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K.L.E. Society's
G. I. Bagewadi Arts, Science, Commerce & P G College,
Nipani – 591237
Dist:Belagavi, Karanataka State

[Affiliated to Rani Channamma University, Belagavi]
[Re-accredited at 'A' level by NAAC with CGPA 3.254]

Proceedings of the UGC SPONSORED TWO DAY NATIONAL CONFERENCE ON "GLOBAL WASTE MANAGEMENT"

19th & 20th December, 2014

Organized by

Department of Chemistry

KARNATAK LINGAYAT EDUCATIONS SOCIETY, BELAGAVI.

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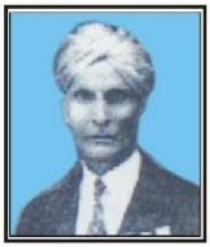

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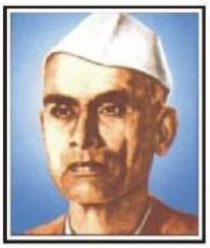

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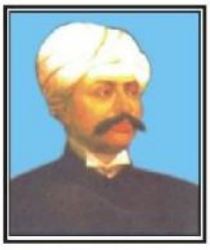

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G. I. Bagewadi Arts, Science, Commerce
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राष्ट्रीय मूल्यांकन एवं प्रत्यायन परिषद

विश्वविद्यालय अनुदान आयोग का स्वायत्त संस्थान

NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

An Autonomous Institution of the University Grants Commission

Quality Profile

Name of the Institution : K. L. E. Society's
G. I. Bagewadi Arts, Science and Commerce College

Place : Nipani, Dist. Belgaum, Karnataka

Criteria	*Weightage (W_i)*	*Criterion-Wise Grade Point Averages (Cr_i GPA)*	W_i X Cr_iGPA
I. Curricular Aspects	050	3.00	150
II. Teaching-Learning and Evaluation	450	3.33	1499
III. Research, Consultancy and Extension	100	3.15	315
IV. Infrastructure and Learning Resources	100	3.30	330
V. Student Support and Progression	100	3.40	340
VI. Governance and Leadership	150	3.00	450
VII. Innovative Practices	050	3.40	170
Total	$\sum_{i=1}^{7} w_i = 1000$		$\sum_{i=1}^{7}(W_i \text{ X } Cr_i GPA) = 3254$

$$\text{Institutional Score} = \frac{\sum_{i=1}^{7}(W_i \text{ X } Cr_i GPA)}{\sum_{i=1}^{7} W_i} = \frac{3254}{1000} = 3.25$$

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EC/53/RAR/23

राष्ट्रीय मूल्यांकन एवं प्रत्यायन परिषद

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NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

An Autonomous Institution of the University Grants Commission

Certificate of Accreditation

The Executive Committee of the
National Assessment and Accreditation Council
on the recommendation of the duly appointed
Peer Team is pleased to declare the
K. L. E. Society's
G. I. Bagewadi Arts, Science and Commerce College
Nipani, Dist. Belgaum, affiliated to Karnatak University, Karnataka as
Accredited
with CGPA of 3.25 on four point scale
at A grade
valid up to September 03, 2015

Date : September 04, 2010

Director

EC/53/RAR/23

PRABHAKAR B. KORE
MEMBER OF PARLIAMENT
(RAJYA SABHA)

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MESSAGE

I am happy to learn KLE G.I. Bagewadi Arts, Science & Commerce College, Nipani is organizing Two Days National Conference on "Global Waste Management" on 19th & 20th December, 2014 and invited eminent resource persons for the scheduled Technical Sessions. I am sure the topic for deliberations will enrich the knowledge and inspire the academicians, scientists, faculty and students participating in the Conference.

Congratulations to the organizers and I wish the Conference a grand success.

18.12.2014.

Dr. Prabhakar B Kore

C1 / 19, Humayun Road, New Delhi - 110 003
B.C. 92 "CASA AJMER", Church Road, Camp, Belgaum - 590 009, Karnataka,INDIA
E-mail : chairman@klesociety.org, drpbkore@klesociety.org, Website : www.klesociety.org

KLE ACADEMY OF HIGHER EDUCATION & RESEARCH
(KLE University)
[A Deemed-to-be-University established u/s 3 of the UGC Act, 1956 vide Government of India Notification No. F.9-19/2000-U.3(A)]
Accredited 'A' Grade by NAAC

Prof. (Dr.) Chandrakant Kokate, *Ph.D. (Pharm.Sciences)*
Vice-Chancellor

Ref. No. KLEU/14-15/SOVC 16th December 2014

Dear Dr. Jaganure,

I am happy to learn that Dept. Of Chemistry, KLE Society's Arts, Science, Commerce and PG College, Nipani is organizing National Conference sponsored by UGC, New Delhi on 19th & 20th December 2014 on the theme **"Global Waste Management"**

The Conference of this dimension shall provide ample of opportunities for all the stakeholders in the areas of environmental sciences, solid waste management etc. to exchange their views and deliberate upon several issues of professional significance.

On behalf of the KLE University and on my own behalf, I extend my warm greetings to all the participants in the aforesaid Conference.

I congratulate you and other members of the Organizing Committee for the herculean task undertaken in organizing this event.

With regards,

Yours sincerely,

(C.K.KOKATE)

To

Dr. A.S. Jaganure
Convener & HOD
Department of Chemistry,
KLE Society's Arts, Science, Commerce and PG College,
Nipani-591237

JNMC Campus, Nehru Nagar, Belgaum-590 010, Karnataka state, India
Phone : 0831 - 2444444 **Fax** : 0831 - 2493777 **Web** : http://www.kleuniversity.edu.in **E-mail** : chandrakokate@gmail.com

PROCEEDINGS OF THE UGC SPONSORED

Two Day National Conference

ON

"GLOBAL WASTE MANAGEMENT''

19th & 20th December, 2014

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- PROF. [MISS] S. K. KADAGAONKAR
- PROF. [SMT] D. D. BHOITE
- PROF. [MISS] S. D. MUDDEBIHAL

PROCEEDINGS OF THE UGC SPONSORED
Two Day National Conference
on
"GLOBAL WASTE MANAGEMENT''
19th & 20th December, 2014

CONTENTS

ABOUT THE KLE SOCIETY:

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 244 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 Sciences, Tourism, Hotel Management, Engineering and Technology, Nursing, Pharmacy, Dental and Medical Sciences, Educational training, among others. 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 hollowed path of growth of the society is that 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 dynamic 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 first accreditation process by NAAC during 2004-05 and re-accredited during 2010-11. Among the 15 aided HEI's 7 have been re-accredited at 'A' level. This only speaks of the high standards set by our Society in basic degree education field. Now these institutions are due for 3rd cycle of accreditation in 2015-16.

FROM PRINCIPAL DESK

K.L.E's G.I.Bagewadi Arts, Science and Commerce & PG College is located at Nipani a semi rural place situated in multi lingual Karnataka-Maharashtra border area.

The institution is re-accredited by NACC at 'A' level with enviable CGPA of 3.25. Its CGPA ranking is the highest in within the jurisdiction of Rani Channamma University.

It has UG programs in Arts, Science, Commerce and PG in Commerce & Mathematics. The institution conducts all its academic programs in an exquisitely excellent fashion.

The college history is replete with rare feats in curricular and extracurricular arena. There are 11 Doctorates and 08 M.Phils on its rolls. Some have NET and SLET qualifications also. It has the best of faculty who are serving their stakeholders in an inimitable fashion. Gold Medalists, among the faculty, are also sizeable in number.

With its focus on digi-campus and ICT application in teaching methodology, ours is a virtual SMART campus, in the real sense of the term. We can humbly, say that ours is a virtually technology enabled campus.

As a part of Co-curricular activities New Indoor Stadium and eight lanes Olympics Standard Swimming Pool are under construction.

Teachers being the heart and soul of a seats of learning we feel we have no dearth of such teachers in our college. The faculty member keep themselves updated to make the students face the world with a sense of competence and confidence.

Prin. Dr. M. B. Kothale
President,
National Conference

ABOUT NATIONAL CONFERENCE:

In view of changing scenario of globalisation, the entire world is emerging as an one umbrella where rest of life activities are carried out, such as socio-economic growth, trade transformations, research and development, change of life style etc., with all these development, we have forgoten one thing i.e. clean and cleanleness around us. Our Priminister Narendra Modi's dram of ***Swach Bharat Abhiyan and Nirmal Bharat Nirman*** was the inspiration to our conference.

As the world race toward its urban future, the amount of municipal solid waste (MSW), one of the most important by-products of an urban lifestyle, is growing even faster than the rate of urbanization. Ten years ago there were 2.9 billion urban residents who generated about 0.64 kg of MSW per person per day (0.68 billion tones per year).

It is estimated that about 3 billion residents generating 1.2 k.g. waste per person per day i.e. total of 1.3 billions tones of waste per year, in one or other form on this globe. By 2025 the waste generation will likely to increase to 4.3 billions i.e. 1.42 k.g./ capital/day of Municipal Solid Waste. It is alaraming to all human beings if we do not take care of generating waste, then a day will come where every corner of globe is full of waste. So every one should wake up to see our surrounding and minimize the waste.

Waste Management is the generation, prevention, characterization, monitoring and treatment of various forms of waste generated by mankind. It is a direct threat to the healthy survival of man himself and to his surroundings. These are resulting in degradation of Environment and bio-diversity. The purpose of this conference is to provide the forum for exchange of ideas and new concepts regarding the difficulties in waste management, financial implications on exchequer.

The major sources of waste are – waste generated in metro cities, polymeric waste material, medical waste, e-waste, nuclear waste etc affecting our environmental and ecological system. Keeping all these view in mind our national conference is aiming to isolate a solution of sustainable system to curb and control the waste generation. We hope the experts from various field will come out with a reasonable solution to our conference.

Dr. S. B. Solabannavar
Organizing Secretary

Dr. A. S. Jaganure
Convenor

K.L.E. Society's
G.I. BAGEWADI ARTS, SCIENCE AND COMMERCE COLLEGE, NIPANI
TWO DAY NATIONAL CONFERENCE
ON
"GLOBAL WASTE MANAGEMENT"

ORGANISED BY
DEPARTMENT OF CHEMISTRY
VENUE: GOLDEN JUBILEE CONFERENCE HALL

Day-1 Friday , 19th December - 2014	**9.00-10.00 am**	Registration & Breakfast
	10.00-11.15 am	Inaugural function
	11.15 – 11.30 am	**Tea break**
	11.30 am -12.30 pm	Key note address by, **Dr. C.K.Kokate** Vice- Chancellor K.L.E University , Belagavi
	12.30-1.45 pm	**Technical Session-I** **Mr. Mahesh. T** Environment Officer, KSPCB, Bangaluru **Topic: Overview of Waste Management**
	1.45-2.30 pm	**Lunch**
	2.30 -3.45 pm	**Technical Session-II** **Dr G.S.Gokavi** Department of Chemistry Shivaji University,Kolhapur **Topic: Waste Management & its importance**
	3.45 – 4.00 pm	**Tea Break**
	4.00 – 5.30 pm	**Technical Session-III** Paper presentation & Poster Presentation (Students) **Topic: Global Waste Management**
	6.00-7.30 pm	**Cultural Program**
	7.30-8.30 pm	**Dinner**

Day-2 Saturday , 20th December - 2014	**9.00-10.00 am**	Breakfast
	10.00-11.15 am	**Technical Session-IV** **Dr. K.B.Gudasi** Department of Chemistry, Karnataka University, Dharwad **Topic : Waste Management**
	11.15-11.30 am	**Tea Break**
	11.30 – 1.00 pm	**Technical Session-V** Paper presentation (Teachers) **Topic: Global Waste Management**
	1.00 – 2.00 pm	**Lunch**
	2.00-3.15 pm	**Technical Session-VI** **Dr J.Manjanna** Department of Chemistry, Rani Channamma University, Belagavi **Topic : Global Waste Management**
	3.15-3.30 pm	**Tea Break**
	3.30pm	**Valedictory Function**

K.L.E. Society's

G. I. Bagewadi Arts, Science and Commerce College, Nipani – 591237

[Re-accredited at 'A' level by NAAC with CGPA 3.254]

Dist:Belagavi, Karanataka State

"GLOBAL WASTE MANAGEMENT"

(19th & 20th December, 2014)

Organized by DEPARTMENT OF CHEMISTRY

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3. PROF. [MISS] GEETA KAMATE	Member
4. MISS SHRUTI SHIRAGAVE	Member

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TWO DAY NATIONAL CONFERENCE

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"GLOBAL WASTE MANAGEMENT''

19th & 20th December, 2014

About the Conference…….

Waste Management is the "generation, prevention, characterization, monitoring and treatment of various forms of waste generated by mankind. It is a direct threat to the healthy survival of man himself and to his surroundings. These are resulting in degradation of Environment and bio-diversity. The purpose of this conference is to provide the forum for exchange of ideas and new concepts regarding the difficulties in waste management, financial implications on exchequer.

INAUGURAL FUNCTION

The Inaugural function began with invocation song by final year students. Dr. M. B. Kothale has welcomed the dignitaries and delegates. He also introduced about KLE Society and college. Dr. A. S. Jaganure introduced the President of the function Dr. C. K. Kokate and Dr. R. G. Kharabe introduced the Chief guest Dr. Anuj Nandi and the Guest of Honor Shri Ashokanna Bagewadi Dr. C. N. Naikar, Prof A. D. Tigadi, Prof G. B. Kumbar presented bouquet and memento to the Dignitaries as a token of love and respect. All the Dignitaries lighten the lamp as a formal ceremony in the occasion. The eminent personality bearing the title of **"*KLE Ratna*"** Shri Deepak Dhadoti had felicitated by the dignitaries for his contribution to success of Mars Orbiter Mission MOM.

He addressed the gathering and told about the success of Mars Orbiter Mission. Later the chief guest Dr. Anuj Nandi spoke for the delightenment of delegates. He told that India is Leading Country in the world in the field of Astrophysics & Space science. He also told that for this the contribution of other subjects like Chemistry, Zoology& Mathematics are needed. For development of scientific field Astrophysics plays an important role. To understand our Galaxy & Universe a technology is required. He explained that after the success of Mars Orbiter Mission, the success launch of GSLV-Mark-III is also made. On this luscious occasion it is coincidence that this National Conference on Recent Advances in Astrophysics & Space Science was organized. Dr. C. K. Kokate addressed that "*Today's Science is Tomorrow's Technology*" in his presidential remarks. He presided

over the function. In his speech he told that without Science we cannot think of our future life. Today whatever modern facilities are available; they are results of Scientific research development. He also told that the management of Waste is today's important issue to be discussed. For that development of new technology is needed. If we succeed in such technology we can maintain ecosystem properly. Finally Dr. S. B. Solabannavar proposed the vote of thanks to the dignitaries.

Key note Address : By Dr C. K. Kokate

The key note address of the conference on global waste management was delivered by Dr. C. K. Kokate ,Vice Chancellor , KLE University, Belagavi. During his key note address, he stressed on

1) Solid waste management
2) Bio-medical waste management
3) Green Chemistry

1) Solid waste management: He stressed on solid waste management is specially on plastics & e-waste. He emphasized that the solid waste management is the biggest burning problem because about 1.3 billion tons of solid waste is produced per year for every individual & it is about 1.2 kg/day. He opined that amongst the solid waste management, the non-biodegradable polythene & plastics are threats for the healthy life of public. He highlighted this with the example of dumping of solid waste from metro cities like Bangaluru, near Mandur village were many people are unable to bear the bad smell & affected with various diseases. He called on delegates & the student representatives to think seriously on this issue by minimizing the use of non-biodegradable plastics.

2) Bio-medical waste management:

Bio-medical waste management is another prime area in keeping good health of citizens of India to fulfil the dream of honorable Prime minister of India ie **"*Swach Bharat & Swasth Bharath*"**. He highlighted on bio-medical waste management like disposable syringes , needles, dressing material, surgical waste etc. He enlightened the delegates by explaining the steps taken by Dr Prabhakar Kore Medical Hospital & research centre, Belagavi on melting of needles & reprocessing of other medical waste.

3) Green Chemistry:

Dr C. K. Kokate explained the need of preserving our ecosystem by giving more importance to the upcoming branch of chemistry i.e. Green chemistry. He highlighted the importance of Green chemistry which converts harmful byproducts into useful chemicals.

He sighted the example of conversion of waste like CO_2, CO, NO, NO_2 etc into the useful chemicals like hydrocarbons & the acids. He narrated 12 principle of Green Chemistry.

The honorable Vice Chancellor concluded the keynote address by highlighting the importance of waste management & stressed the role of the student delegates & faculty members in guiding the students. The session ended with enthusiastic & active participation of delegates in interacting with honorable Vice Chancellor Dr C. K. Kokate.

Technical Session - I

Topic : Overview of Waste Management
Resource Person : Mahesh .T
Environment Officer, KSPCB, Bangaluru

Mr. Mahesh .T focused on how to manage solid waste & explained different laws applied in solid waste management. He also threw light on segregation of solid waste processing them & reusing .He explained about waste management status and management in Karnataka. Solid waste is classified into different categories such as Municipal Solid Waste (Wet Waste And Dry waste) ie organic waste, Inorganic waste, Recyclable waste, Inert Waste, Bio-Medical Waste, Hazardous Waste Landfill able, Recyclable, Incinerable , Non hazardous Industrial waste, Plastic waste ie Biodegradable & Non Bio-degradable. Battery waste ie Lead Acid , other than Lead Acid & E-waste.

There are different environmental laws for managing solid waste like

- Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008;
- Bio-Medical Waste (Management & Handling) Rules,1998;
- Municipal Solid Waste (Management & Handling) Rules, 2000;
- Batteries (Management & Handling) Rules, 2001;
- e-Waste (Management & Handling) Rules, 2011;
- Plastic Waste (Management and Handling) Rules, 2011.
- Fly Ash Notification 1999; and 2008.

Municipal Solid waste (Management and Handling) Rules, 2000 imposes responsibility on the Urban Local Bodies to scientifically manage the Waste. About 213 Urban Local Bodies out of 218 in the State have lands for MSW .Dry and Wet Waste is required to segregate at source. At present majority of waste is dumped. More number of composting,

Vermi-composting, Biomethanation plants are required to be established. The prevalent practice is to dump fly ash on wastelands, and this has lead to waste thousands of hectares all over the country.

