beads has been characterized by using FT-IR, TGA/DTA/DSC SEM, andfurther, the drug release behavior and swellingbehavior were studied at two different pH (2.0 and 7.5), at37°C in different time interval using UV-Visible spectroscopy.

**Key words:** Cross-linked beads, Chitosan, Cassia fistula leaf extract, Controlled drug release.

MPS-16

# HYDROXAMIC ACID-METAL CHELATORS: *IN-VITRO* AND *IN-SILICO* DNA INTERACTION AND ITS ANTI-BREAST CANCER ACTIVITY

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## ABSTRACT

Nucleic acid is the potential target of numerous drugs utilized widely in cancer therapy. Understanding the interaction of small molecules with DNA has become an active research area at the interface between chemistry, molecular biology and medicine. Some of the efforts have been directed in the design of non-platinum, transition-metal-based antitumor agents. Hydroxamic acids are a group of weak organic acids of the general formula, RC(O)N(R')OH (R = alkyl/aryl; R' = alkyl/aryl or H). The rich chemistry, coordination behavior, ability to form stable chelates and biological activity of many hydroxamic acids (HAs) makes this class of compounds important for medicinal chemistry. The present study embodies the detail of interaction of N-p-chlorophenylbenzohydroxamic acid-Vanadium(V) complex [N-p-ClPBHA-V(V)], N-phenylbenzohydroxamic acid-Tungsten(VI) complex [N-PBHA-W(VI)] and N-p-tolylbenzohydroxamic acid-Cobalt(II) complex [N-p-TBHA-Co(II)] with ct-DNA and its consequences by UV-Visible, fluorescence spectroscopy and viscosity measurements. *In-silico* studies of interaction of ct-DNA with N-p-TBHA-Co(II), N-p-ClPBHA-V(V) and N-p-PBHA-W(VI) uncover the strong binding interactions as it has smaller value of binding energy. Finally, the *in-vitro* cytotoxicity studies indicate that the complexes have excellent anticancer activity against the breast cancer cell line, MCF-7. The observed results would be a great tool in the design and development of hydroxamic acid-metal complexes as potent anti-cancer agent.

**Keywords:** *Hydroxamic acids, metal complexes, ct-DNA, In-silico, Cytotoxicity*

# GROUNDWATER POLLUTION VULNERABILITY ASSESSMENT USING MODIFIED DRASTIC MODEL AND ANALYTICAL HIERARCHY PROCESS TECHNIQUES IN RAIPUR CITY, CHHATTISGARH, INDIA

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## ABSTRACT

Groundwater pollution vulnerability assessment has been regarded as the initial step to understand and evaluate the susceptibility of the subsurface to contamination. One of the important ways to prevent groundwater contamination is the identification of vulnerable areas and applied its results for land use management.

In this study, the Groundwater pollution vulnerability of Raipur city evaluated using Modified DRASTIC model and an Analytic hierarchy process (AHP) method. DRASTIC model uses seven hydrogeological parameters: depth to water table (D), recharge rate (R), aquifer media (A), soil media (S), topography (T), impact of vadose zone (I) and hydraulic conductivity (C). In present study, land use/land cover (LULC) added in the original DRASTIC Model to modify it and the rating and weight of the different parameters were optimized through AHP technique and groundwater pollution vulnerability zones were identified using DRASTIC, Modified DRASTIC-Lu, DRASTIC-AHP and Modified DRASTIC-Lu AHP models. Finally, groundwater pollution vulnerable maps were validated using Nitrate concentration. In this study it is observed that Modified DRASTIC-Lu AHP model is most accurate and suitable for the study area. This study reflecting that urbanization and agricultural activity is main cause of groundwater pollution in the study area. This study established the effectiveness of AHP as a multi-criteria decision support technique in enhancing environmental decision making with particular reference to groundwater vulnerability assessment.

**Keywords:** DRASTIC, Groundwater vulnerability, Analytical hierarchy process, Geographic Information System.

MMAG-2

# DELINEATING GROUNDWATER POTENTIAL ZONES IN CHHOKRANALA WATERSHED USING REMOTE SENSING AND GIS TECHNIQUES IN RAIPUR DISTRICT, CHHATTISGARH, INDIA

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## ABSTRACT

The present study was conducted on Chhokranala Watershed situated in Raipur district Chhattisgarh. The purpose of this study was to investigate new water sources using Remote Sensing and GIS methods. The various thematic maps have been generated like Geology, geomorphology, structure, soils, slope and land use land cover helped in identification of the potential zones for development planning and forecasting. which were prepared using the LISS-III satellite imagery and conventional data. In addition, soil and drainage maps were digitized from published maps. The thematic layers were finally integrated using ArcGIS software to yield a groundwater potential zone map of the study area. Lineaments and their intersections appear to be potential sites for groundwater. This GIS based output result was validated using water level depth data collected from Institute of Water studies, CGWB. Finally, it is concluded that the RS and GIS techniques are very efficient and useful for the identification of groundwater potential zones.

**Key words:** Remote Sensing, GIS , GPS, Chhokranala Watershed, Potential zones.

MMAG-3

# DEVELOPMENT OF AN INNOVATIVE METHOD OF BLASTING FOR EFFICIENTLY DECREASING THE EXPLOSIVE CONSUMPTION

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## ABSTRACT

In Indian mining industry blasting is the most prominent technique of rock fragmentation. The explosive industry is dominated by three commercial explosives namely ANFO, slurry and emulsion. Among these explosives, most of the mines prefer emulsion explosive for rock fragmentation due to its superior detonation characteristics which is complimented by its ease in loading, charging, and storage. The only problem of emulsion explosive is its high density. It is much denser than ANFO and slurry. This leads to more consumption of emulsion explosive for soft and easy to blast rock. Attempts have been made by different researcher and blasting engineers to overcome this demerit of emulsion explosive by introducing decks, developing heavy ANFO, using plastic tubes and plastic bottles in the explosive column. But all these techniques suffer from one or other drawbacks.

This paper presents an attempt to develop a new technique of introducing uniformly distributed spherical air gaps in emulsion explosive. The experiments were conducted at the laboratory of M/S Special Blasts limited near Raipur which is a leading explosive manufacturer of India. 10 to 30% of explosive was replaced by spherical air gaps in explosive cartridge of 83 mm diameter, and velocity of detonation was measured. The study revealed that up to 20% of explosives can be effectively replaced with spherical air gaps for mines in Chhattisgarh which can help in overcoming the demerits of other practiced techniques.

PHY-1

# SYNTHESIS, CHARACTERIZATION AND PHOTOLUMINESCENCE STUDIES ON $Dy^{3+}$ DOPED $SrSiO_3$ PHOSPHORS

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## ABSTRACT

In present paper $Dy^{3+}$ doped $SrSiO_3$ phosphors doped with different concentrations of $Dy^{3+}$ ions (0.2, 0.5, 1.0, 1.5 and 2.0 mol %) were synthesized by modified solid state reaction technique. Sample with optimum Photoluminescence (PL) intensity was characterized by X-ray diffraction (XRD) Technique. XRD spectrum observed for prepared sample, matched quite significantly with Crystallographic open database (COD), card number 96-431-7121. This COD is for monoclinic SrSiO3. Particle size of prepared phosphor and its surface morphological investigations are done using Scanning Electron Microscope (SEM). Photoluminescence emission spectra were recorded for $SrSiO_3$: $Dy^{3+}$ phosphors with different concentrations of $Dy^{3+}$. Under 362 nm excitation, emission spectra exhibit two prominent peaks at 473 and 576 nm due to the transition $^4F_{9/2} \rightarrow {}^6H_{15/2}$ (Blue emission) and $^4F_{9/2} \rightarrow {}^6H_{13/2}$ (Green emission) of $Dy^{3+}$ respectively. Emission peaks at 658 and 660 nm is due to transition $^4F_{9/2} \rightarrow {}^6H_{11/2}$ (Red emission). CIE coordinates expressed that, overall emission is near white light region. In order to investigate the suitability of the samples for white light emitting phosphor, Correlated Colour Temperature (CCT) was determined.

