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**Capacity Enhancement Programme
on Management of Plastics, Polymer
Waste and Bio-Polymers, Impact of
Plastics on Eco-System**

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Member - EC



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ICPE-ENVIS Co-ordinator

Mr. T. K. Bandopadhyay

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Designed By

Mr. Sudheer Khurana

Sr. Programme Officer



Editorial

We are happy to inform that a comprehensive Waste Management (MSW) system including the Management of All Types of Plastics Waste, has been set up in a residential colony in New Delhi. Initiatives were taken earlier in some parts of the country for disposal of biodegradable / food waste by composting or biomethanation methods. Dry Waste also has been segregated and forwarded to respective recyclers for recovery. However, to our knowledge, it is for the first time in India that a residential colony has implemented a system which can recycle all types of plastics waste within the colony itself, restricting its dumping in the landfill. In the two editions of ENVIS Eco-Echoes Newsletters, current and the previous, description of the system has been outlined. ICPE assisted the private organisation in selecting the Feedstock Recycling Plant and adopting the technology for scientific disposal of all types of plastics waste by converting it into useful products in an environmentally safe method.

This is a successful model of decentralization of the system of recycling and recovery of MSW in an urban area without sending the waste to the landfill. Green Planet Waste Management Pvt. Ltd. (GPWM), appointed by the All India Plastics Industries Association (AIPIA) and Plastic Manufacturers and Traders Association, Delhi (PMTA), with the technical guidance of ICPE, had undertaken the Extended Producers Responsibility (EPR) as envisaged in the Plastics Waste (Management & Handling) Rules, 2011 of the Ministry of Environment and Forests, GoI. National Building Construction Corporation Ltd, a Government of India Enterprise and the Ministry of Urban Development, GoI had taken initiative for setting up of the infrastructure of such a decentralized system of MSW Management in the heart of New Delhi. It is believed that successful sustenance of such system with the participation of all stakeholders could effectively resolve the waste management issues of our country.

A list of PET recyclers of India has been given in the Data Sheet. ICPE ENVIS Centre is in the process of collecting the information on recyclers of other types of plastics as well. Information collected so far has been uploaded in ICPE ENVIS website for the benefit of web visitors.

A brief report of the National Interaction-cum-Evaluation Workshop for Environmental Information System (ENVIS) Centres under the Ministry of Environment and Forests has been published in this edition. Experts attending this Workshop commented that information available on the ENVIS Centres' Websites is mind-boggling. They observed that it is one of the biggest repositories of environmental information, anywhere in the world, even in its existing form. The efforts are on to upgrade it continuously over time to become a National Knowledge Mission and Virtual Library. There are various stakeholders who depend on these information/ knowledge products provided by ENVIS on Environmental Information System. For more information, the Editor may be contacted.

Subscription Information:

ENVIS is sent free of cost to all those interested in the information on Plastics and Environment.

Readers are welcome to send their suggestions, contributions, articles, case studies, and new developments for publication in the Newsletter to the ICPE-ENVIS address.

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Editor

Mr. T. K. Bandopadhyay

LCA of Plastic Packaging

A Holistic Yardstick of Environmental Performance



As the population of the world grows, so does the demand for resources to meet the requirements of our people. It is estimated by year 2050, we could be 9 billion people living on this planet and if we consume our resources, our minerals, our materials at the same rate as we do today, we will not be able to meet our people's requirements or meet their aspirations and help them improve their quality of life.

One of the benefits of globalisation in this century is irrespective of where the goods are produced; their availability is facilitated in any part of the world due to tremendous improvement in packaging. Our scientists, engineers and researchers, have in the middle of the last century, helped us find a versatile new material called 'plastic' which is, today, being extensively used as a packaging medium for thousands of applications.

Use of LCA provides credibility to the marketing claims and reputation of the company as a responsible part of society which implies the company, besides making profits, cares for the planet and the environment by its efforts and actions thereby minimising its eco footprints.

Vijay Merchant
Director, Polycraft, Mumbai

This material primarily produced from hydrocarbons with properties that can be tailor-made, has helped replace traditional packaging materials like glass, paper, jute and metal. However, due to such extensive uses, the common man, who is today much better educated than he was 50 years ago, sees a lot of plastic packaging in his daily life. He often becomes a critic of plastic packaging, seeing it is as a waste after it has performed its primary function of product protection.