- To prevent the fly ash from getting airborne, the dumping sites have to be constantly kept wet by sprinkling water over the
- Nearly 150-200 million tones of fly ash will be produced in India every year primarily by thermal power plants and, to a lesser extent, by cement and steel plants and railways.
- This poses problems in the form of land use, health hazards, and environmental dangers.

Technical Session - II

Topic : Waste Management & its importance

Resource Person : Dr G. S. Gokavi
Department of Chemistry
Shivaji University, Kolhapur

Dr. G. S. Gokavi delivered a lecture on waste management & how chemistry plays an important role in managing the waste. He also explained about solvent free reactions, energetically feasible reactions & minimizing the production of hazardous byproducts.

There are three important terms in managing the waste ie Minimization, Recycling & Disposal. Before disposing do not mix Incompatible materials; sodium metal with water, Use sealed containers, Reuse old chemical containers. Liquid waste should be filled to 75% of capacity to allow for expansion, Label the waste with different colors and if possible with the signs on it.

Technical Session -III

Oral & Poster presentation by students

Topic : Global Waste Management

In this session students presented the paper by oral & poster presentation. For this session, Dr. B. Padamashalli ,HOD, Chemistry Department, Rani Chanamma University, Belagavi & Dr. J. Manjanna, Associate Professor, Department of Chemistry, Rani Chanamma

University, Belagavi were the Chair persons as well as judges.15 students presented the paper about their respective themes and 06 students did the poster presentation.

Technical Session - IV

Topic : Waste Management

Resource Person : Dr K. B. Gudasi

Dr. K. B. Gudasi delivered a lecture on different methods of segregation of bio-degradable & non – biodegradable solid waste. He explained managing the waste from household level to industrial level, radioactive waste & e-waste. He emphasized on reuse of the solid waste to produce new & useful products. He quoted an inspiring slogan – Waste is not a waste, if not wasted.

Technical Session – V

Oral presentation by teachers

Topic : Global Waste Management

The fifth Technical session started i.e. Oral presentation by teachers. In this session Dr V. B. Helavi Principal , Rajaram College, Kolhapur was the chair person. **Ten** teacher delegates presented the papers on their respective topics.

Technical Session - VI

Topic : Global Waste Management

Resource Person : Dr. J. Manjanna
Department of Chemistry
Rani Channamma University, Belagavi

Dr. J. Manjanna delivered a lecture on recycling of lithium batteries, sodium oxide fuel cells, nuclear waste management & explained about sources of nuclear energy & nuclear fuel & reprocessing.

VALEDICTORY FUNCTION

This function started with invocation song by the final year students. Dr. A. S. Jaganure has welcomed the dignitaries and introduced about KLE Society and college. Then Dr. C. N. Naikar introduced the guests of the function. Prof A. D. Tigadi sir presented bouquet

and memento to the chief guest Shri S. B. Pawar. Prof G. B. Kumbar presented bouquet and memento to another chief guest Dr. I. M. Khazi. Dr. S. B. Solabannavar presented bouquet and memento to the guest of Honor Shri. S. G. Bagewadi & students gave bouquets to other dignitaries on the dais. The Chief guests Shri S. B. Pawar. He told that basic Science is foundation to new scientific research & Technology. We should develop the habit of reading Scientific books. Do the discussion about optional subject by making friends groups. By doing like this, the interest of learning increases. Curiosity & creative mind is the main step of success. Another guest Dr. I. M. Khazi addressed the gathering. Believe, hopes & self confidence are the main formulas for success. Waste of management is the big task in today's life. In this matter the government, Laws & Constitution will not do anything. First we have to be stand for this. We have to adopt Technology in our life. Some of the teacher delegates & Students gave the opinion about Two day National Conference. Dr. M. B. Kothale has given the presidential remark about the overall conference. Lastly the vice principal of GIB College Dr. R. G. Kharabe sir proposed vote of thanks to the honorable chief guests, principal, all the teacher delegates, participants and dear students.

Waste Management status in Karnataka by Mr. T. Mahesh, Environmental Officer, Karnataka State Pollution Control Board Bangaluru

ABSTRACT

The wastes in any form if not treated/processed scientifically causes environmental pollution. Thereby the degradation of water, air and land takes place at a rate directly proportional to the quantity and quality of waste. In some kind of special waste (toxic) even small quantity of waste has potential to cause significant degradation of the environment. Therefore, the waste are to be monitored in the environment to know their concentration and to assess their impact.

The Wastes are broadly classified into Liquid, solid, semi solid and Gaseous. Generally, the wastes are generated from manufacturing/production processes, operations and services. The liquid wastes are broadly classified into domestic effluent (domestic operation) and trade effluent (generated from industrial operations). Similarly the gaseous emissions are generated from the industrial, automobile and mining operations.

The solid wastes are classified based on the characteristics namely hazardous, municipal solid waste, electronic waste, Battery waste, plastic waste, construction and demolition waste, Bio-medical waste etc.

Legal Framework:

In India there are legislations to address the waste problems. The Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981 address the water and air pollution problems. Similarly, to address Solid Waste the following rules have been framed under the Environment (Protection) Act, 1986:

- Hazardous Waste (M, H & TM) Rules, 2008;
- Bio-medical Waste (M & H) Rules,1998;
- Municipal Solid Wastes (M & H) Rules, 2000;
- Batteries (M & H) Rules, 2001;
- e-Waste (M & H) Rules, 2011;
- Plastic Waste (Management and Handling) Rules, 2011

In Karnataka, the above rules are implemented by the Karnataka State Pollution Control Board and salient features of the implementation are summarized as below:

e-Waste (Management and Handling) Rules, 2011: All the electronic wastes are covered under the rule. Under the rule, 42 e-waste recycling facilities have been registered and being operated with an installed capacity of around 9118 MT/annum of e-waste.

Hazardous Waste: A Treatment, Storage and Disposal Facility (TSDF) is established and being operated at Dabaspet under BOOT scheme for treatment and disposal of landfillable hazardous waste in the state. Board is encouraging the co-processing of incinerable hazardous waste in cement kilns. There are six incineration facilities operated to treat the incinerable hazardous waste.

Bio-medical waste: All the health care and animal houses are covered under the Rule. Board has encouraged private entrepreneurs to set up 19 common bio-medical waste treatment facilities in the State and additional 8 facilities are being established.

Municipal Solid Waste: Out of 218 ULB's in the State, 213 have landfill sites for disposal of Municipal Solid Waste. The Board has financially and technically supported to establish simple method of segregation and disposal of MSW in Koppal and encouraging other ULB's to follow the same model.

In respect of sewage treatment and disposal from ULB's in the State, only 50 ULB's have established Sewage Treatment Plants (STP's). In this regard, the Board has issued directions to UDD to take action to establish STP's in all the ULB's.

WASTE MANAGEMENT: A CHEMISTRY VIEWPOINT

Prof. G. S. Gokavi, Department of Chemistry, Shivaji University, Kolhapur

ABSTRACT

Management of waste in all fields of daily life has become important as it creates problems such as pollution and even some catastrophic effects also. The understanding of waste management starts with how it is created, how it can be reduced or prevented and how it can be reused if at all it is generated. Most of the routine industrial chemical processes also generate harmful waste. Therefore, green chemistry principles have been implemented in recent times both in industrial sector as well as in research institutions. Even though, all precautions are taken to make the process more environmentally friendly generation of waste is unavoidable. Each chemical process is associated with catalysts, reactants, products and solvents. Therefore, search for alternative methods with higher atom economy is the present day need. It is also necessary to replace the generally used solvents in chemical processes with alternative solvents which are biocompatible.

Considering the above mentioned points which should be known to a person involved in chemistry, it has been thought to discuss some advances made in recent times. Since, the waste generation is unavoidable, general ways of treating chemical waste is discussed initially. The reason for the waste generation in chemical processes and probable remedies will be included in the middle part of the discussion as well as the significance of use of alternative solvents. The concluding part of the dicussion will introduce briefly the contribution from our laboratory to purify the solvents through pervaporation technique and some catalytic methods developed for fine chemical synthesis.

WASTE MANAGEMENT

Dr K.B.Gudasi, Professor of Chemistry, Karnataka University, Dharwad

ABSTRACT

Every day we humans generate waste. As the world moves ahead, the amount of municipal solid waste surpasses the rate of urbanization. Today it is estimated that 3 billion urban residents generate 1.2 kg of waste per person per day making it to 1.3 billion tonnes per year and that's a lot of waste.

Every day, urban India generates 188,500 tonnes of MSW - 68.8 million tonnes per year - and waste generation increases by 50% every decade.

Government is spending substantial amount just to sustain the treatment and management of the municipal solid waste. In addition to the financial burden, there are many Health/environmental hazards caused by waste.

Part of the Municipal solid waste will be recovered by an army of informal recyclers - 20% in large cities and less in smaller cities. However, more than 80% reaches open dumpsites where it causes damaging public health, deteriorating the environment, and causes climate change.

Landfill space is hard to find in and around India's urban centres. Dumpsites in almost all cities are already handling more waste than they can hold. Finding new landfills near cities is almost impossible due to the sheer lack of space.

What is the Present requirement?

- There is a need of a sustainable solution which can solve the waste management problem at a substantially lower cost and at the same time generating renewable energy and protecting the environment.
- So the concept of "Waste to Wealth" or "TODAY'S GARBAGE, TOMORROW'S POWER " be followed while managing the waste.
- In order to achieve this we should have the basic knowledge of waste, like What is waste, types and sources of wastes.

Definition of a waste:

One can define waste as, "A product or substance that is no longer suited for its intended use" ,or "waste is any material which is not needed by the owner, producer or processor".

Classification of waste:

The waste can be classified as,

1. Solid and liquid waste based on their state of occurrence
2. Bio-degradable and non- degradable, based on their properties
3. Hazardous and non-hazardous based on their effect on human health and environment

If we narrow down to India, the major wastes that are of concern are, Muncipal solid waste (Garbage), Health care waste, e-waste and radioactive waste.

1. **Municipal Solid Waste management(MSW)**

   Municipal waste is the difficult waste to treat as it contains a mixture of many kinds of wastes.

   The steps required to treat the municipal waste are as follows.

A. Collection of different kinds of wastes like food, paper, plastic , glass, metals etc. segregated at the source level (home, offices, restaurants etc) itself.

B. Separation of biodegradable waste from the non- biodegradable ones.

C. Use of these wastes for different applications

Management of biodegradable waste

- Biodegradable waste can be converted into compost.
- It can be used for the generation of biogas which can be used as a fuel, a resource for heat, electricity by means of incineration.
- Biogas can be compressed, the same way natural gas is compressed to CNG, and used to power motor vehicals.
- Some biodegradable wastes such as paper can be recycled
- Bio-degradable waste in particular, vegetable and fruit waste can be used to manufacture beverages like, Beer, Brandy, Wine, Cedar etc.

What is Compost ?

Compost is a sweet-smelling, dark-brown, humus-like material that is rich in organic material and soil nutrients. It has many benefits. It aerates the soil, improves soil's ability to retain water and nutrients, helps prevent erosion and prevents nutrients from being dumped in landfills.

What is composting ?

Composting is simply the process of breaking down the organic matter (food waste) in the presence of air and water, using micro organisms and small insects present in nature. The

end product is called compost which is rich in readily usable plant nutrients forming a part of healthy soil.

Composting can be done at the village /township level, colony level, Institution level and at individual level also.

Composting at home

- Separate your edible kitchen waste (vegetable peels, fruit peels, small amounts of wasted cooked food) in a container
- Collect dry organic matter (dried leaves, sawdust) in a small container
- Take a large earthen pot or a bucket and drill 4 – 5 holes around the container at different levels to let air inside.
- Line the bottom with a layer of soil.
- Now start adding food waste in layers alternating wet waste (food scraps, vegetable and fruit peels) with dry waste (straw, sawdust, dried leaves).
- Cover this container with a plastic sheet or a plank of wood to help retain moisture and heat.
- Every few days, use a rake to give the pile a quick turn to provide aeration. If you think the pile is too dry, sprinkle some water so that it is moist.
- Within 2 - 3 months, your pile should start forming compost that is dry, dark brown and crumbly and smelling of earth. There are also readymade composting kits available for those who want to overcome initial resistance to starting composting.

Management of non-biodegradable waste

- Non-biodegradable wastes such as plastic and glass can be recycled
- Waste plastic bottles which can not be recycled can be used as additive for stone mastic asphalt for paving roads.

  Plastic recycling is the process of recovering scrap or waste plastic and reprocessing the material into useful products.

Glass Waste

- The glass component in municipal waste is usually made up of bottles, broken glassware, light bulbs and other items.
- Glass makes up a large component of household and industrial waste due to its weight and density.

- Every 1,000 kg of waste glass recycled into new items saves 315 kilograms of carbon dioxide from being released into the atmosphere during the creation of new glass.
- What is health-care waste?
- Health-care waste includes all the waste generated by health-care establishments, research facilities, and laboratories. In addition, it includes the waste originating from "minor" or "scattered" sources--such as that produced in the course of health care undertaken in the home (dialysis, insulin injections, etc.)."
- Improper management of health care waste can have both direct and indirect health consequences for health personnel, community members and the environment.
- Health care waste include sharps, : Infectious waste(: waste contaminated with blood or other body fluids, cultures and stocks of infectious agents from laboratory work, waste from infected patients in isolation wards; dressings, bandages and other material contaminated with blood or other body fluids), Pathological waste (Human tissues, organs or fluids; body parts; fetuses; unused blood products),pharmaceutical, chemical and radioactive wastes.

Management:

Sharps: Do not recap needles, Never pass used sharps from one person to another, Locate needle destroyer and container near the point of generation, Sharps should be disposed of in puncture-resistant sharps containers

Infectious and Pathological waste should be disinfected by the experts before the final disposal

E-Waste

- Electronic waste (e-waste) is the fastest growing waste stream today.
- The global growth in electrical and electronic equipment production and consumption is exponential
- Due to the high financial investment needed for environmentally sound waste management, there is currently a high level of trans boundary, often illegal, movement of e-waste into developing countries for recycling and the worldwide market for e-waste is growing by almost 9% per year.
- Between 50% and 80% of e-waste collected for recycling in developed countries each year is being exported into developing countries.

Risks to Workers and the Environment

- The main hazards arise from the presence of heavy metals, persistent organic pollutants, flame retardants and other potentially hazardous substances.
- Main concerns:
- Mercury in relays, switches, and gas discharge lamps;
- Batteries containing mercury, cadmium, lead and lithium.
- Printed circuit boards contain a number of substances of concern such as lead, antimony, beryllium and cadmium.
- Plastics containing brominated flame retardants and polyvinyl chloride in wire insulation – releases of dioxins and furans when burnt.
- Liquid crystal display (LCD) screens contain a mixture of 10-20 substances
- The workers and local residents in areas of e-recycling in developing countries are exposed to the chemicals through inhalation, dust ingestion, dermal exposure and dietary intake leading to chronic ailments such as asthma, skin diseases, eye irritations etc.
- For the most part, workers are not aware of environmental and health risks, do not know better practices or have no access to investment capital to finance safety measures.
- It is a global environmental and health emergency, beyond occupational exposure involving vulnerable groups and future generations
- **Solutions**
- E-waste is a cross-cutting issue with global significance and therefore requires cross-sectoral implementation.
- A two-way flow of information between developed and developing countries.
- Integration of the informal sector with the formal could result in reduced pollution, better resource management and create numerous jobs in the recycling sector.
- There is a need for different interventions, international cooperation and goal-oriented actions on e-waste, including:

  - Enforcement of a global ban (Basel Convention Enforcement) of the trans boundary movement of hazardous waste from developed to developing countries.

  - Education and Information including eco-labelling of products; increase public, scientific and business knowledge.

  - Technology transfer and capacity building.

- The establishment of a global information database.
- Optimizing the life cycle - design for recycling and for long-life products, improve supply chains, energy efficiency and close material loops.

Radioactive waste

The waste produced by health-care and research activities involving radionuclides, disposal of nuclear spent fuel etc,.

Radioactive waste management

- Unlike waste management of other types of wastes, Radioactive waste management requires many careful implications and expertise. It cannot be incinerated, lanfilled or any other similar treatments can be given just like that for other wastes. There is a high risk from the harmful radiations coming out of the radioactive waste. So a special treatment is required .

WHAT SHOULD BE DONE ?

Reduce Waste

- Reduce office paper waste by implementing a formal policy to duplex all draft reports and by making training manuals and personnel information available electronically.
- Improve product design to use less materials.
- Redesign packaging to eliminate excess material while maintaining strength.
- Work with customers to design and implement a packaging return program.
- Switch to reusable transport containers.
- Purchase products in bulk.

Reuse

- Reuse corrugated moving boxes internally.
- Reuse office furniture and supplies, such as interoffice envelopes, file folders, and paper.
- Use durable towels, tablecloths, napkins, dishes, cups, and glasses.
- Use incoming packaging materials for outgoing shipments.
- Encourage employees to reuse office materials rather than purchase new ones.

Donate/Exchange

- old books, old clothes, old computers, excess building materials, old equipment to local organizations

INDIVIDUAL RESPONSIBILITY

- Follow the five R's of resource use: Refuse, Reduce, Reuse, Repurpose, and Recycle.
- Ask yourself whether you really need a particular item.
- Rent, borrow, or barter goods and services when you can.
- Buy things that are reusable, recyclable, or compostable, and be sure to reuse, recycle, and compost them.
- Do not use throwaway paper and plastic plates, cups and eating utensils, and other disposable items when reusable or refillable versions are available.
- Refill and reuse a bottled water container.
- Use e-mail in place of conventional paper mail.
- Read newspapers and magazines online.

  Buy products in concentrated form whenever possible

BEST WORKING MODELS AROUND US

Town municipal corporation Vellore, Christian Medical College Vellore in Tamilnadu, Gram Panchayat in Yallur near Miraj in Maharastra are the best working models , not only for the waste management but to make wealth out of waste as well. Places of worth visit.

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RECYCLING OF WASTE PRODUCTS [E-WASTE]

Dr B. G. Bevinkatti, R. L. Science Institute, Belagavi.