PHY-2

# AN INVESTIGATION OF STRUCTURAL, MICROSTRUCTURAL AND ELECTRICAL BEHAVIOR OF $EU^{3+}$ IONS SUBSTITUTED $BAZR_{0.05}TI_{0.95}O_3$ CERAMIC

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## ABSTRACT

Pure and $Eu^{3+}$ doped polycrystalline Barium Zirconium Titanate ($BaZr_{0.05}Ti_{0.95}O_3$) ceramics were prepared by the conventional solid state reaction method. Phase and structural analysis of the samples was done by X-ray diffraction (XRD) which confirmed the tetragonal structure at room temperature. The microstructural investigations in terms of scanning electron mjcroscopy (SEM) of the sintered samples show that there is a significant decrease in grain size with increasing Eu concentration from 6μm to almost 1μm. Structural phase transitions in the samples were observed in terms of dielectric studies with respect to temperature. Three significant structural phase transitions were observed in pure sample while the doped samples showed single phase transition. The Curie temperature as well as maximum dielectric constant was found to decrease with the increasing Eu concentration. The dielectric loss as a function of temperature was also studied. Conduction mechanism in the samples was studied with the help of AC conductivity data as a function of temperature. A typical PTCR (positive temperature coefficient of resistance) behavior was observed in all the samples above the Curie temperature.

**Keywords:** BZT, XRD, SEM, Dielectric, PTCR

PHY-3

# THERMOLUMINESCENCE STUDY OF COMBUSTION SYNTHESIS DERIVED AND UV IRRADIATED $Y_2O_3:Er^{3+}$ NANOPHOSPHORS

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## ABSTRACT

This work describes the Thermoluminescence (TL) of $Y_2O_3:Er^{3+}$ nanophosphor synthesize by Combustion method using urea as a fuel. The doping agents were incorporated in the form of erbium nitrate. Systematic studies on the structural, morphological, and thermoluminescence (TL) properties were reported. These prepared materials were characterized by using Powder X-ray diffraction (PXRD) techniques, transmission electron microscopy (TEM), and Fourier transform infrared spectroscopy (FTIR). Powder X-ray diffraction patterns revealed that the synthesized particles have a pure body centred cubic $Y_2O_3$ structure and Transmission electron microscopy (TEM) confirms the spherical shape of the particles whereas FTIR studies confirm the presence of organic residua OH and CO in the samples. TL glow curve of $Y_2O_3:Er^{3+}$ phosphors were also recorded for different UV exposure time and were found maximum for 10 minutes UV radiation. The increase of TL intensity is attributed to the decrease of the non radiative recombination probability, which occurs through the elimination of quenching defects. The trapping parameters ($\mu$, E, s) were estimated from Chen's glow peak shape method and are discussed in detail for their possible usage in dosimetry applications. The TL Glow curve was also fitted in CGCD (computerized glow curve deconvolution) techniques and trapping parameters were calculated.

PHY-4

# STUDIES ON STRUCTURAL, VIBRATIONAL AND DIELECTRIC CHARACTERIZATION OF $NaNbO_3$MODIFIED $BiFeO_3$

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## ABSTRACT

Multiferroic materials possess both magnetic and ferroelectric properties simultaneously in a single phase; are of keen interest for scientists and industries as they have a spontaneous magnetization that can be switched by an electric field and vice-versa. Among all existing multiferroics, $BiFeO_3$ (BFO) is the most important room-temperature multiferroic material with $T_C$~1103 K and $T_N$~ 643 K. BFO has low resistivity and the leakage problems make the observation of the ferroelectric loop very difficult and hamper the dielectric properties measurement. In order to solve this problem, some attempts have been made including synthesis of single phase $BiFeO_3$, cation doping, and forming solid solutions of $BiFeO_3$ with other perovskite materials. In present work, ceramic samples of solid solution of multiferroic $BiFeO_3$ with antiferroelectric $NaNbO_3$[i.e., $(Bi_{1-x}Na_x)(Fe_{1-x}Nb_x)\ O_3$] for x = 0.20, 0.25, 0.30, 0.32, 0.38, 0.40 were prepared by solid state ceramic method to overcome these drawbacks as well as basic physics involved. Single-phase of this system show a structural transformation from the rhombohedral to cubic/pseudo-cubic phase by increase in concentration of $NaNbO_3$. The formation of dense ceramic with a non-uniform crystal size were observed using Field Emission Scanning Electron Microscopy. Analysis of room temperature Raman of the material has provided different modes of molecular vibration. The dielectric and complex impedance spectroscopy was utilized to analyze the electrical properties of the material. The presence of temperature dependent electrical relaxation phenomenon occurring in the compound can be suggested from the impedance measurement which is carried out at selected temperatures and frequencies.

**Keywords:** Solid state ceramic method, XRD, FE-SEM, EDS, Raman analysis, dielectric and impedance analysis, Conductivity.

PHY-5

# EFFECT OF VARIOUS DOPING PERCENTAGE OF $GD^{3+}$ DOPED $CAZRO_3$PHOTOTHERAPY LAMP PHOSPHOR AND ITS THERMOLUMINESCENCE STUDIES

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## ABSTRACT

The present research work is focussed on the new aspects of $CaZrO_3:Gd^{3+}$ as a suitable candidate for phototherapy applications. The as-prepared $CaZrO_3:Gd^{3+}$ samples were synthesized by high temperature modified solid state diffusion method. The structuralparameters and confirmation of phase formation was determined by X- ray diffraction analysis technique and Rietveld refinement. The morphological studies were done by scanning electron microscopy (SEM) and transmission electron microscopy (TEM) techniques. Photoluminescence analysis of as-prepared phosphor for variable concentration of $Gd^{3+}$ ion shows narrow-band UVB emissions of $Gd^{3+}$ ion ($^6P_J \rightarrow {}^8S_{7/2}$).The detailed description of concentration quenching phenomenon and the energy transfer mechanismof $Gd^{3+}$ ionsof as-prepared phosphors are given. The narrow-band UVB emission shows the phosphors may be useful for excellent material of phototherapy lamp. The thermoluminescence glow curve were recorded for UV and $\gamma$ - irradiation and found the traps information from kinetic parameters calculation using computerized glow curve deconvolution (CGCD) technique. Here most of the peak showed general order of kinetics. The effect of $\gamma$ and UV dose exposure on the TL studies was also examined and it showed a linear response with dose which indicated that the samples might be useful for TL dosimetry.

**Keywords:** narrow band UVB emission, zirconium based phosphor, phototherapy lamp phosphor; TL studies.

PHY-6

# LUMINESCENCE PROPERTIES OF CERIUM DOPED $M_3MGSI_2O_8:CE^{3+}$ (M=SR, BA, CA) PHOSPHORS

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## ABSTRACT

Silicate based host is one of the most important host materials with rare earth doping. The silicate usually has excellent thermal stability, high brightness, long duration of afterglow and environmental stability. $M_3MgSi_2O_8:Ce^{3+}$ phosphors were prepared by the high temperature solid state reaction method. The prepared phosphor was characterized by XRD, SEM, TEM and FTIR techniques. In order to study the luminescence properties of phosphor, the excitation and emission spectra of prepared $M_3MgSi_2O_8:Ce^{3+}$ phosphor was recorded. The excitation spectra were recorded in the range of 200 to 400 nm consists of f-f transition of $Ce^{3+}$ is observed and emission spectra were observed in the range of 400 to 700 nm. The emission is associated with characteristic transition of $Ce^{3+}$ ions. The kinetic parameters of prepared $M_3MgSi_2O_8:Ce^{3+}$ phosphor has been investigated by thermoluminescence glow curve using peak shape method.

