K.L.E. SOCIETY'S

G. I. BAGEWADI ARTS, SCIENCE & COMMERCE COLLEGE,

NIPANI-591237

DIST:-BELAGAVI, KARNATAKA STATE (INDIA)

[Affiliated to Rani Channamma University, Belagavi.]

[Accredited at 'A' level in 3rd Cycle by NAAC with CGPA 3.35]

"College with Potential for Excellence"

PROCEEDINGS OF THE SELF FUNDING ONE DAY NATIONAL CONFERENCE ON

"RECENT TRENDS IN CHEMISTRY"

3rd FEBRUARY, 2018

ORGANIZED BY

DEPARTMENT OF CHEMISTRY

PROCEEDING WITH ISBN : 978-81-930758-5-2

Inaugural Speech:
Dr. Vivek . A.Saoji,
Vice-Chancellor,K.L.E.University, Belagavi.

Lighting the lamp by
Shri. Ashokanna Bagewadi
Vice Chairman, KLE Society Belagavi

Dr.G.S.Rashinkar,
Associate, Professor,Department of Chemistry,
Shiavji University, Kolhapur.
Addressing the young mind during
Technical session

Valedictory Function: Addressed by Chief Guest,
Dr.B.Padamashali,
Dean, School of Science,
Rani Channamma University, Belagavi.

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Website: www.klegibnpn. **E-mail: klegib_npn@yahoo.co.in**

PROCEEDINGS OF THE SELF FUNDING ONE DAY NATIONAL CONFERENCE ON "RECENT TRENDS IN CHEMISTRY"

ISBN : 978-81-930758-5-2

Published by : ***Department of Chemistry,***
KLE'S G.I.Bagewadi Arts,Science &Commerce College,
Nipani-591327
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One day National Conference on 'Recent Trends in Chemistry,
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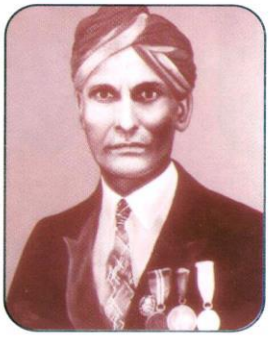

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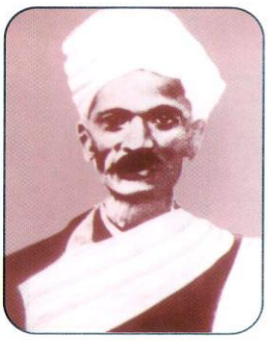

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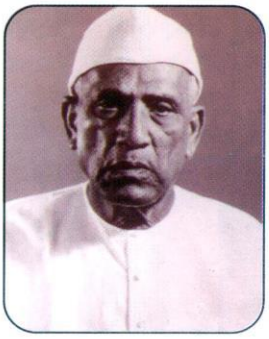

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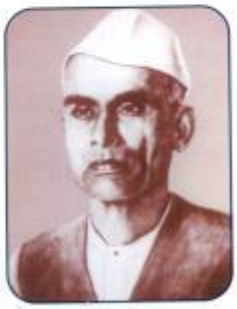

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MESSAGE

I am happy to learn KLE GI.I.Bagewadi Arts, Science and Commerce College, Nipani is Organising one day National Conference on "RECENT TRENDS IN CHEMISTRY" on 3rd Feburury, 2018 and invited eminent resourse persons for the scheduled Technical Sessions. I am sure that the topics for deliberations will enrich the knowledge and insire the academicins, scientists, facyulty and students participating in the Confernce.

Congratulations to organisesrs and I wish the Conference a Grand success.

03.02.2018.

Dr.Prabhakar B Kore.

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Nipani, Chikodi, Belagavi,
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at A grade
valid up to September 15, 2021

Date : September 16, 2016

Director

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VII. *Innovations and Best Practices*	100	370	3.70
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3rd FEBRUARY, 2018

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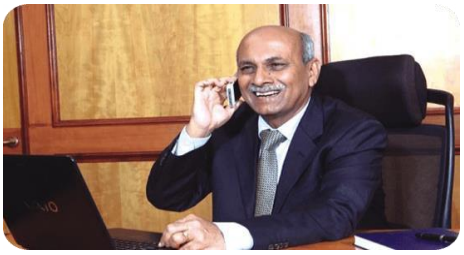
ABOUT K.L.E. SOCIETY



Dr. Prabhakar Kore, MP,
Chairman, K.L.E. Society and
Chancellor K.L.E. University, Belagavi.

The KLE Society was founded in 1916. It has been playing a vital role in the academic and socio-economic upliftment of North Karnataka region by imparting education at every level of learning ranging from KG to PG. Now it has expanded its realms of activity to international level too. At present as many as 256 institutions, 16,000 dedicated staff serve their best to cater the needs of about 1, 25,000 students every year. The courses offered are in Basic, Social & Management Science, Tourism, Hotel Management, Engineering and Technology, Nursing, Pharmacy, Dental, Medical Sciences, Educational training, etc. KLE Society's institutions of higher education are spread across the country. The Society has established collaborations with prestigious international educational institutions of UK, USA, Malaysia, China and Zimbabwe, apart from many national institutes of repute. Another milestone in the medical and allied institutes have been brought under the umbrella of KLE University.

The great visionary, our beloved Chairman Dr. Prabhakar Kore, M.P. and Chancellor of KLE University, ably assisted by the dynamics Board of Management, deserves special acknowledgement for the quantum leaps and spectacular growth that the society has achieved over the last three decades.

Under his leadership and able guidance all our aided degree colleges have undergone firs accredition process by NAAC during 2004-05, re-accredation during 2010-11 and 3rd cycle accredation during 2015-16. Among the 15 aided HEI's, 10 have been accredited at 'A' level. This only speaks of the high standards set by our Society in basic degree education field.

Prin. Dr.M.B. Kothale.

President, National Conference

ABOUT COLLEGE

KLE Society's G.I.Bagewadi Arts, Science & Commerce College, Nipani is a temple of learning founded in the year 1961 with a vision to provide quality education for the empowerment of the rural and linguistic minority youth of Karnataka and Maharashtra states. Our college is named after the principal donor Late Shri. Ganapati Ishwarappa Bagewadi. The college campus is spread over an area of 11 acres. It has UG programmes in Arts, Science and Commerce streams.

Looking into the difficulty of semi urban students to pursue their post graduate studies, in the year 2010 PG course in Commerce and in 2011 P.G course in Mathematics are introduced. The institution conducts all its accadamic programs in exquisitely excellent fashion.

We have 13 doctorates and 07 M.Phil, qualified staff on the role. Some of staff members have NET and SET qualifications and amoung them some of them are Gold Medalists who are serving their stakeholders in an inimitable fashion.

In the year 2016 our college was accredited in 3rd cycle by NAAC at 'A' level with highest CGPA of 3.35 amongst the jurisdiction of Rani Channamma University Belagavi. Another feather in the cap that our college is recognized as the College with Potential for Excellence (CPE) status during 2016.

Our campus is eco-friendly with solar energy harvesting, lush green gardens encompassing the elegant structure, providing serene atmosphere, digi-campus and ITC application in teaching methodology. As a part of co-curriclar activites our campus is providing new indoor Stadium and eight lanes Olympics Standard Swimming Pool for allround development of our student community

We can humbaly and proudly say that ours is a virtually techenology enabled campus so that the faculty members keep themselves updated with modern teaching methodology to serve better to stackholders of todays genarations.

Preface

The 21st century is allegedly called as a century of knowledge, because the only change that has taken place in the present century is in the form of exponential change in science and technology that has revolutionized the pace of processing of information and its conversion in to knowledge. Earlier knowledge was stored in mind (physiocentric) or in written or printed form (Scriptocentric), now a day one need just internet connection to access information or download. The technology has changed the institution of guru or' teacher 'and the role of teacher has become more central than ever.

Our conference is mainly focusing on application of Technology in particularly to Chemistry field. Globally there are many issues related to chemistry like medical waste management, energy crises as the natural sources are exhausting within few decades so nuclear energy may be the alternative source provided it should be handled properly. Polymers in daily life creating many health related problems for human life so bio-degradable polymers may be the next hope. The major crises of this century is pure drinking water to resolve this human understanding play an important role. Green chemistry will be the better solution to solve many environmental issues like soil erosion, effect of insecticides and pesticides and also pollutions of soil, air and water. Spectroscopy be the interesting tool in hands of chemists to save the time and energy to arrive early conclusion for new synthesis and discoveries.

We are highly delighted to present this special Proceedings of one day National Conference titled "RECENT TRENDES IN CHEMISTRY" with ISBN number 978-81-930758-5-2 which includes selected papers presented by teachers, research scholars and students. This proceeding consists of 42 papers of teacher delegates and 48 papers of student delegates. We whole heartedly thank all the participants who actively participated in this event. We personally thank to our Honorable Chairman, Vice Chairman and Board of Management of K.L.E Society, beloved Principal and financial

assistance made by Chemistry staff and sponsors. Finally we thank everyone who have directly or indirectly supported us and made this conference successful one.

Prof .G.B.Kumar	**Dr.S.B.Solabannavr**	**Dr.A.S.Jaganure.**
Joint Secretary	**Organizing Secretory**	**Convener.**

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3rd FEBRUARY, 2018

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CONFERENCE SCHEDULE	
Registration and Breakfast	9.00am to 10.15am
Inauguration	**10:15am to 11:00am**
Keynote address	**11.00am to 12.15pm**
Chief Guest	**Dr. V. A. Saoji.** Hon. Vice Chancellor K. L. E. University, Belagavi
Guest of Honor	**Shri, A. G. Bagewadi.** Vice Chairman, K.L.E. Society, Belagavi.
President	**Dr. M. B. Kothale**
Tea Break	12:15pm to 12:30pm
Technical Session I	**12:30 pm to1:30pm**
Resource person	**Dr. G .S. Rashinkar** Department of Chemistry Shivaji University, Kolhapur
Lunch Break	1:30pm to 2:30pm
Technical Session II	**2:30pm to 4:00pm**
Paper presentation by Delegates at Golden Jubilee Hall.	
Chair Person	**Dr. B. M. Kalashetty** BLDE'S. Science College, Jamakhandi
Rapporteur	**Dr. S. M. Deshpande** G.S.S. College, Belagavi
Technical Session III	**2:30pm to 4:00pm**
Paper Presentation by Students in Seminar Hall	
Chair Person	**Dr. P. S. Manoli** TP Sci. & SS Art College, Sankeshwar
Rapporteur	**Dr. A. S. Kulkarni** B. K. College, Belagavi
Tea Break	4:00pm to 4:15pm
Valedictory	**4:15pm to 5:00pm**
Chief Guest	**Prof Dr. Basavaraj Padmashali** Dean, School of Basic Science, Rani Channamma University, Belagavi
Guest of Honor	**Dr. S.R.Patil** L.G. B, Nipani
President	**Dr.M.B.Kothale**

Inaugural Lecture by: Prof. Dr.Vivek A. Saoji. M.S. (Surgery)

Hon.Vice- Chancellor,
K.L.E University, Belagavi

In his Inaugural and Key note address Dr.Vivek Saoji, expressed with the new concept "The role of youths and teachers in Nation building and the challenges for Science and Technology."

1. **Science, Technology and Chemistry**:

Dr.Vivek Saoji, in his inaugural address made a remark that "Today's Science be the Tomorrow's Technology so the Inventions in Chemistry with modern technology in day to day life creates a new path for better life and improvement of life standard. Today whatever modern facilities available are the results of scientific efforts and researches. The recent trends and developments in chemistry be the next generation's guidelines for safe world such as green chemistry, eco-friendly machineries, nuclear energy as alternative source of energy and the new inventions in drug designing for curing deceases. The challenges ahead to young scientist is to resolve water crises, bio-degradable polymers, issues related to environment which includes insecticides and pesticides, soil erosion, impact of bio-medical waste and its management. In this conference an amicable solutions are to be drawn by carrying out various discussions.

2. Life style and technology

He highlighted the "Inventions in chemistry with modern technology and the vital role played by chemistry in day to day life creates a new path for better life". More emphasis will be made between stakeholders and experts during the exchange of ideas, sharing of thoughts and expressing their views. More tress will be given to update knowledge in subject rather than regular class room teaching. He quoted that 'to be a successful in any field one should have a passion for that field, even if he/she sent forcefully to that field so one should respect and justify the accepted discipline and have a passion for it.

3. Passion of Life - Excellency of teaching:

He suggested that the importance of 3P'S mantra i.e. Passion, Performance and Perseverance (persistency) are the best tools for an aspirant to be a successful person in life otherwise the life will be boring. He said at this occasion that "every student knowingly or unknowingly learns lots of things from teachers so it is challenging duty for every teacher to a role model with moral and ethical values. It is the duty of teacher to polish every student who has excellency, potency and capability to become good citizen of nation". Now it is time make a paradise shift for a teacher from class room teaching towards a new blended learning ICT teaching for new innovative methodology and shine successfully among student community.

4. **Leadership qualities in youths**:

He suggested that in the present modern world, not only bookish knowledge is sufficient but every youth needs additional skill like communication, personality, leadership ability and working as a team. To face any challenges in life determination of mind is essential and one should have goal and vision of life. Focusing in all-round development personality of a person to be successful he said success comes automatically provided efforts are made in right direction at right time.

About the Conference

The national conference on "**Recent Trends in Chemistry"** aims to create awareness about recent developments in science and technology and applications of new approaches in particularly chemistry to young minds. Our concern is to make young people to know more how the different branches of science links with chemistry. Medicinal waste be the burring problem for entire universe. Energy crises in all sector is under threat let us hope will nuclear energy may be a part of solution. Environmental issues such as pesticides, insecticides, soil erosion drinking water crises are great concern of today, is green chemistry be a better hope for future. The purpose of this conference is to provide a platform for exchange of ideas, views and thoughts of younger generation by interacting with experts and finally come out with new concepts.

Inaugural function:

The inaugural function began with invocation song by final year students. Dr.A.S.Jaganure welcomed the dignitaries, delegates and students. He briefed about the aim and themes of self-funding conference. Dr.S.B.Solabannavar introduced the Chief Guest of function Dr.Vivek Saoji, Hon. Vice chancellor KLE University, Belagavi. All the dignitaries on the dais lighten the lamp as a formal ceremony in the occasion. Dr. M.B.Kothale presented bouquet, memento and trophy to the Chief Guest Dr. Vivek Saoji. Dr. A. S. Jaganure presented bouquet and trophy to the Guest of honor Shri. Ashokanna G. Bagewadi, Vice Chairman, KLE Society, Belagavi. The students gave bouquets to other dignitaries on the dais. Felicitation to achievers by chief guest to Miss Soumya Patil for securing IV Rank in B.Sc.(PCM), RCU Belagavi and Miss Vinaya Khot for securing II Rank in Mathematics P.G. Section RCU Belagavi.

Inaugural speech

In his Inaugural speech Dr.Vivek Saoji. Vice Chancellor, KLE University addressed the gathering to have Innovative thinking to serve better tomorrow, in particularly Science and Technology will be the solutions for many problems. This conference "Recent Trends in Chemistry" may come with new concepts and ideas to boost the present changing scenario word wide. He rightly pointed out that today's young mind will be the tomorrow's nation builders. Now a days Chemistry, Physics, Biology and Mathematics are becoming pillars of Science and Technology, so it is the need of hour to do the researches in basic science.

Dr. M.B.Kothale in his presidential remark said that the recent trends in chemistry will going to boost the young scientists to take active part in research work and join their hands in nation buildings. He further briefed about the history of KLE Society and about G.I.Bagewadi College

Nipani. He highlighted the achievements of college such as NACC grade with CGPA 3.35 during 3rdcycle of NAAC accreditation which will be the highest amongst jurisdiction of Rani Channamma University Belagavi, eco-friendly campus with solar energy harvesting, lush green gardens in the campus, ITC enabled teaching class room, College with Potential for Excellence (**CPE**) and utilization maximum UGC funds during 12th plan for Swimming pool, Indoor stadium and other parts of campus developments.

Finally Prof. G. B. Kumbar proposed vote of thanks to the dignitaries.

Technical Session – I

Topic: "Green Chemistry and it's applications in Synthetic Organic Chemistry - Supported Ionic Liquid Phase (SILP) as Green Catalyst for Organic Synthesis".

Resource Person: Dr. G. S. Rashinkar, Professor in Chemistry,
Department of Chemistry, Shivaji University, Kolhapur.

He briefed the students with new innovative ideas about the Principles and rules of Green Chemistry which reduces or eliminates use of hazardous chemical substances in the manufacture and designing of new chemical products. The major applications of green chemistry are conservation of energy, global environmental changes, depletion of resources, even in food supply and over all prevention of eco-system too. Now a day's very new developments in chemistry are leading to one or the other way issues of environmental and many harmful unexpected side effects, so to overcome all these difficulties Green chemicals and Green approach be the alternate solution for present situation.

He highlighted about the wide range of applications of Supported Ionic Liquid Phase (SILP) in the manufacture of Nanomaterial, Industrial solvents, Nuclearfuel waste, Enzymatic Catalyzed reactions, Lubricants Heat Transfer Reactions, Solar Energy Conversions, Batteries Full Cells. One of major the drawback of Ionic Liquids is that they are very costly, toxic to aquatic life and racialization of required energy. Further he highlighted regarding the insertion of supported ionic liquid phase as a catalyst which immobilize the ionic liquid phase or ionic liquid in to a solid support and then immobization occurs which involves physisoption and covalent bonding. Thus all supported ionic liquid phase catalysts have ability to catalyze organic reactions follow the green chemistry principles. The study of Morphology of the SILP catalyzed reactions were scanned by using electron microscopic method. It is observed that the bead degradation was found in the SILP catalyzed reaction which may be due to stress and enormous tension on the beads. Although the morphology of SILP catalyst was not as that of original Merrifield resin where there was no effect on its catalytic activity.

In his concluding speech he emphasized that there is immense scope for pursuing in SILP catalyzed reactions as the research in this area is in infancy.

Technical Session – II

Topic: "Recent Trends in Chemistry and sub themes"

The Oral paper presentation session for teachers and students was carried out in golden jubilee hall. In all **twelve papers** were presented by teacher delegates and **twenty one** papers were presented by students including research scholars on different themes of conference.

Dr. B. M. Kalashatty, Associate Professor and Head of Department of Chemistry, BLDE.'S Arts Science College, Jamakhandi, was Chair Person for this Session.

Dr.S.M.Deshapande, Associate Professor in Chemistry, G.S.S.College, Belagavi. was Rapporteur for this session.

Technical Session – III

Topic: "Recent Trends in Chemistry and sub themes"

The Oral paper presentation session for students was carried out in conference hall no.01 In all **twenty four paper** were presented by students on different themes of conference.

Dr. P.S.Manoli, Associate Professor and Head of Department of Chemistry, TP Science & S. S. Arts College, Sankeshwar, was Chair Person for this Session.

Dr.A.S.Kulkarni, Associate Professor in Chemistry, B.K.College, Belagavi, was Rapporteur for this session.

VALEDICTORY FUNCTION

The valedictory function started with invocation song by the final year students. Miss. Preeti M.Patil welcomed the dignitaries on dais and briefed about the conference. Miss Padmini Shedabale gave introduction of Chief guest Dr. Basavaraja. Padamashalli, Dr.S.B.Solabannavar presented bouquet, memento and trophy to the Chief Guest. Dr. Basavaraja. Padamashalli. Dean, School of Basic Science, Rani Channamma University, Balagavi. Dr. A.S. Jaganure presented bouquet and trophy to the Guest of honor Dr.S.R.Patil, Local Governing Body Member, Nipani. The students gave bouquets to other dignitaries on the dais.

The winners of paper presented by students were felicitated with trophy and cash prizes by chef guest namely, First prize was shared between Miss Varsha Patil, Miss Sameena Mulla and Miss.Parvati Chougale of G.I.Bagewadi College Nipani, Second prize was shared between

Miss.Aishwarya Modi of G.I.Bagewadi College Nipani and Miss. Priyanka Sapale of Devachand College, Arjunnagar. Thired prize was shared between Miss. Reshama Dhumal of Devachand College, Arjunnagar and Miss.Aishwarya Khot of G.I.Bagewadi College Nipani Felicitation of sponsors Shri. Kumar Shedabale and Branch manager Syndicate Bank G.I.Bagewadi college campus by chief guest at this occasion.

Dr.Basavaraja. Padamashalli. **Dean, School of Basic Science, Ranni Channamma University,** addressed the gathering –he told that the basic science is foundation to new scientific research & technology. The eco-system is quite balanced where the percentage of various gaseous elements or particulates on this earth are well balanced i.e. equilibrium of the system is achieved naturally. Generally speaking the toxic gases like oxide of Carbon, Nitrogen, and Sulphar etc were considered to be environmental affecting but in reality they are recycling themselves to provide good results to mankind.

He highlighted that in recent times several anti-cancer agents were developed for instance boron neutron therapy is used to reduce cancer cells, certain triazol derivatives and substituted heterocyclic derivatives shows anti-cancer activities. The diseases like HIV, Cancer and viral diseases will be no more as the vaccines for these diseases are available in market soon. Nuclear energy be the alternative source of energy in future as the renewable sources like coal, petroleum and wind energy are becoming limited applications. The nuclear safe reactors with more precession in nature will provide energy source for fuel, provided it should not reach the devils hands. Finally it is in the hands of youths to build a new nation with high precession in science & technology for the securing healthy and safe nation.

Some delegates and students expressed their opinion about the one day National conference on "RECENT TRENDS IN CHEMISTRY' about the various topic for discussion and appreciated the arrangements made by organizing committee.

Dr. M .B. Kothale has given the presidential remark about the overall view of the conference. Chemistry is turned out to be sole for all researches and in days to come nano science and nano technology will be the emerging trend in chemistry. He added that in this self-funding conference about 150 student delegates including 40 students from Maharashtra state and 85 teacher delegates including 20 delegates from Maharashtra and 8 research scholars from different P.G. centers were actively participated. Further he said that 12 teacher delegates and 42 student delegets presented papers and exchanged their views.

Lastly Prof. Prashant Narwade proposed vote of thanks to honorable chief guest, principal , all the teacher delegates, research scholar's , student participants, sponsors and media persons for making a successful events.

Dr.S.B.Solabannavr
Organizing Secretory

Dr.A.S.Jaganure.
Convener

PAPER PRESENTATION BY TEACHERS.

01. CHARATERIZATION OF $CS_3(PMO_{12}O_{40})$ BY HYDROTHERMAL TECHNIQUE FOR OPTOSTRUCTURAL AND ELECTRICAL PROPERTIES.

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ABSTRACT:

In the present research work, we have synthesized $CS_3(PMO_{12}O_{40})$ by hydrothermal technique. The optostructural and electrical properties of $CS_3(PMO_{12}O_{40})$ material have been investigated. Scanning electron microscopy (SEM) and X-ray diffraction (XRD) techniques were used to study the structural properties of the materials. Morphological study shows after doping Cs^+ there is formation of spherical shaped grains of $Cs_3(PMo_{12}O_{40})$ heteropolyoxometalate . X-ray diffraction study revealed that, the material is polycrystalline in nature having simple cubic spinel structure. After doping Cs^+ intensity of prominent peak (311) increases and other peaks are suppressed indicating intercalations of Cs^+ in the octahedral lattice of phosphomolybdate anion without change in crystal structure. The optical absorption study revealed that, there is decrease in band gap (Eg) of material after doping Cs^+. DC electrical conductivity measurement of the material shows semiconducting behavior at lower temperature. The TEP study shows, p-type semiconducting behavior. The TGA-DTA study revealed that, after doping Cs^+, stability of $Cs_3(PMo_{12}O_{40})$ material increases and the material is thermally stable up to 687.61^0C.

Keywords: Hydrothermal, heteropolyoxometalate, thin films, electrical conductivity.

1. INTRODUCTION:

The heteropolyoxometalate (HPOM) materials of Vanadium, Molybdenum and Tungsten are an exciting class of materials whose properties are intermediate between atoms or molecules and bulk materials [1]. Metal ion doped HPOM materials are technologically important due to its high electrical and thermal conductivities [2], redox ion exchange behaviors [3-5]. The heteropolyanions of V, Mo, and W find applications in biochemical industrial catalysis, proton conductor [6], ion exchange materials, thin layer

chromatography, materials for separation of amino acids [7]. Heteropolyoxometalates (HPOM), in addition to their considerable applications in catalysis and medicine, are attracting attention for advanced materials.

So, in the present investigation, we are reporting influence of Cs+ doping on optostructural and electrical properties of hydrothermally grown molybdenum heteropolyoxometalate thin films.

2. Materials and Methods

2.1 Thin film deposition of CsPMA

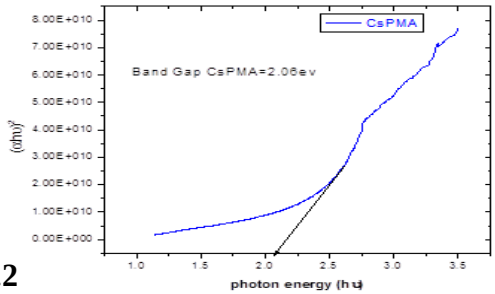
The cesium doped molybdenum HPOM (CsPMA) thin films were deposited on FTO substrates. The aqueous solution of 0.05M phosphomolybdic acid ($H_3PMo_{12}O_{40}$) and disodium salt of ethylene diamine tetra acetic acid (EDTA) was used as a complexing agent. A complexing agent of about 20 ml is obtained by mixing PMA (0.05M) and EDTA (0.1M) this mixing solution was adjusted to P^H of about 9.5 by adding drop wise ammonia .Resulting solution of complexing agent along with 20 ml CsCl (0.2M) was poured in the Teflon of autoclave arrangement set up. Precleaned fluorine doped tin oxide (FTO) substrates were immersed vertically in autoclave containing reaction mixture and temperature was kept at 150^{O}C for three hours. After cooling deposited thin films were washed with distilled water and dried. The dried films were annealed at 200^{O}C by keeping in a furnace. Thickness of the deposited films was measured by surface profilometer. The DC electrical conductivity of the films were measured by using two probe method in the range from room temperature to 285 ^{O}C.TEP measurement of the sample were carried out at taking 10 ^{O}C difference between hot and cold end.

3. Result and Discussions:

3.1 Optical characterization:

Fig.1 shows the plot of $(\alpha h\upsilon)^2$ verses $h\upsilon$ for CsPMA thin films. The presence of single slope in the curves suggests that films are single phase in nature and type of transition is direct and allowed. From Fig. 1 it was found that for Cs^+ doped material optical band gap is 2.06 eV [8-9].

Fig.1: Plot of $(\alpha h\upsilon)^2$ verses $h\upsilon$ for CsPMA thin film.



3.2 Morphological Analysis:

The morphological investigations of CsPMA HPOM materials were analyzed by SEM technique. The scanning electron microphotographs of Cs^+ doped PMA thin films annealed at 200ºC for 2 hours are shown in Fig.2. From this figure it is found

that, there is uniform distribution of grains for Cs^+ doped PMA.The grains of Cs^+ doped material becomes spherical this indicates that Cs^+ plays an important role to improve optostructural and electrical properties. Spherical grains achieve good electrical properties.

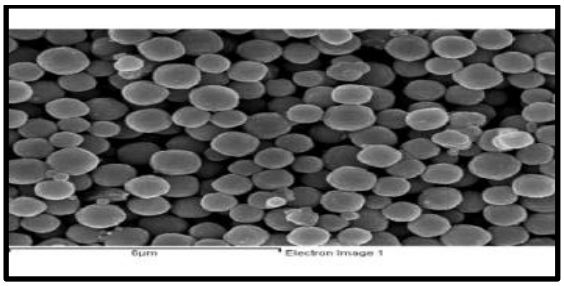


Fig. 2: SEM of CsPMA

3.3 Compositional analysis by EDS:

Required atomic percentage of phosphorus, oxygen, molybdenum and cesium composition under investigation was confirmed by analyzing annealed thin film on Energy Dispersive X-ray Analyzer. Fig.3 shows the EDS spectra of CsPMA.

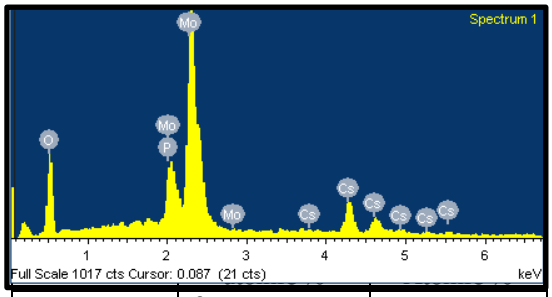


Fig.3: EDS of CsPMA

The EDS pattern shows the presence of O, P, Mo and Cs in the films without any major impurity. Table 1 shows theoretical and practical atomic percentage of O, P, Mo and Cs.

Table 1: Theoretical and practical atomic percentage of O, P, Mo and Cs

O	54.50	67.82
P	2.01	2.76
Mo	50.96	22.34
Cs	22.13	7.09

3.4 Structural analysis of CsPMA by XRD:

The X-ray diffractograms of CsPMA is presented in Fig. 4. The presence of prominent peak having 311 planes in the XRD pattern shows that the material posseses simple cubic spinel structure.

The crystallite size, lattice constant and average grain size of CsPMA is shown in Table 2 which indicate that, Cs^+ doping crystallite size (D),lattice constant (a) and average grain size (Ga) values decreases[10].

Table 2: Effect of Cs+ doping on crystallite size,lattice constant and average grain size.

Sample	Crystallite size'D' (nm)	Lattice constant 'a' (A^o)	Average grain size 'Ga' (nm)
CsPMA $[Cs_3(PMo_{12}O_{40})]$	31.34	10.89	1031

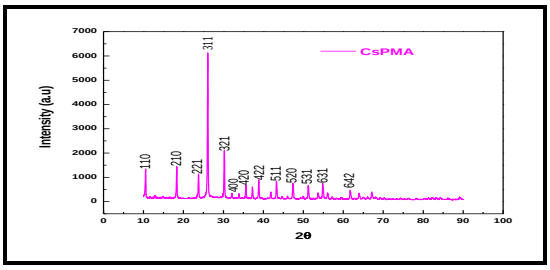


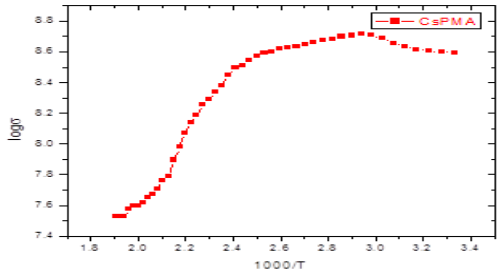
Fig.4: XRD of Cs^+ doped phosphomolybdic acid(CsPMA)

3.5 DC Electrical conductivity

The electrical conductivity (σ) was measured as a function of temperature in

the range from room temperature to 252 ^{o}C for CsPMA. The conductivity data have been analyzed to distinguish between possible mechanisms in the material. The plot of log σ verses 1000/T for CsPMA is shown in Fig.5

Fig.5: log σ verses 1000/T plots for CsPMA material.



The plot of log σ verses 1000/T of CsPMA shows that, in the lower temperature range (67 ^{o}C to 147 ^{o}C) conductivity increases with increase in temperature indicating conducting behavior of the material. This may be due to increasing the mobility of the electron in the material. At higher temperature range (147 ^{o}C to 252 ^{o}C) conductivity decreases with increase in temperature indicating semiconducting behavior of the material. This may be due to carrier concentration of electron and hole.

From Fig.5 it is found that, Cs doping conducting and semiconducting behavior is observed at lower temperature. The activation energies in ferrimagnetic and paramagnetic regions are calculated from slope of the plot log σ verses 1000/T and are tabulated in Table 3.

Table 3: Observed variation of ΔE for Cs PMA material.

Sample	Transition Temp. (^{o}C)	Activation energy ΔE (eV)		ΔE = Ep - Ef
		Ferrima-gnetic	Parama-gnetic	
CsPMA	147	0.08	0.4673	0.3873

From Table 3 it is observed that Cs doped heteropolyoxometalate material shows conducting nature at lower temperature. This is due to lower concentration of hopping mechanism due to anions [11].

3.6. Thermoelectric power (TEP) of phosphomolybdic HPOM material:

Seebeck coefficient of a material was determined from the plot of the measured seebeck voltage verses the temperature difference across the material. We measured the seebeck coefficient (S) of the CsPMA in the range 300K to 550K which is shown in Fig.6. Cs doped material show p-type behavior in the temperature range 300K to 473K. Hence there is improvement in the p-type conducting behavior after Cs doping [12].

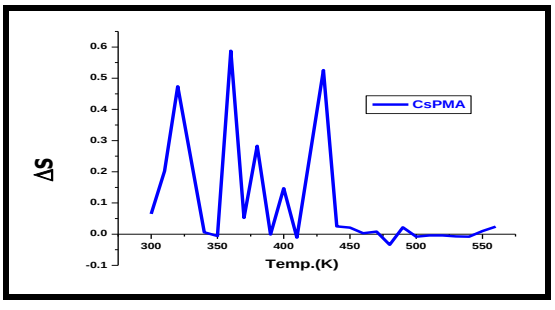


Fig.6: Temperature dependence of the seebeck coefficient of CsPMA material.

3.7 TGA-DTA measurements:

Thermal stabilities of CsPMA were determined by TGA-DTA measurements. Fig.7 shows TGA-DTA curves for CsPMA. TGA-DTA curves shows that, CsPMA is thermally stable up to 687.61^{O}C.

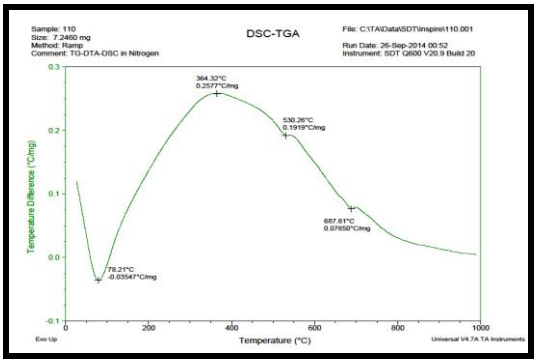


Fig.7: TGA-DTA curve CsPMA

4. Conclusion:

Thin films of the CsPMA were prepared by hydrothermal process. X -ray diffraction study confirms well formation of simple cubic spinal spherical nanocrystals. Band gap, crystallite size, lattice constant decreases with Cs^{+} doping. DC electrical conductivity shows that, after Cs doping conducting and semiconducting behavior is observed at lower temperature. TEP study shows that, there is improvement in the p-type conducting behavior after Cs doping. Thus Cs_3 ($PMo_{12}O_{40}$) HPOM material is applicable for fabricating semiconducting and switching devices.

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02. ENVIRONMENTALLY BENIGN PROTOCOL OF KNOEVENAGEL CONDENSATION REACTION

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Abstract

A Knoevenagel condensation is a nucleophilic addition of an active hydrogen compound to a carbonyl group followed by a dehydration reaction in which a molecule of water is eliminated (hence *condensation*). The product is often an α, β-unsaturated ketone (a conjugated ionone).There have been several modifications of the reaction such as the Hantzsch pyridine synthesis, the Gewald reaction, Doebner modification and the Feist–Benary furan synthesis all contain a step of Knoevenagel reaction.

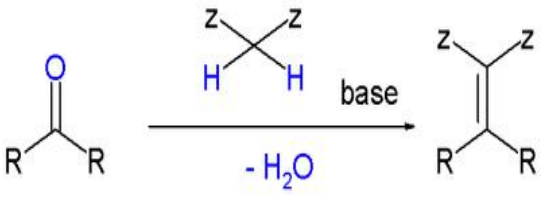
Here in the present work we have attempted to discover the role of sodium ethoxide as a catalyst in Knoevenagel reaction. We are successful in a one pot protocol for the synthesis of 2 [3,4 dimethoxy benzyllidene] malanonitrile by just stirring the equimolar mixture of malanonitrile, 3,4-dimethoxy benzaldehyde, in personce of catalytic amount of sodium ethoxide. The structure of the derivative was confirmed based on the spectral data. The confirmed structures were subjected to computer programme PASS for the biological activity. We expect improved efficacy as an excellentErbB-1 antagonist.

Introduction:

Knoevenagel Condensation

The Knoevenagelondensation (pronounced *[ˈknø:vəna:gl])* reaction is an organic reaction named after Emil Knoevenagel. It is a modification of the aldol condensation.[1] [2]

A Knoevenagel condensation is a nucleophilic addition of an active hydrogen compound to a carbonyl group followed by a dehydration reaction in which a molecule of water is eliminated (hence condensation). The product is often an α, β-unsaturated ketone (a conjugated ionone).



In this reaction the carbonyl compound is an aldehyde or a ketone. The catalyst is usually a weakly basic amine. The active

hydrogen component has the following form[3]

- Z–CH_2-Z or Z–CHR–Z such as diethyl malonate, Meldrum's acid, ethyl acetoacetate or malonic acid, or cyanoacetic acid.[4]
- Z–CHR_1R_2 such as nitromethane.

where Z is an electron withdrawing functional group. Z must be powerful enough to facilitate deprotonation to the enolate ioneven with a mild base. Using a strong base in this reaction would induce self-condensation of the aldehyde or ketone.

The Hantzsch pyridine synthesis, the Gewald reaction , Doebner reaction and the Feist–Benary furan synthesis all contain a step of Knoevenagel reaction.

Doebner proposed a modification of the Knoevenagel condensation where, acrolein and malonic acid react in pyridine to give trans-2,4-pentadienoic acid with the loss of carbondioxide.

With malonic compounds the reaction product can lose a molecule of carbondioxide in a subsequent step. In the so-called ***Doebner modification*** [[5] *where pyridine is used as the base. For example, the reaction product of acrolein and malonic acid in pyridine is trans-2,4-pentadienoic acid with one carboxylic acid group and not two.*[6]

Literature survey

A Knoevenagel condensation is demonstrated in the reaction of 2-methoxybenzaldehyde with the thiobarbituricacidt in ethanol usin piperidi ne as a base.[7] *The resulting enone is a charge transfer complex molecule.*

The Knoevenagel condensation is a key step in the commercial production of the antimalarial drug Laumefantrine (a component of Coartem).[8] *A multicomponent reaction featuring a Knoevenagel condensation is demonstrated in this more synthesis with cyclohexanone, malononitrile and 3-amino-1,2,4-triazole.* [9] The Weiss–Cook reaction consists in the synthesis of cis-bicyclo[3.3.0]octane-3,7-dione employing an acetonedicarboxylic acid ester and a diacyl (1,2 ketone). The mechanism operates in same way as the Knoevenagel condensation.P. ShanthanRao.[10] has shown that reaction proceeds smoothly in presence of zinc chloride, without the need for solvent, to furnish products of good purity in high yield.

Carbonyl-methylene condensation products were prepared from aromatic aldehydes and substituted acetonitriles using zinc chloride as catalyst.

L.MuralidharC.R.Girija[11] describedthe Knoevenagel condensation reaction between aryl aldehyde and active methylene using gallium chloride catalyst under solvent-free conditions. The reaction

took place at room temperature by grind stone method and offered good purity of product in high yield. Work-up was very simple and the products did not need further purification. The reaction conditions were very mild and this protocol was applicable to various aldehydes such as aryl aldehydes and heteroaromatic aldehydes as well as active methylene compounds namely, malononitrile or ethyl cyanoacetate.

Faiz Ahmed Khan[12] has shown that the, Knoevenagel condensation proceeds efficiently in recyclable [bmim]PF_6 and [bmim]BF_4 without any catalyst, and hydrotalcites in ionic liquid serve as a safe and recyclable reaction system for both Knoevenagel as well as nitroaldol condensations. Knoevenagel condensation proceeds efficiently in recyclable [bmim]PF_6 and [bmim]BF_4 without any catalyst, and hydrotalcites in ionic liquid serve as a safe and recyclable reaction system for both Knoevenagel as well as nitroaldol condensations.

Brett T Watson[13] carried out a solid phase synthesis of substituted coumarin-3-carboxylates using the Knoevenagel condensation reaction between ethyl malonate bound to the Wang resin and *ortho*-hydroxyary- laldehydes. The reaction has been shown to proceed cleanly to give the desired products.

YoheiOgiwara[14] *has shown that the, $InCl_3$ and acetic anhydride remarkably promote the Knoevenagel condensation of a variety of aldehydes and activated methylene compounds.*

Umesh R. Pratap[15] has carried out an ecofriendly baker's yeast catalyzed Knoevenagel condensation of aromatic aldehydes and active methylene compounds.

Uyen P. N. Tran[16]*used a highly porous zeolite imidazolate as an efficient heterogeneous catalyst for the Knoevenagel reaction.*

YangYangHong[17] studied a solid catalyst amino-functionalized metal–organic framework of Zr(IV) with 2-aminoterephthalate, UiO-66-NH_2, in Knoevenagel condensation. The material could efficiently catalyze the condensation reaction of benzaldehyde with ethyl cyanoacetate or malononitrile in highly polar solvents such as DMF, DMSO and ethanol.

Jack van Schijndel [18]has carried out the, green Knoevenagel procedure for the chemical transformation of benzaldehydes into their corresponding α,β-unsaturated acids.

Brindaban C. Ranu[19] has shown that task-specific ionic liquid, [bmIm]OH, as a catalyst and as a reaction medium in Michael addition. Very interestingly, although the addition to α,β-unsaturated

ketones proceeded in the usual way, giving the monoaddition products, this ionic liquid always drived the reaction of open-chain 1,3-dicarbonyl compounds with α,β-unsaturated esters and nitriles toward bis-addition to produce exclusively bis-adducts in one stroke.

Therapia Kourouli[20] *has carried out a general and convenient synthesis of* β-*ketols and* α,β-*alkenones by a Knoevenagel condensation of a* β-*ketoacid with an aldehyde in aqueous medium.*

GelsonPerin[21] has developed simple, clean and efficient method for the synthesis of phenylselenoacrylonitriles and phenylseleno unsaturated esters by a one-pot reaction of aldehydes with phenylselenoacetonitrile or ethyl)phenylseleno(acetate respectively, in the presence of a solid supported catalyst)KF/Al_2O_3(, without any solvent.

Arun K.Sinha] 22] hasperformed condensation reaction on 4-hydroxy substituted benzaldehydes and malonic acid with a mixture of acetic acid–piperidine as condensing agent under focused microwave irradiation.

John Kallikat Augustine[23] has carried out a facile synthesis of α,β-unsaturated carboxylic acids from *gem*-dibromomethylarenes and malano acid.

S. Fioravanti[24] has carried out the facile and highly stereoselective one-pot synthesis of either)*E*(- or)*Z*(-nitro alkenes

J. S. Yadav[25]has carriedout the phosphane-catalyzed Knoevenagel condensation fora synthesis of α-cyanoacrylates and α-cyanoacrylonitriles

K. Ebitani[26]has reconstructedhydrotalcite as a highly active heterogeneous base catalyst for carbon-carbon bond formations in the presence of water.

Y. Ogiwara [27] has carried out the indium)iii(-catalyzed Knoevenagel condensation of aldehydes and activated methylenes using acetic anhydride as a promoter.

C. Su[28] had shown that the ionic liquid 1-butyl-3-methylimidazonium tetrafluoroborate]bmim[BF_4 was used for ethylenediammonium diacetate)EDDA(-catalyzed Knoevenagel condensation between aldehydes or ketones with active methylene compounds. Catalyst and solvent can be recycled.

B. C. Ranu[29] has used ionic liquid as catalyst and reaction medium - a simple, efficient and green procedure for Knoevenagel condensation of aliphatic and aromatic carbonyl compounds using a task-specific basic ionic liquid.

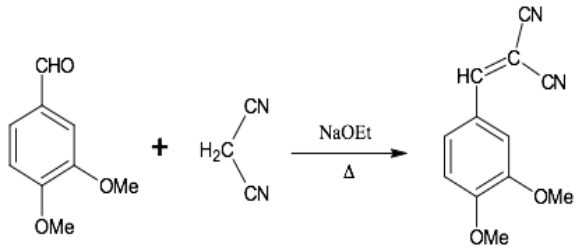
Considering the above work we have been inspired to explore the Knoevenagel condensation in our present work.

EXPERIMENTAL WORK:

General procedure: Synthesis of 2-(3,4-Dimethoxy-benzylidene)-malononitrile

In a 100 ml round bottom flask 1 mmole of malanonitrile[0.066gm] is warmed 5 min on magnetic stirrerand mixed with 1 mmole of 3,4 dimethoxy benzaldehyde [0.166gm]alongwith catalytic amount of sodium ethoxide [5 cm^3] and warmed on mechanical stirrer for 3 minutes and then5 ml water is added to get yellow solid. The completion of reaction checked by T.L.C. The reaction mixture was poured on ice contained a beaker to obtain the product. The solidified substance was filtered and recrystallized from ethanol.

REACTION:



Characterisation:

Molecular Formula =$C_{12}H_{10}N_2O_2$:

Molecular Weight =214.23

Exact Mass =214

Molecular Composition Calculated (found)

C 67.28%(67.30%) H 4.71%(4.75%) N 13.08(13.05%)

H NMR :ᵭ ppm 7.14-7.87(m,3H,Ar) 3.85(S,3H,OMe) 3.86(S,3H,OMe) 6.88(S,1H,CH)

IR (KBr):cm^{-1} (3080-3030) =C-H ;(3050.83) Ar. C-H; (2235-2215) CN; (1604±3)C=C; (1160.03)O-CH_3

BIOLOGICAL PREDICTION STUDY:

The confirmed structure was subjected to computer programme 'PASS' for Biological Predictions. The probabilities for being active)Pa(are compared with the structures to find out most active molecules for the predicted biological activity. It is predicted to have excellent ErbB-1 antagonist activity.

RESULT & DISCUSSION:

The objectives in present research work is to provide green methodology for the synthesis of 2 [3,4 dimethoxy benzyllidene] malononitrile. A highly efficient and simple method has been described for the catalysed synthesis of this compound using ethanol and water the system with moderate heating on magnetic stirrer. The present condensation completes with the principle of green chemistry.

CONCLUSION

Thus, we have successfully synthesized 2 [3,4 dimethoxy benzylidine] malononitrile by environmental benign protocol of Knoevanagel condensation reaction.

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03. One pot Protocol for Dakin- West reaction catalysed by sodium hydroxide to synthesize an efficient membrane integrity agonist but-2-enyl acetamide derivative

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Abstract

The direct conversion of an alpha-amino acid into the corresponding alpha- acetyl amino alkyl methyl ketone by the reaction of acetic anhydride in the presence of a base such as pyridine, takes place with the evolution of CO_2 and is generally known as the Dakin –West reaction. Dakin west reaction has been studied by number of researchers with several modifications in the reactants, reagents and reaction conditions. Several catalyst have been used in Dakin West reaction such as boric acid, silica sulphuric acid, heteropolyacid, trifluroacetic anhydride etc. Here in the present work we have attempted to discover the efficiency of sodium hydroxide in Dakin West reaction. We are successful in a one pot protocol for the synthesis of butenyl acetamide derivative from equimolar mixture of 4-ethoxybenzaldehyde, 4-methoxyacetophenone, acetyl chloride and acetonitrile in presence of catalytic amount of sodium hydroxide irradiated with microwaves. The structures of butenyl acetamide derivatives were confirmed based on the spectral data. The confirmed structures were subjected to computer programme PASS for the biological activity. We expect improved efficacy as a membrane integrity agonist.