Growing Concern to Protect Our Planet

Since sustainability has become an extremely important challenge for governments, international bodies like UNEP and groups like G20, there is growing pressure to work towards protection of our planet. There is now mounting pressure on brand owners, retail giants, producers of consumer goods and marketing experts to communicate to masses that although they are doing business, they are also acting responsibly and their packaging is 'green and helps protect the earth we live on'.

What is an Objective Way to Judge Green Claims

On account of the growing demands of enlightened consumers, one sees a widerange of claims being made by corporations and business houses. Companies claim their

packaging is greener, lighter, or they have reduced packaging, or offer recyclable packs, or packs made from recycled materials, energy efficient, less polluting etc. So, how does the common man or the environmentalist, or even the corporation weigh all the qualities to know which pack helps us minimise our eco footprint.

The answer to this is now offered by Life Cycle Analysis (LCA).

Life Cycle Analysis

The LCA perspective of a pack is a comprehensive evaluation of the environmental and human health impact and enables us to objectively assess how one pack is environmentally more preferable than another. Examples of some pack comparisons can be glass milk bottle v/s poly pouch, pickle jar v/s stand up pouch, jute sacks for grains v/s HDPE bags, paper cement bags v/s PP woven bags, cartons for drink bottles v/s shrink wraps. We now have ISO 14040 series as a guidance in this comprehensive assessment to go by.

Structuring the LCA Study

In brief, how the LCA process can be used by corporations and businesses to evaluate which pack is greener is as follows:

- Define objectives and systems
- Inventory of resources and emissions
- Impact assessment

Next would be interpretation of the data tabulated.

Finally, use of this for package design and development, its improvement and strategic corporate plan and execution.

In this, one of the very important and challenging tasks is that of 'LCA Inventory'. Considerable data inputs need to be collected in detail of resources and emissions in all four stages of the pack (raw material to final disposal) to finally compile the inventory with accurate figures of resource usage and emissions,

- In raw material production including extraction
- During pack production, processing etc.
- During pack transport and use
- At the pack's end-of-life



Table 1: Impact Assessment (Packing per 100 g of Coffee) in the Base Case Scenario

Impact Category	Unit	Glass Jar	Pouch
Global Warming	Kg CO ₂ Eq.	0.40	0.10
Non-renewable Energy	MJ Primary	7.35	2.01
Water use	L	6.42	2.20

The LCA perspective of a pack is a comprehensive evaluation of the environmental and human health impact and enables us to objectively assess how one pack is environmentally more preferable than another.

Once the corporation has the complete LCA data, experts from the Designing team along with the Marketing team get involved to decide the choice of materials, supply chain operations, material weight, impact of logistics and finally, the end-of-life management such as recycling, disposal etc.

Today, we have access on the net to some very well conducted LCA studies of packs. One such study is by REMIT University Center for Design, commissioned by Nestle, for its overall coffee pack improvement strategies. This has helped Nestle change its coffee pack from traditional glass jars to laminated pouches in some of its developing markets.

Extract from the REMIT University Study for Nescafe

The characterised impact assessment (packing per 100 g of coffee) in the base case scenario is as tabulated in Table 1.

For the laminate pouch packaging system, relative to the glass jar packaging system, impact reductions in the base case are:

- 75% for global warming potential
- 73% for non-renewable energy
- 66% for water use (non- turbined)

The Switch

India were the pioneers in switching from glass milk bottles to polythene pouches several decades ago; although in the last 3 years, we see several European countries switching from glass or HDPE bottles to poly-pouches for milk retailing. Such switches not only reduce eco footprint, but also cost of packs and enable smoother sustainable delivery systems. Another example from India has been for pickles. The shift from glass jars to multilayer stand-up pouches and now, tomato ketchups has served not only local, but also many overseas markets very well due to significant weight saving, reduced energy consumption during transport, elimination of wastage during breakages etc.



The fact is, since 1970, LCA has been practiced and standardised through several organisations like SETAC and ISO; but has gained momentum recently. Systematic LCA studies by several institutions examine the 'inputs' i.e. resources and energy and 'outputs' i.e. emissions, water effluents and solid wastes of each pack under study to enable companies and FMCG giants to finally make the best pack selection which is sustainable.