PHY-7

# VISIBLE TO ULTRAVIOLET C UPCONVERSION OF $ER^{3+}$ DOPED YTTRIUM ALUMINIUM GARNET PHOSPHOR

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## ABSTRACT

In present work the visible to ultraviolet (UV) upconversion $Er^{3+}$ doped yttrium aluminium garnet (YAG) ceramic phosphor was developed by solid state synthesis reaction method. The structural characterization of the prepared phosphor was carried out by using X-ray diffraction analysis and transmission electron microscopy techniques. The up-conversion behaviour of the phosphor was studied by recording the emission spectra of the phosphor under 460 nm blue LED source. The emission spectrum was obtained in the UV region containing peaks centred at 217 nm, 256nm, 275 nm and 312 nm. The emitted UV radiation belongs to the germicidal UV wavelength; therefore this behaviour of phosphor was applied for the inactivation of surface born microbes through the emitted radiation. The emission behaviour of the phosphor was further investigated by LED encapsulation. The emitted UV radiation belongs to the germicidal UV wavelength; therefore this behaviour of phosphor was applied for the inactivation of surface born microbes through the emitted radiation. The upconversion emission increases with increase in crystal size.

**Key words**: $Er^{3+}$ doped YAG, ceramic phosphor, visible-UV upconversion, LED encapsulation, antimicrobial activity

PHY-8

# CONTROLLING THE VARIOUS MORPHOLOGY OF COPPER SULFIDE NANOPARTICLES AND THEIR APPLICATION FOR FLUORESCENCE DETECTION

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## ABSTRACT

We studied the effect of copper and sulfur source precursors in controlling the size, shape and morphology of CuS nanostructures using synthesized refluxing condensation method. CuS nanoparticles are synthesized by varying $Cu(CH_3COO)_2.H_2O$, $Cu(NO_3)_2.3H_2O$,$CuSO_4.5H_2O$ as copper precursors and $CH_4N_2S$, $Na_2S_2O_3.5H_2O$, $Na_2S$ as sulfur precursors. As synthesized copper sulfide nanoparticles were characterized by X-ray diffraction (XRD), Field emission scanning electron microscopy (FESEM), transmission electron microscopy (TEM), SAED pattern, energy dispersive X-ray (EDX), Ultra Violet - visible spectrophotometer (UV-Vis), Fourier transform infrared spectroscopy (FT-IR), and micro Raman spectroscopy. XRD confirmed that the final products were well crystalline, nano-size single phase covellite copper sulfide, except when sodium sulfide is as a sulfur source in that case mixed phases are observed. FESEM micrograph varying morphology such as hexagonal plate like, tube like, cluster of nanoparticles, plate like and ball like nanostructures when different precursors are used. TEM images show particle size variation (particle size 20 ~ 25 nm) for different. EDX confirm that stoichiometric ratio of Cu/S is approximately 1:1 which is in good agreement with the starting molar ratio. FT-IR and Raman spectra confirm the absence of $Cu_2S$ and the band width of S-S stretch mode is correlated with particle size. Optical Energy band gap calculated from absorption spectra varies in the range 1.80~2.31 eV and is also correlated.

**Keywords** – CuS nanostructures, refluxing method, TEM, Raman spectra, morphology.

PHY-9

# PREPARATION AND LUMINESCENCE PROPERTIES OF WHITE LIGHT EMITTING $CaSrAl_2SiO_7:Dy^{3+}$ PHOSPHORS

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## ABSTRACT

Powder samples of $CaSrAl_2SiO_7$ doped with variable concentration of $Dy^{3+}$ were synthesized by solid state reaction route. Structural analysis was done by X-ray diffraction technique. Elemental compositions were confirmed by energy dispersive spectroscopy. Thermoluminescence properties of ultraviolet (UV)–exposed $CaSrAl_2SiO_7:Dy^{3+}$ phosphors were investigated in detail. Glow curve of $CaSrAl_2SiO_7:0.005Dy^{3+}$ phosphor was composed of four traps; kinetic parameters and activation energies were determined for all traps. Activation energies were found in the range 0.42-0.68eV. Photoluminescence study of $CaSrAl_2SiO_7:Dy^{3+}$ phosphors were also investigated. Present phosphor shows characteristic emission bands of $Dy^{3+}$ ions i.e. in blue region (480nm and 493nm; due to $^4F_{9/2} \rightarrow {}^6H_{15/2}$) and in yellow region (576nm due to $^4F_{9/2} \rightarrow {}^6H_{13/2}$). Results obtained from present work direct that $CaSrAl_2SiO_7:Dy^{3+}$ phosphor is a suitable candidate for White LEDs.

PHY-10

# EFFECT OF COPPER SALT ON TRANSPORT AND MATERIAL PROPERTIES OF PEO-BASED POLYMER ELECTROLYTES FOR BATTERY APPLICATION

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## ABSTRACT

Thin nano composite polymer electrolytes (NCPE) based on polyethylene oxide (PEO) and copper triflate [Cu(CF3SO3)2] dispersed with various concentrations of aluminum oxide Al2O3 nano-particles have been prepared by hot press casting technique. Solid polymer electrolyte (SPE) film composition: [90PEO: 10Cu(CF3SO3)2] is highest conducting film with room temperature conductivity (σrt) ~3.0 x 10–6 S/cm, has been used as the Ist-phase host matrix and Al2O3 filler particles of nano-dimension as IInd -phase dispersoid. The fractional dispersal of Al2O3 filler (viz. x = 3 wt%) in Ist-phase SPE host resulted into nearly three orders increase in the room temperature conductivity than that of pure PEO. This NCPE film: [90PEO: 10Cu(CF3SO3)2] + 3 Al2O3 has been referred to as optimum conducting composition (OCC) NCPE film. XRD, FTIR and SEM techniques were used to study materials property in SPE/NCPE OCC film which also confirmed the complexation of salt in the polymeric host as well as increase in degree of amorphousity. All-solid-state battery in the cell configuration: Cu (Anode) || NCPE OCC film || C + I2 + Electrolyte (Cathode) has been fabricated and cell performance has been studied under two load resistances viz. 60 and 100 kΩ. Some important battery parameters have also been evaluated from the plateau regions of cell potential discharge profiles.

**Keywords**: nano composite polymer electrolytes (NCPEs), hot-press film casting technique, ionic conductivity ($\sigma$), ionic transference numbers ($t$ion and $t$+).