ABSTRACT

Metals play a key role in furthering the progress of mankind. Nations economy and social status is solely determined by the mineral wealth and other natural resources.

A wide range component made of metals, plastics and other substances are contained in electrical and electronic equipments. A personal computer which is one of the most commonly used electronic equipment contains metals like iron, aluminum, copper, tin, cobalt gold, palladium etc almost in their pure state. Conservation of natural resources by recycling of end of life personal computers and resource recovery from Personal Computer is the best example.

Recovery efficiency of resources from PC is estimated that 38% Fe, 7.6% Cu, 1.4% Al, 0.0012% Au, 28.77% Polymer and 18% silica are recoverable.

Based on the characterization study and recycling efficiency it is estimated that recycling of PC produces 38% Fe by processing of 1 ton of PC's. One can save 0.6 ton of ore 0.38ton of coke 0.45 ton of basic flux 1.2J of energy and 570man Hrs.

Another important precious metal gold deposit in India are available only in Hattigold mines Karnataka. Savings on natural resources by recovering gold from personal computers gains great significance. By recycling one ton PC's recovering 12gm of gold, mainly we can save 1.5kg of sodium cyanide 7.5kg of lime, 1269 units of power 9000 Liter's of water 7.53kg of bleaching powder almost 3 tons of dumping of ore tailing can be avoided.

Thus recycling of PC's would be a sustainable business and generates employment to the local people.

MANAGEMENT OF WASTE AND CHALLENGES

Dr. M. G. Yaranal, K L E's Arts & Commerce College , Mahalingpur

ABSTRACT

Waste minimization is a process of elimination that involves reducing the amount of waste produced in society and helps eliminate the generation of harmful and persistent wastes, supporting the efforts to promote a more sustainable society. Waste minimization involves redesigning products and/or changing societal patterns, concerning consumption and production, of waste generation, to prevent the creation of waste.The most environmentally resourceful, economically efficient, and cost effective way to manage waste is to not have to address the problem in the first place. Waste minimization should be seen as a primary focus for most waste management strategies. Proper waste management can require a significant amount of time and resources; therefore, it is important to understand the benefits of waste minimization and how it can be implemented in all sectors of the economy, in an effective, safe and sustainable manner.The basic concept behind waste management is the waste hierarchy, where the most effective approaches to managing waste are at the top. Waste management is in contrast to waste minimization. Waste management focuses on processing waste after it is created, concentrating on re-use, recycling, and waste to energy conversion rather than eliminating the creation of waste in the initial phases of production.

Waste minimization involves efforts to minimize resource and energy use during manufacture. For the same commercial output, usually the low materials are used, the less waste is produced. Waste minimization usually requires knowledge of the production process, cradle to grave analysis and tracking of materials from their extraction to their return to earth and detailed knowledge of the composition of the waste most environmentally resourceful, economically efficient, and cost effective way to manage waste is to not have to address the problem in the first place. Waste minimization should be seen as a primary focus for most waste management strategies. Proper waste management can require a significant amount of time and resources; therefore, it is important to understand the benefits of waste minimization and how it can be implemented in all sectors of the economy, in an effective, safe and sustainable manner.

EXPERIMENT FOR MINIMIZING CHALLENGES OF SOLID WASTE MANAGEMENT

Anjali Patil, Department of Botany,
Rajaram College, Kolhapur (Maharashtra)

ABSTRACT

Environmental degradation is a global problem and it is directly related to natural resource depletion in quality and quantity. This is a result of population explosion industrialization and changing life style of the modern society. Think globally, act locally" theme can be very effectively implemented in not only managing solid waste, but also can become a small scale source of generating income. During the academic year 2013-14, exhibition and sale of products generated from waste materials was organized for school students, their mother parents and science teachers from twelve tehsils of Kolhapur District. Fifty four different types of products were exhibited and sold. The outcome of the project was overwhelming, with recycled products worth rupees fifteen thousand sold by the students in the exhibit.

Key words: Exhibition, Recycling, Solid waste.

MEDICAL WASTE MANGEMENT

S.N.Benal Arts, Commerce & Science College, Badami

Katageri C. S. Arts, Commerce & Science College, Muddebihal

ABSTRACT

The Medical waste production in the world is increasing because of the increase in population as well as the technological and many other activities of mankind. The medical wastes including hospitals, clinics and places where diagnosis and treatment are conducted generate medical wastes that are highly hazardous and put people under risk of fatal diseases and effect the healthy environment of the world. The people are also worried about the risk of pathogens associated with blood borne diseases through the mishandling of medical waste. A safe and effective management of medical waste generated by healthcare institutions is a legal necessity and also a social responsibility. Most of the western countries have developed scientific techniques to manage solid waste in a hygienic way. In almost all the developing countries including India the disposal of solid waste is done in unscientific ways. Even in many advanced countries, the people in charge of management of solid waste give more importance for the elimination of waste rather than recycling of the material and the recovery of the energy. This paper introduce about the medical waste, sources generation and quantity of medical waste. Types of medical waste and their components, medical waste management procedures and control techniques etc.

INTRODUCTION :

Waste in general is any substance (Solid, Liquid or gas) that has no use and is discarded permanently. The waste may be hazardous or non- hazardous. A waste is considered hazardous if it exhibits any of the characteristics such as being inflammable, reactive, explosive, corrosive, radioactive, infectious, irritating, sensitizing or bio-accumulative. Bio-medical waste is a solid waste or liquid waste including its containers and any intermediate which is generated during the diagnosis, treatment or immunization of human beings /animals or in production and testing of biologicals. Medical waste is limited to infectious and hazardous and any other wastes that are generated from health care institutions such as hospitals, clinics and medical laboratories. Human anatomical waste, discarded medicines and psyclotoxic drugs, blood, puss, liquid and chemical wastes

associated with the medical operations, treatment, pathological investigations, waste sharps, syringes, animal wastes, microbiological and biotechnological wastes are collectively called biomedical waste. The management of medical waste has been of major concern due to potentially high risks to human health and the environment. In earlier days medical waste which pose specific and severe health hazards were often mixed with household wastes and disposed in municipal solid waste landfills. For this reason it is more important to handle and manage the biomedical wastes separately from municipal solid wastes and that management systems should be more strictly controlled.

SOURCES, GENERATION AND QUANTITY OF BMW :

The main source of biomedical wastes (BMW) are healthcare centers including hospitals, nursing homes, maternity homes, veterinary hospitals, clinics and general practitioners, dispensaries, blood banks, and research institutes. The other sources of biomedical waste are house – holds, industries, Animal house, education institutes & slaughter houses,

The domestic sector generates BMW to a small portion which is less than 0.5% of the total waste generated. The types of BMW generated in a house hold are syringes, cotton swabs, discarded medicines, bandages, plaster, sanitary wares, napkins and diapers. Animal houses & laboratories of industries, education and research institutes also generate BMW in substantial quantities. The waste generated from the animal house is typical animal tissue, organs, body parts, care cases, body fluids etc. This sector also generates microbiological and biotechnological wastes which are highly hazardous. Blood banks and clinical laboratories generate all types of medical wastes.

It is estimated that 85% of the healthcare waste is non-hazardous & non infectious. 10% is infectious and 5% is hazardous but non infectious. The quantity of hospital waste generated is usually expressed as the amount of waste/bed/day. It varies between 1.2 kg in medium hospitals in developing countries to 4.5 kg /bed/day in superspeciality hospitals in developed countries. The percentage of hazardous waste generation was 15% in Dhaka and it was 5% in Netharland, 9% in sweden, 25% in Denmark, 28% in USA and 14% in Germany. The difference in the quantity of waste generation in different places may be due to geological location, living habits, living standards, availability of different treatment facilities and also due to categorization of wastes according local regulations. In a study by the National Environmental Engineering research institute, the waste generated

from health care unit in India ranges from 0.5 to 2.0 kg/bed/day with variation among government and private establishments. Approximately 506.74 tons/day waste generated. Out of which only 57% waste undergoes proper disposal.

MEDIAL WASTE TYPES & THEIR COMPONENTS :

Waste category No	Type of Waste	Components of The waste type
1	Human Anatomical Waste	human tissues, organs, body parts
2	Animal Waste	animal tissues, organs, body parts carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, colleges, discharge from hospitals, animal houses
3	Microbiology & Biotechnology Waste	Wastes from laboratory cultures, stocks or micro-organisms live or vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures
4	Waste Sharps	needles, syringes, scalpels, blade, glass, etc. that may cause punture and cuts. This includes both used and unused sharps
5	Discarded Medicines and Cytotoxic drugs	Waste comprising of outdated, contaminated and discarded medicines
6	Soiled Waste	items contaminated with blood, and body fluids including cotton, dressings, soiled plaster casts, lines, bedding, other material contaminated with blood
7	Solid Waste	Waste generated from disposal items other than the sharps such a tubings, catheters, intravenous sets etc.
8	Liquid Waste	Waste generated from laboratory and washing, cleaning, housekeeping and disinfecting activities
9	Incineration Ash	Ash from incineration of any bio-medical waste
10	Chemical Waste	Chemicals used in production of biologicals, chemicals used in production of biologicals, chemicals used in disinfection, as insecticides,

MEDICAL WASTE MANEGEMENT TECHNIQUES :

Following are the steps in the management of BMW

1. Survey of waste generated
2. Segregation of medical waste
3. Collection and categorization of waste
4. Storage of waste (Not beyond 48 hours)
5. Transportation of waste
6. Treatment of Waste.

The methods used to minimize the hazards resulting from medical waste or

1) Segregation :

This method is useful since it prevents the contamination of non-hazardous waste by the hazardous waste. Segregation will reduce the toxicity and the volume of the waste. Morever segregation makes easier to transport the waste. Waste is segregated depending on the contents and quantity of waste generated.

2) Collection of waste using colored bags :

BMW can be collected in bags of different colours for appropriate treatment. In medical centers, infectious, pathological waste and sharps are placed in different containers or bags. The containers are labeled as 'biohazard' closed, water tight & uniform colour for each type of BMW. The size of bags depends on the volume of waste generated & the containers used are easy to handle and transport. Following coloured bags are used for the wastes of different types.

Color Coding	Type of Container Bag	Waste category No	Treatment and disposal
Yellow	Plastic bag	1,2,3 & 6	Incineration @/deep burial*
Red	Plastic bag/dis infected container	3, 6 & 7	Autoclaving/micro-waving/ chemical treatment
Blue/ White (Translucent)	Plastic bag	4 & 7	Autoclaving/micro-waving/ chemical treatment & Destruction/ Shredding
Black	Plastic bag	5,9 & 10	Disposal in secured landfill

3) Disinfections :

This method is used in order to reduce a toxicity of some medical wastes. Chemical disinfectants are used for solid waste, disinfection is effective if only waste materials are shredded. In some case, disinfectants themselves are hazardous thus is not recommended for treating pharmaceutical, chemical and some types of infectious waste.

4) Incineration :

This is effective and efficient method. Incineration is the process of destructing waste by burning it at elevated temperatures in furnaces. The process removes hazardous materials, reduces, the mass & volume of waste and converts it into ash which is harmless. Incineration is suitable for wastes that are 60% combustible with moisture content more than 30%. Incineration is suitable for pathological, infectious and sharp wastes. Incinerators vary in their design and each incinerator has a specific function. The advantage of incineration is that the volume of waste that will remain for disposal will be reduced by 50-400 times. But its disadvantages includes high costs. Smoke generation and pollution risks.

5) Disinfections by plasma :

In this process low temperature plasma produced by the plasma generator using air as working fluid organizes a combustion process. The medical waste is constantly mixed. Thus it maximizes the heat and mass exchange which saves any energy loss. The heat produced is used as an additional source in the process. This technology eliminates the formation and release of irregular forms of NO_x and high-toxic substances into the atmosphere. This method has advantage of low consumption of energy compared to other process.

6) Emerging Technology :

A new technology for management of hazardous medical waste. That transforms the regulated medical waste into municipal solid waste is recently introduced. This method involves shredding and grinding the infectious medical waste bags. Via sharp cutting blades that are installed within the vessels. The blades rotate and the volume of shredded waste is reduced by 80% the steps included in the process are loading, shredding, heating, sterilization, cooling, draining, vacuum and unloading. The hole process is enclosed in

compact size the system can easily be used for on- site treatment of the waste and installed in hospitals. This will reduce the transportation costs of the medical wastes. This is a clean and chemical – free technology and does not have any hazardous emission. This method is economical and environmentally friendly and is reliable in terms of ease of use and maintenance. This technology is currently practiced in the middle – eastern countries.

ENVIRONMENTAL LEGISLATION :

- The Environment (protection) Act, 1986
- The biomedical waste (Management & Handling) rules 1998
- The municipal and solid waste (management & handling) rules 2000
- The hazardous waste (management and handling) rules 1989
- The National environmental tribunal Act 1995
- The air (prevention & control of pollution Act 1981

Suggestions which would act as remedial measures in BMW management

01 Quality assessment of biomedical waste management be done from time to time. Regular quality analysis by independent authorities.

02 Awareness raising and training about risks related to health care waste, and safe and sound practices

03 Clear directives in the form of a notice to be displayed in all concerned areas in local languages.

04 By assessing the need of man power and other things for the BMWM of hospitals and fulfilling the all requirements.

05 Specific personal need to be deputed to monitor the bio medical waste management.

06 To build –up of a comprehensive system, addressing responsibilities recourse allocation, handling and disposal. This is a long term process, sustained by gradual improvements.

CONCLUSION :

Medical wastes are highly hazardous and put people under risk of fatal diseases. The lakh of awareness about the health hazards, insufficient financial & human resources and poor control of waste disposal are the most common problems connected with health care wastes. Individual participation and responsibility is required for handling and disposal of medical waste appropriately. Government and Municipality should pay importance to disposal of

medical waste economically by implementing the rules. Educating and motivating ourself first is important and then preach others about it. Thus by proper handling of the waste we make our environment healthy.

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GREEN SYNTHESIS OF 3-BROMO AND 3-METHYLTHIO IMIDAZO[1,2-A]PYRIDINES,

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ABSTRACT

The present talk describes green synthesis of imidazo[1,2-*a*]pyridines, imidazo-fused bicyclic and tricyclic heterocycles. Synthesis, method development and mechanistic considerations have been explained in this talk.

We describes an atom economical and novel method for the synthesis of 3-bromoimidazo[1,2-*a*]pyridines via *in situ* oxidation of HBr salt by conc. nitric acid at room temperature. In this chapter the formation and mechanism of an unexpected product, Ethyl 3-bromo-8-methylimidazo[1,2-*a*]pyridine-2-carboxylate **2.4** during nitration of ethyl 8-methylimidazo[1,2-*a*]pyridine-2-carboxylate.HBr (**2.2**) has been investigated.

We again improved the above method by utilizing milder oxidizing agents and that describes a microwave assisted one-pot, atom economical synthesis of 3-bromoimidazo[1,2-*a*]pyridines. The method involves electrophilic aromatic bromination using bromodimethylsulfonium ion generated *in situ* via oxidation of HBr salt by DMSO.
Further we developed metal free method for methylthiolation of imidazo[1,2-*a*]pyridines using DMSO-$POCl_3$ as a reagent.

IMPACT OF E -WASTE AT GLOBE

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ABSTRACT

The amount of waste generated by humans in daily life has increased steadily in relation to our population and economy. According to Environment Agency, 90% of resources we consume are either thrown away as 'waste' or discarded into the environment as effluent or air emissions. Management of certain waste has become a complex area, legally, technically and commercially. But we conceive that "Saving the world begins at home". We must know how our own activities might impact the environment. So, the present study focuses on preventing the production of household waste through waste minimisation and reuse through recycling. It can be achieved only by better decisions about what we buy and how we dispose it, that helps to protect the environment.

INTEGRATED MANAGEMENT APPROACHES TO HANDLE SOLID WASTE

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ABSTRACT

Investigative study on Integrated Management Approaches in Handling Dry Solid Wastes Since years, there is an increasing acknowledgment of our impact on the environment due to our lifestyle, while the need to adopt a more Sustainable Development approach concerning our consumption habits emerges as of particular significance. Rapid increase in volume and types of wastes due to dynamic growth is becoming a burgeoning problem for National and Global community to ensure effective and sustainable management of waste. Though considerable efforts are being made by Developed nations in tackling waste-related problems, there are still major gaps visible in developing countries particularly in India in ensuring the effective implementation of techno-economically viable measures mainly due to lack of funds. The scope of R & D through "Cleaner Production" routes is found to be limited as compared to the increasing volumes of wastes and their complex chemical nature. There is a need to translate Cleaner Production approaches into a unified goal incorporating "Integrated Solid Waste Management Approaches (ISWM)" to create sustainable systems that are economically affordable, socially acceptable and environmentally effective. The ISWM systems which is based on 3Rs (Reduce, reuse, recycle)involved use of different treatment methods, as no single treatment procedure can manage all the waste.This paper provides a comprehensive overview and analysis of various kinds of wastes and evaluation of best suited treatment and disposal options based on their chemical composition to best meet current social, economic and environmental conditions.

It examines the progress that has been made in this sector and explores alternative pproaches and business models for such management.

INTEGRATED SOLID WASTE MANAGEMENT APPROACHES:

1. Cleaner Production technologies.
2. Sustainable Development through 3R(Reduce, Reuse, Recycle)
3. Adaption of Preventive Techniques.
4. Management Practices based on principles of " Polluters pays principle"

BUSINESS MODEL APPROACHES:

1. General Tax Base Funding.
2. Deposit / Refund system
3. Advanced Disposal/ Advanced Recovery Fees.
4. End of life fees
5. Extended Producer Responsibility

E-WASTES MANAGEMENT :

Present Scenario:

The increased production of E-waste in developing countries is due to "market penetration" and in developed countries due to "replacement market". The E-waste inventory based on the obsolescence rate in India for the year 2013 has been estimated to be over 8,00,000 tonnes. Illegal import of E- products account for an almost equal amount to what is being generated in the country.

Regulations:

Initially E-wastes were brought under the purview of Hazardous Wastes (M&H)Rules-2008. Separate law enacted as e-Wastes(M&H) Rules -2011.