INTRODUCTION

The direct conversion of an alpha-amino acid into the corresponding alpha-acetyl amino alkyl methyl ketone by the reaction of acetic anhydride in the presence of a base such as pyridine, takes place with the evolution of CO_2 and is generally known as the Dakin –West reaction. Its discovery by these two authors in 1928 was accompanied by a brief exploration of its nature, its scope and its mechanism. Most general references to the reaction describe only the conversion of an alpha-primary amino-acid, as in the above example. But in fact, non–amino-acid such as phenylacetic acid also yield methyl ketone under these conditions, as do secondary amino acid. More recent work has also improved the efficiency of many of these conversions and this simple 'one-pot' conversion of a carboxylic acid into a ketone, under mild condition, often proceeds in good yield. These transformations do not all involve the same reaction mechanism, but they all

involve the same reaction conditions and they are all included as example of the general Dakin-West reaction.

DAKIN WEST REACTION

The **Dakin–West reaction** is a chemical reaction that transforms an amino-acid into a keto-amide using an acid anhydride and a base, typically pyridine. It is named for Henry Drysdale Dakin (1880–1952) and Randolph West (1890–1949). In 2016 Schreiner and coworkers reported the first asymmetric variant of this reaction. With pyridine as a base and solvent, refluxing conditions are required. However, with the application of catalyst, the reaction can take place at room temperature.

DAKIN WEST REACTION MECHANISM

The reaction mechanism involves the acylation and activation of the acid to the mixed anhydride. The amide will serve as a nucleophile for the cyclization forming the azlactone. Deprotonation and acylation of the azlactone forms the key carbon-carbon bond. Subsequent ring-opening of **6** and decarboxylation give the final keto-amide product.

CATALYSTS An improved method for the preparation of a series of oxazole-containing dual PPARα/γ agonists[1] was described via aminomalonate-derived chemistry or in pivotal SAR intermediates derived from aspartic acid.

Mohammd M.Khodaei[2] proposed a one-pot, four-component condensation of an aryl aldehyde, an aryl ketone, acetyl chloride and acetonitrile in the presence of silica sulfuric acid as an active, inexpensive, recoverable and recyclable catalyst for the synthesis of β-acetamido ketones.

Khanh-Van Tran and David Bickar[3] proposed that triethylamine and 1-methylimidazole were found to be selective catalysts for the Dakin−West synthesis of diaryl ketones and aryl methyl ketones, respectively.

A. Ezzat Rafieel[4] examined heteropoly acid $H_3PW_{12}O_{40}$)PW(supported on silica)PW/SiO_2(as an efficient, reusable solid acid catalyst in the one-pot, four-component coupling process for the synthesis of β-acetamido ketones.

Joseph Richard[5] proposed a practical synthesis of a tripeptide carried out for the first time by using a modified Dakin-West reaction.

Ezzat Rafiee [6] proposed an efficient improved procedure for the synthesis of β-acetamido ketones developed by a heteropoly acid (HPA) catalyzed three-component coupling protocol.

B. Majid M. Heravi[7] et. al. described an efficient and improved procedure for the synthesis of β-acetamido carbonyl compounds developed in the

presence of trimethylsilyl chloride by a heteropolyacid catalyzed three-component coupling protocol**.**

Masami Kawase[8] proposed the base-catalyzed reaction of N-acylprolines with trifluoroacetic anhydride proceeding through mesoionic 1,3-oxazolium-5-olates followed by the pyrrolidine ring cleavage to afford the 5-trifluoromethyloxazoles in good yields.

FarahnazK.Behbahani[9] proposed the synthesis of β-amidocarbonyl compounds via the Dakin–West analogue reaction using enolizable ketones and esters in the presence of aldehyde derivatives and nitrile compounds.

Momoko Saeki[10] proposed a novel transformation of N-acylprolines to enol esters realized by utilizing chlorodifluoroacetic or trifluoroacetic anhydrides in the presence of inorganic bases.

Ashok K.Tiwari et. al**[11]** synthesised some amide derivatives and tested them for their α-glucosidase inhibitory potential against rat intestinal α-glucosidase.

Reza Tayebee[12] proposed four-component condensation of an aromatic aldehyde, acetonitrile, acetyl chloride, and an enolisable ketone in the presence of $H_7SiW_9V_3O_{40}$ catalyst.

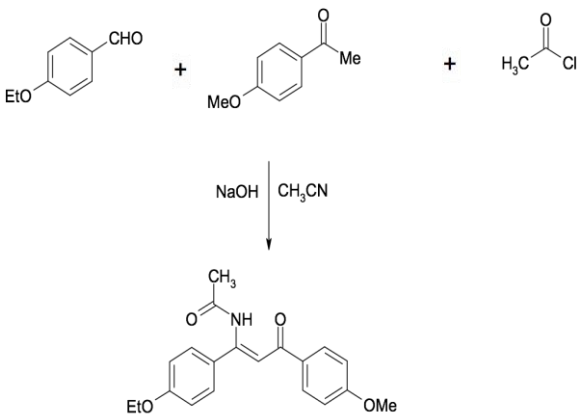
Zahed Karimi-Jaberi and Korosh Mohammadi[13] proposed synthesis of β-acetamido ketones in excellent yields through one-pot condensation reaction of aldehydes, acetophenones, acetyl chloride, and acetonitrile in the presence of boric acid as a solid heterogeneous catalyst at room temperature.

Mantu Rajbangshi[14] employed iodine-alumina as a catalyst in the coupling reactions of aldehydes, enolizable ketones, or 1,3-dicarbonyls with methyl carbamate or aromatic amines under microwave irradiation to afford β-amino carbonyl compounds in good-to-excellent yields. The key features of this environmentally friendly methodology were its operational simplicity, mild reaction conditions, and less reaction time.

EXPERIMENTAL SECTION

To a mixture of 1 mmol (0.150g) of 4-ethoxybenzaldehyde and 1 mmol(0.150g) of 4-methoxyacetophenone taken in a round bottom flask 2 cm^3 of sodium hydroxide solution were added and the reaction mixture was irradiated with microwave at 20% power for 5 mins. Then 1 mmol (0.0785g) of acetyl chloride and 1 mmol (0.041g) of acetonitrile were added and microwave irradiation was continued for 8 more mins. Then the mixture was filtered to separate yellow solid as product. (0.328 g , M.P.100^0c). The completion of reaction and purity of the product were

confirmed by TLC (ethyl acetate + n-hexane + chloroform). **Scheme I**



Scheme I

SPECTRAL DATA:

IR: 3300 cm-1 (N-H), 1660cm-1(C=O),1695cm-1(C=O),1650cm-1(C=C), 1150cm-1(C-O)

HNMR:

1.44(S,3H,OCH_3),1.58(S,3H,$COCH_3$),4.10 (q,2H,CH_2),3.84(t,3H,CH_3),

6.88- 7.96(m,8H,ArH),

6.19(S,1H,=CH),11.12(S,1H,NH)

BIOLOGICAL PREDICTION STUDY:

The confirmed structure was subjected to computer programme 'PASS' for Biological Predictions. The probabilities for being active (Pa) are compared with the structures to find out most active molecules for the predicted biological activity. The structure is predicted for biological activities as Membrane integrity agonist with excellent activity.

RESULT AND DISCUSSION:

Several catalyst have been used in Dakin West reaction such as boric acid, silica sulphuric acid, heteropolyacid, trifluroacetic anhydride etc. However, we found that the potential of the simple catalyst like sodium hydroxide has not been explored by any researcher, hence we attempted to discover the efficiency of sodium hydroxide in Dakin West reaction. The catalyst was prepared in situ very efficiently and easily. Besides the catalyst we also tried to apply a ecofriendly mode of energy transfer such as microwave irradiation for the accomplishment of the reaction. This mode has been proved to be highly efficient as far as the conventional methods of heating are compared. Both these aspects have made the current research effort highly time saving, clean and green.

CONCLUSION

We have been successful in getting an efficient practical technique using a scientific microwave method for the synthesis of a but-2-enyl acetamide derivative in presence of sodium hydroxide, as an efficient, abundantly available and cheap material as catalyst.

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04. Novel Syntheses and characterization of triazine trichloride derivatives of quinazolinones.

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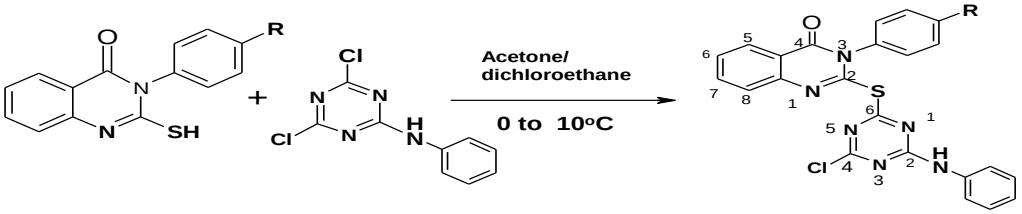
Abstract:-

Quinazolinone possessing thio group are found to be effective in the synthesis of biological actve derivetives.Our approaches is to condense cynuric chloride with different Quinazolinones to isolate anti-inflemmatory derivatives.

In the present work synthesis of 2-[4-chloro-6-anilin)-[1,3,5]triazine-2-yl-sulfanyl]-3-phenyl-substituted-3H-quinazolin-4-one is carried out by two steps. First step involves condensation of triazine tricloride with aniline at 0 to -5^{o}c in dichloro methane /acetone using mild alkaline solution of Na_2HCO_3.to obtain 2-Anilino substituted 1,3,5-triazine-4,5-dichloride (2.2)

In the second step Aryl-substituted quizolines (5.3 to 5.7) were condensed with 2-Anilino substituted 1,3,5-triazine-4,5-dichloride(2.2) at room temperature using acetone solvent system in presence of pyridine base to get 2-[4-Chloro-6-anilin)-[1,3,5] triazine-2-yl-sulfanyl]-3-phenyl-substituted -3H-quinazolin-4-one derivatives (5.8 to 5.12). The isolated products were recrystallized by using n-Hexene and purity is checked by TLC method. The structure of the derivative was confirmed based on the NMR spectral data. The confirmed structures were subjected to computer programme PASS for the biological activity.The few synthesized products show anti-bacterial activity.



5.3 to 5.7 **2.2** **5.8 to 5.12**

where R = - H, -CH3, -OCH3, -Cl , -Br etc.

Experimental

The picular property of cynuric chloride to replace one by one of its there chlorine atoms at different conditions of temperature attract us to carry out the ractions of cynuric chlorides with nuleophic reagents like ammonia, aniline, phenols etc. The molar mixture of equivalent amount of aniline (1m mole) and cynuri chloride (1m mole) were stared by magnetic

sterer at -5^{o}C for about three hurs in presence of $NaHCO_3$ to obtain the product 2.2 which is washed with acetone dried.

The isolated product 6-(-4-anilino-)-2,4,-dichloro-1,3,5-triazine [2.2] (1 m. mole) was dissolved in 60ml of acetone, solution was cooled to room temperature in a freezing mixture with constant stirring 0^{o}C.To the cold reaction mixture 2-sulfanyl-3-phenyl substituted-3*H*-quinazolin-4-one (5.3 to 5..7) (1 m. mole) were added to the reaction mixture bit by bit with constant stirring. Meanwhile triethyleamine (1.8 ml) (1 m. mole) was added to the reaction mixture drop by drop for the period of 3 hours. The reaction was carried out for the period of 8 -10 hours. The completion of reaction was monitored by TLC. The solid product obtained was immediately filtered at suction pump, washed with acetone and dried in desiccators over anhydrous calcium chloride. The product 5.8 to 5.12 were recrystallized from ether/ n-hexane to obtain white crystals in78 -85 % yield.

NMR Spectral analysis of compounds synthesized 5.8 to 5.12

Comp	R	Aromatic protons attached to *quinazolinone* in δ ppm [TMS]					*Quinazolinon e*protons in δ ppm		Aromatic protons substituted to Triazine nucleus in δ ppm [TMS]				
5.8	-H	6.5,d	6.8,d	6.25d	6.16,d	7.0,d	2.9,8	3.1,s	6.5,q	7.01,q	6.42,q	7.1,q	5.9,,q
5.9	$-CH_3$	6.8,d	6.9, d	6.9 , s	7.06,d	7.1,d	3.5,s	3.3,s	7.0,q	7.23,q	6.5,q	7.20,q	61,,q
5.10	OCH_3	6.9,d	7.0,d	1.99, s	7.10,d	7.0,d	3.8,s	3.9,s	6.40,q	7.11,q	6.72,q	7.11,q	6.10,q
5.11	-Cl	7.20,d	7.16,d	7.25,d	7.17,d	7.20,d	3.7,s	3.6,s	6.50,q	7.08,q	6.62,q	7.08,q	6.2,,q
5.12	-Br	7.23,d	7.16,d	7.25,d	7.17,d	7.20,d	3.7,s	3.6,s	6.50,q	7.08,q	6.62,q	7.08,q	6.6,,q
Where s = singlet ; d= doublet ; m = multiplet ; q = quadrant.													

Fuerther the biological ativity of synthesized products was carried out at Maratha Mandals NGH Institute of Dental Science and Research Center, Belagavi, Department of Microbiology, Molecular Biology and Immunology it is observed that six copunds out of eight arr found to be anti-inflemmatory.

Conclusion:

Anti inflammatory activity of synthesised compounds 5.8 to 5.12, were screened with the micro-organisms like Staph, E Coil, Smatans, Klebesiella, Candida, Aniger at different concentrations like 100µg/ml ; 50 ; 25 ; 12.5 ; 6.25 ; 3.12 ; 1.6 ; 0.8 ; 0.4 ; 0.2 µg/ml. for the determination of the MIC values. The product 5.8, 5.11, and 5.12 are found to be anti-inflammatory.

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05. SYNTHESIS OF ECO-FRIENDLY INSECTICIDE: A GREEN APROACH

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Abstract:

Insecticides are agents of chemical or biological origin that control insect. Control may be result from engaging in behaviors deemed destructive. Insecticides may be natural or manmade and are applied to target pests in a myriad of formulation and delivery system. The science of biotechnology has in recent years even incorporated bacterial genes coding for insecticidal proteins into various crop plants that deal to unsuspecting pests that feed on them. An insecticide is a substancesused to kill insects. They include ovicides and larvicidesused against insect eggs and larvae, aphids, mites, trips, whiteflies etc. Insecticides are used in agricultural, medicine industry and by consumers. Insecticides are claimed to be a major factor behind the increase in the 20th century's agricultural productivity. Nearly all insecticides; mayare toxic to humans; some concentrate along the food chain.

Furthermore one can distinguish three types of insecticide.

1. Natural insecticides, such as nicotine pyrethrum and neem extracts, made by plants as defences against insects.
2. Inorganic insecticides, which are organic chemical compounds, mostly working by contact.
3. Organic insecticides which are organic chemical compounds, mostly working by contact.

The homemade pesticides such as vegetable oil spray insecticides, neem leaves spray insecticides , garlic spray insecticide, Chile pepper insecticide spray , bitter melon insecticide spray , tomato leaves spray insecticide etc. Are cheap and easy to make with many being just as effective as some commercial products on the market. No fancy ingredients required, everything you need is likely stocked in your kitchen and garden. Most of the ingredients are earth friendly and natural with the harshest being liquid dish detergent no need to use toxic chemicals.

Many people assume that natural insecticides because they are natural are safe. However,this is not always true. Even through they are derived from plants, natural Insecticides can be just as a toxic as their synthetic counterparts. Insecticides should always be evaluated on an individual basis for both effectiveness and to and toxicity.

Now a days, all farmers even our familiars use commercially made insecticides to control insects. They spray on crops which are affected by insects. Commercially made insecticides contains many toxic substances like organochlorides, organophosphates and carbonated, parathyroid, neonicotinoids, ryanoids, DDT etc. are control the insects but harmful to all living organisms and environment. Also these insecticides damage our ecosystem, disturb our food chain. By all this conclusion, we decide, we prepare household insecticides using naturally available materials are non-toxic, easily available and inexpensive for farmers. We try in our home and in farm, it gives good effects. These naturally homemade insecticides also protect from ladybirds and caterpillars. These insecticides used in agricultural, industrial

Anybody who spends time outside during mosquito months or who has a garden will know how important it can be to control insects around the house. But not everybody likes and there are ways you can make your own natural ones at home. Most homemade insecticide recipes call for basic things you can find around the house, so they are easy to make and effective with certain pests. The key is in the application, because pests need to come into direct contact with the insecticide in order for it to be effective.

The difference is one made naturally occurring chemicals and one is synthetically made. Most people incorrectly assume that "Natural" means it is not toxic and safer this is not necessarily the case. Natural chemicals are produced by nature without any human intervention synthetic chemicals are made by humans using methods different than those nature uses and these chemical structures may or may not be found in nature.

A homemade insecticide made from vegetable oil, neem leaves, garlic, tomato leaf, bitter melon, soap, Chile pepper etc. Are powerful natural insecticides and can have devastating effect on certain troublesome insects.

Vegetable oil

Vegetable oil is a homemade insecticide spray used for controlling a wide range of insect pests in the garden. The spray works by blocking the breathing Pores of insects, causing suffocation and death. It is effective in the control of aphids, scale, mealybug, mites, citrus leaf miner and smooth skinned caterpillars.

Neem leaf

Neem is a highly effective insecticide that once sprayed, will keep the insects at bay. It works in a variety of ways from killing all sucking and chewing insects, keeping insects at bay who refuse to eat the sprayed foliage and end up dying of starvation , as well as disrupting the sexual reproduction of insects so that their life cycle is both disrupted and ended.

Best of all neem is perfectly safe to spray on vegetables and fruit crops as well as ornamental shrubs and plants. It has also been included in India in tooth-paste, soap, shampoo for nits, cosmetics and cattle feed. Neem seeds, neem oil and even the neem leaves control over 200 insects. Crop insects that have been successfully controlled by neem are aphids, adult, larvae, neem, etc

Tomato leaf

As members of the nightshade Family, tomato plants contain toxic compounds called all kids in their leaves. When the leaves are chopped and stepped

in water, they release these all kids making a very effective repellent that is both toxic to aphids and other leaf eating insects but completely safe for us and other beneficial bugs like bees and ladybirds.

Garlic

Garlic bulbs containsan amino acid that converts to a substance called Allison when crusted, blended or chopped. The characteristic odor released as a result of this process has powerful properties. "When garlic extract is absorbed by a plant, bio-chemical changes take place in its foliage which cause it to actively repel insects". In short, plants are provided with a long-lasting case of 'garlic breath' that causes insects to move elsewhere.

Soap

Horticultural soaps are derived from petroleum or plant oils. Insecticidal soap is based on potassium fatty acids and is used to control many plant pests. Because insecticidal soap works on only direct contact with the pests, plaguing plants such as aphids, spidermites, whiteflies, mealybugs and scale. Insecticidal soap contain potassium of fatty acids, which dissolves the exoskeleton and disturpts the insects cell membrane. Never use automatic dish washer soap laundry detergent or set detergent. These products can cause more harm to the plants than the insects you are trying to control.

Chili powder / chili pepper

Homemade chili powder sprays can protect plants against insects. Chili powder spray won't kill all insects, but the spray will repel most insects and other pests that eat garden plants. It should not be sprayed directly on fruits, vegetables or herbs meant for the meant for the table as they could end up tasting.

Materials and Methods

Materials

Glass wares–Beaker, Funnel, Tongs, Mortar and pestle, Measuring cylinder, etc.

Chemicals- Soap, Vegetable oil, Garlic bulb, Chile pepper, Tomato leaves, Neemleave,etc.

Methods

Vegetable oil spray insecticides

A homemade insecticides made from vegetable oil (cotton seed oil)mixed with a soap can have devastating effect on certain troublesome insects, such as aphids, mites, thrips etc.

1. Take 250 ml cotton seed oil in breaker.
2. Add 5 ml liquid soap. Shake well.
3. Then this solution fill in spray bottle and spray on insects.

Neem leaf spray insecticides

Neem leaves are powerful natural insecticides, capable of distribution the life cycle of insects at all stages (adult, larvae and egg) making it a great resource for the organic gardener. Neem leaves are biodegradable and is non-toxic to pests birds, fish and other wildlife and is effective against a variety of common garden insects as well as natural fungicide.

1. Take one liter water in breaker, boil it for ten minute.
2. Add washed neem leaves in one liter boiled water and again boil for five minutes.
3. Let the mixture sit for twenty-four hours.
4. After twenty-four hours, filter the mixture and add ten ml liquid soap. Shake well and fill in spray bottle.
5. This insecticide disrupting the sexual reproduction of insects, disr7upted and ended.

Garlic spray insecticides

Garlic is well known for its pungent 'aroma' which is delectable to some and yet repellent to others and it is this great scent that comes into play when used as a natural insecticides.

1. Take one liter water in breaker, boil it for ten minutes.
2. Add 50 gm garlic bulbs. Again boil for five minutes.
3. Cool the mixture, filter then add 10 ml liquid soap.
4. Fill this mixture in spray bottle. Shake well and use as a insecticide.
5. Add 50 gm garlic bulbs. Again boil for five minutes.
6. Cool the mixture, filter then add 10 ml liquid soap.
7. Fill this mixture in spray bottle. Shake well and use as a insecticide.

Chili pepper/Chili powder spray insecticides

Chile pepper spray is a great homemade natural insect repellent that can be used for a variety of different pests. Chile spray can be made from either fresh hot peppers or Chile powder.

1. Take 500 ml water in breaker, boil it well.
2. Add 25 gm chili powder. Cool the mixture.
3. Filter the mixture and add 10 ml liquid soap.
4. Fill the mixture in spray bottle and use as a insecticide.
5. Limit the spray to nonedible leaves.

Tomato leaf spray insecticides

Tomato plants contain toxic compounds called alkaloids in their leaves. When the leaves are chopped and stepped in water, they release these alkaloids which is very effective repellent.

1. Take one liter water in breaker boil it well for ten minutes.
2. Add washed 150 gm tomato leaves in boiled water. Again boil 5 minutes.
3. Let the mixture sit for twenty-four hours.
4. After twenty-four hours, filter the mixture. Fill the mixture in spray bottle, add 10 ml liquid soap. Shake the bottle and spray on insects.

Soap spray insecticides

The fatty acids present in the soap are very effective against many softbodies insects such as aphids, mealybugs, mites, thrips and whiteflies. The most effective soaps are potassium based soaps.

1. Take 250 ml water in breaker.
2. Add 10 ml liquid soap. Fill the mixture in spray bottle. Shake the bottle and use as a insecticides.
3. This spray dissolves the exoskeleton and disturpts the insect's cell membrane.

Observation –

S.N	Sample	Name of the insects kill by insecticides
1.	Vegetable oil spray insecticides.	Adelaide, Aphids, Eriophyidmites, Leafhoppers, Scale insects, Spider mites, Whiteflies.
2.	Neem leaf spray insecticide.	Aphids, Whitefly, Grasshoppers, caterpillars.
3.	Tomato leaf spray insecticides.	Aphids, Ants, Grasshoppers, Bees, Ladybirds.
4.	Garlic leaf spray insecticides.	Aphids, Ants ,Whiteflies, Slugs, Termites, Beetles, borders, Caterpillars, Army worms.
5.	Chile pepper spray insecticides.	Aphids, Ants, Whiteflies, Grasshoppers, Mites spider.
6.	Soap spray insecticides.	Aphids, Mites, Whiteflies, Thrips, Mealybugs, Spider.

Result and discussion –

Thousands of chemicals have been synthesized and used routinely in day to day life. Many of they while in use or during manufacture causes serious hazards to the environment and human health. Ever increasing demand of chemicals is rapidly depleting our natural resources; generating unmanageable amount of waste causing extensive environmental pollution. The hazardous effect of manmade chemicals is directly or indirectly challenging the very existence of our ecosystem. It is the design of products and processes that minimize or eliminate the use and generation of substance hazardous to humans, animals, plants and environment.

The effect of chemical insecticides on environment affected as like air pollution, soil pollution, water pollution. Water soluble pesticides are easily transported from the target area into ground water and streams since the pesticides get dissolved in the water and cause damage to un-targeted animals and plants in other places.

The effect of insecticides on human health depend on the toxicity of the chemicals and the length and magnitude of exposure. Farmers and their families experience the greatest exposure to agricultural insecticides through directly contact. And in todays life, the number of death of people mostly farmers increase by drinking chemically made insecticides or pesticides. By this many families become destroyed and become economically poor. This problem becomes more dangerous in Maharashtra. Hence, naturally made insecticides or pesticides also control this problem because our naturally made insecticides are non-toxic to human being.

All of this comes to a final conclusion about chemically made insecticides.

1. Insecticides damage ecosystem.
2. It may damage or harm untargeted animals.
3. It may decrease biodiversity.
4. It may cause a decline in population or even cause extinction of species.
5. It may “mess up” food chains.
6. It maydistrupt the natural balance in ecosystem.

There are twelve principles of green chemistry. We use eight principles from them to make natural homemade insecticides as follows:

1. These prevents waste.
2. They are less hazardous chemical synthesis.
3. These are safer products.
4. They attain safer solvents and reaction conditions.

5. This use as renewable feedstock.
6. They do not contain chemical derivatives.
7. Design chemicals and products to degrade after use.
8. Analyse in real time to prevent pollution.

In our surroundings area, we see variety of insects we must control them by making natural insecticides by using household chemicals. So we trying to make natural homemade insecticides by using garlic, vegetable oil, neem leaves, tomato leaves, chilli -pepper with some drops of liquid soap. We are successful in this project. These insecticides show good effects and which are nontoxic, not harmful to human beings and inexpensive to farmers.

So now a days, all farmers even our familiars use commercially made insecticides to control insects. They spray on crops which are affected by insects. Commercially made insecticides contains many toxic substances like organochlorides, organophosphates and carbonated, parathyroid, neonicotinoids, ryanoids, DDT etc. are control the insects but harmful to all living organisms and environment. Also these insecticides damage our ecosystem, disturb our food chain. By all this conclusion, we decide that we have to prepare household insecticides using naturally available materials these are non-toxic, easily available and inexpensive for farmers. We try in our home and in farm, it gives good results. These naturally homemade insecticides also protect from ladybirds and caterpillars. These insecticides used in agricultural, industrial field. Also used in our home to avoid ants, Whiteflies, Spider etc.

Form above result and discussion, our naturally prepared insecticide have some application as follows:

1. Natural homemade insecticides used for controlling a wide range of insect pests in the garden.
2. Natural homemade insecticide such as tomato leaf spray insecticide used as a pesticides
3. These insecticides are perfectly safe to spray on vegetables and fruit crops as well as ornamental shrubs and plants except vegetable oil spray insecticides and Chile pepper spray insecticides.
4. These insecticides also protect from ladybirds and caterpillars.
5. These insecticides are used in agricultural, medicine, industry.
6. These insecticides are non-toxic and safer to human beings.
7. Natural homemade insecticides are useful to usually farmers. In low budget these insecticides gives devastating effect. These insecticides also use as a pesticides and fungicides.

Conclusion-

From above result and discussion, it was clear that the natural insecticide have great results than that a synthetic commercially available insecticide. On other hand it was found that the synthetic commercially available insecticide is hazardous to human being and causes the serious diseases in human being. To overcome this problem we are prepared six types of natural insecticide by using naturally available materials. Such as neem leaves, garlic, tomato leaves, vegetable oil, chili pepper, soap, etc. and prepared six types of insecticide as vegetable oil spray insecticide, garlic spray insecticide, neem leaf spray insecticide, chili pepper spray insecticide, tomato leaf spray insecticide, soap spray insecticide, etc. They all are found to best results to control the insects butterflies, ants, whiteflies, etc. but out of these some are found to have greater result in controlling the insects. Finally it was concluded that we are advising to the farmers for use of these tomato leaf spray insecticide, garlic spray insecticide, neem leaver spray insecticide.

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06. NEW APPROACHES OF POLYMER SCIENCE

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Abstract

The present paper effectively talks about new approaches of polymer science. This paper concentrates on the growing importance of polymer science in information and communications, an emerging field for polymers significantly based on their electronic properties makes the interdisciplinary aspects of polymer research abundantly clear. This area is attracting a great deal of attention, particularly among researches who are not traditional specialists in polymer science.

Our world has been transformed as the transistor based technologies have given rise to new modes of information storage, processing, and transmission, vital to enchanced productivity, improved healthcare, and better transportation systems. These technologies are abundantly evident as supermarket scanners, fax machines, word processors, automatic teller machines, and many other "essentials" of modern life. In all these technologies polymers are key factors. The role of polymers is predicted not only to increase in quantitative terms, but also, more importantly, to extend into new areas in which polymers have not been employed in the past. In this paper, some of exotic properties of polymers are briefly described. For many of materials, applications are only now being developed. It is likely that the new applications will have rich economic factor.

Introduction

Polymer, any of a class of natural or synthetic substances composed of very large molecules, called macromolecules that are multiples of simple chemical units called monomers. Polymers make up many of the materials in living organism, including, for example, proteins, cellulose, and nucleic acids. Polymers have become an undetachable part of our everyday life. The recent developments of polymer technology have revolutionized the field of material science increasing the use of polymer based substances from building materials to packing materials, fancy decoration articles, electrical engineering, communications, automobile, aircrafts, etc. In this paper, some of more exotic properties of polymers in information and communication are described.

Polymer Sensors

A great deal of sensor research and development is focused on tailoring polymeric materials for applications in the

chemical and biochemical fields. Polymers used in sensor devices either participating sensing mechanism or immobilize the component responsible for sensing the analyte. A new class of polymers known as intrinsically conducting polymers (CPs) or electroactive conjugated polymers exhibit interesting electrical and optical properties, which were found only in inorganic systems.

A) Alcohol Sensors

Conducting polymers gained popularity as their use in sensor for alcohol vapors, such as methanol, ethanol and proponal. Polyaniline doped with camphor sulphonic acid also showed a good response for alcohol vapors. Polyaniline and its substituted derivatives such as poly(o-toluidine), poly(o-anisidine), poly(2,3 –dimethyl aniline), poly(N–dimethyl aniline), poly(N –ethyl aniline), poly(2,5 –dimethyl aniline), poly(diphenyl amine) were found sensitive to methanol, ethanol, propanol, butanol and haptanol vapors. All polymers respond to the saturated alcohol vapors by undergoing a change in resistance; resistance decrease in the presence of small chain alcohols (methanol. Ethanol and propanol), while an opposite trend was observed with butanol and haptonol vapors. Such change in resistance of the polymers on exposure to different alcohol vapors was attributed to their chemical structure, chain length and dielectric nature. All the polymers showed measurable response for short chain alcohols, at concentration up to 3000 ppm, but none of them is suitable for long chain alcohols. Polypyrrole doped with dodecyl benzene sulponic acid and ammonium persulphate showed a linear change in resistance when exposed to methanol vapors in range 87-5000 ppm. Barlett and Ling-Chung also detected methanol vapors by the change in resistance of a polypyrrole film.

B) Optical Sensors

Optical sensors are based on the measurements of light absorbed or emitted as a consequence of a biochemical reaction. Light waves are guided by means of optical fibers to suitable detectors. Such sensors can be used for measurements of pH, O_2, CO_2 etc. A commercial optical sensor, a hybrid electrochemical/optical LAPS (light addressable potentiometric sensor), was developed by M/s Molecular Divices in Palo Alto, USA. Development of cheap, efficient, fiber optic cable for applications in telecommunications and technological advances in the design of small monochromators and laser diodes has stimulated research into optical sensors. Typically, these devices incorporate a material at the tip or on the side of the cable, which can generate an optical signal related

to the concentration of target species in the sample. Both fluorescence and absorbance have been used for this purpose via direct and indirect mechanism.

Polymer Dielectrics for Electronics

Organic polymers play a crucial role as insulating materials in electronics. The most visible applications are in silicon chip encapsulation and in dielectric layers for printed circuit boards (PCBs). Encapsulation of chips is accomplished through transfer molding in which the chip, attached to its metal lead frame, is covered entirely with plastic, leaving only the ends of the lead frame connectors exposed for connection to printed wiring board (PWB) pads. The polymer employed is usually an epoxy that is highly loaded with silica powder to reduce the coefficient of thermal expansion. Differences in thermal expansion between chip and encapsulant create large stresses on cooling from mold temperatures and as the temperature of the assembly is cycled in testing and in use. Encapsulation is mainly for mechanical and chemical protection of the chip and the lead frame and thus facilitates handling for automatic assembly. Materials and processes have been developed to a high degree of sophistication. High mechanical strength is achieved with the smallest external dimensions.

Printed circuit boards are layered structures of patterned copper connection paths ("wires") placed on a polymer substrate. The width of the "wires" is typically 100 to 200 micrometers (µm). Polymers employed include epoxies, polyesters, fluoropolymers, and other materials, but glass-reinforced epoxies (usually bisphenol-A based) are by far the most widely used. Metal patterns are defined photolithographically and plated to the desired thickness, and the layers are then piled up and cured in a press. Circuits with more than 40 copper layers (signal, power, and ground) have been produced commercially. Connection to the inner layers is made through "via" holes that are copper plated. One super-computer was marketed in which all of the electronics was placed on a single multilayer circuit board. The materials and process control requirements are challenging, and the functional end-product is worth a great deal.

In some cases a finer form of interconnection is needed, and this is provided by hybrid circuits based on an alumina substrate (with "wire" widths of about 75 µm) and multichip modules (MCMs) usually built on a silicon wafer (with "wire" widths in the 10- to 50-µm range). MCMs represent the leading edge of interconnection technology, and they are

used when the time of transit of signals from chip to chip is an important limitation on the processing speed of the electronic system. The speed of light is the ultimate barrier, and consequently it is essential to employ dielectrics that have the lowest practical dielectric permittivity. This is an area in which polymers offer substantial advantages over inorganic dielectrics.

Printed Circuit Board Materials

Practically any twentieth century gadget we can think of, from the cheapest clock radio to the most expensive mainframe computer, has its electronic guts mounted on printed circuit boards. These "boards" actually fiberglass cloth impregnated with a brominated epoxy polymer resin got their name because the electronic components on them are wired together by thin copper ribbons deposited directly onto the boards, like ink on paper. The idea that bulky, plastic-clad copper wires could be replaced by ribbons of bare metal on an insulating background was one of the fundamental breakthroughs of the electronics revolution of the 1960s.

Printed circuit board substrates are an example of a "composite material" a multicomponent material that performs better than the sum of the properties of its individual components. The chemical structures of such a material's components, and their relative proportions, can be tailored to provide just the right set of properties for a given application. In this case, the material has to be not only lightweight and strong but also an electrical insulator, which rules out the use of metal sheets. The material must also be fracture-resistant, so that it can be cut to shape or drilled without cracking. And the material must be thermally stable some of the newest, high technology computer chips give off a lot of heat. Where such a chip is mounted, the board can be exposed to temperatures of up to 121°C. The board has to handle such a hot spot without melting. The board also has to be flame retardant, so that an electrical short does not become a conflagration that wipes out a lot of expensive hardware. In this composite material, the glass fiber cloth gives the board its lightweight strength, while the brominated epoxy resin eventually becomes a rigid, three dimensional network that gives the board the necessary stiffness, fracture resistance, and other properties.

The manufacturing process starts with a roll of glass-fiber cloth. Carefully adjusted tension rollers feed the cloth at a precisely determined rate through a bath of the resin, which has been dissolved in a solvent. The resin-impregnated cloth then wends its way over other rollers and through a series of ovens to evaporate the solvent. The heat and a catalyst also "cure" the resin

promoting the chemical reactions that harden it into a tough, durable solid. Several layers of partially cured cloth can be laminated together before further curing to make an even stronger circuit board. Finally, the cured board, now as stiff as its namesake, is sawn up into the individual circuit boards.

Circuit board substrate materials have evolved over the years. New epoxies are now being used to improve dimensional control. Alternative polymer matrices are used for applications demanding high-temperature performance. Polymers are also being used for the reinforcing fibers themselves. Printed circuit boards, the key interconnection medium for electronics, depend critically on polymers and their composites.By far the most research and development on materials for MCM dielectric layers has gone into polyimides, and most existing applications are based on polymers of this family. Great strides have been made in achieving the demanding property mix required through careful tailoring of the monomer chemistry. Improved adhesion, lower dielectric constant, reduced sensitivity to moisture, higher thermal stability, and other properties have been improved greatly. The in-plane coefficient of thermal expansion was reduced and adjusted to the range of silicon, metals, and ceramics. Most major electronics companies manufacture MCMs based on polyimides.

In spite of the extent of commitment to polyimides, it has proved difficult to achieve all the desired properties in a given composition. Other polymer dielectrics are in use, and new materials are under consideration. For example, commercial MCMs are manufactured by one electronics systems provider based on a proprietary epoxy-acrylate-triazine polymer that is photodefinable. Sample MCMs have been produced based on a benzocyclobutene (BCB) polymer dielectric. In spite of the large experience base with the polyimide materials, the newer polymers have advantages and offer attractive alternatives. All of the candidates are glassy polymers. The dielectric constants may be compared as follows:

Alumina	9
Glass ceramics	4-5
Fused silica	4
Polyimides	3-4
Triazine	2.8
BCB	2.7

In the final analysis, the choice of materials will be based on the sum of property advantages and processing practicality. Polymers offer the lowest dielectric constants and the thinnest "wires."

Lithographic processes and associated technologies have advanced to the point that semiconductor device cells and

conductor lines are so small (less than 1 μm) and the switching times are so fast that the continual increase in performance traditionally derived from a combination of improvements in device structure and reduction of device dimensions cannot be fully realized. This is owing to the fact that the propagation of signals through the wiring on the chip is becoming the dominant limitation on processor cycle time. The velocity of pulse propagation in these structures is inversely proportional to the square root of the dielectric constant of the medium. Hence, reductions in the dielectric constant translate directly into improvements in processor cycle time, in part because of the speed of propagation. In addition, the distance between signal lines is dictated by noise issues or "cross-talk" that results from induced current in conductors adjacent to active signal lines. A reduction of the insulator dielectric constant permits moving the signal lines closer together, allowing designers to reduce the length of conductor lines and thereby improve cycle time.

Performance demands on polymers incorporated as permanent parts of the chip structure are even more stringent than the requirements for MCMs and PCBs. Insulating materials in chip applications must be able to withstand the very high temperatures associated with the processes used to deposit metal lines and to join chips to modules. At a minimum, they must withstand soldering temperatures without any degradation or outgassing. They must have thermal expansion coefficients that are closely matched to that of silicon. Silica meets all of the requirements extremely well, and this would continue to be the material of choice were its dielectric constant not so high. While much attention has been given to polymers with very low permittivities, there is an increasing need for high-permittivity polymers in capacitor applications. The rational design of polymers having high ($\varepsilon >$ ca. 10 to 15) permittivities and low loss has not been pursued, and this represents an attractive opportunity for joint efforts in molecular modeling and polymer synthesis.

Clearly, organic polymers currently play a critical role as insulators in electronic devices and systems. Continued success in the development of new generations of these critical dielectric materials depends on close interactions between the microelectronics and the chemical communities, a relationship that is not in evidence in the United States. New partnerships are needed if we are to maintain competitiveness in this vital industry.

Compact Disk Technology

Compact disks have emerged as the dominant recording medium for the musical entertainment field. Information is recorded as a series of pits on radial or concentric tracks that extend from the inner to the outer diameter of the disk. The pits are typically 0.25 µm deep, 0.5 µm wide, and up to 3.5 µm long. The information is read by means of a laser beam that is reflected when it falls on the flat of the disk but is almost entirely deflected when it falls on a pit. This digital bit stream is converted to an analog signal to reproduce the music. The disk itself is made of a polymer by means of a process that is technically demanding and economical.

The manufacturing sequence consists of encoding the pit pattern onto a glass master. This is accomplished by means of a lithographic process employing a polymer resist and an irradiating laser. The open areas thus formed are etched to form the pits. Nickel is then vacuum deposited, thickened, and formed into a negative "stamper." The stamper is then seated into a mold cavity, and CDs are produced by injection molding of polycarbonate or poly(methyl methacrylate). The molding process is carried out at very high pressures, and dust particles must be avoided. A class 10 cleanroom is usually required to achieve quality replication and long stamper life.

Molded-in stress is a major consideration. When polycarbonate flows in the submillimeter thickness of optical disks for several centimeters, there is significant molecular orientation that manifests itself as birefringence or optical distortion.

Polymeric Light Emitting Diodes

Recently, light-emitting diodes (LEDs) based on conducting polymers have been achieved in a number of laboratories around the world. The active element is a thin film structure based on a modified poly(phenylene vinylene) (PPV), with a metal film as the electron injector and polyaniline as the hole injector. Various colors have been demonstrated, and the operating characteristics are competitive with inorganic LEDs. Highly flexible devices have been fabricated supported on a poly(ethylene terephthalate) base. The possibility of making large-area displays exists.

Much research and development remains to be done. For example, low work function metals are required, and they are difficult to passivate. However, the simplicity of fabrication of the laboratory devices, involving spin casting from solution, is promising if the problem of limited device lifetime can be solved.

Conclusion

The foregoing examples illustrate the breadth of application of advanced polymeric materials in applications that are not generally recognized. In these applications, the polymer is in some sense the active element that plays the central role. No other class of materials can rival its range of properties, flexibility in processing, and potential for low cost. Quality of performance is an essential and challenging feature that is being demonstrated by polymeric materials in an impressive array of applications. And the polymer revolution in this arena is just beginning. Polymer sensors exist for chemical species, thermal and acoustic radiation, temperature, pressure, humidity, ionizing radiation, electric charge, and more. Polymer dielectrics in electronics offer the basis for the smallest circuits and the highest speed of operation. Light-emitting diodes based on flexible polymeric films have been fabricated and are likely to find diverse applications in the future. The collaboration of polymer scientists and technologists in research will accelerate the availability of durable and cheap information and communication devices for human consumption.

07. IMPACT OF PERSISTENT & NON-PERSISTENT PESTICIDES ON AGRI-ECOSYSTEM

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Human interference in the natural processes has created many irreversible changes in both terrestrial & natural ecosystems. Managing numbers & distribution of certain plants & animals in Agri-ecosystem has resulted in upset of many ecological processes & principles. Food chains are very seriously damaged & resulted in outbreak of many diseases. Cultivation of high yielding, short duration as well as improved & genetically modified (GM) varieties of plants & animals posed vulnerability towards pest attack. Change in weather conditions & Climate busted them. To overcome this problem Pesticides, a category of toxic & hazardous chemicals entered agriculture. They efficiently controlled pests but raised many environmental issues. They are like a double edged sword. They should be wisely used. Pesticide is an umbrella term covers large number of hazardous chemicals specially designed to kill/control a target organism called as pest. Pest may be insect, animal, plant or microbes. Use of both persistent & non-persistent Pesticides is responsible for upset of ecological processes. It has adverse effects on both natural ecosystems & managed agri-ecosystems. Pesticide use has adverse impacts on all biotic & a-biotic components of ecosystem. They have detrimental effects on properties of these precious natural resources like soil, air & water. Sustainability of these resources & ultimately health of human beings is at risk. Persistent Pesticides residues remain in ecosystem for many years depending on its half-life. It enters food chain & then get transferred from one organism to other organism in higher tropical levels. This transfer results in accumulation of higher quantities of it in tropical levels, called as bio-accumulation & consequently results in bio-accumulation. Non persistent Pesticides affect beneficial organisms, being more toxic affect human beings also & repeated use results in development of resistance in target organism. Thus both persistent & non-persistent pesticide use has serious environmental consequences on sustenance of agri-ecosystem.

Key words- Persistence Pesticides, Agri-ecosystem

Introduction

Modern agriculture employ's Scientific & Technological tools. The factors & conditions which affect the growth & development of useful plants & animals are controlled by these means. Todays tropical agriculture is traditional, transitional & modern farming systems. Crop production system vary with crop, time, location & the level of technology of that area. Protection of crop is becoming one of the essential features of agriculture. Any organism, which is harmful or potentially harmful to plants, live-stocks or human can be called Pest. Disease is the product of the interaction between the causal organism, host & certain factors within the environment. Pest have arisen in two major ways

1. Natural selection
2. Alteration of ecosystems(Human Activity) which includes selective Breeding, introduction of new plants or animals into environment, monoculture, changes in social habits, & use of toxic chemicals like pesticides.

In the present era pests are managed by use of chemical pesticides. Each pesticide or pesticide class comes with a specific set of environmental concern. Such undesirable effects have led many pesticide to be banned, while regulations have limited or reduced the use of others. Over time pesticides have generally became less persistent & more species specific, reducing their environmental footprint.

Soils cover large part of the land surface of the earth. They are three Dimensional, often contains distinct horizons(Layers) & vary with climate, parent material & topography. They also change over time. Soil is a mixture of minerals, organic material, living organisms, air & water that together support the plant life , which are primary producers in all ecosystem. Soils largely determine the effective functioning of both natural & agricultural ecosystems. Together with the climate, the properties of soils determine the potential biological production of land. Soil properties affect the qualities of surface water & the atmosphere. Farmers are particularly concern with the soil. Urban dwellers should also be concerned about soil because soil health determines the quality & quantity of food they will eat. Food or nutrition is a prime factor which determine health of human beings.

Pesticide use has reduced quality & quantity of biomass & reduced capacity of soil to support biomass production in both natural & agri-ecosystem, resulting in serious environmental consequences.

To overcome impacts of pesticides on environment & to maintain good soil health new strategies of pest management are invited. Present paper give emphasis on

study of pesticide impact on soil & other related natural resources and their control for sustainable agriculture.

Material & Methods

The present research work was undertaken to study the environmental consequences of pesticide use. Objectives of the research was to study the reason behind the selection of chemical method of pest management by farmers & the environmental impacts of pesticide use. Emphasis was given on the Influence of pesticide use on ecological systems. As dimensions of ecosystem can not be precisely defined, survey was done in intensively cultivated eastern area of Sangli District. Grape is the major fruit crop of this area. Many farmers cultivate Grapes to sell it as a fresh fruit in market and others cultivate it for processing at farm level. They process grapes to resins. Survey was done for use of agrochemicals. While surveying it was found that these farmers use number of agrochemicals . This kind of cultivation is referred as intensive agriculture. Soil samples were collected by using appropriate sampling technique from cultivated area. These samples were analyzed for fertility/nutrient status. Conventional methods of analysis were used. Organic matter was estimated by Walkely & Black Rapid Titration Method. Available potassium was estimated by ammonium acetate extraction & subsequent flame Photometric. Available Phosphorus was determined by using colorimetric method & available Nitrogen was measured by Alkaline KMnO4 method. DTPA extract of soil was used for micronutrient analysis by Atomic Absorption Spectrophotometer. Soil was also tested for microbial count.

Growth pattern were seen in the field for deficiency symptoms as well as for malformation. Emphasis was given on the outbreak of particular organism in relation to pesticide use.

Results & Discussion

Sustainability is a complex concept. The property of Biological Systems or natural resources to remain diverse & productive indefinitely is called as sustainability. Agriculture is a purposeful work through which elements in the nature eq. natural resources are harnessed for the production of useful plants & animals for human welfare. Mismanagement in the agricultural practices has led to the irreversible changes in the ecological processes which will not support productivity in future.

Soil flora & fauna has a great importance in nutrient recycling in ecosystem. They play crucial role in maintenance of soil health & nutrient availability. Pesticide use has found dramatic changes in number & distribution of both flora & fauna. It was

found that microbial flora & fauna in the pesticide used area was dramatically affected. That was also reflected on growth patterns of crop grown in that area.

Persistent pesticides

Pesticide use has direct and indirect effects on ecosystems. Persistent pesticides like Chlorinated Biphenyls eq. DDT kill not only the unwanted target pest but also destroy non target organisms. These non target organisms are helpful for sustainable ecosystems. These organisms play a critical role in food chain. Many of them are pollinating agents. This results in decreased productivity of crop plants & also in the upset of ecological food chains. This phenomenon may result in increased population of certain organisms whose predator has eliminated. This way many organisms number will explode & result in emergence of new diseases. Being persistent they are accumulated in soils, enters plants & then enter the food chain. As human being is at the end of food chain enters human body & gets accumulated in the body. It is reported that many are responsible for nervous disorders, liver & stomach cancer. Many of them are suspected carcinogen & may affect the delicate organs like liver, kidney as well as reproductive system of animals.