Conclusion

In conclusion, it can be said that LCA is a method used for evaluation of a pack with alternatives which provides a systems approach to examining environmental factors. It gives a scientific basis to responsible environmental decisions in designing of the pack or its improvement. LCA helps those using it to better understand trade-offs and identify where in a package life cycle, greatest environmental burdens occur. Ultimately, use of LCA provides credibility to the marketing claims and reputation of the company as a responsible part of society which implies the company, besides making profits, cares for the planet and the environment by its efforts and actions thereby minimising its eco footprints.

Author is a Member- Governing Council, ICPE. The Article was published earlier in the Magazine of Indian Institute of Packaging.

National ENVIS Interaction - Cum -Evaluation Workshop of MoEF at Gangtok, Sikkim from 28th to 30th March, 2014

A three-day National Interaction-cum-Evaluation Workshop for Environmental Information System (ENVIS) Centres was organized by the State Council of Science & Technology for Sikkim (SCSTS), Gangtok on behalf of M/o of Environment & Forests (MoEF), at Chintan Bhavan, Gangtok, Sikkim. 36 Thematic ENVIS Centres and 21 State/ UT ENVIS Centres participated in the Workshop. Shri A.K. Srivastava, Chief Secretary, State Government of Sikkim (GoS) graced the function as the Chief Guest. He stressed on protection of environment and need to have strong institutional instrument that can serve as a repository of database and information, which the ENVIS Centres are appropriately poised to serve as. Shri S.K. Shilal, Secretary, Department of Science, Technology and Climate Change, GoS, Shri Abhay Kumar, Dy Economic Advisor, MoEF, GoI, Shri B. Brahma, Senior Adviser, MoEF, GoI, Shri Arvind Kumar,

Principal Secretary-cum-PCCF, Forests, Environment and Wildlife Management Department, Shri M.G. Kiran, Principal Secretary, Home Department and Evaluation, GoS, and experts from different central universities and institutions also participated in the occasion. Experts attending this Workshop commented that information available on different ENVIS Websites is mind-boggling. They observed that it is one of the biggest repositories of environmental information, anywhere in the world, even in its existing form. The efforts should be to upgrade it continuously over time to become a National Knowledge Mission and Virtual Library. There are various stakeholders who depend on these information/ knowledge products provided by ENVIS on Environmental Information System. Ms. Vandana Aggarwal, Economic Adviser, MoEF and Head, ENVIS Scheme, assured that she would do everything possible to improve the output quality of ENVIS system.



Plastics Waste Management Project at New Moti Baugh Colony, Delhi

ICPE has taken up a project for comprehensive Management of Municipal Solid Waste generated in a medium size residential colony – New Moti Baugh Colony, New Delhi, along with a private partner – Green Planet Waste Management (Pvt) Ltd. The project is supported and assisted by National Building Construction Corporation Ltd (NBCC), a Government of India Enterprise.

Brief of the activities were published in the Oct – Dec addition of the ENVIS Eco – Echoes Newsletter. While a Composting Plant to convert Organic and Kitchen waste into manure and a Horticulture / Green waste Treatment plant to convert all kinds of grass, plant leaves, twigs etc into Energy Pellets (green coal) was already installed in the Colony earlier, a Plastics Waste to Fuel conversion plant was installed in April/May, 2014.

The Fuel Plant was formally inaugurated by Shri Sudheer Krishna, Secretary, Ministry of Urban Development, Government of India in the presence of Dr. A. K. Mittal, CMD – NBCC, Sh R. K. Aggarwal, GM – NBCC, Director General – CPWD and other officials of NBCC and NDMC. Shri P. K. Gupta – Executive Director, GAIL and his team and officials of IOC were also present.