Recommendations:

1. Strengthen sustainable management on the principle of producer pays principles- should be rule-bound to take back their products and to get it recycled/disposed in an environmentally safe manner.
2. National Inventorisation of E-waste needs to be undertaken on a priority basis.
3. Producers shall have secured centralised facility for end use as EXTENDED PRODUCER RESPONSIBILITY.
4. Use of Hazardous substances like Cadmium, Mercury, Lead and PCB should be reduced with raw material substitution within a given time frame.
5. Need of more R & D projects on recovery of precious and non ferrous metals in an
6. environmental friendly manner.

PLASTIC WASTE MANAGEMENT:

Present Scenario:

Plastics waste has attracted widespread attention across the world due to the indiscriminate littering on open land, drains, rivers, coasts, landfill-sites etc. As per 2013 report of CPCB plastic consumption was 27400 tpd, 75% of which is generated as waste. Only 60% of total waste is recycled, remaining goes uncollected with other biodegradable waste.

Composition:

The plastics waste constitutes two major categories of plastics:

1. **Thermoplastics (Recyclable):** which include Polyethylene Terephthalate (PET), Low Density Poly Ethylene (LDPE), Poly Vinyl Chloride (PVC), High Density Poly Ethylene (HDPE), Polypropylene (PP), Polystyrene (PS) etc, constitute 80% of the total plastics.
2. **Thermosets (Non- recyclable):** comprise alkyl, epoxy, ester, melamine formaldehyde, phenol formaldehyde, silicone, urea formaldehyde, polyurethane, etc. which constitute the rest 20% of the total plastics waste generated in India.

Regulations: The Indian Govt. stipulated stringent legislations, however lacking seriousness in implementation compared to Western world. The nodal regulating body, MoEF, New Delhi enacted law on plastic wastes management as " Plastic Wastes(Management & Handling) Rules 2011.

Recommendations:

1. National level Inventorisation of plastic wastes for formulating polices and rules.
2. Manufacturer shall cover under " Polluters pays principle" for ultimate waste anagement option.
3. Establishment of safe and sustainable common plastic waste management units by plastics processors/re-processors.

   From: K. D. Kamate, M.Sc(Chem), M.Tech (Env Engg),
   Lecturer & Corporate Faculty
4. Producers to sponsor R&D activities on plastic waste mitigation ensure environmentally sound management practices adhering to food and health safety standards – use of food based starch.
5. Educational modules for consumers by NGOs, Social groups and Government agencies.

BIO-MEDICAL WASTE MANAGEMENT:

Present Scenario:

According to SPCB statistics 2013, (53.25 %), Health Care Establishments in operation without authorization. 57 % of total waste 508 tpd is treated through Common or captive

Waste Treatment Facilities (159 nos). There are 602 Bio-medical Waste Incinerators (common and captive), 2218 autoclaves, 192 microwaves, 151 hydroclaves and 8,038 shredders in the country. 70.4% of 602 incinerators are only provided with APC devices.

Regulations:

Ministry of Environment & Forests (MoEF) notified Bio-medical Waste (Management & Handling) .Rules (BMWM Rules), in year 1998.

Recommendations:

1. Existing rules to be more stringent. All the HCFs should be brought under the scope of
2. BMWM Rules and CREP guidelines
3. Within organisation "Bio-medical Waste Management Cell". Every 50 and above bedded
4. HCFs to have at least one person who has qualified distance learning programme on BMWM as accredited by CPCB.
5. Special budget allocation by UGC to promote young scholars for R &D work.
6. Periodic Training workshops on Bio-medical Waste Management at District /State / National /International levels. Discourage Hg based thermometers and Sphygmomanometers.

HAZARDOUS WASTE MANAGEMENT:

Present Scenario:

There are about 36,000 hazardous waste generating industries in India which generate 6.2 million tonnes out of which 44% is land fillable hazardous waste and 7% is incinerable hazardous waste and 7% is recyclable hazardous waste and 49% is Indiscriminate and unscientific disposal of wastes. At present there are 64 Common Hazardous Waste Transportation, Storage and Disposal Sites (TSDFs) have been identified in various States.

Regulations:

MoEF enacted law as Haz Waste (M, H& TBM) Rules-1989 with an amendment in 2008.

Recommendations:

1. Need to periodically update the national inventory on hazardous waste generation to facilitate decision making procedures.
2. Cleaner production technology norms for each industry should be defined so that less
3. hazardous waste are generated.

4. Payback schemes should be introduced as a part of extended corporate CREP guidlines
5. responsibility in case of lead-acid batteries.
6. Waste exchange Banks /Centers" should be established to provide information on wastes
7. and promote reuse, recovery and recycling technologies.
8. Remediation strategy needs to focus on the „polluter pays principle" with the polluter being asked to pay penalty as well as costs of cleaning up the pollution.

From: K. D. Kamate, M.Sc(Chem), M.Tech (Env Engg),
Lecturer & Corporate Faculty

PACKAGING WASTE MANAGEMENT:

Present Scenario:

Packaging is a strategic business tool for enhancing product characteristics and its safety. Packed product when unpacked for use, generate waste. These are broadly classified as food and non-food packaging materials:

1. Food packaging material comprise of: Glass, ceramic and earthenware, stainless steel, aluminium cans, foils, Plastics, Laminated Paper
2. Non-food packaging material: Card board, Blister plastics, Thermocol, Paper, Wood
3. The non-food packaging make up almost 80-90% of packaging waste all goes to land fill and Dump sites. They are also a major cause of pollution when burnt or incinerated.

Composition:

Pigments (such as red, pink, black etc) in such packaging materials containing hexavalent Chromium, Mercury, Cadmium and Lead are carcinogenic and could harm the endocrine and neurological systems. Similarly when PVC is used for blood bags or for making dialysis units, they are known to cause toxicity in patients due to leaching of pthalates, which are plasticizers, into the blood. Fused Aluminum and plastic are used for packaging food materials. PolyAl is completely nondegradable and emits toxic fumes on burning. It could cause infertility of soil.

Regulations:
No specified regulations, however plastic packing waste is covered under Plastic waste (M&H) Rules 2011.

Recommendations:

1. Comprehensive legislations on packing wastes from MoEF, New Delhi. BIS to describe stds.
2. Quantification and characterization of non-plastic packaging waste reaching landfill site.
3. Scientific methodologies for landfill.
4. Mass awareness programmes for manufacturers, consumers, regulators, policy makers.
5. Incineration practices to discourage. Cleaner production technologies based on 3Rs to be promoted.

CONSTRUCTION AND DEMOLITION (C&D) WASTE MANAGEMENT:

Present Scenario:

Construction and Demolition Waste comprises of concrete, plaster, bricks, metal, wood, plastics etc. Construction industry in India generates ~33000 tpd. 50% of the C&D waste is not currently recycled in India and dump it in unauthorised manner along road or other public land. C&D waste requires focus in view of its potential to save natural resources (stone, river sand, soil etc.)

Regulations:
No specific rules as per MoEF, however, covered under Municipal Solid Waste Management Rules-2000. Maharashtra Non-Biodegradable Solid Waste Rules, 2006".

Recommendations:

1. Preventive measures are the key to the SD. So National level Inventorisation of C&D Waste data under resource conservation measures in framing and regulating the legislations.
2. Promotion of segregation of C&D waste at source and encourage reuse and reprocessing like making tiles from crushed construction debris.
3. Charges of end utilisation should be levied on C&D waste generators.
4. Environmentally friendly technologies should be adopted for waste utilization of C&D. use of water spray.
5. Amendment in existing MSWM Rules 2000 to include and address the C&D waste with

6. guidelines for its collection, utilization and safe disposal.

RECYCLING OF WASTE PRODUCTS

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ABSTACT

Organized groups have a tremendous opportunity to operate waste reduction programs. School-related groups might include science classes, environmental clubs, and parent-teacher organizations. Other groups might include Girl and Boy Scouts, Boys and Girls Clubs, 4-H, or Future Farmers. These groups can often educate the whole community about benefits of waste reduction and encourage everyone to make waste reduction a part of their everyday life styles. Increasing the flow of reusable and recyclable materials can even generate extra funds for school departments and groups.No matter how you live, work, and play, everyone produces waste.We can control this waste by reducing, reusing, and recycling it. While many people already recycle products at home, waste reduction opportunities exist anywhere we have waste. Recycling is one way to reduce waste; reusing products is another. Products that can be reused and recycled are countless, and include everything from paper to clothing to worn-out electronics. Some examples of the many items we can reuse include clothing, school supplies, and sports and electronic equipment.The items we most commonly recycle are paper, aluminum, glass, steel, cardboard, and yard waste. Most waste reduction efforts save money, energy, and natural resources, and can teach children and young adults how solid waste affects their lives and their environment.

Be Part of the Solution

Nearly 70 million tons of materials were recycled or composted in 2000. Help add to that number by recycling at least one pound of waste per day. The economic and environmental benefits of waste reduction (which includes preventing waste, reusing, and recycling) accrue both locally and globally.These activities can:

Prevent pollution created by manufacturing new products or products made from virgin materials.

Save energy in manufacturing, transportation, and disposal of products.

Decrease greenhouse gas emissions, which contribute to global climate change.

Conserve natural resources such as timber, water, metals, and fossil fuels.

Reduce the need for land filling and incineration, which are expensive to operate and maintain.

- Protect and expand U.S. manufacturing jobs and increase U.S. competitiveness.
- Help sustain the environment for future generations.

The following options for waste reduction programs are some suggested methods that work for others. After evaluating your needs, capabilities, and goals, choose the option that works best for you.

- One-time or periodic reuse or recycling drives
- Continually operating reuse or recycling programs
- Stationary or mobile collection centers
- Sponsored waste reduction programs
- Credit accounts at local recycling or materials collection centers.

Conduct one-time or periodic reuse or recycling drives

Students and groups can establish one-time or periodic drives to collect reusable and recyclable items. Reusable items, such as clothing, books, toys, computers, and other electronic equipment, or recyclable materials, such as paper, aluminum, glass, and plastic, can be brought to a drop-off location on an appointed day or days.A reuse program might involve:

- Swapping with one another on site.
- Donating the collected materials to a specific beneficiary, such as a library, shelter, or charitable organization.
- Selling the collected materials at a community yard sale and using the profit for school or group activities.(These drives are also sometimes part of a national, state, or local government campaigns.)
- Collecting materials for a commercially sponsored "take-back" program. A recycling program might involve:
- Having your local recycling center collect the materials and transport them back to the center for processing.
- Arranging for adult volunteers to take the collected materials to the recycling center.
- Hiring a hauler for transportation.

Seasonal Products

Collect Christmas trees and recycle them into mulch. Use the mulch to help offset and scaping costs in green spaces at your school or group's location. Alternatively, you can donate the mulch to nursing homes or other organizations for their use. If you collect enough trees, you can also consider selling the mulch for fund-raising. Keep in mind that you will need to rent mulching/shredding equipment from your home improvement store, unless you can find someone to loan a free machine to a good cause! And remember, only an adult can operate such equipment.

If you have a community waste reduction or recycling coordinator, be sure to coordinate with them on this process. This option does not require long-term storage space, but it does require extra space in people's homes for collecting materials before they are brought to the collection location.

Establish a continually operating reuse or recycling program

Many different kinds of permanent reuse or recycling programs exist, with different options for funding, supplies, and services. Student-run clubs, local or state government programs, or nonprofit. Institutions are all possible sources of support for your program. For this kind of program, your school or group needs collection bins and storage space for the reusable or recyclable materials, which also should be picked up regularly by a designated hauler. Even though a long-term reuse or recycling program requires careful planning and continuous outreach, it can also offer great rewards. Such a program allows participants to see the results of their collection efforts on a daily or weekly basis. Depending on how the program is set up, students might even run the program, with adult supervision. An in-school or outside group program also greatly encourages people to make waste reduction part of their daily routine.

School Supplies

Many students leave school supplies in their lockers at the end of the year or dispose of them at home. Instead of throwing these items away, regularly collect them for a community sale or donation drive. Some of these materials can be very useful to others.

Composting

Composting is an age-old practice with modern-day applications that appeals to people of all ages. Composting is the controlled biological decomposition of organic material, such as food scraps or lawn trimmings. It is also a waste reduction method. Collecting certain

food scraps and yard trimmings significantly reduces the amount of waste that needs to be disposed of or otherwise managed. Compost can be used as a soil additive to improve soil texture, increase the ability of soil to absorb air and water, suppress weed growth, decrease erosion, reduce the need to apply commercial soil additives, and degrade some toxic materials in the soil. Many municipalities collect compostable materials, such as yard and food scraps, paper, and coffee grounds and filters, instead of disposing of the waste. This technique may require more time, commitment, management, supervision, and space than other waste reduction programs discussed in this handbook, but it is a viable option proven to be successful in schools, groups, and communities. Your school or group should work closely with your community leaders before beginning this kind of waste reduction program. Lawn businesses can also collect yard waste and conduct their own composting program.

Establish a stationary or mobile collection center

Because schools often serve as focal points for local residents, they are ideal for stationary reuse and recycling drop-off points .A storage facility where people can drop off their reusable and recyclable products should be put in an easily accessible holding area, such as a parking lot. You can either arrange for pickup of the collected items by a local recycling center or hauler or enlist volunteers to transport the collected materials to a nearby recycling center or charity. For some very specific materials, such as computers and other electronics, you might need to make special arrangements with a manufacturer or business that collects those particular items (sometimes called "take-back programs"). Schools in smaller communities or rural areas can also serve as mobile recycling centers. Smaller schools or groups can make arrangements to share a trailer that travels to different locations. For example, the trailer can be borrowed from a recycling center for a special fund-raising activity. Since these waste reduction programs directly involve the community and depend heavily on the support of its residents, be sure to widely publicize your efforts to maximize participation. Post a schedule of the trailer's stops in schools, in area stores, and on the Internet. You will need storage space at each pickup point where reusables or recyclables can be collected until the trailer arrives. Arrange for convenient locations, such as grocery store parking lots, to temporarily park the trailer, and establish regular deposit schedules with your local recycling facility.

Team up with a sponsor for waste reduction programs

Corporate or government organizations sometimes sponsor reuse or recycling drives or donate money or supplies to start a waste reduction program. Corporate sponsors may be good sources for funding and advertising, but you might have to follow their guidelines and have the sponsor's name associated with your school or group.

Do you have any old computers, cell phones, stereo equipment, televisions, VCRs, PDAs, video games, or other electronic equipment sitting around in your home? Believe it or not, these items, as well as other pieces of electronic equipment, can be recycled and refurbished for reuse in your schools and community organizations. You can help by partnering with your local government or community groups on their electronics recycling efforts. To learn more about e-cycling and ways you can contribute to the safe reuse and recycling of electronics.

Establish a "credit account" with a local recycling center

If a school or group establishes a "credit account" with a local recycling center, the monetary value of any recyclables dropped off there will be added to that account. Students and others can drop off recyclables and have the proceeds of those items posted to that account. That means your school or group will receive the money from those recyclables. Promoting the school or group that will be the recipient of the recycling effort is important as a motivator for participation and to ensure that credit is properly given to the organization. Classroom activities and publicity reinforce recycling lessons and increase participation. If storage space is a problem for your location, you might want to consider this type of program.

Recycling Ideas

Paper: If you collect paper for recycling, be sure you are collecting it properly. Contact your municipal solid waste management agency or your local recycling center, and follow their specific guidelines on collecting and sorting. Your diligence in sorting will ensure that the paper is not only recyclable but also marketable to companies that can turn it into recycled-content products.

Glass: Regardless of color, most glass food and beverage containers are 100 percent recyclable and can be reused an infinite amount of times. Some glass products, such as windows, mirrors, drinking glasses, dishes, and light bulbs, cannot be recycled. Be sure to find out if your local recycling center has any restrictions regarding separation of colors before you start collecting glass for recycling .Also check with the center about metal tops and rings.

Metals: Different metals require different recycling processes. Two of the most common metals that are recyclable from schools are aluminum cans and steel (actually tin-coated steel) cans. An easy way for students to separate steel from aluminum is to hold a magnet to them. Magnets won't stick to aluminum. If you plan to collect mixed metals, you might be able to borrow magnetic sorting tables from a can recycling company. Check with your local recycling center or solid waste agency.

Plastics: Different types of plastic are chemically different and are, therefore, recycled differently. Schools commonly generate two types of recyclable plastic: polyethylene terephthalate (PET) and high-density polyethylene (HDPE). Check with your local recycling center or solid waste agency to find out which types of plastic are accepted The most successful reuse and recycling programs follow a series of steps, as follows: Select the type of waste reduction program that works best for your group. Organize a team. Decide what materials to collect. Identify viable end uses or markets for your materials. Work out a budget.

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Step 1:

SELECT THE TYPE OF WASTE REDUCTION PROGRAM THAT WORKS BEST FOR YOUR GROUP

You can model your program after one described in this handbook or design one to fit your schools and group's needs. Because the success of your waste reduction program will depend on the level of interest and enthusiasm in your school or group, let others help you make this decision. One possible way to measure the level of interest in your program is to survey students, parents, and group leaders, asking specific questions about their willingness to participate. Some questions to ask might include:

- Do you know about the benefits of reusing and recycling?
- Are you willing to keep reusable and recyclable materials at home?

- Are you able to bring reusable and recyclable material to school or another drop-off location?
- Can you donate your time to volunteer for the program?
- Can you contribute money or donate advertising for the program? After the survey has been completed, you can use the results to gauge which type of collection program might work best for your school or group.

Step 2:

ORGANIZE A TEAM

A good team will help the program run smoothly. Besides being responsible for program planning, publicity, and operations, the team structure makes waste reduction fun. The team can include students, parents, teachers, custodians, or other volunteers. A strong team leader is essential for generating support and enthusiasm for the waste reduction program. A student leader, department director, club sponsor, or teacher, whose program benefits from the waste reduction effort, is a good choice for team leader. In fact, anyone interested in protecting the environment by reusing orrecycling will probably do a great job!