Pesticides may enter water bodies & and has adverse effects on aquatic life & biodiversity.

Workers in the pesticide industries & workers in the field are exposed to many hazardous chemicals during process. Accidents during industrial processes pose threat to workers & common people.

Non-persistent or low Persistent pesticides

Many non-persistent or low Persistent pesticides, remain in the atmosphere for short period of time but because of high toxicity are harmful for non target organisms , human & wildlife eq. Organo-phosphate pesticides are responsible for causing muscular weakness, tremors & dizziness in animals.

Being non persistent they are repeatedly used, which develops resistance in target Insect/pest after a certain period of time. Thus effectiveness of these insecticides decreases considerably. This also results in use of higher concentrations of these chemicals for next time which may adversely affect human & wildlife.

Soil health Study

It is reported that fungicide use results in increase in bacterial population. Certain fungicides are toxic to soil arthropods. Captan like chemicals reduces the population of the useful soil invertebrates like springtails, earthworms

& millipeds. It also affect useful algae at very low concentrations.

It was found that residues of herbicides decreases bacterial count & increases fungi count. This may result in outbreak of new fungal disease.

Pesticide use has adversely affected number & distribution of earthworms. The effect was reflected in decreased yield & quality of product. Soil flora & fauna plays a key role in soil health management. It was observed that flora & fauna of study area was drastically changed. Food chains were seriously altered. This may also result in outbreak of new insect disease. Increased number of Thrips in study area was the suspected reason behind this. Thrip attack was aresult of misuse of insecticides in the study area.

It was found that the available nutrient content of soil samples collected were High with respect to Nitrogen, K2O & P2O5. Micronutrient content was also categorized as High. Thus all soil samples collected were rich in nutrient content. But still malformation found in the foliage of plants. That was due to complex interaction between plant & attach of thrips with response to pesticide misuse.

Integrated Pest Management (IPM)

It was found that Pesticide use in agri-ecosystem has created several problems in the agricultural sustainability.Requirement of our generation is to manage sustainability of soil & related resources. It is fact that without pesticides agriculture will not have sustainability. So this impact of pesticide on environment can be managed by applying Integrated Pest Management (IPM). It is a strategy of pest management whose goal is not eradication, rather to keep pest population below that which can cause economic loss to crop production. This can be accomplished by an interdisciplinary approach. All strategies & methods of pest management are appropriately used in IPM. Pesticide use is reduced to minimum level. In brief , IPM is a pest management strategy that combines the principles of other pest management systems, but with reduced emphasis on the use of chemicals to reduce pest population below levels that can cause economic loss. Mechanical(Physical), Agronomical, legislative & biological methods are used sequencialy. Use of Bio-pesticides is recommended as ecological principles like predation, parasitism & antagonism are explored.

Safe Pesticides

Safe pesticide use is allowed in IPM. Now goal of pesticide industries & regulatory bodies is to design & recommend safe pesticides. A safe pesticide used in IPM should be able to destroy the target pest within a short period

(one or two weeks) & dissipate rapidly. This will reduce chance of entry of these chemicals in food chain.

Absence of synthetic pesticides means encouragement of wildlife.Consequently reduced risk of polluting nearby water system.Low level pesticide application ..more soil Organisms survival ..better soil structure & increased inherent soil fertility. More insects above ground, more food for spiders, birds & predators..Biodiversity maintenance

08. Synthesis and spectral studies of thiazoldine-2,4-dione derivatives as antidiabetic agents

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ABSTRACT

Diabetes mellitus is a complex, chronic, progressive disease of glucose metabolism, which eventually can adversely affect function of number of organs as well as the nervous and vascular systems. Diabetes mellitus is of two types 1.Insuline dependent Diabetes mellitus (IDDM), which arises due to due to absolute lack of Insulin. 2. Non- insulin in dependent diabetes mellitus (NIDDM), which is characterized by insufficient secretion of insulin and reduction in response of the found to more dominant and Thiazolidine Moiety is found to be more effective.

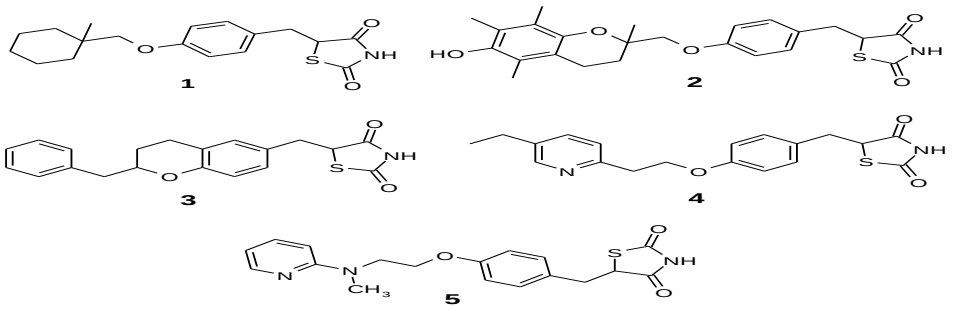
In the present paper we have given a brief account of Thiazolidine-2,4-Dione derivatives, which are promising Anti-Diabetic agents. Emphasis has been given to synthesis of analogues of enegitazone derivatives, in which fused heterocycle (Imidazo[2,1-B]Thiazole) has been introduced. As a part of this we have synthesized precursor 2-Aminothiazole and A-Haloketones which are used further for the synthesis of 2-Alkyl/Aryl-6-Arylimidazo[2,1-B][1,3,4]Thiazole and their formyl derivatives. Formyl group is condensed with Thiazolidine-2,4-Dione to get analogues of englitazole derivatives. All newly synthesized compounds were confirmed by their spectral studies. Newly synthesized compound have shown good Anti-Microbial activities and will be screened for their anti-Diabetic activitie

INTRODUCTION

Type II diabetes **is** one of the major causes of several chronic diseases, such as retinopathy, nephropathy, neuropathy and cardiovascular diseases.[1] Therefore, it is important to regulate the blood glucose level in order to control diabetics.[2] Treatment of diabetes has been carried out with a combination of diet, exercise and hypoglycemic agents. Sulfonylurea stimulate pancreatic β-cells and increases secretion of insulin to lower the blood glucose level.[3,4] However sulfonylurea therapy has some problems such as primary or secondary failure of efficacy, enhancement of obesity, weight gain, high incidence of hypoglycemia.[5,6] A significant advancement has been made with the introduction of new class of compounds thiazolidine-2,4-diones (TZDs) which act as insulin sensitivity enhancers.[7]

Since after the pioneering discovery of ciglitazone[8] (**1**), a new class of thiazolidine-2,4-dione based compounds have been developed to treat diabetic patients that can reverse the insulin resistance in non-insulin dependent diabetes mellitus (NIDDM) type II patients. It

lowered the elevated blood glucose, plasma insulin and triglyceride level in insulin resistant animals, but showed no hypoglycemic effect in nondiabetic or IDDM animal models. Among various substituted compounds benzyl-2,4-thiazolidinedione compounds, troglitazone englitazone[10] (**3**), pioglitazone[11] (**4**) and rosiglitazone[12] (**5**) are potential antidiabetic compounds that have been clinically examined.



PRESENT WORK

In the present work, we have synthesized 5-formyl derivatives of imidazo[2,1-*b*] [1,3,4]thiadiazole and then thiazolidine derivatives using formyl function. The required phenacyl bromides **2** were prepared by using reported procedures.[13] The required 2-amino-5-alkyl/aryl-1,3,4-thiadiazoles **1** were prepared by the reaction of of various carboxylic acids with thiosemicarbazide using sulphuric acid or phosphorous oxychloride for cyclisation [14,15]. The 2-aminothiadiazoles (**1a-c)** were reacted with equimolar quantity of phenacyl bromides (**2a,b**) to get corresponding imidazo[2,1-*b*][1,3,4] thiadiazole derivatives (**3a-f)**.

By this method the required substituents at 2-, 5- and 6-positions have been obtained by starting with appropriately substituted synthons. The respective free bases were obtained by neutralization of the salts with aqueous sodium carbonate solution in good yields[16-18]

The imidazo[2,1-*b*][1,3,4]thiadiazoles (**3a-f),** reacted with DMF and $POCl_3$ mixture (VilsmeierHaack reaction) to afford the new 5-formyl derivatives **7** in good yields. Fomylated imidazo [2,1-b][1,3,4] thiadiazoles (**4a-f)** were treated with thiazolidine-2,4-dione in presence of catalytical amount of piperidine acetate in toluene under reflux condition to get new 5-(2

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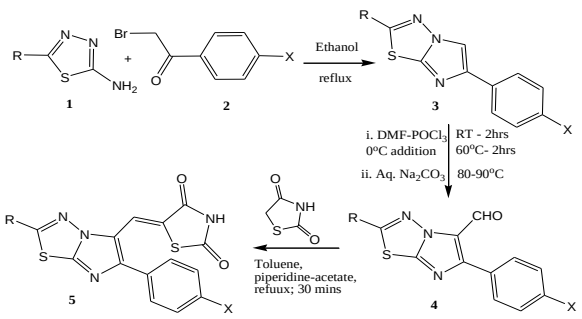

Scheme 1: R = propyl, cyclohexyl, thienyl; X = Cl, OMe

alkyl/aryl-6-arylimidazo[2,1-*b*][1,3,4] thiadiazol-5-yl) methyl lene-1,3-thiazo-li dinediones (**5a-f)** (Scheme 1)

RESULT AND DISCUSSION

The 2- and 5- substituted imidazo[2,1-*b*][1,3,4]thiadiazoles (**3a-f**) were prepared by the reaction of 2-amino-1,3,4-thiadiazole (**1a-c**) with α-haloketones (*p*-chlorolphenacyl bromide **2a** and *p*-methoxy phenacyl bromide **2b)** in dry ethanol as hydrobromides, which on neutralization with aqueous sodium carbonate gave corresponding free bases (**3a-f**) in good yields and products were confirmed by comparing their melting points with that of reported in literature. A sample ^{1}H-NMR (of **3a**) exhibits imidazole C_5-H) proton around δ 7.95 in ^{1}H NMR spectra.

Imidazo[2,1-*b*][1,3,4]thiadiazoles (**3a-f**) were further subjected to VilsmeierHaack reaction, which resulted in the formation of expected imidazo[2,1-*b*][1,3,4] thiadiazole-5-carbaldehydes (**4a-f**) and were confirmed by their melting points. The sample IR spectra of

4a displayed the aldehydic carbonyl at 1681cm^{-1} and ν_{C-H} around 2842cm^{-1}. The structures were further confirmed by the presence of a signal around δ 10.00 for aldehydic proton and absence of C_5-H of imidazole in the ^{1}H NMR spectra.

Formylated imidazo[2,1-*b*][1,3,4]thiadiazoles **4a-f** on reaction with thiazolidine-2,4-dione in refluxing toluene in presence of piperidine-acetate underwent smooth Knoevenagel condensation to afford target molecules (**5a-f**), which possessed $\nu_{C=O}$ for two carbonyl groups around 1730 and 1695cm^{-1} along with $\nu_{C=N}$ and ν_{C-O} in usual region. The ^{1}H NMR spectra displayed the absence of aldehyde proton

EXPERIMENTAL

Preparation of 2-alkyl/aryl-6-arylimidazo [2,1-*b*][1,3,4]thiadiazole-5-carbaldehydes (4a-f); General method (Vilsmeier-Haack reaction) **:**and the presence of vinylic proton around δ 7.80, confirming the condensed product.VilsmeierHaack reagent was prepared by adding phosphorous oxychloride (3mL) in dimethylformamide (20mL) at 0°C with stirring. At the same temperature appropriately substituted 2-alkyl/aryl-6-arylimidazo[2,1-*b*][1,3,4]thiadiazole (**3a-f**) (0.01mol) was added to the reagent and

stirred at 0-5°C for 30 minutes. The mixture was further stirred for 2 hrs at room temperature and then at 60°C for additional 2 hrs. The reaction mixture was cooled in ice water bath and quenched with 5mL water. The reaction mixture was basified with aq. sodium carbonate (10%) solution with proper cooling and further stirred at 80-90°C for 2 hrs. After cooling, the mixture was diluted with water, extracted with chloroform (30mL x 3). The combined extracts were washed with water (100mLx3), dried over anhydrous sodium sulphate. Solvent was removed by evaporation and solid obtained was recrystallised from suitable solvent to afford colorless to pale yellow crystals in excellent yields.

6-(4-Chlorophenyl)-2-propylimidazo[2,1-*b*][1,3,4]thiadiazole-5-carbaldehyde (4a): Colorless cubes (chloroform+hexane), yield 85%, m.p. 88-90°C; IR (KBr) υcm^{-1}: 3058, 2856, 1678, 1588, 1542; ^{1}H NMR (300MHz, $CDCl_3$) δ: 1.09(t, *J*=7.3Hz, 3H, $CH_2\underline{CH_3}$), 1.86(sextet, J_{CH2CH3}=7.4Hz, J_{CH2CH2}=7.3Hz, 2H, $CH_2\underline{CH_2}CH_3$), 3.10(q, *J*=7.3Hz, 2H, $\underline{CH_2}CH_2CH_3$), 7.49(d, *J*=8.4Hz, 2H, C_3, C_5-H, phenyl), 7.86(d, *J*=8.3Hz, 2H, C_2, C_6-H, phenyl), 10.04(s, 1H, CHO); ^{13}C NMR (300MHz, $CDCl_3$) δ: 13.8, 23.0, 34.3, 124.3, 129.4, 130.6, 131.2, 136.3, 151.2, 154.6, 167.9 and 177.5.

6-(4-Methoxyphenyl)-2-propylimidazo[2,1-*b*][1,3,4]thiadiazole-5-carbaldehyde (4b): Colorless cubes (chloroform + hexane), yield 78%, m.p. 118-120°C; IR (KBr)υcm^{-1}: 2964, 1679, 1580, 1557, 1178; ^{1}H NMR (300 MHz, $CDCl_3$) δ: 1.08(t, *J*=7.3Hz, 3H, $CH_2CH_2\underline{CH_3}$), 1.87 (sextet, J_{CH2CH3}= 7.6Hz and J_{CH2CH2}= 7.5Hz, 2H, $CH_2\underline{CH_2}CH_3$), 3.09(t, *J*=7.6Hz, 2H, $\underline{CH_2}CH_2CH_3$), 3.87(s, 3H, OCH_3), 7.03(d, *J*=8.5Hz, 2H, C_3, C_5-H, phenyl), 7.82(d, *J*=8.5Hz, 2H, C_2, C_6-H, phenyl), 10.00(s, 1H, CHO); ^{13}C NMR (300MHz, $CDCl_3$) δ: 13.8, 22.9, 34.2, 55.7, 114.5, 123.9, 125.2, 130.8, 151.2, 156.3, 161.3, 167.2 and 177.6. Anal. calcd. for $C_{15}H_{15}N_3O_2S$: C, 59.78; H, 5.02; N, 13.94. Found: C, 59.96; H, 5.10; N, 13.82%.

6-(4-Chlorophenyl)-2-cyclohexylimidazo[2,1-*b*][1,3,4]thiadiazole-5-carbaldehyde (4c):): Colorless crystalline solid (chloroform + hexane), yield 78%, m.p. 148-150°C; IR (KBr) υcm^{-1}: 3053, 2927, 2856, 1675, 1589, 1546; ^{1}H NMR (300MHz, $CDCl_3$,) δ: 1.30-2.19(m, 10H, cyclohexyl), 3.18(m, 1H, C_1-H, cyclohexyl), 7.43(d, *J*=7.5Hz, 2H, C_3, C_5-H, phenyl), 7.76(d, *J*=7.5Hz, 2H, C_2, C_6-H, phenyl), 10.01(s, 1H, CHO); ^{13}C NMR(300 MHz, $CDCl_3$) δ: 26.0, 26.2, 33.6, 41.7, 113.6, 124.6, 129.3, 129.6, 130.4, 142.2, 152.6, 155.9 and 177.9.

2-Cyclohexyl-6-(4-methoxyphenyl)imidazo[2,1-*b*][1,3,4]thiadiazole-5-carbaldehyd (4d): Colorless needles (chloroform+hexane), yield 68%, m.p. 140-142 °C;. IR (KBr) υcm^{-1}: 3057, 2935, 1680, 1583, 1542, 1982; ^{1}H NMR (300MHz, $CDCl_3$) δ: 1.25-2.16(m, 10H,

cyclohexyl), 3.15(m, 1H, C_1-H, cyclohexyl), 3.88(s, 3H, OCH_3), 7.08 7.08(d, *J*=8.1Hz, 2H, C_3, C_5-H, phenyl), 7.64(d, *J*=8.1Hz, 2H, C_2, C_6-H, phenyl), 9.98(s, 1H, CHO.

6-(4-Chlorophenyl)-2-thien-2-ylimidazo[2,1-*b*][1,3,4]thiadiazole-5-carbaldehyde (4e): Pale yellow cubes (chloroform+hexane), yield 66%, m.p. 140-142°C; IR (KBr) υcm^{-1}: 2855, 1682, 1610, 1553; ^{1}H NMR (300MHz, $CDCl_3$) δ: 7.16(dd, J_{H3H4}=3.3Hz, J_{H4H5}=3.3Hz, 1H, C_4-H, thiophene), 7.26-7.86(m, 6H, C_3, C_5-H, thiophene andphenyl protons), 10.08(s, 1H, CHO).

6-(4-Methoxyphenyl)-2-thien-2-ylimidazo[2,1-*b*][1,3,4]thiadiazole-5-carbaldehyde (4f): Pale yellow needles (chloroform + hexane), yield 75%, m.p. 168-170°C; IR (KBr) υcm^{-1}: 2857, 1678, 1614, 1552; ^{1}H NMR (300 MHz, $CDCl_3$) δ: 3.86 (s, 3H, OCH_3), 7.04(d, *J*=6.7Hz, C_3, C_5-H, phenyl), 7.17(dd, J_{H3H4}=3.3Hz, J_{H4H5}=3.3Hz, 1H, C_4-H, thiophene), 7.28(d, *J*=3.1Hz, 1H, C_3-H, thiophene), 7.56-7.69(m, 3H, C_5-H, thiophene; C_2, C_6-H, phenyl), 10.03(s, 1H, CHO). Anal. calcd. for $C_{16}H_{11}N_3O_2S_2$: C, 56.29; H, 3.25; N, 12.31. Found: C, 56.44; H, 3.31; N, 12.19%.

Preparation of 5-(2-alkyl/aryl-6-arylimidazo[2,1-b][1,3,4]thiadiazol-5-yl) methyl lene-1,3-thiazolidinediones (5a-f); General method: A well stirred mixture of 2-alkyl/aryl-6-arylimidazo[2,1-*b*][1,3,4]thiadiazole-5-carbaldehyde (4a-f, 0.001mol) and 1,3-thiazolidine-2,4-dione (0.11g, 0.001mol) was refluxed in toluene (25mL) with catalytic amount of piperidine-acetate for 2 hrs. The yellow solid separated was collected by filtration, washed with hot benzene and methanol. The products were recrystallized from dimethylformamide.

5-{[6-(4-Chlorophenyl)-2-propylimidazo[2,1-*b*][1,3,4]thiadiazol-5-yl]methylene}-1,3-thiazolidine-2,4-dione (5a): Bright yellow granules (DMF), yield 93%, m.p. 272-276°C; IR (KBr) υcm^{-1}: 3162, 2893, 1729, 1696, 1614, 1556; ^{1}H NMR (300MHz, C_6D_6+TFA) δ: 1.08(t, *J*=6.3Hz, 3H, $CH_2CH_2\underline{CH_3}$), 1.88 (sextet, J_{CH2CH3}=6.1Hz, J_{CH2CH2}=6.3Hz, 2H, $CH_2\underline{CH_2}CH_3$), 3.10(t, *J*=6.6Hz, 2H, $\underline{CH_2}CH_2CH_3$), 7.60(d, *J*=8.4Hz, 2H, C_3, C_5-H, phenyl), 7.78(d, *J*=8.9Hz, 2H, C_2, C_6-H, phenyl), 7.98(s, 1H, vinylic proton).

5-{[6-(4-Methoxyphenyl)-2-propylimidazo[2,1-*b*][1,3,4]thiadiazol-5-yl]methylene}-1,3-thiazolidine-2,4-dione (5b): Yellow granules (DMF), yield 91%, m.p. 266-270°C; IR (KBr) υcm^{-1}: 3104, 3022, 2927, 1730, 1685, 1585, 1209; ^{1}H NMR (300MHz, C_6D_6+ TFA) δ: 1.10(t, *J*=6.3Hz, 3H, $CH_2CH_2\underline{CH_3}$), 1.89(sextet, J_{CH2CH3}=6.0Hz, J_{CH2CH2}=6.1 Hz, 2H, $CH_2\underline{CH_2}CH_3$), 3.10(t, *J*=6.0Hz, 2H, $\underline{CH_2}CH_2CH_3$), 3.82(s, 3H, OCH_3), 6.98(d, *J*=7.8Hz, 2H, C_3, C_5-H, phenyl), 7.55(d, *J*=7.8Hz, 2H, C_2, C_6-H, phenyl), 8.00(s, 1H, vinylic proton

5-{[6-(4-Chlorophenyl)-2-cyclohexylimidazo[2,1-*b*][1,3,4]thiadiazol-5-yl] methylene}-1,3-thiazolidine-2,4-dione (5c): Bright yellow granules (DMF), yield 94%, m.p. >300°C; ^{1}H NMR (300MHz, $CDCl_3$ + TFA) δ: 1.35-2.31(m, 10H, cyclohexyl), 3.24(m, 1H, C_1-H, cyclohexyl),

7.37(d, *J*=8.3Hz, 2H, C_3, C_5-H, phenyl), 7.63(d, *J*=8.3Hz, 2H, C_2, C_6-H, phenyl), 7.93(s, 1H, vinylic proton).

5-{[2-Cyclohexyl-6-(4-methoxyphenyl)imidazo[2,1-*b*][1,3,4]thiadiazol-5-yl] methylene}-1,3-thiazolidine-2,4-dione (5d): Bright yellow granules (DMF), yield 94%, m.p. >300°C; IR (KBr) υcm^{-1}: 3172, 2952, 2865, 1734, 1698, 1611, 1575, 1184;

5-{[6-(4-Chlorophenyl)-2-thien-2-ylimidazo[2,1-*b*][1,3,4]thiadiazol-5-yl] methylene}-1,3-thiazolidine-2,4-dione (5e): Orange-yellow granules (DMF), yield 85%, m.p.290-294°C; IR (KBr) υcm^{-1}: 3146, 3036, 2985, 1732, 1699, 1611, 1561; ^{1}H NMR (300MHz, $CDCl_3$ + TFA) δ: 7.18(dd, J_{H3H4}=3.1Hz, J_{H4H5}=3.3Hz, 1H, C_4-H, thiophene), 7.20-7.91(m, 6H, C_3, C_5-H, thiophene and phenyl protons), 8.02(s, 1H, vinylic proton); MS (m/z, %): 445.9 (33.3), 443.9 (100), 374.9 (22.23), 372.9 (66.69), 337 (30.34), 229.0 (47.07), 113.1 (81.58). Anal. calcd. for $C_{18}H_9ClN_4O_2S_3$: C, 48.59; H, 2.04; N, 12.59. Found: C, 48.59; H, 2.04; N, 12.59%.

5-{[6-(4-Methoxyphenyl)-2-thien-2-ylimidazo[2,1-*b*][1,3,4]thiadiazol-5-yl] methylene}-1,3-thiazolidine-2,4-dione (5f): Bright yellow solid (DMF), yield 84%, m.p. 276-278°C; IR (KBr) υcm^{-1}: 3216, 1736, 1704, 1610, 1560, 1174; ^{1}H NMR (300 MHz, $CDCl_3$ + TFA) δ: 3.95(s, 3H, OCH_3), 7.16(dd, J_{H3H4}=3.8Hz, J_{H4H5}= 3.9 Hz, 1H, C_4-H, thiophene), 7.32-7.38(m, 3H, C_3-H, thiophene; C_3, C_5-H, phenyl), 7.55(d, *J*=7.4Hz, C_5-H, thiophene), 7.84 (d, *J*=7.4, 2H, C_2, C_6-H), 8.02(s, 1H, vinylic proton).8.

Acknowledgements: Sincere thanks to B. V. V. Sangha's Bharata Ratna Prof. C.N.R. Rao Research Centre for providing necessary facilities and Karnatak University, Dharwad for providing NMR facility.

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09. Drinking Water Crisis

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Abstract

Water makes a very small fraction of all water on the planet, while nearly 70 percent of the world is covered by the water, only 25 of it is fresh water. 80 % is undrinkable sea water. Even then, just 1% of our fresh water is easily accessible, with much of its trapped in glaciers and snowfields. India is the second most populated country in the world with over 1.2 billion people which faces a large gap between current supply and projected demand, amounting to 50 per cent of demand or 754 BCM. India's water crisis is predominantly a manmade problem. India's climate is not particularly dry, nor is it lacking in rivers and groundwater. Extremely poor management, unclear laws, government corruption, and industrial and human waste have caused this water supply crunch and rendered what water is available practically useless due to the huge quantity of pollution. Changes proposed in the National Water Policy in Agriculture Sector, Industrial Sector and Domestic Sector. Activities such as farm ponds, percolation tanks, water reservoirs and construction of small and medium size dams and rivers can retain more surface water, while increasing the ground water recharge. India is not a water deficit country, but due to severe neglect and lack of monitoring of water resources development projects, several regions in the country experience water stress from time to time.

Introduction

With a diverse population that is three times the size of the United States, but one-third the physical size, India has the second largest population in the world (Snyder, n.d.,). Isn't that mind-boggling? India's large population and unaccommodating country size is its severe downfall. These factors combined contribute to India's overcrowding issues, poverty issues, health issues, pollution issues, resource distress issues and many more other threatening issues. In the past few decades, India has faced some tough times. With the increasing population pressure and overcrowding, India is running out of resources to provide its citizens with. Not only that, but climate change is adding to this stress with such little rainfall, and is directly impacting production of agriculture, leaving the nation barren. A severe challenge, which is also the focus of this paper, that the nation is currently facing and has been facing for a long time is the shortage of water. Although, in the past few decades India has made improvements to both the availability of water systems and municipal drinking, the increasing population has

stressed planned water resources and unfortunately the rural areas are left out thus creating an imbalance society and unjust environment.

Water Availability

Water in India is intricately intertwined with the cultural fabric of the country, and has both economic and social connotations. Several attempts have been made to estimate the country's available water resources and the total estimated water budget varies considerably. Official estimates of the Ministry of Water Resources (MoWR) have put total utilisable water at 1,123 billion cubic metres (BCM) as against the current use of 634 BCM, reflecting a surplus scenario (Planning Commission, 2010). Narsimhan (2008) calculated the water budget using an evapotranspiration rate of 65 per cent as against the 40 percent used in official estimates. The utilisable water for human use thus comes out to be 654 BCM, which is very close to the current actual water use estimate of 634 BCM reflecting an alarming situation (ibid.). It is pertinent to note that there exists a considerable temporal and spatial variation within the country with respect to water availability. For instance, the Ganga-Meghna-Brahmaputra basin covers a land area of 33 per cent and accounts for 60 per cent of India's water resources, while the catchment of rivers flowing west is 3 per cent and they account for 11 per cent of the country's water resources. Therefore, 71 per cent of India's water resources are available to only 36 per cent of the area while the remaining 64 percent has 29 per cent available (Verma and Phansalkar,2007). Various estimates point to a widening gap between water demand and supply in the future. For example, in the base case scenario developed by 2030 by the Water Resources Group, India faces a large gap between current supply and projected demand, amounting to 50 per cent of demand or 754 BCM (Addams et al., 2009).

Challenges

There are a number of challenges that face India today: the increase in population that could be anywhere between 1.4 and 1.65 billion in 2050. Food grain demand could go up to 450 million tonnes per annum. The per capita water demand will increase for industries and cities almost on a daily basis. Power demands will be three to four times what they are today, even if half the households remain without access to electricity, pollution and looming climate change will make the rainfall (the primary source of water), droughts, and floods more and more destructive, yet more and more frequent and at unusual places and times. In 2006, the International Water Management Institute found that the proportion of canal irrigated areas is decreasing across the country. India's reservoirs are silting up: the latest data from Central

Water Commission, analyzed by us, showed that capacity equal to at least two thirds of the additional storage capacity that we are adding annually through new large dams at huge economic, social and environmental costs is silting up and little is being done. The generation of electricity per MW installed capacity from large hydropower projects has reduced by over 20 percent in the last twelve years as a result of aging machines, silting reservoirs, and overdevelopment in some of the river basins. The clearest sign of how poorly India is dealing with water resources development and management is the growth of water-related conflicts. But what is the response of the government to this reality? There is no democracy in water resources development and the solution lies in changing that situation in fundamental ways. We know that besides being used for drinking purposes it has a multiple uses, not just in the industry, it is forms a base for all kind of activities in the economy. And even more pitiable fact is that it is a victim to the corrupt practices of our country's politicians. The Government of India allocates subsidized water to the farmers for farming purposes only a fraction of which goes to the desired destination. As a scarce commodity, water is prone to exploitation.

Changes proposed in the National Water Policy:

- **Agriculture Sector**

1. Improvement in water usage efficiency;
2. Adoption of rainwater harvesting and watershed management techniques;
3. Reduction of subsidies on power supply particularly for pumping water;
4. Prevention of ground water exploitation by introducing differential pricing, rewards and punishments;
5. Implementation of National River Link project which aims to connect 30rivers and canals to generates 175trillion litres of water.

- **Industrial Sector**

1. Encourage recycling and treatment of industrial wastewater throughregulations and subsidies;
2. Encourage introduction of new technologies which consume less water.

- **Domestic Sector**

1. Introduction of a policy for mandatory rainwater harvesting in cities;
2. Propagation of efficient water usage;

Creation of awareness about water conservation among common public.

Increasing Water Storage Capacity: Activities such as farm ponds, percolation tanks, water reservoirs and construction of small and medium size dams and rivers can retain more surface water, while increasing the ground water recharge. Series of contour bounds particularly in undulating areas will facilitate percolation of water in the soil and improve the ground water table, while reducing soil erosion. Gully plugging, construction of series of small dams on rivulets will help in storing water in reservoirs. In the absence of harnessing rainwater in the forests and denuded hilly terrains, inadequate soil and water conservation measures are leading to severe soil erosion, silting of rivers beds and reservoirs and frequent flooding across the country. Presently, over 40 million ha are prone to floods in the country. Invariably, 8-million ha are affected by floods over year. During the year 2007-08, floods in India have caused 3689 deaths, loss of 1.14 lakh livestock and damaged 3.5 million houses, causing huge losses to the people, society and the Government. One of the major reasons for soil erosion and silting of rivers is severe deforestation. As a result of soil erosion, many of the rivers have been changing their courses almost every year damaging fertile agricultural lands. Brahmaputra is a good example where the width of the river during summer is 3-4 km which increases to 10-12 km during the rainy season. This highlights the extent of flooding of the river and harassment to the people living along the river. Due to poor management of this river, only 22 billion m^3 of water is utilisable while over 607 billion m^3 water is wasted. Similar situation is prevailing with respect to other rivers such as Ganga, Godavari, Mahanadi, Narmada etc. Interlinking of rivers will help in preventing floods while improving water distribution in the country. Control of water flow and floods will prevent soil erosion. Presently, billions of tons of fertile soils along with precious nutrients are washed out of our fertile agricultural lands and forests. In fact, the amount of nutrients lost due to soil erosion is almost equivalent to the chemical fertilisers produced in the country.

Efficient Irrigation Practices:

Efficiency in irrigation is most essential, if the country wants to face the challenge of water crisis. As most of the crops are watered through flood irrigation, over 70% of the water used for irrigation is wasted. Furthermore, as the water supplied is not measured, farmers have a tendency to flood the field with excessive water without any additional cost. Such a practice has been creating a negative impact by way of increased cost of leached nutrients, pollution of ground water, increase in soil salinity and increase of pests and diseases. It is high time that India compels the farmers to adopt micro-irrigation systems, which will not only reduce the

water requirement but also bring down the cost of production, while increasing the area under irrigation. The Government of India should consider enforcing a ban on flood irrigation in the country. Simultaneously, metered supply of irrigation water, recovery of water cost, promotion of micro-irrigation systems and involvement of water users' group for water distribution would significantly help in improving the water use efficiency and reducing the cost of agricultural production.

Watershed Development:

Development of watersheds is an important programme to make best use of the rainwater for agricultural production while improving soil conservation and biodiversity. Fortunately, the Government of India has given top priority for watershed development to provide assured water supply of agriculture in rain fed areas. Under the watershed development programme, the catchment area of a basin is considered as a unit and efforts are made to harness rainwater by treating the land from the ridge to the valley. It is estimated that over 63% of the cultivated lands in the rain fed areas need to be brought under watershed development to conserve soil and water, which in turn would improve the crop yields as well as ground water table. Watershed development programme introduced almost about three decades ago, had covered over 51 million ha by the end of the Tenth Five Year Plan. Additional 36 million ha were being developed under the watershed development programme during the Eleventh Five Year Plan. However, a large number of watersheds are still subjected to heavy soil erosion, due to poor quality soil conservation work undertaken in the past and lack of convergence with other agricultural development activities.

Control of Water Pollution:

Excessive use of water for agriculture, industries and domestic uses is leading to water pollution, because such excess water is transformed into saline water, sewage or effluent. Thus, rewards and punishments should be introduced for persuading people to make optimum use of the precious water. Discharge of sewage and affluent into water bodies and rivers must be banned and recycling of waste water must be pursued and enforced. This will help in keeping the water sources clean and reducing the future demand for water. Treated sewage and effluent can be used for agriculture and industrial production.

Desalination of Sea Water:

Over 70% of the global water resources being saline, economic desalination of sea water is an excellent option to meet the future shortage of sweet water particularly to meet the human

consumption. Presently, desalination of sea water is expensive and non-popular. However, with solar power, desalination can be a viable alternative to meet the water needs in coastal areas.

Conclusion

India is not a water deficit country, but due to severe neglect and lack of monitoring of water resources development projects, several regions in the country experience water stress from time to time. Further neglect in this sector will lead to water scarcity during the next 1-2 decades. It is therefore necessary to prevent this crisis by making best use of the available technologies and resources to conserve the existing water resources, convert them into utilisable form and make efficient use of them for agriculture, industrial production and human consumption. Imposing regulatory measures to prevent the misuse of water and introducing rewards and punishment to encourage judicious use of water, will be helpful to conserve water. Finally, awareness and orientation of all the water users to change their lifestyle to conserve water can help the country to tide over the water crisis in the future. The challenge is manageable provided we have favourable policies and mechanisms to persuade our people to change their lifestyle.

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10 NUCLEAR ENERGY A SOLUTION TO ENERGY CRISES

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Abstract: The demand for electricity is going to increase at fast pace especially in India. For long term sustainable development, nuclear option is going to be inevitable. For the development of the country, the electricity generation capacity is to be increased and nuclear power potential has to be harnessed to meet the targeted economic growth. The nuclear power technology in the country has demonstrated its commercial viability. With the safe and reliable operation of nuclear power plants, nuclear power has to be expanded as an economical and environmentally friendly source to meet the growing aspirations of the country and its people. The public acceptance of nuclear energy as a source of electricity and also for its non-electricity applications is an important key factor for its implementation. The fear psychosis in the minds of people, which originates from certain myths not based on facts, needs to be removed by putting forward the scientific facts before them in a language they can understand and appreciate.

Keywords – electricity, nuclear power, *myths, scientific facts,*

INTRODUCTION

ELECTRICITY DEMAND & SUPPLY SCENARIO:

Energy is the prime mover of economic growth. Future economic growth & development depends on the long-term availability of energy from sources that are affordable, accessible and environmentally friendly. Access to energy is one of the basic requirements for human development. Inadequate access to safe, clean and affordable energy is closely linked to a range of social concerns, including reduced economic and social opportunities contributing to poverty, poor health, and reduced educational attainment [1].

OPTIONS FOR MEETING ELECTRICITY DEMAND

India needs to sustain an 8% economic growth rate, to eradicate poverty and meet its human development goals. To deliver this growth rate and to meet the lifeline energy needs of all citizens, electricity generation is to be increased by 5 times from the current levels by 2031-32 [2]. The present installed electricity capacity constitutes 55% from Coal, 21% from Hydro, 10% from Oil & gas, 11% from Non-conventional and 3 % from Nuclear.

ENERGY POLICY:

The integrated energy policy envisages electricity from different fuel mix of Coal, Gas, Nuclear, Hydro and Renewable energy sources like wind and solar to meet the electricity needs of the country. The energy mix scenario by 2020 as per planning commission [2] is as follows:

The broad vision of the energy policy is to reliably meet the demand for energy services of all sectors including the lifeline energy needs of households using different fuels and forms of energy, both conventional and non-conventional, as well as new and emerging energy sources to ensure supply at all times with a prescribed confidence level considering that shocks and disruption can be reasonably expected [2]. In this context expanding the nuclear power generation base for long term energy security is planned.

THE NUCLEAR POWER - ADVANTAGES:

Higher Energy Density Source : The human kind has progresses from the use of wood to coal, oil, gas and to Uranium because of their higher energy concentration, which has offered economy, convenience. The comparison indicated below indicates the compact nature of nuclear power.

1 kg of Firewood produces 1 kWh of electricity

1 kg of Coal produces 3 kWh of electricity.

1 kg of Oil produces 4 kWh of electricity.

1 kg of Natural Uranium produces 50,000 kWh of electricity

1 kg of Plutonium produces 60,000,000 kWh of electricity

As energy density increase, the quantity of fuel required reduces and the power plant area required also reduces. For ex. an area of 1-4 km2 is required for nuclear, 20-50 km2 is required for Solar Photovoltaic, an area of 50-150 km2 is required for Wind , and 4000–6000 km² is required for Biomass power plants to produce 1000MWe electricity[11].

Source	Electricity Capacity (MWe)
Coal	2,30,000
Oil & Gas	25,000
Hydro	65,000
Wind	30,000
Solar	20,000
Nuclear	29,000

INDIAN NUCLEAR POWER PROGRAMME

India figured in the Nuclear power map of the world in 1969 when two boiling water reactors were commissioned at Tarapur (TAPS-1&2) with the help of GEC of USA. The main objective of this was to prove the techno-economic viability of nuclear power and to obtain operation & maintenance experience and to demonstrate technical viability of operating the nuclear power stations with Indian regional grid system. For Tarapur plant all the components and nuclear fuel were imported and the role of Indian industries was limited

to construction, erection and service contract.

India's present nuclear installed capacity is 4,780 MW, consisting mainly of domestic Pressurized Heavy Water Reactors (PHWRs), which require natural uranium as the fuel. Capacity expansion with imported Light Water Reactors (LWRs) is also pursued. India has rather meagre reserves of Natural Uranium (61000 tonnes), of which the fissile element U-235 content is 0.7% and this can be directly used in the nuclear reactor to produce energy through nuclear fission with a limited electricity potential of 330 Gwe-Yr[2]. However, nearly a third of the entire world's thorium is available in India. Thorium is a fertile element, and needs to be first converted to a fissile material, U-233 in a reactor. The strategies for large scale deployment of nuclear energy must be, and are therefore, focused towards utilization of thorium. The large growth in nuclear power capacity can be realized only through efficient conversion of fertile materials into fissile materials and utilizing the fissile materials to produce energy. The three stage nuclear power programme based on closed fuel cycle envisaged by Dr. Homi J. Bhabha consists of PHWRs in the 1st stage, Fast Breeder Reactors (FBRs) in the 2nd stage, and Thorium-based systems in the 3rd stage.

THREE STAGE INDIAN NUCLEAR POWER PROGRAMME.

It is a sequential programme based on a closed fuel cycle where the spent fuel of one stage is reprocessed to produce fuel for the next stage, it multiplies manifold the energy potential of the fuel and greatly reduces the quantity of waste. The details are as follows:

Stage-1: PHWRs with natural uranium as fuel for generation of electricity. The natural uranium also consists of U-238, a part of which will be converted to fissile plutonium (Pu), while producing electricity. This will be available in the spent fuel of the Stage-1 reactors.

Stage-2: The plutonium reprocessed from stage-1 spent fuel will fuel FBRs. The electricity potential of FBRs is estimated 42,200 GWe-Yr [2]. Thorium is introduced in FBRs as blanket material. In this blanket, conversion of Thorium to fissile U-233 takes place. The U-233 will be used as fuel in stage-3 reactors.

Stage-3: The U-233 fuel from second stage reactors is used along with Thorium mix and power production on a sustained Thorium-U233 cycle will be realized. This provides long term energy security to the country and the electricity potential is estimated 1,50,000 GWe-Yr[6]. The electricity potential of 3-stage programme is summarized in Table-5[1] below:

Technology is critical to developing 2nd programme and for developing the Thorium-based 3rd stage of India's nuclear power programme. Department of Atomic Energy (DAE) has gained sufficient experience in FBR technology and a 500 MWe prototype FBR is under construction. Advanced Heavy Water Reactor (AHWR) of 300 MWe capacity that would provide industrial scale experience necessary for the Thorium-based Stage Three, is also planned.

RADIOACTIVE WASTE MANAGEMENT

The safe and effective management of radioactive waste has been given utmost importance from the inception of nuclear industry in India and it covers the entire range of activities from storage, handling, treatment, conditioning and disposal for different types of waste. Volume reduction is the main objective for the management of low and intermediate level waste. In the case of high level waste vitrification in high level waste is being practiced on plant scale at Tarapur and Trombay. The vitrified waste products generated from these facilities are kept for interim storage in solid storage surveillance facility, Tarapur for more than thirty years.

Concern for the environment and establishment of radiation protection goals have been among the major priorities in planning of India's nuclear energy programme. This programme based on closed fuel cycle where reprocessed uranium and plutonium are recycled. Radioactive waste is generated at each stage of fuel cycle which includes mining and milling of uranium ore, fuel fabrication, reactor operation, spent fuel reprocessing, decontamination and decommissioning of aged nuclear facilities. Besides these sources, radioactive wastes are also produced as a result of the ever-increasing use of radio-isotopes in medicine, industry and agriculture. Currently there are seven near surface disposal facilities co-located with power/research reactor in various parts of the country.

Particulars	Electricity, GWe-Yr.
Stage-1 PHWRs	330
Stage-2 FBRs	42,200
Stage-3 **Thorium** Breeders	1,50,000

The sole objective of nuclear waste management is to protect the man and environment from the harmful effect of radiation now as well as in future. This is achieved mainly by isolating the waste into environmentally compatible inert matrix and discharging remaining into the environment following as low as reasonable achievable (ALARA) principle.

All the waste treatment/disposal facilities currently operating in India are co-

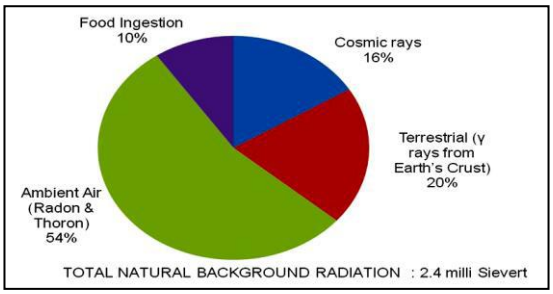
located with waste generating facilities. In our country, the necessary codes and safety criteria guidelines for achieving this objective are provided by Atomic Energy Regulatory Board (AERB) in conformity with the principles of radiation protection as formulated by International Commission on Radiation Protection (ICRP)[12].

Experiences show that the volumes of radioactive waste containing higher level of activity are much smaller than the volume of low and intermediate level waste. Therefore, development of innovative treatment processes for low and intermediate level wastes in recent times has focused on volume reduction as one of the main objectives. The concentrates obtained from the primary treatment processes are conditioned prior to disposal. The technology for conditioning in suitable matrices is now quite mature and well established.

In the context of high level radioactive liquid waste (HLW), direct immobilization in borosilicate glass matrix is being practiced using induction heated metallic melter [13]. Adoption of joule heated ceramic melter for enhanced throughput is in the advanced stage. These vitrification facilities are housed and operated in indigenously designed hot cells with adequate remote viewing and handling arrangement.

PUBLIC PERCEPTIONS ABOUT NUCLEAR ENERGY: MYTHS VERSUS REALITIES

Over the last century, nuclear science and technology has contributed immensely to the overall societal developmental. Today, nuclear applications can be found in almost every social and



economical sector and in virtually every corner of the globe. Nuclear power technology has developed and matured as a safe, clean and efficient means of meeting the globe's expanding energy needs – needs that cannot be fulfilled by any other non-carbon based technology. We in fact have never been in a better position to use nuclear energy safely, and we have never been in a greater need of doing so than today. Although people in general have been appreciating many of the above achievements, some of them are skeptical about the safety of nuclear reactors. Large sections of society are also not aware of, or, are indifferent to many positive contributions that nuclear science and technology has made to everyday life. The

public understanding of nuclear power remains shrouded in myths and fears quite disproportionate to the facts. Answering these deeply rooted public concerns about nuclear energy means challenging the following widespread myths.

- ✓ Can Nuclear energy foster nuclear weapons proliferation?
- ✓ Can Nuclear reactors explode like an atom bomb?
- ✓ Does the Nuclear waste represent an environmental time bomb?
- ✓ General phobia about radiation and radiation is a result of Nuclear power.
- ✓ Is Nuclear plant polluting the environment?
- ✓ Is Nuclear power plant safe?

The first myth that nuclear reactors breed nuclear weapons has no foundation. On the very mention of the word nuclear, public is immediately reminded of the sorrows and sufferings of Hiroshima and Nagasaki. But then one must remember that Hiroshima and Nagasaki happened when there was not a single operating nuclear reactor in the world. Each of the so called five nuclear weapon states built their bombs before moving to civilian power production. Thus, technically speaking, power reactors are not steps for making nuclear bombs. After all, one cannot stop manufacturing steel just because it can be used for making knives and pistols. Dynamite too was introduced to the world in a destructive manner but now a days dynamite is used for a number of constructive activities. Nuclear energy too should be viewed with a wider perspective in terms of a number of advantages it offers to the mankind.

The second myth is that a nuclear reactor in case of an accident is likely to explode like a bomb and release massively fatal doses of radiation. This myth exercises a powerful hold on the public mind due to collective memories of 3-miles island (1979) and Chernobyl (1986) accidents. The power of these two images far exceeds what is warranted by facts. Before talking about reactor safety in general, it would be better to recall certain facts about these two accidents. First talking about 3-miles island, the simple truth is that public health was not endangered despite a series of mistakes, which seriously damaged the reactor. The only outside effect was an inconsequential release of radiation, which was negligible when compared to natural radiation in the atmosphere. The composition of annual average radiation exposure is as follows:

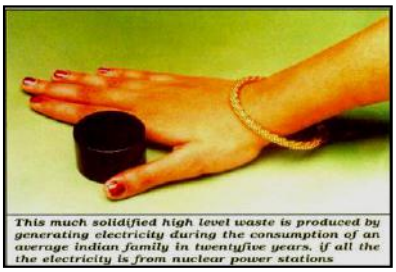
The accident also proved that the protective barriers in the reactor design worked. Chernobyl accident on the other hand was a tragedy with serious human and environmental consequences. This reactor

lacked the safety technology, the procedures and the protective barriers considered normal elsewhere in the world. The fire led to massive release of radiation through the open roof of the reactor. Without meaning to minimize the gravity of the Chernobyl accident, it can be said that in its more than 8000 reactor-years of operation, the nuclear industry had one serious accident. Meanwhile, in the years since Chernobyl, many thousands have died in the production of coal, oil and gas and millions each year are affected with pollution-induced disease resulting from fossil fuel based electricity production.