VET-1

# EFFICACY OF DOSE DEPENDENT PHARMACOKINETIC INTERACTIONS OF ALBENDAZOLE AGAINST NATURAL CAPRINE GASTROINTESTINAL NEMATODOSIS

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## ABSTRACT

To prove the hypothesis that goats might require different doses of albendazole (ABZ) for maximising its efficacy against gastrointestinal nematodes, the present research work was undertaken to study the dose-dependent pharmacokinetics of albendazole in naïve and parasitized goats following oral administrations of ovine dose of 5 mg $kg^{-1}$ body weight and at 7.5 and 10 mg $kg^{-1}$ body weight. The study revealed significantly higher concentration maximum ($C_{max}$), area under concentration-time curve (AUC) and total area under the first movement of plasma drug concentration-time curve (AUMC) for albendazole sulphoxide (ABZ-SO) and albendazole sulphone (ABZ-$SO_2$) in goats administered ABZ at 7.5 and 10.0 mg $kg^{-1}$ body weight. Increased AUC had resulted in double relative bioavailability of both the metabolites in goats administered ABZ at higher doses. As no significant difference in drug bioavailability was observed in goats administered 7.5 and 10.0 mg $kg^{-1}$ body weight, goats should be dosed with ABZ at least at 7.5 mg $kg^{-1}$ body weight to control gastrointestinal nematodes. Plasma levels of albendazole sulphoxide was significantly higher in goats with zero eggs per gram of faeces. Pharmacokinetic analysis of data revealed significantly higher $C_{max}$, $T_{max}$ and AUC in goats with zero eggs per gram of faeces, while significantly lower bioavailability of albendazole sulphoxide could be observed in goats with 5000 eggs per gram of faeces. The study indicated that the relative bioavailability of anthelmintically active moiety albendazole sulphoxide was considerably decreased in goats with 5000 epg at all the three dose rates. Extrapolation of data of albendazole sulphoxide in terms of drug-parasite contact revealed that the parasites are not exposed to the lethal toxic levels of the drug following administration of the drug at 5.0 mg $kg^{-1}$ body weight in highly parasitized goats but for a considerable lesser duration following oral administration of the drug at 7.5 and 10.0 mg $kg^{-1}$ body weight.

**Keywords** : Albendazole, Dose-dependent pharmacokinetics, Parasitic gastroenteritis, Goats

VET-2

# DETECTION OF PESTICIDE RESIDUES IN COW AND BUFFALO MILK SAMPLES IN CHHATTISGARHAND THEIR RISKS TOHUMAN HEALTH

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## ABSTRACT

The present study was undertaken to determine the carbaryl, DDT and deltamethrin pesticide residues in milk samples of cows and buffaloes from Chhattisgarh state.Estimation of pesticide residues in milk samples was performed using High Performance Liquid Chromatography with Photo diode array detector.Out of 200 samples 55(27.50%), 22(11%) and 10 (5%) samples were found contaminated withcarbaryl, DDT and deltamethrin, respectively.All milk samples contaminated with carbaryl, DDT and deltamethrin residues exceeded the codex maximum residual limits except two cow milk samples which contained DDT residues below MRL. The spatial distribution of pesticide residues indicated that carbaryl was wide spread over the entire study area. No species variation was found in cow and buffalo milk samples forcarbaryl, DDT and deltamethrin residues. The estimated daily dietary intake of different pesticides was found below the acceptable dietary intake for both adult and children, at mean as well as 95th percentile level.Hazard Quotient and lifetime cancer risk assessment during the study showed the low, non –carcinogenic as well as low carcinogenic health risk for adults however for children risk was higher.

VET-3

# THERAPEUTIC EXECUTION OF *CURCULIGO ORCHIOIDES* AGAINST LPS AND ALCOHOL INDUCED HEPATITIS IN RATS

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## ABSTRACT

*Curculigo orchioides* Gaertn. (Amaryllidaceae) is an endangered medicinal plant. Present study aimed to evaluate phytochemical profile and evaluation of therapeutic potential of *Curculigo orchioides* against LPS and alcohol induced hepatitis in rats. Qualitative & Quantitative estimation of phytochemical confirms medicinal properties of *Curculigo orchioides* For therapeutic efficacy rats were conjointly Rat administered with alcohol &*Curculigo orchioides* extract (Dose 50mg/kg, 100mg/kg, 200mg/kg) orally for 6 days and LPS (dose 10 µg/kg) was administration on 6th day & animal were sacrificed on 7th day. Serum AST, ALT, ALP, urea, uric acid, creatinine and bilirubin were increased due to LPS and alcohol induced hapatitis. All these parameters were turned towards control in dose dependent manner with therapy. Thus, it may be concluded that *Curculigo orchioides* has hepatoprotective effect against LPS and alcohol induced hepatitis in rats.

VET-4

# PATHOLOGY OF BOVINE PASTEURELLOSIS AND FIELD EVALUATION OF IMMUNE RESPONSE TO HAEMORRHAGIC SEPTICAEMIA VACCINE

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## ABSTRACT

Haemorrhagic Septicaemia (HS) is an acute, fatal septicaemic disease of cattle, worldwide in distribution and caused by *Pasteurella multocida* serotype B:2 in India. A total of five isolates (Durg I and Durg II, Raipur I and Raipur II and Dhamtari I) of *P. multocida* type B were isolated from carcasses of cattle suspected to have died from HS in Durg, Raipur and Dhamtari districts of Chhattisgarh. All the 5 isolates were confirmed microscopically and biochemically. All the field isolates were found to be 100% sensitive to Amoxicillin, Gentamicin, Enrofloxacin, Trimethoprim, Tetracycline and Cotrimoxazole and intermediate sensitive to Ciprofloxacin and Amikacin.

The genomic DNA of test isolates and organisms recovered from the experimental mice produced an amplicon size of 460 bp specific for *KMT1* gene by PM-PCR. Further, all the isolates also produced amplicon size of 590 bp, 760 bp and 1.2 kb in HS, Capsular and *OmpH* PCR assays respectively. Nucleotide sequencing of amplified PCR products of Raipur I isolate for *KMT1, bcbD* and *OmpH* genes of *P. multocida* revealed 450, 640 and 1070 bp of nucleotides respectively and BLAST analysis showed 100% identity with other Indian isolates.

All the five *P. multocida* isolates in the present study were found to be pathogenic to mice causing mortality within 24 hrs post inoculation.

Necropsy examination of carcasses of cattle died due to *P. multocida* type B revealed petechial haemorrhages on the serosal surfaces of lungs, heart, liver, kidneys and spleen. The histopathological examination showed fibrinous bronchopneumonia in lungs, haemorrhages and necrosis in heart and liver, tubular necrosis with atrophy of glomeruli in kidneys, haemorrhages and depletion of lymphocytes from Malphigian corpuscles in spleen.

ELISA antibody titer against *P. multocida* was evaluated in Sahiwal, Holstein Friesian and Kosali breeds of cattle on 0th, 30th, 90th and 120th day by immunizing with alum precipitated HS vaccine. All the animals of 3 breeds showed peak at 60th day post immunization (DPI), plateauing upto 90th DPI and declining by 120th DPI.

VET-5

# ACARICIDAL ACTIVITY OF CITRUS LIMETTA OIL AGAINST SYNTHETIC PYRETHROID RESISTANT RHIPICEPHALUS (BOOPHILUS) MICROPLUS INFESTING CATTLE AND BUFFALOES IN CHHATTISGARH

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## ABSTRACT

In India, Rhipicephalus (Boophilus) microplus populations have developed a certain level of resistanceto most of the acaricides marketed against tick species. Detection of resistance levels against deltamethrin and cypermethrin inRhipicephalus (Boophilus) microplus collected from Mahavir Goshala, Raipur, Chhattisgarh (India)was carried out usinglarval packet test (LPT). The results showed the presence of resistance level II and I againstdeltamethrin and cypermethrin, respectively. Adult immersion test (AIT) and LPT wereused to evaluate the in vitro efficacy of hesperidin against synthetic pyrethroid resistant adults and larvae of R. (B.) microplus. Four concentrations (1.25, 2.5, 5 and 10 %) of *C. limetta* (CL) oil with four replications for each concentration were used in the bioassay. A concentration dependent mortality was observed with CL oil. The eggweight of the live ticks treated with different concentrations of hesperidin was significantly lower than that of control ticks; consequently, the reproductiveindex and the percent inhibition of oviposition values of the treated ticks were reduced.The complete inhibition of hatching was recorded at 10 % of CL oil. The 10 % extracts caused 100 % mortality of larvae after 24 h. It can be concludedthat the CL oil had better acaricidal properties againstadults and larvae of R. (B.) microplus.