The plant is based on pyrolysis technology and runs in batch process. The batch capacity is 50 Kgs. The technology helps in converting all types of synthetic polymers into liquid hydrocarbon fuel and LPG range gas at a temperature range of 150 - 450° C with the help of a unique pyro-cracking catalyst developed and patented by the technology provider. A special characteristic of the technology is that the volatile gases from the heated polymer react with the catalyst which is packed in a cartridge placed outside the reactor. This, as per the technology provider, ensures greater safety of the whole reaction process. The gas generated during the process burns with a blue flame and can be used for domestic cooking purpose. The residue after pyro-cracking is a mixture of carbonaceous material along with some

percentage of inorganic debris. This residual material has sizable calorific value and could be used as solid fuel similar to coke. Any metal part which was embedded in the plastic waste product, would settle down at the bottom of the reactor to be collected separately at the end of the reaction. The conversion rate depends on the type of plastic waste. Typical conversion rates are:

Liquid Fuel	25 – 80 %
LPG range Gas	15 – 50 %
Soil Fuel	05 – 25 %

Some amount of water vapour formed during the reaction process evaporates while collecting the fuel. Polyethylene and Polypropylene gives highest conversion rate to fuel while polyester gives low conversion. By mixing different types of plastics together, the optimum conversion could be achieved. No untoward VOC's are emitted in the surrounding environment.

The hydrocarbon fuel is in the range of Light Diesel Oil (LDO) and can be used in boilers, transformers, generators etc. Gross calorific value of the fuel is around 10, 500 cal/G. Normally rigid plastics waste like bottles, jerry cans, broken buckets etc are mechanically recycled in plants located at industrial areas. The packaging films – mostly multi layered films and Thermocole (Expanded Polystyrene) materials which are abandoned by the mechanical recyclers, are put into such Waste to Fuel plant for scientific disposal. It is observed that average quantity of multilayered and other film waste and Thermocole waste generated in the colony is around 15 to 20 Kgs / per day, which is fully converted to fuel. At present no plastics waste (and no MSW) generated in this Colony, goes to the Landfill!



Shri Sudheer Krishna, Secretary, Ministry of Urban Development, Government of India inaugurating the Plastics Waste to Fuel Plant at New Moti Baugh Colony, New Delhi



The Plastics Waste to Fuel Plant in operation at the Project Site

SABIC Waste-Free Environment event emphasises Environment-Friendly Plastics



600 SABIC employees and their families joined in the launch of the 2014 Waste Free Environment initiative in Riyadh on February 20.

Riyadh, February 20, 2014

The initiative, conducted in collaboration with the Gulf Petrochemicals and Chemicals Association (GPCA), unites nine cities across the Gulf including three in Saudi Arabia - Riyadh, Jubail and Jeddah. In addition to SABIC employees and their families, the Waste Free Environment initiative involves the participation of volunteers from government agencies, schools, and NGOs with an interest in environmental issues.

The launch event in Riyadh included an exhibition, awareness lectures and entertainment activities to emphasize the importance of environment preservation as well as a clean-up exercise in the Thumamah area. Total participation in the 2014 Waste Free Environment initiative is estimated to have more than trebled in comparison to the 2,500 people who participated in 2103. Last year's campaign resulted in the collection of 10,000 kg of waste, of which 35% was recycled.

"The harmonization of industrial development and environment preservation is essential to achieve the pillars of sustainable development at SABIC," said Prince Saud

bin Abdullah bin Thunayan Al-Saud, Chairman of the Royal Commission for Jubail and Yanbu and Chairman of SABIC. "Waste disposal is the responsibility of every citizen, as it plays a significant role in promoting the team spirit culture that helps keep our environment intact." According to data collected by GPCA, no more than 10% of plastic material is recycled in the Gulf region, while plastic waste constitutes 26 million tons of the total 80 million tons of waste produced in GCC countries annually.

Recycling plastic waste enhances the economic value of the material and contributes to the local economy. Using plastic in place of other conventional materials such as wood or aluminium can help reduce CO2 emissions and limit its dangers to the environment. Recycling ten 600 ml plastic bottles saves enough energy to operate a laptop for over 25 hours. SABIC's participation in the event is a part of the company's ongoing effort to enhance awareness among local communities about the recycling of waste, especially plastic waste, and promote a broader awareness of the value of plastic products.