Coming back to the Chernobyl accident, although it severely affected the public confidence in nuclear power, it inspired important advances in nuclear reactor safety. National Regulatory agencies, World Association of Nuclear Operators (WANO) and IAEA now work together to promulgate state-of-the-art knowledge. A system of peer review of nuclear power plants to detect any deviations from the high standards has been introduced. The few Chernobyl type of reactors viz. Soviet light water cooled graphite moderated reactor (RBMK) operating in three countries of former USSR empire are now equipped with safety upgrades and better trained personnel The modern nuclear reactors are engineered on the principle of Defense in Depth ensuring against a release into environment even in case of a severe internal accident and chances of even this environmentally harmless event is of extremely low probability.

Nuclear bombs contain Uranium-235 concentration $\geq$ 90%, whereas the concentration of Uranium-235 within the reactor fuel is far too low to be explosive.

The third myth is that nuclear waste is an insoluble problem – a permanent and accumulating environmental hazard. The reality is that of all the energy forms capable of meeting the world's expanding needs, nuclear power yields the least and most easily managed waste. The advantage of nuclear industry is that nuclear waste is small in volume and is effectively



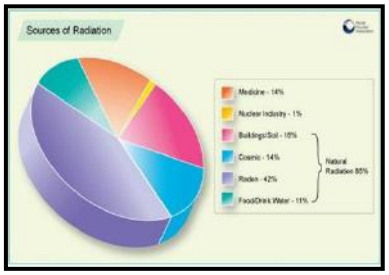
This much solidified high level waste is produced by generating electricity during the consumption of an average indian family in twentyfive years. if all the the electricity is from nuclear power stations

managed. The small volume of high radioactive waste produced is illustrated in the figure below:

Most of the low and intermediate level waste consists of short-lived isotopes and can be handled safely through controlled burials or storage in near surface facilities. The high level waste though highly radioactive and long-lived is very small in

volume. Annual global volume of spent fuel from world's all the reactor is approximately 12000 tones. This is quite tiny an amount as compared to billions of tonnes of green house gases and tonnes of toxic pollutants being discharged annually. In countries like India, which follow a closed fuel cycle, that is, they reprocess the fuel to recover valuable material, the amount of high level waste further decreases. There is a proven technology to contain and safely store this waste. This high level waste is vitrified and placed in double walled SS vessels which are then placed in lead flasks thus isolating the wastes totally from the surroundings and also ensuring that radiation emitted from them does not come out into the atmosphere. After 40-50 years the radioactivity of the waste decreases drastically and suitable repositories are being searched where this waste can be kept away in an isolated condition. Here it may be noted that in the field of pollution abatement one important rule is not to release pollution into environment. Thus the important slogan is 'CONTAIN' and that is what nuclear industry practices to such an extent, to which no other industry can boast of. A special feature of nuclear waste is that its harmful effect decreases with time due to radioactive decay. Many chemical pollutants like mercury remain toxic forever. Among the radioactive isotopes, the short-lived isotopes are more dangerous as compared to long-lived ones. Thus a natural fact about radioactive waste is that the more dangerous parts of it decay fast and do not remain on the scene for long and it is the less dangerous waste which stays for a long time and that too is kept totally isolated from population. Thus nuclear waste is not to be feared about but is a matter of pride for the nuclear industry.

The fourth myth is a general phobia against radiation. As mentioned earlier, people think that a reactor is



constantly emitting radiation into the public domain. The fact is that as mentioned above, nuclear reactors are designed and operated with a philosophy of Defense in

Particulars	Dose Received (milli Sv)
Living near a nuclear plant compound for 1 Yr.	< 0.01
Eating 1 banana/ day for 1 Yr.	0.036
Living in a brick house for 1 Yr.	0.1
Natural Radiation for 1 Yr.	2.4
Smoking 1 pack of cigarettes/ day for 1 Yr.	13
Nuclear plant worker, exposure limit per Yr.	20
3 hours Aeroplane flight	0.01
One dental X-ray, for 18 sec	0.014
One chest X-ray for about 0.5 sec	0.1
One CT scan: heart	16
Coronary angiogram, heart X-ray studies for about 1 hour	50
Single dose, fatal within weeks	10,000

Depth. It is ensured that any nuclear facility does not add to the natural background radiation by more than a few percent. International Commission for Radiation Protection (ICRP) and Atomic Energy Regulatory Board (AERB) of India have specified maximum limits to which radiation workers and general public can be exposed. Still the nuclear facilities instead of confining to these limits, practice what is known as 'As low as reasonably achievable (ALARA) approach'. Thus, the actual radiation exposures are generally kept much below the limits prescribed by ICRP or AERB.The exposure from entire nuclear industry including mining, fuel processing, fuel fabrication, nuclear power plant, spent fuel is about 1% of the total average radiation exposure and nuclear power plan t merely contributes to an extent of 0.15% of the total radiation exposure to the population living at the fence of a Nuclear Power Plant.

Examples of Typical radiation exposures:

Among the wide range of applications of radiation, one sector is that of food security. Employing radiation, mutant varieties of crops have been developed with advantages in terms of increased yield, resistance to diseases, drought resistance etc. 22 such varieties have been released in India and are being employed advantageously by the farmers of the country. Similarly radiation has also been employed for processing of food items for increasing their shelf life and for disinfestations. Government has cleared many items for radiation processing. A commercial demonstration plant for radiation processing of spices is operating at BRIT, Vashi, Navi Mumbai. Another plant for radiation processing of onion and potato is being set up at Lasalgaon near Nasik. This is as far as the technology development demonstration and deployment is concerned. But for these developments to bear their real fruits, public acceptance is very essential because finally it is the consumers who are going to accept or reject these products. It has been found that public fears that radiation might cause some radioactivity to these products and/or may affect the nutritive value of the food. Here it is worth mentioning categorically that gamma radiation is totally incapable of inducing radioactivity in any substance. There is also no toxicological hazard specific to radiation processed food. At the doses employed for radiation processing, amino acids are virtually unchanged and there is no vitamin loss. These food items, instead, retain their freshness and are free from the risk of chemical additives. Public should therefore accept these facts, because if accepted by the masses, these technologies will go a long way in addressing the chronic food

storage problem caused by insect infestation, microbial contamination and spoilage/ The fifth myth questioning whether Nuclear plant is polluting the environment is not based on scientific data. Nuclear reactors emit no greenhouse gases. Over their full lifetimes, nuclear reactors result in comparable emissions to renewable forms of energy such as wind and solar.

Nuclear energy is as safe – or safer – than any other form of energy available.

Only 3 major accidents to have occurred in over 14,500 cumulative reactor-years of commercial nuclear power operation in 32 countries. Apart from Chernobyl, no nuclear workers or members of the public have ever died as a result of exposure to radiation due to a commercial nuclear reactor incident. There have been no radiation-related health effects linked to 337 Reactor-years of safe operation in India / 3,500 reactor years of operation in USA. No member of the public has ever been killed due to radiation from NPP in India.

The sixth myth that nuclear power plant is not safe is based on apprehensions and not on a perspective based on facts. Only 3 major accidents to have occurred in over 14,500 cumulative reactor-years of commercial nuclear power operation in 32 countries. Apart from Chernobyl, no nuclear workers or members of the public have ever died as a result of exposure to radiation due to a commercial nuclear reactor incident. In Fukushima event, evacuees were screened for contamination upon reporting to shelters. Between March and June, 195,354 people were screened, and no member of public exposed to more than normal limits. 30 workers had received between 100-250 mSv. This is within the emergency exposure limits. On the contrary, radio- medical treatments involve exposure upto 1000 mSv to the healthy organs and 2000 mSv to tumour cells. Nuclear energy is as safe – or safer – than any other form of energy available. The table below shows the fatality rate in various energy chains.

Some argue that in case of accidents nuclear plant has largest potential for human deaths and again this can be said to be based on apprehension only and not on facts. The table below shows that potential to cause

Number of Potential Human Deaths*	
Nuclear Power	10 billion
Barium	100 billion
Hydrogen cyanide	6000 billion
Ammonia	6000 billion
Phosgene	20,000 billion
Chlorine gas	400,000 billion

deaths is lesser than many other chemicals.

(These numbers including the nuclear power figure, are calculated by dividing the estimated lethal dose into the total quantity of material produced annually in U.S. They

Energy chain	Death per Million MWh
Coal	161
Oil	36
Natural gas	4
Hydro	1.4
Nuclear	0.04
Solar(rooftop)	0.44
Wind	0.15

are purely hypothetical numbers, useful only for making comparisons)

CONCLUSION

The demand for electricity is going to increase at fast pace especially in India. For long term sustainable development, nuclear option is going to be inevitable. The public acceptance of nuclear energy as a source of electricity and also for its non-electricity applications is an important key factor for its implementation. The fear psychosis in the minds of people, which originates from certain myths not based on facts, needs to be removed by putting forward the scientific facts before them in a language they can understand and appreciate. Here media can play an important role.

Generally, the Indian media has been quite supportive of the Indian nuclear programme, but some times, certain sections of media react towards nuclear industry in a manner that tends to make the public even more suspicious about nuclear energy and radiation. The need of the hour is that while being thoroughly watchful, media can play the role of knowledge facilitators and contribute their bit to remove the above mentioned myths from the minds of the public. In case of any event connected with nuclear energy or radiation technology; they must indulge in factual reporting after ascertaining the facts from responsible and knowledgeable sources and should do so without sensationalizing the whole thing. It is felt that in addition to the marathon efforts of scientists and engineers engaged in developing nuclear science and technology, the sincere efforts of media are going to play a major role in realizing the full potential of atom.

Electricity demand in India has to be met for its economic & human development aspirations. Any source of electricity generation has an effect on environment and a balanced assessment has to be made for sustainable development. The nuclear energy is no more risky than other electricity generating industry. The environmental impact is negligible due to a nuclear power plant and public acceptance should pave way for development of India with nuclear power for the energy security of nation.

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11. NEW APPROACHES OF POLYMER SCIENCE.

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A b s t r a c t

New classes of polymeric materials with unique applications are being introduced. In many cases, the properties and their usage were discovered only recently. This covers two areas: (1) health, medicine, and biotechnology, a rapidly developing domain based largely on known materials but moving to designed and engineered polymers. (2) Information and communications, an emerging field for polymers significantly based on their electronic properties. These two areas are attracting a great deal of attention, particularly among researchers who are not traditional specialists in polymer science. The growing importance of these fields makes the interdisciplinary aspect of polymer research abundantly clear.

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HEALTH, MEDICINE, & BIOTECHNOLOGY : Polymers play a major role in all aspects of biological processes. Thus informational, chemical, mechanical, and other properties of living systems find their origin in the molecular structure of their component polymers. Medicine, as a biological science, therefore must be dependent on the nature of polymers. Molds and impressions of teeth, dentures and denture bases, adhesives, and fillings are polymer based. Sutures, which were made of cat gut for over 2,000 years, are now made of synthetic polymers. Hard and soft lenses required after cataract surgery, artificial corneas, and other ocular materials are all polymers. Orthopedic implants, artificial organs, heart valves, vascular grafts, hernia mesh, and artificial arms, legs, hands, and feet all depend critically on polymeric materials. Similarly, catheters, syringes, diapers, blood bags, and many other trappings of modern medicine depend heavily on polymeric materials. Most of these items arrive in sterile form, packaged in polymers. Significant quantities of polymers are used in medical devices, consumable medical products, and the packaging for medical products. The most common products are devices such as catheters and intravenous lines, nearly 100 million of which are used annually in the United States. Polyesters, polyamides, polyethylene, polycarbonate, polyurethanes, silicones, fluorocarbons, and other familiar polymers have been employed successfully in medical applications. Hence, polymers are positioned to play a vital role in improving the quality of life, enhancing longevity, and reducing the cost of health care. Polymers in Health Applications.

2. IMPLANTS AND MEDICAL DEVICES : Development of medical implants has

been limited by many factors. The Synthetic non degradable materials needed in such products as orthopaedic joints, heart valves, vascular prostheses, heart pacemakers, neurostimulators, and ophthalmic and cochlear implants must meet many technical requirements, including being stable and biocompatible in the host environment for moderate to long lifetimes. Polymers being considered for vascular prostheses include poly(ethylene terephthalate) fibers, expanded polytetrafluoroethylene foams, segmented porous polyurethanes, and microporous silicone rubber. Polymers also play a major role in devices used to oxygenate blood. They must operate without blood damage. Silicone rubber and polypropylene have been used successfully in both solid and microporous forms.The general field of load-bearing implants involves metals, ceramics, and polymers, and the field has advanced rapidly in recent years is hip replacements.

3. DENTAL COMPOSITES : Traditionally, crowns for teeth in the back of the mouth, where strength is more important than appearance, have been cast from alloys of mercury with silver or gold. And dentures have been made with porcelain pearly whites rooted in a pink base of an acrylic polymer a life like combination that is rugged enough to chew ice cubes, while the firm plastic base distributes the stresses gently. These plastics, properly colored, looked just like real teeth and did not decay. A PMMA material system similar to that employed in the fabrication of denture bases is used to bind metal hip replacements to the femur. Ultrahigh-molecular- weight polyethylene is used as the hip cup material. Even the metal alloys of the bone replacement are gradually beginning to be replaced by fiber-reinforced composites. Polystyrene, nylon acrylamide, dextrans, and agarose have all been used for attachment of antibodies and antigens.

4. CONTROLLED DRUG RELEASE : Interest in drug delivery research is increasing for a number of reasons: the need for systems to deliver novel, genetically engineered pharmaceuticals, the need to target delivery of anticancer drugs to specific tumors, the need to develop patentable sustained delivery systems, and the need to increase patient compliance. Polymers are essential for all the new delivery systems, including transdermal patches, microspheres, pumps, aerosols, ocular implants, and contraceptive implants. The major disease areas that are expected to benefit from development of new delivery systems include chronic degenerative diseases, such as central nervous system disorders associated with

aging, cancer, cardiovascular and respiratory diseases, chemical imbalances, and cellular dysfunction. They can be classified into various categories by their mechanism of release:

5. IMPLANTED POLYMERS FOR DRUG DELIVERY : We have all heard that biodegradable polymers are good for the environment. But they may be good for cancer patients, too. Efforts are now under way to design polymer implants that will slowly degrade inside the human body, releasing cancer-fighting drugs in the process. Anhydride linkages formed when two carboxylic- acid-containing molecules join together into a single molecule, creating and expelling a water molecule in the process are promising candidates, because water molecules readily split the anhydride linkages in the reverse of the process that created them, yet the polymer molecules can still be water-repellent in bulk. The polymer degradation method of drug delivery is making good progress toward approval by the Food and Drug Administration

12 . **WATER CRISIS IN INDIA**

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Abstract

More than two billion worldwide live in regions facing water scarcity and India this is a particularly acute crisis. Millions of Indians currently lack access to clean drinking water, and the situation is only getting worse. India's demand for water is growing at an alarming rate. India currently has the world's second largest populations, which is expected to overtake china's by 2050. When it reaches a staggering 1.6 billion, putting increasing strain on water resources as the member of people grows.

Since independence, India's primary goals have been economic growth and food security, completely disregarding water conservation. This has caused serious ramifications being felt today, as many citizens still operate under these principles, unlike many other developing countries, especially those with acute water scarcity issues such as china, Indian law has virtually no legislation on ground water. Anyone can extract water: however former or industry as long as the water lies underneath there plot of land.

Introduction:-

Rapidly growing economy and a large agricultural sector stretch India's supply of water even thinner, meanwhile, India's supply of water is rapidly dividing due primarily to miss management of water resources, although over- pumping and pollution are also significant contributors. Climate change is expected to exacerbate the problem by causing erratic and unpredictable weather which could drastically diminish the supply of water coming from rainfall and glaciers. As demand for drinking water starts to outstrip supply by increasing amounts in coming years. India will face a slew of subsequent problems, such as food shortages, interstate and international conflict.

India's water crisis is predominantly a manmade problem. India's climate is not particularly dry, nor is it lacking in rivers and ground water. Extremely poor management, unclear laws, Government corruption, and industrial human waste have caused this water supply crunch and rendered what water is available practically useless due to huge quantity of pollution. In managing water resources, the Indian Government must balance computing demands between urban and rural, rich and poor, the economy and the environment.

MEANING OF WATER CRISIS:

Did you know that only 2.5% of all the water in the world is fresh water? And that only 1% is accessible, by accessible I

mean trapped in glaciers and snow fields. We only have real access to 0.0007% of the planate water, that's all we have to feed and fuel over 6.8 billion people. The lack of clean water is a flinch which affects 1.8 billion people every year. A water crisis is when there is not enough potable water for a pollution. Which in turns leads to drought, famine and death.Today safe drinking water has become a luxury for people leaving in draught hit area and African sub-continent, people can be seen walking miles and spending entire day in searching of water. Even if they get it, they have to fight with water borne diseases a arising from it, economic development suffers when basic necessities are not met and people have to struggle hard for them. Still, we people take it for granted and do not understand the importance of water conservation. Access to safe, portable water is a fundamental human right, however, access is plagued by in equality the wealthiest 12% of over global populations utilise nearly 85% of the world's water. The water crisis that over generation has been presented with is far greater than anticipated : as such, it is definition is ever expanding.

DIFINATION OF WATER CRISIS:

The water crisis is a situation where the available portable, unpolluted water within region is less than that regions demand. Water scarcity is being driven by two covering phenomena, growing fresh water use and depletion of usable fresh water resource. Today we will be going to over some of the causes effects and possible solutions for the water crisis.

CAUSE OF WATER CRISIS:

1] Water Pollutions: Most of the source of water in rural areas are terrible polluted due to poor sanitation and lack of west treatment plants. Oral levels of global pollutants are having a negative effect on drinking water that is currently clean, as time goes on this damage will be execrated.

2] Ground water over drafting : The excessive use of ground water in our agricultural industries is leading to diminished yields and wasted water, over 70% of our water is use to grow crops and most is wasted due to leaky pipes and poor water technique.

3] Over use and misuse of water: This leads to more being wasted and squanders of pointless reason and leads to further escalations of the crisis. One single hamburger taken 630 gallons of water to produce.

4] Disease: A large quantity of the available the ground water in the worst affected parts of the world is ridden with disease. Due to the lack of proper water treatment and recycling.

5] Climate change: Climate change is changing the way water evaporates and where it rains, pushing rainfall further south in both hemispheres.

6] Miss management: Improper training and education leads to needless waste of safe clean water every day, as well as over use in areas that don't require so much of water.

7] Corruption: Simply put, some of the people who have the power to help those people in need just don't care.

8] Lack of institutions: Lesser developed countries have no institutions to advise on water treatment and management, this leads to mismanagement and waste.

9] Lack of infrastructure: Poor regions often don't have the fund or education to implement proper infrastructure such as waste treatment and recycling plant.

10] Loss of ground water: Due to climate change, human expansion and development is leading to loss of groundwater worldwide.

11] Unfair pricing of water: Areas of extreme poverty often have to pay extortionate rates in order ot purchase clean water. Those who have no money have to drink from holes in the dirt, or puddles on the roadside.

EFFETS OF WATER CRISIS:

1] Death: All life needs water, every 90 secs a child dies from water relate illness and disease.

2] Disease: Waterborne disease is one of the leading cause of mortality in the world. Water related disease affects more than 1.5 billion people each year.

3] Warfare: Regional conflicts have arisen due to the loss of safe water soures.

4] Lack of irrigation: Without water, farmers can't grow any crops, which leads to the death of nearly 1 million people every year.

5] Lack of sanitation: Which leads to disease, and causes countless health issues and leads of disease.

6] Lack of hygiene: 1/3 of the world's population lives without access to a toilet. This leads to disease and kills nearly 1 million people each year.

7] Agricultural problems: No water means no crops. Previous regions with a good amount of water have seen a decline in the ground water and without water, they cannot grow crops.

8] Livestock problems: The lack of water leads to the impossibility of keeping live stock, which in turn makes it even harder for people in arid regions to find food and income.

9] Birth defects: Lack of nutrition during pregnancy and malnutrition causes birth defects in infacts.

10] Poor Education: Most schools in the worst affected areas do not have a toilet or safe drinking water for students, which leaves students dehydrated and mentally incapable of achieving well in schools.

11] Poor Heath care: Most hospitals and clinics operate without access to safe water, leaving them unable to safely help people.

ECONOMICS EFFECTS OF WATER CRISIS:

1] Wasted Time: Roughly 24 billion worth of time is wasted each year gathering water.

2] Loss of funds: Ending the water crisis would result in 32 billion in benefits by reducing health care costs and increased productivity.

3] Cost of death: Ending the water crisis would result in 18.5 billion dollars from deaths avoided.

EFFECTS OF WATER CRISIS ON THE ENVIRONMENT:

1] Increased Salinity: Due to poor treatment of water and sanitation. This leads to more water being unsafe to drink.

2] Nutrient pollution: Although growth caused by excessive nutrients in groundwater is rendering more water being unsafe to drink to high levels of nitrate.

3] Loss of flood plains: Due to human expansion, leads to drying of riverbeds and loss of habitat.

4] Drying of riverbeds: Due to poor agricultural practices and human expansion. Leads to loss of habitat and loss water access for poor regions.

5] Subsidence: Caused by the loss of groundwater, leads to landslips and sinkholes.

6] Loss of habitat: Due to the water crisis the habitant migrates one place to another.

SOLUTIONS TO WATER CRISIS:

1] Charities : Donating to a charity will help in a small way, charities help people in rural areas get access to waters by constructing wells, sanitation and agricultural systems.

2] Funding: Governments could allocate more funding toward ending the water crisis, currently the US government donates 8 billion every year, 1 Trillion is needed to solve the problem in he long term.

3] Spreading a message: Educate people better on the causes and effects of the water crisis, as well as what they can do to help. So they in turn can teach others and raise, awareness.

4] New Techonologies: In centivize innovation in the fields of water recycling, conservation and consumption.

5] Improved irrigation: Change the way we irrigate Roughly 70% of the world's freshwater is used to grow crops: we could improve these practices to use much less wager than we currently use.

6] Wager pricing: Research the true effects of water pricing. Experts are currently debating increasing the price of water to veduce pollution but that would take water ever further out of reach by those experiencing proverty.

7] Climate change: Experts say that by decreasing the effects of global warning by pursuing cleaner energies that will in turn help with the water crisis as we find new technologies to keep water safe, and use less energy to do so.

8] Rain water harvesting: Change the way we irrigate. Areas with very little ground water reserves can greatly improve the way they harvest rain water by building larger facilities and in corporating better technologies.

9] Adverse Pollution:

10] Population growth control:

11] Transfer of Technologies:

13. Effect of association of fungal microflora on seed germination of *Delonix regia*

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Abstract

The present paper deals with the study of Effect of association of fungal microflora on seed germination of *Delonix regia*. *Delonix regia* is a handsome ornamental tree , usually propagates through seed but seed germination is the most sensitive and critical phase. Cultivation practices of this plant suffer a lot due hard seed coat. Hard seed coat has inhibitory effect on germination or induces seed dormancy. Seed dormancy is nature's way of setting a time clock that allows seeds to initiate germination when conditions are normally favorable for germination and survival of the seedlings. Seed coat or external dormancy can be broken for successful and early germination of seeds. Keeping this view in mind in the present investigation an attempt has been made to Break the seed coat dormancy by using some technique such as Scarification method using sand paper mechanism for 20 minutes was adopted, immersion in Hydrochloric acid and Hot water for 20 minutes at 100*c and a Control method with untreated seeds were conducted.Freshly harvested mature seeds of *Delonix regia* failed to germinate in laboratory conditions. While other scarification methods showed poor results. However, the seeds associated with fungal microflora showed successful germination and that at higher percentage.

INTRODUCTION

Delonix regia is a handsome ornamental tree from a Caesalpineceae family which is a fast growing tree with usually low, widely spreading branches producing a flat broad crown and highly needed for the decoration and beautification of the environment due to its decorative flowers and its canopy formation. It is used in road side plantation and due to its canopy formation is used to provide shade and as a source of recreation, conservation as well as fuel wood.

The plant usually propagates through seed but seed germination is the most sensitive and critical phase in the life cycle of a plant. Cultivation practices of this plant suffer a lot due hard seed coat. Hard seed coat has inhibitory effect on germination or induces seed dormancy. Seed dormancy is nature's way of setting a time clock that allows seeds to initiate germination when conditions are normally favorable for germination and survival of the seedlings. Seed coat or external dormancy can be broken for successful and early germination of seeds. Keeping this view in mind in the present investigation an attempt has been made to Break the seed coat dormancy by using some technique such as Scarification method using sand paper

mechanism for 20 minutes was adopted, immersion in Hydrochloric acid and Hot water for 20 minutes at 100*c and a Control method with untreated seeds were conducted.

MATERIAL AND METHODS

Two different types of seeds of *Delonix regia* were collected. First type of seeds was gray in color, hard to touch, harvested directly from the ripened, dry and black fruit present on the plant. Second type of seeds was black in color, soft to touch collected from rotten fruit on garden soil.

For the germination purpose polypots (seedling bags), The potting mixtures used for the experiment consisted of a River sand and a compost manure mixture in a ratio of 5: 1. The poly pots were filled with potting mixture then they

were arranged under shade. In accordance with the treatment they were labeled, arranged and watered 1 – 2 times daily to provide moisture that will aid in the germination of the seeds. However germination is generally facilitated by the presence of water or moisture, moderate temperature and air or oxygen.

Scarification involves the process of breaking, scratching or mechanically altering the seed coat to make it permeable to water or gas. Simple methods of carrying this out include rubbing the seed on sand paper, filling or cracking the testa with a hammer or between the jaws of a vice. The seeds of *Delonix regia* were sandwiched between 2 sand papers. They were rub and squeezed carefully until the hardness of the seed coat have been reduced without damage to it for 20 minutes. Then they were planted immediately

In hot water treatment the seeds of *Delonix regia* were immersed in a hot water at 100*c for 20 minutes accompanied by quick withdrawal of the sources of heat and the seeds were planted.In H_2SO_4 (acid scarification) Seeds of *Delonix regia* were immersed in to a 30ml of diluted hydrochloric acid to break dormancy and facilitate germination. The seeds were then stirred up with a stick for 20 minutes. The seeds were removed and washed with clean water and planted in the polypots. For control ten Seeds of *Delonix regia* were directly planted without any treatment. The number of seeds germinated in each polypot after 2, 4, 6, 8 and 10 days were counted and recorded. Radical and plemule emergence was considered as the sign of germination. The germination in these two different types of selected seeds was compared.

Germination test was performed according to ISTA(1976). Standard practices were followed to calculate emergence index and germination speed.

The formulae used were,

$$\text{Germination Speed} = \frac{\text{Germination percentage}}{\text{Day of completion of germination}}$$

For identification of soil microflora on the seeds surface, the spores on seed surface were inoculated on the PDA culture and microscopic observations were done.

RESULTS AND DISCUSSION

Seed germination is the most sensitive and critical phase in the life cycle of a plant. There are several factors influencing seed germination. Hard seed coat has inhibitory effect on germination or induces seed dormancy show poor germination. On the other hand soft seeds showed about 100% germination.From PDA culture studies fungal genera were indentified. Those were Aspergillus, Mucor and Penicillium. The fruit collected with growth of fungi probably was given the softness to seed coat, thus releasing the seed dormancy due to hard seed coat. These results are in agreement with the findings of Arya and Saxena (1999) in tomato and Kumar *et al.* (2004) in pea.

Table 1: Effect of technique for breaking of seed dormancy on gray hard seed of *Delonix regia.*

Treatment	Days of Germination					Germination %	Germination Speed
	2	4	6	8	10		
Control	0	0	0	0	0	00%	-
Mechanical scarification	0	1	1	1	1	10%	1
Hot water treatment	0	1	1	1	1	10%	1
H2SO4 (acid scarification	0	0	0	0	0	00%	-

Table 2: Effect of technique for brecking of seed dormancy on black soft seed of *Delonix regia.*

Treatment	Days of Germination					Germination %	Germination Speed
	2	4	6	8	10		
Control	1	2	4	7	8	80%	8
Mechanical scarification	1	2	5	8	10	100%	10
Hot water treatment	1	2	5	7	07	70%	7
H2SO4 (acid scarification	0	0	1	2	04	40%	4

The comparative study of the data given in table 1 & 2 clearly revealed that, Freshly harvested mature seeds of *Delonix regia* failed to germinate in laboratory conditions. While other scarification methods showed poor results. However, the seeds associated with fungal microflora showed successful 80% germination .Similar type of observations has been made by Bendigri et al. (1986) in sugarcane. Mechanical scarification resulted in 100% germination. Hot water treatment caused 70% germination. Sulphuric acid treatment, however, reduced the seed germination which has just 40% as against 80% in the control. Reduction in germination percentage due to acid scarification has been reported by chaghtai et al. (1991) in *Catharanthus*. In contrast to this finding, Pullock and Toole (1961) reported that acid scarification induced seed germination by improving the seed coat permeability and removing the blockage of gaseous exchange. However, such an effect has not been observed in *Delonix regia* seed.

CONCLUSION

Freshly harvested mature seeds of *Delonix regia* failed to germinate in laboratory conditions. While other scarification methods showed poor results. However, the seeds associated with fungal microflora showed successful germination and that at higher percentage.

14. Trends of Chem-IT

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Abstract:

Information technology (IT)—the hardware and software required for the processing of data and other information—is the backbone of nearly every aspect of today's modern society. IT is responsible for the computers and phones on our desks, iPods in our pockets and televisions in our living rooms. ATMs, cash registers and today's cars all run on IT. The chemical sector uses information technology to streamline the delivery of products and services. Reliable information technology is the key to engineering new scientific and chemical developments, managing the supply chain, executing processes in plants. As technology continues to advance, so will the chemical industry's use of IT to improve the way it conducts experiments. Methods for conducting chemistry experiments were different a century ago. Important discoveries, such as synthesizing life-saving drugs or finding cures for diseases, came from working with hands-on plastic ball-and-stick molecule models, like the ones Stack showed his class. Now, with greater knowledge of chemistry and advanced technologies, chemistry is done through other mediums — like a computer. The potential payoff from this field will be information processing systems that are evolvable, self-replicating, self-repairing and responsive to their environment (as well as having local intelligence), whilst also being capable of interfacing with existing silicon based ICT systems. Many of the complex challenges facing 21st century society will require solutions that transcend disciplinary boundaries.

1. Introduction:

Methods for conducting chemistry experiments were different a century ago. Important discoveries, such as synthesizing life-saving drugs or finding cures for diseases, came from working with hands-on plastic ball-and-stick molecule models, like the ones Stack showed his class. Dressed in a white lab coat and protective goggles, the classical chemist sat behind his lab bench, pouring solutions and clanking beakers and test tubes until he made a discovery. While helpful in the earlier days, these methods are of little use on the microscopic scale when analyzing minuscule changes and rapid chemical reactions. Now, with greater knowledge of chemistry and advanced technologies, chemistry is done through other mediums — like a computer.

Twisting a tinkertoy-like model of red and blue sticks and spheres, professor Dan Stack attempted to demystify organic chemistry. "This is a dibromobutane

molecule," Stack said, as he showed the class the structure. "But there is another way to picture this chemical structure — a computer model."

Tossing the plastic model aside, Stack projected the same three-dimensional model onto the screen with his laptop through a chemistry computer program. He moved the chemical structure with his mouse, showing it from every angle and explained how to adjust the online model to assess the chemicals. The study of chemistry is enhanced by computer applications from the recent surge in technology. As a forerunner in computer science among universities, Stanford combines computational and chemical science, leading to new discoveries, interdisciplinary programs and Nobel Prizes. Nationwide, the number of computer science majors rose 22 percent in 2013, with now on average 400 computer science majors per university — the sixth straight year of increasing undergraduate enrolment — according to the Computing Research Association's annual survey. Enrolment in these majors is increasing rapidly at universities like Harvard, MIT, Stanford and the University of Pennsylvania. Computer science benefits the study of chemistry by adding a layer to analyze chemical processes.

2. Integration

Information technology is one of educational technology which develops from visual movement (1918-1928) and audio -visual education campaign (1918 - 1942) into an educational technology focusing on audio-visual media (after World War II or the 1960s). Meanwhile, the application of computer technology education forms computer –assisted instruction (beginning from the 1950s), CAI for short. In the late twentieth, net-work technology has developed rapidly and become more popular, especially the connection of the Internet and cam-pus network, providing a broader out-look and more abundant resources for school education and creating a web-based teaching form (Web-Based Instruction, referred to as WBI). The development process of applying computer technology into chemical learning is in line with the above process. The basic process is shown in Figure 1.

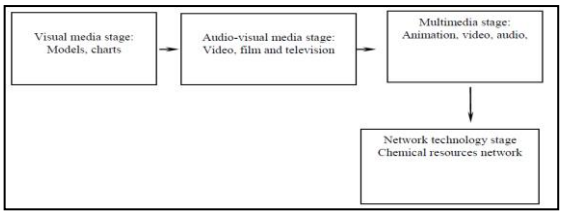

Figure 1. Basic Process for Applying Computer Technology

These stages develop with the improvement of educational technology. In the late stage, it is the comprehensive application of

various media and various methods, with computer multimedia and network technology as its core. The following chart shows that according to the extent of the application, "integration" can be divided into different levels.

3. Opportunities and impact

The potential payoff from this field will be information processing systems that are evolvable, self-replicating, self-repairing and responsive to their environment (as well as having local intelligence), whilst also being capable of interfacing with existing silicon based ICT systems. Such capacity will open up a radically new form of technology that couples information processing with physical control and production at both the micro- and macro-levels. A breakthrough in this area would allow ICT specialists programmable algorithmic entry to the world of nano scale chemical processes, as well as the self-organised power of cellular assemblies. In the future, we will require not top-down, directed assembly of structures, but the utilisation of interactions between components to self-assemble functional information processing materials of immense complexity.

4. Case study

In this Section we give brief summaries of the four projects that form the core membership of the COBRA (Coordination of Biological and Chemical IT Research Activities) Coordination Action. COBRA is supported by the EU FP7 Future and Emerging Technologies (FET) Proactive initiative. These projects all contributed short talks to a special *fet* session, organized by COBRA. The plenary talk was given by Dr Farren Isaacs of Yale University.

ECCell

ECCell is an EU sponsored project funded in the ICT Future Emerging Technologies by the FET-Open program. The aim of the project is to establish a novel basis for future embedded information technology by constructing the first electronically programmable chemical cell. This will lay the foundation for immersed micro- and nanoscale molecular information processing with a paradigm shift to digitally programmable chemical systems.

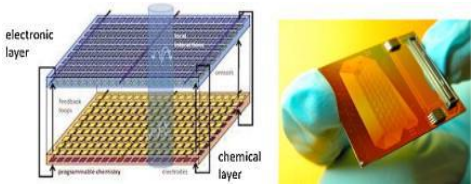

Fig : 2 Digitally programmable chemical systems

Fig. 2. (Left) Tight local coupling of electronic and chemical layers in the ECCell project as proposed by McCaskill. Spatially localized cells can grow and proliferate in the hybrid plane. Through the symmetric local feedback coupling, the role

of the two layers can be made symmetrical, not just electronics controlling chemistry but also the chemistry controlling the electronics. Electronic chemical cell functionality is divided between the two layers: with both electronic and molecular genomes. (Right)Physical realization of programmable environment for electronic chemical cells. Micro-fluidic channels at the rear supply a continuous flow of chemicals and the system is connected via CCD cameras and FPGA chip to a monitoring computer. Chemical cells must combine self-replication, self-containment and self-regulation of resources (metabolism) enabling evolution to qualify as alive. Electronic chemical cells will do this in conjunction with a reconfigurable electronic system.

ECCell is employing novel families of fully synthetic hybrid informational polyelectrolyte copolymers (not simply DNA), which simultaneously support all three cell functionalities. Their self-assembly under electric field control is the primary information processing mode of this technology. Electrochemical reactions at digitally controlled electrodes regulate pH, micro-fluidic flow and metabolite concentrations. The research will establish an effective IT interface between microelectronic and molecular information processing, by demonstrating its use to achieve a hard chemical synthetic systems objective (an artificial cell) opening a platform for programming a novel chemical Living Technology at the micro scale.

5. Future applications of computers in the study of chemistry

Computer programming is making its way into chemistry courses. One chemistry course at Stanford uses MATLAB, a user-friendly computer programming language that allows students to analyze the data they collect in a lab.

MATLAB requires a similar skill-set to the programming language Java used in Stanford's introductory computer science course. "There are newer technologies today to use in chemistry," Stack said, "There are more tools in your toolbox."

These new tools will soon be housed at Stanford's 116-year-old "old organic chemistry" building. Damaged during the 1907 Great Earthquake, the chemistry building is going through a $66.7 million remodel and will open in the fall of 2016.

The building will feature state-of-the-art teaching laboratories and technologies, from computers to lab equipment, such as gas chromatography machines and mass spectrometers.

6. Computer modelling essential in Nobel Prize Award

Computational modelling with chemistry was key to chemistry professor Michael Levitt's research for which he received a Nobel Prize in chemistry in 2013.The prize was awarded to Levitt, along with Martin Karplus, professor of chemistry emeritus at Harvard University, and Arieh Warshel, professor of chemistry at the University of Southern California, for creating computer models to predict chemical processes. Levitt created chemical reactions using computers in the 1970s, and as computers advanced, he portrayed complicated chemical mechanisms and experiments. In 2013, computational chemistry allowed the trio to simulate how a drug works inside the body. Using computer-generated calculations, the Nobel laureates modelled atoms and protein responses to a drug. Such technologies are used today by drug companies to simulate the drug's interaction in a body, followed by hands-on experiments in a chemistry lab for drugs that looked promising. In an interview after winning the Nobel Prize, Karplus said that in the beginning, his chemistry colleagues had thought using computers to simulate molecular processes was a waste of time.

But times have changed: "now it has become a central part of chemistry and structural biology," Karplus said. Computational chemistry allows a computer to understand a specific aspect of science — such as the structure of a protein — and then learn how it functions. Applications of coupling computers and chemistry include creating solar cells and drugs and optimizing motor vehicles. According to the chemistry Nobel Prize press release, "Today the computer is just as important a tool for chemists as the test tube." Computerized models allow researchers to obtain precise numbers and find results that are impossible to conduct with hands-on experiments.

Levitt received funding from the Human Frontier Science Program, which promotes interdisciplinary research and has supported over two dozen Nobel Prize winners, including three 2013 Nobel laureates.

7. Conclusions

Many of the complex challenges facing 21st century society will require solutions that transcend disciplinary boundaries. The focus of Chem-IT is the convergence of nanotechnology, information technology, biotechnology and artificial intelligence that is widely predicted to lie at the heart of the next technological revolution. Chem IT science and technology has the potential to *fundamentally transform* healthcare, agriculture, energy, security, environmental science and many other areas of pressing conce

15. DRINKING WATER CRISIS IN INDIA

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Abstract

Water scarcity, which is broadly understood as the lack of access to adequate quantities of water for human and environmental uses, is considered to be one of the most important global risks for society India's water crisis is often attributed to lack of government planning, increased corporate privatization, industrial and human waste and government corruption. In addition, water scarcity in India is expected to worsen as the overall population is expected to increase to 1.6 billion by year 2050. In India, over one lakh people die of water-borne diseases annually. The country faces a huge challenge in ensuring safe water supply. A large part of the water withdrawals are happening for agriculture. Therefore, greater discussions and interventions also need to be made in the agricultural sector. In fact agricultural productivity is a fundamental part of the solution.

Importance of Drinking Water

1. Eliminates Toxins: Studies have shown that water helps to remove toxins from the body, especially from the digestive tract.
2. Protects Against Cancer: Studies have found that the greater the intake of water, the lower the chances of bladder cancer.
3. Uplifts Mood: Drinking water makes you feel refreshed and improve the state of mind.
4. Promote Healthy Skin: Water help to flush out harmful toxins from the body, there by alleviating the risk of acne and pimples.
5. Optimum weight: Drinking water before meal helps to lose weight faster.
6. Boost Brain Function: Drinking enough water helps to boost mood and energy levels, thus increase brain performance.
7. Reduce Headaches: Studies have proved that adequate consumption of water can subdue headaches in those who are de-hydrated.
8. Prevents Pain: Muscle cramps, strains and aching joints can be prevent by keeping the body hydrated always.
9. Keeps Kidneys in Good Condition: Kidneys eliminate the wastes from the body, balance fluids, and help control blood pressure. Adequate consumption of water keeps kidney working properly.
10. Add Shine to the Hair: Drinking enough water helps to make strands, shinier, smoother and more reflective.

Introduction

Global water demands are expected to increase in the future because of increasing populations, urbanization, and industrialization. In addition, aspects of climate change and anticipated increases in extreme weather events are expected to

contribute to increases in the frequency, severity, and duration of droughts which can exacerbate water availability problems. Developing countries are more vulnerable to drought than developed countries and India is among the most vulnerable drought-prone countries in the world. About two-thirds of its area is drought-prone and per capita water availability is progressively decreasing as its population increases. The average annual per capita water availability was 1816 m^3 in 2001, which decreased to 1545 m^3 in 2011. The country is facing water stress and the demand for water is continuously increasing.

India's Drinking Water

India's drinking water crisis has become severe over the past decade. Increasing demands on available water resources for intensive agricultural practices and industrial use, together with deteriorating water quality, constrain drinking water availability despite massive outlays for drinking water and sanitation infrastructure. Although most of the water supply and sanitation schemes by India's government have penetrated into rural areas and covered many households (about 74% of rural householders are fully covered), many households (about 26%) had no drinking water facilities until 2009.Moreover, there are growing concerns about the sustainable use of groundwater and surface water with respect to emerging issues of inequity of water distribution and access. Although the government assures that drinking water is available in most rural areas, the quality of that water supply is a problem. Currently, a large proportion of India's rural communities is consuming water that does not meet the WHO drinking water quality standards

Drought conditions may further worsen the drinking water availability situation in areas where water stress already exists and in areas prone to drought. Although droughts are being combated with reactive measures and attention is being given to the quantity of water available to communities, the quality of the water is being neglected by local administrations. Lack of infrastructure and facilities to monitor and maintain adequate water quality is evident in most cases. Furthermore, in most of the villages, users are unaware of the quality of the water being supplied to them for drinking. Under drought conditions, the quality of water tends to be overlooked, and priority is given to quantity. Hence, it is essential to examine the quality of the drinking water used by those rural communities in drought-prone areas that lack a proper water supply infrastructure.

Water - India Facts

India is facing a fresh water crisis. India has just 4% of the world's fresh water — but 16% of the global population.

1.76 million are without access to safe drinking water

2.21% of country's diseases are water related[1]

3. Over 329, 000 children under five die due to diarrhea in India in 2015[2]

4.Across India as a whole, it is estimated that women spend 150 million work days every year fetching and carrying, equivalent to a national loss of income of INR 10 billion/ 160 million USD[3].

5. The total potential area to be brought under the micro irrigation (drip and sprinkler) in India is 42.2 million hectare of land, however only 3.9 million hectare of land or 9.2% of the potential is currently under micro irrigation[4].

Water scarcity is the lack of sufficient available fresh water resources to meet water demand. It affects every continent and was listed in 2015 by the World Economic Forum as the largest global risk in terms of potential impact over the next decade.[1] It is manifested by partial or no satisfaction of expressed demand, economic competition for water quantity or quality, disputes between users, irreversible depletion of groundwater, and negative impacts on the environment.[2] Two-thirds of the global population (4.0 billion people) live under conditions of severe water scarcity at least 1 month of the year.[3][4][5][6] Half a billion people in the world face severe water scarcity all year round.[3] Half of the world's largest cities experience water scarcity.[5]

Causes of Water Shortage

1. Pollution. Pollution is a major cause of water shortage. ...

2. Overuse of Water. When water is overused, shortage occurs. ...

3. Water Wastage. Wastage of water is also a major cause of water shortage. ...

4. Drought. ...

5. Restriction by Governments. ...

6. Destruction of Water Catchment Areas.

Water pollution is the contamination of water bodies (e.g. lakes, rivers, oceans, aquifers and groundwater). This form of environmental degradation occurs when pollutants are directly or indirectly discharged into water bodies without adequate treatment to remove harmful compounds.

Water pollution affects the entire biosphere of plants and organisms living in these water bodies, as well as organisms and plants that might be exposed to the water. In almost all cases the effect is damaging not only to individual species and populations, but also to the natural biological communities.

Point source water pollution refers to contaminants that enter a waterway from a single, identifiable source, such as a pipe or ditch. Examples of sources in this category include discharges from a sewage treatment plant, a factory, or a city storm drain. The U.S. Clean Water Act (CWA) defines point source for regulatory enforcement purposes.[9] The CWA definition of point source was amended in 1987 to include municipal storm sewer systems, as well as industrial storm water, such as from construction sites.[10]

Non-point sources

Nonpoint source pollution refers to diffuse contamination that does not originate from a single discrete source. NPS pollution is often the cumulative effect of small amounts of contaminants gathered from a large area. A common example is the leaching out of nitrogen

The specific contaminants leading to pollution in water include a wide spectrum of chemicals, pathogens, and physical changes such as elevated temperature and discoloration. While many of the chemicals and substances that are regulated may be naturally occurring (calcium, sodium, iron, manganese, etc.) the concentration is often the key in determining

what is a natural component of water and what is a contaminant. High concentrations of naturally occurring substances can have negative impacts on aquatic flora and fauna.

Oxygen-depleting substances may be natural materials such as plant matter (e.g. leaves and grass) as well as man-made chemicals. Other natural and anthropogenic substances may cause turbidity (cloudiness) which blocks light and disrupts plant growth, and clogs the gills of some fish species.[12]

India is facing A Perfect Storm in Managing Water.

Centuries of mismanagement, political and institutional incompetence, indifference at central, state and municipal levels, a steadily increasing population that will reach an estimated 1.7 billion by 2050, a rapidly mushrooming middle class demanding an increasingly protein-rich diet that requires significantly more water to produce together, these are leading the country towards disaster. On top of that, there is an absence of serious and sustained attempts at the central or state levels to manage water quantity and quality, a lack of implementation of existing laws and regulations, and pervasive corruption and poor adoption rates of new and cost-effective technologies.

Participatory water resource management

1.Building capacity of local government and community on the principles, processes and provisions;

2.Mapping of water resources and usage;

3.Water budgeting and allocation;

4.Improving access to water supply by leveraging government resources; and

5.Advocacy for regulations of water use in water stressed areas and protection of groundwater.

Source sustainability measures

1.Rainwater harvesting, groundwater recharge;

2.Alternate water supplies like developing surface water systems; and

3.Promoting complementary use of water source – securing scarce fresh water source for consumption.

Water quality management

1.Water safety plans – prevent contamination before it happens;

2.Treatment of water with appropriate technologies (in arsenic or fluoride endemic areas);

3.Monitoring, surveillance and testing through water quality field test kits; and

4.Advocacy for adequate infrastructure and accountability at district and regional labs.

Operation and maintenance

1.Ensure skills, spares and tools for regular maintenance and management (mechanics, pump operators, spares bank, tools for regular maintenance and repair);

2.Finance for operation and maintenance, replacement, expansion and modernization (through village committees or local government based maintenance funds);

3. Monitoring usage to minimize wastage; and Advocacy for decentralized management.

Conclusion

The threat of harmful contaminants in drinking water can no longer be reasonably ignored. The correlation between contaminated drinking water and many significant diseases and health problems. Two of the most volatile drinking water contaminants, chlorine and fluoride, are actually treatment additives. Also, lead, another of the more harmful contaminants, enters drinking water after treatment and cannot be regulated by municipal water systems. Therefore, municipal water systems cannot and should not be trusted to provide healthy, clean drinking water. The absolute best technology now available for treating water and removing undesirable contaminants is water filtration. Water filters, when compared to any other water treatment alternative, will remove more contaminants and provide safer, healthier drinking water.