Step 3:

DECIDE WHAT MATERIALS TO COLLECT

Deciding what materials to collect for reuse and recycling is an important initial step. You might know of a particular material or product that is generated in large quantities that can easily be reused or recycled, and you might want to focus your entire program on that one material. You might decide to address a once-a-year issue, such as Christmas trees or old telephone books. Or, you might want to address an issue that is not handled by your municipal recycling program, such as batteries or electronic equipment. When deciding what materials you want to include in your reuse or recycling program, first consider what programs are already underway in your area. Use the worksheet below to help you. Next, consider materials that you know you can sell, donate, or otherwise deposit at a municipal recycling center .Participating in a community waste reduction program is only part of the reusing and recycling process. For reuse to succeed, materials must be donated or sold to people or organizations that will use the material. For recycling to succeed fully, recyclable materials must be sold to a company that can process them into new products, and those products must be purchased and used. Paper, bottles, jars, and cans are some of the most commonly collected items in municipalities, schools, and groups.

Step 4:

IDENTIFY VIABLE END USES AND MARKETS FOR YOUR MATERIALS

Before you embark on a collection effort, you need to identify a "home" or market for the materials you will collect. Remember the adage, "one person's trash is another person's treasure." You might not have any more use for a product, but chances are, someone else does. Knowledge of your own community's resources can be your first step to locating an end use for reusable materials. Libraries, charities, schools, community centers, or even local businesses might be places to donate or sell used materials. The local phone book and the Internet are good resources for material markets as well. Look in the yellow pages under recycling, charities, waste paper, and salvage or scrap dealers. If your area government already collects some materials and has a local municipal, tribal, or county recycling coordinator, that person can help you find markets for your reusable and recyclable materials. You might also contact your state environmental agency for assistance in locating viable markets. Once you have identified a market for your reusable and recyclable materials, find out what services they have; how and when they pay; if, and how often, they collect items; and whether they transport the materials. The highest price per pound might not always be the only thing to consider if you have to transport products yourself. The sample form on this page can help you determine items that might be good candidates for reuse or recycling by yourschool or group.

Step 5:

WORK OUT A BUDGET

Setting up and operating a waste reduction program costs money. These costs often can be recovered from your reuse and recycling revenues. Find out if your school, group, or sponsor's budget can cover the launch and possibly some operating costs. Look for funding sources, such as your parent-teacher organization, local service clubs, local civic or church groups, local businesses or sponsors, or the student body general fund. Possible costs might include:

- Supplies and equipment
- Transportation of materials
- Facility construction, maintenance, and /or rental
- Storage space rental
- Insurance
- Utilities
- Advertising
- Labor wages

Step 6:

CONTACT YOUR LOCAL AUTHORITIES FOR ASSISTANCE

Because local ordinances might apply to waste reduction programs, you should contact your local authorities before starting your program. If you're considering any type of in- school program, check with the fire marshal, school administrators, and building superintendents regarding storage containers and collection do's and don'ts. Paper recycling, for example, might have specific requirements to prevent fire hazards. might also check with local solid waste management officials to see if your area can get credit for your group's waste reduction efforts when applying for state tonnage grants. If so, you'll need to keep records about the types and weights or volumes of your reusable and recyclable materials. Be careful not to compete with other local organizations that regularly conduct waste reduction programs. Existing volunteer groups (such as a Girl or Boy Scout Troop) that conduct waste reduction drives might depend on the program for money and Good will. When possible, try to combine your resources and efforts with theirs.

Step 7:

ESTABLISH A SYSTEM FOR COLLECTING AND STORING MATERIALS

An efficient collection program is simple and well-organized. Depending on the type of program, you should designate logical deposit locations, either within or around your drop-off location. You should also acquire, label, and place appropriate containers for the collected materials. If you store reusable and recyclable materials at school, you'll need ample storage space with truck access. You can use a shed, garage, or even a receptacle specially designed for your type of product. Smaller spaces might need "igloo" type structures, while larger areas might hold special dumpster-like storage bins. Properly separated recyclables usually will bring higher prices. Your local recycling center can specify how materials should be separated. Establishing a good, long-term relationship with your center can prevent possible disruption of service due to unacceptable materials.

Step 8:

EDUCATE YOUR SCHOOL, GROUP,AND COMMUNITY ABOUT THE WASTE REDUCTION PROGRAM

Notify the entire school, members of your club or group, and the surrounding community about your waste reduction program. You should explain how it will run, and when and

where collections will occur. You can also display examples of reusable and recyclable materials and storage containers.

Advertising is essential to your waste reduction program's success. At the start of your program, send flyers home with students or group members to inform parents and others of program specifics. Display posters, make announcements, and consider having a special assembly or presentation to kick off the program. Send press releases to local newspapers and radio and TV stations to encourage the community at large to participate. Run announcements in weekly shopping circulars, local bulletins, and club and church newsletters. Post flyers around town in local stores. States, tribes, and communities might help promote your waste reduction program, so check with officials about special publications or presentations they might have developed about reuse and recycling.

Step 9:

SET OVERALL AND INDIVIDUAL GOALS

Goals usually encourage people to excel. Set a target amount of reusable and recyclable material that you want to reach and keep a running total prominently displayed. Children, especially elementary school-aged children, work hard to reach goals if they know what is expected. You could even set individual goals for participants.

Step 10:

REWARD PARTICIPANTS

Your program should stress the environmental benefits of reuse and recycling .A reward system, however, may provide stronger incentives to make your waste reduction program successful. Take into account school or group size and available resources when establishing rewards, so that everyone has an equal chance of winning something. The rewards you offer will probably depend on your budget. In some successful programs, the winning group received free pizza, a zoo trip, computers, or other new school equipment. In other programs, participants were awarded "Certificates of Appreciation" or earned Scout badges. Rewards might be donated by local businesses or bought with the proceeds of the waste reduction program. Individuals can be rewarded for outstanding efforts with cash prizes or gift certificates

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HEALTH HAZARDS AND WASTE MANAGEMENT

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ABSTRACT

The generation of waste and the collection, processing, transport and disposal of waste and the process of 'waste management' is important for both the health of the public and aesthetic and environmental reasons. Waste is anything discarded by an individual, household or organization. As a result waste is a complex mixture of different substances, only some of which are intrinsically hazardous to health. The potential health effects of both waste itself and the consequences of managing it have been the subject of a vast body of research.

Waste has been a major environmental issue everywhere since the industrial revolution. Wastes are items we (individuals, offices, schools, industries, hospitals) don't need and discard. The wastes are of two types Controlled waste and Non-controlled waste. Controlled waste includes waste generated from households (municipal solid waste), commercial and industrial organizations and from construction and demolition. Non-controlled waste includes waste generated from agriculture, mines and quarries and from dredging operations. Municipal solid waste (MSW) consists of many different things including food and garden waste, paper and cardboard, glass, metals, plastics and textiles. These are also generated by commercial and industrial organizations although large volumes of chemical and mineral waste are produced in addition, depending on the sector. Agricultural waste comprises mainly slurry and farmyard manure with significant quantities of straw, silage effluent, and vegetable and cereal residues. Most of this is spread on land. Certain types of waste are defined as hazardous because of the inherent characteristics (*e.g.* toxic, explosive). The three largest waste streams in this category are oils and oily wastes, construction and demolition waste and asbestos, and wastes from organic chemical processes.

Waste management is now tightly regulated in most of the developed countries and includes the generation, collection, processing, transport and disposal of waste. In addition the remediation of waste sites is an important issue, both to reduce hazards whilst operational and to prepare the site for a change of use (*e.g.* for building).

The major methods of waste management are:

1. Recycling—the recovery of materials from products after they have been used by consumers.
2. Composting—an aerobic, biological process of degradation of biodegradable organic matter.
3. Sewage treatment—a process of treating raw sewage to produce a non-toxic liquid effluent which is discharged to rivers or sea and a semi-solid sludge, which is used as a soil amendment on land, incinerated or disposed of in land fill.
4. Incineration—a process of combustion designed to recover energy and reduce the volume of waste going to disposal.
5. Landfill—the deposition of waste in a specially designated area, which in modern sites consists of a pre-constructed 'cell' lined with an impermeable layer (man-made or natural) and with controls to minimize emissions.

Health Hazards

Waste, when it is not properly disposed and is left to accumulate, poses a serious health hazard affecting all forms of terrestrial and aquatic animals and human beings. A number of industries release toxins in the form of waste, which may be in the form of solid, liquid or gaseous waste. These toxins are very harmful to human health. They can cause cancer, developmental defects and reproduction problems.

People living near the accumulated heaps of waste are at a risk of infectious diseases, as the accumulated wastes produce an unpleasant odour and the decomposing material is highly infectious in nature. Waste workers or rag pickers have a higher risk of getting infections. People living close to waste dumps are at a risk of getting infected water supply, which has got contaminated due to leakage from landfill sites.

The biomedical wastes are also a source of infection. Contaminated needles, syringes and soiled cotton thrown away as waste have traces of infections and cause several diseases. Colored plastics are harmful as their pigment contains highly toxic metals, such as copper, lead, cobalt, chromium and cadmium. That is why the government is banning the use of plastics, which are a health hazard.

Minamata disease is an example of serious impact of industrial waste on the life and health of human beings. The mysterious disease appeared in people living near such areas due to

eating of fish from mercury polluted bay. The disease killed many people and caused physical and mental deformities in many more.

Generally, the harmful effects of pollution are not felt immediately, but occur after a length of time. They not only cause respiratory infections, but also affect the liver and kidney. Mosquitoes, flies, insects which breed in accumulated waste are carriers of diseases like malaria, dengue, etc.

Water pollution due to sewage and domestic waste is of major concern, because diseases such as typhoid, cholera, jaundice, dysentery, diarrhoea, etc. are infectious diseases which spread through contaminated water. Sometimes this leads to the outbreak of epidemics and mass illness. As they spread through contaminated water, they are called waterborne diseases. About 60 per cent of all diseases in India are due to the presence of pathogenic bacteria in water.

Occupational health and injury issues.

Some of the more commonly reported occupational health and injury issues in waste management:

- Respiratory illness from ingesting particulates, bio-aerosols, and volatile organics during waste collection, and from working in smoky and dusty conditions at open dumps;
- Infections from direct contact with contaminated material, dog and rodent bites, or eating of waste-fed animals;
- Puncture wounds leading to tetanus, hepatitis, and HIV infection;
- Injuries at dumps due to surface subsidence, underground fires, and slides;
- Headaches and nausea from anoxic conditions where disposal sites have high methane, carbon dioxide, and carbon monoxide concentrations; and
- Lead poisoning from burning of materials with lead-containing batteries, paints, and solders.

Environmental health and injury issues.

Some of the more commonly reported environmental health and injury issues in waste management:

- Contaminated leachate and surface runoff from land disposal facilities affecting down gradient ground and surface water quality;

- Methane and carbon dioxide air emissions from land disposal facilities adding to global warming, and subsequently vector-borne disease abundance and pathogen survival;
- Volatile organic compounds in air emissions and inconclusive evidence on altered cancer incidence, birth defects, and infant mortality, as well as psychological stress for those living near solid waste incinerators or inadequately controlled land disposal facilities;
- Animals feeding on solid waste providing a food chain path for transmitting animal and human diseases;
- Uncollected wastes retaining water and clogged drains, thus leading to stagnant waters which encourage mosquito vector abundance;
- Uncollected wastes providing food and breeding sites for insect, bird and rodent disease vectors

Conclusion

Waste management is now tightly regulated in most of the developed countries and includes the generation, collection, processing, transport and disposal of waste. In addition the remediation of waste sites is an important issue, both to reduce hazards whilst operational and to prepare the site for a change of use.

There is no doubt that, there is considerable potential for hazardous exposure to occur through waste management. High levels of contamination of air, soil and water in a few well publicized situations have led to widespread unease about the potential health effects of waste management processes, particularly within communities living in the proximity to relevant sites. Any emissions from waste management processes are likely to be a mixture of many substances for which a toxicological profile is unknown.

Many of the studies are hindered by a lack of good exposure information measures perhaps leading to exposure misclassification. The greatest challenge, however, is to eliminate the effects of factors which might relate to both health outcome and environmental exposure, such as age, ethnicity, gender, socio-economic or deprivation status, smoking, access to health care and occupational history. Studies based on individuals rather than communities are thus perhaps the way forward for future evaluations of potential health effects relating to waste management. However, all of the limitations described above would need to be addressed.

The need to keep the emission of pollutants and exposure to other nuisances arising from waste management operations is widely acknowledged and increasingly stringent regulations have resulted in the development of waste management technologies to achieve this. It is also

likely that the proportion of waste managed by different processes will change and that these proportions will vary between communities depending on the characteristics of the waste generated the facilities already available, economic considerations, and public opinion. The general trend at the moment is towards an increasing proportion of waste being recycled. However, this may generate new challenges, not only a likely considerable financial investment, but a need for a larger workforce for waste sorting and recycling, increasing the need for the issues previously highlighted relating to worker health to be addressed. Wider use of alternative technologies is likely, including advanced thermal treatment, such as gasification and pyrolysis, and bio-mechanical waste treatment which refers to a number of mechanical and biological processes to treat waste before disposal. The health impacts of these technologies will need to be assessed and monitored.

Although the possible physical health effects arising from waste management processes have been addressed, there has been little research into socio-economic impacts of waste-management options. Public perceptions of the relative health risks reflect not only differences in understanding but underlying social values. The development of effective participatory programmes is essential to ensure the public right and responsibility to be involved in the assessment and management of hazards in their communities is addressed, leading hopefully to improved assessments and management strategies.

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WASTE MANAGEMENT DISPOSAL AND TREATMENT PRACTICES IN INDIA

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ABSTRACT

In 21th century waste become a big challenge in the world mostly in front of authorities of developing countries due to increase in generation of waste .Due to the lack of segregation collection and transportation practices ,recycling of waste becomes a big challenge in developing countries. Proper awareness among the government, public and waste handling staff about the waste and its impact is very important as well as priority is given to training of the related persons regarding to the waste and its hazardous effect on environment and human health. Proper waste management helps protect human health and the environment and preserve natural resources, many do not realize that solid waste. In this paper researcher put light on the waste management practices in India.

Key words: awareness, segregation

SOLID WASTE MANAGEMENT

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ABSTRACT

Solid waste management (SWM) is one of the major environmental problems of Indian cities. Improper management of solid waste (MSW) causes hazards to inhabitants. Various studies reveal that about 90% of SW is disposed of unscientifically in open dumps and landfills, creating problems to public health and the environment. In the present study, an attempt has been made to provide a comprehensive review of the characteristics, generation, collection and transportation, disposal and treatment technologies of SW practiced in India. The study pertaining to SWM for Indian cities has been carried out to evaluate the current status and identify the major problems. Various adopted treatment technologies for SW are critically reviewed, along with their advantages and limitations. The study is concluded with a few fruitful suggestions, which may be beneficial to encourage the competent authorities/ researchers to work towards further improvement of the present system.

VALUE CHAIN AND RECYCLING / RECOVERY SYSTEMS OF MAJOR E-WASTE IN INDIA

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ABSTRACT

Development of mankind has lead to betterment of the planet, but it has also made mother Earth to face problems and challenges for its survival. The Manufacturers produce the goods as per the requirements of the customers, from producer these goods move from proper distribution channel and reach the end user. The electrical and electronic equipments (EEE) made by the man are useful for mankind in several ways. But this equipment when are out of order and become useless creates disasters. As a solution for this the policy of Reduce, Recycle, and Reuse (3R) plays a major role, not only in environmental protection but also for better economic benefits of human race. Recycling and recovering important elements from EEE are by heating, burning and extraction process. Most of the plastic parts are Shredded and Grained for further processing and are reused. Some are used for land filling.
Key words: E-waste, EEE, 3R, Recycling, Recovery Land filling.

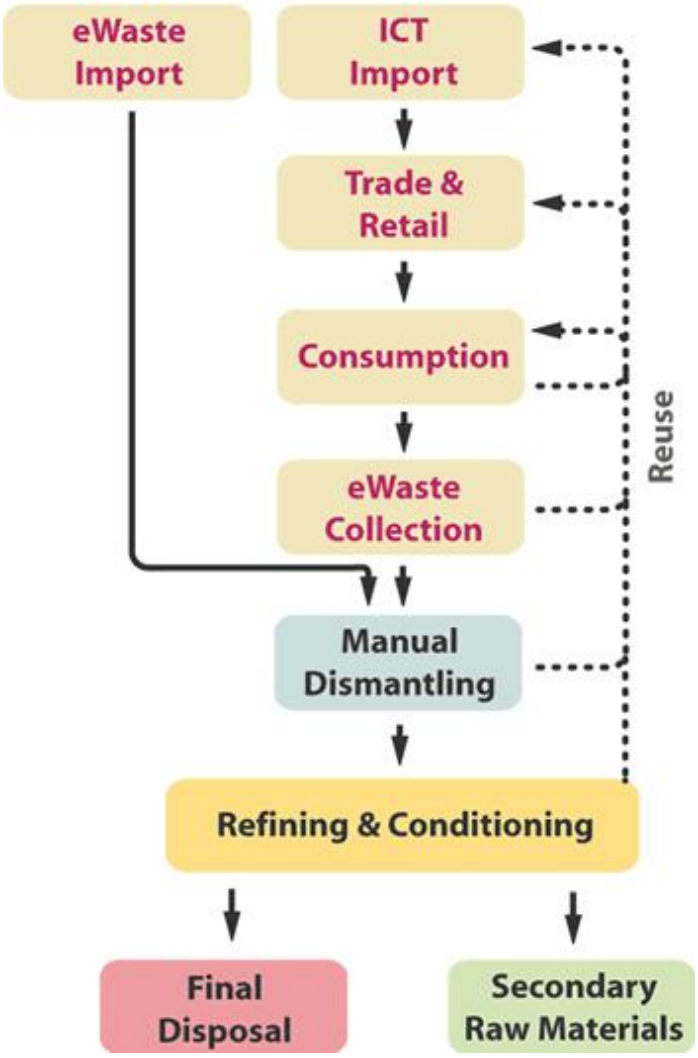
Introduction:

For the development of mankind, we have new inventions. The new products are for the betterment of the mankind. They facilitate us in several ways. The society buys these inventions for the domestic as well as industrial use. Most of these inventions are electronic and electrical goods. After the use of these products when they become use less or out dated, the problem of E-waste starts.