**Keywords:** Ticks, Cattle, Chhattisgarh, Citrus oil

VET-6

# STUDIES ON GROWTH, PRODUCTIONANDCHEMICAL COMPOSITION IN KADAKNATH POULTRY BREED REARED UNDER INTENSIVE MANAGEMENT SYSTEM IN CHHATTISGARH

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## ABSTRACT

The study was designed to investigate of male and female Kadaknath fowl, maintained in the poultry unit of College of Veterinary Science & Animal Husbandry, Anjora, Durg Chhattisgarh, reared under intensive farming system using standard feeding and management practices. for its growth (1, 4, 8,12, 16 and 20 week), Percent egg production(20 - 72week) and chemical composition of meat (20 weeks). The body weights of males and females at 1, 4, 8,12, 16 and 20 weeks of age were recorded as 39.02 ± 0.51 and 37.59 ± 0.56, 90.51 ± 1.9 and 89.48 ± 2.62, 231.07 ± 7.11 and 226.33 ± 7.80, 422.28 ± 14.31 and 401.56 ± 15.15, 743.74 ± 27.8 and 638.83 ± 25.63, 1078.19 ± 42.97 and961.25 ± 33.63g, respectively. The mean body weight gain were ranged from 10.62 to 115.03 in male and 9.85 to 93.08g in female. The feed conversion ratio (FCR) was higher in female as compare to male and showed significant ($p<0.005$) difference at 20week of age and contrary to feed efficiency %(FE) were higher in males than females. Polynomial egg production curve has shown higher predictability power of egg production of total egg production records with partial records. The mean values of Moisture%, Dry matter%, Crude protein% were no significant difference ($P>0.01$) whereas Total ash% and Ether Extract% were 3.74 ± 0.28 and 5.55 ± 0.28, respectively with significant difference ($P<0.01$) in breast and leg muscle of male and female.

**Key words:** Kadaknath, Male, Female

VET-7

# STUDIES ON EGG QUALITY TRAITS IN WHITE LEGHORN LAYERS

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## ABSTRACT

Thepresent study was conducted toestimate different egg quality traits throughout the production cycle and their prediction based on egg weight as explanatory variable in White Leghorn layers. A total of 450 eggs were included for this study andsignificant ($P<0.05$) effect of age of laying hens on egg, albumen, yolk and shell weightwas observed.The egg quality traits like shape index, albumen index, Haugh unit score showed decreasing trend with advancement of age.Eggs produced during early phase had low cholesterol compared to thelate phase of production cycle. The cholesterol / gram of yolk were lowest in advanced age ($68^{th}$-$72^{nd}$weeks).There was a positive and significant ($P<0.05$) correlation between egg weight with its components like albumen ($r$ = 0.925), yolk ($r$ = 0.645) and shell weight ($r$ = 0.682). The coefficient of determination indicated that exponential ($R^2$= 0.861), quadratic ($R^2$= 0.860) and linear ($R^2$= 0.859) model fit better to explain relation between the egg weight and albumen weight. On the other hand, better regressionmodels for prediction of yolk weight from egg weight were logarithmic ($R^2$= 0.418), quadratic ($R^2$= 0.417) and linear ($R^2$= 0.416). While, for the shell weight the appropriate modelswere quadratic ($R^2$= 0.466), linear ($R^2$= 0.465) and logarithmic ($R^2$= 0.464).The results indicated that age of bird had significant effect on egg quality traits and egg weight could predict albumen weight with higher accuracy but yolk and shell weight with moderate accuracy.

**Key words**: Laying age, egg quality traits, prediction models

# 16TH CHHATTISGARH YOUNG SCIENTIST CONGRESS- 2018

**(February 27-28, 2018)**

**Sponsored By**

**CHHATTISGARH COUNCIL OF SCIENCE & TECHNOLOGY, RAIPUR (C. G.)**

**Organized by**

**DURG UNIVERSITY, DURG (C. G.)**

**Co-organized by**

**Govt. V. Y. T. PG. Autonomous College, Durg**

**Bhilai Institute of Technology, Durg**

## Day-1 (27.02.2018) Venue: Closed Auditorium, BIT, Durg

| Programme | Time |
|---|---|
| Participant Registration (**Closed Auditorium, BIT, Durg**) | 08.00– 9.00 am |
| Break Fast (**at Mechanical Block**) | 08.30 – 9.30 am |

| **INAUGURAL FUNCTION (Venue: Closed Auditorium, BIT, Durg)** | |
|---|---|
| **Programme** | **Time** |
| Lighting of lamp followed by Saraswati Vandana | 10.30am |
| Welcome to Guest | 10.30am-<br>10.35am |
| Badges to Guest | 10.35am-<br>10.40am |
| Introduction of Congress by Nodal Officer (Dr. Ajaya Kumar Singh) | 10.40am-<br>10.45am |

| | |
|---|---|
| Address by Co-ordinator **Dr. Arun Arora** (Principal BIT, Durg) | 10.45am-10.50am |
| Address by Guest of Honour- **Dr. N. P. Dixit,** (Vice-chancellor, Durg University) | 10.50am-11.00am |
| Address by Special Guest **Dr. M. S. Gaur**, (IIT, Jammu) | 11.00am-11.10am |
| Address by Chief Guest **Dr. A. K. Singh**, (DRDO, Hydrabad ) | 11.10am-11.20am |
| Releasing of Souvenir and Felicitation of Guest | 11.20am-12.00pm |
| Conclusive Remark by President, **Dr. K. Subramanium** | 12.00pm-12.10pm |
| Vote of Thanks by, **Dr. S. K. Tripathi** (Registrar, Durg University) | 12.10pm-12.15pm |
| **High Tea** | 12.15pm-12.30pm |
| Keynote Address by **Dr. A. K. Singh** (DRDO, Hyderabad) | 12.30pm-01.00pm |
| **Lunch Break** (at Mechanical Block) | 01.00pm-02.00pm |

| **TECHNICAL SESSON, DAY-01, (27.02.2018)** | | |
|---|---|---|
| Discipline | Venue | Time |
| **Biology (Botany, Zoology and Chemical Biology) (01-08)** | Bhilai Institute of Technology, Electronics Block- **EXG- 16** | 02.00pm-06.00pm |

| | | |
|---|---|---|
| **Environmental Sciences, Engineering and Forestry (01-08)** | Bhilai Institute of Technology, Electronics Block- **EXG- 09** | 02.00pm-06.00pm |
| **Medical and Pharmaceutical Sciences (01-08)** | Bhilai Institute of Technology, Electronics Block- **EXG- 08** | 02.00pm-06.00pm |
| **Agriculture Science** | Bhilai Institute of Technology, Electronics Block- **EXS- 03** | 02.00pm-06.00pm |
| **Mathematical and Statistical Sciences** | Bhilai Institute of Technology, Electronics Block- **EXS- 08** | 02.00pm-06.00pm |
| **Life Sciences (Bioscience, Microbiology and Anthropology)** | Bhilai Institute of Technology, Electronics Block- **EXS- 10** | 02.00pm-06.00pm |
| **Home Science and Behavioural Sciences** | Bhilai Institute of Technology, Electronics Block- **EXS- 11** | 02.00pm-06.00pm |
| **Chemical Engineering** | Govt. V.Y.T.PG.Auto. College, **Department of Biotechnology** | 02.00pm-06.00pm |
| **Earth and Atmospheric Sciences** | Govt. V.Y.T.PG.Auto. College, **Vivekanand Hall** | 02.00pm-06.00pm |
| **Computer Science, Electronics, IT and Instrumentation** | Govt. V.Y.T.PG.Auto. College, **Geology Lab.** | 02.00pm-06.00pm |
| **Civil and Architecture Engineering** | Govt. V.Y.T.PG.Auto. College, **Chemistry Lab.** | 02.00pm-06.00pm |
| **Electrical and Electronics Engineering** | Govt. V.Y.T.PG.Auto. College, **APJ Abdul Kalam Hall** | 02.00pm-06.00pm |
| **Mechanical, Mechatronics and Production Engineering** | Govt. V.Y.T.PG.Auto. College, **Department of Physics** | 02.00pm-06.00pm |