16. Nuclear energy a solution to energy crisis

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Abstract:

India is marching towards achieving a desirable status of a developed country with rapid strides. Ensuring uninterrupted supply of energy to support economic and commercial activities is essential for sustainable economic growth. In true sense, sustainable development should be widely spread in all three dimensions - social, economic, and environmental. For all these areas, energy is perhaps the most important aspect. The production and the consumption patterns at the local and the global scale, determine not only all the activities in society, but also some major environmental issues like pollution, green house effect, and desertification. This paper presents the scenario of power generation, consumption and forecasts power requirements up to 13th five year plan. While it also stressing on energy and its close linkages with environment, poverty and sustainability.

Keywords: Power Demand, Sustainable Development, Energy Crisis.

INTRODUCTION

Nuclear energy is energy in the nucleus (core) of an atom. Atoms are tiny particles that make up every object in the universe. There is enormous energy in the bonds that hold atoms together. Nuclear energy can be used to make electricity. But first the energy must be released. It can be released from atoms in two ways, nuclear fusion and nuclear fission. In nuclear fusion, energy is released when atoms are combined or fused together to form a larger atom. This is how the sun produces energy. In nuclear fission, atoms are split apart to form smaller atoms, releasing energy. Nuclear power plants use nuclear fission to produce electricity. Nuclear reactions involve changes in an atom's nucleus and thus causes a change in the atom itself. Unlike normal chemical reactions that form molecules, nuclear reactions result in the transmutation of one element into a different isotope or a different element altogether. There are two types of nuclear reactions. The first is the radioactive decay of bonds within the nucleus that emit radiation as it decays or transforms to a more stable state. The second is the "billiard ball" type of reactions, where the nucleus or a nuclear particle (like a proton) is slammed into by another nucleus or nuclear particle.

Energy Crisis in India

An energy crisis is also called "load shadding" is noteworthy bottleneck in the supply of energy assets to an economy. In prominent writing, it frequently alludes to one of the energy sources utilized at a specific time and place, specifically those that supply national power

frameworks or those utilized as fuel in vehicles. Electricity power is basic to fuel the financial development of India. The nation is on the quick direction of improvement yet to keep the force of development high, accessibility of continuous power supply is an unquestionable requirement. India needs power to fuel the development of each industry, be it substantial scale or little scale, assembling, human services or training. India has been reliant to a vast degree on energy imports to meet its national energy prerequisites. According to the assessments of Planning Commission, Government of India (GoI), to guarantee a supported 8% development of the economy, by 2031-32 India needs to expand its essential energy supply by three to four circumstances and its power era by five to six circumstances of the 2003-04 levels. To confine the reliance on energy imports and contribute in meeting this energy challenge, the legislature is additionally laying.

There is a requirement for substitute energy which won't just counter balance the request of ordinary fossil fuel, additionally clear approach to cleaner arrangements A green development economy is the need of great importance. Unexpectedly, India has world's fifth biggest coal saves and still confronts intense power crisis. India's per capita control part utilization, around 940 kilo watt-hour (kWh), is among the most minimal on the planet. In correlation, China has a for every capita utilization of 4,000 kWh, with the created nations averaging around 15,000 kWh of per capita utilization.

General Effects of Energy Crisis on National Development

Following general effects of energy crisis

1. Inflation 2. Economic uncertainty 3. Increase in prices of domestic goods

4. Retrenchment with the resultant increase in unemployment level

5. Energy poverty 6. Increased general poverty 7. Poor health delivery system resulting to deaths 8. Absence/poor quality research with resultant low knowledge production.9. Depletion of foreign reserve. 10. Devaluation of local currency

11 increase in lending rate

12. Slow pace of economic activities 13.Slow pace of infrastructural development.14. Resource depletion resulting to environmental degradation

15. Ineffective implementation of budgetary plan due to insufficient funds.

Solution for Crisis of energy The study indicates that most of the prosperous nations are extracting about 30-40 per cent of power from nuclear power and it constitutes a significant part of their clean energy portfolio, reducing the burden of combating climate change and the health hazards associated with pollution. Meanwhile in India, we are not generating even 5000

MW of nuclear power from the total of about 150 GW of electricity generation, most of it coming from coal**.** India is blessed with the rare, and very important, nuclear fuel of the future – Thorium. We cannot afford to lose the opportunity to emerge as the energy capital of the world, which coupled with the largest youth power, will be our answer to emerge as the leading economy of the world. India has the potential to be the first nation to realise the dream of a fossil fuel-free nation, which will also relieve the nation of about $100 billion annually which we spend in importing petroleum and coal. Besides the billions spent on importing coal or oil, we are also importing millions of tonnes of CO_2 and other greenhouse gases, which are a hazard to the environment and human health. It is noteworthy that in 2010-11, India imported about 82 billion tonnes of coal a large fraction of which was for the thermal power plants.

Nuclear power, on the other hand, provides a relatively clean, high-density source of reliable energy with an international presence. Today, there are 29 countries operating 441 nuclear power plants, with a total capacity of about 375 GW. Sixty more units, with a total target capacity of 58.6 GW were under construction.

Conclusions

Nuclear Energy has the potential for generating huge quantities of cheap electricity. Utilizing Nuclear Energy is needed if humanity is to continue its advancement. It has great potential to be quite a useful and beneficial part of humanitarian growth and development in the decades to come. It is extremely important that Nuclear Power plants be held to stringent safety standards. Despite of risks, we should not rule out the use of Nuclear Fission, and potentially Nuclear Fusion in the future, as impractical. As a world, it is imperative that we work to expand the use of nuclear energy.

17. Bio medical waste and its management

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Abstract:-

The Bio medical Waste (Management and Handling) Rules, 1998, imposes a duty on an institution generating biomedical waste to take measures to prevent any adverse effects on human and the environment The world health organization estimated that around 20 percent of the total waste from health care activities are hazardous and contains harmful micro organisms and can infect patients, health care workers & public in general

Common bio medical waste treatment facility (CBWTF) plays an important role in the collection and treatment of bio medical waste this reduces threats to human health and environment caused by untreated bio medical waste.A detailed classification of hospital waste indicates the several types of wastes in the hospital set up All figures mentioned in classification are shown in percentages

Types of Biomedical wastes and their category, recycling and non recyclable are also important .There is a risk of contamination and infection due to improper disposal of hazardous chemicals, drugs& disposables in the open area Bio medical waste management is multi dimensional, multidisciplinary area touching every field of medicine, scientific research management techniques, Law and environment as well as Social and Political issues.

Key words: - Hospital Waste, Hospital Infection, Hospital Disposal

Meaning: - Any waste generated during diagnosis, treatment of human beings or animals or by research activities is bio medical waste

Introduction: Biomedical waste generated from health care units depends on number of factors such as

1. Types of health care units
2. Availability of Infrastructure and resources
3. Methods of waste management

Other health care facilities which generate bio medical waste are Laboratories, Veterinaries, Nursing facilities, Dentals, Funeral homes etc.

'Hospital waste'' generated during the patient care cause many harmful

l effects to the environment including human beings they transmit infections particularly HIV, Hepatitis, Tetanus to the people who handle it or come in contact with it. Therefore we need to know the meaning, categories, problems related to biomedical waste, procedure of handling and disposal of biomedical waste The government of India specifies that hospital

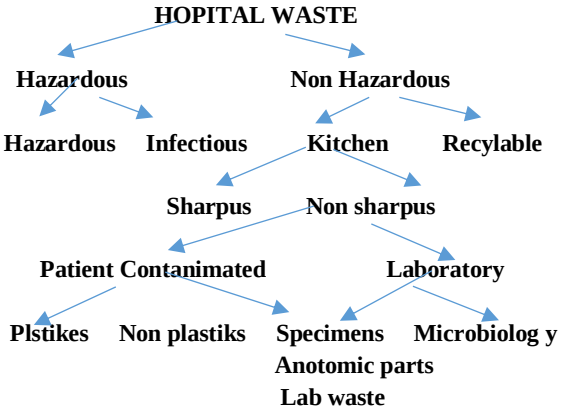
waste management is a part of hospital hygiene and maintenance activities this involves systematic functions to be carried out, such as collection, transportation and disposal of waste

World Health Organization (WHO)estimated that 10-15% of health care waste is ''Infected waste'' Non infectious or Non contaminated waste becomes infected when it gets mixed with infected waste this can be avoided only ,if the waste is segregated or separated into infected and household waste at the point of source or at the point of generation

Classification of Hospital Wastes

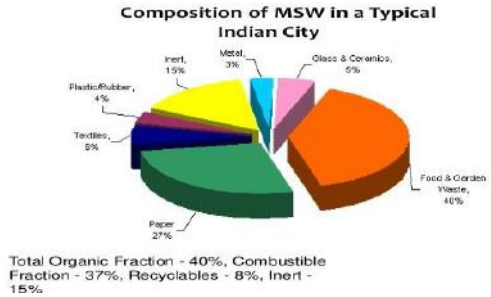
Waste Categories	Types of Waste
Category No 1	Human Anatomical Waste
Category No 2	Animal Waste
Category No 3	Microbiology& Biotechnology
Category No 4	Sharp Wastes
Category No 5	Discarded medicine & cyto toxic drugs
Category No 6	Soiled waste
Category No 7	Solid waste
Category No 8	Liquid waste
Category No 9	Incineration waste
Category No 10	Chemical waste

A detailed classification of hospital waste is shown in figure I below



This indicates several types of wastes that can exist in a hospital set up

Percentage Layout of Biomedical Waste



Total Organic Fraction - 40%, Combustible Fraction - 37%, Recyclables - 8%, Inert - 15%

Here all figures mentioned in figure 1 are in percentages

India has more than 15000 small and private hospitals and nursing homes. Apart from clinics and pathological laboratories, India generates around 3 million tones of medical waste every year.

After the notification of the biomedical waste rules, 1998.Health care units in India are slowly moving on track to the process of waste segregation, collection, treatment and disposal.

The Biomedical waste rules, 1998, under schedule I provides different categories of biomedical waste.

These biomedical wastes shall be segregated at the point of generation onto containers or bags they shall not be mixed with any other waste.

Schedule II of Bmw Rules, 1998 Provides Color Codes and types of containers for disposal of biomedical waste.

Schedule III of BMW rules,1998 provides label as having non washable and noticeably visible hazardous & cytotoxic

symbols. the waste generated here is for the purpose of disposal. It shall also contain information such as senders name and address, Receivers name & address etc

The un reacted Biomedical waste shall be transported only in a specially designed and approved vehicle. It shall not be stored beyond the period of 48 hours.

Biomedical waste management process

In any health care units

1.Handling,Seggregation,Disinfection,Storage,Transportation & Disposal are vital steps for safe and scientific management of biomedical waste

2. Seggregation that is separation of biomedical waste makes transportation and disposal easier

3. The most appropriate way of identifying the categories of biomedical waste is by sorting the waste into color coded containers or plastic bags

Treatment and Disposal of BMW

The goal of Biomedical Waste treatment is To reduce or eliminate the waste hazards

Treatment should render the waste safe for handling and disposal

There are five technology options for the treatment of biomedical waste they are grouped as follows

1.Chemical process: - The process involves the use of disinfectants e.g. Sodium hypochlorite, Dissolved Chlorine dioxide, per acetic acid.

2.Thermal processes : - The process utilizes heat to disinfect biomedical waste .The process is of two categories

a. Low heat system - (operates between 93-177^{O}C**)** here steam, Hot water r electromagnetic radiation is used to heat & decontaminate the waste. This System includes

b. Autoclaving – It uses steam and pressure to sterilize the waste

c. Microwaving - It uses moist heat and steam generated by microwave energy to disinfect the waste

d.High heat System – this system uses combustion and high temperature to decontaminate and destroy the waste. This system includes - 1 Hydroclaving & 2.Incineration

3. Mechanical Processes:- This process is used to change the physical form of the waste to facilitate easy handling of the waste and the process involves two types

a.Compaction – This is used to reduce volume of the waste

b.Shredding – This is used to destroy plastics to prevent their reuse

4. Irradiation process – here the waste is exposed to ultraviolet or Ionizing radiations in an enclosed chamber the waste becomes unrecognizable

5. **Biological Process** – Here Biological enzymes are used for treating medical waste, Biological reaction will disinfect the

waste & also destroy all the organic constituents

Common Biomedical Waste Treatment Facility (CBWTF)

CBWTF plays an important role in collection & treatment of biomedical waste. this reduces the threats to human health and environment which may be caused due to untreated biomedical waste

The Central Pollution Control Board (CPCB) has issued guidelines for setting common biomedical waste treatment and disposal facility. The guidelines provide the requirement of line, equipment treatment, infrastructure setup etc...

The CBWTF & CPCB aims at betterment of environment and sustainable society

Conclusion

The importance, use and purpose of this study have been kept in mind and an evaluation of the data and findings gathered from the different aspects of research methodology at hand has been concluded. This has been done by keeping in mind the objectives of this research and it has involved assessment of the salient aspects of information generated through research tools as recorded. This study has critically analyzed the deficiencies in infrastructure of the healthcare establishments based upon the findings arrived at from the respondents in the study. The suitability of the provisions of law in the context of Bio-Medical Waste Management and their implementation is examined in this research, based on which suggestions and recommendations are made for effective management of Bio-Medical Wastes.

18. Importance of Spectroscopy In Chemistry (UV, IR, NMR)

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A b s t r a c t

Chemist are Able to Design Specific Synthetic Routs to produce Compounds from Starting Materials the Chemist Do Actually Know What's Structures, Chemicals have it has Probably been the most important development in organic Chemistry in modern times. There are 4 major types of Spectroscopy used in organic Chemistry 1.UV , 2.IR , 3.NMR 4. Mass Spectroscopy

Introduction

UV Spectroscopy

The molecular spectroscopy is the study of the interaction of electromagnetic waves and matter. Ultraviolet – visible spectroscopy (λ200 - 800 nm) Studies the changes in electronic energy levels within the molecule arising due to transfer of electrons from π- or non-bonding orbital's. It commonly provides the knowledge about π-electron systems, conjugated unsaturations, aromatic compounds and conjugated non-bonding electron systems etc.

Applications of Electronic Spectroscopy in Predicting Absorption Maxima of Organic Molecules

1. Conjugated Dienes, Trienes and Polyenes

2. Commercial Applications of UV and Visible Spectroscopy

The UV-Vis spectroscopy has innumerable applications in the drugs and pharmaceutical Industry. Beer-Lambert law offers a valuable and simple method for quantitative Analysis. In practice, The UV spectroscopy is used extensively in determining rate constants, equilibrium Constants, acid-base dissociation constants etc for chemical reactions.

IR SPECTROSCOPY

IR Spectroscopy Involves the Interaction of Infrared Radiations with matter it Covers a range of Technique Mostly Based of Absorption Spectroscopy. As with all Spectroscopy Techniques it can be used to identify and study the Functional Group Information of the Unknown organic Compounds. The Infrared Spectrum can be used for molecules such as Fingerprint can be used for Humans. The more important use of IR Spectrum is to determine the Structural information about a molecule. The absorption of each type of bond (N-H, C-H, O-H, C-X, C=O, C-O, C-C C=C). Infrared Spectroscopy is a Simple and Reliable Technique Widely used in Both Organic & Inorganic Chemistry, in Research & Industry. It is used in Quality Control, Dynamic Measurement, it is also used in Forensic Analysis in both Criminal & Civil Cases, for Ex: in

Identifying Polymer Degradation. It can be used in Determining the Blood Alcohol Content of a Suspected Drunk Driver.

NMR SPECTROSCOPY

Nuclear Magnetic Resonance Spectroscopy the most Commonly Known as NMR Spectroscopy is Research Technique that Exploits the Magnetic Properties of Certain Atomic Nuclei this type of Spectroscopy Determines the Physical and Chemical properties of atoms or the Molecules in which they are contained.

Applications

1. Chemical Research & Development:- Organic, Inorganic & Physical Chemistry

2.Chemical Manufacturing Industry 3. Food Industry 4. Pharmaceutical Development & Production 5. Agrochemical Development 6. Polymer Industry 7 Biological and Bio chemical Research

19. Medicinal Chemistry and Drug Designing - Coumarins, Hydrazones and their derivatives as potential Biomaterials and Anticancer Agents

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Abstract:

A novel Coumarin based and Hydrazone derived materials are widely developed as promising biomaterials and find wide applications in the synthesis of pharmaceutical drugs. The coordination structure of the ligands enables them to form bidentate and tridentate bonding with transition metals forming their respective metal complexes. The metal complexes are proven to be thriving antibacterial and antifungal agents while hydrazones are found to posses a very good anticancer and antioxidant properties alongside being a good antimicrobial agents themselves. The current paper focuses on the special features of these materials with respect to their biochemical and medicinal applications.

Keywords: Biomaterials, Coumarins, Hydrazones, Medicinal Chemistry

Introduction

Schiff-bases have often been used as chelating ligands in coordination chemistry [1,2]. Schiff-bases with donors (N, O, S, etc.) have structure similarities with neutral biological systems and due to presence of imine group are utilized in elucidating the mechanism of transformation of rasemination reaction in biological system [3–5]. Coumarins, Hydrazones and its derivatives as ligands with potential sulphur and nitrogen bonds are interesting and have gained special attention not only the structural chemistry of their multifunctional coordination modes but also of their importance in medicinal and pharmaceutical field. They show biological activities including antibacterial antifungal [6–10], antidiabetic [11], antitumor [12], antiproliferative [13], anticancer [14], herbicidal [15], anticorrosion and anti-inflammatory activities [8–10]. Schiff-bases represent an important class of compounds because they are utilized as starting materials in the synthesis of industrial products [16]. Moreover, Schiff-bases are regarded as privileged ligands [17]. Due to their capability to form complexes with different transition metals can act as catalysts for many different reactions [18–20].

Hydrazones are axomethines characterized by the grouping : C=N-N : [21] . They are distinguished from other members of this class (imines, oximes, etc.) by the presence of the two interlinked nitrogen atoms. Hydrazones are usually named after the carbonyl compounds from which they are derived; thus benxaldehyde and

phenylhydrazine give benzaldehyde phenylhydrazone.

Materials and Methods

Synthesis of Coumarins and Hydrazones

Coumarins are synthesized by fusing acetates with aldehydes. Generally ethanolic solutions of the reactant mixtures are refluxed for a short duration, followed by filtration and recrystallization [22-23]. Hydrazones, in general, are prepared by refluxing the stoichiometric amounts of the appropriate hydrazine and aldehyde or ketone dissolved in a suitable solvent. The compound, which usually crystallizes out on cooling the solution, is recrystallized from a suitable solvent [24]. Recrystallization ensures the uniform growth of particles [21].

Biological Activities of Coumarins, Hydrazones and their derivatives

Pharmacology, Antibacterial and Antifungal activity

The purified products were screened for their antibacterial activity by using cupplate agar diffusion method [26]. The nutrient agar broth prepared by the usual method, was inoculated aseptically with 0.5 mL of 24 h old subculture of S. aureus, B. megaterium, P. vulgaris, and E. coli in separate conical flasks at 40 50 oC and mixed well by gentle shaking. About 25 mL of the contents of the flask were poured and evenly spread in petridish (90 mm in diameter) and allowed to set for two h. The cups (10 mm in diameter) were formed by the help of borer in agar medium and filled with 0.04 mL (40 μg/mL) solution of sample in DMF. The plates were incubated at 37 oC for 24 h and the control was also maintained with 0.04 mL of DMF in similar manner and the zones of inhibition of the bacterial growth were measured in millimeter.

Results and Discussions

The antimicrobial activity data of Coumarins and Hydrazones discussed above clearly illuatrates that the metal complexes have significant antibacterial and antifungal activity against tested organism. It can be concluded that the Cu(II),Fe(II) and Fe(III) complexes showed higher activity where the other complexes have moderate activity. It is clear that all the compounds have displayed maximum activity against *S. aureus.*

Conclusion

Based on the above information about the biologicall applications of Coumarins and hydrazones it is concluded that the they are thriving materials in the field of Bio and Medicinal Chemistry and holds a lot of promise in the sector.

20. Nuclear Energy-A Solution to Energy Crises

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ABSTRACT

An **energy crisis** is any significant bottleneck in the supply of energy resources to an economy. In popular literature, it often refers to one of the energy sources used at a certain time and place, in particular those that supply national electricity grids or those used as fuel in vehicles. Energy crisis and finding a viable solution for it constitutes an important contemporary debate in India today. Non-renewable energy forms major chunk of total energy resources of the country. Soaring international prices of crude oil entails heavy outflow of foreign exchange and there is omnipresence of energy insecurity in the event of disruption in supply. Nuclear energy is being offered as panacea for energy crisis being faced by India. Nuclear energy is a cheaper, In this paper a solution to energy crisis like nuclear energy is explained.

Introduction:

Industrial development and population growth have led to a surge in the global demand for energy in recent years. In the 2000s, this new demand — together with Middle Easttension, the falling value of the U.S. dollar, dwindling oil reserves, concerns over peak oil, and oil price speculation — triggered the 2000s energy crisis, which saw the price of oil reach an all-time high of $147.30 a barrel in 2008.

Energy crisis and finding a viable solution for it constitutes an important contemporary debate in India today. Energy crisis has a great bearing on all socioeconomic development of a country and its sovereignty. Indo-US nuclear deal trans-country pipelines and aggressive policy of securing petroleum fields in different parts of the worlds can be seen in light of the energy crisis.

India is not the stand alone case facing energy crisis. The world on the whole is facing energy crisis. Energy intense economies of the developed world copied with increasing demand from rapidly developing countries such as India, china, Brazil is responsible for huge increase in demand.

In India there are number of factors which led to the situation of energy crisis. There has been sharp rise in the consumption of energy in India since the last decade of 20^{th} century. The year 1991 unlashed the forces of liberalization, privatization sector and accompanying rise in energy, tidal energy etc. These resources have failed to fill the gap of demand and supply of

energy due to variety of reasons. Hydroelectricity is a cheap source of energy but is inflexible in terms of location.

There are many social and environmental concerns such as displacement of tribals, submergence of forests are associated with hydroelectricity. Other renewable energy resources such as solar power, geo-thermal, tidal power are in nascent stage of development and are commercially unviable.

Non-renewable energy forms major chunk of total energy resources of the country. Coal oil or gas fired power stations produce electricity. Petroleum derivatives are used in transportation sector. Problem with not renewable energy is that India has to import a major portion of petroleum products as it is not naturally endowed with them in sufficient quantum. Soaring international prices of crude oil entails heavy outflow of foreign exchange and there is omnipresence of energy insecurity in the event of disruption in supply.

Traditional energy resources like firewood, dried cow dung cake and charcoal are being used in rural India. Such usage of traditional energy resources in inefficient and cause make life miserable for women. To achieve cent percent rural electrification as envisaged by national programmed for rural electrification, availability of ample energy is must.

Nuclear energy is being offered as panacea for energy crisis being faced by India. Nuclear energy is location independent sources of energy i.e. a unclear reactor can be set in any locality to supply electricity. Further nuclear fuel is cheaper than the petroleum. India has gained a considerable expertise in the development and harnessing of nuclear energy. Nuclear energy on the other hand is a result of heat generated through the fission process of atoms. All power plants convert heat into electricity using steam. At nuclear power plants, the heat to make the steam is created when atoms split apart - called fission. The fission releases energy in the form of heat and neutrons. The released neutrons then goes on to hit other neutrons and repeat the process, hence generating more heat. In most cases the fuel used for nuclear fission is uranium.

India’s nuclear program is three stage programmes which encompasses the use of vast thorium reserves in the county. Nuclear energy is seen to be capable of bridging the gap between the demand and supply of energy in India.

Of late, the nuclear energy program faced problem of non availability of natural uranium for rapid expansion of nuclear energy in country. Natural uranium occur in small quantities in India and India can not import natural uranium from outside as it is not a signatory to NPT and as a consequence NSF refuse to export any nuclear energy related material and technologies to India.

Indo–US unclear deal should be seen in light of the projected benefits of nuclear energy. July 18 deal envisages that US will co operate with India for the development of civilian nuclear technology and use its good offices to ensure NSG rules are modified in a way so that India would be able to receive natural uranium as well as advanced nuclear technologies for civilian use. The deal in turn obliges India to demarcate its civilian as well as military establishment under IAEA regime.

There are many strategic and defensive aspect undercurrents of the nuclear deal. Questions have been raised in parliament regarding India compromising its sovereignty independent foreign policy and about the reliability of USA as a long term strategic partner. Scientists have alleged that US have shifted the goal posts and is demanding more obligations from India than that were required by July 18 deal.

Former honorable president Kalama has released a road map for achieving the energy security for the nation. He visualizes important contribution by hydroelectric power and nuclear power for the attainment of energy security. He also gives emphasis on conventional source as well as renewable sources of energy such as wind power for energy security of the country.

According to Professor Cohen, if the Uranium deposit could be proved to last as long as the relationship between the Earth and Sun is supposed to last (5 billion years) then nuclear energy should be included in the renewable energy portfolio. [2]

In his paper Professor Cohen claims that using breeder reactors (nuclear reactor able to generate more fissile material than it consumes) it is possible to fuel the earth with nuclear energy indefinitely. Although the amount of uranium deposit available could only supply nuclear energy for about 1000 years, Professor Cohen believes actual amount of uranium deposit available is way more than what is considered extractable right now. In his arguments he includes uranium that could be extracted at a higher cost, uranium from the sea water and also uranium from eroding earth crust by river water. All of those possible uranium resources if used in a breeder reactor would be enough to fuel the earth for another 5 billion years and hence renders nuclear energy as renewable energy. [2]

India has been given a membership to group of countries involved research in international thermonuclear experimental reactor. This research is aimed at finding means to harness thermo-nuclear energy for peaceful purposes i.e. for the production of electricity. ITER is projected as means that can provide unlimited energy using the principle of nuclear fusion.

State of Tamilnadu, Maharashtra and Gujarat have taken lead in this sector. Government should encourage this private sector imitative by providing the required infrastructure at war footing.

So that estimate potential can be harnessed private sector participation should be encourage this private sector imitative by providing the required infrastructure at war footing. So that estimate potential can be harnessed private sector participation should be encouraged.

Energy crisis in India can treacle by the effective involvement of civil society. In India civil society is inactive in the field of energy conservation unlike the western countries. Energy conservation is the key civil society can lead the front by educating masses about the need to conserve energy. Energy conserved is energy earned.

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21. Testing performance of varieties of bidi tobacco for seed yield at nipani in view of its prospective alternative use for seed oil purpose

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Abstract

Tobacco (*Nicotiana tabacum* L.) although is an important commercial crop, but the growing concerns about its health hazards alarms the researchers to look for its alternative uses which are equally remunerative to sustain the crop cultivation. One of its alternative uses is as source of seed oil, which is free from nicotine. Literature indicated that Tobacco seeds contain 33-40% of oil characterized to be rich in polyunsaturated fatty acids (PUFA). Therefore, increasing seed yield levels both through breeding and crop management approaches forms an important research objective.

A study was carried out at Agricultural Research Station, Nipani, which consisted of tobacco varieties, to evaluate in two experiments i) for seed yield under varying plant densities and nutrient levels ii) for seed yield and its component traits. In experiment I conducted during 2008-2011, three varieties viz., A-119, A-145 and GL-54 were tested at two spacing levels (45 x 45 cm and 60 x 45 cm) and two fertilizer levels (100% and 150% NPK). The results indicated that A-145 recorded highest seed yield followed by GL-54 and A-119, and varying spacing and fertilizer levels did not influence seed yield significantly. In experiment II seven varieties of bidi tobacco (A-119, NBD-209, Bhavyashree, Vedaganga, Bhagyashree, A-2 and PL-5) recommended for cultivation in Nipani area, were tested for seed yield and yield components during 2016-17. Wide range was observed for seed yield among the varieties (64 to 663 kg/ha), with the highest recorded by A-119 followed by Bhagyashree. These varieties recorded high values for number of pods per plant, pod weight per plant and seed weight per plant. Highest seed index (%) was recorded by A-119 followed by A-2 and Bhavyashree and highest seed yield per pod by Bhavyashree followed by A-2 and PL-5. These varieties may be utilized in genetic improvement for seed yield.

22. Microwave assisted green and efficient synthesis of 3,4 dihydropyrimidones catalysed by *Lemon juice*

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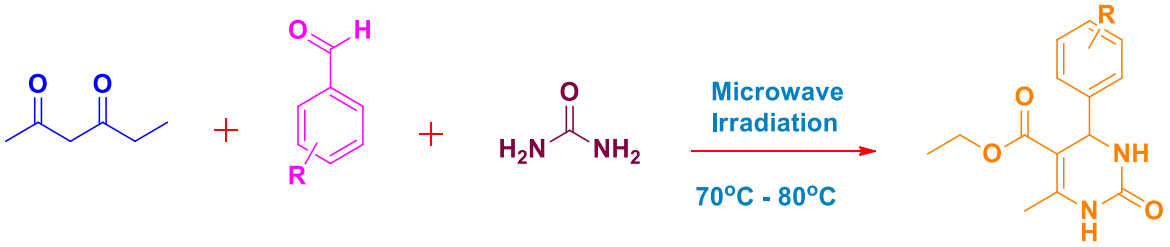
Abstract

First time we reported the synthesis of Biginelli reaction derivatives by green approach.A simple, eco-friendly and economic method to synthesize various 3,4 dihydropyrimidones has been demonstrated using lemon juice in the absence of any organic solvent. Using microwave heating, reaction times were shortened from 1hr to 2 min. The advantages of this method include the use of *lemon juice* as a green catalyst, short reaction time, easy work up, and excellent yields.

GRAPHICAL ABSTRACT:



Keywords: Dihydropyrimidone, Lemon Juice, Microwave Irradiation et

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23. Impact of pesticides and insecticides on the environment- A Review

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Abstract:

Different types of pesticides are available in the market, and they are used to kill the pests and insects which are the harmful on the various agricultural crops. Till date, majority of developing and non developing countries are widely used pesticides for controlling the insect pests. The various kinds of pesticides plays crucial role in the agricultural field, and they are provided benefits to human property and also protect the various crops. But, its excessive use causes harmful effect on the biodiversity. Their excess uses also directly and indirectly effect on human being, terrestrial animals, aquatic organisms, microorganism and other beneficial insects and other organisms. The present paper is briefly revealed that impact of pesticides and insecticides on the environment.

Keywords: Pesticides, Environment, Biodiversity, Agricultural crops

24. IMPACT OF PERSISTENT & NON-PERSISTENT PESTICIDES ON AGRI-ECOSYSTEM

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Abstract

Human interference in the natural processes has created many irreversible changes in both terrestrial & natural ecosystems. Managing numbers & distribution of certain plants & animals in Agri-ecosystem has resulted in upset of many ecological processes & principles. Food chains are very seriously damaged & resulted in outbreak of many diseases. Cultivation of high yielding, short duration as well as improved & genetically modified(GM) varieties of plants & animals posed vulnerability towards pest attack. Change in weather conditions & Climate busted them. To overcome this problem Pesticides, a category of toxic & hazardous chemicals entered agriculture. They efficiently controlled pests but raised many environmental issues. They are like a double edged sword. They should be wisely used. Pesticide is an umbrella term covers large number of hazardous chemicals specially designed to kill/control a target organism called as pest. Pest may be insect, animal, plant or microbes. Use of both persistent & non-persistent Pesticides is responsible for upset of ecological processes. It has adverse effects on both natural ecosystems & managed agri-ecosystems. Pesticide use has adverse impacts on all biotic & a-biotic components of ecosystem. They have detrimental effects on properties of these precious natural resources like soil, air & water. Sustainability of these resources & ultimately health of human beings is at risk. Persistent Pesticides residues remain in ecosystem for many years depending on its half life. It enters food chain & then get transferred from one organism to other organism in higher tropical levels. This transfer results in accumulation of higher quantities of it in tropical levels, called as bio-accumulation & consequently results in bio-accumulation. Non persistent Pesticides affect beneficial organisms, being more toxic affect human beings also & repeated use results in development of resistance in target organism. Thus both persistent & non-persistent pesticide use has serious environmental consequences on sustenance of agri-ecosystem.

Key words- Persistence Pesticides, Agri-ecosystem

25. "SYNTHESIS AND ANTI-BACTERIAL ACTIVITY OF PYRAZOLE DERIVATIVE"

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Abstract:

Different Pyrazole derivatives were synthesized by cyclization of substituted chalcone derivatives in presence of hydrazine hydrate and 1-Phenyl hydrazine (P1-P6). All the synthesized compound were characterized by spectral analysis (UV, IR, NMR and MS). These compounds were screened for their antibacterial activity against Gram-positive bacteria and Gram negative bacteria. All synthesized compounds (P1-P6) exhibited good antibacterial activities µg/ml against E.coli, P. aeruginosa, B.pumilus.

Keywords: - Pyrazole, Chalcone, Hydrazine, 1-Phenyl hydrazine, Antibacterial.

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26. Bio medical waste and its management

Prof C.S..Patil* ,Prof S.V.Salimath ,
Raja Lakhamagouda Science Institute ,Belagavi

Abstract

The Bio medical Waste (Management and Handling) Rules, 1998, imposes a duty on an institution generating biomedical waste to take measures to prevent any adverse effects on human and the environment. The world health organization estimated that around 20 percent of the total waste from health care activities are hazardous and contains harmful micro organisms and can infect patients, health care workers & public in general

Common bio medical waste treatment facility (CBWTF) plays an important role in the collection and treatment of bio medical waste this reduces threats to human health and environment caused by untreated bio medical waste. A detailed classification of hospital waste indicates the several types of wastes in the hospital set up. All figures mentioned in classification are shown in percentages

Types of Biomedical wastes and their category, recycling and non recyclable are also important .There is a risk of contamination and infection due to improper disposal of hazardous chemicals, drugs& disposables in the open area

Bio medical waste management is multi dimensional, multidisciplinary area touching every field of medicine, scientific research management techniques, Law and environment as well as Social and Political issues. Key words: - Hospital Waste, Hospital Infection, Hospital Disposal

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27. New Approaches to the Synthesis of Pure Conjugated Polymers

Prof. C. Lingareddy, Principal, K.L.E Society's J.T.College, GADAG

Abstract:

Recent advancement in the field of polymerization is aimed at the synthesis of high-purity conjugated polymers, polyacetylenes and polyanilines in particular. Current techniques for making such composite materials depend upon synthesizing the nanocrystals and conducting polymer separately, and subsequently mixing them. Conjugated polymers and oligomers have been under intensive research and development as new functional materials for electronics, photonics, advanced coatings, and related applications. Some conjugated polymers such as polypyrrole and polyaniline have already found practical applications in the construction of capacitors, analytical sensors, antistatic films and coatings, materials for electrostatic discharge protection, electrochromic windows, anticorrosion paints, etc. Neat conjugated polymers are insulators or semiconductors, which, however, become conductive upon partial oxidation or reduction, also referred to as doping; in the case of polyaniline, protonation (proton doping) is also necessary. The doping processes allow the properties of these polymers to tune from insulators to metallic conductors. The development of new preparation procedures giving pure conjugated polymers almost free of catalyst residues and other polymerization side products is highly desirable. There are about six types of procedures used for the preparation of conjugated polymers: Homogeneous coordination polymerization, Chemical (stoichiometric) polymerization, Catalytic versions of chemical polymerization, Chemical transformation of a precursor polymer, electrochemical polymerization, photochemical polymerization. Here we also discuss catalytic cahin polymerization in to two phase systems whichcontains a brief information on the liquid-liquid systems but mainly it deals with a preparation of mesoporous polymerization catalysts and their use and effectivness in the synthesis of high-purity polyacetylenes.

28. Impact of Pesticides & insecticide on environment

Dr.Smt.V.R.Naik. Miss: Sampada M Hegade.
Department of Zoology KLE Society`sG. I. Bagewadi College, Nipani

Abstract

Herbicides, rodenticides, molluscicides, nematicides, plant growth regulators and others. The term pesticide covers a wide range of compounds including insecticides, fungicides, Among these, organochlorine (OC) insecticides, used successfully in controlling a number of diseases, such as malaria and typhoid, were banned or restricted after the 1960s in most of the technologically advanced countries. The introduction of other synthetic insecticides – organophosphate (OP) insecticides in the 1960s, carbamates in 1970s and pyrethroids in 1980s and the introduction of herbicides and fungicides in the 1970s–1980s contributed greatly to pest control and agricultural output. Ideally a pesticide must be lethal to the targeted pests, but not to non-target species, including man. Unfortunately, this is not the case, so the controversy of use and abuse of pesticides has surfaced. The rampant use of these chemicals, under the adage, "if little is good, a lot more will be better" has played havoc with human and other life forms.

Pesticides can contaminate soil, water, turf, and other vegetation. In addition to killing insects or weeds, pesticides can be toxic to a host of other organisms including birds, fish, beneficial insects, and non-target plants. Insecticides are generally the most acutely toxic class of pesticides, but herbicides can also pose risks to non-target organisms.

Insecticides have saved millions of human and animal lives since the date of their synthesis and use. They have played an important role that brought revolution in the field of agriculture and human health on control of insect pests of crops and vector-borne diseases. More than 80,000 chemical substances are now commercially available in agriculture and industry. About 4.6 million of pesticides are applied into the environment and insecticides accounted for the largest portion of total use in the world to increase the productivity of food and fibre as well as to prevent the incidence of vector-borne diseases.

Key words: Effect of pesticides & Insecticides, control measures

29. Studies on Toxicity of Fluoride and Impact of Endemic Fluorosis from Ground Water Resources of Bagalkot District, Karnataka.

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1. Associate Professor & Head, Department of Chemistry, BLDE's Science College, Jamakhandi,
2. Research Scholar, R&D Centre, Bharathiar University, Coimbatore–Tamilnadu, India
3. P. G. Studies in Chemistry, Karnataka University, Dharwad

ABSTRACT

Fluorine is the most electronegative element, never occurs in Free State due to its high reactivity. In most of the places of the world drinking water from underground sources is invariably contaminated with fluoride. The concentration of fluoride according to the WHO standard allowed upper limit is 1.5 ppm whereas per Indian standard, the allowed upper limit is 1mg/litre of course fluoride ion is essential component of drinking water, since it helps to strengthen teeth enamel and skeleton parts but above the limit of 1mg/litre it is found to be detrimental. Fluoride ion gets contaminated in drinking water due to withering of the soil and rocks we found that ground water sources of granite belt of Bagalkot district contain much higher concentration of fluoride (up to 6 or 7 ppm) in the survey we noticed that the concentration of fluoride even at 1.34 ppm has caused tooth decay with the permanent brown scales on the teeth, the initial signs of 'Dental Fluorosis' with fluoride ion concentration 1.35 to 2.25 ppm, dental Fluorosis very common and endemic. Above this limit even at 2.85 to 3.15 ppm prolonged exposure resulted in skeletal Fluorosis, dislocation of teach, decayed tooth enamel, joint pains, neuromuscular disorders, stunted growth, bulging of knee, curving of leg below the knee joints etc were observed . At the elevated levels of fluoride from 4 to 5 ppm the toxic effects occur earlier since Fluorosis is irreversible damage, to avoid the endemic problem only alternate source of drinking water or (R.O.) water is the only remedy. The area under our study comprise mainly poor farmers, uneducated working class and farm labours whose affordability to get alternate source of water is very less. Only low cost reagents which can coagulate or absorb fluoride ion can help such people.

Keywords: Toxicity of ground water resources, teeth enamel, endemic Fluorosis.

30. IMPACT OF PESTICIDES AND INSECTICIDES ON ENVIRONMENT

Dr B.G.Bevinakatti*, Prof N.B.Gokavi,Associate Professor in Chemistry
Raja Lakhamagouda Science Institute,(Autonomous)Belagavi

Abstract:-

A variety of synthetic organic chemicals in the form of pesticides, plasticizers, herbicides ,dyes, detergents, drugs , petroleum products and industrial effluents are released either deliberately or accidentally into the environment .Many of these chemicals are potentially toxic ,mutagenic or carcinogenic to man and animals . If such chemicals are not degraded, they could accumulate in the soil and cause a serious environmental pollution and ecological changes .The Plethora of compounds that enter the soil includes different classes of aromatics such as halo aromatics, nitro aromatics, sulphoaromatics, polychlorinated biphenyls and polycyclic aromatic hydrocarbons which are found to be environmental pollutants. The environmental chemicals exert their toxicological and other undesirable effects on various components of the ecosystems.

Biodegradation of environmental chemicals is influenced by a wide variety of microbial community of the biosphere .Indigenous microbial populations present in the soil and water posses versatile mechanisms to degrade a vast array of organic compounds into intermediates which can enter the major metabolic pathways Microorganisms being important agents for destroying synthetic chemicals in the natural environment.

Attention has been given to the studies on microbial degradation of environmental chemicals and its possible biotechnological applications in the decontamination of polluted effluents and sites.

Key words: - Environmental pollutants, Biodegradation.

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31. IMPORTANCE OF NMR SPECTROSCPY IN CHEMISTRY

Shri. S.M.Kodikoppa , Lecturer , K.L.E Society's J.T.College, Gadag**.**

Abstract:

Nuclear Magnetic Resonance (NMR) Spectroscopy is a non-destructive analytical technique that is used to probe the nature and characteristics of molecular structure. There are many nuclei which are NMR active. Some of the more common NMR active nuclei include 1H, 2H, 13C, 11B, 15N, 19F, 31P and 195Pt. All these spectroscopy have their own significance towards research. NMR experiment produces information about the sample in the form of a spectrum, which provides details about: The types of atoms present in the sample, The relative amounts of atoms present in a sample, The specific environments of atoms within a molecule, The purity and composition of a sample, Structural information about a molecule, including constitutional and conformational isomerisation. Now a day's NMR has become a powerful analytical technology that has found a variety of applications in many disciplines of scientific research, medicine, and various industries. Some of the common applications are Structure elucidation, Chemical composition determination, Formulations investigation, Raw materials fingerprinting, Mixture analysis, Sample purity determination, Quality assurance and control, Quantitative analysis, Compound identification and confirmation, Analysis of inter- and intramolecular exchange processes, Molecular characterization, Reaction kinetics examination, Reaction mechanism investigation, Chemical research and development: organic, inorganic and physical chemistry, Chemical manufacturing industry, Food industry, Polymer industry. Modern NMR spectroscopy also highlighting the application in biomolecular systems and plays an important role in structural biology.

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32. Impact of Insecticides and Pesticides on Environment

Miss. Shubha.H.Kattegoudra, Department of Chemistry, KLE's J.T.College,Gadag

Abstract :

Pesticides present the only group of chemicals that are purposely applied to the environment with aim to suppress plant and animal pests and to protect agricultural and industrial products. Pesticides are used to kill the pests and insects which attack on crops and harm them. Different kind of pesticides have been used for crop protection for centuries. However, the majority of pesticides is not specifically targeting the pest only and during their application they also affect non-target plants and animals. Repeated application leads to loss of biodiversity. Many pesticides are not easily degradable, they persist in soil, leach to groundwater and surface water and contaminate wide environment. Pesticides benefits the crop; however, they also impose a serious negative impact on the environment. Excessive use of pesticides may lead to the destruction of biodiversity. Many birds, aquatic organisms and animals are under the threat of harmful pesticides for their survival. Pesticides are concern of sustainability of environment and global stability. This chapter intends to discuss about pesticides, their types, usefulness and the environmental concern related to them. Pollution as result of over use of pesticides and the long term impact of pesticides on the environment are also discussed in the chapter. Finally it looks forward towards the future impacts of the pesticides use the future of the world after eradicating pesticides.

33. Green Synthesis of Azo Dyes Under Dry Grinding Condition

Prof R. V. Kupwade Department of Chemistry, Smt. Kasturbai Walchand College, Sangli.

Abstract:

Human's fondness for color reaches back almost prehistoric times. In past few decades, organic color chemistry has experienced an exciting development as it has found wide applications in high technology fields such as electronic devices, linear and non linear optics, reprography, sensors and biomedical uses. Hence environmentally benign approach towards synthesis of azo dyes has attracted attention of many researchers. Synthesis of azo dyes involves the formation of aromatic diazonium salt starts with protonation of nitrous acid under strongly acidic conditions followed by coupling reaction between the diazonium cation and nucleophilic coupling component. In the traditional methods, synthesis of azo dyes requires special conditions such as low temperature and liquid acids. Processes involving conventional acids are typically associated with several drawbacks such as high toxicity and corrosion, environmental incompatibility. Environmental and toxicological concerns have resulted in increased interests in development of benign processes for synthesis of azo dye. Range of catalysts such as silica sulfuric acid,[1] clay,[2] zeolite, sulfated zirconia. Azo dyes can be obtained also by grinding. Nano silica supported periodic acid[3] under solvent-free conditions at room temperature is also reported. Although satisfactory yields of products are usually obtained is above said protocols, the development of clean, high-yielding, mild, and green approaches is still a challenge for diazotization. In this context tartaric acid as a catalyst under solvent free condition will be the best choice. Here in, we wish to report a convenient and one-pot method for synthesis of dyes using tartaric acid under solvent-free conditions at room temperature. Appropriate aromatic amine, tartaric acid and sodium nitrite were ground in a mortar with a pestle to obtain a homogeneous mixture grinding is continued by addition of β-naphthol final products are obtained in good to excellent yield.

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3. A. Bamoniri, A. R. Pourali, S. M. Reza Nazi

34. Bio-medical waste and its management

Prof. C.S.Katageri. Dept. of Chemistry, M.G.V.C Arts, Commerce & Science College, Muddebihal
Prof. S.N.Benal. Head, Dept of Chemistry, S.S.B.M Arts, Commerce & Science College, Badami.

Abstract:

The waste generated in the course of health care activities is the biomedical waste. Hospitals generate large volumes of waste and is hazardous because of infectivity and toxicity. When medical wastes are thrown in backyards of hospitals or into open municipal pits or road side heaps of rubbish, they become breeding sources for disease producing mosquitoes, flies, rodents and microbes. Also indiscriminate open burning of infectious waste, especially plastics will result in emission of noxious gases which may produce cancer. With increasing infrastructure, facilities offered and rise in population health care units generate much more waste than before. Medical waste if not managed it can create various health hazards and environmental pollution. For healthy life medical waste generation is unavoidable but management of waste play a vital role.

Biomedical waste management (BMWM) has become a growing concern in the health care facilities. It is a global issue and also a complex issue starting from collection, transportation, dumping etc., which requires a critical and systematic disposition, storing, recycling or re-use especially the hazardous and non degradable material in view of public health and environmental degradation. A safe and effective management of medical waste is a legal necessity and also a social responsibility. Most of the western countries have developed scientific techniques to manage waste in a hygienic way. In almost all the developing countries including India the disposal of waste is done in unscientific ways and give more importance for elimination of waste rather than recycling and re-use of the material. Waste should be properly managed by the use of colour coded bags/containers and treated effectively by suitable technology. We need to teach and create awareness to public in large and implement the BMWM rules in order to safe guard our generation in future. This Paper introduce about the medical waste, sources, generation, quantity of medical waste, types of medical waste and their components, medical waste management procedures and control technologies, laws and conclusions.

35. SOIL EROSION AND ITS PREVENTIVE MEASURES

Prof. S. D.Gorinaik and Prof.B.K.Patil. , Associate Professors in Chemistry
Raja Lakhamagouda Science Institute, (Autonomous) Belagavi

Abstract:

Soil erosion is a naturally occurring and slow process that refers to loss of field's top soil by water and wind or through conversion of natural vegetation to agricultural land soil erosion can have the greatest impact on farmers and agricultural land. When farming activities are carried out, the top soil is exposed and is often blown away by wind or washed away by rain. When soil erosion occurs the movement of the detached soil typically facilitated by either a natural process – such as wind or water movement – or by the impact of man, such as through tilling farmland.

The process of soil erosion is made up of three parts:

1. Detachment: This is when the top soil is actually "detached" from the rest of the ground.

2. Movement: This is when the topsoil is relocated to another area.

3. Deposition: Where the topsoil ends up after this process.

PREVENTIVE MEASURES: Here are some measures to prevent soil erosion.