These equipments when become out dated can be donated to needy people or schools or laboratories where they can be used. The owner can also exchange the product with vendor. The vendor can upgrade the product and can be further reused. The useless equipments are further given to scrap dealers; they dismantled them and extract electronic parts, plastic and metals from the equipment.

E-waste inventory has been assessed with an approach consisting of material flow methodology, which is based on the market size of items of electrical and electronic equipment (EEE) and confirmation by tracer analysis.

The Electronic and electrical equipments (EEE) can't be degraded in soil as they contain heavy metals and plastic parts. Some of the metal parts are extracted by the heating and boiling. Plastic parts are sheered and granules are produced which can be further processed for the preparations of toys and other plastic goods. The remaining residue is used for land filling purpose.



Fifure: 1.Life cycle of E-waste trade

E-waste trade value chain:

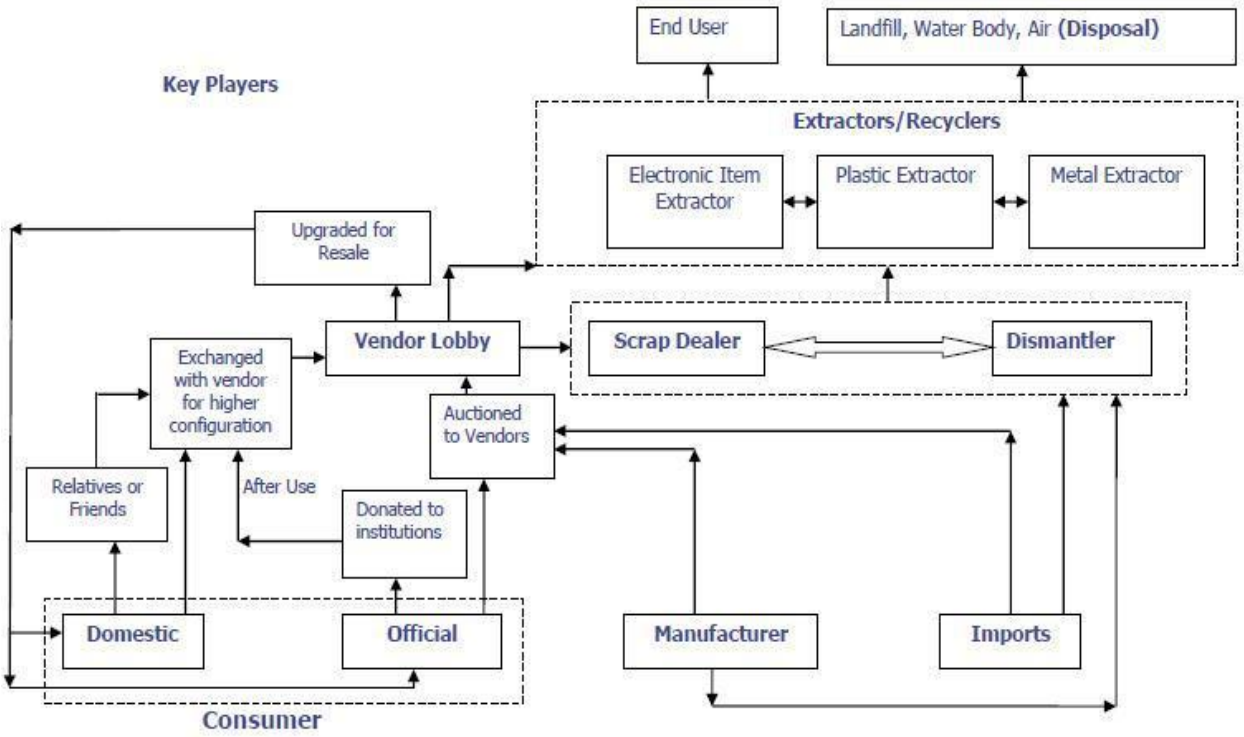


Figure 2: **E-waste trade value chain**

Recycling/Recovery System:

Most of the activity involves for recycling E waste are physical dismantling by hammer, chisel, screw driver and bare hand. The most high- tech piece of dismantling equipment witnessed was an electric drill. The immediate objective of most of the operations involves dismantling and rapid separation of primary materials. The following materials were observed being separated for further recycling:

- **Material containing copper:** Including printer and other motors, wires and cables, CRT yokes, circuit boards, etc
- **Steel:** Including internal computer frames, power supply housings, printer parts, washing machines, refrigerator, etc.
- **Plastic:** Including housings of computers, printers, faxes, phones, monitors, keyboards, etc.
- **Copper:** Extracted from transformer and CRT after their dismantling
- **Circuit Boards:** These come from many applications including computers, phones, disc drives, printers, monitors, etc. Each of these processes has been described below.

Printed Circuit Boards (PCBs)

The printed circuit boards contain heavy metals such as antimony, gold, silver, chromium, zinc, lead, tin and Copper. According to some estimates, there is hardly any other product for which the sum of the environmental impacts for raw material, industrial refining and production, use and disposal is as extensive as for printed circuit boards. The methods of salvaging material from circuit boards are highly destructive and harmful as they involve heating and open burning for the extraction of metals. Even after such harmful methods are used, only a few of the materials are recovered. The recycling of circuit boards, drawn from monitors, CPU, disc and floppy drives, printers, etc. involves a number of steps.

Extraction of IC/ other components from PCB

IC/other components from PCBs are manually extracted. This process is common for PC, TV and cell-phone. The E-waste stream from cell-phone joins the E-waste stream of PC and TV.

Recovery of Gold

Gold pins are recovered from PCB manually. First, there is manual removal of gold-plated pins. The core of each motherboard has a flat laminated gold plate. These laminated parts cut down and sold to gold-smiths for gold recovery. The preheating process is applied to remove resalable components like ICs, condensers, bearings (pulleys) from floppy drive and hard drive. Pre-heating means simply putting the motherboard on a burning stove Low heat is maintained to loosen only the chemical bond between solder and plastic. Then resalable chips, condensers, etc, are plucked out from these pre-heated plates. Then the pre-heated circuit boards are taken by other dealers for recovery of solder (which consists of lead and mercury).

Monitors

Monitors are much sought after by scrap dealers as they contain good quantity of copper yoke, besides circuit board and picture tube. The first step in monitor recycling involves physical removal of plastic casing, picture tube(cathode ray tube), copper yoke and plates The intact and functional CRT is used for the manufacture of colour and black & white televisions for local brands. Re-gunning is possible only for those monitors whose terminal pin (diode pin) of electron gun has not broken in the process of removing yoke from gun.

Recovery of Glass from CRT

Defective CRT is broken down to recover iron frames from the glass funnel .The iron frames are found only in color CRTs and not in black & white monitors. The glasses and iron frames from picture tubes are given to waste traders.

Copper Extraction from Wires

Two kinds of processes are being followed under this category as listed below:

1. Manual drawing of wires for copper
2. Extraction of copper by burning the wire

Manual drawing of Wires for Copper

Under this process with the use of knife the edge of wire is cut and then with the help of pliers the copper is extracted from PVC. copper goes for sale to copper smelters and PVC is used for plastic graining.

Plastic Shredding and Graining

The plastic casings of monitors are made either of PVC (polyvinyl chloride) or ABS (acrylonitrile-butadiene styrene). PVC was used more commonly in the early models of computers. Now computer-manufacturing companies have shifted to ABS plastic in the production of monitors. Though both types of plastics are currently being recycled the PVC one cannot be recycled. This is due to the high percentage of silicate being added for making it fire retardant. The silicate plastic often ends up at kilns as an alternate source of energy. The plastic casing is recycled into EBS or High Impact Plastic. These kinds of plastics are frequently used in manufacturing toys

Disposal

Field Investigations reveal that easy and approachable method for disposal of e-waste is throwing in Municipal dust bin which goes for land filling sites. Most of the components get extracted and only thing, which is left for disposal in landfills are ashes and plastic residues from IC chips, condensers etc.

Conclusion

One can avoid the problem of E-waste by Reducing the use of EEE, Reusing it, and recycling the equipments in proper manner so that the ecological balance of the Mother Earth is maintained a we all could preserve the nature for our next generation.

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BIODEGRDABLE PLASTICS

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ABSTRACT

Science and technology have created the modern lifestyle that mankind is living in which efficiency is the keyword. The term 'plastic' is defined as any of numerous organic synthetic or processed materials that are mostly thermoplastic or thermosetting polymers of high molecular mass and that can be made into objects, films or filaments.(1)Plastics make up a significant and growing portion of the waste stream. Plastics present three general environmental problems: they are derived from fossil fuels, they don't readily biodegrade, and their production and disposal can produce dangerous chemicals. In response to these issues, some businesses now are attempting to develop plastics derived from plants on a commercial scale. These "bioplastics" enjoy several important ecologic benefits; however, they also come with their own environmental costs. On balance, they can reasonably be considered "greener" than conventional plastics Biodegradable plastics are those that can be completely degraded in landfills, composters or sewage treatment plants by the action of naturally occurring micro-organisms. Truly biodegradable plastics leave no toxic, visible or distinguishable residues following degradation (2).**Keywords:** Biodegradableplastics, Bioplastics, Ploylacticacid, Polyhydroxyalkanoates, starch based plastics.

Synthesis of non-biodegradable plastics:

1. **Polyvinyl chloride (PVC):** Vinyl Chloride commonly called as "vinyl" incorporates chlorine atoms. The C-Cl bonds in the monomer backbone are hydrophobic and resists oxidation and burning. All PVC polymers are degraded by heat and light. When this happens, hydrogen chloride is released into the atmosphere and oxidation of the compound occurs. Because hydrogen chloride readily combines with water vapor in the air to form HCl.

$$n CH_2CHCl \rightarrow [- CHCl\text{-}CH_2 -]_n$$

Synthesis of biodegradable plastics: The methods for the production of biobased and biodegradable polymers can be classified into three types:

(i) Chemical polymerization of monomers derived from biological processes. e.g., Poly lactic acid(PLA),

(ii) The direct biosynthesis of polymers in microorganisms. e.g., Polyhydroxyalkanoate (PHA), and

(iii) Modification of natural polymers, e. g., starch and cellulose.(3)

1. Poly (lactic Acid) (PLA): PLA was first studied and characterized in the year 1845.[4] PLA is produced by naturally occurring lactic acid bacteria of the genus *Lactobacillus*, which ferment hexose sugars. Among the many different biobased and biodegradable plastic materials investigated to date, PLA and polyhydroxyalkanoates (PHAs) have been the two most studied materials. This is mainly because both these aliphatic polyesters have mechanical properties that resemble those of commodity plastics such as polyethylene (PE), polypropylene (PP) and polystyrene (PS). In addition, both PLA and PHA can be produced from renewable biobased resources such as starch and sugars. They are also both degradable under a wide range of conditions, although PLA hydrolytic degradation needs to be initiated by relatively high temperatures PLA and its copolymers have been successfully used for biomedical and pharmaceutical applications in the form of biodegradable sutures and matrices for drug delivery systems.[5]In Japan, Mitsui Chemicals Inc. developed a different direct condensation polymerization process for the production of PLA, which requires the use of a highly active catalyst and an organic solvent [6].In order to produce high molecular weight PLA without using organic solvents,another process was later developed, which consists of liquid-state polycondensation and solid state polycondensation.[7] With these new cost-effective processes, PLAs, which were formerly only affordable for medical and pharmaceutical applications, can now be produced for bulk applications. PLA is a crystalline, thermoplastic polyester with a melting temperature of 155^0C. The properties of PLA are suitable for a wide range of processing methods such as injection molding, film forming, blown-film, spinning, blow-molding, extrusion and expansion molding. The potential areas of application for PLA include packaging and containers, agricultural and civil engineering materials as well as composting materials. Because of the high transparency of PLA, it is an excellent material for packaging. A Japanese group has modified a polyhydroxyalkanoate synthesizing enzyme to facilitate polymerization of lactic acid, thereby allowing polymer synthesis within the microbe without the need for chemical polymerization.[8]
2. **Polyhydroxyalkanoates (PHA):** PHA was first studied and characterized in the 1920s.[9] PHAs are hydroxyalkanoate polyesters of various chain lengths. PHAs are carbon and energy reserves stored as insoluble inclusion bodies in most bacteria under nutrient-limiting and carbon-excess conditions.[10] Later, during the petroleum crisis in

the 1970s, PHAs received serious attention as a natural substitute for synthetic plastics. The properties of PHAs can also be tailored to suit numerous applications ranging from stiff packaging goods to highly elastic materials for coatings. The most important quality that set PHAs apart from conventional plastics is their complete biodegradability in the natural environment.[11,12] In fact PHAs are more readily biodegradable under various environmental conditions compared to PLAs. When the same films are buried in soil or mangrove sediments, the degradation is usually much faster because of higher microbial activities.[13,14] In addition, PHAs are also renewable by nature; they can be produced from renewable resources such as plant oils[15,16], sugars[17,18],and carbon dioxide.[19,20] At present, approximately 150 different constituents of PHAs have been identified as homopolymers or as copolymers. If all these different types of PHAs can be produced in a cost-effective manner, materials with an enormous range of properties can be obtained. The main reason for the possible formation of these diverse types of PHAs is due to the extraordinarily broad substrate specificity of PHA synthases (the biological catalysts that polymerizes PHAs in the bacterial cell) as well as the effects of the types of carbon sources fed to the microorganisms and the metabolic pathways that are active in the cell. Many of the commercially important PHAs that have been studied in detail are those that contain monomers ranging from 4 to 6 carbon atoms. This is because of their physical and mechanical properties that resemble the properties of common commodity thermoplastics. These are PHAs such as poly(3-hydroxybutyrate) [P(3HB)], poly(3-hydroxybutyrate-co-3- hydroxyvalerate), [P(3HB-co-3HV)], poly(3-hydroxybutyrate-co-4-hydroxybutyrate) [P(3HB-co-4HB)] and poly(3-hydroxybutyrate-co-3-hydroxyhexanoate) [P(3HB-co-3HHx)]. PHAs have been used for the manufacture of films, coated paper and board, compost bags and disposable flatware and can also be moulded for the production of bottles and razors and are completely biodegradable to CO_2 and water.

Biodegradable Additives:

Biodegradable Additives are additives that enhance the biodegradation of the polymers by allowing microorganisms to utilize the carbon within the polymer chain itself. Biodegradable additives attract microorganisms to the polymer through quorum sensing after biofilm creation on the plastic product. Examples: Starch powder has been mixed with plastic as filler to allow it to degrade more easily.[21]

Biodegradable plastics as solution:

The present work will help the environment by the synthesis of biodegradable polymers by using the biodegradable additives, the new approach towards this synthesis can be use of the starch in the ester based polymer. This new polymer can be used as the plastic due to polymer nature and its thermoplastic nature. It will also act as the biodegradable due to the presence of starch and ester which are easily breakdown to alcohols,H_2O and CO_2 by soil bacteria.

Conclusion:

As discussed in the present review, the production of plant-based polymers can be approached in a number of ways. The use of biodegradable additives is the new aspect for the synthesis of the starch containing ester based polymers. Some progress has been made in commercialization of plant based materials, for example, the starch-based PLA polymers. Since PLA and PHA biodegradable, these biobased plastics can be converted back to CO2, which is then fixed by plants via photosynthesis. Thus, the production of both PLA and PHA can be regarded as "carbon neutral" or "zero-emission" processes, whereby the net amount of carbon in the environment remains constant over the long term and on a global scale. The main reason for the initial interest in biodegradable plastics is because non-biodegradable plastic packaging presents a major waste disposal problem. This has given a very strong push for the development of biodegradable plastics that can be produced from renewable resources.

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ELECTRONIC WASTE

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ABSTRACT

E-waste is a popular informal name for electronic products nearing the end of their useful lives. E-wastes is a term used for almost all types of Waste Electrical and Electronic Equipment (WEEE). If these wastes are discarded with other household garbage, the toxics pose a threat to both health and vital components of the ecosystem.

Disposal of E-wastes:

1) Land filling:

It is the most widely used methods for disposal of e-waste. But these do not seem to be environment friendly due to the leaching behavior of the metals. Moreover landfills are prone to uncontrolled fires which can release toxic fumes.

2) Incineration:

It is a controlled and a complete combustion process in which the waste is burned in specially designed incinerators. These contribute to large amount of residues of toxic gases.

What can be done?

1) Inventory management:

Proper control over the materials used in the manufacturing process is an important way to reduce waste generation. By reducing both the quantity of hazardous materials and amount of excess raw materials in stock, the waste generated can be reduced.

2) Production Process modification:

Changes can be made in the production process, which will reduce waste generation. This reduction can be accomplished by changing the materials used to make the product or by the more efficient use of input materials in production process or both.

3) Volume Reduction:

Volume reduction includes those techniques that remove the hazardous portion of a waste from a non-hazardous portion. These techniques are usually to reduce volume and thus the cost of disposing of a waste material.

4) Recovery and reuse:

This technique could eliminate waste disposal costs. Waste can be recovered on-site or at an off-site recovery facility, or through inter industry exchange. Reuse in addition to being an environmentally preferable alternative, also benefits society.

GREENER SYNTHESIS OF SPIRO BENZOTHIAZOLEINDOLONES

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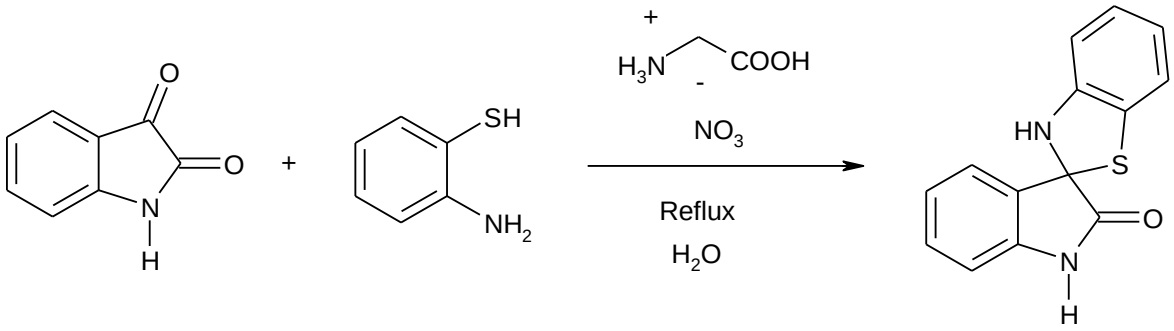
ABSTRACT

Glycine nitrate mediated an environmentally benign, simple method is reported for synthesis of 3H-spiro[1,3-benzothiazole-2,3'-indol]-2'(1'H)-ones from 1H-indole-2,3-diones and 2-aminothiophenol in water under reflux condition with excellent yields. Moreover, the method is applicable for a variety of isatins. Rapid eco-friendly reactions with high yields, high atom economy, use of universal solvent, water and recyclability of catalyst contributes towards prevention of waste.