| | | |
|---|---|---|
| **Biotechnology, Biochemistry, Bioinformatics and Biomedical Sciences** | Govt. V.Y.T.PG.Auto. College, **Tagore Hall** | 02.00pm-06.00pm |
| **CULTURAL PROGRAMME** | Closed Auditorium, BIT, Durg | 07.00pm – 8.30 pm |
| **DINNER** | Mechanical Block, BIT, Durg | 08.30 pm |

| **DAY-02, (28.02.2018)** | | |
|---|---|---|
| **Break Fast** (Mechanical Block, BIT, Durg) | | 8 am–9.00 am |
| **TECHNICAL SESSON (9am – 1pm)** | | |
| Discipline | Venue | Time |
| **Biology (Botany, Zoology and Chemical Biology) (09-16)** | Bhilai Institute of Technology, Electronics Block- **EXG- 16** | 09.00am-01.00pm |
| **Environmental Sciences, Engineering and Forestry (09-16)** | Bhilai Institute of Technology, Electronics Block- **EXG- 09** | 09.00am-01.00pm |
| **Medical and Pharmaceutical Sciences (09-16)** | Bhilai Institute of Technology, Electronics Block- **EXG- 08** | 09.00am-01.00pm |
| **Veterinary Science, Animal Husbandry and Dairy Technology** | Bhilai Institute of Technology, Electronics Block- **EXS- 03** | 09.00am-12.00pm |

| | | |
|---|---|---|
| **Mining, Metallurgy and Applied Geology** | Bhilai Institute of Technology, Electronics Block- **EXS- 03** | 12:00pm-1:00pm |
| **Agricultural Engineering/Technology** | Bhilai Institute of Technology, Electronics Block- **EXS- 08** | 09.00am-01.00pm |
| **Physics (Biophysics, Chemical physics, Geo-physics, Astrophysics, Nuclear physics)** | Bhilai Institute of Technology, Electronics Block- **EXS- 10** | 09.00am-01.00pm |
| **Chemical Sciences** | Bhilai Institute of Technology, Electronics Block- **EXS- 11** | 09.00am-01.00pm |
| **LUNCH BREAK** | Mechanical Block, BIT, Durg | 01.00pm-02.00pm |

| **VALIDICTORY FUNCTION and AWARD CEREMONEY (Venue: Closed Auditorium, BIT, Durg) 2.30pm** | |
|---|---|
| **Programme** | **Time** |
| Lighting of lamp followed by Saraswati Vandana | 02.30pm-02.35pm |
| Welcome to Guest | 02.35pm-02.40pm |
| Conclusive Remark by Nodal Officer (Dr. Ajaya Kumar Singh) | 02.40pm-02.45pm |

| | |
|---|---|
| Address of Co-ordinator **Dr. S.K. Rajput** (Govt. V.Y.T.PG. Auto. College, Durg) | 02.45pm-02.50pm |
| Address of Co-ordinator **Dr. Arun Arora** (Principal BIT, Durg) | 02.50pm-02.55pm |
| Address by CCOST Director **Dr. K. Subramanium**, (**Guest of Honour**) | 02.55pm-03.05pm |
| Address by Chief Guest **Dr. S. K. Pandey,** (Vice-chancellor, Pt. RSU Raipur) | 03.05pm-03.15pm |
| Announcement of Award (Young Scientist) | 03.15pm-03.45pm |
| Presidential Address by **Dr. N. P. Dixit** (Vice-chancellor, Durg University) | 03.45pm-03.55pm |
| Vote of Thanks by, **Dr. S. K. Tripathi** (Registrar, Durg University) | 03.55pm-04.00pm |
| **NATIONAL ANTHEM** | 04.00pm |

# List of Committees

## Organizing Committee

| Name | Department | Contact No. |
|---|---|---|
| **Dr. Neerja Rani Pathak** | **DSW, Durg University** | |
| Dr. AnupamaAsthana | HOD, Chemistry, Govt. V.Y.T.PG.Auto. College Durg | 98271-62574 |
| Dr. Jagjeet Kaur Saluja | Professor, Physics, Govt. V.Y.T.PG.Auto. College Durg | 99777-17571 |
| Dr. K.R. Hari | Pt. Ravishankar Shukla University, Raipur | |
| Dr. A.K. Khan | Govt. V.Y.T.PG.Auto. College Durg | |
| Dr. Rajesh Lalwani | Associate Professor, Physics, BIT Durg | |
| Dr. Anil Jain | Durg University, Durg | |
| Dr. D.K. Rai | C.G. COST, Raipur | |
| Dr. (Smt) Joyce Rai | C.G. COST, Raipur | |
| Dr. Tribhuvan Singh | C.G. COST, Raipur | |

**(Note: Invitation to Guest, Jury members and Website maintenance)**

# Sub Committee

## Discipline wise Professor In-charge for Scientific Sessions

| Discipline | Professor In-charge & Address | Contact No. |
|---|---|---|
| Agriculture Sciences | Dr. Mausami Dey, Govt.VYT PG Auto. College Durg<br>Dr. Hema Kulkarni, Govt.College, Patan | |
| Agriculture Engineering/ Technology | | |
| Biology (Botany, Zoology, Chemical Biology) | Dr. Ranjana Shrivastava, Professor of Botany,<br>Govt. V.Y.T.PG.Auto. College Durg | |
| Biotechnology, Biochemistry, Bioinformatics & Biomedical Sciences | Dr. R. M. Chandola, Ambedkar Medical College, | |
| Chemical Sciences | Dr. Alka Tiwari Professor of Chemistry, Govt. V.Y.T.PG.Auto. College Durg | |

| | | |
|---|---|---|
| Earth & atmospheric Sciences (Geology, Geography, Meteorology, oceanography) | Dr. S.D. Deshmukh, Govt. V.Y.T.PG.Auto. College Durg | |
| Chemical Engineering | Dr. Madhurima Pandey, Professor, Chemistry, BIT Durg | |
| Computer Sciences, Electronics, Information Technology, Instrumentation etc. | Dr. Manisha Sharma, BIT Durg. | |
| Civil & Architecture Engineering | Dr. M.K. Gupta, Professor & Head, Civil Engineering BIT, Durg | |
| Electrical & Electronics Engineering | Prof. R. M. Poddar, Electronics Deptt. BIT, Durg | |
| Mechanical, Mechatronics and Production Engineering | Dr. S.K. Ganguly, Professor & Head, Mechanical Department BIT, Durg | |
| Environmental Sciences, Engineering and Forestry | Dr. Sindhu Nair, BIT, Durg | |
| Home Science and Behavioral Sciences | Dr. Sandhya Madan Mohan, Head Department of Home Science, Bhilai Mahila Mahavidhyalaya, Bhilai | |
| Life Sciences (Bio Science) Microbiology & Anthropology | Dr. Pragya Kulkarni, Assistant Professor Govt. V.Y.T.PG.Auto. College Durg | |
| Mathematical & Statistical Science | Dr. Anshumala Chandangar Govt. V.Y.T.PG.Auto. College Durg | |
| Medical & Pharmaceutical Sciences | Dr. G.K. Sahu, Pt. J.L.N. Medical College, Raipur | |
| Physics (Bio-Physics, Chemical Physics & Geo Physics, Astro-Phyiscs, Nuclear-Physics) | Dr. C. S. Robinson BIT Durg | |
| Veterinary Science, Animal Husbandry & Dairy Technology | Dr. Javed Khan, Professor, Govt. Veterinary College, Anjora, Durg | |
| Mining, Metallurgy & Applied Geology | Prof. K. R. Hari, Pt. R S U, Raipur. | |