1. Crop Rotation: Plenty of crop rotation is crucial for keeping land happy and healthy. This allows organic matter to build up making future plantings more fertile.

2. Water control: For those areas where soil erosion is predominantly caused by water- whether natural or manmade- specialized chutes and runoff pipes can help to direct these water sources away from the susceptible areas, helping stave off excess erosion. Having these filters in particular areas rather than leading to natural bodies of water is a focus to reduce pollution.

Key words: soil erosion, preventive measures.

36. Natural Feedstock in organic transformations: Chickpea exudates as a highly efficient, greener reaction medium for synthesis of multifunctionalized pyran-annulated heterocycles

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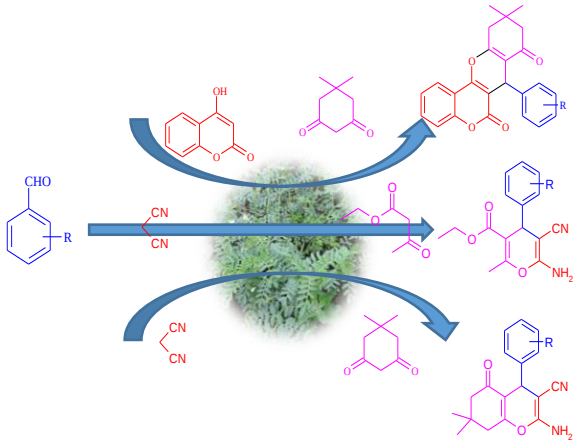
Green Chemistry Research Laboratory, Department of Chemistry, SMDBS College, Miraj, Dist. Sangli-416410 (MS), India. Email: sanyujapatil@yahoo.com



Abstract:

A clean and efficient method has been developed for the preparation of multifunctionalized pyrano[3,2-c] chromene, 4*H*-chromene and 4*H*-pyran derivatives in the presence of *Chickpea leaf exudates* under elevated temperature condition. This novel, biodegradable, natural sourced catalyst obtained from renewable source showed high catalytic activity with good to excellent yields of the desired products in short reaction times. High yields, short reaction time, easy work-up and reusability of the catalyst are advantages of this procedure. All synthesized products were characterized by physical and spectral data. The physical and spectroscopic data are in consistent with the proposed structure and is in harmony with the literature values.

Keywords: Pyrano[3,2-c]chromene, 4*H*-chrom

37.

DRINKING WATER CRISIS

Prof. Miss Preethi Patil and Prof. Miss Padmini Shedbal
G.I.Bagewadi Arts, Science, Commerce & PG College ,Nipani

Abstract -

There are millions of people all over the world who don't have access to water, or, if they have access, that water is unable to be used. About 70% of the Earth's surface is covered with water and 3% of it is actually freshwater that is fit for human consumption. Around two-thirds of that is tucked in frozen glaciers and unavailable for our use. According to WWF, some 1.1 billion people worldwide lack access to water, and a total of 2.7 billion find water scarce for at least one month of the year.

Clean drinking water is scarce and there are millions of people across this globe who spend their entire day searching for it. Yet, people who have access to safe, clean drinking water take it for granted and don't use it wisely. Water scarcity involves water crisis, water shortage, water deficit or water stress. Water scarcity can be due to physical water scarcity and economic water scarcity. Physical water scarcity refers to a situation where natural water resources are unable to meet a region's demand and economic water scarcity is a result of poor water management resources.

Causes of Water Scarcity: Overuse of Water, Pollution of Water, Conflict, Distance , Drought, Govermental Access.

Problems due to Water scarcity: Lack of access to drinking water, hunger, Lack of Education, Diseases, sanitation issues , poverty.

Solutions for water scarcity : Education, recycle water, Advance Technology Related to Water Conservation, Improve Practices Related to Farming, Improve Sewage Systems, Support Clean Water Initiatives.

PAPER PRESENTATION BY STUDENTS

38. Soil erosion and its preventive measures

Shri. Mallappa Muddapur & Mounesh Badiger IV Semester,KLE'S College Mahalingapur

Abstract:

The word "erosion" is derived from the latin word erosio (gnaw away). In general soil erosion implies the physical removal of top soil by various agents, including rain, water flowing over and drought the soil profile, wind etc.The consequences are on-site and off-site.On-site effects are loss of soil and the breakdown of the soil structure, it resulting drought-prone conditions. Off-site problems result from sedimentation, downwind, which reduces capacity of rivers which increases the flooding.

Types of soil erosion:

There are many types In soil erosions, the main important types are:
Wind erosion: Removal of soil particles by the force and K.E of the wind.
Water erosion: It is caused by the K.E of the rain falling on the soil surface.
Gravity erosion: Mass movement of soil occurs on steep slopes under the influence of gravity.

The reasons for Soil Erosion

There are many reasons which causes soil erosion, they are: soil texture: open structure soil erodes more than closed structure soil
Ground slope: Steeper slope ground erodes more than mild slope due to increase speed of runoff soil. Intensity and amount of rain fall: more the intensity of rain fall more soil erosion Mismanaged utilization of soil resources: soil erosion increased by improper surface drainge, overgrazing removal of forest filter etc. Deforestation: it is one of the major problem for soil erosion.Distribution of rain fall and landscape: if the ground surface rainfall distributes evenly, there is no plenty rainfall so erosion will be less.

Effect of soil Erosion

Which causes the loss of natural nutrients and fertilizers directly affect crop growth, and yield. Seeds can be disturbed. The soil quality, structure, stability and texture are also affected which in tern affect the holding capacity of the soil.Eroded soil can inhibit the growth of seed plant could become sandblasted resulting decreased yield.

Nature of Water Erosion:

Water erosion is the detached and removal of soil material by water. The process may be natural or by human activity (human-made structures; fill reservoirs, lakes, rivers; damages land) .Effects:Mud, silt, sediment material usually the richest part of the soil Highest nutritive content Most organic matter

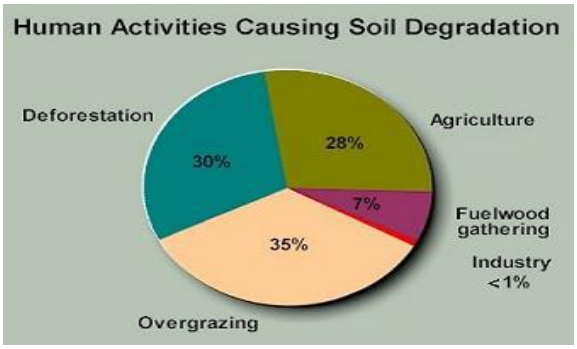
Preventation for soil erosion

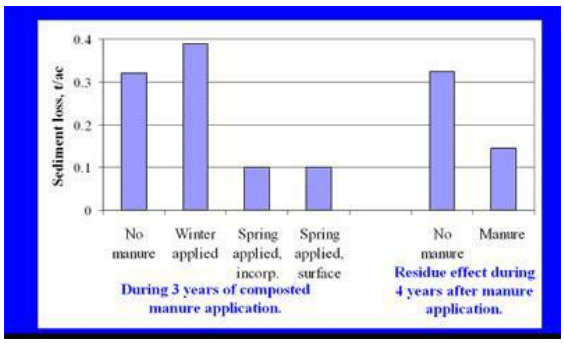
By applying some simple steps we can prevent the soil erosion
Vegetation: the simplest and most natural way to prevent erosion is through planting vegetation. Plants establish root systems, which stabilizes the soil and prevent the soil erosion
Water control: F or those areas where soil erosion is predominantly caused by water whether natural or man made specialised chutes and runoff pipes can help to direct these water sources away from the susceptible areas, helping stave of excess erosion.

Crop rotation: plenty of crop rotation is crucial for keeping land happy and healthy this allows organic matter to build up making future planting more fertile.

Increased structure for plants: introducing terraces or other means of stabilizing plant life or even the soil around them can help reduce the chance that the soil loosens and erodes. Boosting areas that are prone to erosion with sturdy plant life can be a great way to stave off future effects

Increased knowledge: a major factor of preventing soil erosion is educating more and more people who work with the land on land why it is a concern, and what they can do help reduce it. This means outreach to farmers in susceptible areas for ways thatthey can help protect crops from inclement weather, or ways that they bcan help make sure their soil remains compact without restricting their plant growing activities





Conclusion

Soil erosion remains a key challenge for agriculture in several countries. Proper management of this valuable resource is vital to sustain long term agricultural productivity. The fertility of soil remember friends soil is a precious natural resource and it is our duty to conserve it for keeping the environment healthy.

39. "Comparative study of different flower extract as indicator in acid base titration"

Mr. Ferrao Sebastian Shahu Mr. Ravan Akshay Pandurang
Mr. Teli Shrishail Kallappa
Dr. Ghali College, Gadhinglaj**.**

Abstract:
A pH indicator is a chemical detector for hydrogen ions (H^+). The indicator causes the color of the solution to change depending on the pH. In pH, p stands for "Potenz" (Means "Strength" in German). The pH value of a neutral solution is 7.0. Solutions with a pH value below 7.0 are considered acidic and solutions with pH value above 7.0 are basic. The value of pH indicates acidic or basic nature of a solution.when acids in aqueous give more numbers of H^+ ions then they are termed as strong acids.when acids in aqueous give less numbers of H^+ ions then they are termed as weak acids.

NATURALLY OCCURRING OF pH INDICATOR

Litmus is used from Middle Ages and still available.It is made from a mixture of lichen species, particularly Roccella tinctoria.The word *litmus* is literally from 'colored moss' in old Norse.The color changes between red in acid solutions and blue in base solution.

MATERIALS AND METHODS

Analytical grade reagents were procured from Dr. Ghali College Gadhinglaj Tal-Gadhinglaj Dist-Kolhapur.The flowers of vinca, red roses, hibiscus was collected and used for further study.The petals were separated from whole flower and used for further study.Four gm of petals were macerated for 15 min with 20 ml methanol. After pressing the mark, filtrate was collected. By repeating same procedure with same solvent the extract was concentrated. Finally extract was filtered and used as indicator.The experiment was carried by using the same set of glassware for all type of titrations.As the same samples were used for both titrations i.e. titration by using P.P indicator and flower extract, the reagent were not calibrated. The equimolar titrations were performed using 10 ml of titrant with three drop of indicator.

The flower extract was screened for its use as an acid base indicator in acid base titration. The results of this screening were compared with the result obtained by standard indicators (phenolphthalein) for strong acid strong base (HCl VS NaOH), Weak acid VS Strong Base (CH3COOH VS NaOH). 12. The results of screening were listed in Table1 and Table2.

Table No. 1

Strong acid vs strong base (hcl vs naoh)		
Indicators	***Titration reading***	***Colour change***
0.1 Phenolphthalein	23.2	Colorless to pink
Rose Flower Extract	22.8	Orange red to Greenish Yellow
0.1 Phenolphthalein	23.4	Colorless to pink
Sadafully Flower Extract	19.7	Pink to Greenish
0.1 Phenolphthalein	23.4	Colorless to pink
Hibiscus Flower Extract	22.5	Orange red to violet

Table No. 2

Weak acid vs strong base (ch_3cooh vs naoh)		
Indicators	***Titration reading***	***Colour change***
0.1 Phenolphthalein	16.8	Colorless to pink
Rose Flower Extract	16.5	Orange red to Violet
0.1 Phenolphthalein	16.9	Colorless to pink
Sadafully Flower Extract	15.2	Orange red to Greenish
0.1 Phenolphthalein	16.6	Colorless to pink
Hibiscus Flower Extract	12.7	Orange red to blue

Result and Discussion

For all titrations the equivalence point obtained by the flower extract coincident with the equivalence point obtain by standard indicator while in case of strong acid and strong base titration, the results obtained by the flower extract matched with the results obtained by standard indicator.

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40. BIO MEDICAL WASTE AND ITS MANAGEMENT

Miss Nirmala. S. Dhangi & Miss Shweta Ravannavar , B.Sc.IV Semester.
K.L.E G.I. Bagewadi Collage, Nipani.

Abstract

Let the waste of 'the sick', Not contaminate, the lives of 'the healthy'.

Bio medical waste: Bio medical waste is distinct from normal trash or general waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities. The issue of biomedical waste management has assumed great significance in recent times particularly in view of the rapid upsurge of HIV infection .Government of India has made proper handling and disposal of this category of waste a statutory requirement with the publication of gazette notification no. 460 dated 27 July 1998 .The provisions are equally applicable to our service hospitals and hence there is need for all the service medical, dental, nursing officers, & other paramedical staff to be well aware of basic principles of handling, treatment and disposal of biomedical waste .

The quantity of biomedical waste generated per day per bed will be vary depending upon the type of health problems, the type of care provided and the hospital waste management practices.

The challenge before is to scientifically manage growing quantities of biomedical waste that to go beyond past practices. The biomedical waste that is not properly managed, are a serious health hazard and lead to spread of infectious diseases.

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41. ENVIRONMENTLY BENIGN PROTOCOL OF KNOEVANAGEL CONDENSATION REACTION

Rupali A. Mang, Snehal K. kamble, Ashwini A. Sankpal, Vaishali D. Gadakari, Arati S. Gondhali Under the guidance of Dr.(Smt).Savita R. Dhongade
Devachand College Arjunnagar

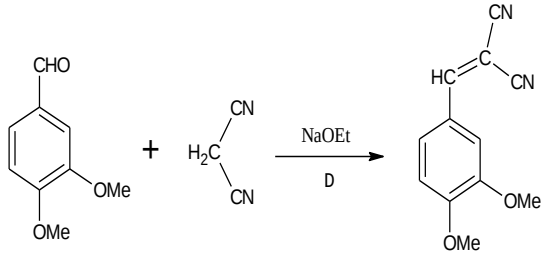
Abstract

We have carried out the Knoevenagel reaction using Aryl Aldehydes, active methylene compound such as malonoinitrile in presence of Na-ethoxide to synthesize the desired derivative.Knoevenagel reaction is an organic reaction named after emil knoevenagel**.** It is a modification of the aldol condensation**.** [1] [2] a knoevenagel condensation is a nucleophilic addition of an active hydrogen compound to a carbonyl group followed by a dehydration reaction in which a molecule of water is eliminated ***(***hence condensation***).*** The product is often an α, β-unsaturated ketone ***(***a conjugated ionone***).***

General procedure

General procedure : Synthesis of 2-(3,4-Dimethoxy-benzylidene)-malononitrile

In a 100 ml round bottom flask 1 mmol of malanonitrile [0.066gm] is warmed for 5 min on magnetic stirrer and mixed with 1 mmol of 3,4 dimethoxy benzaldehyde [0.166gm] alongwith catalytic amount of sodium ethoxide and warmed on mechanical stirrer for 3 minutes and then 5 ml water is added to get yellow solid. The completion of reaction checked by TLC. The reaction mixture was poured on ice containing beaker to obtain the desired product. The solidified substance was filtered and recrystallized from ethanol.



CHARACTERISATION

Molecular Formula =$C_{12}H_{10}N_2O_2$

Molecular Weight =214.23

Exact Mass =214

Elemental Analyses: Calculated (found)

C 67.28%(67.30%) H 4.71%(4.75%) N 13.08(13.05%)

^{1}H NMR**:** d ppm 7.14-7.87(m,3H,Ar), 3.85 (S,3H,OMe), 3.86 (S,3H,OMe), 6.88(S,1H,CH) IR **(**KBr**):**cm^{-1} (3080-3030) =C-H ;(3050.83) Ar. C-H; (2235-2215) CN; (1604±3)C=C; (1160.03)O-CH_3

Biological prediction study The confirmed structure was subjected to computer programme 'PASS' for Biological Predictions. The probabilities for being active (Pa) are compared with the structures to find out most active molecules for the predicted biological activity. It is predicted to have excellent ErbB-1 antagonist activity.

RESULT AND DISCUSSION

The objective of present research work is to provide green methodology for the synthesis of 2[3,4 dimethoxy benzylidene] malanonitrile. A highly efficient, catalysed and simple method has been described for the synthesis of 2[3,4 dimethoxy benzylidene] malanonitrile.by using ethanol & water .The system with moderate to good yields. The present synthesis complete with the principle of green chemistry.

CONCLUSION

Thus, we have successfully synthesized 2 [3,4 dimethoxy benzylidine] malononitrile by environmentally benign protocol of Knoevanagel condensation reaction.

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42 . GREEN APPROACHES IN APPLIED SCIENCE

Shri. Veerkumar Gorwade Shivaji University Kolhapur

Abstract

Agriculture plays a vital role in a developing country like India. Apart from fulfilling the food requirement of the growing Indian population, it also helps in improving economy of the country. Hence the use of chemical pesticides and fertilizers in Indian agriculture has a sharp impact in enhancing crop yields in the recent years. An increase in use of these chemicals has caused heavy damage to human health. Therefore there is urgent need of environmental friendly methods like **Biopesticides** for improving soil fertility, pests and disease control strategy.

Zanthoxylum rhetsa (Roxb.) DC. Belonging to family Rutaceae is commonly known as Triphal and is distributed in Konkan, Decan, Mysore, Malabar. Also found in Assam and Meghalaya and Eastern and Western Ghats of peninsular India. *Helicoverpa armigera* is commonly known as cotton bollworm. It is a major pest in cotton and one of the most polyphagous and cosmopolitan pest species.

Materials and Methods-The plant were selected based on available literature, abundant avaiabilty,medicinal and insecticidal properties.

Collection of plant: *Zanthoxylem rhetsa* leaves were collected from Amboli hills of South Maharashtra. **Extraction of plant material:** Plants leaves were shade dried and powdered .gm of powder is used with acetone and chloroform(200ml),in a Soxhelt apparatus separately until exhaustion. The extract obtained was stored at 4^0C in an amber vial.**Establishment of *Helicoverpa armigera*:** *Helicoverpa armigera* egg masses were collected from the chickpea field near by Nipani area. Reared in laboratory(Fig.2).Third instar larvae were selected for test.**Antifeedant activity:** Antifeedant activities of plant extracts were studied using leaf disc no choice bioassay method. Fresh castor leaf disc (1350sq.mm) were dipped in one per cent concentration of each plant extracts (Fig.5). After solvent evaporation at room temperature, leaf disc was kept in individual petriplate. In each petriplate a pre starved third instar larvae of *Helicoverpa armigera was* introduced. The larva was allowed to feed on treated discs for twenty four hours. A total of three trials were carried. At the end of the experiment, unconsumed area of leaf disc swas measured with the aid of a leaf area meter and per cent antifeedant activity calculated based on the formula of Singh and Pant. Larval mortality was also recorded.

Formula used

Per cent antifeedant activity= Leaf disc consumed by the larvae in control - Leaf disc consumed by the larvae in treated ×100

Leaf disc consumed by the larvae in control + Leaf disc consumed by the larvae in treated

- Per cent larval mortality= Number of dead larvae ×100

Total number of treated larva

Results

Antifeedant activity

Antifeedant activity of crude plant extracts was assessed based on antifeedant index. Higher antifeedant index normally indicate decreased rate of feeding. In the present study, the antifeedant activity varied significantly based on the solvents used for extraction. Antifeedant effects of plant extracts were evaluated based on leaf area consumed by *Helicoverpa armigera* .Table.1.The antifeedant effect of plant extract of a plant species tested. Among the plant tested, the extract of *Zanthoxylem rhetsa* was found to be effective against the third instar larvae of *Helicoverpa armigera*. Maximum antifeedant activity as recorded in acetone is 70% (at 10% extract) and chloroform is 75% (at 10% extract).(Table 1) Table .1.The antifeedant effect of plant extract of a plant species tested.

Table 01 Concentration of Acetone (%)	**Antifeedant activity(%)**
1	55
5	60
10	70
Chloroform(%)	
1	65
5	70
10	80

Results

The concentrations of 5 and 10% solutions of extracts caused 85% mean larval mortality. The maximum mean percent mortality for topical treatment was 90% (at 10% acetone extract) and 80% (at 10% for chloroform extract). The mortality percent recorded at 6, 12 and 24 hrs respectively after the application. The highest mortality was noted after 24 hrs of application. The treated larvae were notified smaller than its control. Table.2. The mortality percent of larvae of plant extract tested for 10% Acetone Extract

Table 02 Time in Hrs	**Mortality (%)**
3	40
6	60
12	70
24	90

Mortality Results for 10% Acetone Extract

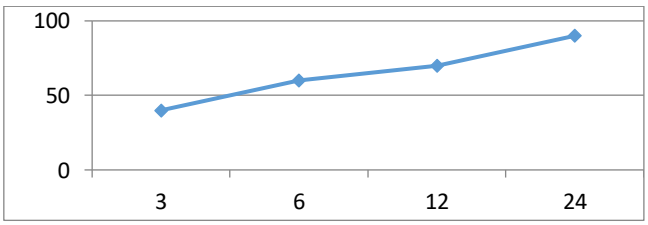
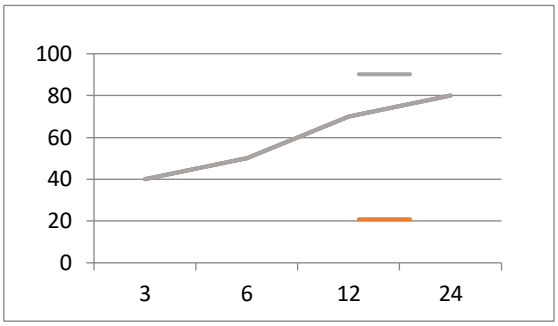


Table 03 Time in Hrs	**Mortality (%)**
3	40
6	50
12	70
24	80

Table 3 the mortality percent of larvae of plant extract tested for 10% Chloroform Extract .

Mortality Results for 10% Chloroform Extract



Discussion

Antifeedant activity of botanicals against insects has been studied in many countries. Quantification of antifeedant effect of botanicals is of great importance in the field of insect pest management. From ecological point of view, antifeedant are very important since they never kill the target insects directly and allow them to be available to their natural enemies and help in the maintenance of natural balance. (Yasui,1998) Higher antifeedant index normally indicate decreased rate of feeding. Antifeedant is a chemical that inhibits the feeding without killing the insect pests directly, while it remains near the treated foliage and dies through starvation (Pavunraj ,2012). Several investigators have already reported that botanicals offer antifeedant activity against Spodoptera litura (Ulrichs,2008)

Conclusion; In the present investigation, the food consumption of third instar larvae of *Helicoverpa armigera* treatment was highly reduced by the extracts of *Zanthoxylem rhetsa*. Maximum antifeedant activity was recorded in Acetone where as minimum in Chloroform extracts.(Frazier,1998).

43. MEDICAL CHEMISTRY AND DRUG DESIGNING

Miss. Rachana Patil K. L. E.'s G. I. Bagewadi Degree College, Nipani- 591 237

Abstract:

Medicinal chemistry is best to be defined as an interdisciplinary research area incorporating different branches of chemistry and biology in the research for better and new drugs

Generally medicinal chemists can:- Make new compounds. Determine their effects on biological processes. Alter the structure of the compound for optimum effect and minimum side effects. Study uptake distribution metabolism and excretion of drugs.

Compounds used in the medicinal chemistry Compound used in medicine are most often organic compounds which are often divide into the broad classes of small organic molecu e.g. atorvastin, fluticasone, clopidogrel

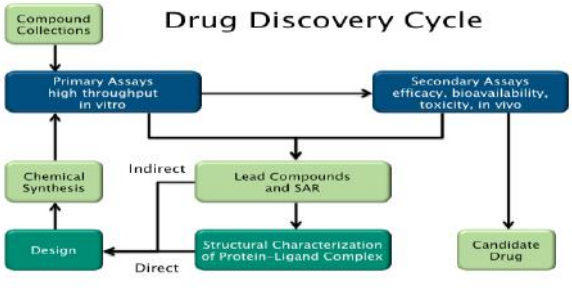
In concern with 'BIOLOGICS' Example:-Infiximab, erythroprotein, insulin, glargine Concern with proteins :- natural and recombinant antibodies, hormones etc.Concern with inorganic and oregano metallic compound:- They are also useful as drugs (ex lithium and platinum) based agents such as lithium carbonate and cis-platin as well as gallium

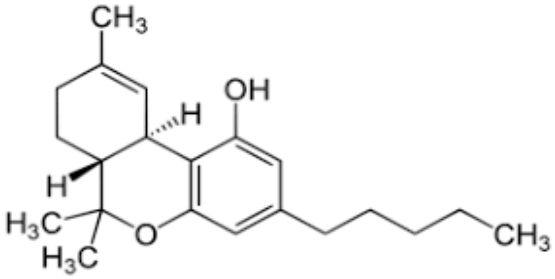
Medicinal chemistry combine to form a set of highly interdisciplinary sciences. Setting in organic, physical and computational emphases alongside biological areas such as Biochemistry,Molecular Biology, Pharmacognosy, Pharmacology, Toxicology, Veterinary and human medicine, Project management statistics and pharmatically business,Pharmaceutical formulation, They are safe and efficacious and there for use in treatment of disease.

Application of medicinal chemistry

1.Effective medicine:- A medicine is effective when it is able to kill the parasite or rectify a deficiency or alter a physiological state to the desired level of wellbeing 2.Minimal toxicity:- Medicinal chemistry strives to prepare water soluble drug molecules which will be easily metabolized. The accumulation of drug toxins is controlled by medicinal chemistry 3. In expensive drugs:- medicinal chemistry can help find alternative drug molecules or manufacturing methods to minimize the cost of the drug this helps the drug to reach people of all economic state 4.Discover new drug molecules:-This is done by a method of which is (QSAR) qualitative structure activity relationshipurrently medicinal chemistry uses the technique of computer aided drug (CAD) to minimize the time taken for drug discovery

Drug discovery cycle





PRODRUG Definition Inactive compounds which are converted active compounds in the body. Uses:-Improving membrane permeability, prolonging activity, masking toxicity and side effect, varying water solubility, Drug targeting, improving chemical stability, 'sleeping agents'

44. **Green Approaches in Applied Science**

Miss. Shweta Patil & Miss. Aishwarya Zele
K. L. E.'s G. I. Bagewadi Degree College, Nipani- 591 237

Abstract: Green Chemistry is defined as the "design of chemical products and processes to reduce the use and generation of hazardous substance.''Green chemistry is a relatively new emerging field that strives work at the molecular level to achieve sustainability. The field has received widespread interest in the past decade due to its ability to harness chemical innovation to meet environmental and economic goals simultaneously. Green chemistry has a frame work of a cohesive set of Twelve Principles, which have been systematically surveyed in this critical review.

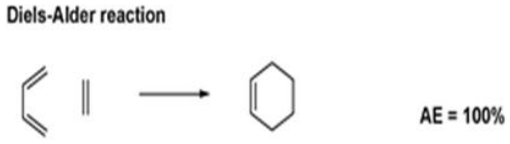
Twelve Principles of Green Chemistry

1. Prevention 2.Atom Economy
3. Less Hazardous Chemical Synthesis
4. Designing Safer Chemicals
5. Safer Solvents and Auxiliaries
6. Design for Energy Efficiency
7. Use of Renewable Feedstock's
8. Reduce Derivatives
9. Catalysis 10.Design for Degradation
11. Inherently Safer Chemistry for Accident Prevention
12. Real-Time Analysis for Pollution prevention

Atom Economy:

The atom economy of a reaction is a theoretical percentage measure of the amount of starting materials that end up as the 'desired' use full reaction products.

The less waste there is, the higher the atom economy, the less materials are wasted, less energy used, so making the process more economic, 'greener' and sustainable.



Diels–Alder type reactions belong to the category of cycloaddition which is among the greenest types of reactions in traditional chemistry

Energy: The requirement of energy can be kept to a base minimum in certain cases by the use of a catalyst. By using phase catalyst, conversion of benzyl chloride into benzyl cyanide.$C_6C_6H_5CH_2Cl$ +aq KCN $C_6H_5CH_2CN$+KCl

Conventionally, we have been carrying reaction by heating on wire gauze, in oil bath or heating mantels. It is now possible that the energy to a reaction can be supplied by using microwaves, by sonication or photo chemically.

$C_6H_5CONHC_6H_5$ MW.12 mines C_6H_5COOH What happens if we not approaches to green in applied science? 1. Destroys Forest 2.Decreases Rain fall 3.Causes many diseases like Asthma, Cancer, Heart related problems.4.Global Warming 5.Affects Aquatic animals and other species.

Conclusion: For generations, molecular scientists have invented the molecules, materials, and manufacturing processes that have allowed economic and societal development. Green Chemistry is ensuring that all of that creative ability that is the long tradition of the field of chemistry is practiced in a way that builds in impact on people and the planet as a design criterion. In doing so, Green Chemistry has shown that through innovation companies can be economically more profitable and more environmental benign at the same time. Although an impressive amount of work has been done by practitioners of Green Chemistry around the world, the achievements of the past pale by comparison to the power and potential of the field.

45. IMPORTANCE OF SPECTROSCOPY IN CHEMISTRY

Miss. Vaishali Adake & Miss. Lata Bharmak
K. L. E.S G. I. Bagewadi Degree College, Nipani- 591 237

Abstract:

Spectroscopy takes advantages of the fact that all atoms and molecules. Absorb and emit light at certain wavelengths.In the Bohr atom an electron in a particular orbit is associated with a specific amount of energy. Unlike planets which remains fixed in their orbits electrons can hop from one orbit to another.

Applications of spectroscopy

1.Cure monitoring of composites using optical fiber.

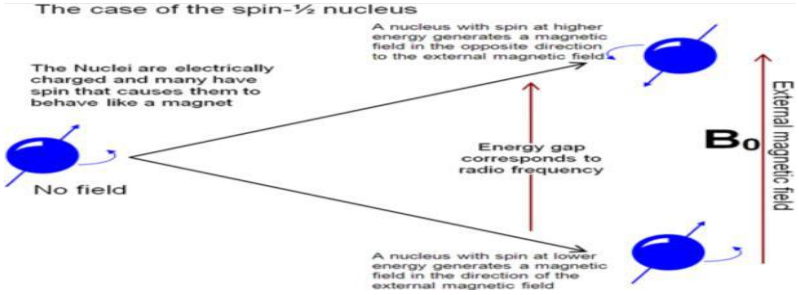
2. Measurement of toxic compounds in blood samples.

3. Measurement of different compounds in food samples by absorption spectroscopy both in visible and infrared spectrum.

Nuclear magnetic resonance (NMR)

Principle: Many Nuclei have spin & all nuclei are electrically charged. If an external magnetic field is applied, an energy transfer takes place at wavelength corresponds to R.F. field, & when the spin returns to base level, energy is emitted at same frequency then resonance takes place which we call NMR.

NMR:



Importance of NMR

NMR Spectroscopy is a non-destructive analytical technique that is used to probe of nature and also characteristics of molecular structure. It is used for determining the content and purity of a sample.A sample of NMR experiment produces information in the of a spectrum, which is able to avoid details about….The types of atoms present in the sample.The relative amount of atoms present in the sample.The specific environments of atom present in the sample.The purity and composition of a sample.The structural information about the molecules.

Conclusion: 1.It has probably been the most important development in chemistry.2.Now chemists are able to determine the structure of molecules.

46. DRINKING WATER CRISIS

Miss. Gowry Khot, Mr. Amit Patil & Miss. Shraddha Gurav
K. L. E.'s G. I. Bagewadi Degree College, Nipani- 591 237

Abstract:

The water crisis is health crisis. Access to safe water means improved health for women and girls who no longer have to delay finding a place to go. It means reduced child and maternal mortality rates. It means increased dignity and reduced psychological stress for girls and women. It means reduced physical injury from constant lifting and carrying heavy loads of water. Time spent gathering water or seeking safe sanitation accounts for billions in lost economic opportunities . Access to safe water and sanitation turns time spent into time saved, giving families more time to pursue education and work opportunities that will help break the cycle of poverty.

A children's and education crisis

Children are often responsible for collecting water to help their families this takes time away from school and play. Access to save water and sanitation changes this. Reductions in time spent collecting water have been found to increase school attendance. Access to safe water gives children time to play and opportunity for a bright future.

The solution

India have been an agrarian economy for thousands of years. But recently , water shortage have been the biggest challenge that farmers have faced in the country. To help farmers sustain the shortage of water and use it efficiently bangaluru based start up , 'Avanijal' is helping farmers irrigate their field using an app. The automated irrigation system , nikash , uses internet of things to control irrigation.Such techniques are very useful to overcome water crisis. Being a 21st century people we have to use such methods and have to take good benefits of that.

- The experiments like soil filter also helps us to get the solution for water crisis.
- Water management interventions push scarcity downstream.
- Large scale interventions to water resources , such as irrigation , dams and reservoirs and water withdrawals , have been essential to human development .
- New technologies : Incentivize innovation in the fields of water recycling , conservation and consumption.

47. **BIODEGRADABLE POLYMERS**

Miss. Asmita Burji K. L. E.'s G. I. Bagewadi Degree College, Nipani- 591 237

Abstract:

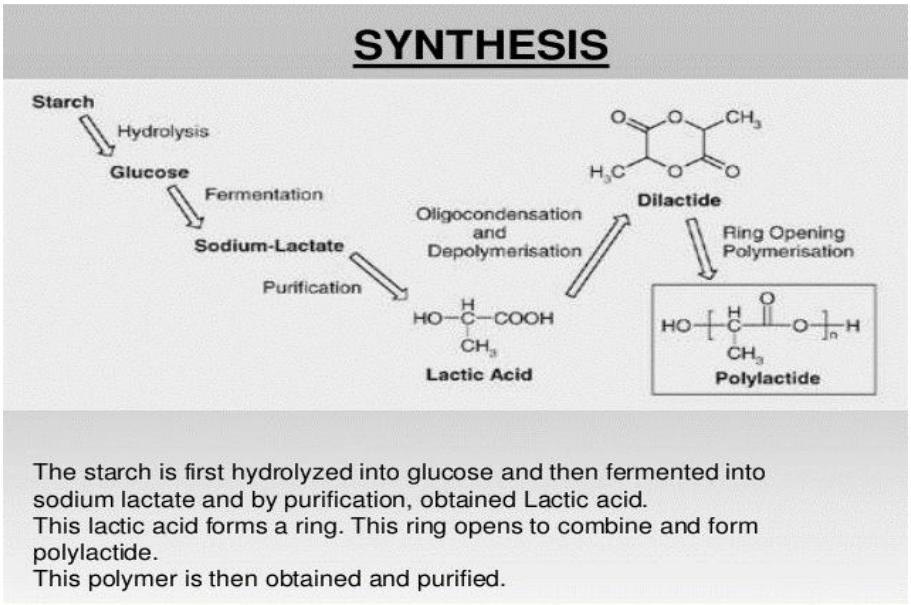
Biodegradable polymers are defined as polymers comprised of monomers linked to one another through functional groups and have unstable links in the backbone are Biodegradable polymers.

Classification of biodegradable polymers baesd on the source

Synthetic biodegradable polymers: ex: aliphatic poly (esters)polyanhydrides , polyphospha-zenes, poly orthoesters etc

Natural biodegradable polymers ex: albumin, collagen, dextran, gelatin, pectin starch etc

Pla (polylactic acid) which is also called "corn material".Pla is a biodegradable and bioactive thermo plastic aliphatic polyester derived from renewable resources, such as corn starch, sugarcane and etc.



Conclusion

- Biodegradable polymers have proven their potential for the development of new, advanced and efficient and capable of delivering a wide range of bioactive materials.
- however only few have entered the market since many drugs faces the problem of sensitivity to heat, shear forces and interaction between polymers.
- These problem can be overcome by fully understanding the degradation mechanism to adjust the release profile.

48. **Nuclear energy, a solution to energy crisis.**

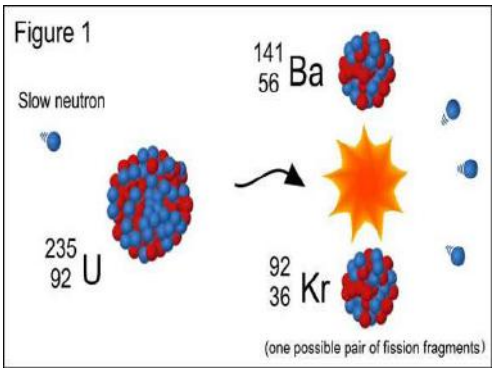
Mr. Laxman Ingale B.Sc Semester
K. L. E.'s G. I. Bagewadi Degree College, Nipani- 591 237

Abstract:
Today's present world depends on the sources of energy such as fossil energy, petroleum energy, solar energy, wind energy etc. But have anyone thought of future generation when these fossil fuels and all natural resources get depleted. So within the next 30 years all nonrenewable sources of energy will be diminishing, so the future of entire world would become dark so for this reason nuclear source of energy would be alternative one. Nuclear energy can be the solution to our energy crisis and it can end the paradigm that one must produce more amount of dirt and waste.

Production of electricity:-1. Naturally . 2. Man-made.

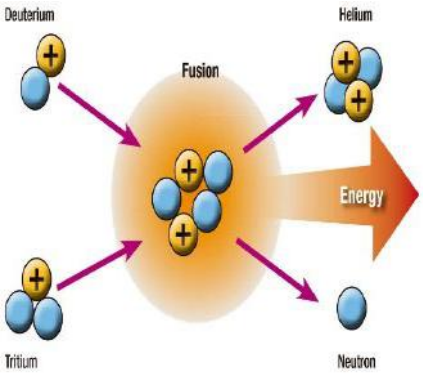
Naturally :- Some nuclear energy is produced naturally. E.g., the sun and other stars make heat and light by nuclear reactions.

Man-made :- The Production of nuclear energy takes place in nuclear power plants using man-made nuclear reactions such as explosion of atomic and hydrogen bombs. Produced electricity is supplied to many cities.



Nuclear Fission

In Nuclear fission, the nuclei of atoms are split, causing the energy to be released. The element uranium is the fuel used to undergo the nuclear fission to produce energy. Uranium nuclei can be easily split by shooting neutrons at them. Also, once a uranium is split, multiple neutrons are released which are used to split other uranium nuclei. This phenomenon is known as chain reaction. This splited neutrons get absorbed by uranium nucleus and produces enough energy which causes elongation of uranium nucleus which results in the fission process. The energy of fission is mainly in the form of kinetic energy of the fission fragments that fly apart from one another and also gamma radiations are emitted. The reaction energy releases about 200,000,000 electrons volts



.**Nuclear Fusion :** Nuclear Fusion is the process in which two lighter nuclei fuse together to form a heavy nucleus with releasing huge amount of energy. Here Deuterium and Tritium combine to form heavy nucleus of helium and there is release of energy i.e. A Neutron. Its released energy may be up to 24 m.e.v. This happens only under very hot condition. Most of the energy is in form of fragments, mainly neutrons. When this neutrons are captured the energy of fusion turns into heat and this heat is transformed into electricit

Advantages of nuclear energy:-

The earth has limited supplies of coal and oil. Nuclear power plants could still produce electricity after coal and oil become scarce. A nuclear power plant needs less fuel than ones which burns fossil fuels. One tons of uranium produces more energy than is produce by million tones of coal or million barrels of oil. Coal and oil burning plants pollutes the air. Well-operated nuclear power plants do not produce contaminants in the environment.

Disadvantages of Nuclear Energy:-

Nuclear explosion produce radiation. This radiations harms the cells of the body which can make people sick or even kill them. Illness can strike people years after their exposure to nuclear radiations. Nuclear reactors which are used to produce energy have waste disposal problems. Reactors produce nuclear waste products which emits dangerous radiations, because they could kill the people who touch them. They cannot be thrown away like ordinary garbage. Currently many nuclear waste are stored in special cooling pools at nuclear reactors.

It as also created many milestones in history of nuclear energy like:- 1. USA on Aug 6. 1945 dropped an atomic bomb on HIROSHIMA, JAPAN Killing 100000 People. 2. On Aug 9 1945 USA dropped again one bomb on NAGASAKI, JAPAN Killing over 45000 people.

Future of Nuclear Energy:-

The total installed electrical capacity of INDIA is just over 300 GW and of that 210 GW i.e. 70% constituted thermal power such as coal, gas, and diesel. But since these are non renewable resources we have to find for alternative method i.e. Nuclear energy. The installed capacity of nuclear power is 5.78GW all over INDIA which is very low. Since India's

Nationally Determined Contribution (NDC) committee has decided to reduce the economy's carbon intensity and increase clean energy capacity to 40% of total installed capacity. So nuclear energy with its massive potential will have to play a key role in the country's future energy crisis. Nuclear energy is the fourth largest source of electricity in INDIA after thermal, hydro electricity and renewable sources of electricity. INDIA at present has 22 Nuclear reactors in operation in 8 nuclear power plants having a total installed capacity of 6780MW.

49. IMPACT OF PESTICIDES ON HUMAN HEALTH

Miss. Soumya P Patil, B.Sc. VI Semester
K.L.E Society's G. I. Bagewadi College Arts, Science & Commerce College, Nipani.

Abstract:

Pesticides are designed to kill and because their mode of action is not specific to one species, they often kill or harm organisms other than pests, including humans. The application of pesticides is often not very precise, and unintended exposures occur to other organisms in the general area where pesticides are applied. Children, and indeed any young and developing organisms, are particularly vulnerable to the harmful effects of pesticides. Even very low levels of exposure during development may have adverse health effects.

Pesticide exposure can cause a range of neurological health effects such as memory loss, loss of coordination, reduced speed of response to stimuli, reduced visual ability, altered or uncontrollable mood and general behavior, and reduced motor skills. These symptoms are often very subtle and may not be recognized by the medical community as a clinical effect. Other possible health effects include asthma, allergies, and hypersensitivity, and pesticide exposure is also linked with cancer, hormone disruption, and problems with reproduction and fetal development.

Pesticide formulations contain both "active" and "inert" ingredients. Active ingredients are what kill the pest, and inert ingredients help the active ingredients to work more effectively. These "inert" ingredients may not be tested as thoroughly as active ingredients and are seldom disclosed on product labels. Solvents, which are inert ingredients in many pesticide formulations, may be toxic if inhaled or absorbed by the skin.

Thus the use of pesticides must be reduced and the need for development of pesticides which effect the species at the particular area and biodegradability must be achieved soon.

Introduction

Pesticides are the chemicals used to kill the pests grown in the crops and other useful crops. No one wants to miss a diagnosis, especially if it might mean significant morbidity or even mortality for the patient. Similarly, it can be frustrating, even embarrassing, when a patient has a reasonable health-related question and the clinician does not feel equipped to answer.

Due to rapid growth of public awareness about the risks of pesticide exposure, it is increasingly common for clinicians to receive questions about these chemicals. With the large number of potential exposure "pathways"— pesticides can move from their

Intended target through air, water, food, and surface – contact - the physician's role is critical. In some cases, the doctor must become the detective, identifying clues that could link symptoms to environmental health hazards.

Key elements of good preventive medicine include education, behavior change, and even social change aimed at prevention of future disease. Effective prevention may entail taking protective action despite scientific uncertainty. We already immunize children to prevent their serious illness should they by (statistically small) chance be exposed to certain infectious diseases; we ban smoking in many public places due to the increased risk of lung cancer and other diseases from environmental tobacco smoke. Similarly, health professionals dealing with pesticides must consider recommendations to protect public health. These might range from counseling children and pregnant women to avoid pesticide exposure, to recommendations to eliminate use of the most hazardous pesticides.

Types

The two largest classes of synthetic pesticides are insecticides, which are designed to kill insects, and herbicides, which are designed to kill plants. Other classes of pesticides include fungicides (for molds and fungi), rodenticides (for mammals), and antimicrobials (for microorganisms such as bacteria and viruses). Antimicrobial pesticides are used as preservatives, sterilizers, and disinfectants in home institutional, and commercial environments

How Pesticides Work

Pesticides work by interfering with an essential biological mechanism in the pests, but because all living organisms share many biological mechanisms, pesticides are never specific to just one species. While pesticides may kill pests, they may also kill or harm other organisms that are beneficial or at least not undesirable. They may also harm people who are exposed to pesticides through occupational or home use, through eating foods or liquids containing pesticide residue, or through inhaling or contacting pesticide-contaminated air. The ideal pesticide would be highly specific to only the target organism, be quick acting, and would degrade rapidly to harmless, inert materials in the environment.

Acute Effects of Pesticide Exposure:

Acute pesticide poisonings present with rapid onset of symptoms — such as those in the case above — stemming from exposures generally within the past several hours or days. Acute pesticide poisonings are the pesticide - related health effect that practitioners

are most likely to recognize and treat. However, large numbers of acute pesticide poisonings each year go undiagnosed and unreported, according to pesticide researchers.

Sign and Symptoms:

Children may present with a different clinical picture from adults. Hypotonia, lethargy, seizures, and coma were more common presenting symptoms in children than in adults, and children rarely present with the classic cholinergic signs of salivation, lacrimation, diaphoresis, bradycardia, or fasciculations.Theoretically, acute symptoms of organophosphate or carbamate poisoning are classic and easily recognized , but in practice diagnosis can be difficult. Pesticide poisoning can easily be misdiagnosed as gastroenteritis, influenza, bronchitis, or a wide range of other illnesses.Even severe pesticide poisoning requiring intensive care unit admission was misdiagnosed 80% of the time in one series, with diagnoses including pneumonia, meningitis, and epilepsy.

The only way to be sure to correctly diagnose acute pesticide poisoning is to maintain a high index of suspicion and take a screening occupational and environmental history from any patient that presents with suggestive symptoms. Brief questions about occupation, household exposures, and any other potential exposures to fumes, dusts, or gases will allow a rapid assessment of the likelihood that an illness could be related to pesticides or other toxic chemicals.

Long term effects: Cancer **:-** Many studies have examined the effects of pesticide exposure on the risk of cancer. Associations have been found with lymphoma leukemia, brain, kidney, breast, prostate,pancreas, liver, lung, and skin cancers. This increased risk occurs with both residential and occupational exposures. Increased rates of cancer have been found among farm workers who apply these chemicals. A mother's occupational exposure to pesticides during pregnancy is associated with an increases in her child's risk of leukemia, Wilms' tumor, and brain cancer. Exposure to insecticides within the home and herbicides outside is associated with blood cancers in children.

Neurological: - Evidence links pesticide exposure to worsened neurological outcomes. The risk of developing Parkinson's disease is 70% greater in those exposed to even low levels of pesticides. People with Parkinson's were 61% more likely to report direct pesticide application than were healthy relatives. Both insecticides and herbicides significantly increased the risk of Parkinson’s disease. There are also concerns that long-term exposures may increase the risk of dementia..

Reproductive effects:-Strong evidence links pesticide exposure to birth defects, fetal death and altered fetal growth. In the United States, increase in birth defects is associated with conceiving in the same period of the year when agrochemicals are in elevated concentrations in surface water, Agent Orange, a 50:50 mixture of 2,4,5-T and 2,4-D, has been associated with bad health and genetic effects in Malaya and Vietnam. It was also found that offspring that were at some point exposed to pesticides had a low birth weight and had developmental defects.

Route of Exposure:- People can be exposed to pesticides by a number of different routes including: occupation, in the home, at school and in their food.There are concerns that pesticides used to control pests on food crops are dangerous to people who consume those foods. These concerns are one reason for the organic food movement. Many food crops, including fruits and vegetables, contain pesticide residues after being washed or peeled. Chemicals that are no longer used but that are resistant to breakdown for long periods may remain in soil and water and thus in food.

Preventing Acute Pesticide Poisoning: Advice for Patients

Patients who have suffered acute pesticide poisoning require close medical follow-up because certain health effects, particularly neurological impairment, can emerge after apparently successful treatment and recovery.

• Avoid using pesticides unless absolutely necessary. Select less toxic alternatives whenever possible. For example, insect baits and traps are almost always safer than broadcast sprays, and non – pesticide alternatives include sealing cracks, cleaning up food scraps, and using soap products to eradicate scents.