PYROLYSIS

A NEW TECHNOLOGY TO OBTAIN ENERGY FROM WASTE MATERIAL

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ABSTRACT

Pyrolysis is a thermochemical decomposition of organic waste material at elevated temperatures without participation of oxygen. It involves the simultaneous change of chemical composition and physical change and is irreversible.

During pyrolysis, solid carbonaceous materials are heated under oxygen(O_2) limited conditions to between 300 - 700^0 C. The various components of the organic feedstock material including hemicelluloses, cellulose and lignin progressively undergo thermal breaking down into a stream of synthetic producer gases. The resultant "syngas" is comprised of various amounts of Hydrogen, Carbon monoxide, Methane and lesser quantities of ethane, propane etc. These gases can produce electricity or cleaned and condensed into a liquid fuel such as H. Another product of pyrolysis is bio-oil can be gasified / refined for energy use.

The amount of energy that can be generated from pyrolysis is substantial by waste and debris materials such as saw dust sawmill scraps, urban waste , livestock manure, sewage, food waste, storm debris, agro-feed stocks etc. Recyclable materials are filtered out at the pre-processing line for further sale and that 265 tons of waste with average moisture content 60% per day is converted into energy. The electric energy output is 5+ MW.

The production capacity of the reactor is 125 TPD with waste moisture content 20%. Waste heat from the reactor is recovered and reused in order to minimize outside energy sources used in the operation of the system.

The syngas is then directed to a thermal oxidizer for further degradation leaving the solid carbon char to drop through a retort chamber floor. Inside the oxidizer the gasses are combusted at temperatures exceeding 1200 C for 2, 5-3 seconds, which allows for molecular decomposition of dioxins, furans & other harmful components. Thermal energy captured from the oxidized gas is converted into high temperature steam supplying energy to turbine generators which produces clean electrical power.

MEDICAL WASTE MANAGEMENT

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ABSTRACT

In this modern world where all the works are done at the finger tips in the speed of a wave, waste is also being produced simultaneously along with it. Production of waste seems an easy task but management of waste produced is quite tedious. When the world around is indulged in generating more and more waste and hospitals and health care centers are no exception, the waste produced by them is termed as 'MEDICAL WASTE' Which can be infectious, contain toxic chemicals and pose contamination risks to both people and the environment. We cannot neglect the risks and the impacts of medical waste on health and the environment since it may result in trauma and infection and we know if patients are to receive health, care and to recover they need safe surroundings and so waste must be disposed off safely. Though different agreements are signed like BAMAKO CONVENTION (1991), STOCKHOLM CONVENTION ON PERSISTENT ORGANIC POLLUTANTS (UNEP 2004) to minimize the generation of hazardous waste and for treatment and disposal the countries are lacking in proper management of medical waste. It is so brimming out as a very necessary deed to set up training to handle, recycle and sort out medical waste for poor and also unaware under developed countries. Collection of waste regularly is also very important step in waste management and storage centers of the waste collected must be maintained at proper temperature and care should to be taken to avoid spillage. And the means for transport must be reserved for waste transport alone. The waste transported cannot be directly disposed, the choice of treatment and disposal techniques depends on different parameters like the quantity of waste, its type and many other factors. Depending on these factors medical waste can be disposed.

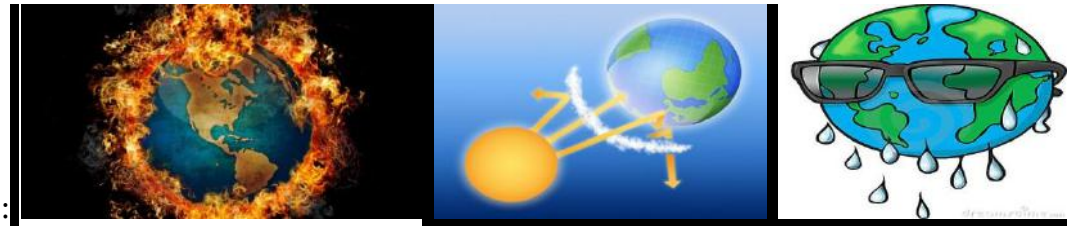
Thus the accurate and economical method must be selected with a view to minimize negative impacts on health and the environment.

IMPACT OF WASTE MANAGEMENT ON GLOBAL WARMING AND GREEN HOUSE EFFECT

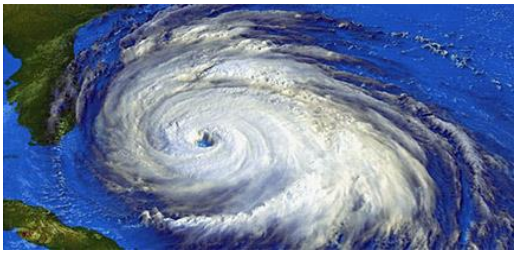
Akshay Khavare, G.I.Bagewadi College, Nipani

ABSTRACT

INTRODUCTION



One of the biggest problem which world is facing today is global warming. Many experts believe that our production of carbon dioxide and other Greenhouse gases is heating the atmosphere, and this could be very dangerous for human life. . Due to this many problems ould result from global warming. One of the biggest is rising sea level. This could result in the flooding on coastal areas andcities, such as Egypt, the Netherlands, the Bangladesh e.c.t. Another problem is changes in weather patterns. Many areas of the world are experiencing increased hurricanes, floods, and other natural disasters.

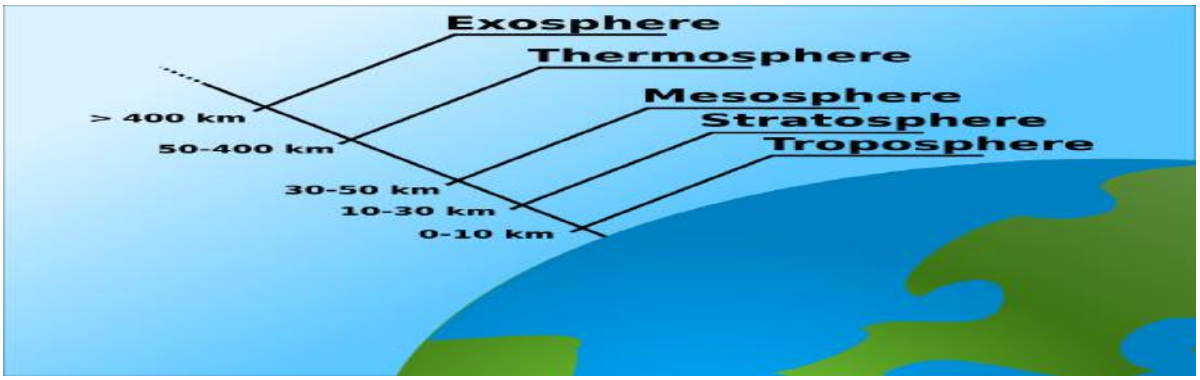


A final issue associated with this phenomenon is the negative effect on animals. Fish Populations could be effected, while some insects which spread disease might become more common.

THE LAYERS OF THE ATMOSPHERE

The atmosphere is divided into 5 layers.

It is thickest near the surface and thins out with height until it eventually merges with space



The **troposphere** is the first layer above the surface and contains half of the earth's atmosphere.

Weather occurs in this layer.

The **stratosphere** is the second layer. Many jet aircrafts fly in the stratosphere because it is very

stable. The stratosphere contains the OZONE LAYER, which absorbs harmful rays from the sun.

The **mesosphere** is the next layer up. Rock segments burn up in this layer.

The **thermosphere** is the fourth layer and this is where space shuttles orbit.

The **exosphere** is the layer where the atmosphere merges into space. It is extremely thin.

Greenhouse effect definition:

An average increase in the earth temperature or natural trapping of heat by earth is called Greenhouse effect.

A greenhouse is a small house made of glass that is used to grow plants.

A greenhouse traps the sun's rays and keeps the heat from escaping.

It is warm inside.

In the same way that the glass traps heat in a greenhouse, the atmosphere traps heat next to the earth.

Certain gases in the atmosphere such as carbon dioxide, methane and water vapour trap energy from the sun.

The natural greenhouse gases act like a big blanket around the earth, keeping it warm.

Humans can create extra greenhouse gases but this means that more heat gets trapped.

This causes the temperature of the earth to rise, which results in ***Global Warming.***

GLOBAL WARMING DEFINITION :

Due to modern human activities the trapping of more infrared radiation is taken place, there is increase in the temperature of the earth and this abnormal process is called ***global warming.***

Global Warming is the recorded increase in the average temperatures of the earth's atmosphere and oceans. Global Warming affects the weather patterns on Earth and causes Climate Change.

Climate change results in higher sea levels, more rainfall and severe droughts and floods.

EFFECTS OF GLOBAL WARMING:

- ***Rise in water sea level***: Due to rise in temperature the polar ice melts .Hence sea level increases which covers coastal cities, forests, fertile agriculture land mass and also affects rivers.

- ***Extreme weathers***: Due to global warming there is imbalance in environment hence drought, flood and other natural disaster occurs by global warning.

- ***Agriculture and forestry***: Due to global warming the plants growth retards, photosynthetic activity reduces .hence agriculture yield forest productivity reduces.

- ***Ecosystem and biodiversity***: Due to global warming there may be a damage of ecosystem and depletion in biodiversity.

Ozone layer duplicatio*n*:

The ozone layer is a layer of concentrated ozone gas about 24km up in the atmosphere. Like a good pair of sunglasses, it protects us from the sun's harmful ultra-violet rays. The ozone layer is present in stratosphere . The stratosphere may broke up and rebuilt up. But due to human activities it upset the balance. There is duplication of ozone layer and certain area it is completely disintegrated , they are called as ozone holes .CFCs discharges in lower part of atmosphere move upwards and reaches stratosphere. In stratosphere, UV rays act on them releasing Cl atoms. Cl degrades ozone realizing molecular oxygen, with these atoms acting merely as catalysts ; Cl atoms are not consumed in the reaction . Hence, whatever CFCs are added to the stratosphere , they have permanent and continuing effect on ozone level. Although ozone duplications is occurring widely in the stratosphere, the duplication is particularly marked over the Antarctic reason .This has resulted in formation of a large area of thinned ozone layer , commonly called as ozone holes.

Causes for ozone duplication :

- ***Chlorofluro carbons*** :They are strongest ozone depleters either present in liquid or gaseous forms . They are used as coolants in refrigerators, air conditioners and air coolers and used as fuel in supersonic jets .
- ***Unions*** : They are also similar as that of C.F.C but contain bromine instead of chlorine (Bromofloro carbons) they are also used as a coolant and fire breakers.
- ***Carbons tetra chlorides (CCI_4):*** It is used as a thinner or solvent and also used as a spray in fire extinguishers.

"Impact of waste management on global warming and green house effect''

solid waste is a problem that must be properly managed. While it is generally understood that proper waste management helps protect human health and the environment and preserve natural resources, many do not realize that solid waste also impacts climate change. The manufacture, distribution, and use of products—as well as the disposal of the resulting waste — all result in emissions of atmospheric gases called "greenhouse gases" that affect the Earth's climate. When organic waste decomposes in landfills and uncontrolled dumps, it produces methane, one of the major greenhouse gases contributing to climate change. Waste generation increases with population expansion and industrialization. we can reduce greenhouse gas emissions, however, through proper solid waste management.

(Integrated Solid Waste Management):

Solid waste should be managed through a number of activities—waste prevention, recycling, composting ,controlled burning, or land filling. Using a combination of these activities together in a way that best protects your community and the local environment is referred to as integrated solid waste management (ISWM). An ISWM program can help reduce greenhouse gas emissions and slow the effects of climate change. This folder and its accompanying fact sheets are designed for government to officials, nongovernmental organizations, and others involved in planning and communicating the benefits of ISWM programs. The fact sheets will introduce you to important issues you will need to address in planning a successful ISWM program. These fact sheets also assist you in planning an ISWM program by providing guidelines for recycling and composting, waste collection and transport, and waste disposal (land filling and combustion).

The following descriptions introduce and define the main activities classified under ISWM.

WASTE PREVENTION

Waste prevention—often called source reduction—means reducing waste by not producing it. Examples of waste prevention would include purchasing durable,long-lasting goods and seeking products and packaging that are as free of toxic substances as possible. It can be as simple as switching from disposable to reusable products, or as complex as redesigning a product to use fewer raw materials or to last longer. Because waste prevention actually avoids waste generation, it is the preferred waste management activity. Overall, waste prevention conserves resources, protects the environment, and prevents the formation of greenhouse gases.

***RECYCLING*:** Recycling makes use of materials that otherwise would become waste by turning them into valuable resources. Recycling helps reduce greenhouse gas emissions, in part, by diverting waste from landfills. In some countries, a great deal of recycling occurs before the aste reaches the landfill. Scrap dealers buy directly from households and businesses, waste pickers or scavengers collect materials from waste bins ,and waste collectors separate materials that can be sold as they load their trucks. Governments can build on these practices by providing support to organize and improve recycling efforts.

COMPOSTING: Another form of recycling is composting—the controlled aerobic biological decomposition of organic matter, such as food scraps and plant matter, into humus, a soil-like material. Compost acts as a natural fertilizer by providing nutrients to

the soil, increasing beneficial soil organisms, and suppressing certain plant diseases, thereby reducing the need for chemical fertilizers and pesticides in landscaping and agricultural activities. Organic materials often comprise a large portion of the solid waste stream, particularly in communities that rely heavily on tourism. Composting can be particularly helpful to communities managing their waste and thus reducing greenhouse gas emissions.

COMBUSTION: Combustion is the controlled burning of waste in a designated facility to reduce its volume and, in some cases, to generate electricity. Combustion is an ISWM option for wastes that cannot be recycled or composted, and is sometimes selected by communities where landfill space is limited. While the combustion process can generate toxic air emissions, these can be controlled by installing control equipment such as acid gas scrubbers and fabric filters in combustors. Combustion of solid waste can help reduce amount of waste going to landfills. It also can reduce reliance on coal, one of the fossil fuels that produces greenhouse gases when burned.

***LANDFILLING*:** Uncontrolled dumping of waste can contaminate groundwater and soil, attract disease carrying rats and insects, and even cause fires. Properly designed, constructed, and managed landfills provide a safe alternative to uncontrolled dumping. For example, to protect groundwater from the liquid that collects in landfills (leachate), a properly designed landfill has an earthen or synthetic liner. As waste decomposes, it emits methane, a greenhouse gas that can also cause fires. To prevent fires, a properly designed landfill should have a way to vent, burn, or collect methane. Landfill operators can also recover this methane—thereby reducing emissions—and generate electricity from the captured gas.

RECYCLING OF WASTE PRODUCTS

Shruti Shiragave, G.I.Bagewadi College, Nipani

ABSTRACT

The earth does not belong to man, man belongs to earth, man did not weave the web of life, and he is merely a strand in it. Whatever he does to the web, he does to himself.
Recycling is a process to change waste material into new useful products. This is done to reduce the use of raw materials that would have been used. Recycling also uses less energy and great way of controlling air, water and land pollution.

Recyclable materials include many kinds of glass, paper, metal, plastic, textiles and electronics. The composing or other reuse of biodegradable waste such as food or garden waste is also considered recycling materials to be recycled are either brought to a collection center or picked up from the curbside then sorted, cleaned and reprocessed into new materials bound for manufacturing.

The process of recycling of waste materials is explained in present paper. The recycling of waste materials is applied to industrial waste recycling and e-wasterecycling.
There are some advantages and disadvantages of recycling of waste products are designed in the following paper.

The awareness among the people about the recycling of waste material is also the theme of the paper; hence it has included the public participation in recycling programs.

Introduction

Recycling is a process to change waste material into new, useful products to prevent waste of potentially useful materials, reduce the consumption of fresh raw materials, reduce energy usage, reduce air pollution, and water pollution by reducing the need for conventional waste disposal, and lower greenhouse gas emissions as compared to plastic production. Reduce reuse and recycle the five R's.

Recyclable materials include many kinds of glass paper metal plastic textiles electronics composting or other re use of biodegradable waste such as food or garden waste is also considered recycling materials to be recycled or either brought to a collection center or picked up from the carbside then sorted cleaned and reprocessed in to know materials bound for manufacturing

Effective recycling starts with household [or the place where the waste was created] in money serious countries the authorities help households with bin bags with labels on them.

Households then sort out the waste themselves place them in the right bags for collection. This makes the work of recycling less difficult.

Importance and benefits of recycling

1) **Recycling helps to protect the environment:**
This is because the recyclable waste materials would have burned or ended up in the land fill. Pollution of the air, land, water and soil is reduced.

2**) Recycle conserves national resources:**
Recycling more waste means that we do not depend too much on raw [natural] resources which are already massively depleted.

3).**Recycling save energy:**
It takes more energy to produce items which raw materials then from recycling used materials. This means we are more energy efficient and the prices of products can come down.

4) **Recycling create jobs:**
People are employed to collect, sort and work in recycling, companies others also get jobs with business that work with these recycling units. There can be ripple of jobs in the municipality.

Recycling of industrial waste products

Although many government programs are concentrated on recycling at home, a large portion of waste is generated by industry. The focus of many recycling programs done by industry is the effectiveness of recycling. The ubiquitous nature of cardboard packaging makes cardboard a commonly recycled was he product by companies that deal heavily in packaged goods like retail stores warehouses and distributions of goods. Other industries deals in specialized products, depending on the nature of the waste materials that are present.

Levels of metals recycling are generally low. The increase in the use of a metals during the 20^{th} and into the 21^{st}century has led to a substantial shift in metal stocks from below ground to use in applications within society above ground.