## Application Receiving/Selection of participants.

| Name | Department | Contact No. |
|---|---|---|
| Dr. Pragya Kulkarni | Microbiology, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Sunitha Mathew | Chemistry, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Ranjana Sharma | Geography, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Rajesh Lalwani | Physics, BIT Durg | |
| Prof. Mausami Dey | Zoology, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Nikhil Mishra<br>Ekta Singh | Biotechnology, Govt. V.Y.T. PG Auto. College, Durg | |

## Printing of Souvenir/Brochure/Letter head

| Name | Department | Contact No. |
|---|---|---|
| Prof. S.V. Tiwari | BIT, Durg | |
| Dr. Prashant Sahu | BIT, Durg | |
| Mr. Pawan Patnaik | BIT, Durg | |

## Inauguration/Valedictory Ceremony

| Name | Department | Contact No. |
|---|---|---|
| Dr. R. K. Chaube | Govt. V.Y.T. PG Auto. College, Durg | |
| Dr.Anupama Asthana | HOD, Chemistry, Govt. V.Y.T. PG Auto. College, Durg | 98271-62574 |
| Dr. Sanjay Sharma | Prof. of Maths, BIT, Durg | |
| Dr. Ruby Das | HOD, Physics, BIT, Durg | |
| Prof. Samriddhi Mishra | MBA, BIT, Durg | |

## Accommodation (Durg and Bhilai)/Travel/Transport

| Name | Department | Contact No. |
|---|---|---|
| Dr. O.P. Gupta | Professor, Commerce, Govt. V.Y.T. PG Auto. College, Durg | 99261-70704 |
| Dr. A.K. Khan | Professor, Economics, Govt. V.Y.T. PG Auto. College, Durg | 98274-70364 |
| Dr. Anil Kashyap | Professor, Chemistry, Govt. V.Y.T. PG Auto. College, Durg | 98279-58247 |
| Dr. Sapana Sharma | Asstt. Professor, Sociology, Govt. V.Y.T. PG Auto. College, Durg | 98934-67679 |
| Dr. Vinod Sahu | Asstt. Professor, Maths, Govt. V.Y.T. PG Auto. College, Durg | 94241-09573 |
| Dr.Sanjay Kumar Das | Asstt. Professor, Geography, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. G.S. Thakur | Asstt. Professor, Botany, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Sumita Nair | Associate Professor, Chemistry, BIT Durg | |
| Dr. Tarlochan Kaur | Asstt. Professor, English, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Rakesh Tiwari | Asstt. Professor, Mathematics, Govt. V.Y.T. PG Auto. College, Durg | 98265-23228 |
| Dr. Yashu Verma | Asstt. Professor, BIT Durg. | |
| Dr.Shreeram Kunjam | Asstt. Professor, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr.Abhishek Mishra | Asstt. Professor, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Dileep Sahu | Asstt. Professor, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Dev Prakash | Asstt. Professor, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. S.D. Deshmukh | Asstt. Professor, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Samit Tiwari | Asstt. Professor, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Satish Sen | Asstt. Professor, Govt. V.Y.T. PG Auto. College, | |

| | | |
|---|---|---|
| | Durg | |
| Dr. Sanju Sinha | Asstt. Professor, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Alka Mishra | Asstt. Professor, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr.Durgesh Kotangle | Asstt. Professor, Govt. V.Y.T. PG Auto. College, Durg | |

## Food & Catering

| Name | Department | Contact No. |
|---|---|---|
| Dr.Abhinesh Surana | Professor, Hindi, Govt. V.Y.T. PG Auto. College, Durg | 98274-92040 |
| Dr.Shankar Nishad | Professor, Hindi, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr.Shikha Agrawal | Professor, Economics, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Arvind Shukla | Asstt. Professor, Political Science, Govt. CLC College, Patan | 97522-89902 |
| Dr. Ajay Pillai | Govt. V.Y.T. PG Auto. College, Durg | |
| Dr.Shakeel Hussain | Asstt. Professor, Political Science, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Samit Tiwari | Prof. of Physics, BIT, Durg | |
| Dr. Anoop Misra | BIT Durg | |
| Dr. Naresh Diwan | Govt. College, Arjunda | |

## Audio visual/Photography/multimedia

| Name | Department | Contact No. |
|---|---|---|
| Dr.S.D.Deshmukh | Asstt. Professor, Geology | 93291-12268 |
| Dr.Nagendra Tripathi, | BIT, Durg | 94252-44857 |
| Dr. Dilip Sahu | Asstt. Professor, Computer App. Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Abhishek Mishra | Asstt. Professor, Physics. Govt. V.Y.T. PG Auto. College, Durg | |

## Finance/T.A./D.A. Payment to resource persons/students

| Name | Department | Contact No. |
|---|---|---|
| Dr. Padmavati | Professor Maths, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. S.K. Chatterjee | Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Vinod Ahirwar | Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Vinod Sahu | Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Rakesh Tiwari | Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Sriram Kunjam | Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Alka Mishra | Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Nikhil Mishra | Govt. V.Y.T. PG Auto. College, Durg | |
| Mr. Deepesh | Res, Scholar, Chemistry, Govt. V.Y.T. PG Auto. College, Durg | |
| Sushant Bhattacharya | Govt. V.Y.T. PG Auto. College, Durg | |
| Dinesh Kumar | Govt. V.Y.T. PG Auto. College, Durg | |
| Motiram Sahu | Govt. V.Y.T. PG Auto. College, Durg | |
| R.L. Yadav (Head Clerk) | Durg Universtiy, Durg | |

## Medical Aid/Health Service

| Name | Department | Contact No. |
|---|---|---|
| Dr. O.P. Gupta (NCC) | Professor & Head, Commerce, Govt. V.Y.T. PG Auto. College, Durg | 99261-70704 |
| Dr. Sapana Sharma (NCC) | Asstt. Professor, Sociology , Govt. V.Y.T. PG Auto. College, Durg | 98934-67679 |
| Dr. Meena Maan (NSS) | Asstt. Professor, English, Govt. V.Y.T. PG Auto. College, Durg | 98279-46117 |
| Dr. Tarlochan Kaur (YRC) | Asstt. Professor, English, Govt. V.Y.T. PG Auto. College, Durg | 98278-95972 |
| Dr. Anil Dubey | Professor, Mathematics, BIT Durg | |

## Media Publicity/Press

| Name | Department | Contact Number |
|---|---|---|
| Dr. Prashant Shrivastava | Asstt. Professor, Geology, Govt. V.Y.T. PG Auto. College, Durg | 98271-78920 |
| Dr. Anupama Kashyap | Asstt. Professor, Chemistry, Govt. V.Y.T. PG Auto. College, Durg | 98279-58247 |
| Dr. Sanjay Sharma | Professor Mathematics BIT, Durg | |