• If there are children in the home, make sure that all pesticides are stored out of reach. Do not store any highly toxic pesticides in the home, especially agricultural pesticides.

• Never store pesticides in containers other than the original, labeled container. In particular, never store pesticides in soft - drink bottles or other food containers.

• If any object, including clothing, containers, or equipment, becomes contaminated with pesticides, discard it or clean it thoroughly and separately. Do not leave any pesticide contaminated objects in areas where children might come into contact with them.

Conclusion:

In order to have a safe and secure life and to not to allow bio magnification to happen its necessary to reduce and prevent the use of pesticides. Thus the precaution and the regulations on pesticides must be followed to lead a peaceful life.

50. ANAESTHETIC DRUGS

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K.L.E's G.I.Bagewadi Arts Commerce and Science College Nippani.

Abstract

"Anesthetic means the drugs which produce loss of sensation, in other words insensibility to the vital functions of all types of cells mainly those of nervous system."

Effect of anesthetic is reversible hence individuals return to the normal state as soon as the concentration decreased. Thus it is a temporary insensibility to pain or sensation in body. The Basic requirements of an anesthetic include the following-

1. It should be safe and pleasant. 2. It should produce sufficient relaxation

3. It should have prompt recovery.

Nitrous oxide, Procaine and Ether are some examples of anesthetic. Nitrous oxide is called as Laughing gas and it is widely used in Rocket motors, internal combustion engine and in dental treatment. We can prepare nitrous oxide from Laboratory method and Biological method. There are so many anesthetic drugs in which some are ideal and some are addictive .All drugs are chemical compounds which are used during surgery to give relief from pains.

INTRODUCTION: Anesthetic drugs has two types-

1.General Anesthetics ,2.Local Anesthetics: Nitrous oxide is the General Volatile Gaseous anesthetic. And is commonly known as "LAUGHING GAS". It is a colorless non-flammable gas, with a slight metallic scent and taste, and is on the WORLD HEALTH ORGANIZZATION's list of essential medicines

We can prepare Nitrous Oxide by 3 methods-

1.Industrial method 2. Laboratory method. 3. Biological process.

INDUSTRIAL METHOD:-

In Industrial method take ammonium nitrate into the container and gently heat it between 170 ^{0}C & 240^{0}C because higher temperature causes the ammonium nitrate to detonate.Then the hot gases are cooled to condense the water. The best way to do this is using a pneumatic through, which involves a tube leading from the ammonium nitrate container that bubbles the gases up through water into a collection jar. And the gas in the collection jar is nitrous oxide.

LABORATORY METHOD: - There are many methods.

1. It can be obtained by heating a mixture of sodium nitrate and ammonium sulfate.

$$2NaNO_3 + (NH_4)_2SO_4 \longrightarrow Na_2SO_4 + 2N_2O + 4H_2O$$

2. Another method involves the reaction of urea, nitric acid and sulfuric acid.

$$2(NH_2)_2CO + 2HNO_3 + H_2SO_4 \longrightarrow 2N_2O + 2CO_2 + (NH_4)_2SO_4 + 2H_2O$$

3. By Ostwald's Process also we can obtain nitrous oxide.

That is Direct Oxidation of ammonia with a manganese dioxide- bismuth oxide catalyst has been reported.

$$2NH_3 + 2O_2 \longrightarrow NO_2 + 3H_2O$$

BIOLOGICAL PROCESS:-Biological process means, this will be affected by soil chemical & physical properties such as the availability of mineral nitrogen & organic matter, acidity and soil types; as well as climate –related factors such as soil temperature & water content. Hence it is estimated that 30% of the Nitrous Oxide in the atmosphere is due to human activity & chiefly agriculture And emission of gas to the atmosphere is limited greatly by its consumption inside the cells, by a process catalyzed by the enzyme nitrous oxide reductase.

USES Nitrous Oxide is very useful in many ways, as an oxidizer in Rocket motor, we can use it in internal combustion engine, and also as aerosol propellant means the gas is approved for use as a food additive.And most important use of nitrous oxide is in medical field, while doing surgery and dental treatment. So nitrous oxide can save the life.

DISADVANTAGES

Due to the long term exposure to the nitrous oxide it causes mental & manual impairment, and oxygen deprivation, vitamin B12. Deficiency, and prenatal development means it have adverse effect on the developing fetus. And also it causes Greenhouse effect & Ozone layer depletion.

CONCLUSION :-

Nitrous Oxide is a chemical compound which can save the lives, when used in necessary amount. And is easy to prepare. It's a simple compound with good effect in medical treatment.

"The Gas which makes you LAUGH"

" The Gas which makes you to LIVE".

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51. Photosynthetic Efficiency Study In Some Cereals Under The Influence Of Plant Growth Regulators

Miss. Tejaswini Patil, B.Sc. IV Semester Devachand College Arjunnagar

Abstract:

Cereal grains have been the principal component of human diet and have played a major role in shaping human civilization for thousands of years.Effect of Plant growth regulators on chlorophyll content and on photosynthetic efficiency has been reported (1) in some fruit trees. In the present study effect of Kinetin been studied.The seeds of Wheat and Sorghum were selected for the present study. The seeds were treated with Kinetin at concentration 5ppm, 10ppm, 15ppm and 20ppm for one, two and three hours .The primed seeds were sown in trays containing sand. The leaf chlorophyll content was analyzed by calculating the absorbance on UV-Vis Spectrophotometer(Elico Made) after ten days of sowing. The experiment was repeated three times and the data is presented as mean values.

RESULT AND DISCUSSION

The total chlorophyll content in Wheat and Jowar treated with Kinetin after ten days of sowing showing the variation with respect to concentration and treatment period. From Fig. 1. ,It is clear that seeds treated for one hour with !0ppm Kinetin showed maximum Chlorophyll content as compared to control. At Lower and Higher concentration of Kinetin Chlorophyll content was reduced.

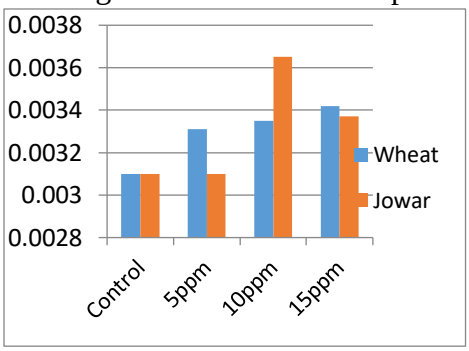

Fig.1. Effect of kinetin on Chlorophyll content in Wheat and Jowar

SUMMERY AND CONCLUSION

The seeds of Wheat and Jowar were treated with Kinetin at different concentration for one hour. The chlorophyll content was calculated from ten days seedling leaves. From the result it is concluded that 10ppm kinetin is more significant with respect to chlorophyll content .

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52. Qualitative Fungicide Residue Analysis by TLC In Tomato

Miss. Madhuri Kumbar B.Sc IV Semester Devachand College Arjunnagar

Abstract:

Tomato (*Lycopersicon esculemtun*)and belongs to family Lycopersicae. The estimated area and production of tomato in India is about 3,50,000 hectares. Tomato crop is affected by pests and diseases The copper fungicides like Tri-basic copper sulfate, copper oxychloride, copper hydroxide etc. are recommended for use in tomato. The farmers are using these fungicides indiscriminately(1). The fungicides can remain intact on the skin and pulp up to month(2).These fungicides can cause endocrine tumors, affect reproduction and damage liver ,spleen and kidney.Thin Layer Chromatography(TLC) is a rapid, simple, relatively low cost and less time consuming technique(3) is used in the present study for qualitative analysis of pesticides.

MATERIAL AND METHODS

1.The vegetable such as tomato is used for the present study.

2.Fresh tomatoes were collected from the local market.

3.The fruit surface was washed with 25ml of distilled water and evaporated on water bath to make it concentrated. The wash is used as sample.

4.The TLC plates were prepared by using silica gel G and activated in oven.

5.Acetone and Toluene was used as developing solvent (9:1) and observed under UV light.

6.The Copperoxychloride and Sulphur(80%)were used as standard samples The Rf values were calculated and data is recorded.

RESULT AND DISCUSSION

The TLC plates were taken from the jar and immediately observed under the UV light. The Rf values were calculated and the results were documented in the observation table.

Table. 1. Rf values of fungicides Fig. TLC with fungicides

Fungicide	Rf value
Sample	0.58
Copperoxychloride	0.58
Sulphur	0.63

From the observation table it is clear that the sample shows the presence of fungicide copperoxychloride and Sulphur on the fresh vegetables.

SUMMARY AND CONCLUSION

The chemical plant protestants are very commonly farmers are using to protect the plants from insects and diseases. The protestants remain for longer duration on the vegetables. After consuming such vegetables human beings are suffering from different diseases and disorders. In the present study it has been observed that ,the fungicides were present on the tomato fruit surfaces. This data will help in knowing the presence of fungicides on vegetables.

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53. Influence of Plant Growth regulator on Seed Germination and Early Growth Performance in *Sorghum bicolor* L.

Monika Kadale B.Sc. IV Semester Devachand College Arjunnagar

Abstract:

Sorghum bicolor belongs to family Poaceae .It is a main staple food crop cultivated in various states of India. Jowar is a good source of vitamin ,protein Sucrose,Maltose ,Lactose,and Glactose.Applications growth regulators have been extensively used in order to ascertain their beneficial effects upon the growth and development of plants (1) .

In the present study effect of IAA (Indol,3-Acetic acid) is used to treat the seeds of Jowar.The parameters such as percent seed germination ,shoot length and root length will be studied.

MATERIAL AND METHODS

The seeds of Sorghum (M-35) were selected for the present study. The seeds were treated with Indol 3-acetic acid with concentration 5ppm, 10ppm, 15ppm and 20ppm for one, two and three hours .The primed seeds were sown in trays containing sand. The germination percentage, shoot length, root length etc. were analyzed after ten days of sowing. The experiment was repeated three times and the data is calculated and presented as mean values.

RESULT AND DISCUSSION

The seeds treated with IAA with different concentrations showed variable results after ten days of sowing .The results are depicted in the observation table.

Table.1. Effect of IAA treatment on germination and growth performance of Chick Pea

IAA (PPM)	Treatment peri od 1-hour			Treatment period 2-hours			Treatment period 3-hours		
	Germination (%)	Shoot length (cm)	Root length (cm)	Germination (%)	Shoot length (cm)	Root length (cm)	Germination (%)	Shoot length (cm)	Root length (cm)
Control	76	6.32	8.0	76	6.32	8.0	76	6.32	3.24
5ppm	84	6.32	8.4	86	6.15	8.16	86	6.72	8.94
10ppm	92	7.05	11.4	92	6.50	19.15	95	5.35	8.94
15ppm	97	10.20	17.12	97	9.69	18.95	98	8.62	16.90
20ppm	90	5.64	19.15	95	5.64	11.28	95	5.64	19.15

RESULT AND DISCUSSION

From Table 1. It is clear that as the concentration of IAA increases with time the germination percentage also increases.IAA at 15ppm concentration treatment for 1-hr and 2-hours are found to be more effective for shoot growth. Similarly seeds treated with IAA(10ppm)for 2-hours is showing maximum root length as compared other treatment. Similar results are reported in maize (Elangbam,2017)

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54. Effect of Indol, 3-Acetic Acid (IAA)On Agronomical Parameters in Chickpea (*Cicer arietinum* L.)

Miss. Tejaswini Tondphode B.Sc. IV Semester Devachand College Arjunnagar

Abstract:

Chickpea (*Cicer arietinum* L.) belongs to family Leguminoseae. It is the third most important pulse crop in the world. It accounts for 20% of the world pulses production. India is the largest producer and accounting about 70% of total world production Seed has protein (18-22%), fat (4-10%), 6.3%, carbohydrates (52-70%) and minerals (Calcium, Phosphorous, Iron) and Vitamins. To study the effect of Indol,3-Acetic acid on germination of seeds.Early growth performance study in Chick pea. Different parameters of growth are analyzed. To find out best concentration and treatment period of IAA for germination and Early growth performance study in Chick pea.

MATERIAL AND METHODS

The seeds of chickpea of Pusa-391 were selected for the present study. The seeds were treated with Indol 3-acetic acid with concentration 5ppm, 10ppm, 15ppm and 20ppm for one, two and three hours .The primed seeds were sown in trays containing sand. The germination percentage, shoot length, root length etc. were analyzed after ten days of sowing. The experiment was repeated three times and the data is calculated and presented as mean values.

RESULT AND DISCUSSION

The seeds treated with IAA with different concentrations showed variable results after ten days of sowing .The results are depicted in the observation table.

The seeds treated with IAA with different concentrations showed variable results after ten days of sowing .The results are depicted in the observation table.

IAA (PPM)	Treatment peri od 1-hour			Treatment period 2-hours		Treatment period 3-hours			
	Germination (%)	Shoot length (cm)	Root length (cm)	Germination (%)	Shoot length (cm)	Root length (cm)	Germination (%)	Shoot length (cm)	Root length (cm)
Control	84	15.02	8.0	84	15.02	8.0	84	16.02	3.24
5ppm	84	15.50	8.4	84	15.71	8.16	85	16.02	8.94
10ppm	93	18.05	11.4	92	17.52	19.15	95	15.66	8.94
15ppm	93	18.05	17.12	94	14.57	18.95	95	13.15	16.90
20ppm	93	28.10	19.15	95	14.72	11.28	95	13.15	19.15

From Table 1. It is clear that as the concentration of IAA increases with time the germination percentage also increases.IAA at 10 and 15ppm concentration treatment for 1-hr and 2-hours are found to be more effective for shoot growth. Similarly seeds treated with IAA(10ppm)for 2-hours is showing maximum root length as compared other treatment. Similar results are reported in chickpea at higher concentrations of GA by (Elangbam,2017)

SUMMERY AND CONCLUSION

The seeds treated with IAA for 5ppm, 10ppm ,15ppm and 20ppm for one ,two and three hours showed significant results.IAA at 15ppm and three hours treatment showed 94% seed germination and is highest as compared to others.The shoot and root length is also maximum at 15ppm IAA treated seeds.

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55. Microwave Assisted Synthesis of Dihydropyrimidone (BIGINELLI-RECTION)

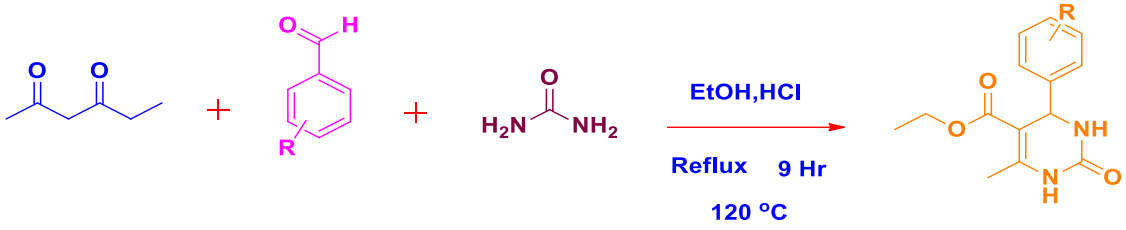
Miss. Aishwarya Halunde , B.Sc. VI Semester Ghali College Gandhinglaj

Abstract:

E-CHEMISRTY –Easy, Economic, Eco-friendly. Step towards Green Chemistry.

Microwave assisted chemical synthesis gaining popularity as non conventional technique in organic synthesis.Why?-Simple-inexpensive instrumentation,Lesser/ solvent free synthesis, Less time required, Easy to extract, lesser by products, pure compound, Eco-friendly Selective heating, high temperature, Absolute control over reaction, Eco-friendly way, Biginelli- Italian chemist (1860-1937), University of Turin, Know for work in three component organic synthesis, Acid- catalysed, three-component reaction of an aldehyde, a ß- ketoester and urea gives of dihydropyrimidones, called Biginelli reaction . (3,4-dihydropyrimidinone)Aldehydes, β-keto ester and urea/thio urea.

Dihydropyrimidone is multifunctional active heterocyclic moiety. pharmaceutical application.Wide range of aromatic aldehyde & keto esters can be used with prominent yields.Broad range biological effects- Antiviral, Antitumor (e.g. :-Manastrol), antibacterial, Anti-inflammatory activities



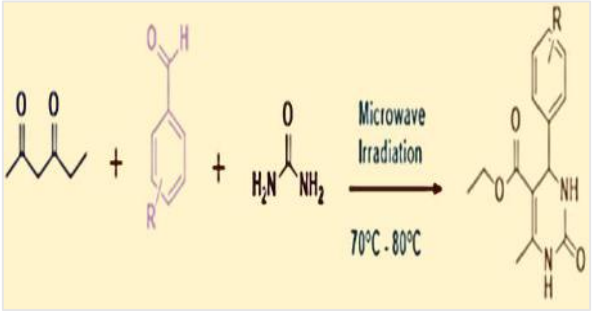
Classical method for dihydropyrimidone synthesis Biginelli (in 1893), synthesised dihydropyrimidone(DHPM) (4-aryldihydropyrimidin-2-(1-H)-one)by simple one pot acid catalysed condensation of ethyl aceto-acetate, benzaldehyde and urea dissolved in ethanol solvent, refluxed for hours. Since it is a multifunctional, biological active heterocyclic moiety, tremendous increase in activities occurred in synthesis of DHPM from late 1980's.

Backdrops of classical methods-

1.Low to moderate yield 2. Time consuming 3.Not energy efficient- long time heating refluxing time 4. Not solvent free synthesis 5. Complicated multistep strategy 6.Side reactions and formation of undesired by-products 7.Synthetic reagents like PPE-polyphosphate ester catalyst, PPA-polyphosphate acid etc. must used to increase yield.

Microwave assisted Biginelli synthesis of Dihydropyrimidone

We carried out a simple, eco-friendly and economic method to synthesize various dihydropyrimidone(DHPM) (4-aryldihydropyrimidin-2-(1-H)-one) using lemon juice in the absence of any organic solvent. Using microwave heating, reaction times were shortened from 1hr to 2 min.Catalyst- 5-6 drops of fresh lemon juice. Microwave radiation- 700 Time required- 1 minute. Recovery from ice cold water. Recrystallization- aqueous ethanol



Microwave assisted Biginelli synthesis of Dihydropyrimidone

Name of the compound	Weights (gm)	Molecular weight	Equivalent weight
Benzaldehyde	1.00	136gm/mol	1
EAA	0.86	130gm/mol	0.9
UREA	1.00	76gm/mol	1.8

Weight of product obtained = 0.850gm

Results –

Physical description	solid
Chemical formula	$C_4H_6N_2O$
Colour	Yellowish white
Melting Ponint	120^0
solubility	Insoluble in water
	Soluble in alcohol

Table : Comparison between classical and microwave heating for synthesis of Dihydropyrimidone derivatives.

ADVANTAGIES- Microwave assisted Biginelli synthesis of Dihydropyrimidone

1.Faster reaction time/ Rapid optimization- microwave heating is dielectric heating. So convert kinetic energy to heat energy with speed of light. Ultimately reduces reaction time from hours to minutes.

2.Energy efficient heating- molecular heating – efficient heating – atom economy.

3.Wide temperature range

4.High production yields- atom economy – less by-products & more yield of target product.

5.Excellent parameter control- temperature controller, wide radiation range, pressure regulators, built in magnetic stirrer fibre optic probe etc.

1.Safety- safe instrumentation with explosion proof reactors, shutdown mechanism, venting for overheating & over pressurization etc.

2.GREEN CHEMISTRY approach- follows GREEN CHEMISTRY PRINCIPLES like solvent free, atom economy, energy efficient, non hazardous natural reagents, modern approach etc.

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56. An Efficient Microwave assisted uncatalysed Multicomponent Synthesis of Pyrimidinone derivative by Biginelli Reaction:

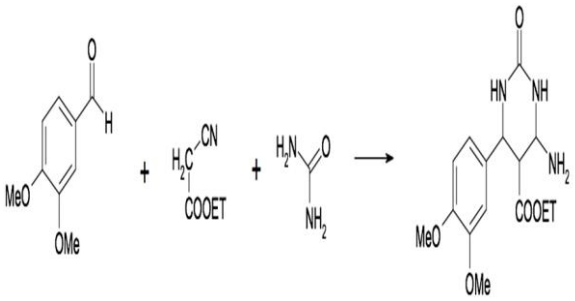
Miss. Apoorva Kangale B.Sc. VI Sem Devachand College Arjunnagar

Abstract:

Biginelli reaction involves acid-catalyzed one-pot synthesis of 3,4-dihydropyrimidin-2(1H)-ones (DHPMs) using easily-accessible starting materials, namely, aldehyde, active methylene compound and urea. DHPMs have stimulated resurgence of interest in the past two decades due to their wide ranging pharmacological activities and presence of diverse natural products. Presently, green approaches to asymmetric Biginelli reaction are being explored for bioactive chiral DHPMs. In materials chemistry, DHPMs are increasingly finding applications in the development of materials such as polymers, adhesives, fabric dyes, etc.In view of the ease with which the Biginelli reaction is conducted, many exciting prospects await for its exploitation in various fields.

EXPERIMENTAL WORK

A mixture of 1mmol (0.166g) of dimethoxy benzaldehyde, 1mmol (0.113g) of ethylcyanoacetate, 1mmol (0.06g) of urea with 5 cm3 of unhydrous alcohol was irradiated by microwaves at low power of 140W for 3.5mins. Upon completion of the reaction as monitored by TLC, the reaction mixture was cooled to room temperature, filtered to give the crude product to furnish pure 6-amino-4-(3,4-dimethoxy-phenyl)2-oxo-1,2,3,4-tetrahydro-pyrimidine-3-carboxylic acid methyl ester.



CHARACTERIZATION OF PRODUCT

Molecular Formula: C15H21N3O5

Molecular Weight = 307.31

Exact Mass = 307

ElementalAnalyses :Found (Calculated)

C 54.72% (54.70%) H 5.58% (5.59%)

N 13.67% (13.66%) O 26.03% (26.00%)

Melting Point : > 3000C

SPECTRAL ANALYSIS

IRvmax:3550-3350cm-1(-NH2),1650(C=0),1300-1500(C-H),1493(C=C),1270(COOEt),1038(OCH3)

1HNMR δ ppm: 1.20 (t,3H,CH2CH3), 2.53 (s, 2H,NH2), 3.83 (s,3H, OCH3), 3.85(s,3H,OCH3), 4.10(q,2H,CH2CH3), 4.45 (s,1H,CH), 6.80-7.15 (m,3H, Ar-H), 7.35 (s,1H,NH), 8.02(s,1H,NH)

RESULT AND DISCUSSION

The objective of present research work is to provide green methodology for the synthesis of pyrimidinone derivative.A highly efficient, unanalyzed and simple method has been described for thesynthesis

of 6-amino-4-(3,4-dimethoxy-phenyl)2-oxo-1,2,3,4-tetrahydro-pyrimidine-3-carboxylic acid methyl ester usingunhydrous ethanolsystem with moderate to good yields. The present synthesis comply with the principle of green chemistry

CONCLUSION

An efficient Microwave assisted uncatalysedmulticomponent synthesis of pyrimidinone derivative namely '6-amino-4-(3,4-dimethoxy-phenyl)2-oxo-1,2,3,4-tetrahydro-pyrimidine-3-carboxylic acid methyl ester' as an excellent antiviral (Influenza A) agent by Biginelli Reaction.

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57. SOIL EROSION AND ITS PREVENTIVE MEASURES

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INTRODUCTION

Soil erosion is the detachment, transport & deposition of soil particle on land surface. Also termed as loss of soil. Sediment generated by erosion processes are prime carrier of agricultural chemicals that pollutes stream or lakes. Soil erosion is a naturally occurring process that affects all landforms. In agriculture, soil erosion refers to the wearing away of a field's topsoil by the natural physical forces of water and wind or through forces associated with farming activities such as tillage.

Detachment occurs when the erosive forces of rainfall drop impact or when flowing water exceeds the soil's resistance to erosion. Detached particles are transported by the splash and flow of raindrop. Deposition occurs when the sediment load of eroded particles exceeds its corresponding transport capacity. The relative importance of these fundamental processes depends on whether the processes are occurring on inter-rill or rill areas and in the levels of the controlling variables. Eroded soil particles generally move downslope, flowing into rills and gullies. Understanding the soil erosion mechanism is very important to design the soil erosion measurement system and develop the soil erosion control techniques. Soil erosion can be a slow process that continues relatively unnoticed or can occur at an alarming rate, causing serious loss of topsoil. Soil compaction, low organic matter, loss of soil structure, poor internal drainage, salinisation and soil acidity problems are other serious soil degradation conditions that can accelerate the soil erosion process.Erosion, whether it is by water, wind or tillage, involves three distinct actions – soil detachment, movement and deposition. Topsoil, which is high in organic matter, fertility and soil life, is relocated elsewhere "on-site" where it builds up over time or is carried "off-site" where it fills in drainage channels. Soil erosion reduces cropland productivity and contributes to the pollution of adjacent watercourses, wetlands and lakes.

This paper aims to describe the major factors affecting upland soil erosion processes, types of soil erosion, characteristics of sloping upland culture, the impact of soil erosion on water quality, soil erosion measurement methods, and the soil erosion control techniques. It also includes wind erosion, water erosion, and process and soil conservation particles.

PHYSICAL PROCESSES

1. Rainfall and Runoff

The greater the intensity and duration of a rainstorm, the higher the erosion potential. The impact of raindrops on the soil surface can break down soil aggregates and disperse the aggregate material. Lighter aggregate materials such as very fine sand, silt, clay and organic matter are easily removed by the raindrop

splash and runoff water; greater raindrop energy or runoff amounts are required to move larger sand and gravel particles.

Soil movement by rainfall (raindrop splash) is usually greatest and most noticeable during short-duration, high-intensity thunderstorms. Although the erosion caused by long-lasting and less-intense storms is not usually as spectacular or noticeable as that produced during thunderstorms, the amount of soil loss can be significant, especially when compounded over time.

1. Rivers and streams

Valley or stream erosion occurs with continued water flow along a linear feature. The erosion is both downward, deepening the valley, and head ward, extending the valley into the hillside, creating head cuts and steep banks. In the earliest stage of stream erosion, the erosive activity is dominantly vertical, the valleys have a typical **V** cross-section and the stream gradient is relatively steep. When some base level is reached, the erosive activity switches to lateral erosion, which widens the valley floor and creates a narrow floodplain. The stream gradient becomes nearly flat, and lateral deposition of sediments becomes important as the stream meanders across the valley floor.

2.Water Erosion

The widespread occurrence of water erosion combined with the severity of on-site and off-site impacts have made water erosion the focus of soil conservation. Surface water runoff occurs whenever there is excess water on a slope that cannot be absorbed into the soil or is trapped on the surface. Reduced infiltration due to soil compaction, crusting or freezing increases the runoff. Runoff from agricultural land is greatest during spring months when the soils are typically saturated, snow is melting and vegetative cover is minimal.

3. Bank Erosion

Bank erosion is the wearing away of the banks of a stream or river. This is distinguished from changes on the bed of the watercourse, which is referred to as scour. Erosion and changes in the form of river banks may be measured by inserting metal rods into the bank and marking the position of the bank surface along the rods at different times.

Fast water flows (often caused by influx of stormwater from impermeable surfaces) wear away stream sides at an accelerated pace, often causing bank failure.

FACTORS AFFECTING SOIL EROSION

Removal of natural vegetation is a precursor to soil disturbance. Plant roots keep soil bound together, and leaves shield the ground from the eroding splash of rain drops. When wind or rain pelts unprotected, un-vegetated soil, it washes away loose particles.

Vehicle and foot traffic, construction, landscaping, farming, and other human activities further disturb the soil, making it even more susceptible to erosion. The effects of erosion are accelerated when these activities are carried out on slopes, where the effects of gravity quicken the flow of storm water runoff.

Confluence of storm water runoff from impermeable surfaces increases the flood events. Impermeable surfaces in urban and suburban areas cause rainwater to run off into storm drains and eventually into surface waterways. During large storm events, the influx of large quantities of water from storm drains can cause rivers to flood their banks.

Rapidly flowing floodwaters accelerate bank erosion, eventually causing bank failure.

Natural weathering processes also adds up to the factors affecting soil erosion. Erosion does occur naturally due to certain climatic, geologic, topographic, and soil conditions. Human activity, however, accelerates this process, disturbing the delicate equilibrium between erosion and sedimentation. Over grazing by cattle, Deforestation, arable land use, faulty farming, mining, etc. also causes soil erosion.

1. Climate- A factor causing soil erosion

The amount and intensity of precipitation is the main climatic factor governing soil erosion by water. The relationship is particularly strong if heavy rainfall occurs at times when or in locations where, the soil's surface is not well protected by vegetation. This might be during periods when agricultural activities leave the soil bare, or in semi-arid regions where vegetation is naturally sparse. Wind erosion requires strong winds, particularly during times of drought when vegetation is sparse and soil is dry (and so is more erodible).

Other climatic factors such as average temperature and temperature range may also affect erosion, via their effects on vegetation and soil properties. In general, the vegetation and ecosystems, areas with more precipitation (especially high-intensity rainfall), more wind, or more storms are expected to have more erosion.

In some areas of the world (e.g. the mid-western USA), rainfall intensity is the primary determinant of erosivity, with higher intensity rainfall generally resulting in more soil erosion by water. The size and velocity of rain drops is also an important factor. Larger and higher-velocity rain drops have greater kinetic energy, and thus their impact will displace soil particles by larger distances than smaller, slower-moving rain drops.

In other regions of the world (e.g. Western Europe), runoff and erosion result from relatively low intensities of stratiform rainfall falling onto previously saturated soil. In such situations, rainfall amount rather than intensity is the main factor determining the severity of soil erosion by water.

The warmer atmospheric temperatures observed over the past decades are expected to lead to a more vigorous hydrological cycle, including more extreme rainfall events. The rise in sea levels that has occurred as a result of climate change has also greatly increased coastal erosion rates.

Studies on soil erosion suggest that increased rainfall amounts and intensities will lead to greater rates of soil erosion. Thus, if rainfall amounts and intensities increase in many parts of the world as expected, erosion will also increase, unless amelioration measures are taken. Soil erosion rates are expected to change in response to changes in climate for a variety of reasons. The most direct is the change in the erosive power of rainfall.

Other reasons include:

1. Changes in plant canopy caused by shifts in plant biomass production associated with moisture regime.
2. Changes in litter cover on the ground caused by changes in both plant residue decomposition rates driven by temperature and moisture dependent soil microbial activity as well as plant biomass production rates.

3. Changes in soil moisture due to shifting precipitation regimes and evapo-transpiration rates, which changes infiltration and runoff ratios.

4. Soil erodibility changes due to decrease in soil organic matter concentrations in soils that lead to a soil structure that is more

susceptible to erosion and increased runoff due to increased soil surface sealing and crusting.

5. Shift of winter precipitation from non-erosive snow to erosive rainfall due to increasing winter temperatures.

6. Melting of permafrost, which induces an erodible soil state from a previously non-erodible one.

7. Shifts in land use made necessary to accommodate new climatic regimes.

2. Cropping and Vegetation

The potential for soil erosion increases if the soil has no or very little vegetative cover of plants and/or crop residues. Plant and residue cover protects the soil from raindrop impact and splash, tends to slow down the movement of runoff water and allows excess surface water to infiltrate.

The erosion-reducing effectiveness of plant and/or crop residues depends on the type, extent and quantity of cover. Vegetation and residue combinations that completely cover the soil and intercept all falling raindrops at and close to the surface are the most efficient in controlling soil erosion (e.g., forests, permanent grasses). Partially incorporated residues and residual roots are also important as these provide channels that allow surface water to move into the soil.

The effectiveness of any protective cover also depends on how much protection is available at various periods during the year, relative to the amount of erosive rainfall that falls during these periods. Crops that provide a full protective cover for a major portion of the year (e.g., alfalfa or winter cover crops) can reduce erosion much more than can crops that leave the soil bare for a longer period of time (e.g., row crops), particularly during periods of highly erosive rainfall such as spring and summer. Crop management systems that favour contour farming and strip-cropping techniques can further reduce the amount of erosion. To reduce most of the erosion on annual row-crop land, leave a residue cover greater than 30% after harvest and over the winter months, or inter-seed a cover crop (e.g., red clover in wheat, oats after silage corn).

3. Slope Gradient and Length

The steeper and longer the slope of a field, the higher the risk for erosion. Soil erosion by water increases as the slope length increases due to the greater accumulation of runoff. Consolidation of small fields into larger ones often results in longer slope lengths with increased erosion potential, due to increased velocity of water, which permits a greater degree of scouring (carrying capacity for sediment).

4. Tillage Practices

The potential for soil erosion by water is affected by tillage operations, depending on the depth, direction and timing of plowing, the type of tillage equipment and the number of passes. Generally, the less the disturbance of vegetation or residue cover at or near the surface, the more effective the tillage practice in reducing water erosion. Minimum till or no-till practices are effective in reducing soil erosion by water.

Tillage and other practices performed up and down field slopes creates pathways for surface water runoff and can accelerate the soil erosion process. Cross-slope cultivation and contour farming techniques discourage the concentration

of surface water runoff and limit soil movement

5. Soil structure and composition

The composition, moisture, and compaction of soil are all major factors in determining the erosivity of rainfall. Sediments containing more clay tend to be more resistant to erosion than those with sand or silt, because the clay helps bind soil particles together. Soil containing high levels of organic materials are often more resistant to erosion, because the organic materials coagulate soil colloids and create a stronger, more stable soil structure.

The amount of water present in the soil before the precipitation also plays an important role, because it sets limits on the amount of water that can be absorbed by the soil (and hence prevented from flowing on the surface as erosive runoff). Wet, saturated soils will not be able to absorb as much rain water, leading to higher levels of surface runoff and thus higher erosivity for a given volume of rainfall. Soil compaction also affects the permeability of the soil to water, and hence the amount of water that flows away as runoff. More compacted soils will have a larger amount of surface runoff than less compacted soils.

6. Topography

The topography of the land determines the velocity at which surface runoff will flow, which in turn determines the erosivity of the runoff. Longer, steeper slopes (especially those without adequate vegetative cover) are more susceptible to very high rates of erosion during heavy rains than shorter, less steep slopes. Steeper terrain is also more prone to mudslides, landslides, and other forms of gravitational erosion processes.

HUMAN ACTIVITIES THAT INCREASED SOIL EROSION

I. Agricultural practice

Unsustainable agricultural practices are the single greatest contributor to the global increase in erosion rates. The tillage of agricultural lands, which breaks up soil into finer particles, is one of the primary factors. The problem has been exacerbated in modern times, due to mechanized agricultural equipment that allows for deep plowing, which severely increases the amount of soil that is available for transport by water erosion.

Others include mono-cropping, farming on steep slopes, pesticide and chemical fertilizer usage (which kill organisms that bind soil together), row-cropping, and the use of surface irrigation. A complex overall situation with respect to defining nutrient losses from soils, could arise as a result of the size selective nature of soil erosion events. Loss of total phosphorus, for instance, in the finer eroded fraction is greater relative to the whole soil.

Extrapolating this evidence to predict subsequent behaviour within receiving aquatic systems, the reason is that this more easily transported material may support a lower solution P concentration compared to coarser sized fractions. Tillage also increases wind erosion rates, by dehydrating the soil and breaking it up into smaller particles that can be picked up by the wind. Exacerbating this is the fact that most of the trees are generally removed from agricultural fields, allowing winds to have long, open runs to travel over at higher speeds. Heavy grazing reduces vegetative cover and causes severe soil compaction, both of which increase erosion rates.

II. Deforestation

Deforestation causes increased erosion rates due to exposure of mineral soil by removing the humus and litter layers from the soil

surface, removing the vegetative cover that binds soil together, and causing heavy soil compaction from logging equipment. Once trees have been removed by fire or logging, infiltration rates become high and erosion low to the degree the forest floor remains intact. Severe fires can lead to significant further erosion if followed by heavy rainfall.

III. Roads and urbanization

Urbanization has major effects on erosion processes—first by denuding the land of vegetative cover, altering drainage patterns, and compacting the soil during construction; and next by covering the land in an impermeable layer of asphalt or concrete that increases the amount of surface runoff and increases surface wind speeds. Much of the sediment carried in runoff from urban areas (especially roads) is highly contaminated with fuel, oil, and other chemicals.

This increased runoff, in addition to eroding and degrading the land that it flows over, also causes major disruption to surrounding watersheds by altering the volume and rate of water that flows through them, and filling them with chemically polluted sedimentation. The increased flow of water through local waterways also causes a large increase in the rate of bank erosion.

PROBLEMS CAUSED DUE TO SOIL EROSION

Soil is the most precious gift of nature. It is the Prime resource for food, fodder, etc. Mismanagement of Soil leads to less productivity. In India, more than 100 million hectares of soil are degraded, eroded and unproductive. About 17 tons per hectare of soil is detached annually. Less than 20% of this is transported by river to sea. 10% of it is deposited in reservoir. This results in 1 to 2% loss off the storage capacity.

Soil erosion deteriorates soil quality and reduces productivity of natural, agricultural and forest ecosystem. Soil erosion deteriorates the quality of water. Increased sedimentation causes the reduction of carrying capacity of water bodies.Increased soil erosion may lead to degradation of soil quality, pollution of water bodies, disturbance to aquatic and wetland ecosystem, sedimentation of waterways and increase in costs of maintenance of stormwater management systems.

I Sedimentation of aquatic ecosystems

Soil erosion (especially from agricultural activity) is considered to be the leading global cause of diffuse water pollution, due to the effects of the excess sediments flowing into the world's waterways. The sediments themselves act as pollutants, as well as being carriers for other pollutants, such as attached pesticide molecules or heavy metals.

The effect of increased sediments loads on aquatic ecosystems can be catastrophic. Silt can smother the spawning beds of fish, by filling in the space between gravel on the stream bed. It also reduces their food supply, and causes major respiratory issues for them as sediment enters their gills.

The biodiversity of aquatic plant and algal life is reduced, and invertebrates are also unable to survive and reproduce. While the sedimentation event itself might be relatively short-lived, the ecological disruption caused by the mass die off often persists long into the future

II. Loss of Arable Land

Lands used for crop production have been substantially affected by soil erosion. Soil erosion eats away the top soil which is the fertile layer of the land and also the component that supports the soil's essential microorganisms and organic matter. In this view, soil erosion has severely threatened the productivity of fertile cropping areas as they are continually degraded.

Because of soil erosion, most of the soil characteristics that support agriculture have been lost, causing ecological collapse and mass starvation. It is likely that most of the cultivated areas around the globe are vulnerable to soil erosion.

III.Land degradation

Land degradation is the process of deterioration of soil or loss of fertility of soil. The causes of land degradation can be divided into natural hazards, direct causes, and underlying causes. Natural hazards are the conditions of the physical environment which lead to the existence of a high degradation hazard, for example steep slopes as a hazard for water erosion.

Direct causes are unsuitable land use and inappropriate land management practices, for example the cultivation of steep slopes without measures for soil conservation. Underlying causes are the reasons why these inappropriate types of land use and management are practised; for example,-the slopes may be cultivated because the landless poor need food, and conservation measures not adopted because these farmers lack security of tenure.

There is a distinction, although with overlap, between unsuitable land use and inappropriate land management practices. Unsuitable land use is the use of land for purposes for which it is environmentally unsuited for sustainable use. For example- forest clearance and arable use of steeply sloping upper watershed areas which would have more value to the community as water sources, managed under a protective forest cover.

Inappropriate land management practices refer to the use of land in ways which could be sustainable if properly managed, but where the necessary practices are not adopted. For example- the failure to adopt soil conservation measures where these are needed. It can also refer to land use which is ecologically sustainable under low intensity of use but in which the management becomes inappropriate at higher intensifies (shifting cultivation and the grazing of semi-arid rangelands).

IMPACT OF LAND DEGRADATION

i. Loss of soil organic matter and nutrients.
ii. Loss of soil structure.
iii. Loss of soil biodiversity.
iv. Loss of water holding capacity and water infiltration.
v. Soil pollution.
vi. Reduced yields of crops.
vii. Reduced land value and resilience to future events.
viii. Impact on food security.
ix. Reduces ability to adapt to climate change.

Water Pollution and Clogging of Waterways

Soils eroded from agricultural lands carry pesticides, heavy metals, and fertilizers which are washed into streams and major water ways. This leads to water pollution and damage to marine and freshwater habitats. Accumulated sediments can also cause clogging of water ways and raises the water level leading to flooding.

The water quality of various streams, rivers, and coastal areas has also been deteriorated as a result of soil erosion, eventually affecting the health of the local communities.

I. Destruction of Infrastructure

Soil erosion can affect infrastructural projects such as dams, drainages, and embankments. The accumulation of soil sediments in dams/drainages and along embankments can reduce their operational lifetime and efficiency. Also, the silt up can support plant life that can, in turn, cause cracks and weaken the structures. Soil erosion from surface water runoff often

causes serious damage to roads and tracks, especially if stabilizing techniques are not used

II. Desertification

Soil erosion is a major driver of desertification. It gradually transforms a habitable land and the ASAL regions into deserts. The transformations are worsened by the destructive use of the land and deforestation that leaves the soil naked and open to erosion. This usually leads to loss of biodiversity, alteration of ecosystems, land degradation, and huge economic losses.

III. On-site effects of soil erosion

The implications of soil erosion by water extend beyond the removal of valuable topsoil. Crop emergence, growth and yield are directly affected by the loss of natural nutrients and applied fertilizers. Seeds and plants can be disturbed or completely removed by the erosion.

Organic matter from the soil, residues and any applied manure, is relatively lightweight and can be readily transported off the field, particularly during spring thaw conditions. Pesticides may also be carried off the site with the eroded soil.

Soil quality, structure, stability and texture can be affected by the loss of soil. The breakdown of aggregates and the removal of smaller particles or entire layers of soil or organic matter can weaken the structure and even change the texture. Textural changes can in turn affect the water-holding capacity of the soil, making it more susceptible to extreme conditions such as drought.

IV. Off-site effect of soil erosion

The off-site impacts of soil erosion by water are not always as apparent as the on-site effects. Eroded soil, deposited down slope, inhibits or delays the emergence of seeds, buries small seedlings and necessitates replanting in the affected areas. Also, sediment can accumulate on down-slope properties and contribute to road damage.Sediment that reaches streams or watercourses can accelerate bank erosion, obstruct stream and drainage channels, fill in reservoirs, damage fish habitat and degrade downstream water quality.Pesticides and fertilizers, frequently transported along with the eroding soil, contaminate or pollute downstream water sources, wetlands and lakes. Because of the potential seriousness of some of the off-site impacts, the control of "non-point" pollution from agricultural land is an important consideration.

TYPES OF EROSION

I. Sheet Erosion

Sheet erosion is the movement of soil from raindrop splash and runoff water. It typically occurs evenly over a uniform slope and goes unnoticed until most of the productive topsoil has been lost.

Deposition of the eroded soil occurs at the bottom of the slope or in low areas. Lighter-coloured soils on knolls, changes in soil horizon thickness and low crop yields on shoulder slopes and knolls are other indicators.

II. Rill Erosion

Rill erosion results when surface water runoff concentrates, forming small yet well-defined channel. These distinct channels where the soil has been washed away are called rills when they are small enough to not interfere with field machinery operations. In many cases, rills are filled in each year as part of tillage operations.

III. Scalding

Scalding can occur when wind and water erosion removes the top soil and exposes saline or sodic soils. Raindrop impact alone

can result in large amounts of soil being moved. However water or wind moving over the surface will remove more soil, and contribute to sheet, rill and gully erosion.

Erosion also tends to remove the lighter, smaller soil particles first (such as clay and silt), leaving fine and coarse sand behind. A combination of large amounts of fine sand and small amounts of clay at the surface means the soil tends to seal and set hard, which limits infiltration (water entering the soil).

IV. Gully Erosion

Gully erosion is an advanced stage of rill erosion where surface channels are eroded to the point where they become a nuisance factor in normal tillage operations.

There are farms in Ontario that are losing large quantities of topsoil and subsoil each year due to gully erosion. Surface water runoff, causing gully formation or the enlarging of existing gullies, is usually the result of improper outlet design for local surface and subsurface drainage systems.

The soil instability of gully banks, usually associated with seepage of groundwater, leads to sloughing and slumping (caving-in) of bank slopes. Such failures usually occur during spring months when the soil water conditions are most conducive to the problem.

Gully formations are difficult to control if corrective measures are not designed and properly constructed. Control measures must consider the cause of the increased flow of water across the landscape and be capable of directing the runoff to a proper outlet. Gully erosion results in significant amounts of land being taken out of production and creates hazardous conditions for the operators of farm machinery.

Gully development may be triggered by:

Cultivation or grazing on soils susceptible to gully erosion.

- Increased runoff from land use changes such as tree clearing in a catchment or construction of new residential areas.
- Runoff concentration caused by furrows, contour banks, waterways, dam by washes, stock pads, fences, tracks or roads.
- Improper design, construction or maintenance of waterways in cropping areas.
- Poor vegetation cover that may be caused by overgrazing, fires or salinity problems.
- Low flows or seepage flows over a long period.
- 'Down cutting' in a creek that causes gullies to advance up the drainage lines flowing into it.
- Diversion of a drainage line to an area of high erosion risk, such as a steep creek bank or soil that is highly prone to erosion.

V. Tunnel erosion

Tunnel erosion is the removal of subsoil. When water penetrates through a soil crack or a hole where a root has decayed, the soil disperses and is carried away with the flow to leave a small tunnel.

Initially, the surface soil remains relatively intact but, with every flow, the tunnel becomes larger and the soil may eventually collapse and form a gully.

The whole process speeds up significantly if an outlet is provided (such as an existing gully or cutting in a roadside) as this allows free flow of subsurface drainage water. Soils vulnerable to tunnel erosion have dispersible subsoil with naturally high levels of sodium. Such soils are referred to as being sodic and are called Sodosols.

When clods of these soils are exposed to water, they readily break down into individual particles of sand, silt and clay

which are easily removed as water moves through the subsoil.

VI. Wind erosion

Wind erosion is a significant problem in the arid grazing lands. It is most likely to occur when strong winds blow over light-textured soils that have been heavily grazed during drought periods. It contributes to scalding, a process that forms smooth, bare areas on impermeable subsoil.

These areas, which vary from a few square meters to hundreds of hectares, are difficult to revegetate due to: 1.Lack of topsoil 2.Low permeability 3.Their often saline surface.

Generally, wind erosion is not a serious issue in cropping areas. However, sandy soils are vulnerable to wind erosion because they cannot store very much moisture and have low fertility.

VII. Bank Erosion

Natural streams and constructed drainage channels act as outlets for surface water runoff and subsurface drainage systems. Bank erosion is the progressive undercutting, scouring and slumping of these drainage ways. Poor construction practices, inadequate maintenance, uncontrolled livestock access and cropping too close can all lead to bank erosion problems.

Poorly constructed tile outlets also contribute to bank erosion. Some do not function properly because they have no rigid outlet pipe, have an inadequate splash pad or no splash pad at all, or have outlet pipes that have been damaged by erosion, machinery or bank cave-ins.

The direct damages from bank erosion include loss of productive farmland, undermining of structures such as bridges, increased need to clean out and maintain drainage channels and washing out of lanes, roads and fence rows.

Stream or bank erosion can also be accelerated by factors such as:

1.Stream bed lowering or infill.
2. Inundation of bank soils followed by rapid drops in flow after flooding.
3. Saturation of banks from off-stream sources.
4. Redirection and acceleration of flow around infrastructure, obstructions, debris or vegetation within.
5. Soil characteristics such as poor drainage or seams of readily erodible material within the bank profile.
6. Wave action generated by wind or boat wash.
7.Intense rainfall events (e.g. cyclones

MONITORING, MEASURING AND MODELLING SOIL EROSION

Monitoring and modeling of erosion processes can help people better understand the causes of soil erosion, make predictions of erosion under a range of possible conditions, and plan the implementation of preventative and restorative strategies for erosion. However, the complexity of erosion processes and the number of scientific disciplines that must be considered to understand and model them (e.g. climatology, hydrology, geology, soil science, agriculture, chemistry, physics, etc.) makes accurate modelling challenging.