"The Waste-Free Environment campaign highlights SABIC's commitment to producing more sustainable plastics," said Mohamed Al-Mady, SABIC Vice Chairman and CEO. "As a leading plastics manufacturer, SABIC has a major role to play in raising public awareness about the societal benefits resulting from the responsible consumption of plastic products." "The positive response of SABIC employees and their families toward this initiative reflects the extent of their eagerness to contribute to the protection of the environment," he added.

Source: http://www.zawya.com/story/SABIC_WasteFree_Environment_event_emphasises_environmentfriendly_plastics-ZAWYA20140220151218/

PMC to Push for Waste Segregation in All Housing Societies

Municipal commissioner Vikas Deshmukh, stressing on better waste management, said citizens must be made aware about segregation of waste. Along with the municipal commissioner, additional municipal commissioner, Rajendra Jagtap, zonal commissioner Suresh Jagtap and mayor Chanchala Kodre met representatives of the National Society for Clean Cities (NSCC) and other citizens on Saturday evening to discuss issues of waste management in the city.

Civic officials emphasized that segregation at source is the only solution. Currently, it is mandatory for societies built after 2000 to enable segregation of waste at source. "It will be made mandatory for all housing societies soon," he added.

Pune generates around 1,500 tonne of waste each day, but the existing waste management plants are unable to run at full capacity. The citizens' group and the municipal authorities also discussed solutions to tackle other issues of solid waste management and contracts had not been renewed for sweeping the streets. Civic officials said by the end of May, these contracts will be renewed. The civic officials also said that the city would be made container free - no waste would be seen lying around stationary containers, but collected from homes.

There would be incentives for people who would be paid for their compost or wet waste and that garden waste would be collected on fixed days from houses. "The PMC is working towards a Rs650-crore project for complete treatment of sewage," said Deshmukh.

Source: <http://timesofindia.indiatimes.com/city/pune/PMC-to-push-for-waste-segregation-in-all-housing-societies/articleshow/34016088.cms>

Awareness Programmes at Pillai's College of Education and Research, Anjuman-I-Islam Jr. College & Pawar Public School Mumbai on 13th, 17th January & 14th February, 2014

ICPE regularly conducts awareness programmes in schools and colleges with emphasis on developing right attitude towards plastics in general and encouraging the students to inculcate the habit of anti-littering and segregation of waste at homes (source) into Dry and Wet to facilitate solid waste management. In 2013 -14 Academic Session, ICPE had organized about 50 sessions of Awareness Programmes among the students and teachers of schools and colleges in and around Mumbai. About 10000 students including about 300 teachers of 25 schools and colleges were covered under the programme.

In this regard ICPE had engaged Ms. Kalpana Andhare, experienced representative of NGO – Stree Mukti Sanghathana, for conducting the Programmes.

The school and college principals appreciated ICPE effort for organizing such awareness programmes among the students. Students, on their part, also responded well to the programmes. The most frequent observations made by the students across various schools was “even if we segregate the waste at homes, Municipality waste collecting vehicles mix up the same and take everything together to the landfill”. Students are pacified that our continuous follow up with the civic bodies for abiding the Rules could bring about the required change. Teachers undertaking B. Ed. Course also found the programme useful.

The present design of ICPE School Programme is more suitable for students of programmes for primary section students.



Pillai's College of Education and Research



Anjuman-I-Islam Jr. College



Pawar Public School

**Awareness Programmes at
Sharad Pawar International School & A.K.Joshi School
IES's Navi Mumbai High School Mumbai
on 06th, 07th & 10th January, 2014**