## Water, Generator, Electricity, Sound, Seminar Hall preparation

| Name | Department | Contact No. |
|---|---|---|
| Dr. A. K. Pandey | Asstt. Professor, History, Govt. V.Y.T. PG Auto. College, Durg | 94242-79195 |
| Mr. Vishwanath Trivedi | BIT Durg | |
| Mr. Bhupendra Kuldeep | Dy. Registrar, Durg University, Durg | 97522-89902 |
| Dr. K.N. Mishra | Professor Mathematics BIT, Durg | |
| Dr. Nutan Rathod | Asstt. Professor, Chemistry, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Upma Shrivastava | Asstt. Professor, Chemistry, Govt. V.Y.T. PG Auto. College, Durg | |

## Cultural Programme

| Name | Department | Contact No. |
|---|---|---|
| Dr. Anupama Asthana | Professor& Head Chemistry, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. K. Padmawati | Asstt. Professor Economics, Govt. V.Y.T. PG Auto. College, Durg | 94241-31422 |
| Dr. Anupama Kashyap | Asstt. Professor, Chemistry, Govt. V.Y.T. PG Auto. College, Durg | 98279-58247 |
| Dr. Jyoti Dharkar | Asstt. Professor, History, Govt. V.Y.T. PG Auto. College, Durg | 98262-34240 |
| Dr. Meena Maan | Asstt. Professor, English, Govt. V.Y.T. PG Auto. College, Durg | 98279-46117 |
| Prof. Sabana Siddiqui | BIT, Durg | 98261-34807 |

## Memento/Welcome Badges /Certificate Writing/Certificate Distribution

| Name | Department | Contact No. |
|---|---|---|
| Dr. S. N. Jha | Professor, Commerce, Govt. V.Y.T. PG Auto. College, Durg | 70046-24093 |
| Dr.V.S. Geete | Asstt. Professor, Chemistry, Govt. V.Y.T. PG Auto. College, Durg | 94252-44857 |
| Dr. Sunitha Mathew | Asstt. Professor, Chemistry, Govt. V.Y.T. PG Auto. College, Durg | 94241-08409 |
| Dr. Mausumi Dey | Asstt. Professor, Zoology, Govt. V.Y.T. PG Auto. College, Durg | 95849-34627 |
| Dr. Anshumala Chandangar | Asstt. Professor, Economics, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Shriram Kunjam | Asstt. Professor, Botany, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Alka Tiwari | Asstt. Professor, Chemistry, Govt. V.Y.T. PG Auto. College, Durg | |

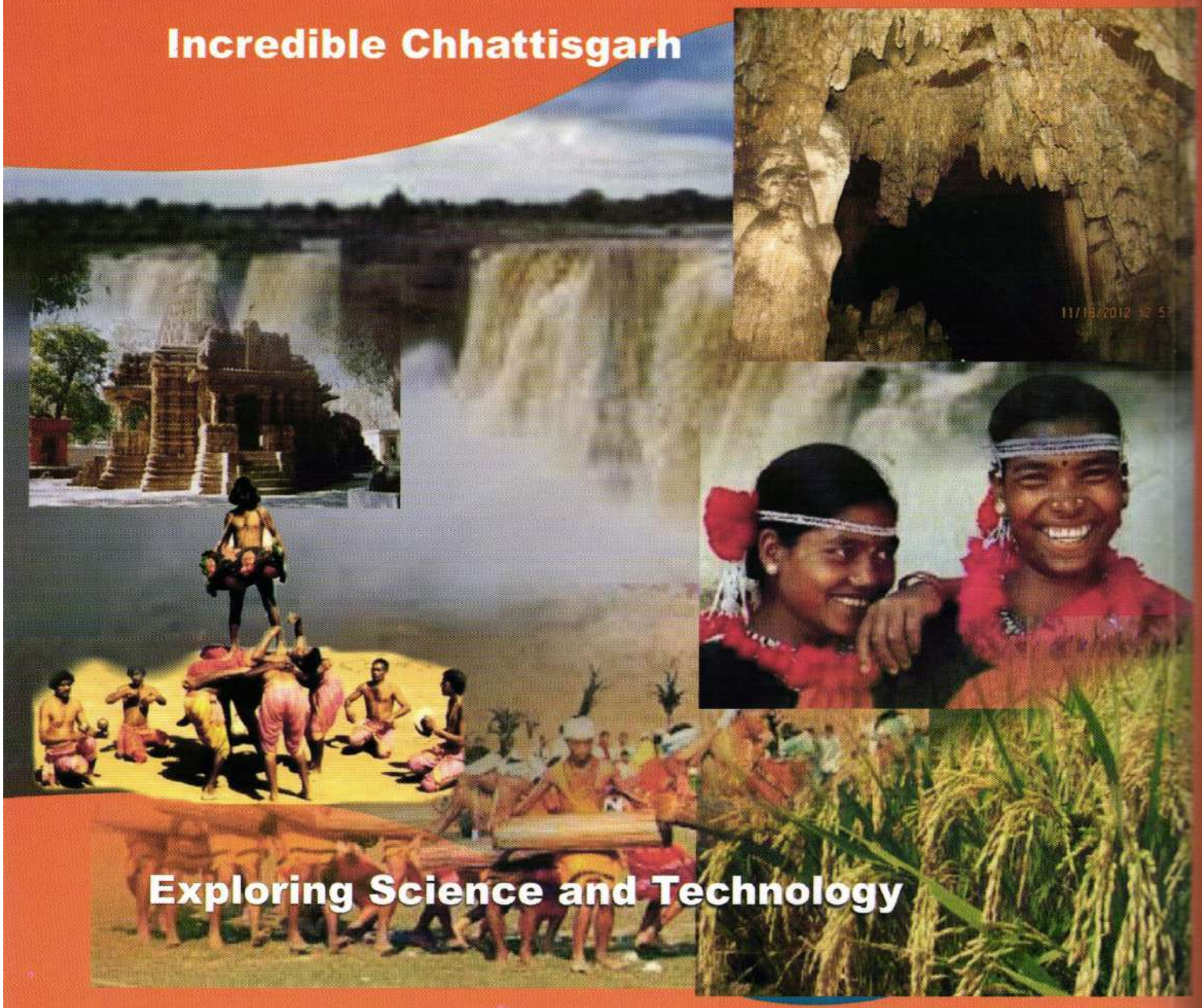
## Registration Committee (Bag/File/Memento/i-card/Certificate/Banner/Poster)

| Name | Department | Contact No. |
|---|---|---|
| Mr. Vinod Ahirwar | Librarian, Govt. V.Y.T. PG Auto. College, Durg | |
| Dr. Rajesh Lalwani | BIT, Durg | |
| Mr. Santosh Mishra | BIT, Durg | |
| Dr. R.S. Singh | Professor, Govt. LCS College, Chowki, Rajnandgaon | |
| Ekta Singh | Research Scholar, Biotechnology, Govt. V.Y.T. PG Auto. College, Durg | 88276-94439 |
| Somendra Kr. Chandrakar | Project Assistant, Biotechnology, Govt. V.Y.T. PG Auto. College, Durg | |
| Sushma Yadav | Research Scholar, Chemistry, Govt. V.Y.T. PG Auto. College, Durg | 70004-92942 |
| Priya Singh | Research Scholar, Chemistry, Govt. V.Y.T. PG Auto. College, Durg | 7987510465 |

## Govt. V.Y.T. PG. Autonomous College, Durg (C.G.)

## Bhilai Institute of Technology (BIT), G.E. Road, Durg

# Incredible Chhattisgarh



## Exploring Science and Technology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