Erosion models are also non-linear, which makes them difficult to work with numerically, and makes it difficult or impossible to scale up to making predictions about large areas from data collected by sampling smaller plots.

The most commonly used model for predicting soil loss from water erosion is the Universal Soil Loss Equation (USLE). This was developed in the 1960s and 1970s.

It estimates the average annual soil loss A on a plot-sized area as:

A = RKLSCP

Where, R is the rainfall erosivity factor,
K is the soil erodibility factor,
L and S are topographic factors representing length and slope,
C is the cover and management factor
P is the support practices factor.

PREVENTIVE MEASURES

The adoption of various soil conservation measures reduces soil erosion by water, wind and tillage. Tillage and cropping practices, as well as land management practices, directly affect the overall soil erosion problem and solutions on a farm. When crop rotations or changing tillage practices are not enough to control erosion on a field, a combination of approaches or more extreme measures might be necessary.

For example, contour plowing, strip-cropping or terracing may be considered. In more serious cases where concentrated runoff occurs, it is necessary to include structural controls as part of the overall solution – grassed waterways, drop pipe and grade control structures, rock chutes, and water and sediment control basins.

The most effective known method for erosion prevention is to increase vegetative cover on the land, which helps prevent both wind and water erosion. Terracing is an extremely effective means of erosion control, which has been practiced for thousands of years by people all over the world.

Windbreaks (also called shelterbelts) are rows of trees and shrubs that are planted along the edges of agricultural fields, to shield the fields against winds. In addition to significantly reducing wind erosion, windbreaks provide many other benefits such as improved microclimates for crops (which are sheltered from the dehydrating and otherwise damaging effects of wind), habitat for beneficial bird species, carbon sequestration, and aesthetic improvements to the agricultural landscape.

Traditional planting methods, such as mixed-cropping (instead of monocropping) and crop rotation have also been shown to significantly reduce erosion rates. Crop residues play a role in the mitigation of erosion, because they reduce the impact of raindrops breaking up the soil particles.

There is a higher potential for erosion when producing potatoes than when growing cereals, or oilseed crops. Forages have a fibrous root system, which helps combat erosion by anchoring the plants to the top layer of the soil, and covering the entirety of the field, as it is a non-row crop.

In tropical coastal systems, properties of mangroves have been examined as a potential means to reduce soil erosion. Their complex root structures are known to help reduce wave damage from storms and flood impacts while binding and building soils. These roots can slow down water flow, leading to the deposition of sediments and reduced erosion rates.

However, in order to maintain sediment balance, adequate mangrove forest width needs to be present.

Applying Mulches: Mulching soil, greatly help in soil erosion control. Mulching is done by putting dead leaves and shredded wood on the soil. Mulching acts as a protective covering for the tree and plants against extreme weathers. Mulching allows water to reach the soil slowly, and thus reduce the impact of rainfall or heavy watering.

Mulches help to prevent the soil from turning acidic and suppresses weeds from growing. Over time, mulches made from organic

materials break down and increase soil's structure and fertility.

Matting the soil: Matting is the process of covering the soil with biodegradable materials that include mulch, straw, coconut fiber and wood chips. These are held together with biodegradable netting made from coco coir. It is like covering the soil with a biodegradable carpet.

Biodegradable spikes are used to hold the matting material in place. Biodegradable means it can decompose or decay and turn to soil fertilizer. Plastic in non-biodegradable that is why it is not good for the environment.

- Terrace farming

Terrace farming, method of growing crops on sides of hills or mountains by planting on graduated terraces built into the slope. Though labor-intensive, the method has been employed effectively to maximize arable land area in variable terrains and to reduce soil erosion and water loss. In most systems the terrace is a low, flat ridge of earth built across the slope, with a channel for runoff water just above the ridge.

Usually terraces are built on a slight grade so that the water caught in the channel moves slowly toward the terrace outlet. In areas where soils are able to take in water readily and rainfall is relatively low, level terraces may be used.

land.

58. Bio-Medical Waste & Its Treatment

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Abstract

Biomedical waste is any of waste containing infectious (or potentially infectious) materials. It may also include waste associated with the generation of biomedical waste that visually appears to be of medical or laboratory origin (e.g., packaging, unused bandages, infusion kits, etc.), as well research laboratory waste containing biomolecules or organisms that are restricted from environmental release. As detailed below, discarded sharps are considered biomedical waste whether they are contaminated or not, due to the possibility of being contaminated with blood and their propensity to cause injury when not properly contained and disposed of. Biomedical waste is a type of biowaste.

Biomedical waste may be solid or liquid. Examples of infectious waste include discarded blood, sharps, unwanted microbiological culture and stocks, identifiable body parts, other human or animal tissue, used bandages and dressings, discarded gloves, other medical supplies that may have been in contact with blood and body fluids, and laboratory waste that exhibits the characteristics described above. Waste sharps include potentially contaminated used (and unused discarded) needles, scalpels, lancets and other devices capable of penetrating skin.Biomedical waste is generated from biological and medical sources and activities, such as the diagnosis, prevention, or treatment of diseases. Common generators (or producers) of biomedical waste include hospitals, health clinics, nursing houses, medical research laboratories, offices of physicians, dentists, and veterinarians, home health care, and morgues or funeral homes. In healthcare facilities (i.e., hospitals, clinics, doctor's offices, veterinary hospitals and clinical laboratories), waste with these characteristics may alternatively be called medical or clinical waste.

59. **Nuclear energy-a solution to energy crises**

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Abstract

Nuclear energy is the future for our energy expectations. We will soon be reliant upon it as a source of energy for maintaining our lifestyle in the face of the anthropogenic global warming resultant from excessive carbon dioxide from fossil fuel consumption. Thus its reception by the public is an important consideration for policy makers as we look towards generating the right kind of policy for nuclear development in our country. The development of nuclear energy is an interesting history of its own that includes a few Nobel Prizes and several major scientific discoveries. As we look toward the future of nuclear policy, we must look to the past and uncover the science of the technology and how we can inform the public and remove misconceptions that prove to be barriers to progress.

Before discussing nuclear energy, it is necessary to explain why it is so important. We are in an age of fossil fuel consumption that propagates vast amounts of carbon dioxide in the atmosphere. From the dawn of the 1900s, scientists have believed that it is our excessive use of fossil fuels in industry that cause a rapid increase in temperatures, global warming, as the greenhouse gases are pumped into the atmosphere. There are many positive feedback mechanisms that deal with greenhouse gases and global warming. And recently, there are a number of sources which show both an increase in carbon dioxide emissions and global temperature escalations as well as a positive causal correlation between the two. Furthermore, it can be proven by computer estimates that there is an anthropogenic quality to the global warming. Thus it is in the interest of us all that we abandon fossil fuels in favor of energy sources that do not emit such gases and, in so doing, turn the tide of global warming.

Introduction

Nuclear fission

In nuclear fission, the nuclei of atoms are split, causing the energy to be released. The atomic bomb and nuclear reactors work by fission. The element uranium is the fuel used to undergo the nuclear fission to produce energy to produce energy since it has many favorable properties. Uranium nuclei can be easily split by shooting neutrons at them. Also, once a uranium nucleus is split, multiple neutrons are released which are used to split other uranium nuclei. This phenomenon is known as a chain reaction.

Nuclear fission involves delicate balance within the nucleus between nuclear attraction and electrical repulsion between protons. In all known nuclei the nuclear forces dominate. In uranium, however, this domination is tenuous. If the uranium nucleus is stretched into an elongated shape, the electrical forces may push into an even more elongated shape. If the elongation passes a critical point, nuclear forces yields to electrical ones, and the nucleus separates. This is fission. The absorption of a neutron by a uranium nucleus supplies enough energy to cause such an

elongation the resultant fission process, may produce many different smaller nuclei.

The combined mass of the fission fragments and neutrons produced is in fission less is less than the mass of the original uranium atom. The tiny amount of missing mass converted to this good amount of energy is in accord with Einstein's relation E is equal to mc squared. The energy of fission is mainly in the form of kinetic energy of the fission fragments that fly apart from one another, with some kinetic energy given to ejected neutrons and the rest to the gamma radiation. This reaction energy releases 200,000,000electron volts (by comparison, the explosion of the TNT molecule releases 30 electron volts.

THE THREE STEPS OF NUCLEAR FISSION

1. It may cause fission of a U-235 atom
2. Escape from the metals into non-fissionable surroundings, or
3. Be absorbed by U-238 without causing fission.

To make the first fate more probable, the uranium was divided into discrete parcels and buried at regular intervals in nearly 400 tonnes of graphite, a familiar form of carbon. A simple analogy clarifies the function of the graphite

Nuclear fusion

In nuclear fusion, the nuclei of atoms are joined together, or fused. This happens only under very hot conditions. The sun, like all other stars, creates heat and light through nuclear fusion. In the sun, hydrogen nuclei fuse to make helium. The hydrogen bomb, humanity's most powerful and destructive weapon, also works by fusion. The heat required to start the fusion reaction is so that an atomic bomb is to provide it. Hydrogen nuclei fuse to form helium, and in the process it releases huge amounts of energy. Although, it provides a huge explosion.

Atomic nuclei are positively charge, fusion to occur; they normally must collide at very high speed in other to overcome electrical repulsion. The required speeds correspond to the extremely high temperatures found in the centre of the sum and stars. Fusion brought about by high temperatures is called thermonuclear fusion that is the welding together of atomic nuclei by high temperature. In the hot central part of the sun, approximately 657 million tonnes of hydrogen are converted into 653 million tons of helium each second. The missing four million tons of mass is discharged as radiant energy. Such reactions are, quite literally, nuclear burning. Most of the energy of nuclear fusion is in the kinetic of fragments, mainly neutrons. When the neutrons of are stopped and captured, the energy of fusion is turned into heat. In fusion reaction of the future, part of this heat is transformed into electricity.

Thermonuclear fusion is analogous to ordinary chemical combustion. In both chemical and nuclear burning, a high temperature starts the reaction; the release of energy into by reaction maintains a high enough temperature to spread the fire. The net result to the chemical reaction is a combination of atoms into more tightly bound molecules. In nuclear reactions, the net result is more tightly bound nuclei. The difference between chemical and nuclear burning is essential one of a scale.

Nuclear reactors

Nuclear reactors are devices that control fission reactions producing new substances from the fission product and energy. Nuclear power stations use uranium in fission reactions as a fuel to produce energy. Steam is generated by the heat released during the fission process. It is this steam that turns a turbine to produce electric energy. There is a nuclear reactor called pressurized-water reactor. The nuclear power plant at Koeberg,

near Cape Town in the Western Cape, is an example of such reactor.

The energy released by nuclear reaction heats water in the reactor vessel, causing convection current that circulates the water through the vessel. Because the water is under extreme pressure, it does not boil. This superheated water is passed through a heat exchanger, and passes its heat on to a secondary water system, which is allowed to boil and precede steam. The steam is produce over a turbine, which is connected to a generator. The spinning turbine thus generates electricity. The steam is then cooled, and it condenses and flows back into the heat exchanger.

The advantage of this system is that the two water systems are completely separated, so the radioactive material in the reactor is prevented from contaminating anything in the surrounding areas. Although it seems simple, the greatest difficulty with this reaction is to control the chain reaction that is set up. This is done by means of control rods, which can be moved in and out of the core (where the radioactive fuel is). These control rods serve to absorb neutrons produced by the fission reaction. In this way, the number of neutrons released can be maintained, so that the reactor does not become hypercritical. Such a hypercritical reaction can lead to nuclear meltdown, a situation where heat cannot be removed from the reactor fast enough by the coolant, so that the reactor fuel overheats and melts. This might lead to explosion and the radioactive material in the atmosphere as happened in 1986 in the world peacetime nuclear disaster in the world, at Chernobyl in Ukraine. South Africa is planning the building of pebble-bed nuclear reactors. This type of this reactor is an improvement on the design of the pressurized-water reactors, and is regarded as the exceptional safe.

The scientific world was jolted by the news of nuclear fission not only because of enormous energy release but also because of the extra neutrons liberated in the process. Typical fission reaction releases an average of about two or three neutrons. These new neutrons can in turn cause the fissioning of two or three other atomic nuclei, releasing more energy and a total of from four to nine more neutrons. If each of this splits just one nuclei, the next step in reaction will produce between eight and twenty seven neutrons and so on. Thus, a whole chain reaction can proceed at an ever accelerating rate.

If a chain reaction occurred in a chunk of pure U-235 the size of a baseball; an enormous explosion would likely result. The uranium separation in these days is more accomplish with a gas centrifuge. Uranium hexafluoride is whirled in a drum of tremendously high rim speeds. Under the centrifuge force, the heavier U-238 gravitates to the outside like milk in a diary separator, and gas rich in lighter U-235 is extracted from the centre. Engineering difficulties, only recently overcome, prevented the use of this in Manhattan project.

Within less than a year after the discovery of fission, scientist realized that a chain reaction with ordinary uranium metal might be possible if the uranium was broken up into smaller lumps and separated by a material that slow down neutrons. Enrico Fermi, who to America from Italy at the beginning of 1939,led the construction of the first reactor or atomic pile, as it was called-in a squash court underneath the grandstands of the university of Chicago's Stagg field. His group achieved the first self-sustaining controlled release of nuclear energy on December 2, 1942.

Mile stones in history of nuclear energy

1. December 2, 1942: The nuclear age began at the University of Chicago when Enrico Fermi made a chain reaction in a pile of uranium.
2. August 6, 1945: The United States dropped an atomic bomb on Hiroshima, Japan, killing over 100 000 people.
3. August 9, 1945: The United States dropped an atomic bomb on Nagasaki Japan, killing over 40 000
4. November 1, 1952: the first vision of the hydrogen bomb (thousands times more powerful than the atomic bomb) was exploded by the United States for testing purpose
5. February 21, 1956: the first major power plant was opened in England.

People are afraid of the consequences of nuclear as is harmful if not controlled with caution. Since the exploding of the power plant station in Chernobyl, Russia. People are scared if the same case could happen if nuclear power plant stations are created. Although the nuclear has the consequences is still has the advantages.

ADVANTAGES OF NUCLEAR ENERGY

1. The earth has limited supplies of coal and oil. Nuclear power plants could still produce electricity after coal and oil become scarce.
2. A nuclear power plant needs less fuel than ones which burns fossil fuels. One tons of uranium produces more energy than is produced by million tonnes of coals or million barrels of oil.
3. Coal and oil burning plants pollutes the air. Well-operated power plants do not contaminants into the environment.

DISADVANTAGES OF NUCLEAR ENERGY

The nations of the world now have more than enough nuclear bombs to kill every person on Earth. The most powerful nations-Russia and United States have about 50 000 nuclear weapons between them. What if there were to be a nuclear war? What if terrorist got their hands on nuclear weapons? Or what if nuclear weapons were launched by accident?

1. Nuclear explosion produce radiation. The nuclear radiation harms the cells of the body which can make people sick or even kill them. Illness can strike people years after their exposure to nuclear radiation.
2. One possible type of reactor disaster is known as meltdown. In such an accident, the fission reaction goes out of control, leading to a nuclear explosion and the emission of great amounts of radiation.
3. In 1979, the cooling system failed at the Three Mile Island nuclear reactor near Harrisburg, Pennsylvania. Radiation leaked, forcing tens of thousands of people to flee. The problem was solved minutes before a total meltdown would have occurred. Fortunately, there no deaths.
4. In 1986, a much worse disaster struck Russia's Chernobyl nuclear power plant. In this incident, a large amount of radiation escaped from the reactor. Hundreds of thousands of people were expose to the radiation. Several dozen died within few days. In the years to come, thousands more may die of cancers induced by the radiation.

1.Nuclear reactors also have waste disposal problems. Reactors produce nuclear waste products which emits dangerous radiation. Because they could kill people who touch them, they cannot be thrown away like ordinary garbage. Currently, many nuclear wastes are stored in special cooling pools at the nuclear reactors.

2. The United States has being planning to move the nuclear wastes to a remote underground dump.

3. In 1957, at a dump site in Russia's Ural mountains, several hundred miles from Moscow, buried nuclear wastes mysteriously exploded, killing dozens of people
4. Nuclear reactors only last for forty to fifty years

THE FUTURE OF NUCLEAR ENERGY

Some people think that nuclear energy is here to stay and we must learn to leave with it. Others say that we get rid of all nuclear weapons and power both sides has their cases as they are advantages and disadvantages to nuclear. Still others have opinions that fall somewhere in between. Nuclear energy is the solutions that ends the paradigm of consuming non-renewable fossil fuels and decreases the threats of climate change. Although it has its consequences that are more than just a climate change but this time is about our health and if there will be a safe world if this method is followed. Let's look a way back where Chernobyl nuclear power plant has struck into the meltdown that left thousands of people sick and hundreds dead because of the radiation that destroys the living cells and can result in cancer, burns. It may be and if it is it must be designed inherently safe and operated responsible, to avoid meltdowns and unconditional hypercritics.

60. NUCLEAR ENERGY, A SOLUTION TO ENERGY CRISIS

Miss. Deepa . M . Pujari B.Sc. II Semester , K.L.E.Society's S.S.M.S. College Athani

Abstract

Energy production and its consumption is rising and will rise in future with the increase of population as well as per capita income of countries in world. This is increasing global carbon emission as well as energy crisis in the world.. The energy consumption pattern in recent world has further created problems like climate change, biodiversity losses and alternative energy cannot become complete solution to the current global energy crisis. This literature reviews importance of nuclear energy in the context of global economy to mitigate environmental problems such as CO emission, climate change, biodiversity losses and combined use with alternative renewable source of energy.

Introduction:

There is today talk the world over of a nuclear renaissance and we cannot afford to miss the bus or lag behind these global developments. The Indian Department of Atomic Energy [DAE] has long made ambitious projections and failed to deliver. Increased investment in Nuclear reactors, reactor must import from France and US as well as fast breeder, reactor is unwise, that's why cost of electricity.

Currently, many nations are looking into nuclear energy, but this involves unstable elements, typically Uranium-235, being bombarded with neutrons, causing the Uranium-235 atom to split into two smaller atoms of different elements. An immense amount of energy is released, but at the same time it also releases dangerous radiation to the environment on top of the risk of a nuclear meltdown, which in the past has hurt and killed thousands. Earth: the sun. Deep within the sun, matter is undergoing a process called fusion, which is very similar to the fission process used to power nuclear power plants, except that while fission involves breaking down very large atoms into smaller atoms, fusion uses smaller atoms, typically hydrogen, and combines them. Since fusion only uses small stable elements, there are no risks of leaked nuclear radiation. Amazingly, fusion also produces several times more energy than fission.

Nuclear Energy and Climate Change:

Reduction of carbon emission in the global environment is essential in order to reduce global temperature. World energy supply in this century is largely dependent upon fossil fuels such as natural gas, oil and coal. However, use of fossils fuel to meet the global demand is not sustainable as well as environmentally friendly. It is also raising global conflicts global players of fossils fuel industries.

Limitations of the alternative energy also makes nuclear energy as relevant future energy source. Availability of natural resources and its intensity as well as its dependency on natural phenomenon limits the production of enough energy needed for global world. The production technology of alternative energy directly competes with the human population for water and space.

Conclusion

Nuclear energy can become one of the future reliable sources of energy in future as it will be cheaper and can overcome the limitations that current energy sources fossil fuels and renewable sources have. The increase in global energy consumption scenario, high demand, increase in global population as well as necessity of environment and biodiversity conservation augmented the importance of nuclear energy. Nuclear energy cam play significant role in reducing concentration of CO gas emission drastically as it emits insignificant amount throughout its life cycle.Technological development and mitigation of risk and health hazards associated with it will help to make it more important source of energy in future not only for human electricity generation but also for world, ecology and the environment as well as human civilization.

61. **Impact of insecticides and pesticides on environment**

Miss. Samina Mulla & Miss Varsha Patil ,B.Sc.IV Semister
K.L.E society's G.I Bagewadi College Nippani.

Abstract

A pesticide is any substance used to kill, repel or control certain form of plant/animal life that are consider as to be pests. Pesticides include herbicides for destroying weeds and other unwanted vegations, insecticides for controlling a wide variety of insects etc. Crop tection products also known as pesticides. They are the chemicals or the biological substance used to control unwanted pastes that can harm out food, health or environment. pesticides play a wide role in agricultural i.e. it helps the farmers, grow healthy crops, protecting our food supply against yield looses and damage caused by weeds, diseases and insects without pesticides products crop yield and quality fall. Many food stuffs wood be in a short supply and food prices would be rice.

Over 97%of the farms use modern pesticides in the form of liquids, granules, powders. pesticides not even used in agricultural but they are used in improving quality of gardens, golf courses & sports pitches &to maintain the safety of our roads & railway , homes hospitals , workplace etc. BUT TO MUCH use of these pesticides having harmful impact on human disease like fatigue, insomnia, dizzeness and other neurological symptoms.

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62 **Bio-Medical waste and its management**

Miss. Pratiksha M Suryavanshi , B.Sc II Sem
KLE Society`s G. I. Bagewadi College, Nipani – 591237 Karnataka.

Abstract

- It is defined as any waste which is generated during the diagnosis, treatment of human beings or animals or research activities pertaining in the production or in health camps. The biomedical waste is generated by forensic labs, hospitals, clinics, first aid rooms etc.
- Biomedical waste characterization is 75-80% Non-infectious, 10-15% infectious, 5-10% hazardous.
- The risk of HIV, HBV and nosociomial infections and others have increased.
- Precautions to cure should be taken like vaccines should be considered as major importance, using of gloves, recapping needles, segregation & safe disposal of biomedical waste.

63. NUCLEAR ENERGY A SOLUTION TO ENERGY CRISIS

: **Miss Akshata S. Badadavar , B.Sc. IVSem**., K.L.E'S. G.I.Bagewadi Collage Nippani.

Abstract

The solution to the energy crises it has to be cleanly produce and safe not the present dirty energy that we use or that we generate of which it minimizes resources as they are more used in production of energy than in the economy and if it continues to be used in no time the resource will be scarce. Now the solution has to be to produce clean energy that will not threaten the species or its inhabitants, and the energy has to be produced without any contribution of natural resources. Therefore, nuclear energy can be the solution to our crisis and it can end the paradigm that one must produce energy and dirt simultaneously. The nuclear energy mainly makes uses of elements then they won't be any uses of fossil fuels but they will be using fusion or fission reactions to produce energy. Energy created in a nuclear reaction is called Nuclear energy, or Atomic energy. Nuclear energy is produced naturally in man-made operations under human. Nuclear reaction takes place in the reactors; nuclear reaction is done in two types: Nuclear fusion & nuclear fission.

Nuclear energy is the solutions that ends the paradigm of consuming non-renewable fossil fuels and decreases the threats of climate change. Although it has its consequences that are more than just a climate change but this time is about our health and if there will be a safe world if this method is followed.

64. Drinking Water Crisis

Miss .Asharani. K. Kaggudi , B.Sc VI sem
S.S. Arts & T.P. Science Institute, Sankeshwar.

Abstract:

Water is one of the abundantly available substance in nature. It is essential constituent of all animal and vegetable matter and forms 75% of the matter of earths crust. Water is distributed in nature in different forms such as rain water, river water, spring water and mineral water. Water, water every where. But not a drop to drink. Even though 75% of earth surface is covered with water, at there is a water crisis. Drinking water crisis is a situation when the supply of water is less than the demand due to non availability of water or mismanagement of water resources. And today this water crisis has become so serious problem that many people specially farmers are committing suicides and there are many clashes going in between many of the states due to drinking water crisis. And burning example of this kind is the clash between Karnataka and Goa due to Mahadayi which is well known.

There are many reasons for the drinking water crisis and in that special credit goes to we humans. Many humans activities like water pollution, deforestation and agriculture also contribute to the shortage of clean drinking water and leads to the crisis of it. There are various steps which should be taken in order to address the problem of water shortage. A forestation and reforestation are the effective approaches. Harvesting of water is form of water conservation. Before the water crisis knocks yet our door lets all wake up and join hands together to minimize the problem.

Key words: sources, crisis, clashes, human activities, afforestation, harvesting.

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65. Nuclear Energy is the solution to energy crisis

Miss Bhakti Patil , B .Sc IV Semester & Prof Smt. Radhika Mane
K.L.E Society's G.I.Bagewadi College , Nipani

Abstract

Present world depends on the sources of energy such as fossil fuels,petroleum etc. But in the future these energy sources may get depleted & the world may have energy crisis. The only solution to energy crisis is use of nuclear energy.Nuclear energy is the energy in the nucleus of an atom which holds proton & neutron together.There are two fundamental nuclear processes for energy production i)Nuclear Fussion ii)Nuclear fission

Solar energy & hydraulic power provides electrical energy but not at all the time, whereas nuclear energy provides 24 hours electricity. It is estimated that the energy released by the complete fission of 1 kg of $_{92}U^{235}$ is equal to heat produced by burning of 4500 tones of high grade coal or 2200 tons of oil.

Nuclear energy is used to convert electrical energy through nuclear fission.It has great importance in industrial sectors such as in manufacture of plastics, for the study of corrosion of machineries & plants. Nuclear weapons based on nuclear technology has great importance in our country..

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66. BIO-MEDICAL WASTE AND MANAGEMENT

Miss Sneha. Rajagouda. Kage & Miss Amruta. Rajagouda. Patil ,BSc VI semester
K.L.E.Society, G. I. B .Degree College Nipani-591 237

Abstract:

Medical care is very essential for our life and health, but the waste generated from medical activities are directly affecting the environment & the human world. It is of extreme importance that this waste must be properly managed and disposed off, safely so as to prevent outbreak of infectious to general public. Bio-medical waste, are those potentially harmful waste materials. "Any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in the production or testing of biologicals" is known as Biomedical waste.

Biomedical waste should be safely and efficiently identified, segregated, stored, transported and disposed after appropriate treatment. Its effective implementation in our community is of prime importance to protect public health and environment. With a growing population, biomedical waste is also growing in quantity in our country. Our current presentation deals with basic issues as definition, classification, sources, problems relating to biomedical waste, management of Biomedical waste, benefits of biomedical waste management.

67. Biological Waste And It's Management

[1]**Shweta M Koruche ,B.Sc.VI Semester ,** KLE'S. G. I. Bagewadi College Nipani

Abstract:

The objective of this study is (i) to summarize the rules for management and handling of biomedical wastes, (ii) to give the definition, categories of biomedical wastes, suggested storage containers including colour-coding and treatment options,

(iii) mainly to highlight the effects of biomedical waste in the environment such as air, land, radioactive pollution and (iv) disposal of wastes, regulation and recommendations. Health-care waste management in several countries including India is receiving greater attention due to stringent regulations. The waste generation rate ranges between 0.5 and 2.0 kg bed-1day-1. The solid waste from the hospitals consists of bandages, linen and other infectious waste (30-35%), plastics (7-10%), disposable syringes (0.3-0.5%), glass (3-5%) and other general wastes including food (40-45%). Several survey works carried out by various research organizations by (Government and Non government and private sectors) have been discussed and reviewed in this paper.

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68. SOIL EROSION AND ITS PREVETIVE MEASURS

Miss. Shreemanti Ashok Patil , & Miss Pooja Annasab Soude BSc VI Semester
K.L.E Society's G.I.Bagewadi College NIPANI-591237

Abstract**:-**

Soil erosion is a major threat to soil functioning. The vegetation to control erosion has long been a topic for research. Soil erosion is, at its core, a natural process. Simply the soil erosion is, when topsoil, which is upper most layer of the ground, is moved from one spot to another. Because top soil is the part of the land that is highest in organic matter and best suited for farming and other fertile activity. Soil erosion have the greatest impact on Farmers and agricultural land. The agents of soil erosion are water and wind, each contributing a significant amount of soil loss each year. The process of soil erosion is made up of three parts, that are, Detachment, Movement & Deposition. Our current presentation contains Causes of soil erosion related to naturally occurring events or influenced by presence of human activity, the effects of soil Erosion on Environment & Some important solutions for prevention of soil erosion.

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69. GREEN APPROACHES IN APPLIED SCIENCE

Fouziya. F., B.Sc VI Semester,
S.S. Arts & T.P. Science Institute, Sankeshwar**.**

Abstract

Green approaches clearly refer to conceptualise the application of green chemistry. Although green chemistry is no doubt a special contribution of chemists to the current condition which approach to all aspects of chemical industry and science. Green chemistry involves 12 set of values which minimize/ eliminate the use or production of unsafe substances. The very strategic application of green chemistry is to reduce or eliminate waste in the manufacture of chemicals and its allied products. As in green strategies include the replacement of organic solvent by water the substitution of environmentally benign substances to replace toxic heavy metals. Harmful synthetic products either should be replaced by green products or should be synthesized by environment friendly technique. Green methods to save vegetation, green products like derivative of β - methoxy acrylic acid (extremely low toxic) are the consort in the way of green approach. The already set about methodology are exploring solvent free reaction, the combination the solvent free and microwave assisted organic synthesis, the industrial application of ionic liquids super critical fluid extraction. Intensive research and development in the recent past tells about the need and importance of the greener life, where green indicates the healthy vegetative spring full life. The need of the day green chemistry if applied to the discipline of science that applies existing scientific knowledge to develop more practical application like technology and inventions.

Key words: green chemistry, eco friendly, 12 principle, waste, chemicals, human health,

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70. Synthesis, Characterization and Biological Screening of Thiobarbiturates Derivative

AA Ramteke *, SP Chavan, R Dhumal, SS Powar, DR Khebude, DU Lakade, SK Kaginkar, SB Patil, SR Patil, BB Patil

*Department of Chemistry, Devchand College, Arjunnagar Tal. Kagal, Dist. Kolhapur (M.S.) India

Abstract.

The dihydromidinone has been synthesized through biginelli reaction and it can be characterized by using the spectroscopic tools such as IR, NMR etc. along with this study the application like biological screening.

Keywords: Synthesis, Barbiturate derivative, IR and NMR spectra, Antimicrobial

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71. New Approaches for the Synthesis of Polymers

Miss. Aayushi Kadam , B.Sc II Semmester,K.L.E's G.I. Bagewadi college, Nipani-591237

Abstract

Polymers are defined as high molecular mass macromolecules, which consist of repeating structural units derived from the corresponding monomers. Polymers are classified on various basis. Biodegradable polymers come under synthetic polymers.

Biodegradable plastics and polymers were first introduced in 1980s .Biodegradable materials are used in packaging, agriculture, medicine and other areas. In recent years there has been an increase in interest in biodegradable polymers. Two classes of biodegradable polymers can be distinguished: synthetic or natural polymers. In general natural polymers offer fewer advantages than synthetic polymers. There are polymers produced from feed stocks derived either from petroleum resources (non renewable resources) or from biological resources (renewable resources). Biodegradability depends not only on the origin of the polymer but also on its chemical structure and the environmental degrading conditions. In addition in recent times oil prices have increased markedly. These facts have helped to stimulate interest in biodegradable polymers and in particular biodegradable biopolymers.. Mechanisms and estimation techniques of polymer biodegradation have been reviewed. Biodegradable polymers have received much more attention in the last decades due their potential applications in the fields related to environmental protection and the maintenance of physical health. To provide added value to biodegradable polymers, some advanced technologies have been applied. They include active packaging technology and natural fiber reinforcements. The following paper represents an overview of the different biodegradable polymers that are currently being used and their properties, as well as new developments in their synthesis and applications. **Keywords:**Biodegradable polymers; polyesters; polyamides; polyurethanes; biopolymers; biodegradable polymer blends

72. IMPACT OF INSECTICIDES AND PESTICIDES ON ENVIRONMENT

Miss. Shaila S.Metri, BSc-IInd Semester, S.S.M.S.College Athani

Abstract

Pesticides are used to kill the pests and insecticides which attack on crops and herm them different kinds of pesticides have been used for crop protection for centuries. Pesticides benefit the crops: however they also impose a serious negative impact on the environment. Excessive use of pesticides may lead to the destruction of biodiversity May bird's aquatic organisms and animals are under the threat of harmful pesticides. Insecticides have saved millions of human and animal lives since the date from of their synthesis and use. Insects are the most successful group of animals existing in every segment of environment.

It has been observed that the over use of pesticides on aquatic ecosystems has led to a serious threat to species of fish including salmon. The use of pesticides decreases the general biodiversity in the soil effect on growth of the plants. Despite their importance insecticides also have negative impact like toxic residues in food water air and soil we are continuously facing the challenges to decrease the incidence of insect pests and vectors to maintain a safe environment for future generation.

The excessive uses of pesticides have erected tremendous adverse effect on environment.

Pesticides drained to water bodies causes water pollution hence water in lakes and seas gets polluted which becomes hazardous to aquatic animals like fishes.

Pesticides may also wash down to ground water which pollute drinking water. During the spraying of pesticides it may reach in to atmosphere and pollute the air.

Identify the circumstances under which chemical pesticides may be required in pest management. Determine what types of chemical products are the most appropriate tools for ecologically based pest management explore the most promising opportunities to increase benefits and reduce health and environmental risks of pesticide use recommend an appropriate role for the public sector in research product development product testing and registration implementation of pesticide use strategies and public education about pesticides.

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73. NEW APPROCHES OF POLYMER SCIENCE

Miss .Shruti Patil & Miss Vani Bhairshetti Bsc VI Semester
K L E Society's G I Bagewadi College Nipani -59123

ABSTRACT:

A polymer is a large molecule, or macromolecule, composed of many repeated units. Polymers play a major role in all aspects of biological processes like health, medicine, biotechnology, diagnostics, controlled drug release, implants and medical devices, seasickness patches and biopolymers in biological motion and molecular recognition .polymers also useful in dielectrics for electronics. Polymer property used in such a sensor is permeability and also for development of optical-fibre chemical sensors and also used in holography, electrophotography and also in light emitting diodes, in compact disk technology. The importance of polymers in advanced technology is a key factor in the future of materials development as, conducting polymers have been commercialized in rechargeable batteries and polymer resists are the basis for the microlithography that makes integrated circuit electronics possible. The field of polymer science includes researchers in multiple disciplines including chemistry, physics and engineering.

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74. **INTERGRATED PEST MANAGEMENT**

Saraswati Shebannavar and Khushboo Naik ,B.Sc.- IV Semester
K.L.E. Society's , G.I. Bagewadi College, Nipani-591237

Abstract

Agricultural production continues to be constrained by a number of biotic and abiotic factors. For instance, insect pests, diseases and weeds cause considerable damage to potential agricultural production. Evidences indicate that pests cause 25 per cent loss in rice, 5-10 per cent in wheat, 30 per cent in pulses, 35 per cent in oilseeds, 20 per cent in sugarcane and 50 per cent in cotton. This underlies the need for generation and diffusion of new technologies that produce sufficient food and protect the environment and human health. According to the noted agricultural scientist, M.S. Swaminathan (1999), agriculture production systems in the 21st century need to be based on the appropriate use of biotechnology, information technology and eco technology. Integrated Pest Management (IPM) is such a technology.

A .Available Technology in India

B. Economic feasibility

C. Enforcement of pesticides regulation to improve adoption of IPM

D. Economic incentives to encourage farmer to switch to IPM

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75. Bio Medical Waste and its Management

Miss. Sangeeta More & Miss.Anita Hamidwade , B.Sc. IV Semester.
K.L.E Society's G.I. Bagewadi College, Nippani.

Abstract:-

Bio medical waste is a waste generated during the diagnosis, testing, treatment, research or production of biological products for humans or animals. Sources of biomedical waste- there are major and minor sources, such as government hospitals, primary health centers, biotechnology institutions, physicians/dentists clinic sanimal houses, vaccination centers etc.The proper management of biomedical waste has become worldwide humanitarian topic today. Although hazardous of poor management of biomedical waste have aroused the concern world over, especially in the light of its far reaching effects of human, health and the environment.

Bio medical waste collection and proper disposal has become significant concern for both the medical and general community. Effective management of biomedical waste is not only a leagal necessitate but also a social responsibility. The major bio medical waste is hospitals waste which refers to all waste, biologic or non biologic that is discarded and not intended for further use. Thus hospitals waste generation has prime concern due its multidimensional ramification as a risk factor to the health of patience, hospitals staff and extending beyond the boundaries of medical establishment, to the general population. So there are many problems regarding this. Now it is too late, so we are observing harmful effects on human health, so get up and take a step towards its management.

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76. NUCLEAR ENERGY, A SOLUTION TO ENERGY CRISES

Miss. Rutuja R. Patil B.Sc.II Semester. K.L.E.Society's G. I. Bagewadi. College Nipani

Abstract

As our population increases, so will our demand for electricity. Air conditioners, computers, televisions, microwaves, and many other appliances have become necessities. All methods of producing electricity have drawbacks. As the earth becomes warmer we must look for ways to

decrease our use of fossil fuels. There are several ways to produce electricity without releasing air pollution. The most feasible method at this time is nuclear energy. Nuclear energy presents a safe, clean, and inexpensive alternative to other methods of producing electricity. Nuclear waste can either be reprocessed or disposed of safely, provided certain precautions are taken.

Nuclear energy is the solutions that ends the paradigm of consuming non-renewable fossil fuels and decreases the threats of climate change. Although it has its consequences that are more than just a climate change but this time is about our health and if there will be a safe world if this method is followed. Let's look a way back where Chernobyl nuclear power plant has struck into the meltdown that left thousands of people sick and hundreds dead because of the radiation that destroys the living cells and can result in cancer, burns. It may be and if it is it must be designed inherently safe and operated responsible, to avoid meltdowns and unconditional hypercritics The earth has limited supplies of coal and oil. Nuclear power plants could still produce electricity after coal and oil become scarce. A nuclear power plant needs less fuel than ones which burns fossil fuels. One tons of uranium produces more energy than is produced by million tons of coals or million barrels of oil .Coal and oil burning plants pollutes the air. Well-operated power plants do not contaminants into the environment what are we going to do when we are faced with the inevitable energy crisis early next century? Will we keep burning fossil fuels and polluting the environment, or will we choose an alternative energy source? All forms of energy production, including nuclear power, have their pros and cons. how to provide electricity as our needs increase. Nuclear energy is safe, clean, and cheap, and it provides the answers to our energy problems. We must not allow misinformation and scare tactics to influence those making the important energy decisions. We, should support nuclear power as a practical way to solve our energy problems while preserving the earth.

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77. Energy a Solution to the Energy Crisis

Miss. Parvati Chougule, B.Sc II Semester , K.L.E's G.I. Bagewadi college, Nippani

Abstract

Nuclear energy could be the future of energy and potentially solve the energy crisis problem. Nuclear energy is a sustainable energy source and it can provide millions of times the amount of energy output from a fixed mass of fuel than any other energy source, such as fossil fuel. Nuclear energy is also very clean for the atmosphere. It produces no greenhouse gases at all.

However, nuclear energy can be very harmful to both people and the rest of the natural environment if not managed well.

Most energy is presently obtained by "dirty methods". Hence as energy production increases so do harmful combustion of by products. This production which uses this pattern that produces energy and greenhouse gases simultaneously will affect the earth, which will lead to depletion of the ozone layer, global warming and climate change. And whole earth will experience drop or increase of temperatures, low or high rainfall which leads to floods and drought.

So there should be an alternative to produce clean energy that will not threaten the species nor its inhabitants, and the energy has to be produced without any contribution of natural resources. Therefore nuclear energy can be the solution to our crisis.

Nuclear power remains one of the cheapest and cleanest modes of power generation, and makes use of fuels that are available in almost unlimited supply. Nuclear reactors used in nuclear energy can be used for various purposes, but most well-known of these is probably the production of electricity in a nuclear power plant. This paper also consists of advantages and disadvantages of nuclear energy.

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78. Green synthesis of lead oxide nanoparticle using leaf extract of Momordica charantia and its antibacterial application

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Abstract

In the present paper, we have carried out a green synthesis of lead nanoparticles (PbNPs) using extract of Momordica charantia. We have characterized nanoparticles by using infrared spectroscopy, scanning electron microscopy, x-ray diffraction and UV-visible spectroscopy. It is found that PbNPs show antibacterial activity against pathogenic bacteria of Gram positive (S. aureus,) and Gram negative strains (E. coli, P. aeruginosa) using well diffusion technique and gives reasonably interesting results.

Keywords: Plant extract, lead nanoparticles, antibacterial screening

79. MANAGEMENT AND HANDLING OF BIO-MEDICINAL WASTE

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Abstract:

The biomedical waste management and handling has been assuming increasing significance for the past few years. Biomedical waste is defined as any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals, or in research activities pertaining there to, or in the production or testing of biological. All this is

leading to rapid proliferation and spreading of infectious, dangerous and fatal communicable diseases like hepatitis, cholera, dengue and several types of cancers. The quantity of biomedical waste generated per bed per day wil1 varies depending upon the type of health problems, the type of care provided and the hospital waste management practices. It varies from 1-2 kg in developing countries to 4.5 kg in developed countries 10-15% of the waste is infectious in developed countries whereas it varies from 45 to 50% in India. The entire waste from a healthcare establishment, which includes non-infectious as well as infectious waste, if unsegregated and untreated is mixed with the rest of the waste in a healthcare establishment, will convert the entire non-infectious general waste also into infectious waste. The problem with medical waste lies in the fact that it is not handled and treated according to its type, which leads to hazardous working conditions for hospital personnel and exorbitant investment in technology that creates more problems.

It is essential that every waste generated from the hospital should be identified and quantified. Hospitals should endeavour to reduce waste by controlling inventory, wastage of consumable items and breakages etc. Waste can also be minimized by recycling certain waste such as glassware, plastic material etc after proper cleaning and disinfection. Segregation of waste at source and safe storage is the key to whole hospital waste management process. Microbiological and biotechnology waste being highly infectious should be treated on site by autoclaving/microwaving/chemical treatment.

Keywords: Biomedical waste, types, Effects, Collection, management, handling and Treatment

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80. Microwave assisted green and efficient synthesis of 2-aryl-1, 3-benzothiazoles catalysed by *Lemon juice*

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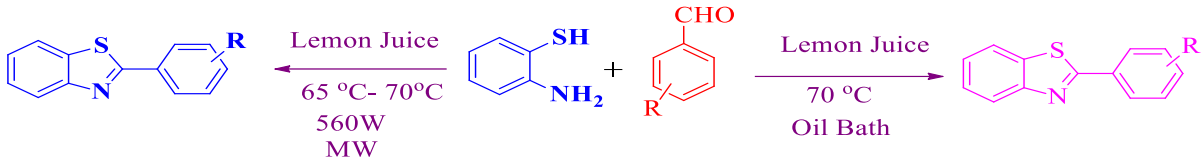
Abstract

A simple, eco-friendly and economic method to synthesize various 2-aryl-1, 3-benzothiazoles has been demonstrated using lemon juice in the absence of any organic solvent. Using microwave heating, reaction times were shortened from 1hr to 2 min. The advantages of this method include the use of *lemon juice* as a green catalyst, short reaction time, easy work up, and excellent yields.

GRAPHICAL ABSTRACT:



Keywords: Benzothiazoles, Lemon Juice, Microwave Irradiation etc

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81. Is nuclear energy a solution to the energy crisis?

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Abstract

Now a day the pattern of consumption of fuel, and providing energy and power has failed. Applying it cannot solve the increase of world energy crisis. But if it is continued then by 2030 the combination of all these factors will produce energy and power and also green house gasses, harmful products which results into the depletion of ozone layer which cause global warming and effects on worldwide economy and biospheres chaos. Therefore nuclear can be the solution to our energy crisis and it can end the paradigm that one must produce energy and dirt simultaneously. Which produced without any use of fossil fuels from nature which going to scarce?

Nuclear power is one of the cheapest and cleanest modes of power generation and which makes use of fuel or elements available in almost unlimited supply. Nuclear reactor used in nuclear energy can be used for various purposes but most well known of these is probably the production of electricity in nuclear power plant.

This paper also talks about advantages, disadvantages, future and also recent developmnts in nuclear energy.

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82. NUCLEAR ENERGY – A SOLUTION TO ENERGY CRISIS

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Abstract:

The solution to the energy crisis, it has to be cleanly produced and safe. Nowadays energy is produced vigorously by many unnatural ways, and dirty techniques, just to fulfill the thirst for energy for the country's development. But it has made many unchangeable problems in climate, food and even the area we live in. The present technique that we are employing to meet the energy crisis has made most of the natural resources scarce .Now the solution has to be produced ,in order to produce clean energy that will not threaten the species, nor its

inhabitants. This energy produced should not involve any natural resources. Therefore Nuclear energy can be the only solution to overcome the energy crisis and it can end the paradigm that must one must produce energy and not the dirt simultaneously. It not only overcomes the energy crisis but also saves natural resources such as like Fossil fuels, and does not have any such harmful effects on the environment as compared to any other source of energy. This method employed to produce energy is much successful method to overcome energy crisis.

Key words: electricity, nuclear power, solar energy, photovoltaics, renewable, nuclear economics.

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83. New Approaches in Polymer Science

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Abstract :-

- Polymer is a useful chemical made of many repeating units. Some polymers are natural & made by organisms. Proteins have polypeptide molecules which are natural polymers made from various amino acid monomer units.
- Polymer source is leading supplier of high quality polymer & bio-polymers for academic & pharmaceuticals /industrial research.
- Polymer synthesis is also called Polymerization, is the process by which monomers are covantly bonded to form a Polymer chain or network.

Metathesis with oleo chemicals: are new approaches for the utilization of plant oils as Renewable Resources in Polymer Science

84. **Importance of Spectroscopy in Chemistry**

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ABSTRACT

Spectroscopy is a branch of chemistry which deals with the interaction between the matter & radiation.The principle of Spectroscopy is the study of interaction between matter & the electromagnetic radiations. Spectroscopy is the term used to refer the measurements of radiation intensity as a function of wavelength & are often used to describe experimental spectroscopic methods.

Spectroscopy plays an important role in chemistry: Mass spectroscopy is used to determine the molecular weight of the compounds. It has great utility in the elucidation the structure of the

molecule.UV –Visible spectroscopy is able to recognize compounds containing carbonyl group or conjugated double bonds.IR spectroscopy is used to determine different bonds & functional group absorb at different wavelengths.NMR spectroscopy used to detect the presence of protons in the molecule & can also distinguish between protons in a different environment within the molecule.

Spectroscopic methods are easier & faster to do than most chemical tests or reactions. They give more information regarding structural features of a molecule with a very small amount of sample.These method are non-destructive & if necessary the entire sample can be recovered.

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85. IMPORTANCE OF SPECTROSCOPY IN CHEMISTRY (UV, IR, NMR)

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Abstract :

The various spectroscopies are the primary method for determining the structure of compounds. If the molecule is not too large or complex, the determination should be very accurate. The electromagnetic radiation interacts with the electromagnetic fields of the electrons to raise their energy levels from one state to the next. The nature of that interaction depends on the energy

available. Ultraviolet and visible radiations have sufficient energy to effect electronic transitions. Infrared radiations have sufficient energy only to effect transitions between vibrational energy states. Microwave has only enough energy to effect transitions between rotationally energy states. Thus the radiation absorbed tells us different information. Radio waves have insufficient energy to effect molecules but affect nuclear spin energy states found in magnetic fields. This latter interaction is most important because it is used in Nuclear Magnetic Resonance spectroscopy. Total molecular energy comprising of electronic energy, vibrational energy and rotational energy; can be used for the determination of molecular structure. Also, qualitative as well as quatitative analysis can be done for the finished goods for their purity and integrity of the compounds. UV, IR and NMR are different analytical tools works on different principles by making use of the above said different energies of the molecule.

Key Words:
UV, IR, NMR, Spectroscopy

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Delegates Opinion