IES's Navi Mumbai High School



Sharad Pawar International School



A.K.Joshi School



DATA SHEET

List of PET Recyclers - All India

Sno.	Name of the Company	Address
1	Ganesh Polytex Ltd	Raipur (Raina) Kalpi Road, Kanpur- Dehat, Uttar Pradesh, India
	Ganesh Polytex Ltd	Plot No.6, Sector 2, I.I.E, Patnagar, Rudrapur, Distt. U.S.Nagar, Uttranchal, India
2	Shiva Textfabs Ltd	Village Iraq, Tehsil Machiwada, Dist Ludhiana, Punjab
	Shiva Textfabs Ltd (KK Fibre)	Village Mauza Rampur Jattan, Tahsil- Nahan Road, Sirmour, Kaleamb, Hiamachal Pradesh
3	Renaissance Corp Ltd. (Former Name - Divine)	Survey No 445, Village & Post- Bhimasar, Anjar Road, Talkua Anjar, Dist.Kutch, Gujarat
4	Rishisraj Filamnent Ltd	Survey No 45-47, Kumbivali Savreoli, Khaparpada Road, Kalapur, Dist. Raigad, Maharashtra
5	Arora Fibres Ltd	Survey No 213, Piparia Industrial Estate, Dadra & Nagar Haveli, Silvassa - 396230
6	Agarwal Polyfill Pvt Ltd	Village & PO Chanderpur, Bagnan, Dist Howrah, Kolkotta
7	Nirmal Fibres	3rd km, Delhi- Gajrauala road, Gajrauala, J.P.Nagar, Moradabad, Uttar Pradesh
8	Polyole Fibre Ltd.	146, Village Dabhel, Opp Dabhel lake, Daman
9	Pacific Harish Ind. Ltd	Gut No. 522/B, Village Gonde Dumala,Taluka-Igatpuri, Dist. Nashik, Maharashtra
10	Alliance Fibres Pvt Ltd	Plot No 1 A, Block No. 200/2, Mota Borasara, Kim, Surat, Gujarat
11	Unitech Fibres	E-56/57, MIDC, Tarapur, Taluka- Palgarh, Dist- Thane, Maharashtra
12	Capitol Fibres Pvt. Ltd.	Gut No. 554, Village Gonde Dumala,Taluka-Igatpuri, Dist. Nashik, Maharashtra
13	Bhavesh Polymer	Gate No 162, Rajrajeshwari Road, MIDC, Malegoan, Sinner, Nashik- 4220103, Maharashtra
14	Tejaria	Plot No - SP-1- 2315 & 2316, Riico industrial Area, Ramchandrapura, Sitapura Extn., Jaipur- 302022
15	Obeettee	Plot No- 1 A, Sector- 2, IIE, Pantnagar, Rudrapur Distt: Udham Singh Nagar,Uttarakhand-263153
16	Amicotex	Village Bir Plassi Ropar Road Nalagarh Dist. Solan (H.P.)
17	Futura Polyester Ltd	1, Kamarajar Salai, Manali, Chennai - 600068, India
18	Pashupati Fibres	Gram Hariyawala-Konda Road, Nr Primary School-Kashipur, Uttrakhand -244713
19	Allied Fibre	130-131, Nand nagar Indl. Estate, Phase II, Village Mahua Khera Ganj, Kashipur Uttarakhand
20	Himalaya Fibres Ltd	Nalagarh Road, N-H-21, Near truck Union Baddi, Tah- Nalagarh, Dist. Solan, Himachal Pradesh
21	Mahalaxmi Spintex Pvt Ltd	118/2/2 baddi, Village Katha, Dist. Solan, Himachal Pradesh

THINK Before You THROW

How to dispose waste wisely.

At Household Level

- Keep two waste bins or even two plastics garbage bags.
- Think and throw Dry Waste into one and Wet waste into the other.
- Instruct your sweeper to handle them separately.



At Society / Building Level

- Instruct the Sweeper to keep the collected Dry Waste and Wet Waste Separately.
- Construct two separate areas to store Wet Waste and Dry Waste.
- Local Municipality authority would arrange to collect the Dry Waste and Wet Waste

What is Dry Waste: Consists of plastics, paper, glass, cloth, rubber, metal, etc., i.e., all recyclable material. This forms nearly 70% of the volume of waste

What is Wet Waste: Consists of garden waste, kitchen waste such as fruit and vegetable peels, egg shells, tea leaves etc., i.e. all bio-degradable material

IT'S SMART TO SEGREGATE WASTE

because the waste generated in households, consists of

Dry Waste and Wet Waste

Most of the Dry Waste can be recycled for manufacturing useful items.

Wet Waste Can be composted / vermiculated to make manure for growing plants.

***Do it - For the Sake of our Environment
Do it - Because it is now the LAW!***

Issued in the Public Interest by

Indian Centre for Plastics in the Environment in association with NGO'S, Plastics Associations and Responsible Citizens like you.



Indian Centre For Plastics in the Environment

(An Autonomous National Body Registered Under Societies Act)

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