As metals are inherently recyclable, the metals stocks in society can serve as huge mines above ground. The recycling rates of many metals are very low. The report warmed that

the recycling rates of some metals used in applications such as mobile phones, battery packs for hybrid cars and fuel cells, are so low that unless future end of life recycling rates are dramatically stepped up these critical metals will become available for use in modern technology.

Some industries like the renewable energy industry and solar photovoltaic technology in particular one being proactive in setting up recycling policies even before there is considerable volume to their waste streams, anticipating future demand during their rapid growth.

Recycling of e-waste product:

Over the last decades the electronics industry has revolutionized the world. Electrical and electronic products have become ubiquitous of today's life around the planet. Without these products modern life would not be possible in industrialized and industrializing countries. These products serve in such areas as medicine, mobility, education, health, food supply communication, security, environmental protection and culture. Such applications include many domestic devices like refrigerators, washing machines, mobile phones, personal computers, printers, toys and TV.

Fundamentals of e-waste recycling:

As basis for the following chapters it is essential to understand the fundamental issues underlying e-waste recycling. These are independent of the recycled material, the device and the recycling location or region.

1. Significance of e-waste for resource management and toxic control.
2. General structure, main steps and interfaces of the recycling chain.
3. Objectives to achieve.
4. General frame conditions which impact process selection.

Process of e-waste recycling:

The recycling chain for e-waste consist of three main subsequent steps 1) collection 2) sorting/dismantling and preprocessing this includes sorting dismantling, mechanical treatment and 3) end processing this includes refining and disposal. Usually for each of these steps specialized operators exist. The efficiency of the entire recycling chain depends on the efficiency of each step and on how well the interfaces between these interdependent steps are managed. If for example for a certain device the efficiency of collection is 50%,

the combined dismantling preprocessing efficiency is 70% and the materials recovery efficiency is 95% the resulting net metal yield along the chain would be only 33%.

Advantages and disadvantages of recycling of waste products

Advantages of Recycling

1. Protects Environment: The foremost benefit or recycling is that it helps in protecting the environmentin the most balanced manner. While many trees are cut down continually, recycled paper made from certain trees is re-used repeatedly to minimize felling/ deforestation. With re-cycled paper as an outstanding example, a number of other natural resources can be reused this way.

2. Reduces Energy Consumption: A large amount of energy is consumed by processing raw materials at the time of manufacture. Recycling helps to minimize energy consumption, which is crucial for massive production, such mining or refining. This also makes the production process very cost-effective and beneficial for manufacturers.

3. Reduces Pollution: Industrial waste today is the main source of all types of pollution. Recycling of industrial products such as cans, chemical, plastics helps to cut down pollution levels considerably, as these materials are re-used, instead of throwing them away irresponsibly.

4: Reduces Global Warming: Recycling helps to alleviate global warmingand its ill effects. Massive waste is burned in heaps which produces large amount of greenhouse gas emissions such as CO2 and CFC's. Recycling ensure that the burning process is minimized and any waste is re-generated as a useful product with no or minimal harmful impact on the environment. Recycling produces less greenhouse gases as industries burn fewer fossil fuels for eco-friendly products.

5. Judicial and Sustainable use of Resources: Recycling promotes judicial and sustainable use of resources. This process ensures that there is no discriminate use of any material when available in plenty in the present. Recycling is encouraged at all levels, starting from school to corporate offices and at international levels. This means we can preserve all precious resources for our future generation, without any compromise in the present.

6. Conserves Natural Resources: If old and used materials are not recycled, the new products are made from extracting fresh raw materials from beneath the earth through mining and extraction. Recycling helps in conserving important raw materials and protects

natural habitats for the future. Conserving natural resources such as wood, water and minerals ensures its optimum use.

7. Reduces Amount of Waste to Landfills: Recycling old and waste products into new products reduces the amount of waste that go to landfills. This helps in reducing water and land pollution as landfills are a major source in contributing to destruction of natural environment. Recycling programs keep 70 tons of waste from being deposited into landfills every year.

8. Create Green Jobs: Recycling is good for the environment and apart from that it also creates green jobs. According to the U.S. Bureau of Labor Statistics, green goods and services accounted for 3.1 million jobs in the United States by 2010.

Disadvantages of Recycling

1. Not always Cost Effective: Recycling is not always cost-effective. Sometimes, there may be a need to establish separate factories to process reusable products. This may create more pollution in terms of cleaning, storage and transportation.

2. Recycled Products May not Last for Long: Recycled products are always not of durable quality. Such items are mostly made of trashed waste, picked up from heaps other waste products which are of fragile or overly used. For this reason, recycled products are cheap and last for a shorter period.

3. Unsafe and Unhygienic Recycling Sites: Recycling sites are often unsafe and unhygienic. Places where all sorts of waste is dumped are conducive for debris formation and spread of disease and other dangers caused by harmful chemicals and waste. This not only causes widespread pollution but is harmful for dedicated people who recycle such products. Such

waste if mixed with water, leads to leachate formation and leads to toxication of water bodies including drinking water.

4. Not widespread on Large Scale: Although recycling is an important step to minimize pollution, unfortunately this process is just a small part of long-term success. Recycling often occurs at a small scale- homes or schools and has failed to be useful at a large level such as at industries or holistically at a global stage. Saving paper at schools cannot be compared to oil spillsor massive tree felling at an industrial level.

5. High Initial Cost: Setting up new recycling unit involves high cost. This huge cost can come up as a part of acquiring different utility vehicles, upgrading the processing facility, educating residents by organizing seminars and other programs, disposing of existing waste and chemicals etc.

After weighing, the pros and cons of recycling, one can wisely take crucial steps involved in this process. Understanding the impact of recycling is essential on a large-scale which if done effectively can bring in massive positive results, beneficial to mutual existence.

Public participation in recycling of waste products

Between 1960 and 2000, the world production of plastic resins increased 25 times, while recovery of the material remained below 5 percent. Many studies have addressed recycling behaviour and strategies to encourage community involvement in recycling programs. It has been argued that recycling behaviour is not natural because it requires a focus and appreciation for long term planning, whereas humans have evolved to be sensitive to short term survival goals; and that to overcome this innate predisposition, the best solution would be to use social pressure to compel participation in recycling programs. However, recent studies have concluded that social pressure is unviable in this context. One reason for this is that social pressure functions well in small group sizes of 50 to 150 individuals but not in communities numbering in the millions, as we see today. Another reason is that individual recycling does not take place in the public view.

In a study done by social psychologist Shawn Burn, it was found that personal contact with individuals within a neighborhood is the most effective way to increase recycling within a community. In his study, he had 10 block leaders talk to their neighbors and persuade them to recycle. A comparison group was sent fliers promoting recycling. It was found that the neighbors that were personally contacted by their block leaders recycled much more than the group without personal contact. As a result of this study, Shawn Burn believes that personal contact within a small group of people is an important factor in

encouraging recycling. Another study examines the effect of neighbors and friends on recycling. It was found in his studies that people who had friends and neighbors that recycled were much more likely to also recycle than those who didn't have friends and neighbors that recycled.

Many schools have created recycling awareness clubs in order to give young students an insight on recycling. These schools believe that the clubs actually encourage students to not only recycle at school, but at home as well.

Conclusion

"The environment, after all is where we all meet, where we all have a mutual interest. It is one thing that all of us share. It is not only a mirror of ourselves, but a focusing lens on what we can become." Protecting our nature is our own duty.

Recycling of waste products is the one of the best of pollution controlling. So the recycling steps should begin with household management.

"One individual cannot possible to make a differences, alone. It is individual efforts, collectively, that makes a noticeable difference, all the difference in the world. So we all together should contribute to the same, then we can make the difference that is clean house, clean area, clean city, clean India and finally clean world.

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CHALLENGES OF WASTE MANAGEMENT IN METROCITIES

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ABSTRACT

Ecosystem is affected by uneducated, unplanned and ineffective waste management. The cycle of garbage generation and recycling is effective to make the cities environment more pollution free, clean, green and habitable for healthy living. Solid waste management is one of the most challenging issues in metro cities.

The annual waste generation has been observed to increase in proportion to the rise in population and urbanization, and issues related to disposal have become challenging as more land is needed for the ultimate disposal of these solid wastes. Garbage generation is growing even faster than the rate of urbanization. Ten years ago there were 2.9billion urban residents who generated about 0.64 kg of MSW per person per day (0.68billion tones per year) . It is estimated that today amounts have increased to about 3billion resident generating 1.2 kg per person per day.

The waste occurs in many different forms in state of solid, liquid and gaseous (Inorganic and Organic). This generated garbage is hazardous and harmful to environment, human health and food chain.

Waste management is the "generation, prevention, characterization, monitoring and treatment of various forms of waste generated.

Waste management includes some methods to manage the wastes in metro cities. First the waste collected in community bins by pickers and it is then transported to segregation and then for procession. Procession includes methods like Recycling, Disposal, Composting, management, By vermicompost, Minimization and so on. If the 100% of waste should collected, transported and recycled. By this we can reach better economy, no waste and reuse of products.

STUDY OF HOUSEHOLD WASTE MANAGEMENT

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ABSTRACT

The amount of waste generated by humans in daily life has increased steadily in relation to our population and economy. According to Environment Agency, 90% of resources we consume are either thrown away as 'waste' or discarded into the environment as effluent or air emissions. Management of certain waste has become a complex area, legally, technically and commercially. But we conceive that "Saving the world begins at home". We must know how our own activities might impact the environment. So, the present study focuses on preventing the production of household waste through waste minimisation and reuse through recycling. It can be achieved only by better decisions about what we buy and how we dispose it, that helps to protect the environment.

RECYCLING OF WASTE PRODUCTS

"Preparation of Dyes from Tea Decoction and Its Effect on Different Fabrics"

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ABSTRACT

Recycling is a key component of modern waste reduction and is the third component of the "Reduce, Reuse and Recycle" waste hierarchy. Use of waste products for extraction of dyes in textile coloration is gaining popularity all over the world during the last decade. A dye is a colored substance that has an affinity to the substance to which it is being applied the clothing were dyed with natural dye substrates.In this study, it is planned to prepare dye from tea decoction and its effect on different fabrics. The products were characterized by FTIR and UV-Visible spectrophotometers. The antibacterial activities of the compounds were studied using gram-positive and gram negative microorganism.

MANAGING AND DISPOSING OF MEDICAL WASTE

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ABSTRACT

Increased Human activity and use of disposables has caused increased Generation of waste. Biomedical waste is one such waste particularly important because of its infective nature.Biomedical waste (BMW) is any waste which is generated during the Diagnosis. Treatment or immunization of human being or animals or in research activities pertaining there to or in the production of or testing of Biological(made from organism or microorganism or products of metabolism) materials.Hospital waste implies that BMW which is generated during any form of health care from establishment namely Hospitals,Nersing Home,Clinical Laborateries,Radiological establishment etc. Hospital waste is generated by Doctors, paramedicals, Patients etc. The management of Hospital waste is an important element in providing quality health care. Improper handlings of Hospital waste have several risks. Awarenes, should be created among the people about the Hospital waste and there co-operation.

KEY WORDS:

Disposables, Infective nature, Biomedical waste, Biological materials.

GLOBAL WASTE MANAGEMENT

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ABSTRACT

World is a global village, and our earth is so beautiful. But we are making it Ugly by generating waste. Waste means unwanted or useless materials. It is also known as garbage, trash, junk and ort. Waste is created by the consumption habits of modern lifestyle, and industrializations has producing wastes.

Objectives of research paper:

1. To reduce waste, recycle, and reuse.
2. To create public awareness on waste management.
3. To maintain closer relation between government, industry and people.
4. To protect environment, animals, and ecosystem.

Challenges of waste management in metro cities:

Mumbai, Delhi,Culcatta, Chennai and Bengalooru.

IN MUMBAI:

- 2300 crore budget expenditure for solid waste management.
- 1, 60,000 metric tons solid waste we can see in Mumbai.
- Each home min 200gm to 600gm/ day garbage outgoing.
- Problem of availability of space for dumping and perishing wastes.

Impact of waste management on global warming & green house effects:

1) To raise see level and changes in local climate conditions.
2) Affects on forests, crop fields and water supplies.
3) Damage to Ozone layer and National parks to be permanently altered.
4) Affects human health and animals.

What should be done?

1) Donate old books, old cloths, old computers.
2) Educate the people to control on waste by conferences.
3) Reduce, Reuse, And Recycle.
4) Awareness should be created by sports events like marathons.

SOURCES:

- News papers
- YouTube
- Personal investigation.

CONCLUSION:

If we are not arise, awake regarding waste management soon life we will end our life.

AIMING FOR BIODEGRADABLE & ECOFRIENDLY PLASTICS

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Abstract

Biodegradation is the Chemical dissolution of materials by bacteria or other biological means. Although often conflated, biodegradable is distinct in meaning from compostable. While biodegradable simply means to be consumed by microorganism & return to compound found in nature.

Biodegradation plastics is plastics that has been treated to be easily broken down by microorganism & return to nature. Many Technologies exists today that allow for such treatment. Currently there are some synthetic polymer that can be broken down by microorganism such as poly caprolactone, other are polyester & aromatic aliphatic ester, due to their ester bonds being succeptible to attack by water.

Some example of these bioderived poly-β-hydroxybutyrate the renewably derived polyacetic acid & synthetic polycaprolactone.

Key words: Biodegradation, synthetic polymer, microorganisms, bioderived.

RECYCLING OF WASTE PRODUCTS

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ABSTRACT

The compound liquids of interest in applications of rotary evaporation are research solvents that one desires to remove from a sample after an extraction, such as following a natural product of isolation or a step in an organic synthesis. Liquid solvents can be removed without excessive heating of what are often complex & sensitive solute combination. A rotary evaporator is a device used in chemical laboratories for the efficient & gentle removal of solvents from the samples by evaporation.To recover such a solvents from reactions, the one of the method used is "ROTARY EVAPORATION'. Rotary evaporation is most often & conveniently applied to separate low boiling solvents such as n-hexane or ethyl acetate from compounds which are solid at room temperature.

The direct disposal of solvents are hazardous to environmental & human being also. So this is the best method for recycling of solvent.

RECYCLING OF WASTE PRODUCTS

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ABSTRACT:

Materials that are not prime which cannot be further used. That is discarded by and individual, household or organization, includes the following types such as municipal waste, hazardous waste, biomedical waste, special hazardous waste(radioactive, explosive and e-waste).The effects of waste products are mainly on health and environment.

Waste reducation and converting it in new products preventing the waste of energy, pollution. Reduce, Reuse,Recycle are the three prime waste hierarchy.Recycling benefits our natural resources more over non renewable resources , saves energy by reducing the generation of a waste. One is truly recycling when he uses the recycled products.

Waste management is now tighly regulated in most developed countries and includes the generation, collection, processing, transport and disposal of waste in addition the remediation of waste is an important issue, to reduce hazardous substances.

CHALLENGES OF E – WASTE

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ABSTRACT:

E- waste describes discarded electrical or electronic devices. The used electronic which are destined for reuse, resale, recycling or disposal are also considered as E- waste. However every person concentrated towards his luxury life his needs are becoming more and more because of technology is becoming however he wants. E-Devices are one of them. For example we are changing our cell-phones every day. Exactly, then what about old one. Never thought, it's always been a question mark!!!!

The things come under e-wastes are official electronic equipments, discarded laboratory equipments, refrigerator and so on… Generally, computer equipments contain a comprehensive range of hazardous elements and substances such as cathode ray tubes with barium and lead oxide biologically active materials, chlorinated brominated substances, heavy metals such as lead & cadmium, mercury, and copper cables. The heavy metals exposed they may enter into soil, water, air which disturb environ there by creating much harm to food chain.

These we have to manage by some process like recycling: A lack of waste management means that more than 70% e-waste either goes to the landfill or is disposed of in the water. Enhancement in the production and maintenance process is necessary and it will significantly reduce the e-waste. Either all the dangerous substances that are used in the production can be replaced or quantity can be minimized. Moreover, it is quite important to evoke some strict production and maintenance regulations and companies should be instructed to abide by them.

Benefits of recycling aims to minimize dangers to human health and environment responsible recycling ensures best management practices of the electronics being recycled, worker health and safety. Hence recycled e – waste resoled and reused.

BIOTECHNOLOGICAL SOUUTION TO E-WASTE

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ABSTRACT

When the world is trying to solve the problems of agricultural waste, municipal waste, plastic waste, biomedical waste; a new type of waste is rapidly growing, and that is e-waste, including household appliances such as refrigerator, air conditioner, cellular phones, personal stereos and consumer electronics to computers. e - waste is the Hazardous Waste because of Toxic metals content, low recycling rate, causing human health problems, Environmental pollution. Keeping this view in mind in the present investigation an attempt has been made to remove metals form the E-waste using Bioleaching method. From experimental results it was found that bioleaching can be used efficiency as compared to pure culture of single organism. as metals are having inhibitory action on the growth of microorganisms, metals adapted culture effectively leach out the metals from electronic waste.

CHALLENGES OF WASTE MANAGEMENT IN METRO CITIES

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ABSTRACT

waste is an unavoidable byproduct of human activities. Economic development, urbanization and improving living standards in cities, have led to an increase in the quantity and complexity of generated waste. Rapid growth of population and industrialization degrades the urban environment and places serious stress on natural resources, which undetermines equitable and sustainable development inefficient management and disposal of solid waste. Municipal corporations of the developing countries are not able to handle increasing quantities of waste, which results in uncollected waste of roads and in other public places. There is a need to work towards a sustainable waste management systems, which requires Environmental, institutional, financial, economic and social sustainability. The purpose of Municipal Waste management system is to improve the present practices of in that prevail in many developing countries where it has received sufficient attention. The researcher has studied the Indian waste management and analyzed its scope for improvement with an objective was to understand the consumer behavior with respect to the services available in market for waste management.

Keywords : Waste management, Informal recycling industry, Public private partnership, Recycling.

Inaugural Function :
Presidential speech by
Dr. C. K. Kokate,
Vice-Chancellor,
K.L.E. University, Belagavi.

Valedictory Function :
Address by the Chief Guest,
Dr. I. M. Khazi,
Special Officer Academic & DPR
Karnataka University, Dharwad.

Engaged Scientific Minds in
the Technical Session


Technical Sessions


Technical Sessions


Delegates Opinion


Prize Distribution